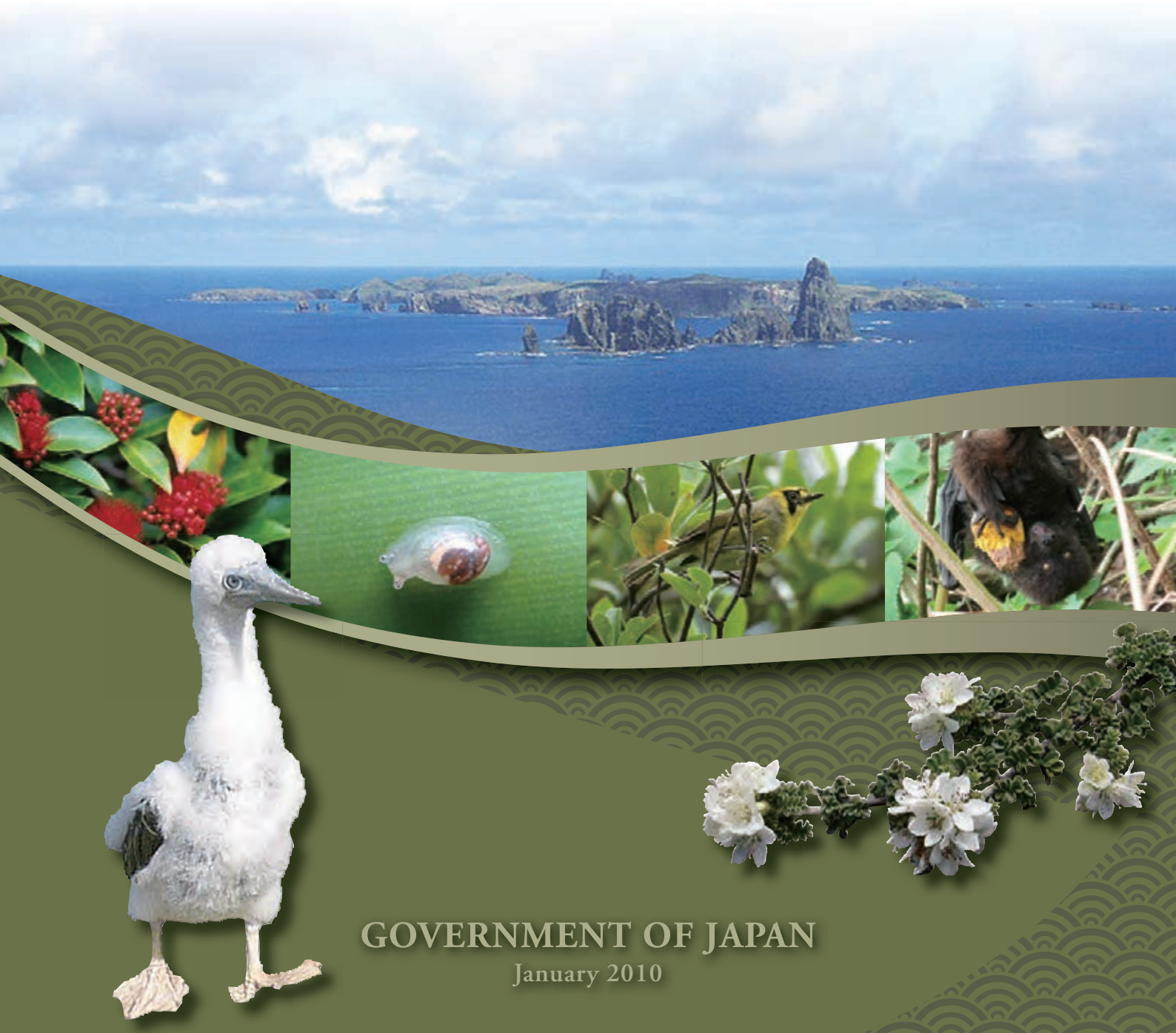
Nomination of the

# OGASAWARA ISLANDS

for Inscription on the World Heritage List

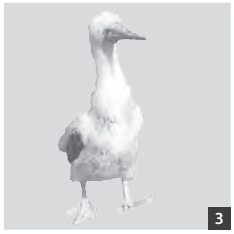


GOVERNMENT OF JAPAN

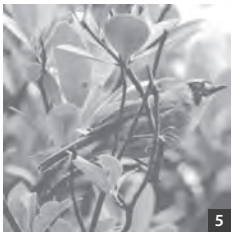
January 2010







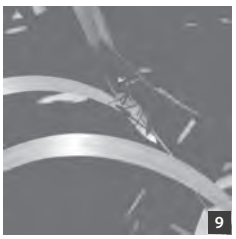



















1. **Mukojima Island Group** *Hideo Maruoka*
2. ***Osteomeles lanata*** *Masaaki Takiguchi*
3. ***Sula leucogaster*** *Masaaki Takiguchi*
4. ***Pteropus pselaphon*** *Hidetoshi Kato*
5. ***Apalopteron familiare*** *Akira Ozono*
6. ***Boninosuccinea ogasawarae*** *MOE*
7. ***Meterosideros boninensis*** *Takaya Yasui*
8. ***Metagoniochernes tomiyamai*** *Hideaki Mori*
9. ***Boninthemis insularis*** *Hideaki Mori*
10. ***Cryptoblepharus nigropunctatus*** *Mitsuhiko Toda*
11. ***Melastoma candidum* var. *alessandrense*** *Takaya Yasui*
12. ***Phoebastria nigripes*** *JWRC*

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## Country

Japan

## State, Province or Region

Tokyo

## Name of Property

Ogasawara Islands

## Geographical coordinates to the nearest second

The center point for the geographic coordinates:

N :25°59'5.32"  E :141°33'44.51"

The outer boundaries:

N:  24°13'28.87" -  27°44'41.76"

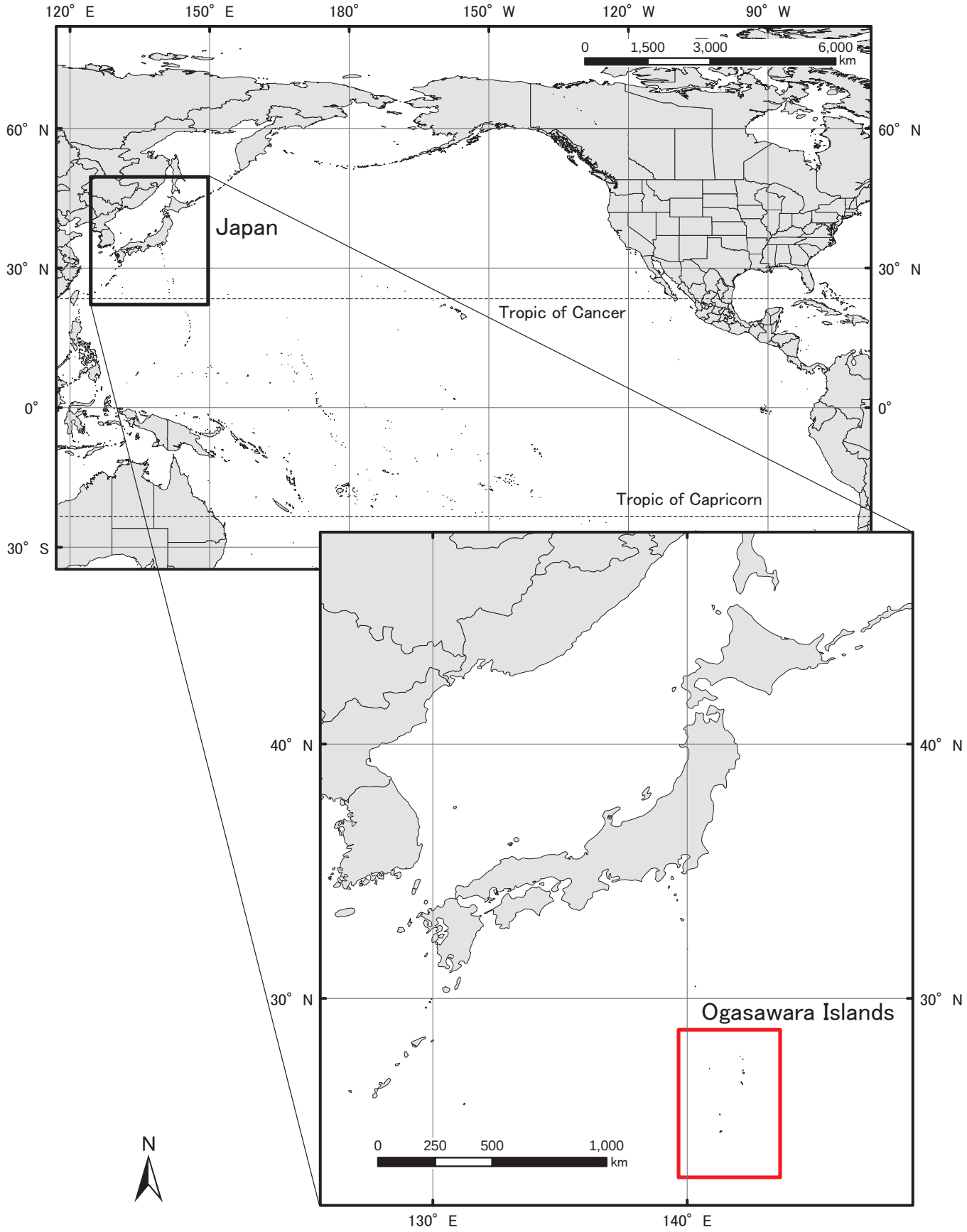
E : 140°52'20.87" - 142°15'  8.15"

## Textual description of the boundary of the nominated property

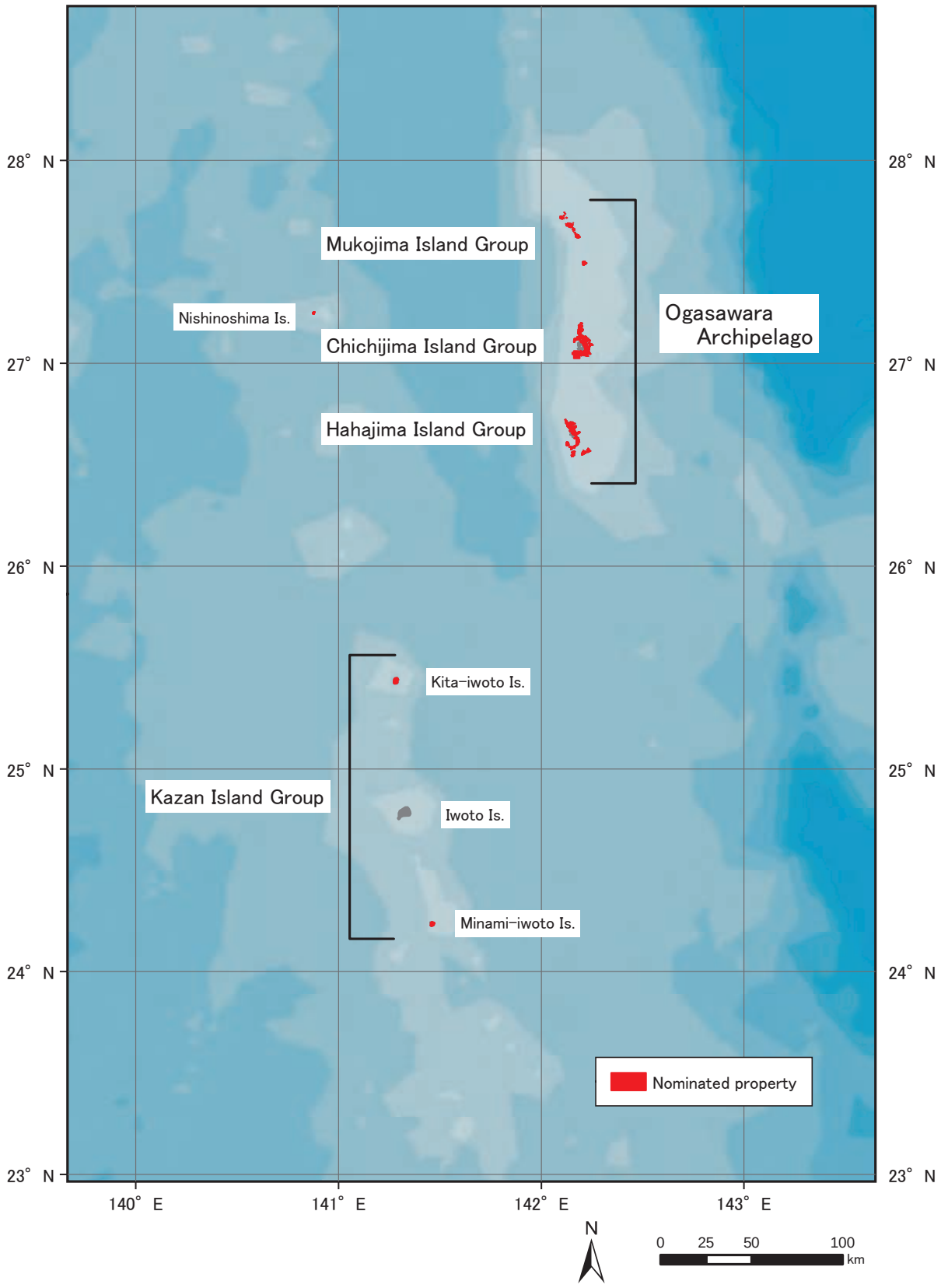
The nominated property is located in the western Pacific Ocean, to the north of the Tropic of Cancer and 1,000 km south of the main Japanese Archipelago. It extends about 400 km from north to south and comprises more than 30 small islands. The nominated property covers, from north to south, the three island groups of the Ogasawara Archipelago, which are: the Mukojima, Chichijima, and Hahajima Island Groups; Kita-iwoto and Minami-iwoto Islands, that are part of the Kazan Island Group; and the isolated Nishinoshima Island, which is situated to the west of Ogasawara Archipelago. The whole terrestrial area of the islands (except for some parts of Chichijima and Hahajima Islands), and some marine areas surrounding a part of Chichijima are included in the nominated property (see the map showing the boundary). The terrestrial area is about 6,358 ha, the marine area about 1,050 ha, and the total area is about 7,408 ha.



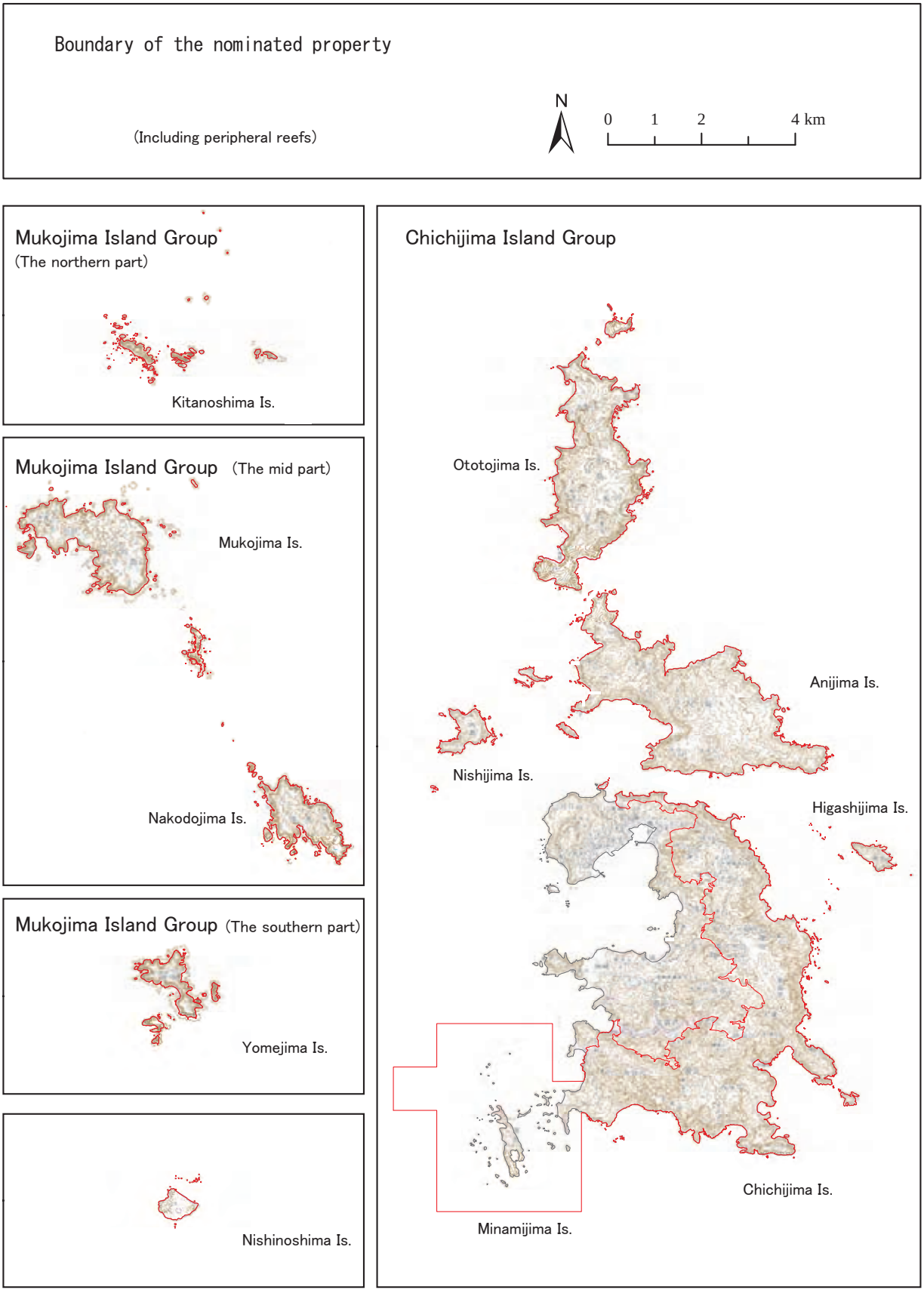
**Sclerophyllous scrub** *(photo:Hideo Maruoka)*



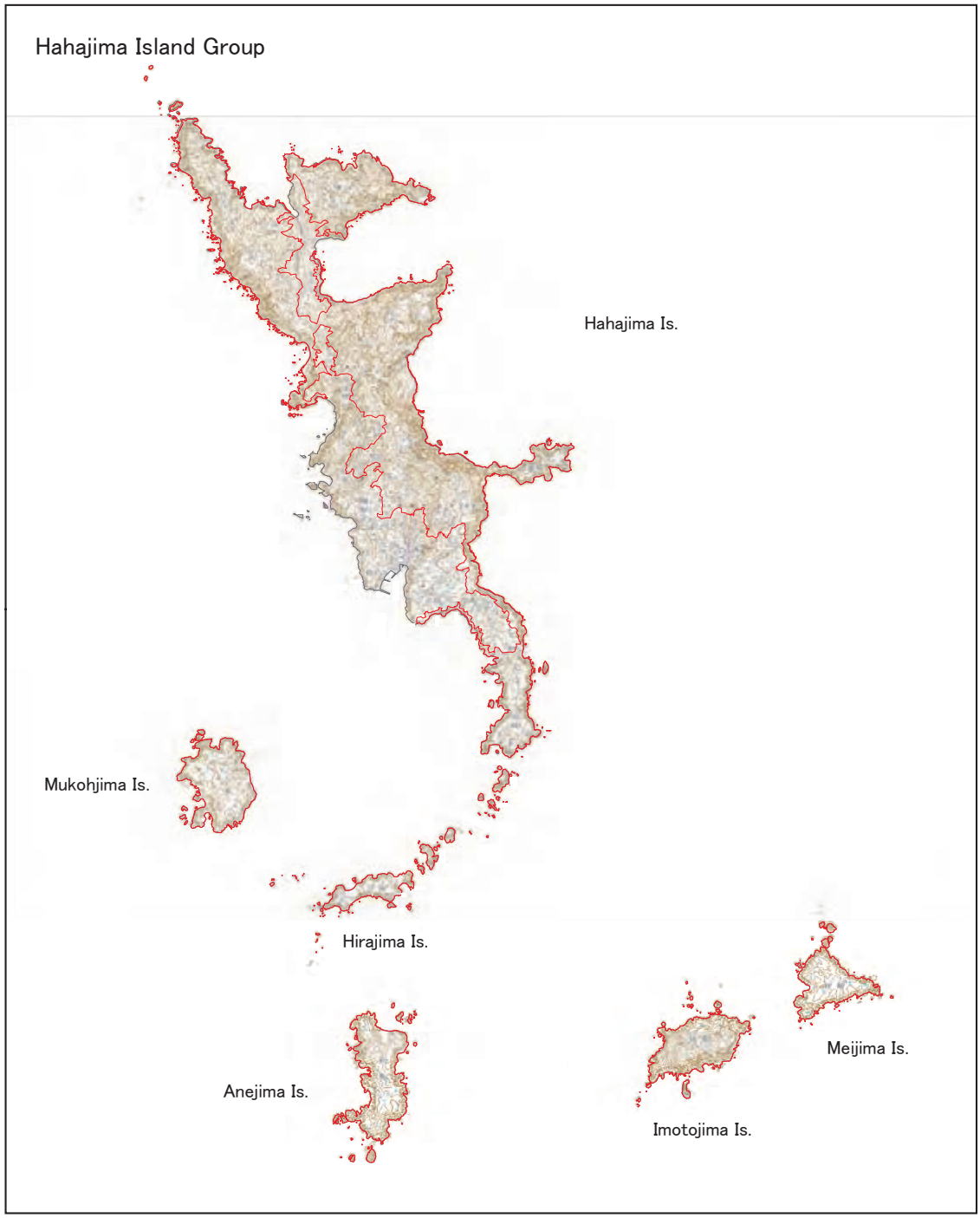

Location map of the nominated property in the Pacific Ocean

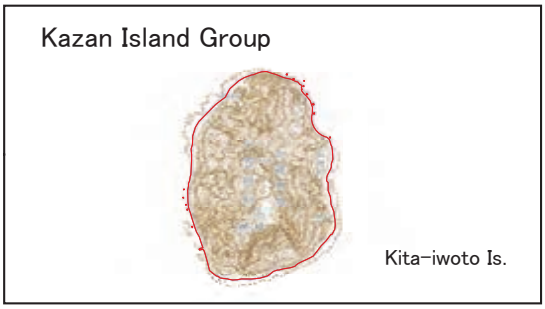


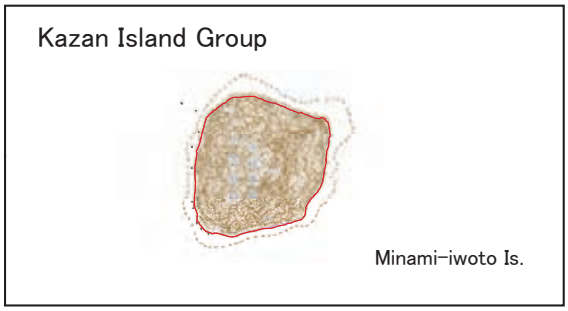

Location map of the nominated property




**Boundary of the nominated property**
**(Mukojima, Chichijima Island Groups and Nishinoshima)**
*(Source: 'Yokosuka' Geographic Information (1/25,000) of Geographical Survey Institute)*




**Boundary of the nominated property**
**(Hahajima Island Group, Kita-iwoto and Minami-iwoto)**
*(Source: 'Yokosuka' Geographic Information (1/25,000) of Geographical Survey Institute)*

## Justification - Statement of Outstanding Universal Value

The Ogasawara Islands are oceanic islands located 1,000 km away from the main islands of Japan. Geologically, the islands are unique in the world in that they provide a rare opportunity to directly observe, on land, the normally hard-to-observe phases of the development of an oceanic island arc. Their large areas of exposed rock strata tell the tectonic story from the beginning of plate subduction 48 million years ago, through transitional periods, and into a stable phase 40 million years ago. The islands are the subject of the world's latest research into the development of oceanic island arcs, and are extremely valuable from a scientific perspective in that they provide insights into the evolutionary history of the earth, especially the mechanisms behind the formation of continents.

Biologically and ecologically, the Ogasawara Islands are peculiar island ecosystems with many endemic species as a result of unique processes of adaptive radiation and speciation on the oceanic islands. The Ogasawara Islands preserve the typical characteristics of isolated oceanic islands, and offer the opportunity to witness the ongoing evolutionary process of speciation. They are also valuable as one of the few isolated land masses in the northwest Pacific region conserving globally significant species, making it very important to maintain this characteristic island ecosystem.

Thus, the Ogasawara Islands preserve a valuable source of information on the evolution of the earth and the life on it.

## Criteria under which property is nominated

The Ogasawara Islands are an oceanic island arc that formed on oceanic crust, far from any continent, and the property meets criteria (viii), (ix), and (x) as specified in paragraph 77 of the Operational Guidelines.

## Criterion (viii)

The Ogasawara Islands provide a unique insight into the initial phases of the process of continent formation, a process which repeatedly took place in the Earth's geological history. More specifically, this is a process whereby oceanic island arcs began to form and take shape in response to the initiation of subduction beneath an oceanic plate. A series of varying volcanic activities and magma compositions record the evolutionary process, from a juvenile oceanic arc to the establishment of a stable subduction zone with continental middle crust. The Ogasawara Islands are the only place on earth that preserve perfect exposures on land illustrating the evolution of an island arc over millions of years. As such, the islands

are an outstanding example of significant on-going geological processes. Today, this unique area continues to contribute to elucidating the mechanisms involved in continent formation throughout the earth's history.

## Criterion (ix)

On the Ogasawara Islands one can observe the process of unique speciation resulting from various mode of evolution, including long-term isolated evolution and adaptive radiation. Also, the biota of the islands have high level of endemism. The Ogasawara Islands are an outstanding biological example of ongoing evolutionary processes in oceanic island ecosystems. For example, outstanding examples of speciation through adaptive radiation are seen among the land snails. The various mode of speciation characteristic of evolution on oceanic islands are as well seen in the plant species. Furthermore, the Ogasawara Islands have some important examples which indicate how some marine species evolved into terrestrial species.

The islands also show some distinctive characteristics of oceanic island ecosystems, such as taxonomic disharmony. Also, the remote Minami-iwoto Island is still maintained in its precious pristine state. Because of all these interesting ecological characteristics of the Ogasawara Islands, research into evolutionary processes in oceanic islands are on-going in a wide range of biological fields.

## Criterion (x)

The Ogasawara Islands have a rich diversity of species of fauna and flora, including endemic ones within a very limited area of land. The islands provide habitats for many endangered species of global significance, and are invaluable for the conservation of biodiversity in the northwest Pacific region.

Even within the islands of the whole Ogasawara Archipelago, there are pronounced differences in ecological conditions. The diverse climatic conditions and topographical features have facilitated the formation of unique ecosystems for each island group. Also, the origins of biota reaching the Ogasawara Islands are quite diverse, including from Oceania, Southeast Asia, and the main island of Japan. Thus, a diverse biota has uniquely evolved in these isolated islands, and the Ogasawara Islands have a large number of species of fauna and flora per unit area of land, including many endemic and rare species.

The Ogasawara Islands also provide irreplaceable habitats for endangered species such as the Bonin flying fox (*Pteropus pselaphon*), the black-footed albatross (*Phoebastria nigripes*), an endemic dragonfly *Boninthemis insularis*, and an endemic land snail *Hirasea chichijimana*.

## Name and contact information of official local institution/agency

### ● Ogasawara Ranger Office for Nature Conservation, Ministry of the Environment

Address: 55-5 Nishi-machi, Chichijima, Ogasawara village, Tokyo 100-2101

TEL : +81- 4998-2-7174　FAX : +81- 4998-2-7175

E-mail : RO-OGASAWARA@env.go.jp

### ● Office of Ogasawara islands forest ecosystem conservation, Kanto Regional Forest Office, Forestry Agency

Address: Higashi-machi, Chichijima, Ogasawara village, Tokyo 100-2101

TEL : +81 - 4998-2-2103　FAX : +81 - 4998-2-2650

E-mail : ogasawara_postmaster@rinya.maff.go.jp

### ● National Forest Division, Ogasawara General Office, Ministry of Land, Infrastructure, Transport and Tourism

Address: Higashi-machi, Chichijima, Ogasawara village, Tokyo 100-2101

TEL : +81 - 4998-2-2103　FAX : +81 - 4998-2-2650

### ● Ogasawara Islands Branch Office, Tokyo Metropolitan Government

Address: Nishi-machi, Chichijima, Ogasawara village, Tokyo 100-2101

TEL : +81 - 4998-2-2123　FAX: +81 - 4998-2-2302

E-mail : S0000651@section.metro.tokyo.jp

Web address : http://www.soumu.metro.tokyo.jp/07ogasawara/index.htm

### ● Ogasawara Village

Address: Nishi-machi, Chichijima, Ogasawara village, Tokyo 100-2101

TEL : +81 - 4998-2-3111　FAX : +81 - 4998-2-3222

E-mail : kikaku@vill.ogasawara.tokyo.jp

Web address : http://www.vill.ogasawara.tokyo.jp

# 1

## *Identification of the Property*

1.a Country
1.b State, Province or Region
1.c Name of the Property
1.d Geographical coordinates to the nearest second
1.e Maps showing the boundaries of the nominated property
1.f Area of the nominated property



*Mandarina suenoae* (photo:Hideaki Mori)

## 1.a Country

Japan

## 1.b State, Province or Region

Tokyo

## 1.c Name of the Property

Ogasawara Islands

## 1.d Geographical coordinates to the nearest second

The "Ogasawara Islands" is a term that collectively refers to groups of islands located at the north of the Tropic of Cancer in the Western Pacific, 1,000 km south of the Japanese Archipelago. The islands comprise more than 30 islands extending about 400 km from north to south (Fig 1-1). They consist of the Ogasawara Archipelago, the Kazan Island Group and several isolated islands. The Ogasawara Archipelago is composed of the three island groups, i.e. Mukojima, Chichijima and Hahajima Island Groups, while the Kazan Island Group consists of Kita-iwoto Island, Iwoto Island, and Minami-iwoto Island.

The nominated property covers, from north to south, the Ogasawara Archipelago, Kita-iwoto and Minami-iwoto, and the isolated Nishinoshima Island, which is situated to the west of Ogasawara Archipelago (Fig. 1-2).

The location (latitude & longitude) and area of each element of the nominated property are shown in Table 1-1.

## 1.e Maps showing the boundaries of the nominated property

The nominated property covers areas with outstanding natural environments, such as outcrops of important rocks, ecosystems unique to the oceanic islands, and habitats of many endemic or rare species, that are protected by stringent legal protection regulations. The scope of the nominated property is shown in topographical maps (Figs. 1-3, 1-4) and the boundaries of protected areas are shown in Fig. 1-5.

## 1.f Area of the nominated property

The terrestrial area of the nominated property totals about 6,358 ha. The breakdown is as follows:

- Mukojima Island Group: 543 ha;
- Chichijima Island Group: 2,868 ha;
- Hahajima Island Group: 2,005 ha;
- Kazan Island Group: 912 ha;
- Nishinoshima and peripheral reefs: 30 ha.

The nominated property includes a marine area of about 1,050 ha. The total area of the nominated property is about 7,408 ha (Table 1-1).

Residential and some other areas on inhabited Chichijima and Hahajima are excluded from the nominated property. The nominated property represents approximately 60% and 70% of Chichijima and Hahajima in area respectively.

Areas surrounding the nominated property are under the regulations stipulated by the National Parks Law. Furthermore, the property, together with its outside areas, is being properly managed in accordance with the Ogasawara Islands Management Plan (hereinafter referred to as "Management Plan", see 5.e). For example, measures to prevent invasion by alien species are implemented in areas both inside and outside the nominated property. For this reason, the areas inside and outside of the nominated property within the scope of the Management Plan have been designated as the main scope of the Management Plan or the "World Heritage Management Area" (Fig. 1-6), instead of designating areas outside of the nominated property as buffer zones. The area is centered at the Ogasawara Archipelago with surrounding waters of three to five kilometers off the coast. The area occupies approximately 129,360 ha, including the nominated property.

**Table 1-1 Latitude / longitude and area of islands in the nominated property**

| Name of archipelago / island group | Name of island | Coordinates for the center point of the main island | | Area (ha) |
|---|---|---|---|---|
| | | Latitude | Longitude | |
| Ogasawara Archipelago | | | | |
| Mukojima Island Group | Kitanoshima and peripheral reefs | N27°43′06″ | E142°05′59″ | 34 |
| | Mukojima and peripheral reefs | N27°40′52″ | E142°08′20″ | 285 |
| | Nakodojima and peripheral reefs | N27°37′40″ | E142°10′42″ | 147 |
| | Yomejima and peripheral reefs | N27°29′47″ | E142°12′38″ | 77 |
| Subtotal | | N27°36′26″ | E142°09′18″ | 543 |
| Chichijima Island Group | Ototojima and peripheral reefs | N27°09′59″ | E142°11′27″ | 536 |
| | Anijima and peripheral reefs | N27°07′21″ | E142°12′35″ | 812 |
| | Some parts of Chichijima and peripheral reefs | N27°04'12″ | E142°12'33″ | 1,410 |
| | Nishijima and peripheral reefs | N27°07'02″ | E142°10'00″ | 51 |
| | Higashijima and peripheral reefs | N27°05'36″ | E142°14'42″ | 26 |
| | Minamijima and peripheral reefs | N27°02'18″ | E142°10'30″ | 33 |
| | Marine area | | | 1,050 |
| Subtotal | | N27°06'08″ | E142°12'21″ | 3,918 |
| Hahajima Island Group | Some parts of Hahajima and peripheral reefs | N26°40'01″ | E142°09'20″ | 1,419 |
| | Mukohjima and peripheral reefs | N26°36'11″ | E142°07'47″ | 144 |
| | Hirajima and peripheral reefs | N26°35'07″ | E142°09'18″ | 64 |
| | Meijima and peripheral reefs | N26°34'10″ | E142°13'54″ | 94 |
| | Anejima and peripheral reefs | N26°33'15″ | E142°09'23″ | 153 |
| | Imotojima and peripheral reefs | N26°33'33″ | E142°12'35″ | 131 |
| Subtotal | | N26°36'38″ | E142°10'50″ | 2,005 |
| Total | | N27°08'10″ | E142°10'21″ | 6,466 |
| Kazan Island Group | Kita-iwoto and peripheral reefs | N25°25'60″ | E141°16'56″ | 557 |
| | Minami-iwoto | N24°14'06″ | E141°27'45″ | 355 |
| Total | | N24°50'03″ | E141°22'21″ | 912 |
| | Nishinoshima and peripheral reefs | N27°14'48″ | E140°52'33″ | 30 |
| Whole Ogasawara Islands | | | | 7,408 |

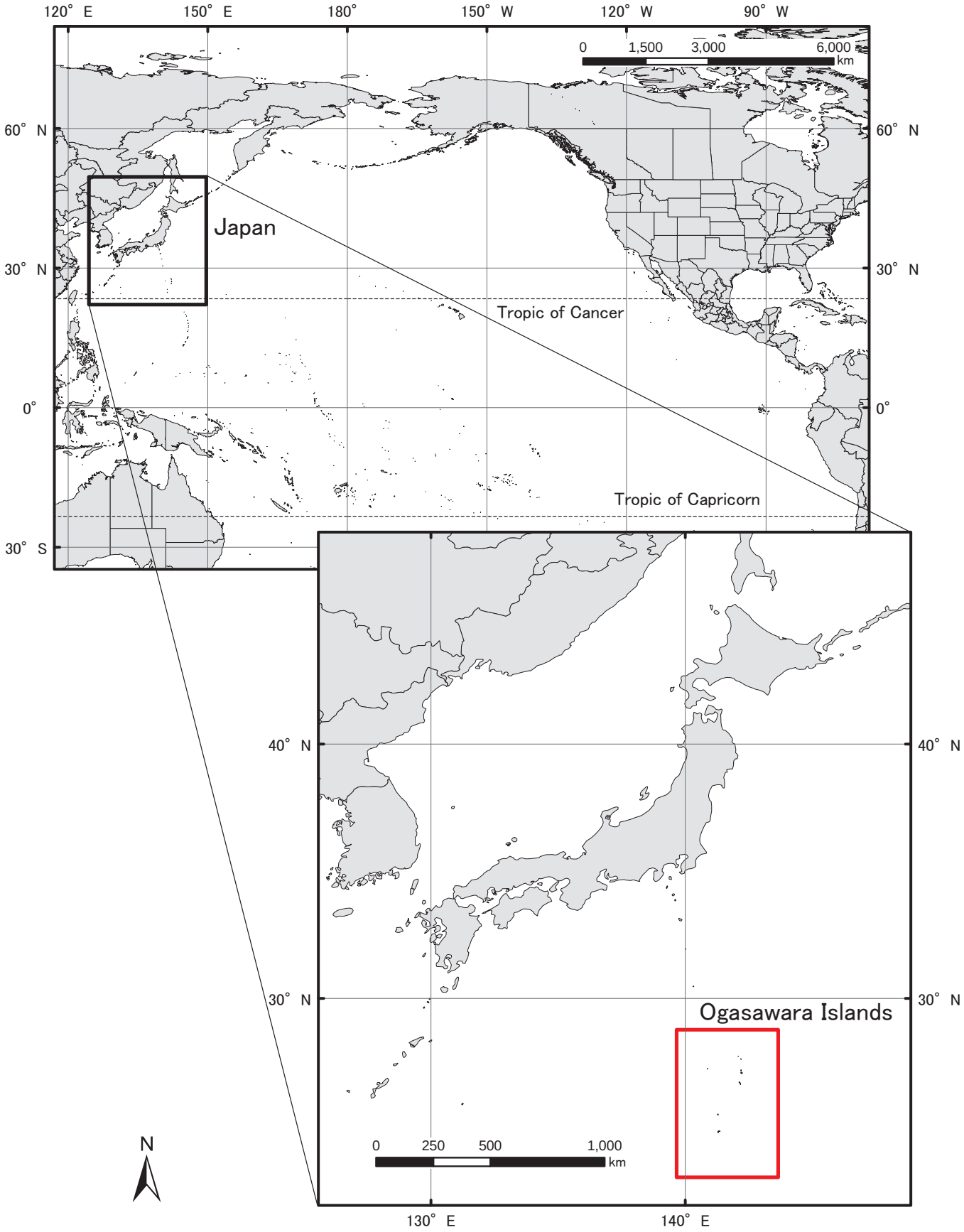



Fig. 1-1 Location map of the Ogasawara Islands

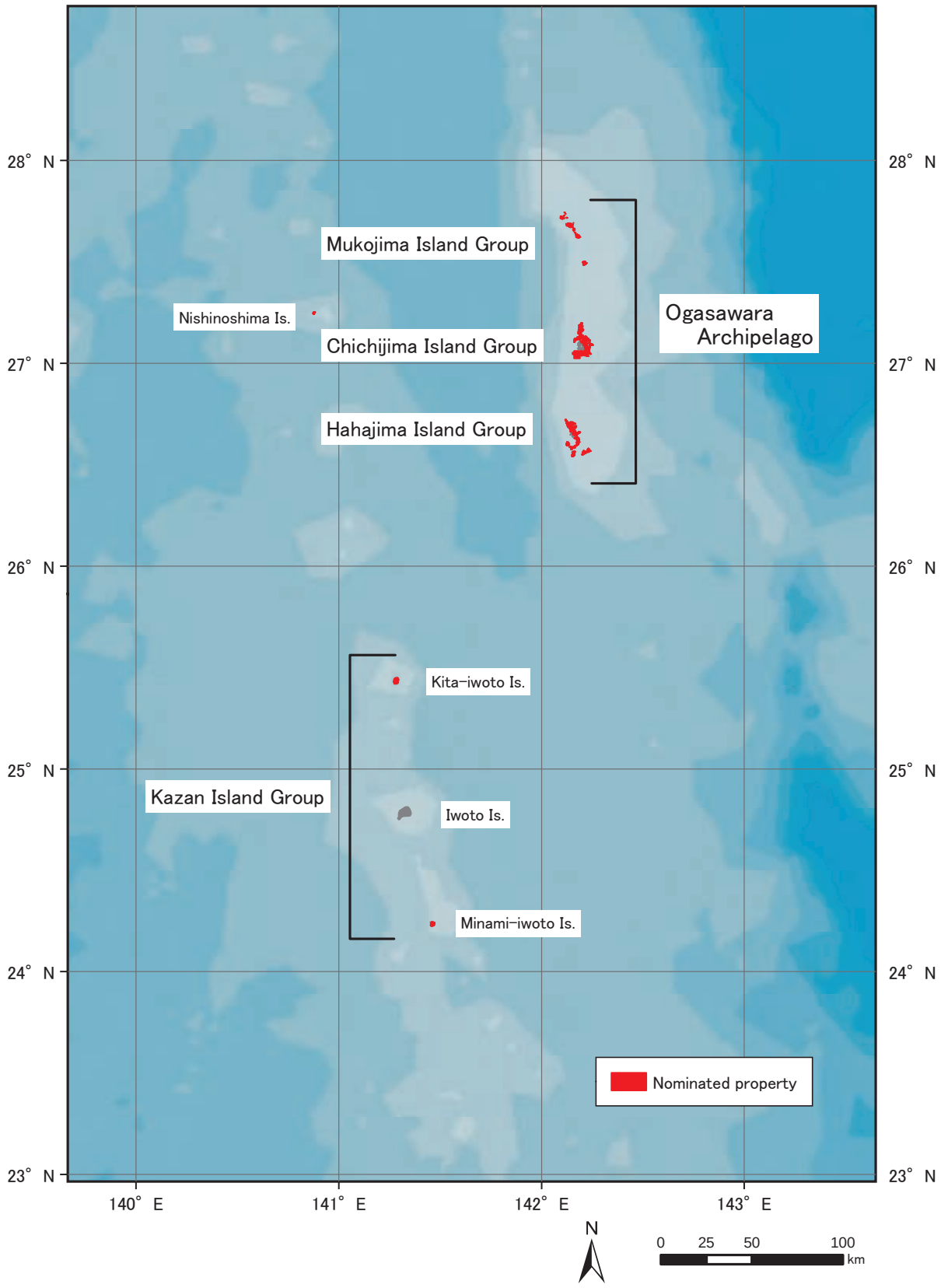



**Fig.1-2 Location of each island group in the Ogasawara Islands**
*(Source: USGS, ESRI, TANA, AND)*

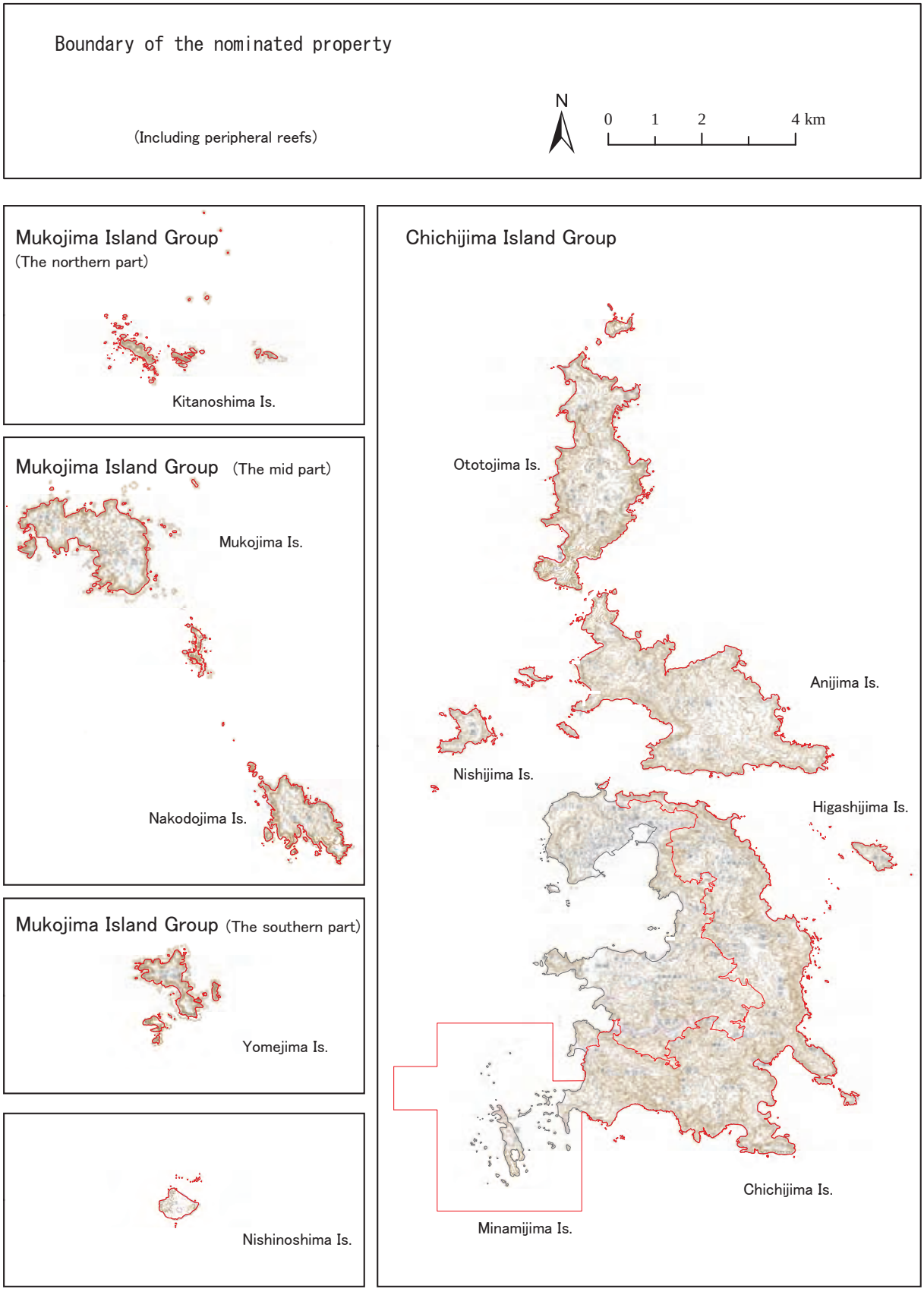



**Fig. 1-3 Boundary of the nominated property**
**(Mukojima, Chichijima Island Groups and Nishinoshima)**
*(Source: 'Yokosuka' Geographic Information (1/25,000) of Geographical Survey Institute)*

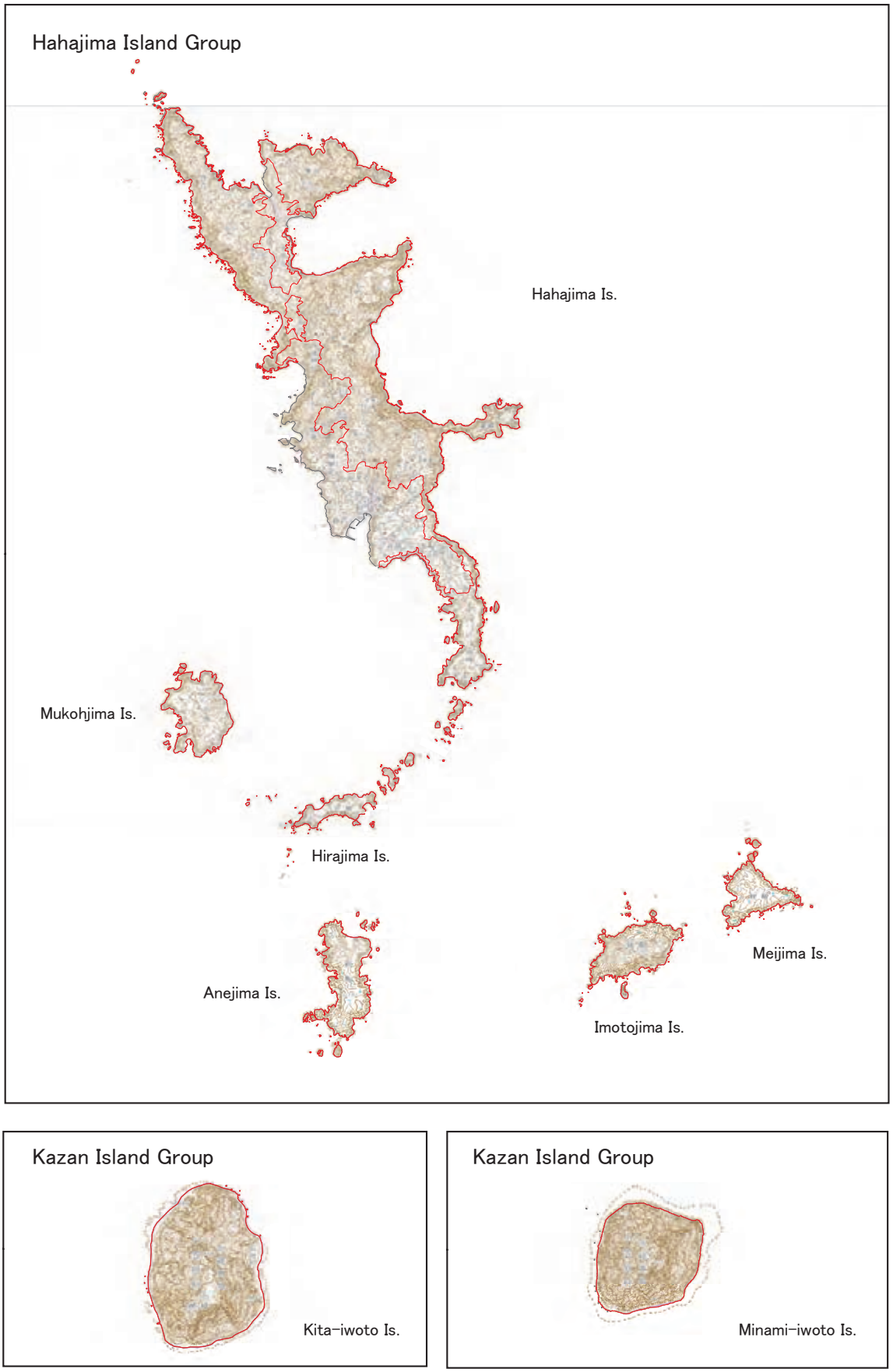



**Fig. 1-4 Boundary of the nominated property**
**(Hahajima Island Group, Kita-iwoto and Minami-iwoto)**
*(Source: 'Yokosuka' Geographic Information (1/25,000) of Geographical Survey Institute)*

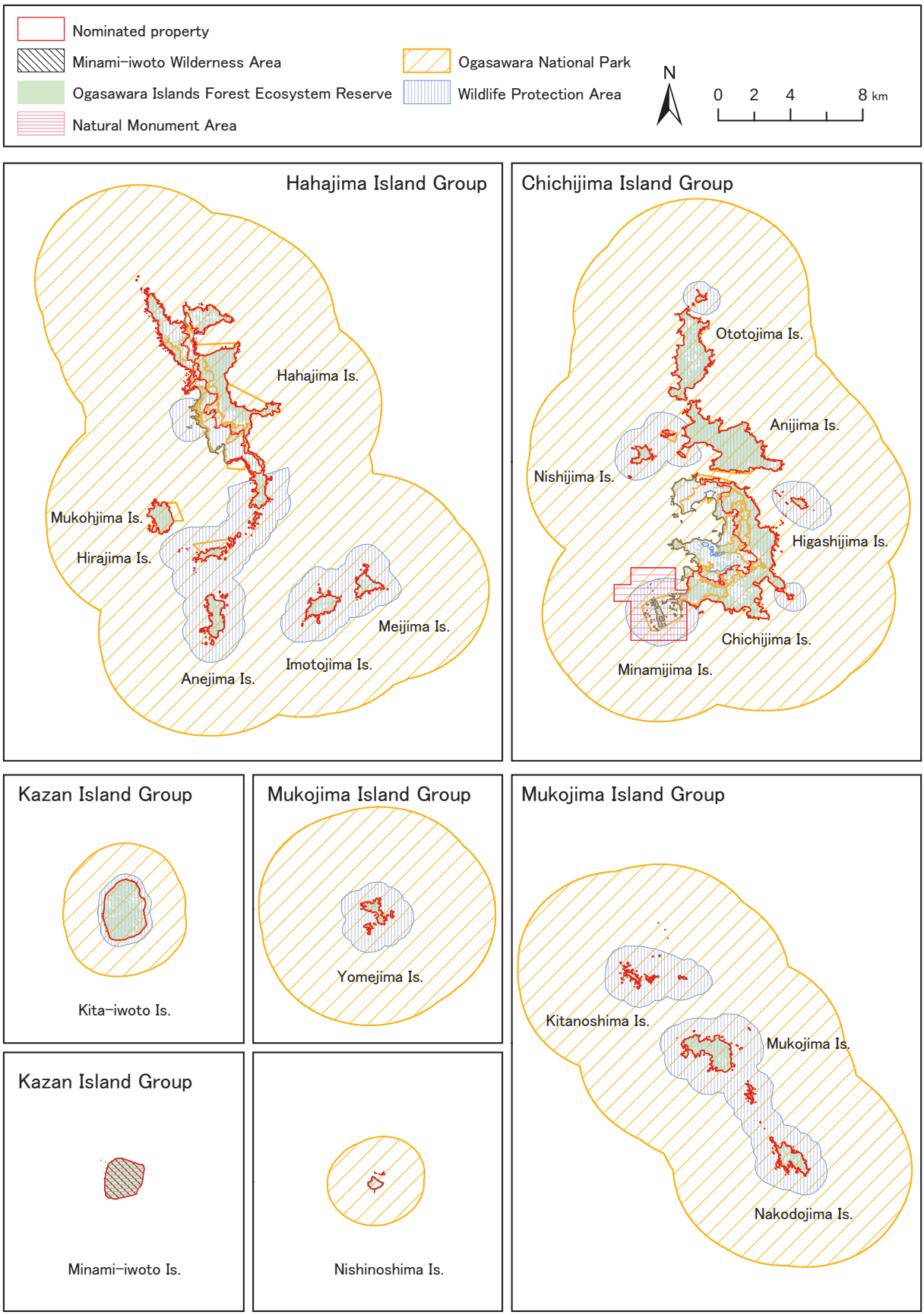



**Fig. 1-5 State of legal protection**

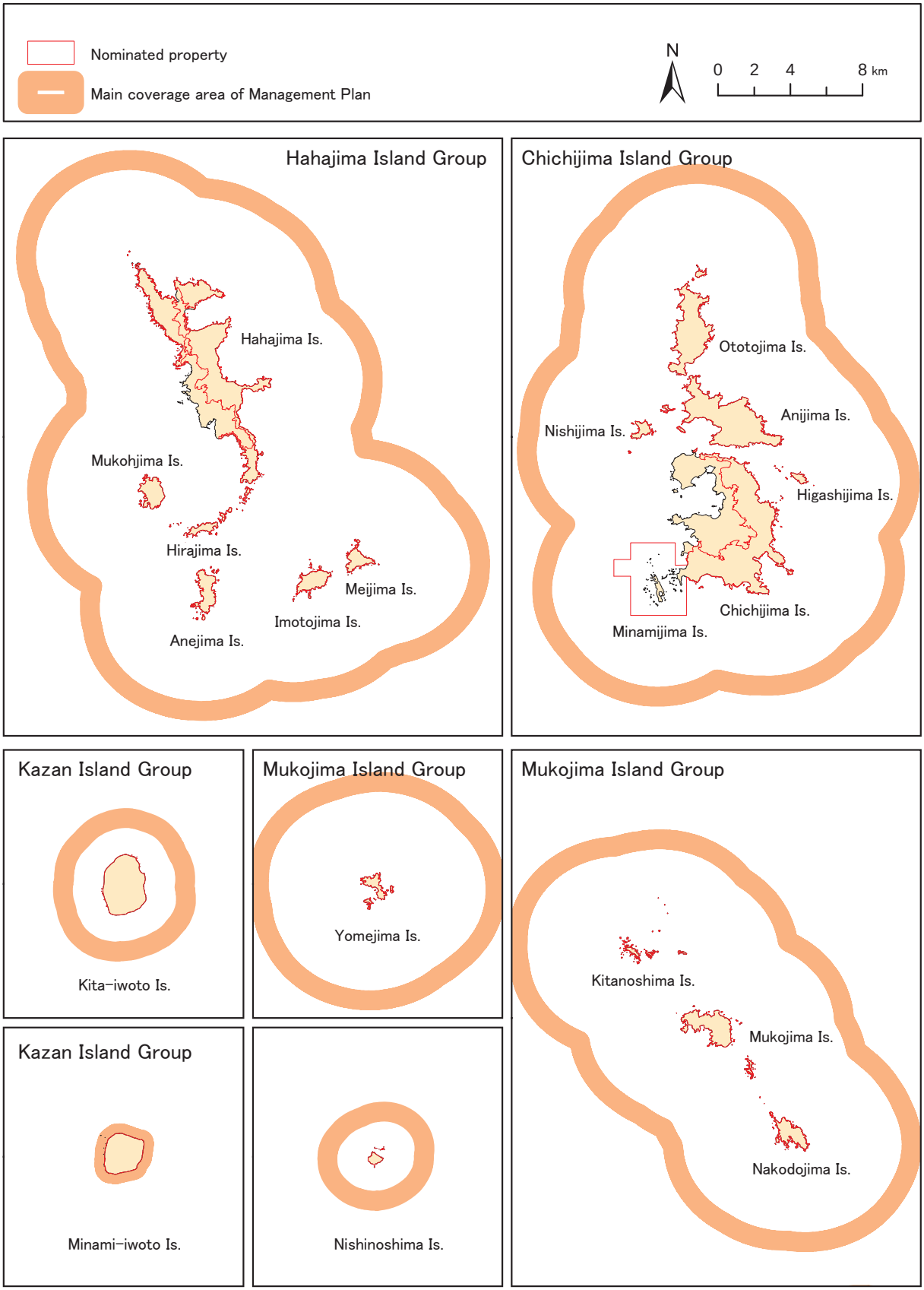



**Fig. 1-6 World Heritage Management Area -Main scope of the Management Plan-**



**Ogiike / Minamijima** *(photo:MOE)*



**Chichijima Island Group** *(photo:Hideo Maruoka)*

# 2

## *Description*

2.a Description of Property

2.b History and development



*Pandanus boninensis (photo:Naomi Nakagawa)*



*Elaeocarpus photiniaefolius (photo:Hideyuki Chiba)*

## 2.a Description of Property

### 2.a.1 Geological features

The Ogasawara Islands make up an oceanic island arc that was formed on an oceanic crust (Fig. 2-1). The Izu-Ogasawara (Bonin) arc, on which the Ogasawara Archipelago and the Kazan Island Group rest, is an island arc-trench system extending 1,500 km in length that was formed along the eastern edge of the oceanic Philippine Sea Plate as a result of the subduction of the Pacific Plate 48 Ma (Ma: *megaannum*, or million years ago).

The main bathymetric features around the Ogasawara Islands, from the Izu-Ogasawara trench to the Philippine Sea plate, are the Ogasawara Ridge, Ogasawara Trough, Shichito Ridge, Shikoku-Parece Vela Basin, and the Kyushu-Palau Ridge (Fig. 2-1). The Ogasawara Ridge forms the fore-arc of Izu-Ogasawara arc. The islands of the Ogasawara Archipelago (from north to south, the island groups of Mukojima, Chichijima, and Hahajima) are dotted over this Ridge. They are submarine volcanoes of the Paleogene volcanic front that rose up above the sea surface due to the subduction of the Ogasawara Plateau. Quaternary volcanoes on the Shichito Ridge comprise the present volcanic front of the Izu-Ogasawara arc, and include the active volcanoes of Nishinoshima Island and the Kazan Island Group of three islands (from north to south, Kita-iwoto, Iwoto, and Minami-iwoto). The Shikoku-Parece Vela Basin is a back-arc basin between the Izu-Ogasawara arc and the Kyushu-Palau Ridge that developed and expanded from 30 to 15 Ma.

The Izu-Ogasawara arc is one of the most studied arc-trench system in terms of geophysics, geology, and petrology because of its scientific importance as a typical example of an oceanic island arc. In particular, many of the Ogasawara Islands are surrounded by spectacular sea cliffs, which provide excellent outcrops for geological observation. Areas such as Chihiroiwa of Chichijima Island and Okuzure Bay of Hahajima Island offer not only breathtaking scenery, but also rich sources of historical information about the geological events that formed the Ogasawara Islands.

Within the geological features of the Izu-Ogasawara arc, a continuous history of island arc growth, from its birth to the present date, is recorded in the form of changes in magma composition and volcanic activity. Because most of the Izu-Ogasawara arc lies under the deep ocean, it is practically impossible to directly obtain and examine these extremely valuable geological records. However, the Ogasawara Islands are unexceptional subaerial exposures of this geological strata that record the growth history of this oceanic island arc, making the Ogasawara Islands the only site in the world where these geological processes can be directly observed in detail. In addition, the middle crust, the origin of the continental crust, has been formed beneath the arc, which demonstrates the ongoing evolution process from an oceanic island arc to a continent.

The geology of the Ogasawara Islands fully exhibits the typical growth process for an oceanic island arc, from the initiation formation of the subduction zone through to its establishment of a subduction zone in steady state. This is why the Ogasawara Islands provide an outstanding evolutionary record of how continental crust formed and grew on the earth.

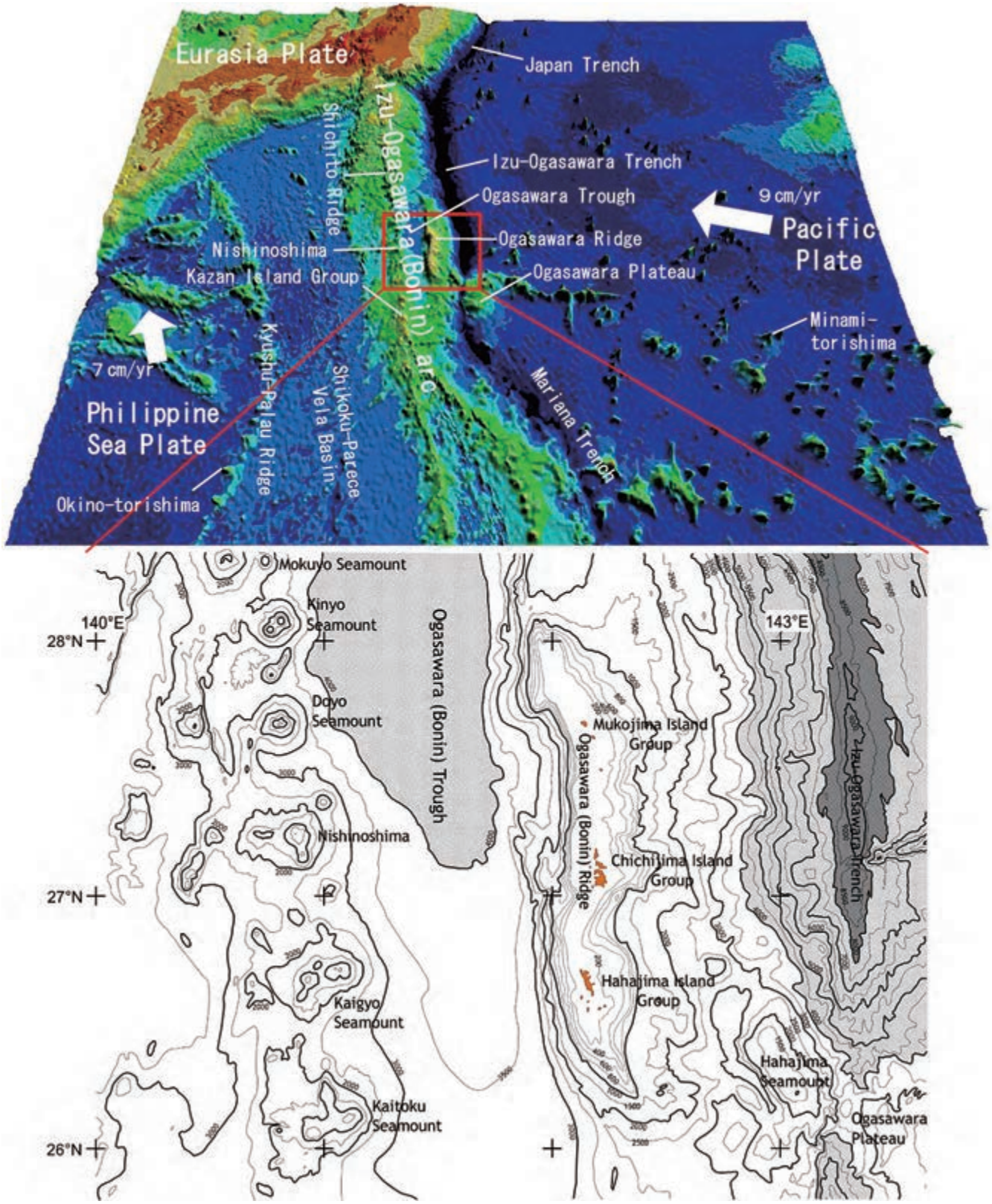



**Fig. 2-1** Submarine topography around the Ogasawara Islands (above) and the Ogasawara Archipelago (below)
*(Revised from Umino, 2008)*

Column

## The evolution of the earth from the formation of subduction zones to the creation of continents

Approximately four billion years ago, the "magma ocean" cooled down and water vapor in the atmosphere condensed and fell in the form of rain, which resulted in the primitive earth being covered entirely by ocean. The earth's surface subsequently cooled and the crust formed, marking the beginning of plate tectonics. There are three types of plate boundaries: *divergent boundaries* such as mid-ocean ridges, where plates spread apart; *convergent boundaries* such as subduction zones; and *transform fault*. Basaltic magmas erupt at mid-ocean ridges from deeper layers of the earth, resulting in the continuous formation of oceanic crust, and oceanic crust is then forced downwards into the earth at subduction zones. In the early history of the earth, the subduction of oceanic crust began with plate tectonics and oceanic island arcs developed above subduction zones, resulting in the creation of some of the first lands on the earth. The continual collision of island arcs through plate tectonics gradually contributed to the formation of larger landmasses and eventually to the birth of continents. This is the basic story of the role of plate tectonics in the creation of continents from the ocean-covered, primitive earth.

Then, how did subduction zones arise? And how did oceanic island arcs develop to form continents? Once plates begin to be forced under one another, or start to "subduct", ocean trenches are formed, magma is ejected, submarine volcanoes are formed, and oceanic island arcs are created. As subduction proceeds further, the environments where magma is formed change; this, in turn, leads to other changes such as the chemical composition of rocks and the locations of submarine volcanoes. Then the subduction zones eventually reach a steady-state situation, where oceanic island arcs continue to develop. Many of the oceanic island arcs we see today are still developing and such island arcs evolve further as the subduction of plates continues. Island arc magmatism leads to the formation of andesitic middle crust under the earth's surface, and this crust has the average chemical composition of continental crust (Fig. 2-2) (Kodaira et al., 2008; Suyehiro et al., 1996; Tatsumi et al., 2008). This phenomenon demonstrates that the process, in which oceanic island arcs develop on oceanic crust, is also the very beginning of continent formation.

Elucidating the mechanism of continent formation is one of the most important issues in unravelling the history of the earth, and better understanding of the process is being achieved through research into the formation and development of oceanic arc islands.

the Ogasawara Islands offer an important research field for scientific studies because geological strata that record the whole development process of this oceanic island arc, from its formation to the present day, are exposed widely on land. Moreover, the presence of middle crust, which is the precursor to continents, has been confirmed beneath the Izu-Ogasawara arc. As outlined above, the mechanisms of the evolution of the earth, from the appearance of subduction zones to the formation of continents, is being elucidated at the Ogasawara Islands.

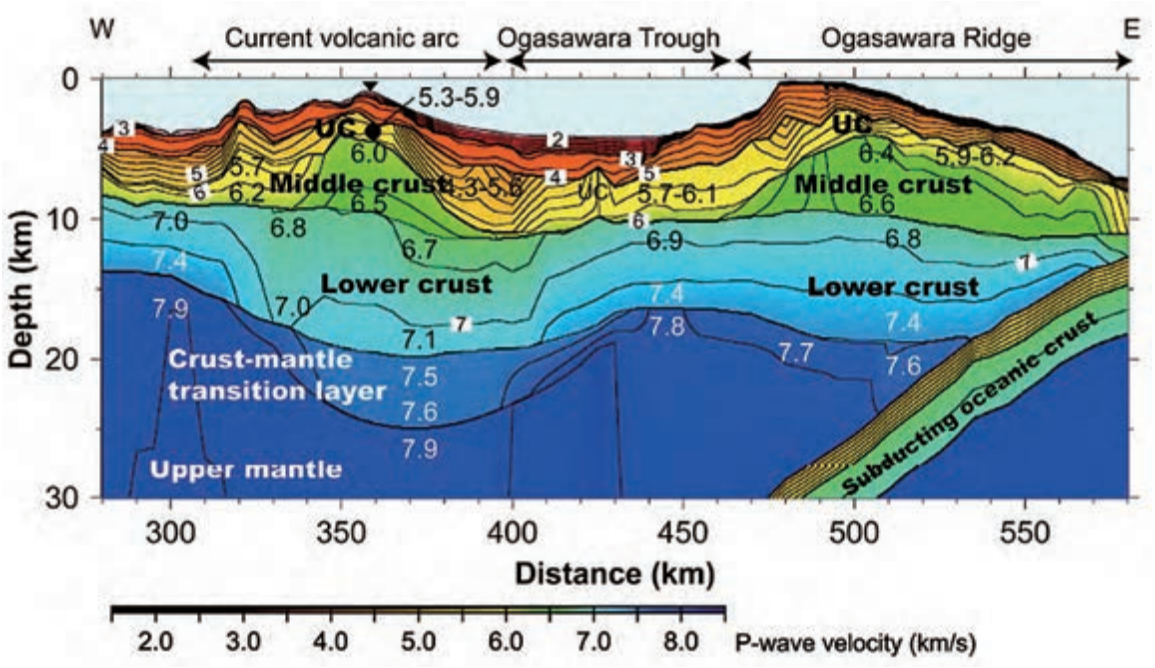



**Fig. 2-2 Estimates for the crust structure of Izu-Ogasawara arc** *(Takahashi et al., 2009)*

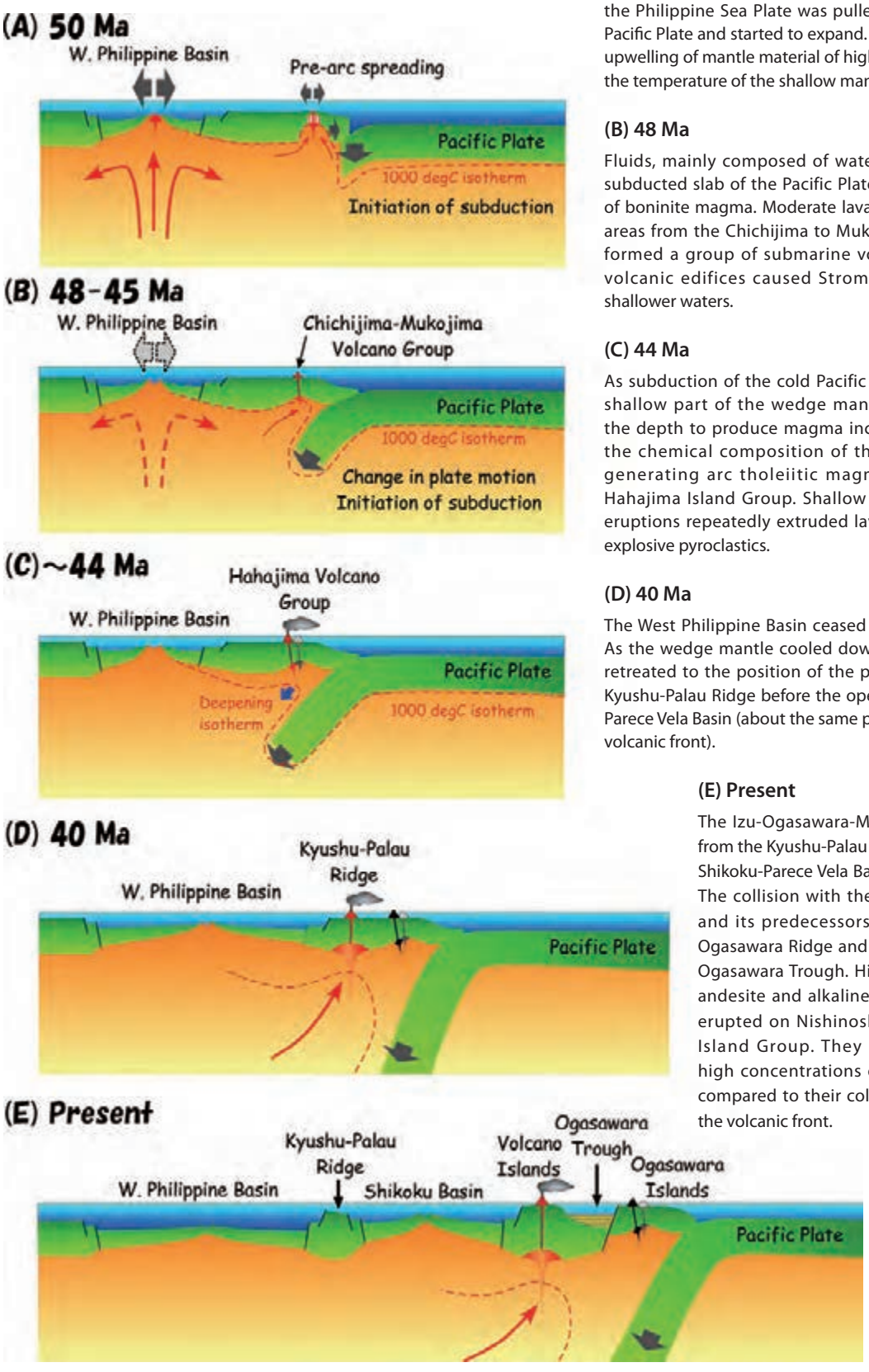
**The figure shows P wave velocity structure in the east-west cross section across the Izu-Ogasawara arc. The zone that has velocities of 6.0-6.6 km/s is the middle crust, which occurs only under the island arc.**

### 2.a.1.1 The development of the Ogasawara Islands

The progressive development of the Ogasawara Islands can be explained in terms of the formation of an oceanic island arc (Fig. 2-3). The formation of the Ogasawara Islands began as far back as 50 Ma, when the Pacific Plate initiated plate subduction (Fig. 2-3A). Around this time the West Philippine Basin was spreading (Tatsumi and Maruyama, 1989), and the subduction of the Pacific Plate created a tension on the eastern edge of the upper Philippine Sea Plate, causing the fore-arc spread (Stern and Bloomer, 1992; Ishizuka et al., 2006). These conditions resulted in the formation of much shallower mantle material of high temperature (Fig. 2-3A). Around 48 Ma, the melting point of the wedge mantle dropped due to the fluid mainly consisting of water released from the subducted plate, and magma was produced. This was the beginning of island arc volcanism, which characterizes the early stage of the volcanism in Ogasawara (Fig. 2-3B) (Umino and Kushiro, 1989; Ishizuka et al., 2006). As subduction continued, the mantle wedge beneath Ogasawara cooled and the depth of magma production shifted deeper (Fig. 2-3C). By 40 Ma the volcanic front retreated to the present site of the Izu-Ogasawara arc (where paleo-Izu-Ogasawara-Kyushu-Palau Ridge was located prior to its separation). This means that a stable subduction zone was established (Fig. 2-3D).



**Anijima** *(photo:Hideo Maruoka)*




**(A) Around 50 Ma**

The Pacific Plate, which abuts on the Philippine Sea Plate, initiated subduction. At that time, the West Philippine Basin was spreading and the eastern edge of the Philippine Sea Plate was pulled by the subducting Pacific Plate and started to expand. These activities led to upwelling of mantle material of high temperature, raising the temperature of the shallow mantle under Ogasawara.

**(B) 48 Ma**

Fluids, mainly composed of water supplied from the subducted slab of the Pacific Plate, caused production of boninite magma. Moderate lava stream eruptions, at areas from the Chichijima to Mukojima Island Groups, formed a group of submarine volcanoes. Growth of volcanic edifices caused Strombolian eruptions in shallower waters.

**(C) 44 Ma**

As subduction of the cold Pacific Plate continued, the shallow part of the wedge mantle cooled and thus the depth to produce magma increased. Accordingly, the chemical composition of the magma changed, generating arc tholeiitic magma underneath the Hahajima Island Group. Shallow marine to subaerial eruptions repeatedly extruded lava flows and ejected explosive pyroclastics.

**(D) 40 Ma**

The West Philippine Basin ceased spreading by 40 Ma. As the wedge mantle cooled down, the volcanic front retreated to the position of the paleo-Izu-Ogasawara-Kyushu-Palau Ridge before the opening of the Shikoku-Parece Vela Basin (about the same position as the present volcanic front).

**(E) Present**

The Izu-Ogasawara-Mariana arc separated from the Kyushu-Palau Ridge by opening the Shikoku-Parece Vela Basin from 25 to 15 Ma. The collision with the Ogasawara Plateau and its predecessors led to a rise in the Ogasawara Ridge and the formation of the Ogasawara Trough. High alkaline tholeiitic andesite and alkaline basaltic magma are erupted on Nishinoshima and the Kazan Island Group. They are noted for their high concentrations of alkaline elements compared to their colleague volcanoes on the volcanic front.

**Fig. 2-3 Schematic model of tectonic development of the Ogasawara Islands**
*(Figure produced by Susumu Umino)*

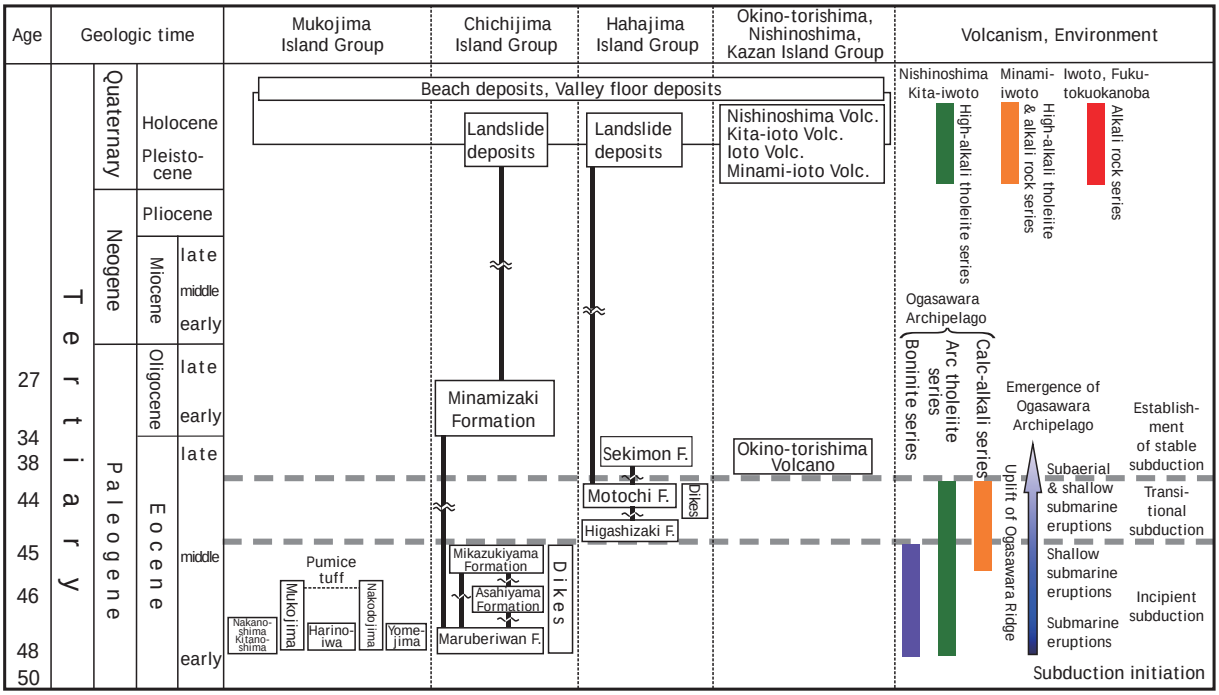



**Fig. 2-4** Geological times of the Ogasawara Islands and their corresponding rock series *(Modified from Umino et al., 2007)*

Fig. 2-4 shows geological times for each stratum and its corresponding rock series on each island. The chemical composition of the rocks changes genealogically and chronologically in accordance with the formation of each geological stratum. This indicates a series of changes in chemical magma composition along with the development process of the plate subduction. This process has three stages, in summary:

- It began with boninitic magmas that formed submarine volcanoes in the Chichijima and Mukojima Island Groups (incipient subduction stage);
- then changed through calc-alkaline and tholeiitic submarine to subaerial volcanism in the Hahajima Island Group (transitional stage);
- to reach the steady-state subduction zone volcanism that formed submarine volcanoes on the Kyushu-Palau Ridge such as Okino- torishima island (steady-state stage).

### Incipient subduction stage (The birth of the island arc)

Island arc volcanic activity started at 48 Ma with the eruption of boninite magma, which continued up to 45 Ma (Figs. 2-3A, B). During this incipient period of subduction intiation, the base of the Chichijima and Mukojima Island Groups were formed firstly through repeated non-explosive eruptions, producing gentle lava flows of boninite rock series and arc tholeiitic rocks under slightly deep water. The shallow submarine volcanism continued, and the chemical composition of erupted magma changed entirely to calc-alkaline andesite and dacite, bronzite andesite, and high-Ca boninite (Fig. 2-4).

Boninite is a high-Mg andesite characterized by the absence of plagioclase and the presence of abundant orthopyroxene (bronzite-enstatite) crystals embedded in the glassy matrix. Boninitic magma is produced under very specific temperature-pressure conditions; that is, melting of the hydrous upper mantle less than 30km in depth (which is shallower than

the generation depths of island arc basaltic magmas). Boninite magma is, therefore, thought to be produced in the incipient stage of a subduction zone formation. In Ogasawara, water was supplied in the shallow mantle of high temperature beneath the West Philippine Basin by subduction of the plate, and boninite magma was produced (Tatsumi and Maruyama, 1989; Ishizuka et al., 2006). Boninite was first discovered and described from Chichijima, and it was named after "Bunin", which is a corrupt form of an archaic term *Munin*, meaning "uninhabited" (Petersen, 1891). Not only Chichijima, the type locality of boninite, but also other islands of the Ogasawara Archipelago have the world's largest and best exposures of boninite.

### Transitional stage

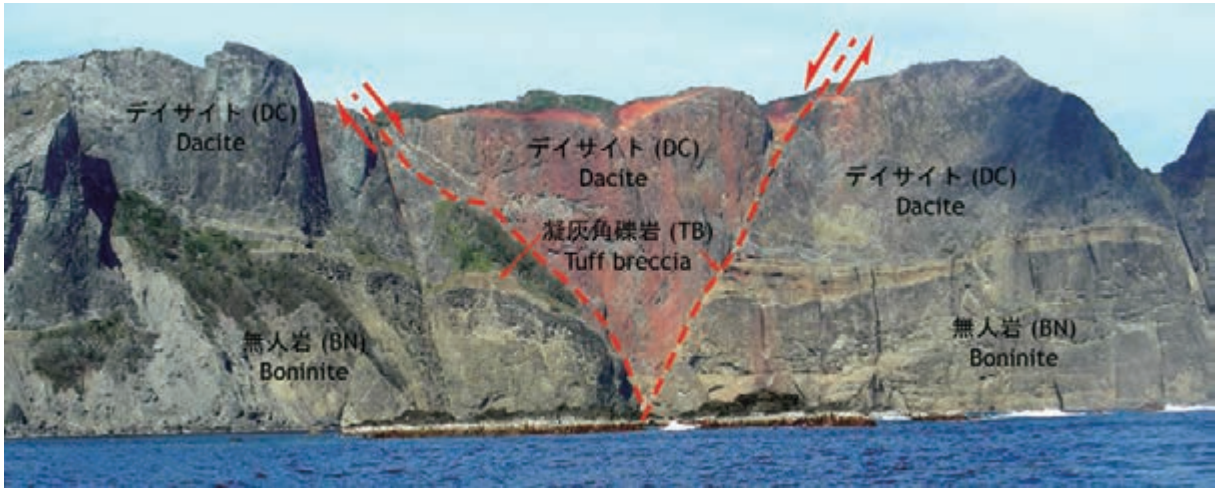
This period experienced a transition of the subduction from its incipient stage to the steady-state stage 44 to 40 Ma (Fig. 2-3C). The regions where magma was produced shifted from a shallow trench side to a deeper back-arc side. The result of this was a change in chemical magma composition from boninitic to common arc tholeiitic.

At this stage, volcanic eruptions in the shallow waters and on the ground formed the foundations for the Hahajima Island Group. The Hahajima Island Group alternately experienced explosive and quiet eruptions that both extruded magmas of island arc tholeiitic and calc-alkaline compositions, characteristic of the transitional period (Fig. 2-4).

Volcanism in the Ogasawara Archipelago came to an end before reaching the steady-state stage. After the cessation of volcanic activity, foraminifers and others become deposited in the shallow seas around the Hahajima Island Group during the middle to late Eocene, and formed a limestone stratum. In the southwest of Chichijima, coral reefs developed in the early to late Oligocene (34 to 27 Ma), eventually forming the limestone of the area around Minamijima Island.



**Boninite (Mukojima)** *(photo:Susumu Umino)*




**South shore in Chichijima (Maruberi Bay, Chihiroiwa)** *(photo:Susumu Umino)*

**(Layers of boninite pillow lava, boninite tuff breccia, and dacite pillow lava [from bottom to top]). Products of volcano for about two million years from 48 to 46 Ma can be seen in these 300 m-high sea cliffs. Red rock face [Heart Rock] is a large fault and is the uppermost strata of dacite, which has sunk more than 100 m.)**

### Steady-state stage

This is a period of island arc volcanism at the subduction zone from 40 Ma to the present day (Fig. 2-3D). By 40 Ma, the volcanic front retreated almost to the present position of the Izu-Ogasawara arc and the thermal structure beneath the island arc reached a steady-state situation. Okino-torishima, located above the Kyushu-Palau Ridge about 1,000 km southwest of the Ogasawara Archipelago, is a 5,000 m-tall submarine volcano formed on the subduction zone at its steady-state during this time. At about 30 Ma, the Izu-Ogasawara arc began to split, and the open of the Shikoku-Parece-Vela Basin had separated the Kyushu- Palau Ridge from the Izu-Ogasawara-Mariana arc by 15 Ma.

Since the island arc volcanism reached steady-state, the andesitic middle crust beneath the Izu-Ogasawara arc was formed. The oceanic island arc volcanism transforming oceanic crust into continental crust is still underway beneath the Izu-Ogasawara arc, as demonstrated by the recently-active volcano chains of Nishinoshima and the Kazan Island Group (Fig. 2-3E).

### 2.a.1.2 Geological and topographical features

***<Chichijima Island Group>***

Chichijima covers 23.79 km$^2$ in area. Its highest elevation is 326 m above sea level, with a gently rolling plain around 250 to 300 m. There are satellite islands around Chichijima such as Anijima, Ototojima, Nishijima, Minamijima, and Higashijima Islands. The areas of Anijima and Ototojima are 7.92 km$^2$ and 5.18 km$^2$ respectively, while the rest of the islands are smaller than 1 km$^2$. These islands are all plateau-like in shape and bounded by sea cliffs.

The Chichijima Island Group was formed by submarine volcanic activity that began 48 Ma. This activity started with fairly calm eruptions forming pillow lava, which gradually gave way to more explosive phreatomagmatic eruptions as the volcanic edifice grew and became shallower. The strata of the Chichijima Island Group are classified into four formations from bottom to top: the Maruberiwan, Asahiyama, Mikazukiyama, and Minamizaki Formations (Fig. 2-4) (Appendix 2). The Maruberiwan Formation consists of boninite-series rocks such as pillow lava, and arc tholeiitic volcanic rocks extruded 48 to 46 Ma. The Asahiyama Formation consists of boninite-series rocks including dacite. The Mikazukiyama Formation consists of calc-alkaline andesite, dacite and so on extruded 45 Ma. All these three formations exhibit the characteristic chemical magma compositions produced in the incipient stage of the subduction. As for the Minamizaki Formation, it is a limestone stratum formed after the cessation of volcanic activity at Chichijima.



Chichijima Island Group *(photo:Hideo Maruoka)*



Boninite pillow lava (West shore in Chichijima) *(photo : Susumu Umino)*

These rocks can be observed throughout the Chichijima Island Group. For example, the oldest strata of boninite pillow lavas are distributed from the north to east and south shores of Chichijima as well as on Anijima and Higashijima. The strata are exposed and can be observed at the sea cliffs. In addition, the Mikazukiyama Formation can be observed at Mt. Mikazuki in Chichijima as well as on Ototojima.



Mikazukiyama Formation in Ototojima *(photo:Susumu Umino)*

### *<The Mukojima Island Group>*

The Mukojima Island Group, located about 40 to 70 km north of Chichijima, is made up of Mukojima Island, Nakodojima Island, Yomejima Island, and several other islands. The areas of Mukojima, Nakodojima, and Yomejima are 2.56 $km^2$, 1.37 $km^2$, and 0.62 $km^2$, respectively. All of the islands are flat and surrounded by sea cliffs.



Mukojima Island Group *(photo:Masaaki Takiguchi)*

The islands in the Mukojima Island Group are raised submarine volcanoes formed at about the same time (48 to 46 Ma) as the Chichijima Island Group (Fig. 2-4). These islands are made up mainly of boninite, bronzite andesite pillow lava, pyroclastic rocks, and arc tholeiitic andesite that were erupted during the early stage of plate subduction (Appendix 2).



Boninites - series rocks in Mukojima *(photo:Hideo Maruoka)*

***<The Hahajima Island Group>***

The Hahajima Island Group is located about 40 to 60 km south of Chichijima. Hahajima covers 20.25 km$^2$ in area. Its highest elevation, Mt. Chibusa, is 462m, making it the tallest of the low-lying Ogasawara Archipelago. It is characterized by relatively precipitous ridges, and is surrounded on all sides by sea cliffs of 100 to 350 m in height, except for the west shore of the southern part of the island. The Sekimon area is marked by the development of a karst landform.

The Hahajima Island Group originated as volcanic islands which began with submarine eruptions under shallow water 44 Ma, and developed into shallow marine to subaerial eruptions (Fig. 2-4). The volcanic rocks of the Hahajima Island Group are mainly island-arc tholeiite and calc-alkaline andesite. There is some undifferentiated basalt and dacite, but no boninite. Undifferentiated basaltic magma was produced at a depth of 35 km, deeper than the boninitic magmas which formed the Chichijima and Mukojima Island Groups. Continued subduction for four million years cooled the shallow wedge mantle and disabled generation of further boninitic magmas. This change in chemical composition from boninitic to basaltic indicates the progress of the subduction zone to more advanced stages (Appendix 2).

After volcanic activity subsided, foraminifers (*Nummulites* spp.), calcareous algae, and other reef-building organisms were deposited near the Sekimon area and ultimately became limestone.



Pyroclastic rock in Hahajima *(photo:Susumu Umino)*

### *<Nishinoshima and the Kazan Island Group>*

Nishinoshima and the Kazan Island Group are volcanic islands stretching north to south, and located about 130 to 330 km to the west and south-southwest of the main Ogasawara Archipelago. They make up the Quaternary volcanic front of the Izu-Ogasawara arc and were created by volcanic activity since the middle and late Pleistocene (Fig. 2-4) (Appendix 2). The Kazan Island Group, unlike other volcanoes to the north and south, is characterized by its high contents of alkaline elements (Yuasa and Nohara, 1992; Ishizuka et al., 2007).



**Nishinoshima** *(photo:Japan Coast Guard)*



**Minami-iwoto** *(photo:MOE)*

The Kazan Island Group is made up of Kita-iwoto, Iwoto, and Minami-iwoto Islands (from north to south). Kita-iwoto covers 5.57 km$^2$ in area with its highest point of 792 m. Minami-iwoto covers only an area of 3.54 km$^2$, but with a peak elevation of 916 m, it is the tallest of the Ogasawara Islands. Kita-iwoto and Minami-iwoto are actually the summits of giant submarine stratovolcanos. The constituent rocks are highly alkaline tholeiitic or alkaline basalts. In addition, neither island is currently volcanically active, nor exhibiting historical

records of eruptions. These young and discrete stratovolcano islands lack flat areas. Minami-iwoto is particularly void of flat terrain. Steep slopes, exceeding 40 degrees from the shore to the summit, make the island virtually inaccessible. This is why it has attracted no human activity and the original, natural state of the island has been well-preserved.

Nishinoshima lies on the peak of a large submarine volcano, rising 3,000 m above the seafloor and with a basal diameter of 20 to 30 km. The island is flat and triangular, covering an area of 0.29 km$^2$. It is composed of volcanic products and beach deposits dating from late Pleistocene to the present date (1973-1974 eruptions are the most recent ones) (Umino and Nakano, 2007). Volcanic eruptions and marine erosion are constantly changing the shape of this island.



Nishinoshima; eruption products of 1973 (front) and Nishinoshima lava (back) *(photo:Susumu Umino)*

## 2.a.2 Climate

The nominated property belongs to a relatively warm subtropical climatic zone. Because both the annual and diurnal temperature ranges are small and the level of humidity is high, the climate there is considered to have maritime nature. The nominated property is located at the center of the Ogasawara High that develops at the western edge of the North Pacific High. Because of this, the area is slightly affected by typhoon rainfall, and the amount of precipitation is low. In the summer months, the amount of evaporation exceeds that of precipitation, and the soil and topographic conditions are characterized by shallow soils and precipitous coast areas, so the soil moisture condition becomes extremely dry in this season. In addition, because of the differences in elevation and wind direction within the nominated property, there is a wide range of climatic characteristics seen locally. As an example, cloud belts develop at the elevated area of relatively tall Minami-iwoto.

### 2.a.2.1 Climatic characteristics of the Ogasawara Islands

The nominated property extends about 400 km from north to south and comprises more than 30 islands spread over the Pacific (Ogasawara Islands Branch Office, Tokyo Metropolitan Government (TMG), 2008), and most of the area has a subtropical climate. Throughout the year, subtropical climatic zones are subject to the subtropical high-pressure belt and the tropical air mass which occurs in the subtropical high-pressure belt.

The mean annual temperature (1971-2000) of Chichijima in the nominated property is 23.0°C. The mean temperature of the coldest month (February) is 17.7°C, and the mean of the

hottest month (August) is 27.6°C. The annual and diurnal temperature ranges are relatively small compared to other areas in Japan (Fig. 2-5). The mean annual precipitation (1971-2000) is 1,276.7 mm. As for precipitation by month, February receives the least (61.4 mm) and May receives the most (174.4 mm). Mean monthly humidity is high, exceeding 80% from April through September. In summary, the nominated property belongs to a relatively warm subtropical climatic zone, characterized by small annual and diurnal temperature ranges and high levels of relative humidity, which qualifies it as a maritime climate.

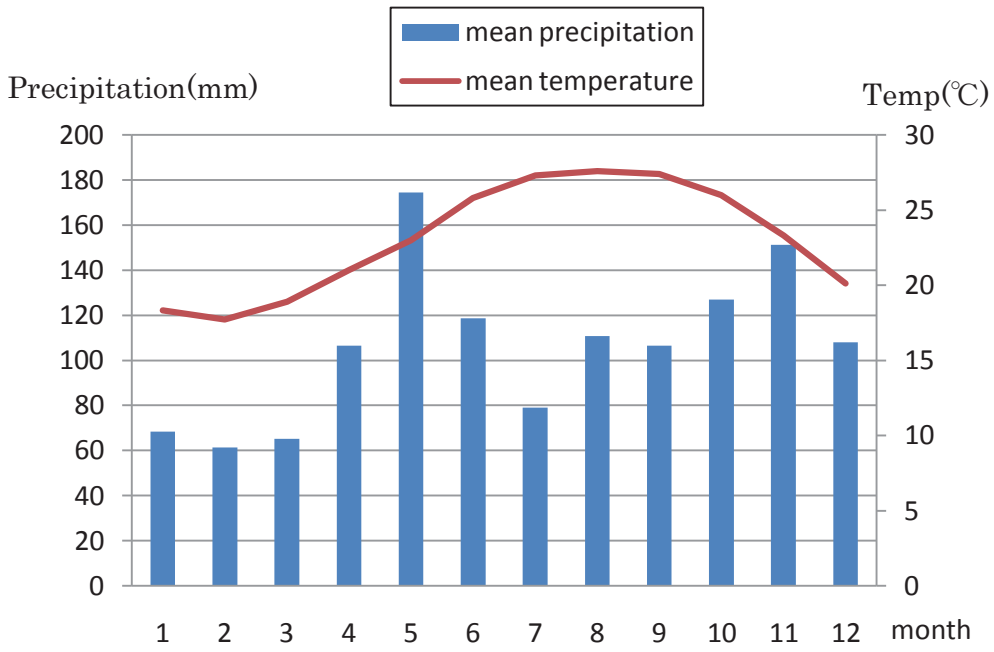



**Fig. 2-5 Mean temperature and mean precipitation by the month on Chichijima**

The nominated property belongs roughly to the same latitude belt as the Ryukyu Islands, and both are located in the Ogasawara High zone. The Ogasawara High that develops near Japan during the summer forms the western edge of the North Pacific High, which corresponds to a subtropical high. Compared with the eastern edge, there are fewer descending air currents which generally make the atmosphere less stable and conducive to wet weather (Nakamura and Komabayashi, 1996). The nominated property, however, is located more than 1,000 km away from the continent with its closeness to the center of the Ogasawara High, the climatic environment is different from that of the Ryukyu Islands; as such there are significant differences in the amount of precipitation in the two island groups.

When the mean monthly precipitation levels of Chichijima and Naha City (of Okinawa Prefecture, Ryukyu Islands) are compared, Chichijima receives less precipitation overall (the mean annual precipitation for Chichijima is 1,276 mm, compared with 2,036 mm for Naha City). The difference is particularly apparent in the summer months (June to September). This is mainly due to the higher rainfall attributable to typhoons, because the Ryukyu Islands are located peripherally to the Ogasawara High that develops in the summer and they lie in the path of typhoons. The nominated property, on

the other hand, is located at the center of the Ogasawara High and belongs to a dry area with low winds and few clouds, making the influence of rainfall from typhoons fairly small. As a result, the amount of precipitation in the summer months (June to September) on Chichijima (414.9 mm) is only about half that of Naha City (835.2 mm) (Oka, 1989).

One of the distinctive features of the climatic environment of the nominated property is that the amount of evaporation far exceeds that of precipitation in the summer months. The mean values for potential evaporation (the amount of evaporation that would occur when sufficient water is given) and annual changes in precipitation levels on Chichijima are shown for the beginning, middle, and end of each month for the period from 1970 to 2001 in Fig. 2-6(a). Potential evaporation (Kondo and Xu, 1997) is lowest in late December (an average of 2.3 mm per day), and highest in early July (5.4 mm per day). The average of total amount for the year is 1,380 mm. There is much precipitation in the rainy season from April to June, with its highest level in late May. The period from late June to late July is the summer dry period and precipitation is at its lowest level of the year (Iijima et al., 2004). Fig. 2-6(b) shows a wetness index (a figure derived by dividing the amount of precipitation in a given period by the potential evaporation. It is used as an index to show dryness and wetness of the soil moisture) for Chichijima.

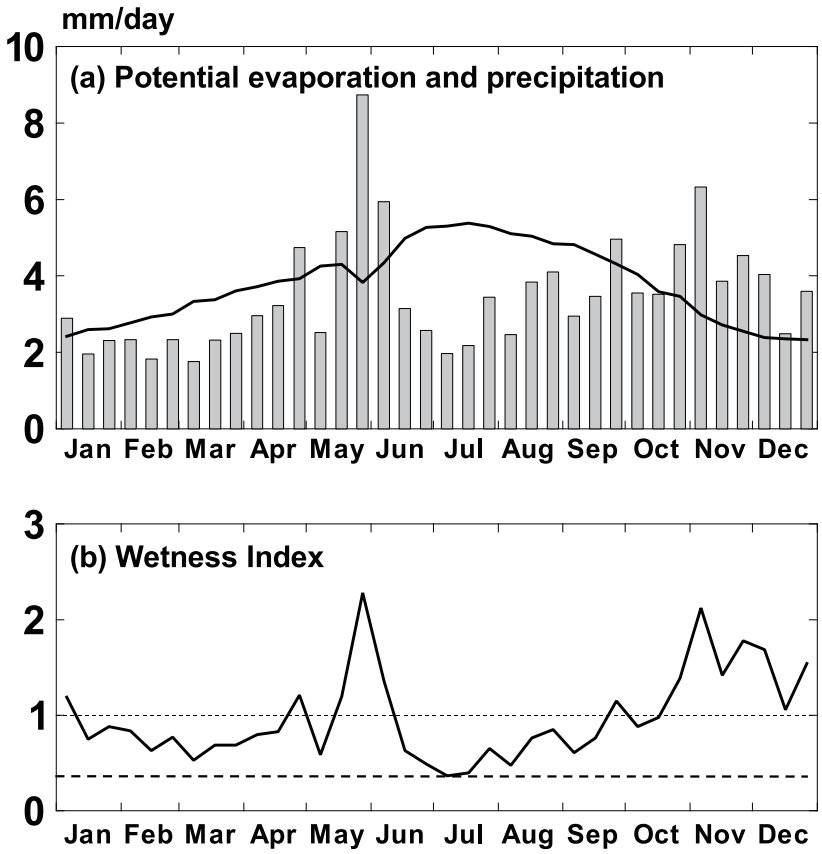



**Fig. 2-6** (a) Mean precipitation levels (vertical bars) for the beginning, middle, and end of each month from 1970 to 2001 and mean potential evaporation (solid line)
(b) Mean wetness index values for the beginning, middle, and end of each month from 1970 to 2001
*(Graphs revised from Iijima et al., 2004)*

From the ranges for wetness index, the climate conditions can be divided into three distinct periods:

- humid periods (when the wetness index is larger than 1),
- subhumid periods (in the 1 to 0.3 range), and
- dry periods (less than 0.3).

In effect, a wetness index of less than 1 means that the amount of precipitation is lower than that of potential evaporation and the soil moisture condition is consequently dry. From Fig. 2-6, it is clear that Chichijima only experiences humid periods during the rainy season (which peaks in late May) and the cool period from late October to early January. Conversely, Chichijima experiences sustained dry and subhumid periods throughout the summertime from mid-June to mid-September (when precipitation is low). The wetness index is lowest in early July (0.37), and the soil during the months immediately after the end of the rainy season is extremely dry. Precipitation is also consistently lower than potential evaporation from mid-January to mid-April (a subhumid period), which is about the same dryness as the summer months.

The data demonstrate that for much of the year the amount of precipitation in Chichijima is less than the potential evaporation; and also show that periods of precipitation are concentrated (Iijima, 2004). Furthermore, these seasonal changes fluctuate greatly from year to year, and there are some extremely dry years (Oka et al., 2000; Yoshida et al., 2006). In addition, there are no major valley systems in the nominated property, the soils in the mountain areas are shallow, and the slopes near the shores are steep and rocky. These soil and topographical conditions combine to make it difficult for soil to retain moisture even when it rains; instead, such water runs off quickly (Iijima, 2004; Kato and Uzukawa, 1982).

Owing to such factors as precipitation, evaporation, soil and topography, there are distinct seasonal wet and dry periods, and the contrast between them is an important feature that characterizes the natural environment of the nominated property (Iijima, 2004).

### 2.a.2.2 The unique climatic conditions forming cloud belts and their effects on the ecosystem

Because of the differences in elevation and wind direction in the islands within the nominated property, there is a wide range of local climatic characteristics. As an example, cloud belts develop on the top of the relatively tall islands such as Minami-iwoto. This is a result of slope upflow and the condensation of moisture in the upflow air above a certain altitude on slopes; such topographical conditions lead to the formation of fog. In arid regions the minimum altitude for cloud belts to form is relatively high, but on oceanic islands this altitude is lower (Oka, 2004). Kita-iwoto (792 m), Minami-iwoto (916 m), and Hahajima (462 m) meet the conditions for cloud belt formation. The frequent presence of fog, accompanied by high levels of humidity, allows many bryophytes, epiphytes and tree ferns to flourish, contributing to the distinctive scenery of the cloud belts. Such localized climatic conditions on individual islands are part of the unique environment of the Ogasawara Islands.

## 2.a.3. Plants

Many oceanic islands of the world are tropical, but the nominated property is located in a milder subtropical zone. For this reason, it has many plant species that have origins in the subtropical regions of Southeast Asia, such as *Schima mertensiana, Planchonella obovata, Elaeocarpus photiniaefolius, Rhaphiolepis indica* var. *umbellata, Distylium lepidotum, Syzygium buxifolium*, and *Ardisia sieboldii*. In addition, there are many northern species that have originated in the mainland of Japan (means here Honshu, Shikoku, and Kyushu expect Hokkaido due to the fact that Hokkaido is located to the north of Blakiston's Line and thus has largely different fauna and flora), such as *Stachyurus praecox* var. *macrocarpus* and *Rubus nakaii*, as well as southern species including *Meterosideros boninensis* and *Santalum boninense*. These species with diverse origins are a characteristic feature of the property and have achieved unique speciation. So despite the islands being oceanic and of small size, there are many plant species and the proportion of endemic species is high. A total of 138 families, 445 genera, and 745 species of vascular plants (including subspecies and varieties) have been recorded, of which, 441 are native, and 161 are endemic (Nature Conservation Bureau, MOE, 2004; Fujita et al., 2008). The conservation measures to protect threatened species are discussed in 4.a.1.



Sclerophyllous scrub *(photo:Hideyuki Chiba)*

### 2.a.3.1 Vegetation types

The nominated property has a relatively short history of human activities and this has helped to preserve diverse natural vegetation on each island (Fig. 2-7) (Okutomi et al., 1983; Miyawaki, 1989). The Hahajima Island Group, Chichijima Island Group, and Kazan Island Group have particularly large natural vegetation areas. Different vegetation types dominate the different islands, forming a diverse natural environment. The characteristic vegetation types of the nominated property are described below.

### Sclerophyllous scrub

One of the characteristics of the nominated property is the wide distribution of sclerophyllous scrub - dominated mainly by *Distylium lepidotum* and *Rhaphiolepis indica* var. *umbellate*. The shrubs and small trees range in height from around five to eight meters and are suited to dry climates, much like the sclerophyllous forests of the Mediterranean. The areas covered by sclerophyllous scrub include northeastern and southwestern parts of Anijima and Chichijima, the southernmost part of Hahajima, and the entire areas of Mukohjima, Meijima, Anejima, and Imotojima. Most likely, the mild subtropical climate and the low levels of precipitation helped develop these globally rare types of vegetation (Ono, 1994). Three types of sclerophyllous scrub communities can be seen covering the relatively gentle slopes atop Chichijima and Anijima: Distylio-Pouterietum dubiae, *Distlium lepidotum* variant of Machilus kobu-Schimetum mertensianae, and *Osteomeles lanata* association (sclerophyllous dwarf scrub), the latter being one of the plant communities in rocky desert on a continent. They cover 477 ha of Anijima (about 60% of the total area), and 481 ha (about 20% of the total area) of Chichijima, mainly on the Yoakedaira and Mt. Chuosan-Higashidaira areas.

The sclerophyllous scrub covering the gentle slopes atop Chichijima (Yoakedaira and Mt. Chuosan-Higashidaira area) and Anijima (overall) have so far not been disturbed by human activity. Based on data collected for Mt. Chuosan-Higashidaira area in 1976 and 1997 (Shimizu, 1999), as well as those of Distylio-Pouterietum dubiae, *Distlium lepidotum* variant of Machilus kobu-Schimetum mertensianae, and plant communities in rocky desert (TMG, 1997), 69 endemic species to Ogasawara Islands have been confirmed in the sclerophyllous scrub communities. This translates into a high endemic ratio of 67% (80.6% for woody plants) (Bureau of Environment, TMG, 2007).

On Hahajima Island Group, *Pittosporum parvifolium* var. *beecheyi*, endemic to this island group, grows in the sclerophyllous scrub of Wikstroemio-Pouterietum-dubiae dominated by *Planchonella obovata* var. *dubia, Rhaphiolepis indica* var. *umbellata* and other such species. These characteristic sclerophyllous scrubs of the Hahajima Island Group have formed on steep slopes, ridges, and wind-beaten terrain with poorly developed soil (Okutomi et al, 1983; Shimizu, 2008). The sclerophyllous scrubs in Hahajima Island Group cover 37 ha of Anejima (about 26% of the total area), and 60 ha (about 48% of the total area) of Imotojima, 42ha (about 48% of the total area) of Meijima, and 61 ha (about 44% of the total area) of Mukohjima.



*Distylium lepidotum (photo:Takaya Yasui)*



*Rhaphiolepis indica* var. *umbellata (photo:Takaya Yasui)*

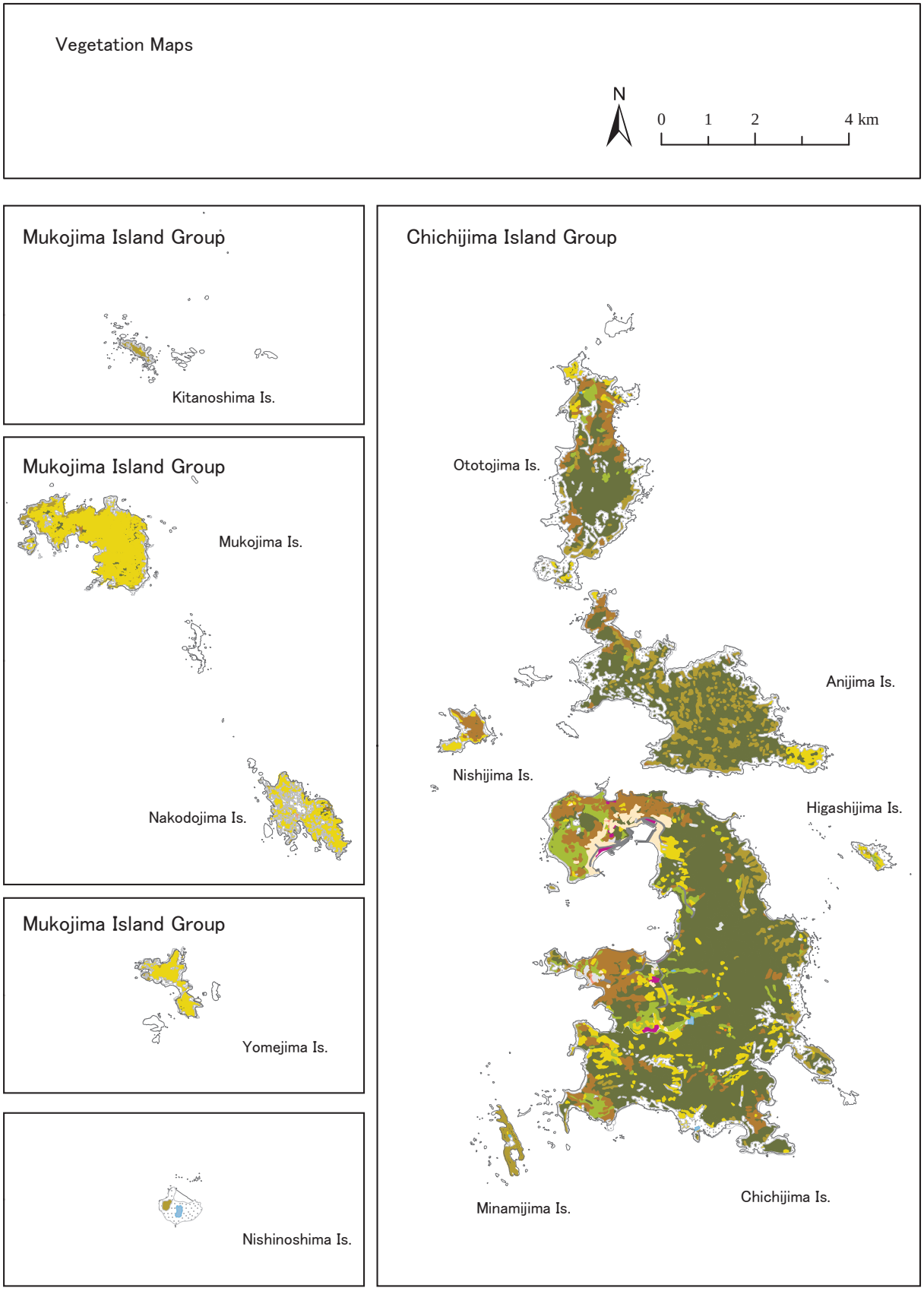



Fig. 2-7-1 Vegetation map (Mukojima, Chichijima Island Groups, and Nishinoshima Island)

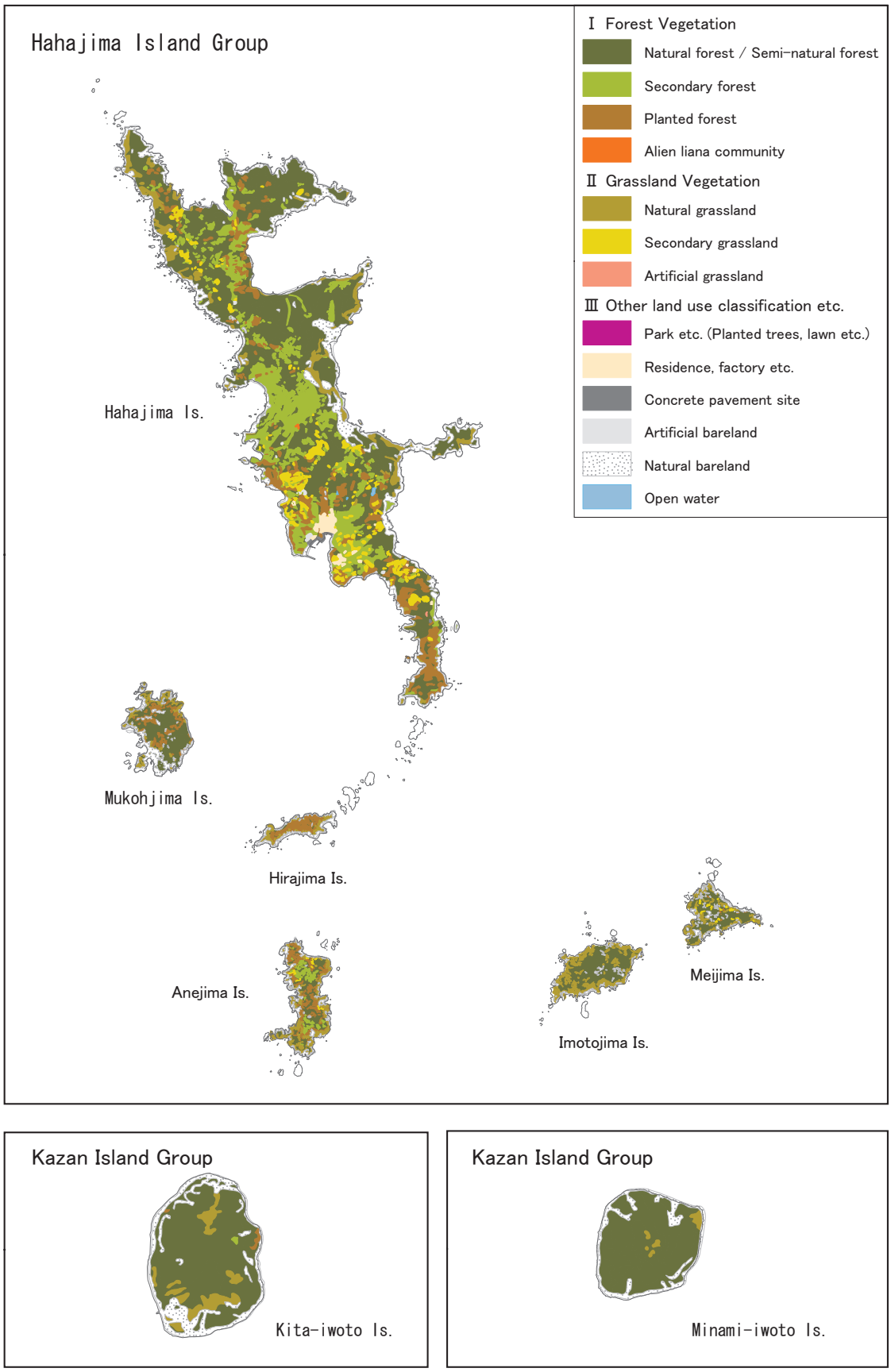



Fig. 2-7-2 Vegetation map (Hahajima Island Group, Kita-iwoto and Minami-iwoto Islands)

### Subtropical rainforest (Pisonio-Elaeocarpetum photiniaefoliae)

In the Sekimon locality of Hahajima, the Pisonio-Elaeocarpetum photiniaefoliae, subtropical rainforest community, grows to a height of 20 m or so. It contains many plants of Southeast Asian origin, such as *Elaeocarpus photiniaefolius, Pisonia umbellifera, Ardisia sieboldii, Planchonella obovata, Morus boninensis, Celtis boninensis* and *Melia azedarach*. Pisonio-Elaeocarpetum photiniaefoliae is the most developed of the forest communities of the Ogasawara Islands (Okutomi et al., 1983). There are many endemic species in this community, notable ones being *Hibiscus glaber* and *Ochrosia nakaiana*. On the limestone rocks of the Sekimon locality, *Asplenium ikenoi* and *Procris boninensis* can be found but their distribution is extremely limited. Because the Ogasawara Islands lack shade-tolerant trees (such as oaks that become dominant in climax forests on the continent and the mainland of Japan), the composition of subtropical rainforests are characterized by shade-intolerant tree species typical of oceanic island vegetation. Unique regeneration patterns due to gaps attributable to typhoons and other disruptions have also been observed (Shimizu, 1998).



*Morus boninensis* *(photo:Hideyuki Chiba)*



Subtropical rain forest *(photo:Mitsuhiko Toda)*

### *Ardisia sieboldii* forests

The forests dominated by *Ardisia sieboldii* and *Schima mertensiana* are the Machilio boninensis-Ardisietum sieboldii (Okutomi et al., 1983). Machilio boninensis-Ardisietum sieboldii is spread over a large area in Hahajima. The *Fatsia oligocarpella* variant of Machilio boninensis-Ardisietum sieboldii occurs in cloud belts on Hahajima. Plant species such as *Fatsia oligocarpella, Colysis pothifolia, Cyathea spinulosa*, and *Goodyera boninensis* grow in this forest community. This forest community is also noted for its richness in epiphytes.



*Meterosideros boninensis (photo:Takaya Yasui)*

### 2.a.3.2 Flora

The diverse flora of the Ogasawara Islands includes plant species with origins in Southeast Asia, Oceania, the main island of Japan, as well as other endemic plants of unknown origin (Toyoda, 2003; Ono and Kobayashi, 1983). It is extremely difficult for dispersal unit (disseminule) such as seeds to transfer to oceanic islands. The plant species dispersed to the Ogasawara Islands are thought to have been carried by ocean currents, winds, and birds with a very low probability.

One of the characteristics of the area is that species with diverse origins achieved even further speciation, so despite the islands being oceanic and small in size, they have a high proportion of endemic species. The MOE Red List (2007) also includes 144 species that grow on the Ogasawara Islands, which is an extremely high number, making the area an important habitat for threatened plants.

### Origins of the flora

About 70% of the component species of flora on the Ogasawara Islands are of Southeast Asian origin. In contrast, there are few species in common with Oceania (Micronesia, Polynesia, etc.), which is relatively close geographically, and even fewer related to those on the Izu Islands or the mainland of Japan (Fig. 2-8) (Toyoda, 2003). It is thought that the tropical Oceania-derived and the other endemic plants are the oldest, while Southeast Asian-derived plants (which are greater in number of species) are newer (Toyoda, 2003; Shimizu, 2007).

Some of the Southeast Asian-derived plants are *Schima mertensiana, Distylium lepidotum, Claoxylon centinarium, Elaeocarpus photiniaefolius*, and *Wikstroemia pseudoretusa* (Toyoda, 2003). *Meterosideros boninensis, Santalum boninense, Lobelia boninensis, Clinostigma savoryanum, Psychotria homalosperma, Boninia glabra, Hedyotis grayi, Osteomeles schwerinae* are some species that are closely related to plants on the islands of Oceania. For example, the species most closely related to *Meterosideros boninensis*, which is endemic to the Ogasawara Islands, is found on Fiji, and it is thought to be particularly old in origin (Wright et al., 2000). All of these species are highly endemic and speciation is thought to have occurred a long time ago. Since there are few species that have become dominant in the forest and many of the species grow on the forest edge on ridges, and on sea cliffs, it is often postulated that they came to the Ogasawara Islands far in the distant past and became endemic; subsequently, Southeast Asian plants came to the islands and displaced them (Shimizu, 1998). It is thought that suitable conditions developed for Southeast Asian plants of a highly subtropical nature to replace much of the tropical vegetation that once covered the Ogasawara Islands (Toyoda, 2003; Shimizu, 2007).



*Schima mertensiana (photo:Mitsuhiko Toda)*

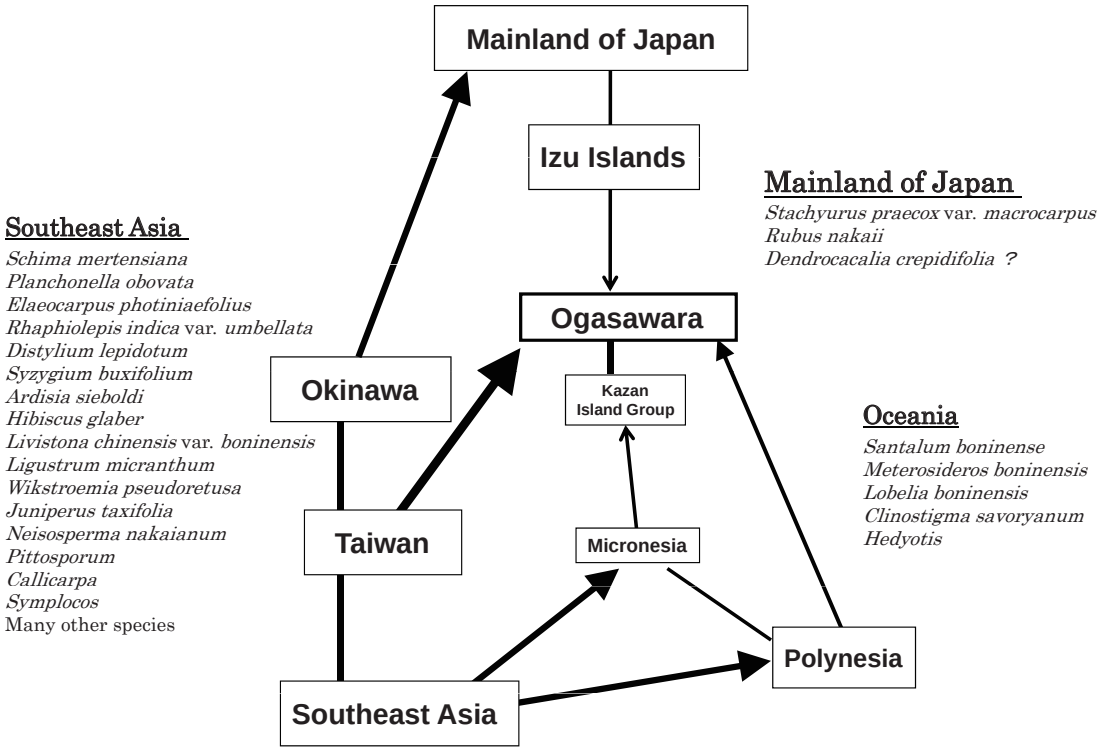



**Fig. 2-8 Origins of flora of the Ogasawara Islands** *(Revised from Shimizu, 2007)*

### Endemic species

The flora of the Ogasawara Islands is characterized by a higher number of species per area and higher percentage of endemic species than the mainland of Japan, the Ryukyu Islands, Taiwan, etc. There are 441 species of vascular plants (excluding alien species) on the Ogasawara Islands, which include two endemic genera and 161 endemic species, for an endemic ratio of 36% (Nature Conservation Bureau, MOE, 2004). Woody plants have an even higher endemic ratio of 64%, with two endemic genera and 88 endemic species out of 138 species in total.

Characteristic species of the Ogasawara Islands include the following three endemic genera: *Boninia* (Rutaceae), *Dendrocacalia* (Asteraceae), and *Marattia* (Marattiaceae, fern). There are also several genera with at least three endemic species each: *Pittosporum* (Pittosporaceae), *Boninia* (Rutaceae), and *Machilus* (Lauraceae) (Table 2-1).



*Juniperus taxifolia* *(photo:Keita Fukasawa)*

The endemic species *Juniperus taxifolia* (Cupressaceae) is the only conifer native to the Ogasawara Islands. It grows in broad areas from the shores to the summits of the Chichijima and Hahajima Island Groups. Very different growth types can be seen depending on conditions and environments of the area where it grows. Sometimes it creeps on the ground, and sometimes it grows straight up to heights of several meters (Kato, 2004).

**Table. 2-1 Genera on the Ogasawara Islands including at least three endemic species**

*(Compiled with data from Soejima, 1995 and Nature Conservation Bureau, MOE, 2004)*

| Genus (Family) | No. of species | Species | Estimate No. of ancestral species | Distribution | | | |
|---|---|---|---|---|---|---|---|
| | | | | Mukojima Island Group | Chichijima Island Group | Hahajima Island Group | Kazan Island Group |
| *Pittosporum* ( PITTOSPORACEAE ) | 4 | *boninense*<br>*boninense* var. *chichijimense*<br>*parvifolium*<br>*parvifolium* var. *beecheyi* | 1 | | ○<br>○<br>○ | ○<br>○ | |
| *Callicarpa* ( VERBENACEAE ) | 3 | *glabra*<br>*parvifolia*<br>*subpubescens* | 1 | ○ | ○<br>○<br>○ | ○<br>○ | ○ |
| *Crepidiastrum* ( COMPOSITAE ) | 3 | *ameristophyllum*<br>*grandicollum*<br>*linguifolium* | 1 | | ○<br>○<br>○ | ○<br>○ | |
| *Boninia* ( RUTACEAE ) | 3 | *glabra*<br>*grisea*<br>*grisea* var. *crassifolia* | 1 | ○ | ○<br>○<br>○ | ○<br>○ | ○ |
| *Ilex* ( AQUIFOLIACEAE ) | 4 | *matanoana*<br>*mertensii*<br>*mertensii* var. *beecheyi*<br>*percoriacea* | 1-2 | ○<br>○ | ○<br>○<br>○<br>○ | ○<br>○<br>○<br>○ | |
| *Ficus* ( MORACEAE ) | 3 | *boninsimae*<br>*iidaiana*<br>*nishimurae* | 1 | ○<br>○ | ○<br>○ | ○<br>○<br>○ | ○<br>○ |
| *Machilus* ( LAURACEAE ) | 3 | *kobu*<br>*pseudokobu*<br>*boninesis* | 1 | ○<br>○ | ○<br>○<br>○ | ○<br>○<br>○ | ○<br>○ |
| *Symplocos* ( SYMPLOCACEAE ) | 3 | *kawakamii*<br>*pergracilis*<br>*boninensis* | 1 | | ○<br>○ | ○ | |

[Genus *Pittosporum*]



*Pittosporum boninense* *(photo:Takaya Yasui)*



*Pittosporum boninense* var. *chichijimense* *(photo:Takaya Yasui)*



*Pittosporum parvifolium* *(photo:Takaya Yasui)*



*Pittosporum parvifolium* var. *beecheyi* *(photo:Takaya Yasui)*

### Sclerophyllous scrub species and cloud belt vegetation

Many of the same plant genera grow in the sclerophyllous scrub of Ogasawara as in the ohia forests (cloud forests) of Hawaii. One of the reasons proposed is that when the islands of Ogasawara were larger and taller, cloud forests similar to those in Hawaii developed in the cloud belts; as the islands lowered, flattened and split apart due to land erosion and glacial-interglacial sea level fluctuations, species originating in the cloud forests survived in the form of sclerophyllous scrub (Shimizu, 1998).



*Melastoma tetramerum* (photo:Takaya Yasui)

One piece of evidence supporting this hypothesis is the distribution of the genus *Melastoma*. *M. tetramerum* (endemic) grows in the sclerophyllous scrub of Chichijima, while *M. tetramerum* var. *pentapetalum* (endemic) grows in the cloud forest-like environment on Hahajima, *M. candidum* (a widely distributed species) grows in a cloud forest on Minami-iwoto, and *M. candidum* var. *alessandrense* (an endemic variety) grows in a cloud forest on Kita-iwoto. This suggests that *M. tetramerum* was once a species that grew in cloud forest-type environments (Shimizu, 1998).

Another piece of evidence involves the distribution of the genus *Stachyurus*. *S. praecox* var. *macrocarpus* (endemic) grows in the sclerophyllous scrub of Chichijima, while *S. praecox* var. *macrocarpus* (an endemic variety) grows in the cloud belt covering the top of Mt. Chibusa on Hahajima (Shimizu, 1998). Furthermore, it is suggested that *Rhododendron boninense*, which remains in an area around the summit of Mt. Tsutsuji on Chichijima, also used to grow in an environment similar to the cloud belt (Shimizu, 1998).

### The relationship between sclerophyllous scrub and related species of laurel forests on the mainland of Japan and the Ryukyu Islands

The small tree species that form the canopies of sclerophyllous scrub have many species and genera in common with the laurel forests that span from Southeast Asia to Okinawa. However, *Distylium lepidotum* on the Ogasawara Islands has leaves that are more suited to dry conditions than the related *D. racemosum* of laurel forest zones of other areas (Mishio, 1992; Ishida et al., 2008a, 2008b). This suggests that laurel forests transformed into sclerophyllous forests over a long period of increasingly dry environment as the Ogasawara Islands became lower and flatter and the cloud belts gradually disappeared (Shimizu, 1998).

### 2.a.3.3 Modes of evolution

Many endemic species are found in the natural sclerophyllous scrub and subtropical rainforest of the Ogasawara Islands. The species composition of sclerophyllous scrub is thought to reflect the geological history of the islands, especially the lowering and flattening of the islands (as described above). Different forms of speciation can be seen in endemic plant species on the islands, such as the evolution of dioecy, the development of woodiness in herbaceous plants, and so on, all modes of evolution are distinctive to oceanic islands.

### Adaptive radiation and on - going speciation

One of the notable characteristics of the speciation processes of adaptive radiation in plants on the Ogasawara Islands is "parallel speciation", in which many different species have adapted to several types of environments, rather than the speciation resulted from the adaptation of only one species to many different types of environments. Plant species thought to have evolved through adaptive radiation include those in the genera *Pittosporum, Callicarpa, Boninia* and *Symplocos* (Ito and Ono, 1990; Ito, 1998; Ito et al., 1997; Soejima, 1995). As described below, examples of parallel speciation can be seen in many species accompanying various morphological changes adapted to each environment of subtropical rainforest, sclerophyllous scrub, and sclerophyllous dwarf scrub (the latter occurs on very dry ridges with shallow soil beds and often reaches heights of only 0.5-2.0 m; however, there are no distinct boundaries between sclerophyllous scrub and sclerophyllous dwarf scrub in species composition or structure: Shimizu, 2008).

Of three species in the genus *Symplocos*, *S. pergracilis* and *S. kawakamii* grow on the Chichijima Island Group, while the remaining *S. boninensis* occurs only on Mukohjima in the Hahajima Island Group. *S. pergracilis* grows in sclerophyllous scrub of 3-7 m in height, while *S. kawakamii* grows in much drier sclerophyllous dwarf scrubs of 0.5-1.5 m. It is thought that sclerophyllous dwarf scrubs diverged from sclerophyllous scrubs to adapt to drier conditions, and in parallel with this vegetation diversification, *Symplocos kawakamii* also diverged from *S. pergracilis* (Soejima el al., 1994; Shimizu, 1989).

In the genus *Boninia, B. grisea*, which has large leaves and reaches heights of over 10 m, is seen in subtropical rainforest, while the shorter *B. glabra* grows in sclerophyllous scrub, and the *B. grisea* var. *crassifolia*, which has thick and small leaves thought to have evolved to adapt to drier environments, grows in even shorter communities of sclerophyllous dwarf scrubs (Kato et al., 1998; Kato, 2004; Shimizu, 1989; Mishio et al., 1997, 2007).

Furthermore, seeds of *Hibiscus glaber*, a species endemic to the Ogasawara Islands and probably derived from *H. tiliaceus* (originating from sea-drifted seeds), lost the ability to float on the seawater in its speciation process. It is known that genetic interaction of *H. glaber* is now limited even between the islands (Takayama et al., 2005). These two species are also different in the range. While the distribution of *H. tiliaceus* is restricted to the coastlines, the distribution of *H. glaber* expands from the coastlines to inland humps of 400 m above sea level (Shimizu, 1984).

A recent study shows that *Syzygium cleyerifolium*, which has been considered

[Genus *Symplocos*]



*Symplocos pergracilis (photo:Hideyuki Chiba)*



*Symplocos kawakamii (photo:Takaya Yasui)*



*Symplocos boninensis (photo:Takaya Yasui)*

a single species, exhibits morphological divergence corresponding to different vegetation types (Fujita et al., 2002). This is an example of ecological release and indicates that speciation in progress can be observed in the Ogasawara Islands.

### The evolution of dioecy

The development of dioecy is a phenomenon often seen on oceanic islands. The mechanism of the evolution of dioecy on islands is not fully elucidated, but there is a theory that dioecy developed as a defense mechanism to avoid the genetic risks caused by self-pollination because pollen-carrying insects lack the ability to fly long distances and tend to carry pollen between the flowers of the same plant (Kato and Nagamasu, 1995). In fact, there are many specimens on the Ogasawara Islands that exhibit dioecious trends. One of the characteristics of the area is that there are species in which dioecy is incomplete and in progress at the very moment (Kondo et al., 2007; Nishide et al., 2009).

For instance, *Wikstroemia pseudoretusa*, a species endemic to the Ogasawara Islands, is dioecious, but *Wikstroemia retusa*, a species in the Nansei (Okinawa, Ryukyu, etc.) Islands thought to be most closely related, produces hermaphroditic flowers. For this reason, it is thought that *W. pseudoretusa* evolved into a dioecious form after arriving in the Ogasawara Islands (Sugawara et al., 2004).

All the three species endemic to the Ogasawara Islands belonging to the genus *Callicarpa,* i.e. *C. subpubescens, C. glabra*, and *C. parvifolia*, have specimens that produce either hermaphrodite or male flowers. However, it has become clear that the pollen from specimens that produce hermaphrodite flowers lacks germ pores (i.e. small opening on pollen for germination) and thus lacks pollination ability, effectively making them female flowers. It is thought that this pollen lacking germ pores developed specifically as a reward (food) to attract insects (Kawakubo, 1990). There are no other dioecious plants in the family Verbenaceae known outside the Ogasawara Islands, indicating that this feature is likely to have evolved on the Ogasawara Islands. In addition, *Dendrocacalia crepidifolia*, another species endemic to the Ogasawara Islands, has also evolved into a dioecious species (Kato and Nagamasu, 1995).

### The development of woodiness in herbaceous plants

The development of woodiness in herbaceous plants is particularly evident in the Asteraceae, Cactaceae, and Campanulaceae families in oceanic islands such as the Hawaiian Islands, the Galápagos Islands, and the Juan Fernández Islands (Ono, 1994). A similar phenomenon can be seen in the nominated property.

On the Ogasawara Islands, woodiness can be seen in three endemic species

[Genus *Callicarpa*]



*Callicarpa glabra* (photo:Takaya Yasui)



*Callicarpa parvifolia* (photo:Eri Nakajima)



*Callicarpa subpubescens* (photo:Hideaki Mori)

in the family Asteraceae: *Dendrocacalia crepidifolia, Crepidiastrum linguifolium*, and *C. ameristophyllum*. It is considered that the development of woodiness in these species occurred in the course of speciation after arrival of their herbaceous progenitor species at the islands (Ito, 1992; Ito and Pak, 1996; Kato, 2004). Of these, *Dendrocacalia crepidifolia* is a particularly large tree, growing 4-5 m in height and having a trunk that can reach up to 10 cm in diameter.

As for *Lobelia boninensis* (Campanulaceae), all the species in the same genus seen in the mainland of Japan are herbaceous, and it is speculated that this species also evolved from a herbaceous form into a woody plant. Flowering specimens of this species reach heights of up to 3 m, but unlike other woody plants they have monocarpic characteristics (Kato, 1994; Toyoda, 2003; Uchiyama and Kachi, 1996,1998; Uchiyama et al., 1996).

### The coevolution of fauna and flora

Many examples of the coevolution of plants and insects can be seen on the Ogasawara Islands. This phenomenon can be seen in the three endemic species of the genus *Ficus*: *F. iidaiana, F. boninsimae*, and *F. nishimurae*. The *Ficus* genus developed a symbiotic pollination system relying on the fig wasps that parasitize *Ficus* flowers. Furthermore, in most cases there is one species of fig wasp acting as pollinator for each *Ficus* species, which is an example of species selectivity. Yokoyama (2003) has analyzed the distribution of *Ficus* species and fig wasps on the Ogasawara Islands and has proposed the following coevolutionary process: 1. populations of *Ficus* species establieshed in different environments on the Ogasawara Islands; 2. gene flow in *Ficus* and fig wasps became restricted, leading to changes in the characteristics of the fig wasps, and then; 3. further gene flow restriction caused genetic differentiation in the species of *Ficus*.



*Dendrocacalia crepidifolia (photo:Takaya Yasui)*

In addition, as stated later (see the section on insects), the absence of active ants in the past on the Ogasawara Islands is thought to have contributed to the loss of extrafloral nectaries that served to attract ants and keep away other predators (Sugiura et al., 2006; Pemberton, 1998; Sugiura, 2007). Among the psyllids of the Ogasawara Islands, of which there are many endemic species, speciation occurred through adaptive radiation, corresponding respectively to three species in the genus *Machilus*: *M. kobu, M. boninensis*, and *M. pseudokobu* (Matsumoto, 2009). Many of the dioecious flowers seen in a variety of taxa, as described above, have most likely resulted from an evolutionary development through their relationship with pollen-carrying insects.

### 2.a.3.4 Biogeographic characteristics of plants in the Ogasawara Islands

***< Chichijima Island Group >***

Natural vegetation and semi-natural vegetation cover the eastern and southern parts of Chichijima. The main natural vegetation includes the Machilus kobu-Schimetum mertensianae, Distylio-Pouterietum dubiae, and Wikstroemio-Pouterietum dubiae (Okutomi et al., 1983). Anijima's proportion of natural vegetation is high and it has a large area of Distylio-Pouterietum dubiae, sclerophyllous scrub. Minamijima is an island made up of limestone from raised coral reefs, and as such has natural vegetation characteristic of limestone beds, including Myoporetum boninensis, Limonium wrightii community, and Lycietum griseolae (Okutomi et al., 1983).

***< Hahajima Island Group >***

Hahajima Island is noted for natural vegetation consisting mainly of Machilio boninensis-



*Elaeocarpus photiniaefolius* (photo:Eri Nakajima)

Ardisietum sieboldii and Pisonio-Elaeocarpetum photiniaefoliae (Okutomi et al., 1983). Shrubs of Dendrocacalietum crepidifoliae dominated by *Dendrocacalia crepidifolia* (Asteraceae), the species endemic to the Ogasawara Islands, occur on the steep slopes and wind-beaten terrain in the cloud belts of Hahajima.

Smaller islands of this island group are mostly covered by natural vegetation. Mukohjima's vegetation is dominated by *Livistonia chinensis* var. *boninensis-Pandanus boninensis* association and Wikstroemio-Pouterietum dubiae. Imotojima, on the other hand, is almost entirely dominated by Wikstroemio-Pouterietum dubiae, which also covers about half of Meijima.

Even though Chichijima and Hahajima are separated only by about 40 km, they have their own endemic species growing on them. The presence of different florae distinctive to different islands is one characteristic of this area. A comparison of the endemic species of both island groups reveals that Chichijima Island Group has 19 species mainly adapting to dry conditions, while Hahajima Island Group has 15 species that grow in relatively damp forests, including fern species. These two island groups share 32 plant species in common, which is a fairly large number, but there are also many species endemic to each island (Toyoda, 2003; Nature Conservation Bureau, MOE, 2004). This suggests that evolution has progressed to the species level on each island.

It is thought that the islands' great distance from the continent, as well as separation between the islands in the archipelago, has led to different processes of evolution among the islands (the "archipelago effect"), resulting in a large number of endemic species (Shimizu, 1998).

***< Mukojima Island Group >***

In Mukojima, forests of Machilio boninensis-Ardisietum sieboldii remain along valleys. These forests have no dominant species, although relatively large areas are covered with *Ardisia sieboldii, Rhaphiolepis indica* var. *umbellate, Neisosperma nakaianum*, and *Livistona chinensis* var. *boninensis* is prominent there (Okutomi et al., 1983; Shimizu, 1993).

***< Kazan Island Group >***

Except coastal bluff areas, the whole Minami-iwoto is covered by pristine natural vegetation, mainly Boninio griseae-Elaeocarpetum pachycarpae, *Machilus kobu-Diplazium virescens* var. *virescense* community, Cyathetum mertensianae, and Cyathetum tuyamae. Also, about 80% of Kita-iwoto is covered with a natural vegetation of Boninio griseae-Elaeocarpetum pachycarpae. Thus this island group is particularly rich in natural vegetation (Okutomi, 1982; Okutomi et al., 1983).

***< Nishinoshima >***

Nishinoshima is a geologically young island that has been heavily affected by submarine volcanic eruptions. Although there are few plant species on the island, the vegetation there is pristine, exhibiting no invasion by alien plant species. The island is an important site to study the processes by which plants disseminated by ocean currents after volcanic eruptions eventually settle on an island. In 1969, there were only three plant species recorded from the island. Then the island erupted in 1973, and four species were newly recorded in 1983, followed by six species in 2004. Of these six recorded in 2004, four species are thought to have been disseminated to the island via ocean currents, and the remaining two dispersed by seabirds or other animals (Abe, 2006).

## 2.a.4. Animals

On oceanic islands that are separated by large distances from the continent and have never been connected to it, all terrestrial animals present are species whose ancestors were somehow capable of crossing vast stretches of the ocean and ended up there through unlikely happenstance. For this reason, the structure of the fauna on such islands is quite distinctive: some taxa are completely absent, or conversely proportions of certain taxa are large. These phenomena account for the extremely disharmonic biological communities typical of oceanic islands (Ono, 1994). As for the terrestrial fauna on the Ogasawara Islands (except birds, which can migrate relatively easily), there are only one mammal species, two reptile species, and no amphibians. With regard to insects, although there is a variety of coleopterous species present on the continent, there is only one species of Cantharoidea and no native Chrysomelidae on the Ogasawara Islands (Takakuwa, 2004). On the other hand, about 25% of the insects naturally distributed over the Ogasawara Islands are endemic. When considered together with the 95% ratio of endemic terrestrial snails, it is clear that the area is characterized by an abundance of endemic species and subspecies that evolved on the islands (Hasuo, 1970).

In short, because the nominated property consists of oceanic islands far from any continent, specific groups of animals have evolved independently, forming a unique fauna. The evolution of this fauna is still on-going, and as such it constitutes a site where the processes of animal diversification can be observed directly.



*Pteropus pselaphon* *(photo:Studio Mononofu!)*

### 2.a.4.1 Mammals

#### Terrestrial mammals

There is only one native terrestrial mammal species: the Bonin flying fox (*Pteropus pselaphon*). The fact that the only mammal is a flying bat embodies the ecosystem characteristics of an oceanic island.

The Bonin flying fox is endemic to the Ogasawara Islands. It is listed as critically endangered (CR) on the IUCN Red List (2008), and CR (endangered IA) on the MOE Red List (2007).

Distribution of this species is confirmed on Chichijima, Hahajima, Kita-iwoto, Iwoto, and Minami-iwoto. Additionally, there is fragmental information on the species inhabiting Anijima (Abe et al., 1994) and Mukojima. The estimated population of the species on Chichijima is about 100 to 160 individuals (Incorporated Nonprofit Organization of Institute of Boninology (hereinafter refferred to as "Institute of Boninology"), 2008) and over 100 on Minami-iwoto (Suzuki et al., 2008), in addition to a few to tens of individuals in other distribution areas (for the current situation of the population and conservation of the flying fox, see the section "4.a.2 Present state of conservation"). The flying fox is reported to feed on 56 species in 19 plant families, including fruit, nectar, pollen, petals, and leaves (Inaba et al., 2004). Flying foxes are known to play an important role in the dispersal of diaspore. Research has shown that the dispersal distance is related to the flying foxes' habitat density (McConkey and Drake, 2006). The Bonin flying fox is likewise an important disperser. In fact, the species is considered crucial for maintaining the forests of the Ogasawara Islands (Inaba et al., 2004).

#### Biogeographic characteristics of the Bonin flying fox populations

***< Chichijima Island >***

This species rests alone or in groups of a few individuals from spring to autumn, but it forms colonies at specific sites during winter. The use of group gregarious resting sites is seen in other flying foxes, but colonization which depends on the season of the year is a peculiar feature of this flying fox on Chichijima, and is thought to be closely related to breeding behavior (Sugita et al., 2009).

***< Minami-iwoto Island >***

The daily behavior of this species in its known distributional areas of Chichijima and Kita-iwoto is nocturnal (Inaba, 2001; Inaba et al., 2002). However, some individuals are observed active in search for food during the day on Minami-iwoto, showing that this species is not necessarily nocturnal. Daytime activities of this species on Minami-iwoto can be attributed to the absence of diurnal predators such as raptors, and to extended searching time for food due to chronic food shortage (Suzuki et al., 2008). Given the absence of impact by alien species, Bonin flying foxes on Minami-iwoto are extremely important to elucidate the pristine biology of this species.

#### Marine mammals

Many species of cetaceans are seen in waters adjacent to the Ogasawara Islands. To date, 23 species in six families have been confirmed (Mori, 2004). There are 86 known species of cetaceans in the world (Jefferson et al., 2008). Excluding the four species that spend their entire life cycles in freshwater, there are 82 species in the world's oceans. This means that about 30% of all cetacean species inhabit adjacent waters of the Ogasawara Islands. These

species represent nearly all cetacean species that are distributed or migrate in the subtropical waters of the North Pacific. The number of species is comparable to that of the Gulf of California, the Gulf of Mexico, and the coastal waters of the Hawaiian Islands and Ryukyu Islands, making waters off the nominated property an important habitat for cetaceans.

Of the 23 species that have been recorded from adjacent waters of the Ogasawara Islands, the IUCN Red List (2008) includes the sei whale (*Balaenoptera borealis*), blue whale (*B. musculus*), fin whale (*B. physalus*), and North Pacific right whale (*Eubalaena japonica*) as endangered (EN), while the sperm whale (*Physeter macrocephalus*) as vulnerable (VU).

Humpback whales (*Megaptera novaeangliae*) and sperm whales have been confirmed breeding in waters around the Ogasawara Islands (Darling and Mori, 1993; Mori et al., 1999). It is known that humpback whales breed in coastal shallow waters of the continents or islands at low latitudes, and there are breeding grounds in Hawaii and Mexico. However, the populations in Asian waters, including the Ogasawara Islands, have little or no interaction with those populations in the eastern and central North Pacific, and they are thought to have their own migratory routes as western North Pacific populations (Calambokidis et al., 2008).

Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) and spinner dolphin (*Stenella longirostris*) occur all year around in the coastal waters off the Ogasawara Archipelago (Mukojima Island Group - Hahajima Island Group). Recent studies suggest that at least the Indo-Pacific bottlenose dolphin has a limited interaction with populations in other areas and it is resident within the areas of the Ogasawara Archipelago (Mori, 2009; Mori and Yoshioka, 2009).

### 2.a.4.2 Birds

The ability of birds to fly makes it relatively easy for them to cross seas but the Ogasawara Islands are separated by about 1,000 km from any other sizeable landmass, so it is not easy even for birds to reach the islands. As a result, the number of bird species that have settled on the islands is limited compared to avifauna on the mainland of Japan. However, birds that did establish on the islands have evolved in isolation over a long period of time, resulting in a very distinctive avifauna that is not seen on the mainland of Japan. Studies of the Ogasawara Islands, the Hawaiian Islands, and the Galápagos Islands suggest that nearly all prominent examples of flora exhibiting adaptive radiation comprise species dispersed by foraging by birds (Ono, 1991); for this reason the role played by avifauna in oceanic island ecosystems is considered to be very important. Furthermore, the Ogasawara Islands serve as an important breeding ground for threatened seabirds.

#### Avifauna

Birds recorded in the nominated property comprise 15 orders, 45 families, and 195 species, excluding those that were only documented before World War II (Hasuo, 1970; Chiba, 1985, 1990; Higuchi, 1984; Hiraoka and Chiba, 1997; TMG, 2001; Suzuki and Chiba, 2004; Institute of Boninology, 2005; Nakano, 2006; Chiba et al., 2007; Clements, 2007).

Of these 195 species, 14 species are listed in IUCN Red List (2008), of which two species are designated as EN, six species as VU, and the remaining six species as near threatened (NT). Also, 39 species and subspecies are listed in the MOE Red List (2006), of which three subspecies are designated CR, 13 species/subspecies as EN (endangered IB), 14 species/subspecies as VU (endangered II), and five subspecies as NT (near

threatened). Of those 195 species, 22 species of native birds have been breeding in the nominated property in recent years. Of these native 22 species, terrestrial birds comprise eight species (nine species/subspecies), they are: one endemic species of Bonin honeyeater (*Apalopteron familiare*), seven endemic subspecies (*Buteo buteo toyoshimai, Columba janthina nitens, Ixos amaurotis squamiceps, I. a. magnirostris, Cettia diphone diphone, Zosterops japonicus alani*, and *Carduelis sinica kittlitzi*), and blue rock thrush (*Monticola solitarius*) (Committee for Check-List of Japanese Birds, 2000).

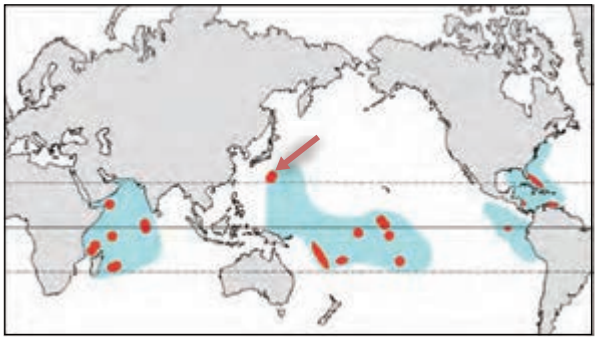
To date, 16 species of seabirds have been reported to breed in the Ogasawara Islands. However, only 14 species have been documented breeding in the nominated property recently because of the local extinction of short-tailed albatross (*Phoebastria albatrus*) and red-footed booby (*Sula sula*) of which nesting is not observed since 1998 (Chiba et al., 2007). With regard to the Laysan albatross (*Phoebastria immutabilis*), the Mukojima Island Group is the only breeding site in the Western Pacific (Onley and Scofield, 2007). The black-footed albatross (*Phoebastria nigripes*) breeds also in Hawaii, but the population in Hawaii differs genetically from the one breeding in the Ogasawara Islands (Eda et al., 2008). In addition, Matsudaira's storm-petrel (*Oceanodroma matsudairae*) and a subspecies of Audubon's shearwater (*Puffinus lherminieri bannermani*) are endemic breeders which means they breed exclusively in Ogasawara Islands, in spite of their wide range of inhabitation in the Pacific and/or Indian Oceans (Fig. 2-9 ).



*Phoebastria nigripes* *(photo:Tatsuya Horikiri)*



Matsudaira's storm-petrel
(*Oceanodroma matsudairae*)



Audubon's shearwater (*Puffinus lherminieri*)
(The arrow shows the breeding site of *P. lherminieri bannermani*)

**Fig. 2-9 Distribution map of seabirds**

**(Blue: Distribution areas in non-breeding period / Red: breeding sites)**

*(Maps taken from the Handbook of the Birds of the World, with modifications. Lynx Edicions, Barcelona)*

### Characteristics of the Bonin honeyeater, an endemic species

There have been records of four endemic species of terrestrial birds occurring on the Ogasawara Islands, however the Bonin honeyeater is the only existing endemic land bird at present.

The Bonin honeyeater, which occurs only on Hahajima and its satellite islands, exhibits the features of a bird that has followed a unique process of evolution in the Ogasawara Islands, an oceanic island group in terms of lifestyle and distribution patterns.

As the Ogasawara Islands are oceanic islands separated by a great distance from the continents, the avifauna is quite different from that on the continents. For example, there is no pheasant species that are typical ground-users, nor woodpeckers that are typical tree-trunk users, nor tits that are typical tree-hollow users. So, native species of the Ogasawara Islands started to use those habitats. It has been reported that the Bonin honeyeaters of Hahajima forage at the tree trunks like woodpeckers, and use tree cavities for nesting instead of nesting in the forks of tree branches, as normally observed for other honeyeaters (Kawakami and Higuchi, 2002). This is considered to be the result of the lack of other competitors using these habitats. Without competitors or terrestrial predators on the Ogasawara Islands, the honeyeaters have come to utilize a variety of places from the upper to understory layers of forests, including the ground, fallen trees, tree trunks, leaves and branches (Kawakami and Higuchi, 2003). In this respect, the bird communities on the oceanic Ogasawara Islands differ from those on the mainland of Japan, and component species are fewer. For this reason, there are more niches available to the Bonin honeyeaters, and they effectively expand to range across these available niches.



*Apalopteron familiare* (photo:Akira Ozono)

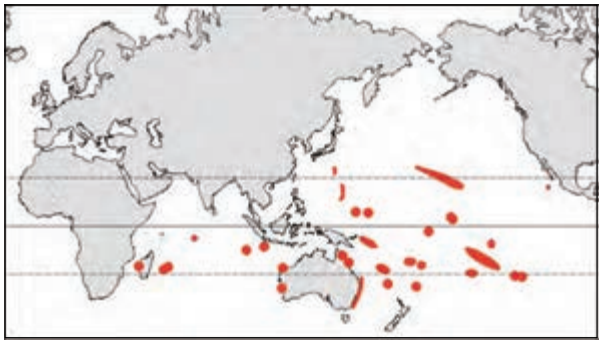
The Bonin honeyeater is thought to be closely related to the golden white-eye (*Cleptornis marchei*) on Saipan (Springer et al., 1995), and there is a possibility that this southern species expanded its distribution. If that is the case, they must have flown across several hundred kilometers of ocean. However, at present the distance of the mere few kilometers of sea that separate the islands in the Hahajima Island Group is a sufficient barrier to the bird's movement. The Bonin honeyeater only occurs on Hahajima, Mukohjima and Imotojima, and does not occur on other nearby islands despite the presence of forest environments capable of supporting it. It is known that there is little movement among them from genetical and morphological analysis of the populations on different islands. It is also observed that there are differences in haplotype compositions on one island dependning on the sampling sites. This suggests the possibility of restriction of their movements even on the same island (Kawakami et al., 2008). This loss of mobility is one of the most striking characteristics of birds that live on oceanic islands.

### Characteristics of the avifauna of the Ogasawara Islands

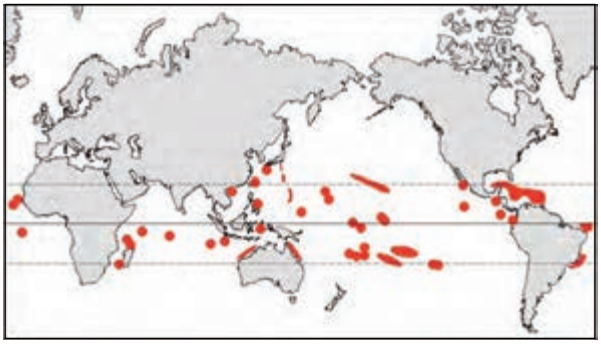
Most of the seabirds documented as breeding on the Ogasawara Islands, such as wedge-tailed shearwater (*Puffinus pacificus*), inhabit tropical and subtropical zones, and the Ogasawara Islands are the northern distributional limit for many of them. In addition, the nominated property is also around the southernmost breeding sites for northern terrestrial birds such as the Eurasian buzzard (*Buteo buteo*), the Japanese bush-warbler (*Cettia diphone*), the brown-eared bulbul (*Ixos amaurotis*), and the Japanese white-eye (*Zosterops japonicus*) (Fig. 2-10). As seen above, the nominated property occupies a location where the habitats of both southern and northern birds intersect.



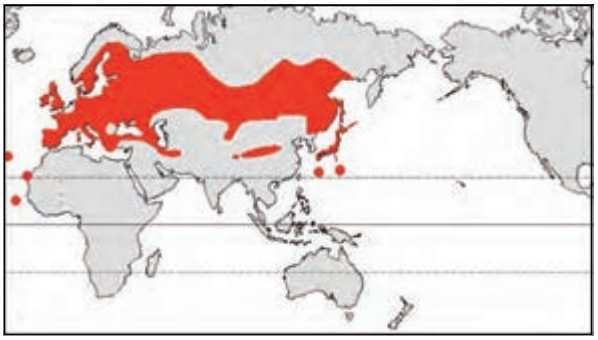
*Sula leucogaster* (photo:Lupin)



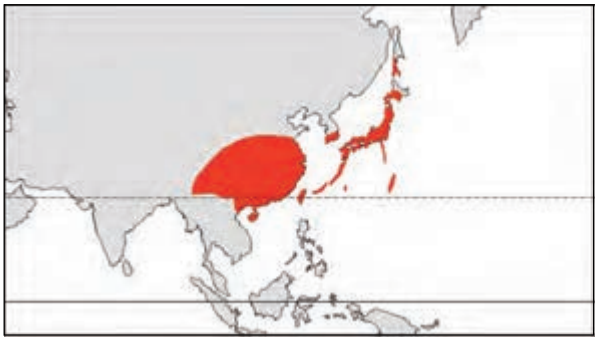
Wedge-tailed shearwater (*Puffinus pacificus*)



Brown booby (*Sula leucogaster*)



Eurasian buzzard (*Buteo buteo*)



Japanese white-eye (*Zosterops japonicus*)

**Fig. 2-10 Breeding areas of the birds that breed in the Ogasawara Islands**
**(Red: Breeding sites)**
*(Maps taken from the Handbook of the Birds of the World, with modifications. Lynx Edicions, Barcelona)*

## Characteristics of component parts of the serial property

Each component part of the nominated property is designated as Important Bird Area (IBA) by BirdLife International. In addition, the Ogasawara Archipelago is designated as an Endemic Bird Area (EBA) by BirdLife International, because it is the habitat of the endemic Bonin honeyeater and *Columba janthina nitens*, a restricted-range species (BirdLife International web page).

### *<Chichijima Island Group>*

A subspecies of Audubon's shearwater (*Puffinus lherminieri bannermani*) was found to breed on Higashijima of this island group in 2007. This is the only breeding record of this subspecies after World War II (Kawakami et al., 2008). Minamijima and Higashijima of the Chichijima Island Group are also the main breeding sites in the Ogasawara Islands for Bulwer's petrel (*Bulweria bulwerii*) (Chiba et al., 2007).

Higashidaira on Chichijima is an important breeding site for *Columba janthina nitens*, and this island group is designated as an IBA because it is the habitat of *Columba janthina nitens*, a restricted-range species.



*Columba janthina nitens* *(photo:Hideyuki Chiba)*

***< Hahajima Island Group >***

As already stated, the Hahajima Island Group is the only area where the endemic Bonin honeyeater currently distributes. They have been observed on Hahajima and two satellite islands: Imotojima and Mukohjima. The island group is also an important habitat for *Carduelis sinica kittlitzi*, an endemic subspecies of oriental greenfinch.

This island group is designated as an IBA, because of its importance as the habitat of the endemic Bonin honeyeater and of *Columba janthina nitens,* a restricted-range species.

***<Mukojima Island Group>***

The Mukojima Island Group is the only confirmed breeding site of the Laysan albatross in the West Pacific, and the main breeding ground in the Ogasawara Islands for the black-footed albatross (Chiba et al., 2007).

This island group is designated as an IBA, because it contains habitats of the black-footed albatross, an internationally threatened species, and of *Columba janthina nitens*, a restricted-range species.

***<Kazan Island Group >***

Matsudaira's storm-petrel has been confirmed to breed only on the Kazan Island Group (Kawakami et al., 2008). Before World War II it was also breeding on Kita-iwoto, but at present its only known breeding place is Minami-iwoto. Because Minami-iwoto has never suffered much human impact to this date, the island serves as important habitat for seabirds such as the Bonin petrel (*Pterodroma hypoleuca*) and Matsudaira's storm-petrel. Furthermore, in recent years, the possibility of Audubon's shearwater breeding there has been suggested (Kawakami et al., 2008).



*Oceanodroma matsudairae* *(photo:Hajime Suzuki)*

This island group is designated as an IBA, because it is a habitat of *Columba janthina nitens*, a restricted-range species, and a regular habitat of more than 1% of the world's population of Matsudaira's storm-petrel and red-tailed tropicbird (*Phaethon rubricauda*), gregarious seabirds.

***<Nishinoshima>***

This island developed its current figuration after submarine eruptions in 1973 and 1974. The terrain of the area is still changing by erosion and volcanic deposits, yet eight species have been recorded breeding there: that is over half of the birds for which there are breeding records in the nominated property. This reaffirms the importance of the area as a breeding site for seabirds (Kawakami et al., 2005).

This island is designated as an IBA, because it is a regular habitat area of more than 1% of the biogeographical population of great crested tern (*Thalasseus bergii*), a gregarious seabird.

### 2.a.4.3 Reptiles

There are only a few reptile species that have crossed the vast distance of ocean to reach and settle on the oceanic Ogasawara Islands, but this fact has contributed to the formation of a unique community structure on the islands.

There are two species in two families of terrestrial reptiles distributed on the islands: the Ogasawara snake-eyed skink (*Cryptoblepharus nigropunctatus*) and the Micronesian gecko (*Perochirus ateles*). The Ogasawara snake-eyed skink has been included in the MOE Red List (2006) as a Near Threatened (NT) species. With regard to marine reptiles, there are four species in two families of sea turtle in the waters off the Ogasawara Islands. All are on the IUCN Red List (2008): the green turtle (*Chelonia mydas*, EN), the loggerhead turtle (*Caretta caretta*, EN), the hawksbill turtle (*Eretmochelys imbricata*, CR), and the leatherback turtle (*Dermochelys coriacea*, CR). It has been confirmed that the green turtle comes ashore every year at beaches on the Ogasawara Islands to lay eggs, making the nominated property important for the conservation of this threatened species.

Among the terrestrial reptiles, the Ogasawara snake-eyed skink endemic to the Ogasawara Islands utilizes a relatively wide variety of habitats, from the ground to trees, while other species of the same genus of *Cryptoblepharus* tend to be ground-dwelling (Suzuki and Nagoshi, 1999). This can be considered a result of this skink expanding its niche through ecological release in an environment where there are few competing species. The green turtle, a marine reptile, inhabits the tropical and subtropical seas of the world, but the species can be divided into several groups according to migration routes and breeding sites. In the Western North Pacific, there is a group that migrates from the northern part of the Mariana Islands to the waters off Japan (Bowen et al., 1992). For this group, the Ogasawara Islands is both the largest and most northern breeding site (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 2007). Egg-laying season on the Ogasawara Islands is from late April to early September. In 2007, about 1,200 and 700 nests per year have been confirmed on Chichijima and Hahajima Island Groups, respectively. The green turtles lay eggs three or four times in one season, which means that over 500 adult females are thought to utilize the Ogasawara Islands as a breeding site. In addition, because the group of green turtles in the waters off the Ogasawara Islands has genetic characteristics different from groups in other areas (Bowen et al., 1992, Karl et al., 1992, Roberts et al., 2004), these turtles are also valuable as subjects for scientific studies on the ecology and evolution of this little-known species. (For the situation regarding their conservation, see "History and development" in Section 2.b.)



*Cryptoblepharus nigropunctatus* *(photo:Hideaki Mori)*



**Green turtle which returns to the sea after laying eggs** *(photo:Hiroo Takahashi)*

### Biogeographic variation in lizards

Lizards of the genus *Cryptoblepharus* are widely distributed in the Pacific and the Indian Ocean regions. In recent years, the taxonomic consensus has recognized that the Ogasawara snake-eyed skink (*C. nigropunctatus*) of the genus's northernmost distribution, is not only a distinct but an endemic species (Horner, 2007; Hikida, 2007). Furthermore, recent genetic analyses have confirmed that this species is genetically diversified even within the Ogasawara Islands (Hayashi et al., 2009). That is, there are major genetic variations among the populations of Mukojima, Chichijima and Hahajima Island Groups. Within Kazan Island Group, the population living on Minami-iwoto is genetically different from that on Kita-iwoto, but is closely related to the populations in the Hahajima Island Group, while the population on Kita-iwoto is genetically close to the populations in the Chichijima Island Group (Hayashi et al., 2009).

As for the Micronesian gecko, an arboreal lizard seen wildely across the island regions of the Western Pacific including the Marianas and the Chuuk Islands, occurs only on Minami-torishima and Minami-iwoto in the Ogasawara Islands; none are present on the other islands to the north (Sengoku et al., 1996).

The biogeographical patterns of these two lizard species are important examples showing that terrestrial fauna in the Ogasawara Islands is formed as a result of the interaction among multiple conditions such as unstable and complex seasonal ocean currents (Asami, 1970a), and the sequence of islands' formation (Asami, 1970b; Yamashita 2004).



*Chelonia mydas* *(photo:Hideyuki Chiba)*



Minami-fukurozawa River *(photo:Satoko Fuchigami)*

### 2.a.4.4 Aquatic animals (except mammals and reptiles)

Aquatic animals such as fish are commonly thought to swim freely in the ocean and easily disperse via ocean currents, but large sections of ocean without any landmass and strong ocean currents in fact form barriers that prevent their movements. For this reason, there are only certain species of aquatic animals capable of traveling to the Ogasawara Islands, which are separated from the nearest landmass by approximately 1,000 km. Aquatic animals that have settled in the waters around Ogasawara, are those species which overcame these prohibitive waters. In addition, freshwater species on the islands are limited to diadromous species thanks to their capability of disperse via sea waters.

#### 1) Freshwater animals

Factors which have affected the characteristics of freshwater animals on the Ogasawara Islands include the fact that there are no large rivers and that they are separated by large distances of ocean from other bodies of inland water. As a result, there are only a few species of freshwater animals. This separation, however, is also thought to have caused some species to evolve into endemic diadromous species, and some of these species to evolve into endemic species that are diadromous in origin but that have strong land-locked tendencies. The Ogasawara Islands are home to peculiar species that have advanced their life history places from coastal waters to brackish water, and then from brackish water to freshwater, making it a valuable area to study the evolutionary progress from saltwater to freshwater.

### *Fish*

Forty species in 19 families of fish have been recorded from the inland water areas of the Ogasawara Islands to date (Yoshigou, 2002). Generally it is well-known that due to the limited, small areas that oceanic islands occupy, in addition to unstable climatic conditions, there are fewer species on such islands than on continental islands.



*Rhinogobius* sp. BI *(photo:Ken-ichi Yokoi)*

There is only one species of freshwater fish endemic to the Ogasawara Islands: *Rhinogobius* sp. BI (a type of goby). It is listed on the MOE Red List (2007) as CR species. Most fish in the genus *Rhinogobius* are freshwater species of the family Gobiidae that have originated on continents and are therefore distributed on continents and continental islands. For this reason, the presence of this particular species on the remote Ogasawara Islands is considered to be an exceptionally rare example. *Rhinogobius* sp. BI has a longer pelagic period than other amphidromous R*hinogobius* species that live in Honshu. This is thought to be an adaptation that increases the possibility of finding rivers to run, as changes in water levels are extreme in Ogasawara and river mouths often become closed (Yokoi, 2006).

### *Crustaceans*

Eight species of freshwater shrimps in five genera in two families have been reported from the rivers of the Ogasawara Islands (Stimpson, 1858; Kato and Takeda, 1981; Suzuki, 1972; Yoshigou, 2002; Satake and Cai, 2005; Satake and Ueno, 2004; Cai et al., 2006). In addition, one shrimp species is reported from anchialine pool (Mitsuya, 1998). These nine shrimp species comprise one species in the family Alpheidae, three species of two genera in the family Palaemonidae, and five species of three genera in the family Atyidae. Of these, there are two species endemic to the Ogasawara Islands: *Palaemon ogasawaraensis* and *Paratya boninensis*. Four species are on the MOE Red List (2006): *Paratya boninensis* (CR+EN), *Metabetaeus minutus* (NT), *Palaemon ogasawaraensis* (NT), and *Atyoida pilipes* (NT).

Seven of these nine species have been amphidromous in their life histories, migrating between rivers and the ocean, while endemic *Palaemon ogasawaraensis* lives only in brackish water. In addition, endemic *Paratya boninensis* lives only in upstream parts of the rivers (i.e. riverheads) and lays small numbers of large eggs, suggesting that they spend their entire life landlocked in rivers. There are no other landlocked freshwater shrimp on other oceanic islands in the world (Satake and Ueno, 2001; Satake and Cai, 2005). Despite *Paratya boninensis* being considered as a landlocked shrimp, it is found in several river systems on Chichijima and Hahajima.



*Paratya boninensis (photo:Kiyoshi Satake)*

As for crabs, seven species in seven genera in three families have been reported on the Ogasawara Islands (Yoshigou, 2002). *Eriocheir ogasawaraensis* moves to the sea to mate, but normally lives in a freshwater environment (Kobayashi, 2005). *Uca crassipes* inhabits the tidal flats at the mouths of rivers (Imajima, 1970). Little is known, however, about the distribution of the other species. At present, *E. ogasawaraensis* is the only recognized endemic species to the Ogasawara Islands (Komai et al., 2006) and is included in the MOE Red List (2006) as VU.

The Ogasawara Islands have six species of terrestrial hermit crabs reported. Five of them belong to the genus *Coenobita* while one is a coconut crab of the genus *Birgus* (TMG Board of Education, 1987; Sasaki and Horikoshi, 2008; Asakura, 2004). *Birgus latro* and *Coenobita perlatus* are categorized as VU on the MOE Red List (2006). Of these crab species, only *Coenobita purpureus* is endemic to Japan. It is distributed in Kagoshima, the Amami Islands, Okinawa Island, Miyakojima Island, and the Yaeyama Islands (Sasaki and Horikoshi, 2008). All the *Coenobita* species were designated as Japan's Natural Monuments in 1970.

As for other crustaceans, two species of isopods have been reported from inland water environments in the Ogasawara Islands. They are thought to be endemic to Ogasawara (Nunomura and Satake, 2006; Nunomura et al., 2008). Of these, *Gnorimosphaeroma boninense*, is listed as critically endangered (CR+EN) on the MOE Red List (2006).

### *Gastropods*

To date, 17 species in 11 genera in six families of freshwater gastropods have been recorded on the Ogasawara Islands (Habe, 1969; Kanno, 1973; Komatsu, 1993; Fukuda, 1993, 1995; Satake et al., 2006; Institute of Boninology, 2007, 2008). Of these, three species are on the MOE Red List (MOE, 2007): *Stenomelania boninensis* (VU), *Neritodryas subsulcata* (VU), and *Septaria lineata* (NT) .



*Stenomelania boninensis (photo:Hitoshi Imai)*

*Stenomelania boninensis* is a freshwater gastropod endemic to Ogasawara that belongs to the genus *Stenomelania* of the family Thiaridae. It is thought to have diverged five to three million years ago from an ancestor in common with *S. juncea*, which lives on and south of Yonaguni (Miura et al., 2008). Most of the component species that make up the genus *Stenomelania* are widely distributed in the tropics of the western Pacific Ocean. *S. boninensis*, which diverged into a species endemic to only certain island groups, is unusual species in this genus. The genus is also amphidromous, developing into a young shell after pelagic larval period, and its distribution is considered to be limited to river mouths near brackish areas and lowland rivers (Bandel et al., 1997; Köhler and Glaubrecht, 2001). However, while *S. boninensis* has a pelagic larval stage (veliger), it lives only in freshwater with no brackish area (Sasaki et al., 2009), and its distribution extends up to headwaters of 250 m or more above sea level. It is also capable of reproducing and growing in pure freshwater environments (personal communications with Sasaki, Satake, and Chiba). In Thiaridae, the only other species whose distributions extend up to

such high elevations and that can spend their entire lives in freshwater are those groups of species in which the female directly produces living young shell (viviparity). *S. boninensis* is the only known species of this kind in the world that has a pelagic larval period. From the standpoint of evolutionary ecology, *S. boninensis* is an extremely valuable species in that it could contribute to the elucidation of the processes by which gastropods adapt to pure freshwater environments.

### 2) Marine animals

As stated above, the barriers such as ocean currents and distance from continental coasts have limited the number of species in the marine fauna. Most of the component species arrived at the islands coincidentally. As a general rule, there are fewer endemic species of marine animals seen in small areas compared with terrestrial animals; however, in areas separated from large landmasses by large distances, such as the Ogasawara Islands, there are some endemic species, most notably those that inhabit coastal waters and brackish water environments.

#### *Fish*

There are 795 species of fish reported around the coastal waters of the Ogasawara Islands (Randall et al., 1997; Nakabo, 2002). The fish fauna of the Ogasawara Islands is more similar to that of southern islands such as the Marianas than the Izu Islands to the north. Furthermore, comparison with east-west regional Pacific piscifauna shows a similarity with fish fauna in the western Pacific, demonstrating that these species have been strongly influenced by the highly diverse Western Pacific and southern seas (Senou, 2004).

As for the distribution of these fish in marine areas, there are many areas that have not been sufficiently studied, and since there is a high probability of the same species being found in other waters, it is difficult to confirm that any of them is a species endemic to the Ogasawara Islands. Nevertheless, as of now, *Scarus obishime*, *Genicanthus takeuchii, Ammodytoides kimurai,* and *Pseudamia rubra* are considered endemic species, as they have not been recorded outside of the Ogasawara Islands, aside from random, incidental spottings (Senou, 2004).

#### *Gastropods*

Two subclasses, 15 orders, 112 families, and 1,031 species of marine gastropods have been reported around the Ogasawara Islands (Fukuda, 1993, 1994, 1995). Of these, there are 884 species (85.7%) of Prosobranchia and 147 species (14.3%) of Heterobranchia. Within Prosobranchia, there are 148 species (16.7%) in Archaeogastropoda, 327 (37%) in Neotaenioglossa, and 409 (46.3%) in Neogastropoda. The low ratio of Archaeogastropoda species is a common characteristic of oceanic islands and is also seen in the Hawaiian, the Mariana, and the Seychelles Islands.

There are few species that are endemic to the Ogasawara Islands in the strictest sense, i.e. species not present on the southern tip of the Izu Islands or the northern tip of the Mariana Islands. The number is thought to be less than five. These include *Cellana mazatlandica*, which is designated as a Natural Monument, as well as *C. enneagona*, and *Lunella ogasawarana* (Tachikawa, 2009).

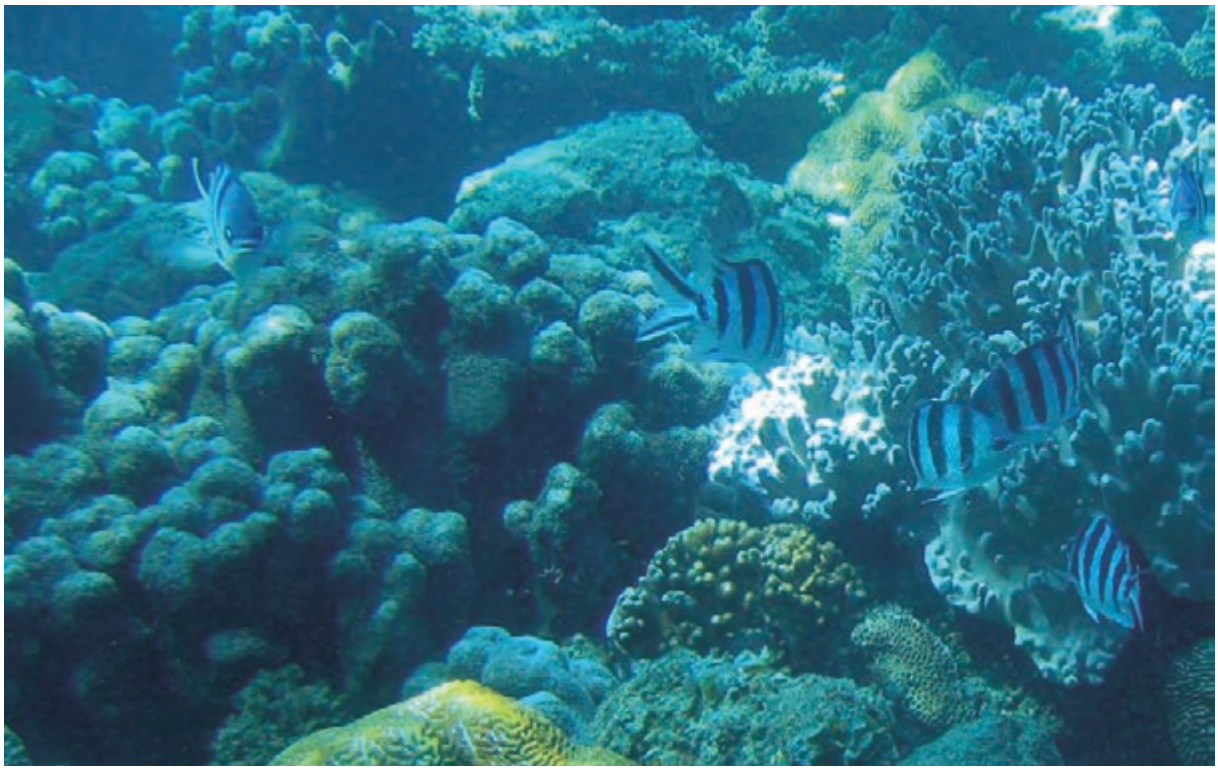
#### *Hermatypic corals*

To date, 226 species of hermatypic corals have been reported from the Ogasawara Islands (the Japanese Coral Reef Society and MOE, 2004). The reason why the number of species

is relatively small is thought that the inflow and outflow of species at the Ogasawara Islands have been limited due to the lack of the effects of the main Kuroshio Current and the equatorial countercurrent. The major component species include *Acropora florida*, which forms large colonies, and massive or encrusting species of Faviidae family. However, one of the characteristics of the Ogasawara Islands is that coral community structure mainly composed of diverse species of *Acropora* rarely occurs in this area (Inaba, 2003).

There are few coasts suitable for hermatypic corals to develop because of the narrow wave-cut benches around the islands there, formed by wave erosions in Holocene epoch.

Aside from data on a part of Chichijima, there is very little information available on the structure and distribution of coral communities. The size of coral reefs varies widely depending on the particular island, but there are discontinuous apron-type reefs around each island (Inaba, 2004). The main distribution areas where relatively developed hermatypic corals can be seen are: the shores off Futami Port and Tatsumi Bay on Chichijima, the Anijima Straight, Takinoura Bay on Anijima, and Higashi Port and Kita Port on Hahajima (Inaba, 2004). Except these areas, there are continuous sheer cliffs on the Chichijima and Hahajima Island Groups, which makes poor conditions for the coral communities to develop, leaving patchy formations of small and encrusting species of Mussidae and Faviidae families on the surface of rock reefs (Inaba, 2004). In this way, the Ogasawara Islands have characteristic coral communities as oceanic islands, and thanks to the fact that the islands are adjacent to the open ocean, they are less affected by high sea temperatures (Inaba, 2003). Therefore, as coral communities in other areas are disturbed by bleaching, those of Ogasawara have a potential role as a gene pool; this makes the Ogasawara Islands an important site for coral conservation.



**Hermatypic corals** *(photo:Yuji Takafuji)*



*Chrysochroa holstii (photo:Shin-ichi Suda)*

### 2.a.4.5 Insects

One of the characteristics of the insect fauna on the Ogasawara Islands is the large proportion of endemic species and the imbalance in taxonomic composition. At present, there have been 1,380 species (including subspecies) of insects recorded in total. Of these, 18 genera, as well as 379 species are endemic (proportion of endemic species: 27.5%). Some insect taxa are not represented because most of Ogasawara's component species reached the islands by flying, were carried by seasonal winds or typhoons, or floated on ocean currents, resulting in this imbalanced taxonomic composition. Insect communities formed by the imbalanced taxa have created unique interactions among organisms, which in turn has resulted in evolution and ecosystems unique to the islands.

The insect fauna on the Ogasawara Islands is characterized by Indomalayan (which includes Southeast Asia), Micronesian, and Palearctic elements. Most of the endemic species are either Indomalayan or Micronesian species. Species with origins in these zones became established in Ogasawara quite early. The ancestral populations of these species spread to different islands in the area, and after being separated from each other, they evolved into endemic species or subspecies (Takakuwa, 2004).

### The insect fauna of the Ogasawara Islands

The insect fauna of Ogasawara is characterized by larger proportion of endemic species than seen on the Japanese Archipelago and, as already stated, an imbalanced taxonomic composition.

As of 2009, there were 1,380 species of insects recorded from the Ogasawara Islands (e.g., Ohbayashi et al., 2004). These species are included in 23 orders in total:

- 442 species of beetles (Coleoptera),
- 266 species of moths and butterflies (Lepidoptera),
- 214 species of stink bugs, cicadas, leafhoppers, etc. (Hemiptera),
- 213 species of flies (Diptera),
- 124 species of wasps, ants, and bees (Hymenoptera),
- 23 species of grasshoppers, locusts, and crickets (Orthoptera),
- 20 species of thrips (Thysanoptera),
- 15 species of dragonflies and damselflies (Odonata),
- 12 species of lacewings (Neuroptera),
- 12 species of springtails (Collembola)

and 13 other orders each of that has less than 11 species.

Endemic species account for up to around a quarter of these insects, a typical feature of oceanic islands. Some major orders with high proportion of endemic species are Coleoptera at 33.0%, Diptera at 32.9%, Hemiptera at 28.0%, and Hymenoptera at 30.6% (Table 2-2).

The imbalanced taxonomic proportions suggest that only certain taxa were able to reach the islands, as the Ogasawara Islands are so remote from any large landmass. In the beetles, which have been relatively well-researched, there are many species with larvae that bore into wood, while there are only few that depend on living plants. For example, there are many species of jewel beetles (Buprestidae) and tumbling flower beetles (Mordellidae), which are not prevalent on the Japanese Archipelago, yet there are thought to be no native species of phytophagous scarabaeids or leaf beetles (Chrysomelidae). In addition, there are no records of mayflies (Ephemeroptera) or stoneflies (Plecoptera), which not only spend their larval stages in freshwater but have short life spans as adults and have fragile bodies. There are also no records of stick insects (Phasmida), which lack the ability to travel long distances on their own and rely on living plants for food. This imbalanced composition ratio is called "taxonomic disharmony," and is one of the characteristic features of oceanic islands.



*Boninthemis insularis* (photo:Hideaki Mori)

**Table 2-2 Comparison of numbers of insect species between Ogasawara and the whole Japan**

*(Kyusyu University et al. (Eds.), 1989; see Appendix 3 )*

| | Whole Japan (1989) | | Ogasawara Islands (see Appendix) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Order | No. of species | Proportion in the whole | No. of families | No. of genera | No. of species | No. of endemic species | Percentage of endemic species | Proportion in the whole | Ogasawara/ Japanese mainland |
| Collembola | 360 | 1.28 | 8 | 12 | 12 | 0 | 0.0 | 0.94 | 3.33% |
| Protura | 50 | 0.18 | 2 | 2 | 2 | 0 | 0.0 | 0.16 | 4.00% |
| Diplura | 13 | 0.05 | 2 | 2 | 2 | 0 | 0.0 | 0.16 | 15.38% |
| Microcoryphia | 14 | 0.05 | 0 | 0 | 0 | 0 | - | 0.00 | 0.00% |
| Zygentoma | 11 | 0.04 | 2 | 3 | 3 | 0 | 0.0 | 0.23 | 27.27% |
| Ephemeroptera | 105 | 0.37 | 0 | 0 | 0 | 0 | - | 0.00 | 0% |
| Odonata | 190 | 0.68 | 6 | 13 | 15 | 5 | 33.3 | 1.17 | 7.89% |
| Plecoptera | 160 | 0.57 | 0 | 0 | 0 | 0 | - | 0.00 | 0% |
| Embioptera | 2 | 0.01 | 1 | 1 | 1 | 0 | 0.0 | 0.08 | 50.00% |
| Blattaria | 54 | 0.19 | 3 | 5 | 7 | 1 | 14.3 | 0.55 | 12.96% |
| Mantodea | 9 | 0.03 | 1 | 2 | 2 | 0 | 0.0 | 0.16 | 22.22% |
| Isoptera | 20 | 0.07 | 2 | 4 | 4 | 0 | 0.0 | 0.31 | 20.00% |
| Orthoptera | 225 | 0.80 | 10 | 20 | 23 | 9 | 39.1 | 1.80 | 10.22% |
| Phasmida | 20 | 0.07 | 0 | 0 | 0 | 0 | 0.0 | 0.00 | 0% |
| Dermaptera | 20 | 0.07 | 2 | 3 | 3 | 0 | 0.0 | 0.23 | 15.00% |
| Grylloblattodea | 6 | 0.02 | 0 | 0 | 0 | 0 | - | 0.00 | 0% |
| Psocoptera | 83 | 0.30 | 6 | 7 | 9 | 2 | 22.2 | 0.70 | 10.84% |
| Mallophaga | 150 | 0.54 | 1 | 1 | 1 | 0 | 0.0 | 0.08 | 0.67% |
| Anoplura | 40 | 0.14 | 0 | 0 | 0 | 0 | - | 0.00 | 0% |
| Thysanoptera | 200 | 0.71 | 2 | 13 | 20 | 2 | 10.0 | 1.56 | 10.00% |
| Hemiptera | 2,800 | 9.99 | 39 | 141 | 214 | 60 | 28.0 | 16.71 | 7.64% |
| Neuroptera | 166 | 0.59 | 3 | 7 | 12 | 1 | 8.3 | 0.94 | 7.23% |
| Coleoptera | 9,000 | 32.10 | 55 | 317 | 442 | 146 | 33.0 | 34.50 | 4.91% |
| Strepsiptera | 31 | 0.11 | 1 | 2 | 2 | 0 | 0.0 | 0.16 | 6.45% |
| Hymenoptera | 4,130 | 14.73 | 25 | 81 | 124 | 38 | 30.6 | 9.68 | 3.00% |
| Mecoptera | 38 | 0.14 | 0 | 0 | 0 | 0 | - | 0.00 | 0% |
| Siphonaptera | 69 | 0.25 | 1 | 1 | 1 | 0 | 0.0 | 0.08 | 1.45% |
| Diptera | 4,600 | 16.41 | 35 | 106 | 213 | 70 | 32.9 | 16.63 | 4.63% |
| Trichoptera | 300 | 1.07 | 2 | 2 | 2 | 1 | 50.0 | 0.16 | 0.67% |
| Lepidoptera | 5,170 | 18.44 | 31 | 200 | 266 | 44 | 16.5 | 20.77 | 5.15% |
| Total | 28,036 | | 231 | 747 | 1,380 | 379 | 27.5 | | 4.92% |



*Indolestes boninensis (photo:Yuji Takafuji)*

The IUCN Red List (2008) includes five species of dragonflies and damselflies (Odonata) which inhabit the Ogasawara Islands: *Boninagrion ezoin, Indolestes boninensis, Rhinocypha ogasawarensis*, and *Boninthemis insularis* are classified as CR, while *Hemicordulia ogasawarensis* is classified as EN (IUCN, 2008). In fact, all dragonfly and damselfly species endemic to Ogasawara are on the IUCN Red List (2008). Of these, *Boninagrion ezoin* and *Boninthemis insularis* are the only species in their respective genera, making the genera also endemic to Ogasawara. The MOE Red List (2007) lists 73 species (CR+EN: 29 species; VU: 30 species; NT: 14 species), including the lycaenid butterfly (*Celastrina ogasawaraensis*), which is considered to be one of the most critically endangered of Japanese butterflies, and the tiger beetle (*Cicindela bonina*), which has the rare distinction among ground-dwelling insects there by sharing common origins with species on the Japanese Archipelago. Of these 73 species, 71 species are endemic to Ogasawara, making Ogasawara important as a habitat for threatened insects. (For their conservation measures, see "Current state of conservation" in Section 4.a.4.)

### Origins of the insect fauna

As already stated, the three constituent elements of the insect fauna on the Ogasawara Islands are Indomalayan (which includes Southeast Asia), Micronesian, and Palearctic. Because most of the endemic species are either Indomalayan or Micronesian in origin (Kurosawa, 1976b), they most likely settled on the Ogasawara Islands very early and evolved into endemic species.

On the other hand, most species with Palearctic features are thought to have been introduced by humans very recently. However, the endemic *Cicindela bonina* (a species of tiger beetle) is thought to be Palearctic (Kurosawa, 1976a) and it is a close relative of *C. elisae* found throughout the Japanese Archipelago and China. This gives *C. bonina* an unusual origin among the insects endemic to Ogasawara. Moreover, the recently discovered and not yet described species of licinine carabid beetles (*Badister*) is thought to be endemic, and with no closely related species in the Indomalayan region or Micronesia (Ball, 1992), thus it is highly probable that this species is of Palearctic origin. This is a very interesting example because species of this genus feed exclusively on land snails, and it is highly possible that the newly discovered beetle has similar origin to some taxa of land snails.

The ancestors of these insect species came to Ogasawara by flying, were carried by seasonal winds or typhoons, or floated to the islands on ocean currents (Habu, 1968; Kato, 1991). Only certain taxa, such as some dragonflies, damselflies, moths and butterflies, flew to the islands under their own abilities, while the majority most likely arrived by happenstance. There are many endemic species of Diptera and Hemiptera. Most of these are small, floating insects that are thought to have arrived via air currents. Many Coleoptera species, such as those in the jewel beetles (Buprestidae), longhorn beetles (Cerambycidae), and tumbling flower beetles (Mordellidae), bore into hard, decaying or dead trees. It has been surmised that many of them arrived adrift at the islands carried by such decaying trees (Kato, 1991).

### The evolution of endemic species of insects

The endemic insects seen in Ogasawara today are valuable products of unique evolutionary processes that involved the conflation of unlikely coincidences. Most species in Homoptera, Auchenorrhyncha of Hemiptera including Tropiduchidae, Ricaniidae, and Deltocephalidae

families, which are plant-sucking insects, are small and are thought to have ancestors that evolved into endemic species after arriving in Ogasawara by wind. Of the 58 Auchenorrhyncha species on Ogasawara, 30 of them are endemic; the percentage of endemic species is 51.7%.

Wood-boring insects most likely arrived at the Ogasawara Islands on ocean currents, after which many of them evolved into endemic species. Of the 20 species of tumbling flower beetles (Mordellidae), 19 of them, or 95%, are endemic. Out of the 46 longhorn beetles (Cerambycidae), 34 species (73.9%) are endemic. Furthermore, of the 93 weevils (Curculionoidea), 42 species (45.2%) are endemic, except bark and ambrosia beetles (Scolitynae) (Table 2-3) (Morimoto, 2005). In addition, nine species out of 10 Apoidea are endemic (Kyushu University and Japan Wildlife Research Center (Eds.), 1989; Goubara, 2002), of which four species belong to the genus *Hylaeus* that utilizes wood hollows to nest.



*Chlorophorus kobayashii* *(photo:Hideaki Mori)*

At the genus level, there are genera endemic to the Ogasawara Islands, including *Boninella* of the family Cerambycidae, and *Ogasawarazo* of the family Curculionidae (Morimoto, 2005; Hasegawa, 2009). These genera radiated and speciated within the islands, and as such provide excellent sources of primary studies in evolutionary processes. Psyllids (Psylloidea) evolved to adapt to the flora endemic to the Ogasawara Islands. In a population of the genus *Trioza*, which feeds on plant species of genus *Machilus*, speciation occurred for each plant species of this genus, including *M. kobu, M. boninensis* and *M. pseudokobu*, and galls of each species show significant diversity in their locations and shapes (Fig. 2-11). Psyllids on the Japanese Archipelago produce similar type of galls on the same family or genus of plants, however on the Ogasawara Islands they have diversified to adapt to genetic divergence within the plant species (Matsumoto, 2009).

Throughout the Ogasawara Islands, there are species that do not appear to have speciated significantly within the islands, although they are thought to have originated on the Ryukyu Islands and elsewhere and evolved into species different from those of their places of origin. On the Japanese Archipelago and continents, where diverse species coexist, ecological niches dominated by a specific species are usually limited, but on the Ogasawara Islands a few species dominate a variety of niches that are widely available to them. For example, on

**Table 2-3 Taxa with high percentages of endemic species**

| Order | Higher group such as suborder | Superfamily | Family | No. of species in the family | No. of endemic species in the family | No. of species in the group | No. of endemic species | Percentage of endemic species in the group |
|---|---|---|---|---|---|---|---|---|
| Hemiptera | Homoptera Auchenorrhyncha | Fulgoroidea | Cixiidae | 2 | 1 | 58 | 30 | 51.7 |
| | | | Delphacidae | 11 | 1 | | | |
| | | | Derbidae | 1 | 1 | | | |
| | | | Tropiduchidae | 7 | 7 | | | |
| | | | Flatidae | 2 | 0 | | | |
| | | | Ricaniidae | 6 | 4 | | | |
| | | Cicadoidea | Cicadidae | 1 | 1 | | | |
| | | Cercopoidea | Aphrophoridae | 3 | 3 | | | |
| | | Membracoidea | Membracidae | 1 | 0 | | | |
| | | Cicadelloidea | Deltocephalidae | 24 | 12 | | | |
| Coleoptera | Polyphaga | Scarabaeioidea | Lucanidae | 2 | 2 | - | - | 100 |
| | | Buprestoidea | Buprestidae | 9 | 6 | - | - | 66.7 |
| | | Tenebrionoidea | Mordellidae | 20 | 19 | - | - | 95.0 |
| | | Chrysomeloidea | Cerambycidae | 46 | 34 | - | - | 73.9 |
| | | Curculionoidea | Anthribidae | 18 | 14 | 93 | 42 | 45.2 |
| | | | Brentidae | 2 | 1 | | | |
| | | | Nanophyidae | 1 | 1 | | | |
| | | | Curculionidae | 64 | 24 | | | |
| | | | Rhynchophoridae | 8 | 2 | | | |
| Hymenoptera | Apocrita | Sphecoidea | Sphecidae | 20 | 11 | - | - | 55.0 |
| | | Apoidea | Colletidae | 4 | 4 | 10 | 9 | 90.0 |
| | | | Megachilidae | 3 | 3 | | | |
| | | | Anthophoridae | 2 | 2 | | | |
| | | | Apidae | 1 | 0 | | | |

the mainland of Japan there is a one-to-one correlation between longhorn beetles and their host plants, meaning the selection range of host plant species by these beetles is limited, but on the Ogasawara Islands, in contrast, single longhorn beetle species use multiple tree species. Furthermore, dominant species such as *Phloeopsis bioculata* use a wide range of tree species, and in this sense they can be called super-generalists (Sugiura et al., 2008; Olesen et al., 2002). It has been suggested that a broad range of feeding habits works as an adaptive advantage in the event that such a species arrives on a new island that is not rich in flora (Sugiura et al., 2008), and can be considered one stage of adaptive radiation leading up to speciation.

Surveys on the entomofauna of the Ogasawara Islands are not yet complete. Even in the relatively well-studied longhorn beetles, as an example, prominent new endemic species such as *Boninoleips kitajimai* and *Olenecamptus fukutomii* have been discovered in recent years (e.g., Hasegawa, 2004), and there are some species that are currently being prepared for description. Additional surveys are very likely to reveal the existence of unknown endemic species. Taxonomic groups yet to be studied are expected to lead to the discovery of many new endemic species.



*Xylocopa ogasawarensis* (photo:Akira Ozono)



Adult of ***Trioza*** sp. (Type2)
*(photo:Kouichi Matsumoto)*

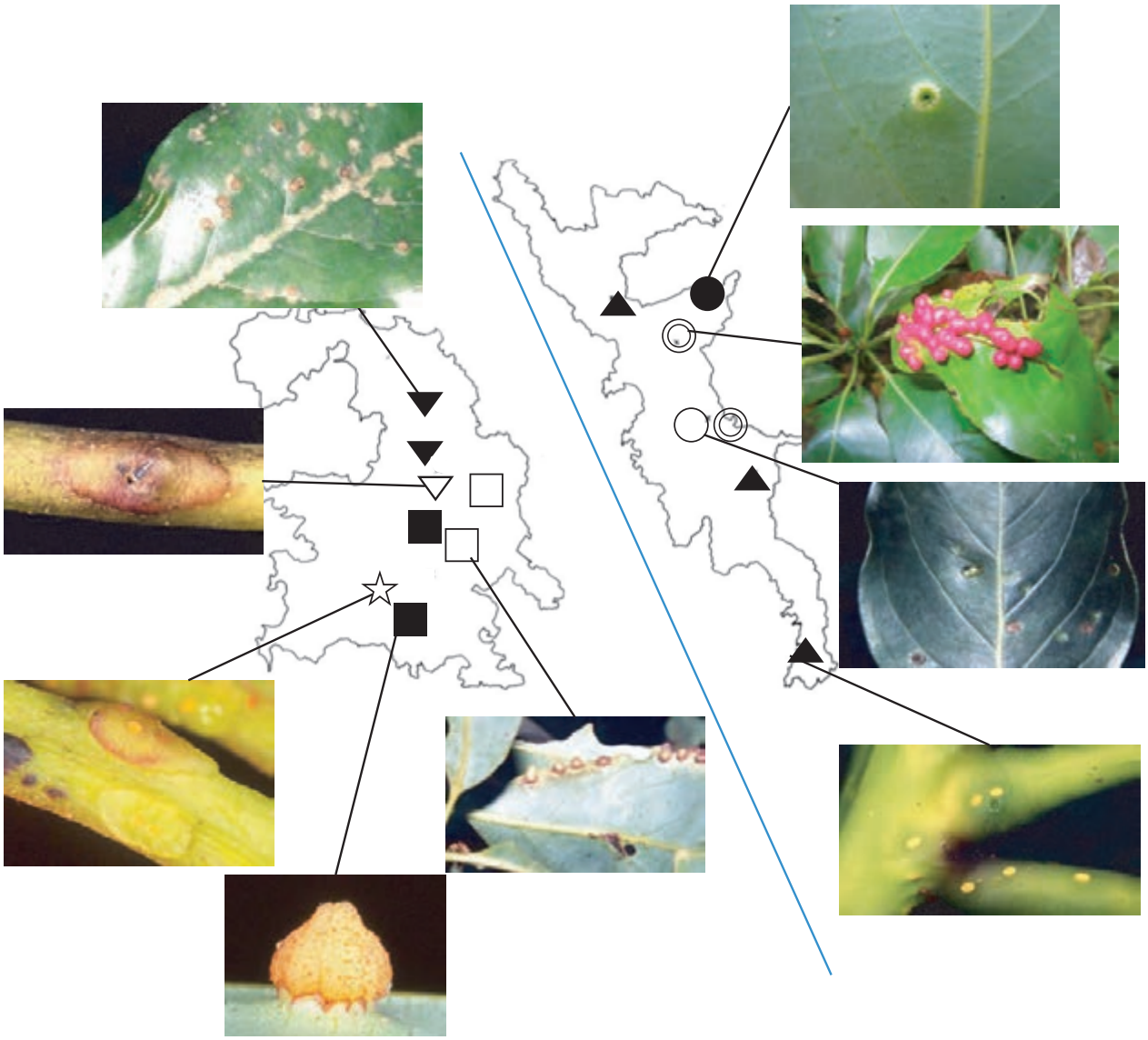


**Fig. 2-11 Distribution of the genus *Trioza* on the Ogasawara Islands and the types of their galls on their host plants of the genus *Machilus***

○ ; Type 1, ▼ ; Type 2, ◎ ; Type 3, □ ; Type 4, ▽ ; Type 5, ▲ ; Type 6, ■ ; Type 7, ● ; Type 8, ☆ ; Type 9. ○◎● ; *"M. boninenis"* of Hahajima, ▲ ; *"M. kobu"* of Hahajima, ■□ ; *"M. boninenis"* of Chichijima, ▼▽ ; *"M. kobu"* of Chichijima, ☆ ; *"M. pseudokobu"* . *(Revised from Matsumoto, 2009)*

*** There are several species of genus *Trioza* distributed on the Ogasawara Islands. However, they are not identified yet and not included in the species list in Appendix 3.**

### Unique interactions among organisms

As stated above, compared to continents or the Japanese Archipelago, the Ogasawara Islands exhibit an imbalanced fauna, with some taxonomic groups entirely absent. However, because of this imbalance, unique and pronounced ecological relationships have been formed, creating ecosystems not seen anywhere else.

In tropical and subtropical regions, ants (Formicidae) usually occupy the greatest proportion of biomass and perform various functions in ecosystems. Recent studies indicate that there were no native active ant species on the Ogasawara Islands in the past (Sugiura, 2007). Consequently, the extrafloral nectaries that act as a defense mechanism for plants have regressed. Extrafloral nectaries serve to attract ants to protect the plants from predators. It is known that from tropical to subtropical regions, 14.8% to 53.3% of plants have extrafloral nectaries (Blüthgen and Reinfenrath, 2003; Oliveira and Freitas, 2004). However, many plants on the Ogasawara Islands, for example the endemic species *Hibiscus glaber*, have lost these extrafloral nectaries (Sugiura et al., 2006). Only 7.5% of all plant species on the islands have extrafloral nectaries (Pemberton, 1998). This is considered to illustrate a unique evolution which has occurred in Ogasawara ecosystems characterized by few ants (Sugiura, 2007). There are still almost no active ants on Minami-iwoto, making the island significant for its preservation in a primitive oceanic island ecosystem.

Earthworms often play an important role as decomposers in soil ecosystems, but all 10 known worm species in Haplotaxida on the Ogasawara Islands are alien, and it is thought that the large Haplotaxida species was not present originally on the islands (Nakamura, 1994). Minami-iwoto is valuable as a soil ecosystem because it has not been invaded by alien species of Haplotaxida. The breakdown of humus that worms are normally responsible for has most likely been the role of Oniscidea on the Ogasawara Islands. There is a high ratio of endemic species in Oniscidea: of the 25 species confirmed, 14 of them are endemic. Some species among these 25 do not have scientific names yet, and hold the possibility of being new endemic species (Yamaki et al., 2008).

The Ogasawara Islands have no native social bees. All of the bees (about 10 species have been confirmed, all of which are considered to be endemic) are solitary. At present, the distribution of European honeybees (*Apis mellifera*), which are alien and social, is confirmed. However, some satellite islands as well as all of the Mukojima Island Group have yet to be invaded by European honeybees, and still maintain ecosystems without social bees. These ecosystems are valuable in that their main pollinators are solitary bees.

### Biogeographic characteristics of insect distribution

***< Chichijima Island Group >***

According to the Species List in Appendix, there are at least 61 species and seven subspecies of insects endemic to the Chichijima Island Group. This is the largest number of endemic taxa in the Ogasawara Islands, which is partly due to the fact that it is the largest island in area. The existence of endemic aquatic insects such as *Indolestes boninensis, Limnogonus boninensis*, and *Goera ogasawaraensis* suggests that a stable water system has existed for a long period of time. One characteristic

of insects in the Chichijima Island Group is the presence of endemic species with close associations to sclerophyllous scrub, such as the tiger beetle, which lives in open spaces around sclerophyllous scrub, and endemic cerambycid species *Olenecamptus fukutomii*, whose host plant is *Distylium lepidotum*, the typical constituent sclerophyllous scrub species.

***< Hahajima Island Group >***

There are at least 51 species and four subspecies of insects endemic to the Hahajima Island Group, giving it the second highest number of endemic taxa behind the Chichijima Island Group. Many endemic species are found in the subtropical rainforests. One characteristic feature is the many species which live in decaying logs and hollows of large trees in the developed forests, including *Duolandrevus major*, *Morion boninense*, and *Glipa kurosawai*. Hahajima itself is also important as the only extant habitat for an endemic species of lycaenid butterfly, which is thought to be extinct on the Chichijima Island Group.

***< Mukojima Island Group >***

Four species, including *Chlorophorus kusamai*, and two subspecies, including *Tamamushia virida fujitai*, are known to be endemic insects to the Mukojima Island Group. The ecosystem of the Mukojima Island Group is generally considered to be in poor condition owing to the destruction of vegetation by goat grazing, but at the same time the islands are still home to large populations of such endemic insects as bees and longhorn beetles. It is also an important refuge for insects on Chichijima and Hahajima that have suffered the impacts of invasive alien species (such as the green anole).

***<Kazan Island Group >***

There are at least five species and two subspecies of insects endemic to the Kazan Island Group, including *Figulus yujii* and *Chlorophorus minamiiwo*. *Satozo minamiiwoensis*, which lacks hind wings, is classified under the endemic genus *Satozo*. *Satozo* is a rich subject of interest as the only endemic genus on the Kazan Island Group.

**Evolution and speciation in each island group**

The phenomenon of speciation from a single original species within the Ogasawara Islands into subspecies that differ among island groups can be observed in beetles and several other taxa. Such speciation at the subspecies level occurs between the Chichijima and Hahajima Island Groups, and also between the Mukojima Island Group and the Chichijima/Hahajima Island Groups. In addition, there are also examples such as *Rhinocypha ogasawarensis* in which differences are not morphologically perceptible, but nevertheless the species shows signs of isolation from island group to island group at the genetic level.

An example of prominent speciation among different island groups can be seen in the genus *Chlorophorus*. There are five species native to the Ogasawara Islands in this genus, each with different areas of distribution. The Mukojima Island Group is home to *C. kusamai* and *C. masatakai*, while the Chichijima/Hahajima Island Groups are inhabited by *C. boninensis* and *C. kobayashii*. *C. kusamai* of the Mukojima Island Group is closely related to *C. boninensis* of Chichijima/Hahajima Island Groups. The same is the case with *C. masatakai* and *C. kobayashii*. The color patterns of their bodies on each, however, show similarities with the other, less closely related species within the same island

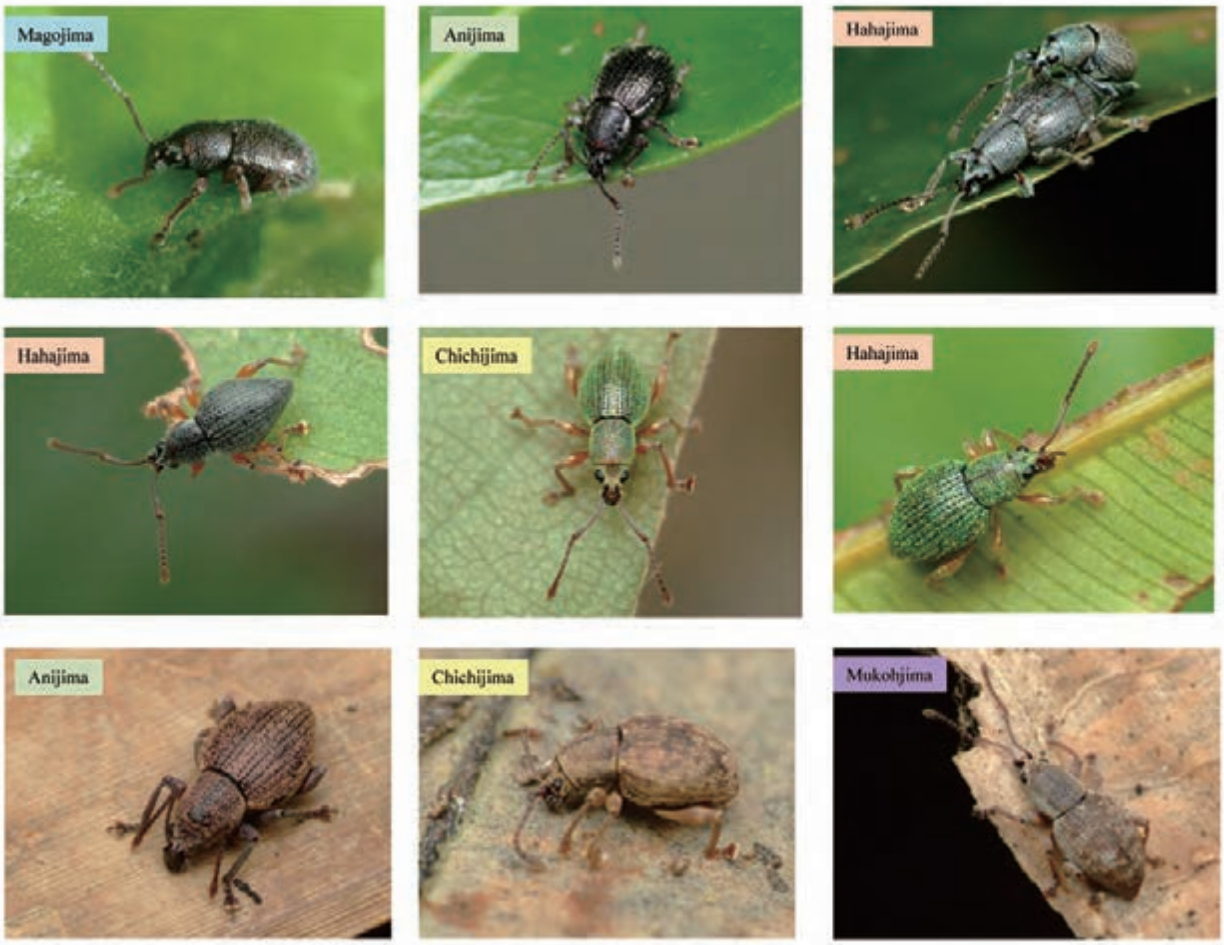



Fig. 2-12 Diversity of the endemic weevil genus *Ogasawarazo*

The figure shows nine taxa including *Ogasawarazo lineatus, O. mater, O. rugosicephalus rugosicephalus, O. rugosicephalus hahajimaensis* and five undescribed new species. Taxonomic and phylogenetical studies are in progress. *(photo:Hideaki Mori)*

group(s). The Kazan Island Group is inhabited by *C. minamiiwo*, which is thought to have origins distinct from the species above. It is classified into subspecies comprising populations that are present separately on Minami-iwoto and Kita-iwoto, respectively.

The genus *Ogasawarazo*, which has lost the ability to fly due to vestigial hind wings, demonstrates speciation by island group as well as by individual islands, with both arboreal and ground-dwelling species found on each island (Fig. 2-12). It is interesting to note that the closely related but distinct genus *Satozo*, which is also unable to fly, is present on Minami-iwoto. Molecular phylogenetic research is being conducted to analyze the relations of these taxa.

### 2.a.4.6 Land snails

One of the most distinctive and apparent examples of adaptive radiation in the unique fauna of the Ogasawara Islands is that of land snails. The land snails in the nominated property are an outstanding example of a fauna clearly exhibiting biological evolution characteristic of oceanic islands.

To date, 134 species of land snails (in 44 genera of 24 families) have been recorded from the Ogasawara Islands, 106 species of which are native to the islands. Of the latter, 100 species, or 94%, are endemic to the Ogasawara Islands (Chiba, 2009a, b). Furthermore, 82 of the native species are extant species, 76 of which are endemic (Chiba, 2009a, b). The extinction rate is low compared to other oceanic islands, and this is one notable feature of the land snails on the Ogasawara Islands. Land snails on the Ogasawara Islands originated from a range of areas, including the Asian mainland, Micronesia, Polynesia. As the progenitor species of these land snails that reached the Ogasawara Islands have followed distinctive evolutionary processes, and the species composition seen today is exceptionally unique. The adaptive radiation within the islands has led to 94% of more than 100 land snails documented from the Ogasawara Islands being endemic to the area.

The history of this distinctive adaptive radiation is gradually becoming clearer with the progress of studies using DNA analyses. In the genus *Mandarina*, as an example, species with the same life habits are very similar morphologically even if they belong to distinct genetic lineages on different islands and island groups. This



*Boninosuccinea ogasawarae* *(photo:Hideaki Mori)*



*Boninena hiraseana chichijimana* (photo:Hideaki Mori)



*Hirasea operculina* (photo:Hideaki Mori)



*Ogasawarana discrepans* (photo:Hideaki Mori)



*Mandarina ponderosa* (photo:Hideaki Mori)

suggests repeated occurrence of speciation and rapid adaptation to each life habit on each island and island group.

In addition, the land snails on the Ogasawara Islands provide evidence of evolution along a variety of time scales. Comparisons between fossil and extant species reveal the temporal change of the evolutionary sequences and species diversification that have occurred in the past. There are also specimens exhibiting ongoing evolutionary processes to respond to environmental change in recent years.
(For their conservation measures, see "Present state of conservation" in Section 4.a.5.)

**Origins and speciation in land snails**

Among the land snails endemic to the Ogasawara Islands, there are those that originated from the Asian mainland, the Japanese Archipelago, and the southern islands of the Pacific such as Micronesia and Polynesia. Their progenitor species represent only the few specimens that managed to cross the vast distances of ocean from their places of origin and by happenstance reached Ogasawara, after which they diversified (or radiated) into the species and groups that are found today. For this reason, the genus structure of each family of the land snails on the Ogasawara Islands have a significant and unique difference from the land snails of the mainland of Japan, Ryukyu Islands, and the Marianas to the south of Ogasawara.

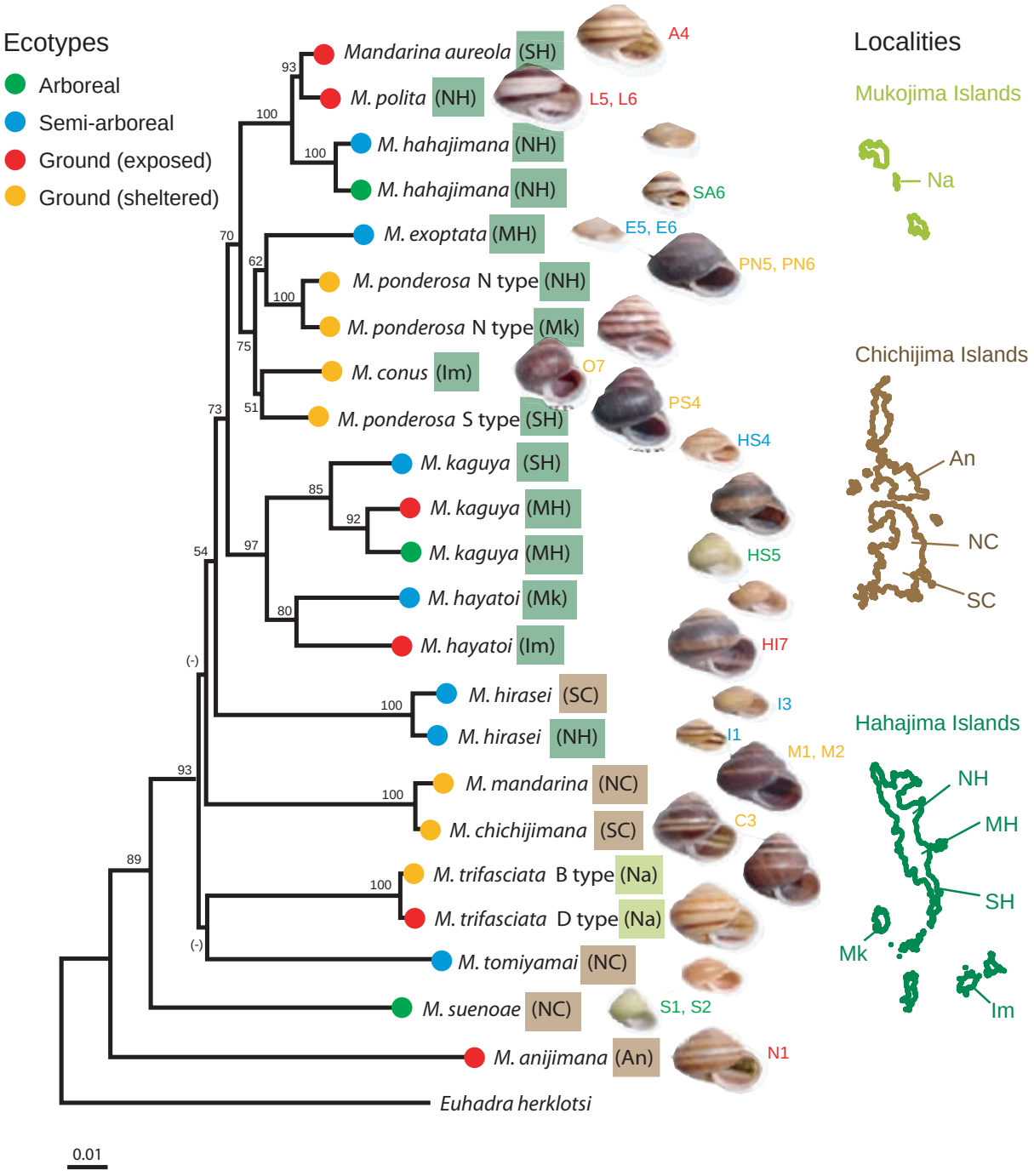



Fig. 2-13 The ecotype and phylogenetic relationship of *Mandarina* species

The tree is based on mitochondrial DNA (≈1,000 bp 16SrRNA and ≈600 bp 12SrRNA). Ecotypes of arboreal, semi-arboreal, ground (exposed), and ground (sheltered) are indicated by green, blue, red and yellow dots respectively. Localities of the species are shown in parentheses. The codes and colors correspond to those in the map. Codes beside each picture of shell correspond to those in Fig. 2-15 which represent morphological type of shell. *(Revised from Chiba, 1999a, 2003)*

In recent years, molecular phylogenic studies using DNA analyses have revealed that species of the genus *Mandarina* evolved from a common ancestor on the mainland of Japan (Chiba, 1999a; Davison et al., 2005), and that the *Boninosuccinea* species are closely related to groups found on the Marquesas Islands. Molecular phylogenic studies utilizing mitochondrial DNA show the extremely distinctive history of adaptive radiation of *Mandarina* that reached the islands of Ogasawara (Fig . 2-13). In each of these island groups there are unique histories of repeated speciation that occurred to adapt to various ecotypes. The progenitor species from the mainland of Japan that reached the Chichijima Island Group have diversified into arboreal, semi-arboreal, and ground ecotypes. While one lineage dispersed to the Mukojima Islands Group, another ancestral lineage of the semi-arboreal *Mandarina hirasei* dispersed to the Hahajima Island Group. These progenitor species that reached the Hahajima Island Group again diversified into arboreal, semi-arboreal, and ground ecotypes (Fig. 2-14). The ecotype divergence occurred at least four times independently in different lineages. The species that diversified in each of lineage are morphologically similar to each other when they belong to the same ecotypes. This kind of parallel adaptive radiation suggests a close relationship between the species diversification and life habit divergence (Chiba, 1999a, 2004).

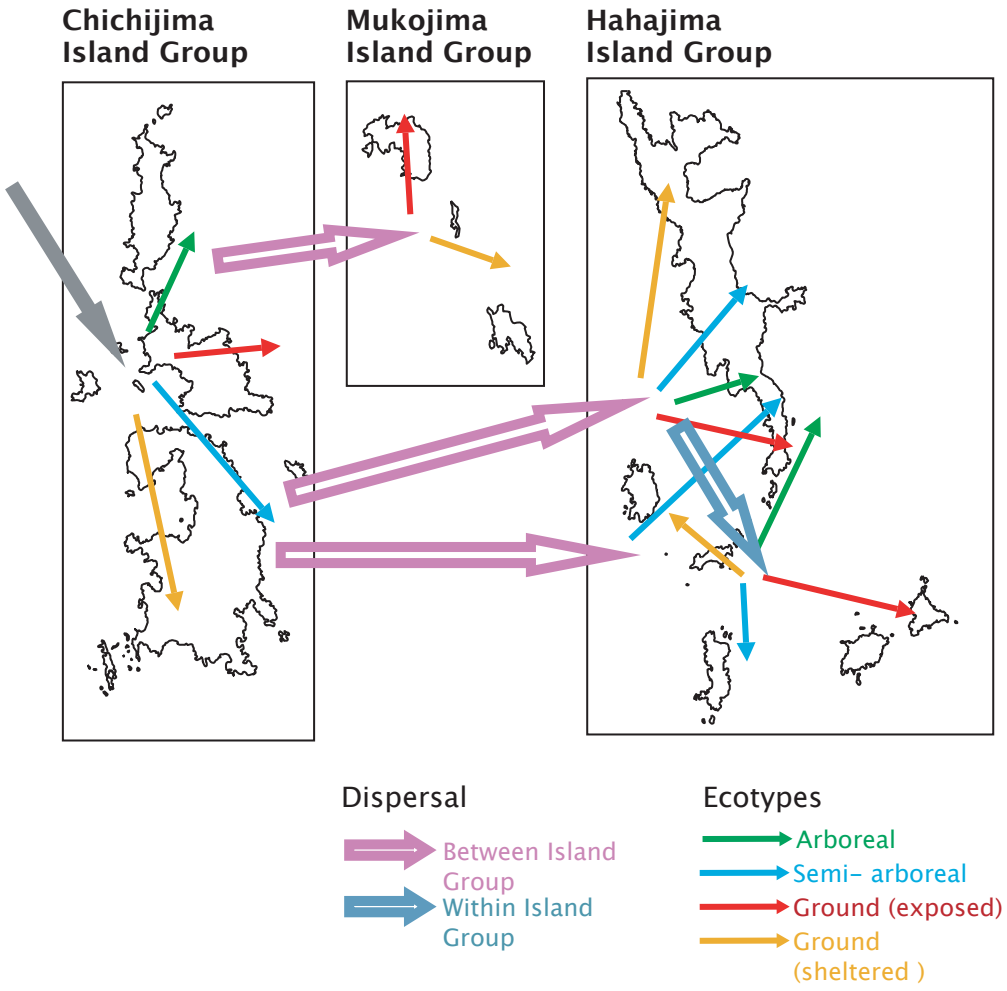



**Fig. 2-14 The adaptive radiation of genus *Mandarina* and geographical relations**
Estimated radiation routes of *Mandarina* based on the phylogenetic relationship by Chiba (1999a: Fig. 2-13)

### Adaptive radiation in land snails

Many examples of adaptive radiation can be observed on the Ogasawara Islands. Sympatric species radiation accompanying ecotype diversification is a unique case, which has not been proven in the past. The availability of open niches on the Ogasawara Islands is expected to have greatly influenced this speciation.

There are 19 extant species in the genus *Mandarina*. If fossils are included, there are a total of 29 documented species. The distinct diversity within this genus can be largely attributed to adaptive radiation accompanying ecotype divergence. Feeding and resting places differ among sympatric species of *Mandarina* (Chiba, 1996). These species can be categorized according to their ecotypes: ground ecotypes, which feed on litter; arboreal ecotypes, which feed on fresh leaves in trees; and semi-arboreal ecotypes, which not only inhabit trees but also descend to the ground. Furthermore, where two species of ground ecotype snails coexist, they separate into two distinctive ecotypes: those that rest at the bottom of litter ("sheltered"), and those that rest near or on the surface of litter ("exposed") (Chiba, 1999b). Such variations in habitat are reflected in the shapes and colors of their shells: shells of arboreal species are higher but smaller, semi-arboreal species flatter, and ground species higher, which can be considered as a convergent evolution. The adaptive radiation occurred repeatedly on different island groups, and those with similar life habits acquire similar morphologies even if snails

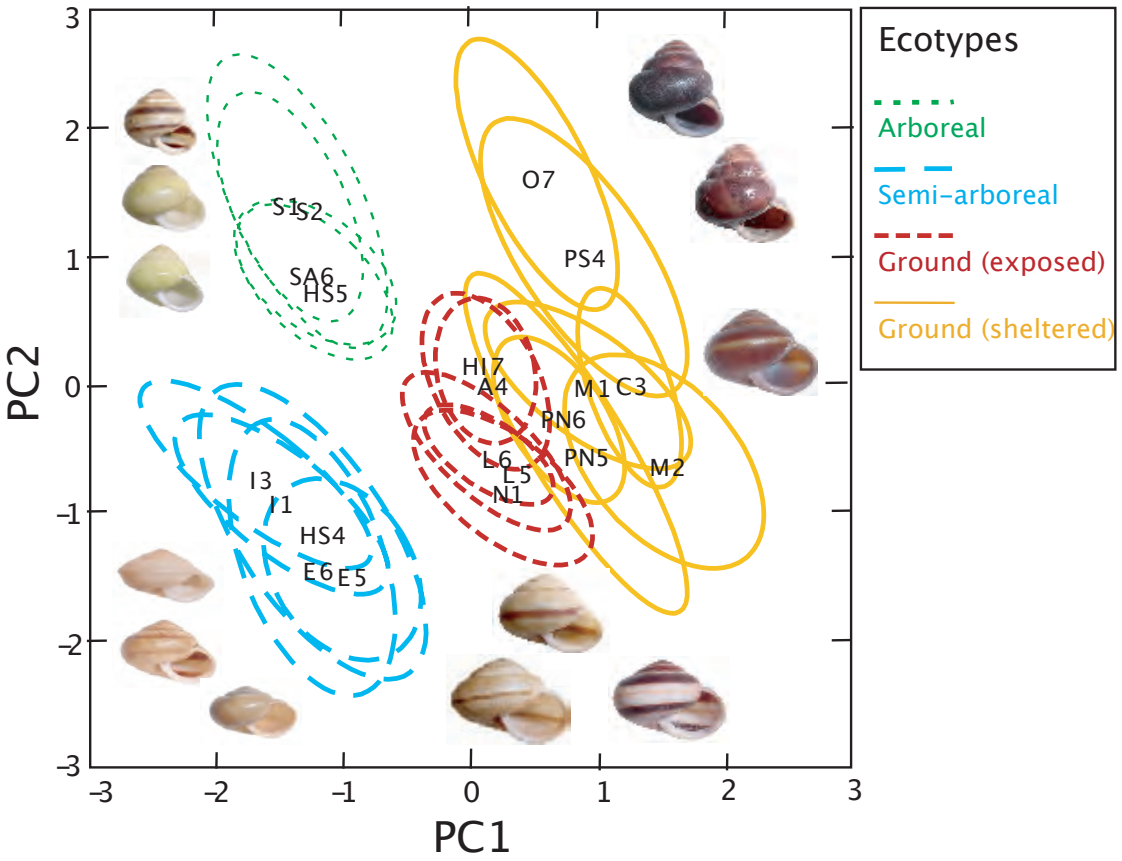



Fig. 2-15 Morphological similarities in *Mandarina* on each ecotype

Groupings according to shell morphology based on principal component analyses. PC1 is an index representing shell size, and PC2 height of spire and apertural length. Each ellipse shows standard deviation (centered on the means). The ellipse center indicates species codes (see Fig. 2-13) and surrounded by representative examples of shell morphology. *(Revised from Chiba, 2004)*

inhabit different islands and belong to different lineages ( Fig. 2-15) (Chiba, 1999b).

Land snails in the genus *Ogasawarana* are also endemic to the Ogasawara Islands. This genus includes 15 documented and several undocumented species. They are relatively small, with a diameter of 4 mm to 7 mm. This genus also shows distinct morphological and ecological diversification, and is a typical example of adaptive radiation. On Anijima, for example, there are four sympatric species. While *Ogasawarana discrepans* and *O. optima* are mainly found on the underside of leaves at the top layer of litter, *O. capsula* inhabits the bottom layer of litter as well as soil layer. *O. nitida,* on the other hand, is found on the live leaves of *Pandanus boninensis* rather than on the ground (Fig. 2-16).

Species in the genus *Hirasea* also have remarkable divergence in shell morphology. This genus contains 14 documented species as well as several subspecies. Extreme morphological differences are found among the species that belong to this same genus. Notable examples include *Hirasea operculina*, which has an extremely flat shell, and *H. diplomphalus*, which has a planospiral shell with a sunken spire. There are few other land snails in the world in which speciation accompanied by such distinct morphological diversification can be observed within a single genus. This shows that the diversification in shell morphology is closely related to divergence in habitats. For example, there are three sympatric species on

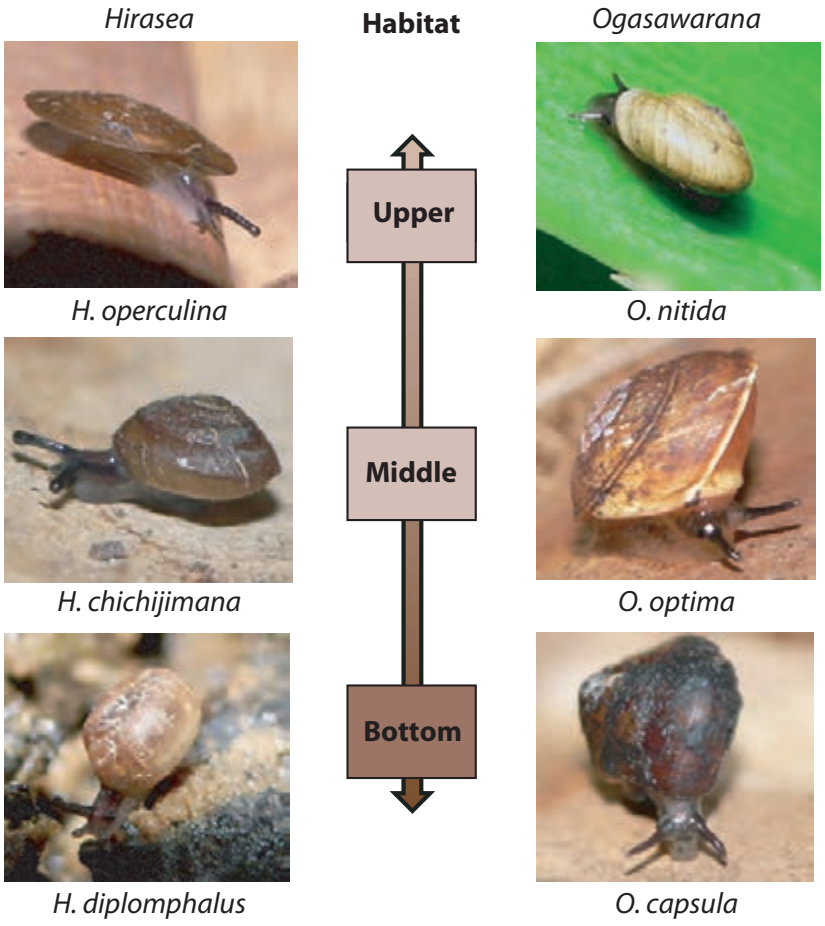



**Fig. 2-16 The relationship between habitat and shell morphology**
In addition to *Mandarina*, closely related sympatric species of *Hirasea* and *Ogasawarana* show diversification in shell morphology in association with their habitats. *(Photos: Satoshi Chiba)*

Anijima: *H. operculina* (contact lens shape) that attaches itself to the underside of fallen leaves near the surface of litter; *H. chichijimana* (conical shape), which occurs at the bottom of litter; and *H. diplomphalus* (grinding mortar shape), which occurs underneath litter in the spaces between small hard pebbles in the soil. Such diversity is a result of these snails adapting to their environments and life habits (Fig. 2-16) (Chiba, 2009c).

### Past and present speciation in land snails

The limestone terrain of the Ogasawara Islands has helped preserve fossils. Through a comparison of the fossil record with extant species, temporal changes in lineage evolution and species diversification can be traced from the past to the present.

The Pleistocene strata from Chichijima to Minamijima, as well as on Hahajima contain diverse fossils of *Mandarina*. Fig. 2-17 shows the selected fossil species that are particularly abundant on Chichijima and Minamijima. Each fossil group was dated by the Carbon-14 dating method and examined for morphological changes over time. The figure indicates that around 20 thousand years ago, rapid morphological changes occurred more or less simultaneously to all species. At about the same time, the *Mandarina nola* lineage became extinct. This suggests that the morphological changes in *Mandarina* follow a punctuated equilibrium pattern, with periods of stability and rapid change. Moreover, the changes occurred synchronically throughout all lineages (Chiba, 1998).



Semifossil of ***Mandarina*** on Minamijima *(photo:Hideaki Mori)*

There are also current examples of the evolutionary process occurring in *Mandarina*. For instance, reproductive isolation is currently occurring in *Mandarina hayatoi*, between arboreal and ground ecotypes on some islands in Hahajima Island Group. Such examples are seen in other species of *Mandarina* as well, and these examples represent the early stages of adaptive radiation accompanied by ecotype change (Davison and Chiba, 2006). In addition, hybrid populations between the two species occur in the upland areas located in the boundary zone of their discrete distributions on both Hahajima and Chichijima. These hybrid zones are likely to have emerged when the uplands in the central part of the islands lost their function as barriers during the evolution of the reproductive isolation. This indicates that

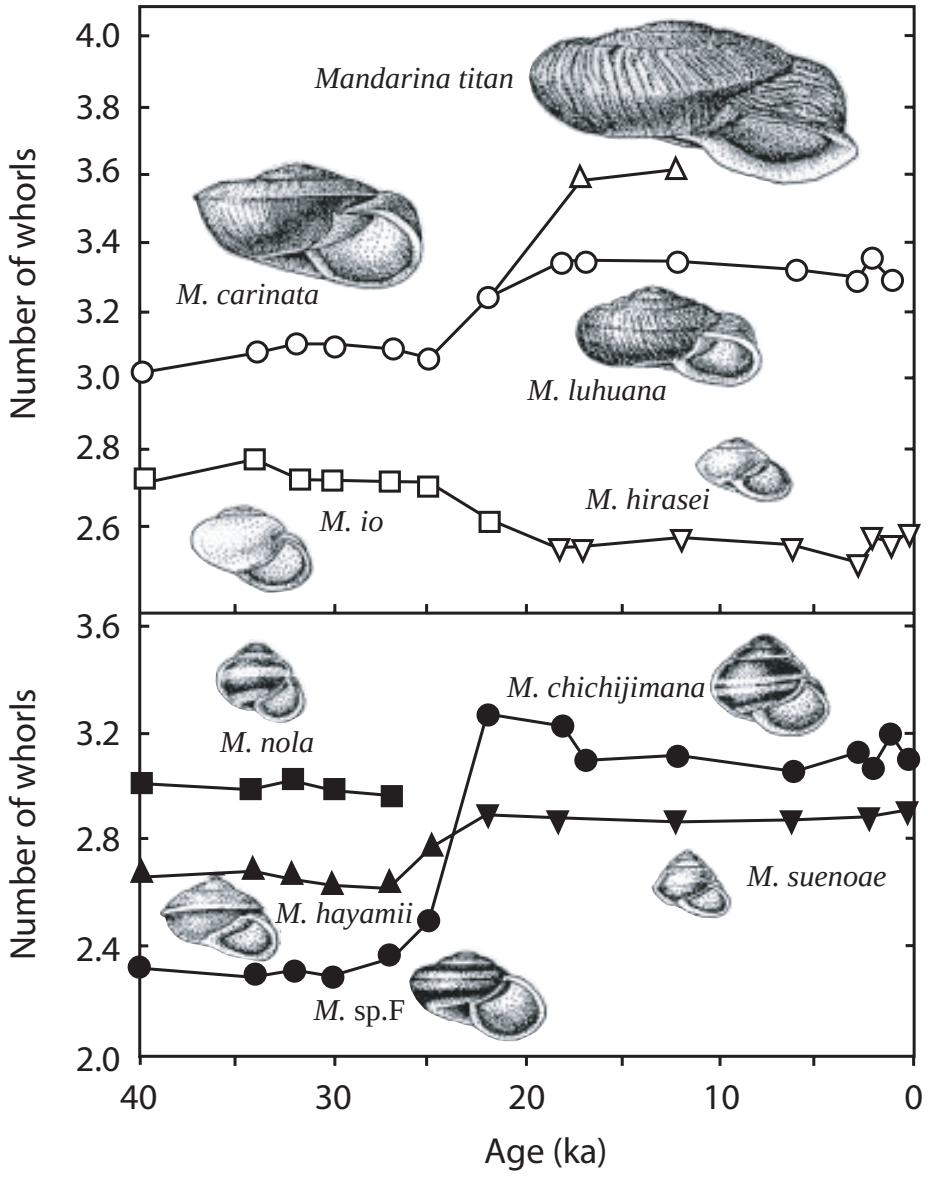



**Fig. 2-17 Temporal changes in shell morphology in *Mandarina***

Temporal changes in shell morphology and speciation from fossil sequences through 40 thousand years on Chichijima and Minamijima. The vertical axis shows the number of whorls. Each symbol represents the mean value of the species on each time. *(Revised from Chiba, 1998)*

these species were in the process of allopatric speciation. Specimens of hybrids between the two species not only exhibit intermediate characteristics between these parent species but also have features different from them, a phenomenon whereby hybridization drives increased diversity (Chiba, 1993, 2005). Furthermore, a high level of genetic divergence among local populations occurs even without geographical barriers in the species of *Mandarina* on Hahajima because of their extremely low dispersal ability (Chiba, 1993). For instance, radical changes in morphological and genetic characteristics are found within a distance of a few hundred meters in *M. aureola* on the southern parts of Hahajima (Fig. 2-18).

There are also groups that have changed their life habits to adapt to recent environmental changes. For example, one group of *M. hayatoi* on a satellite island (Anejima) has begun to live on alien species of *Agave americana*, and as a result has developed shell morphologies different from other groups. This suggests that the evolution of this species is still in progress. Likewise, one species belonging to the genus *Ogasawarana* has peculiarities where it occurs in the litters of an alien species of Casuarina (*Casuarina equisetifolia*). This species has a morphology suggesting juvenilized (neotenic) *O. discrepans* and is thought to be an adaptation to recent environmental changes.

The above examples attest to the significant value of the Ogasawara Islands in that they show evidence of past and ongoing evolutionary processes.

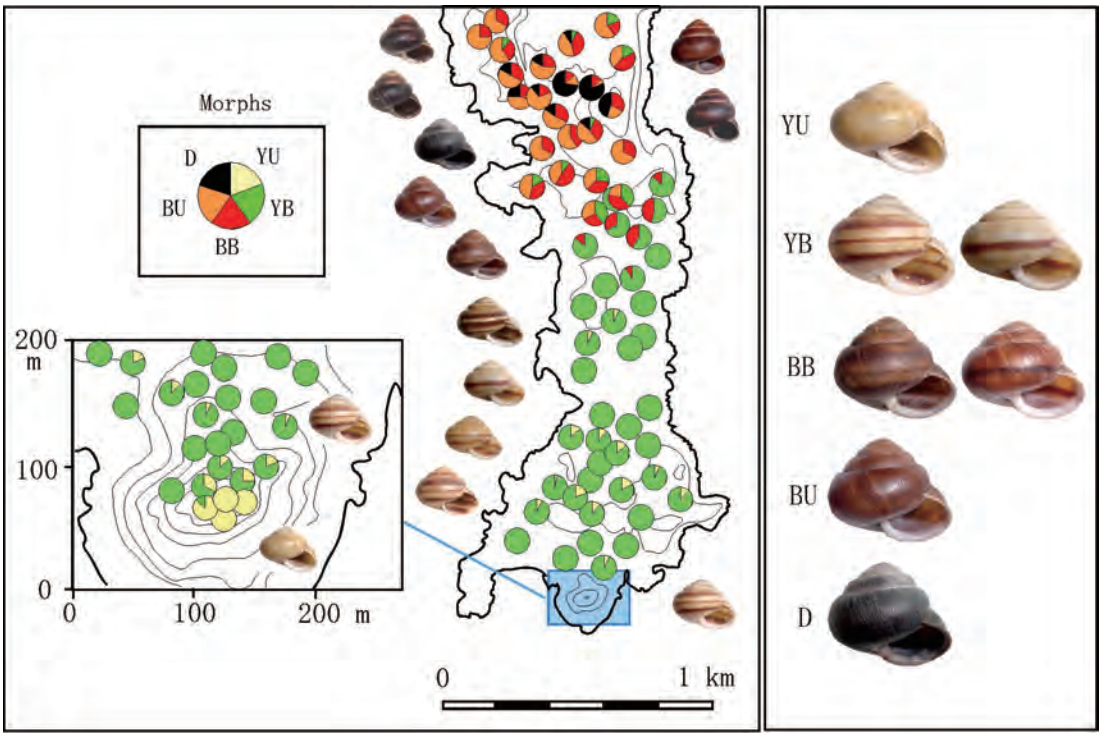



Fig. 2-18 Geographic variations in *Mandarina aureola* on the southern parts of Hahajima
The pie charts indicate the proportion of each distinctive morph (YU, YB, BB, BU, D) in each population. The geographical patterns show that divergence of population occurs within a small area even in the absence of geographical barrier. *(Revised from Chiba, 1993)*

### Diversity as a result of adaptive radiation

At present, 106 species of land snails native to the Ogasawara Islands have been recorded, and of them, 100 species, or 94%, are endemic to Ogasawara (Chiba, 2009a, 2009b). There are seven endemic genera (*Ogasawarana, Boninena, Conacmella, Boninosuccinea, Hirasea, Hirasiella,* and *Mandarina*). *Ogasawarana, Hirasea*, and *Mandarina* in particular have achieved significant evolution and diversification on the islands, differentiated into many species. The IUCN Red List (2008) includes 24 species (six CR, ten EN, and eight VU). In addition, there are 46 species on the MOE Red List (2007) (27 CR+EN, 16 VU, and three NT), which is evidence of the high value of the Ogasawara Islands as a habitat for threatened land snails. It is thought that the two single species in the *Hirasiella* and *Conacmella* genera, as well as 22 other endemic species (including five CR species on IUCN Red List), are extinct, leaving five endemic genera and 76 endemic species (endemic ratio: 93%).

### Biogeographic characteristics of land snails

#### < *Chichijima Island Group* >

Because the Chichijima Island Group is covered with a diverse range of vegetation, from sclerophyllous scrub to relatively wet forest, these are habitats for a land snail fauna with species compositions unique to each. A distinctive land snail fauna can even be seen under the shrubs hugging the dry, rocky areas of ridges. More than 30 species of land snails endemic to Ogasawara occur on Anijima, and species of *Hirasea*, for example, have altered their habitats based on subtle differences in their respective environments (Chiba, 2009c).

In addition, evidence of evolutionary processes in the land snails of the Ogasawara Islands can be observed from different perspectives. Hybridization has occurred in two species of the genus *Mandarina* in the uplands of Chichijima, which is an indication of increased diversity through hybridization (Chiba, 2005). The processes of synchronized morphological changes which occurred in multiple *Mandarina* species can also be observed in Pleistocene fossils found from the southern part of Chichijima to Minamijima (Chiba, 1998).

#### < *Hahajima Island Group* >

The subtropical rain forests nurtured by a cloud belt on Hahajima are rich in communities of arboreal land snails. In particular, there are many species in the area where limestone terrain has formed, and some species are endemic to this area. Several species of land snails thought to be extinct have been rediscovered on a small peninsula that is separated from the rest of Hahajima by a steep precipice (Chiba et al., 2007).

Many examples of adaptive radiation in *Mandarina* can be observed on the Hahajima Island Group. *Mandarina* species have dispersed from the Chichijima Island Group to the Hahajima Island Group several times, and for each time speciation occurred repeatedly to adapt to different ecotypes (Chiba, 1999a, 2004). Reproductive isolation is occurring even now in several species of *Mandarina* among different ecotypes, and these examples represent the early stages of adaptive radiation (Davison and Chiba, 2006). A hybrid zone is constituted between the two species of *Mandarina* in the upland area of Hahajima. In addition, a high level of genetic and morphological divergence is observed among populations within a small area in the absence of any geographical barrier. Some poputlations of *M. hayatoi* are found on alien species of *Agave americana* and they

have developed shell morphologies different from other populations. This is thought to be evolutionary changes as a result of recent environmental alteration.

***< Mukojima Island Group >***

Damage by feral goat grazing has caused the decline of forests in the Mukojima Island Group, but land snails are still found on the southwest part of Mukojima and on Nakodojima's Mt. Byobu. Several of these species, such as *Mandarina trifasciata* and *Boninena hiraseana hiraseana*, are endemic to the Mukojima Island Group. A few smaller species have seen drastic drops in numbers, but in recent years their populations are gradually recovering.

***< Kazan Island Group >***

Recent researches are revealing the existence of hitherto unknown distinctive species of land snails on the Kazan Island Group. Particularly on Minami-iwoto, which has a poor forest-floor litter layer but a well-developed cloud belt forest in higher altitude areas, there are many arboreal land snails, including species endemic to Minami-iwoto (Chiba, 2007). The existence of a rich land snail fauna on an island with volcanic ash soil and poorly developed forest litter may hold the key that unlocks the secrets of the diversification of land snails on oceanic islands.

### 2.a.4.7 Other invertebrates of note (soil animals)

Among soil animals in the Ogasawara Islands, woodlice are noted for their high densities, and they include many endemic species, such as *Ligia boninensis* and *Alloniscus boninensis* (Aoki, 1992). However, researches on non-insect arthropods in the Ogasawara Islands have just begun. Hence, there are many species that have yet to be named, and future study is expected. The soil animal species of the Ogasawara Islands considered to be significant (despite their small size) are described below from the standpoint of biogeography or biological evolution.

**Terrestrial *Ligia***

To date, 13 species, nine genera, and seven families in Isopoda have been recorded from the Ogasawara Islands (Nunomura, 1991, 1999; Nunomura et al., 2008). There are two species in the family Ligiidae, namely *Ligia boninensis* and *L. yamanishii*, both of which are endemic to the Ogasawara Islands (Nunomura, 1991, 1999).



*Ligia boninensis (photo:Hideaki Mori)*



*Ligia yamanishii (photo:Masaaki Takiguchi)*

*L. boninensis* is an exclusively terrestrial species that lives only in the uplands on Hahajima. It is 15 mm in length and is characterized by short second antenna (Nunomura, 1999). This species is found only around Mt. Chibusa on Hahajima (462.6 m), and there are concerns that its distribution area is limited and numbers of individuals may decline as a result of being

preyed upon by alien cane toads (*Bufo marinus*) (personal communication with Horiguchi). There are 36 described *Ligia* species in the world. Of these, there are only seven species of terrestrial *Ligia* and most of the other species occur only in limited areas of the tidal zone near the shore (Taiti et al., 2003).

It is known that littoral *L. exotica* takes in seawater through the anus, a process through which this species prevent body desiccation and maintain internal salinity levels at 4%, which is close to that of seawater (Horiguchi et al., 2007). *L. exotica* has developed morphologies adapted to life on land, but it is known that this species' internal body environment maintains salinity levels close to the sea-dwelling *Bathynomus doederleinii*. Unlike littoral *L. exotica*, however, the terrestrial *L. boninensis* of Ogasawara maintains internal salinity levels close to those of the inland-dwelling *Armadillidium vulgare* and *Porcellio scaber*, which is about 1.5% (Horiguchi et. al., 2008; personal communication with Horiguchi and Hariyama). This means, *L. boninensis* is a species adapted to inland and not depending on seawater.

Furthermore, one species of *Ligia* was found at upstream riverbank (altitude 50m) on Chichijima, as well as from mouth (altitude 12m) to the middle part of a river (altitude 35m) and at its headwaters (altitude 150m) on Anijima (personal communication with Horiguchi and Hariyama, personal communication with Sasaki). Since this species has been found in such freshwater environments as rocks at the riverbank and in water, it is highly possible that this species is a new, undescribed species.

The above shows that *Ligia* species on the Ogasawara Islands have adapted to three types of environments, namely shores, upstream riverbanks, and inland, respectively. It means that *Ligia* has developed a system for modulating salinity within their bodies and moved from littoral to inland areas. Again, this is another example of how the Ogasawara Islands have scientific importance in providing clues to help understand these evolutionary processes.

### Pseudoscorpions

Estimates place the number of pseudoscorpion species inhabiting the Ogasawara Islands at over ten, but only eight species in seven genera of six families have been confirmed (Sato, 1984, 1991a, 1991b). Six species are endemic to the Ogasawara Islands: *Ditha ogasawarensis, Tyrannochthonius similidentatus, Cheiridium aokii, Haplochernes boninensis, Metagoniochernes tomiyamai*, and *Chernetidae* sp. (Sato, 1991a, 1991b).



*Metagoniochernes tomiyamai (photo: Naoko Nakahara)*

There are about 3,000 known species in pseudoscorpions in the world, with about 60 species recorded in Japan (Sato, 1992a). *M. tomiyamai*, which is endemic to the Ogasawara Islands, is notable for being the largest pseudoscorpion species in the world. It ranges from 4.8 to 5.6 mm in length (Sato, 1991a), and males have pedipalps three times longer than their body length, making it an extraordinarily distinctive species of pseudoscorpion in terms of morphology (Sato, 1992b, 2006). *M.tomiyamai*

was confirmed to inhabit Ototojima, Hahajima, and Chichijima in the 1990's (personal communication with Kishimoto), but it is now found mainly on Anijima in the leaf sheaths and trunks of *Pandanus boninensis* and other very specific environments; its number are now surmised to be very small (Sato, 1991b).

There are only three species in the genus *Metagoniochernes* in the world: *M. milloti* in Madagascar, *M. picarridi* in the Congo, and *M. tomiyamai* in the Ogasawara Islands. Such distribution of this genus is extremely unique from a zoogeographical viewpoint (Sato, 1991a). Also interesting is the fact that *M. tomiyamai* of the Ogasawara Islands is the only species in this genus found in Asia. Given the distance of the Ogasawara Islands from Africa, *M. tomiyamai* is a globally significant species (Sato, 1991a, 1992b).

## 2.b History and development

### 2.b.1 History

#### 2.b.1.1 Before World War II

The Ogasawara Islands are traditionally said to have been discovered in 1593 by Sadayori Ogasawara. In 1675, Ichizaemon Shimaya of Nagasaki Prefecture, under orders from the Edo Shogunate, spent about 20 days exploring the islands of Ogasawara. He placed wooden plaques on Chichijima and Hahajima claiming the islands as Japanese territory, after which he returned. Time passed and the islands remained uninhabited. Then, in the 1800s, foreign whaling vessels began to stop over the Ogasawara Islands. In the 1820s, warships and research ships from different countries also started to visit the islands and left records of their



The copperplate engraving by Quito Ritz (ornithologist) who came to Ogasawara in 1828 *(photo: Ogasawara Village)*

research. The copperplate engravings by Quito Ritz, an ornithologist, are particularly precious for recording the natural environments of the islands before human settlement (Shimizu, 2007).

The first settlement on the Ogasawara Islands began with migration to Chichijima in 1830 by five Westerners and more than 10 natives of Hawaii and other Pacific islands. They made their living by gathering fruits and vegetables, catching marine products such as turtles, and supplying them together with water to whaling vessels (Kato and Hamanaka, 1995). This was followed by surveys and pioneering efforts by the Edo Shogunate and later by the Meiji government. In 1876, the islands were internationally recognized as Japanese territory.

From the 1920s to 1930s, the subtropical climate was exploited to grow fruits and maintain a supply of vegetables during winter. During this period, the fishery industry grew, with bonito, tuna, whale, and coral the chief products. At its height, the population of the islands exceeded 7,000 people.

At the same time, in the years leading up to World War II, the strategic value of the Ogasawara Islands increased for Japan and, in 1939, a Japanese navy air squadron base was built on Chichijima. In 1944, as the tide of war turned against Japan, all island residents (6,886 persons) except for military personnel were forcefully evacuated to the mainland of Japan.

### 2.b.1.2 After World War II

Since 1945, after the end of the war, Ogasawara fell under the control of the allied occupation forces represented by U.S. troops. The following year, former island residents, all of whom are of descendants of the Westeners and Pacific Islanders, were allowed to return to the islands, meaning that Chichijima was occupied exclusively by the U.S. military and these islanders. The goats that were released on the Chichijima and Mukojima Island Groups to provide food for residents increased, further degrading the vegetation. Hahajima was left abandoned for 23 years, during which time invasion of Bischofia and Leucaena that had been planted before the war advanced.



Historic battle site *(photo:Yuji Takafuji)*

The islands were returned to Japan in 1968, after which former island residents began to return. On August 20, 1970, the Ogasawara Islands Reconstruction Plan was announced, based on the Act on Special Measures for the Ogasawara Islands Reconstruction (enacted in December, 1969). The Plan included the land use plan, which designated the areas for residents, agriculture, and nature conservation. The Law was initially due to expire after five years, but this was extended to 10 years in order to facilitate the comprehensive reconstruction of the islands. However, being separated from the mainland of Japan by a vast expanse of ocean, the population failed to settle, and industry did not sufficiently develop. For these reasons, in 1979 the Act on Special Measures for the Ogasawara Islands Reconstruction was revised as the Act on Special Measures for the

Ogasawara Islands Development and laid out the Ogasawara Islands Development Plan. This law was again amended in 1989 to the Act on Special Measures for the Ogasawara Islands Promotion and Development and remains in force to this day.

Under the land use plan, scenic areas of outstanding natural beauty, areas that should be conserved for their value in terms of geology and topography, areas inhabited by animals and plants of high scientific value, etc., were designated as protection areas. On October 16, 1972, the Nature Conservation Bureau of the Environment Agency designated more than 30 islands together with their surrounding marine areas, except Iwoto, Okino-torishima, Minami-torishima and parts of Chichijima and Hahajima, as Ogasawara National Park. In 1975, under the Nature Conservation Law, the entire area of Minami-iwoto was independently designated as the Minami-iwoto Wilderness Area (Kato and Hamanaka, 1995).

**Table 2-4 Chronological outline**

| Year | Historical events |
|---|---|
| Prehistoric | Stone implements and bone tools have been unearthed suggesting Micronesian peoples may have inhabited or temporarily stayed in Ogasawara. |
| 1543 | The Spanish galleon *San Juan* sights (but does not land) a group of uninhabited islands (the Kazan Island Group), which were called Los Volcas. |
| 1593 | According to legend, Lord of Fukashi (Matsumoto) Castle of Shinano Province Sadayori Ogasawara has discovered the Ogasawara Islands. |
| 1639 | The Dutch vessels *Engel* and *Graft* pass the waters off the Ogasawara Islands. While they did not land, they recorded the coordinates on a map and called two islands Graft (present-day Chichijima) and Engel (present-day Hahajima). |
| 1670 | Kan'emon, captain of a vessel from Asakawaura of Kaifu Commandry, province of Awa (Tokushima Prefecture) is stranded with his surviving crew on Hahajima. After repairing the vessel, they return home, where they are questioned about the island by the shogunate. |
| 1675 | On orders from the shogunate, Ichizaemon Shimaya leads an expedition that surveys the islands, makes maps, etc. |
| 1727 | Shimaya's expedition to the Ogasawara Islands is taken up in Engelbert Kaempfer's *History of Japan*. |
| 1727 | Sadato Ogasawara petitions the shogunate claiming ownership of the islands. |
| 1824 | The British whaler *Transit* (captained by American James Coffin) lands at Hahajima. |

| Year | Historical events |
|---|---|
| 1827 | The HMS *Blossom* (commanded by Captain Fredrick W. Beechey) visits the Mukojima and Chichijima Island Groups. He erects bronze plaques at Susaki on Chichijima declaring the islands British territory. |
| 1828 | The Russian battleship *Admiral Senyavin* (commanded by Litke) visited the islands. Botanists and ornithologists took specimens home with them. |
| June 26, 1830 | American Nathaniel Savory, together with four other Westerners and about ten natives of Pacific Islands such as Hawaii, settle at Chichijima. |
| 1853 | Commodore Matthew Perry stops off at Chichijima on his way to Japan, meets with Savory, and purchases land from him for supplies of coal. Records from the time report that there were 31 inhabitants on Chichijima |
| 1853 | With guidance from Commodore Perry, an autonomous government is created on Chichijima. Nathaniel Savory is elected Chief Magistrate, while James Motley and Thomas Webb are elected Councilmen. |
| 1861 | Foreign affairs magistrates Tadanori Mizuno, Taichi Tanabe and others visit the islands on the *Kanrin Maru* and declare them Japanese territory. Manjiro Nakahama (a.k.a. John Manjiro) served as interpreter between the Japanese officials and settlers from other countries. Sakunosuke Obana remained as the head of the local administration. Settlers subsequently arrive en masse from Hachijojima Island. |
| 1862 | The shogunate sends 38 settlers on the Choyo Maru from Hachijojima. |
| 1863 | Circumstances at home cause the shogunate to cease settlement activities. Officials and civilians are ordered to evacuate. |
| November 21, 1875 | The *Meiji Maru*, a vessel of the new government, sends a survey team made up of foreign ministry official Taichi Tanabe and others to Chichijima and Hahajima. |
| 1876 | Ogasawara comes under the jurisdiction of the Home Ministry.The government reasserts to foreign countries its territorial claim over and right to govern Ogasawara. Since there were no protests from other countries, the islands officially become Japanese territory. An ocean liner is set up to travel from Tokyo to Chichijima (three times a year). |
| 1880 | Jurisdiction shifts from the Home Ministry to the TMG. A representative office of the Tokyo Government is established for Ogasawara (which would later become the Ogasawara subprefectural government). |
| 1881 | Sugarcane cultivation begins at Kita-fukurozawa. Liner runs are increased to four times a year. |
| 1891 | Kazan Island Group is placed under the jurisdiction of the Ogasawara subprefectural government, and Iwoto officially becomes Japanese territory. |
| 1895 | The Ogasawara Church (a member of the Anglican-Episcopal Church of Japan) is constructed on the property of the Gonzales in Omura, Chichijima. |
| 1914 | German possessions in the South Pacific pass to Japan and interaction thrives between the Ogasawara Islands and islands to the south. |

**Table 2-4 Chronological outline (contd.)**

| Year | Historical events |
|---|---|
| 1920 | The Japanese Imperial Army begins stationing personnel in Ogasawara. The Chichijima Fort Command Post was established in the following year. |
| 1932 | The lagoon that had previously allowed only canoe traffic between Susaki and Mt. Yagyusan is reclaimed, and construction on the Susaki airstrip begins. It is completed in 1937. |
| 1937 | The "flying boats" that travel once a month to islands in the South Pacific begin to use Chichijima as a stopover. The Japanese Navy prohibits photographs of Ogasawara from being taken. |
| June 12, 1944 | Many islanders have left for the mainland of Japan on their own initiative, but from this day forward the military orders mandatory evacuations. |
| June 15, 1944 | The bombing of Chichijima and Hahajima by American carrier-based aircraft begins. |
| July 29, 1944 | The last mandatory evacuees leave Chichijima. |
| August 18, 1945 | An American destroyer enters Futami Port and disarms Japanese soldiers. |
| September 3, 1945 | Aboard the USS *Dunlap*, the Japanese military personnel at Ogasawara sign surrender documents. The military element led by Yoshio Tachibana officially surrenders. |
| Early February, 1946 | Soldiers and other military personnel on the islands leave for the mainland of Japan. |
| April, 1946 | The Ogasawara Islands residents file a plea with General MacArthur to return to the islands. |
| October 19, 1946 | Only 126 islanders, all of whom are descendants of the Westerners and Pacific Islanders, are allowed to return to the islands. |
| 1956 | The U.S. military establishes the Admiral Radford School. |
| 1960 | The Chile Earthquake Tsunami hits Chichijima, causing substantial damage, especially in Omura. |
| 1965 | A group of former Japanese islanders travel to Ogasawara to visit graves. |
| June, 1968 | The U.S. military leaves and the islands are returned to Japanese control. |
| August 20, 1970 | The Ogasawara Island Reconstruction Plan was announced, based on the Act on Special Measures for the Ogasawara Islands Reconstruction. |
| October 16, 1972 | More than 30 islands except Iwoto, Okino-torishima, Minami-torishima and parts of Chichijima and Hahajima, together with their surrounding marine areas are designated as Ogasawara National Park. Seven marine spots of exceptional scenic beauty are designated and protected as Marine Park. |
| May 17, 1975 | Minami-iwoto is independently designated the Minami-iwoto Wilderness Area under the Nature Conservation Law, at which time it was removed from Ogasawara National Park. |
| May, 2003 | The Ogasawara Islands are selected to be nominated as a World Natural Heritage Site. |
| January, 2007 | As a signatory to the Convention Concerning the Protection of the World Cultural and Natural Heritage, Japan inscribes the Ogasawara Islands on its tentative list for World Natural Heritage Sites. |

## 2.b.2 Interactions with humans (industry)

The main industries of the nominated property are agriculture, fishery, and tourism. Farming in the area takes advantage of the warm climate to grow fruits, vegetables, and ornamental plants (Table 2-5). Single rod-and-line fishing for bottom-dwelling fish was once the mainstay of fisheries in the area, but in recent years long-line tuna fishing is being conducted (Ogasawara Village, 2005). Ecotourism, in which visitors experience the natural environment, history, and culture of the area, is being promoted as the main form of tourism.

### 2.b.2.1 Use of agricultural land

In the agricultural areas outlined by the Land Use Plan, 26.9 ha of agricultural land on Chichijima and 39.5 ha of agricultural land on Hahajima were developed as part of the Agricultural Production Infrastructure Development carried out from fiscal 1969. Farm roads, agricultural dams for the irrigation of fields, and an intake weir were also built, together with 20-ton capacity reservoir tanks for the agricultural fields of each farmer. Furthermore, through a project carried out from fiscal 1989 to 1996 designed to get former residents of Iwoto to return to Ogasawara, 3.2 ha of farmland was developed in Komoridani, in addition to farming sections developed in the Nakanodaira and Hyogidaira areas. Despite these steps, the idle farmland is increasing because of more abandonment of farming, aging of farmers, lack of successors, and other reasons. At present, the total amount of land being farmed is 11.9 ha on Chichijima and 22.7 ha on Hahajima (Table 2-6) (TMG, Ogasawara Subprefecture Office, 2008).



**Passion fruit** *(photo: Ogasawara Village)*

**Table 2-5 Total production value of agricultural products** (unit: thousand yen)

| Section | Vegetable | Fruit | Flower | Other crops | Livestock products | Total |
|---|---|---|---|---|---|---|
| Chichijima | 7,017 | 6,817 | 239 | 563 | 6,515 | 21,151 |
| Hahajima | 25,033 | 33,649 | 3,315 | 3,521 | 2,570 | 68,088 |
| Total | 32,050 | 40,466 | 3,554 | 4,084 | 9,085 | 89,239 |

*(January to December, 2007)*

**Table 2-6 Farming area and the number of farmers**

| Section | Farming area (are) | | | | No. of Farmers |
|---|---|---|---|---|---|
| | Total | Field | Orchard | Pasture | Total |
| Chichijima | 1,193 | 785 | 408 | 0 | 25 |
| Hahajima | 2,271 | 1,500 | 690 | 81 | 41 |
| Total | 3,464 | 2,285 | 1,098 | 81 | 66 |

*(From the 2007 roster of delegates for the Agricultural Committee elections)*

### 2.b.2.2 Fishery

The fisheries industry before the World War II flourished, yielding bonito (*Katsuwonus pelamis*), tuna, flying fish, amberstripe scad, whales, and so on. It was a core industry for the Ogasawara Islands. After the islands reverted back to Japan, the industry had a shortage of labor, a lack of developed fisheries infrastructure, and a paucity of fishing skills. As a consequence, despite possessing superior fishing grounds, the industry as a whole declined in the area. In recent years, shared facilities and fishing ports have been built based on the Ogasawara Islands Reconstruction Plan and the Ogasawara Islands Development Plan. In addition, fishing boats have been modernized and younger fishermen have been trained, which has contributed to a stable yield, making fisheries once again a core industry for the region.

Fisheries in the past chiefly targeted flame snappers (*Etelis coruscans*), comet groupers (*Epinephelus morrhua*), and other bottom-dwelling fish using single rod-and-line fishing techniques, but with the recent development and introduction of long-line tuna fishing, trends in the fishery industry have shifted towards swordfish (*Xiphias gladius*), bigeye tuna *(Thunnus obesus*), and other fish that migrate over large areas. Moreover, markets have developed for Japanese Spanish mackerel (*Scomberomorus niphonius*) caught with trolling, mackerel scads (*Decapterus macarellus*) caught with stick-held dip-nets, and lobsters.

As for systematic instruments to manage fisheries, Ogasawara is subject to the "Tokyo Metropolitan Government Regulations on

Fisheries Adjustment", based on the Fisheries Law and Fisheries Resources Protection Law. In accordance with these regulations, a wide spectrum of control is coordinated, including fishing licenses, protection and culture of fishery resources, and fishing controls (Ogasawara Islands Branch Office, TMG, 2008). A licensed fishery is operated for the traditional capture of green turtles, and the no-fishing period and permitted size regulations apply as per the TMG Regulations on Fisheries Adjustment. In addition to these regulations, the artificial hatching and release programs that began in the Meiji era were revived after the islands reverted back to Japan. Because of these conservation measures, the number of green turtles that come to the islands is on the rise (see the column below).

In terms of fish catches, in fiscal 2007 the Ogasawara-jima Fisheries Cooperative reported 383 metric tons and 285,000 aquaculture seedling fish, and the Ogasawara Hahajima Fisheries Cooperative reported 226 tons.



Catch landing *(photo: Ogasawara Village)*

### 2.b.2.3 Tourism

Tourism is flourishing in the nominated property, with its islands and waters endowed with rich natural resources and a subtropical climate. Ogasawara Village is currently promoting ecotourism, in which visitors experience and learn about the natural environment, history, and culture of Ogasawara, and at the same time develop an interest in



Whale watching tours *(photo: Ogasawara Village)*

their conservation (Ogasawara Village, 2005). Brief descriptions of different eco-tours are as follows:

### Whale watching tours

The Ogasawara Islands' whale watching tourism started in 1989. Tours are organized through the year to watch humpback whales or sperm whales. The whale watch is the largest sector of ecotourism operated on the Ogasawara Islands.

### Guided marine tours

Guided marine tours include island-hopping trips to visit unique landscapes and the Marine Park Zone, and activities such as dolphin watching/swimming.

### Guided field tours

Guided land tours began a full-scale operation about 10 years ago. Guides provide interpretation of endemic animals, plants and ecosystems.

### Battle sites tours

These guided tours feature visits to the former radar site, searchlight, and other historic battle sites, while tour guides provide information on the history of Ogasawara.

### Birding tours

Birding tours are mainly operated on Hahajima where Bonin honeyeaters occur. Participants can observe wild birds, including endemic and endangered bird species. In recent years, birding tours are also conducted on Torishima and Mukojima Island Group using boats.

### Night tours

There are guided night tours to observe the endemic Bonin flying fox and a species of luminous mushroom (*Mycena chlorophos*).

### Eco-tours for vegetation restoration volunteer activities

These are eco-tours combined with volunteer programs for vegetation restoration, including Bischofia removal on Hahajima and planting endemic species such as *Elaeocarpus photiniaefolius*.



Ecotourism in Minamijima *(photo: Takashi Kaneko)*



*Stenella longirostris (photo: OWA)*

Column

## Conservation status of green turtles *(Chelonia mydas)*

The global populations of green turtles (*Chelonia mydas*) once decreased sharply due to marine catches (including adults and eggs) and habitat degradation (Seminoff, 2004). The situation was the same with the sea turtle population using the waters off the Ogasawara Islands (Kurata, 1980; Horikoshi et al., 1984). However, owing to conservation efforts such as strict catch restrictions (limits on catch numbers and fixed catching seasons), the number of green turtle nests on the Ogasawara Islands is now increasing (Chaloupka et al., 2007; Everlasting Nature of Asia, 2008) (Fig. 2-19).

At present, most of the beaches used by green turtles in the nominated property are conserved as National Park. Those beaches are in relatively good condition for sea turtles to lay eggs, and additional conservation efforts are also made to protect individual nests. In order to avoid unnecessary human intervention in sea turtle reproduction, eggs are artificially protected only in cases where eggs have been laid in clearly poor conditions or when there is a high probability that a nest will be destroyed by natural disasters. In such cases the eggs are removed from the nest and transferred to a safe place. Once hatched, the hatchlings are released in conditions that are close to their natural state. The number of protected individuals varies from year to year. In 2007, as an example, 10,787 eggs were transferred from 119 nests, of which 7,986 eggs hatched (a hatching rate of 74%, Everlasting Nature of Asia, 2008). In addition, "head starting", an attempt in which some of the hatchlings are nurtured for a certain period of time (five months or longer in Ogasawara) before being released, is practiced to reduce their initial mortality (Everlasting Nature of Asia, 2008).



**Release of juvenile green turtles** *(photo: Ogasawara Village)*

Attempts have also been taken at the shores of Omura Beach, where many turtles lay eggs. This site is located close to the local community area, so such measures are promoted as turning off the nearby park lights and installing an enclosure bund to prevent female turtles from entering areas with unsuitable beaches for nesting, but there are still instances seen of female turtles coming ashore to lay eggs, returning to the sea, and releasing their eggs into the seawater. Further measures are needed to minimize the influence of humans (Everlasting Nature of Asia, 2008).

Numbers of nests and hatching rates have been monitored continually since 1979 (Everlasting Nature of Asia, 2008). In addition, to collect information on migration routes and breeding histories, the tracking of individuals is conducted using tag-and-release methods as well as the attachment of satellite tracking devices (Japan Fisheries Resource Conservation Association, 1999; Everlasting Nature of Asia, 2008). It is now clear that individuals hatched in Ogasawara make their way north all the way to the waters off the mainland of Japan to feed.

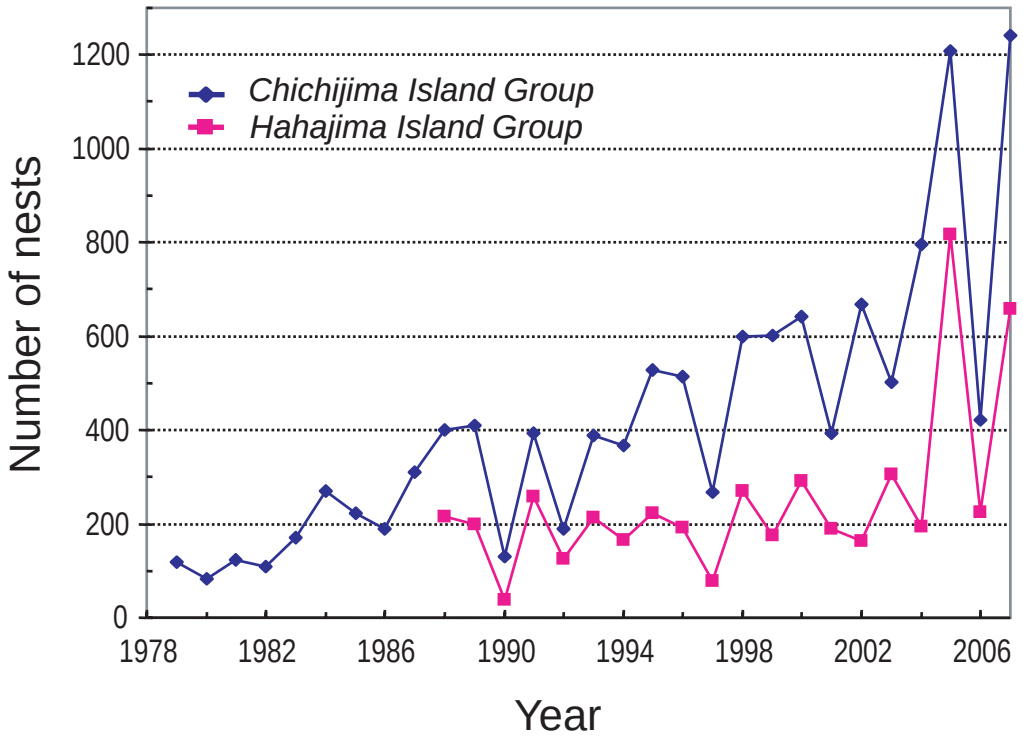



**Fig. 2-19 Changes in the number of green turtle nests on the Chichijima and Hahajima Island Groups** *(Revised from Everlasting Nature of Asia, 2008)*

# 3

## *Justification for Inscription*

3.a Criteria under which inscription is proposed
3.b Proposed Statement of Outstanding Universal Value
3.c Comparative analysis
3.d Integrity



Boninite-series rocks (Ten-nohana) *(photo:MOE)*

## 3.a Criteria under which inscription is proposed

The Ogasawara Islands are an oceanic island arc that formed on oceanic crust, far from any continent, and have never been part of a continent. Their scale is rather small, yet they:

- offer a valuable record of the evolutionary processes of the earth,
- clearly demonstrate the processes of evolution in their flora and fauna including adaptive radiation, and
- contain a very high level of biological diversity for their small size.

As such, the property meets criteria (viii), (ix), and (x) as specified in paragraph 77 of the Operational Guidelines.

### 3.a.1 Criterion (viii)

The Ogasawara Islands provide a unique insight into the initial phases of the process of continent formation, a process which repeatedly took place in the Earth's geological history. More specifically, this is a process whereby oceanic island arcs began to form and took shape in response to the initiation of subduction beneath an oceanic plate. A series of varying volcanic activity and magma compositions records the evolutionary progress from a juvenile oceanic arc to the establishment of a stable subduction zone with continental middle crust. The Ogasawara Islands are the only place on earth that preserve perfect exposures on land of the evolutionary processes involved in the formation of an island arc over millions of years. As such, they are an outstanding example of significant on-going geological processes.

The island arc formation in the Ogasawara Islands began with submarine volcanic activity of boninite in the Chichijima and Mukojima Island Groups; this initial stage of subduction of the Pacific Plate started about 48 million years ago. As subduction progressed, mantle conditions (such as temperature and pressure) changed, and accordingly, the composition of the erupted magma. About 45 million years ago, there was a period of calc-alkaline andesite volcanic activity, followed by the eruptions of primitive basalt and andesite (44 million years ago) which formed the Hahajima Island Group. By about 40 million years ago, the subduction zone had largely taken the shape we see today. After the opening of the back-arc basin about 15 million years ago, basaltic volcanism formed the presently active Quaternary volcanic islands (the Kazan Island Group). The andesitic middle crust characteristic of continental crust continues to develop below the Izu-Ogasawara arc, and this unique area continues to contribute to elucidating the mechanisms involved in continent formation throughout the Earth's history.

### 3.a.2 Criterion (ix)

On the Ogasawara Islands, one can observe the process of unique speciation resulting from various modes of evolution including long-term isolated evolution and adaptive radiation. Accordingly, the biota of the islands has a high level of endemism. The Ogasawara Islands are considered to be an outstanding example of the on-going evolutionary processes in oceanic island ecosystems.

For example, outstanding examples of speciation through adaptive radiation are seen among the land snails. By comparing fossils species with extant species, one can track historical changes in evolutionary sequences and diversity in species. Seven endemic genera are recognized among the land snails and their endemic ratio reaches 94%.

In particular, one of the endemic genera, *Mandarina*, has a large number of endemic species; and they show examples of sympatric adaptive radiation, i.e. morphological changes among species reflecting divergent habitats, e.g. arboreal and ground ecotypes, as well as adaptive radiation among island groups.

The various mode of speciation showing the characteristics of evolution on oceanic islands are seen in the plant species. These include: adaptive radiation to the varying climates and topographies of different islands, diminished seed dispersal capacities, development of mechanisms to promote cross-pollination (e.g.




**Diversity of genus** *Mandarina*

*1-43:Modern species 44-56:Fossil species*

| | Species name | Distribution |
|---|---|---|
| 1. | *Mandarina mandarina* (Sowerby) | *Chichijima/Mt.Yoake* |
| 2. | *M. chichijimana* Chiba | *Chichijima/Takayama* |
| 3. | *M. chichijimana* Chiba | *Chichijima/Kohiyama* |
| 4. | *M. anijimana* Chiba | *Anijima* |
| 5. | *M.* sp. A | *Ototojima* |
| 6. | *M. suenoae* Minato | *Chichijima/Hatsuneyama* |
| 7. | *M. tomiyamai* Chiba & Davison | *Chichijima/Mt.Mikazuki* |
| 8. | *M. hirasei* Pilsbry | *Chichijima/Takayama* |
| 9. | *M. polita* Chiba | *Hahajima/Mt.Chibusa* |
| 10. | *M. polita* Chiba | *Hahajima/Okimura* |
| 11. | *M. polita* Chiba | *Hahajima/Higashiko* |
| 12. | *M. polita* Chiba | *Hahajima/Kitako* |
| 13. | *M. polita* Chiba | *Hahajima/Mt.Higashiyama* |
| 14. | *M.* sp. C | *Hahajima/Sekimon* |
| 15. | *M. aureola* Chiba | *Hahajima/Okinotaira* |
| 16. | *M. aureola* Chiba | *Hahajima/Minamizaki* |
| 17. | *M. aureola* Chiba | *Hahajima/Sekimon Nakanodan* |
| 18. | *M. aureola* Chiba | *Hahajima/Sekimon Harinoiwa* |
| 19. | *M. aureola* Chiba | *Hahajima/Sekimon Uenodan* |
| 20. | *M. aureola* Chiba | *Hahajima/Nabetsuruyama* |
| 21. | *M. ponderosa* Pilsbry | *Hahajima/Sekimon* |
| 22. | *M. ponderosa* Pilsbry | *Hahajima/Sakaigatake* |
| 23. | *M. ponderosa* Pilsbry | *Hahajima/hyogidaira* |
| 24. | *M. ponderosa* Pilsbry | *Mukohjima* |
| 25. | *M.* sp. B | *Hahajima/Minamizaki* |
| 26. | *M. conus* Pilsbry | *Anejima* |
| 27. | *M. conus* Pilsbry | *Imotojima* |
| 28. | *M. hirasei* Pilsbry | *Hahajima/Nishidai* |
| 29. | *M. kaguya* Chiba & Davison | *Hahajima/Minamizaki* |
| 30. | *M. kaguya* Chiba & Davison | *Hahajima/Mt.Chibusa* |
| 31. | *M. kaguya* Chiba & Davison | *Hahajima/Mt.Chibusa* |
| 32. | *M. kaguya* Chiba & Davison | *Hahajima/Higashizaki* |
| 33. | *M. hayatoi* Chiba & Davison | *Mukohjima* |
| 34. | *M. hayatoi* Chiba & Davison | *Imotojima* |
| 35. | *M. hahajimana* Pilsbry | *Hahajima/Sekimon Uenodan* |
| 36. | *M. hahajimana* Pilsbry | *Hahajima/Sakaigatake* |
| 37. | *M. hahajimana* Pilsbry | *Hahajima/Sekimon Shitanodan* |
| 38. | *M. exoptata* Pilsbry | *Hahajima/Sakaigatake* |
| 39. | *M. exoptata* Pilsbry | *Hahajima/Nagahama* |
| 40. | *M. trifasciata* Pilsbry (D type) | *Nakodojima* |
| 41. | *M. trifasciata* Pilsbry (D type) | *Nakodojima* |
| 42. | *M. luhuana* (Soweby) | *Chichijima/Minamizaki* |
| 43. | *M. carinata* Chiba | *Chichijima/Minamizaki* |
| 44. | *M. ogasawarana* Chiba | *Chichijima/Minamizaki* |
| 45. | *M. pallasiana* Pfeiffer | *Chichijima/Hukurozawa* |
| 46. | *M. hayamii* Chiba | *Chichijima/Minamizaki* |
| 47. | *M. hayamii* Chiba | *Chichijima/Minamizaki* |
| 48. | *M. hayamii* Chiba | *Chichijima/Minamizaki* |
| 49. | *M. io* Chiba | *Chichijima/Minamizaki* |
| 50. | *M. chichijimana* Chiba | *Chichijima/Minamizaki* |
| 51. | *M. titan* Chiba | *Minamijima* |
| 52. | *M.* sp. F | *Chichijima/Minamizaki* |
| 53. | *M. polita* Chiba | *Hahajima/Okimura* |
| 54. | *M.* sp. E | *Hahajima* |

*(photo:Satoshi Chiba)*

dioecism), and the transformation of herbs into woody plants. As a result of this speciation, the characteristic sclerophyllous scrublands and subtropical rain forest habitats of the Ogasawara Islands, encompass a particularly large number of endemic plant species. Indeed, the endemic ratio of tree species in the sclerophyllous scrublands is 81%.

Further, the Ogasawara Islands have important examples indicating how some marine species evolved into terrestrial species. There are some endemic aquatic species which progressively shifted their habitat, firstly living in coastal ocean, then brackish water, and eventually fresh water. Also, among soil invertebrates, there is a unique species that is considered to be adapted to the terrestrial life from marine life.

Taxonomic disharmony is another distinctive characteristic of oceanic island ecosystems and this phenomenon is very apparent in the Ogasawara Islands. "Taxonomic disharmony" means the complete absence of certain categories of species and the extreme over-representation of others. The vegetation, for example, is marked by a quite large ratio of ferns on the one hand, but on the other hand only one species of gymnosperms and absolutely no species in the beech family (which is a typical plant family on mainland Japan). As for native land animals, there are only one mammal species, two reptiles, and no amphibians whatsoever. The insect fauna of the order Coleoptera consists of large ratios of jewel beetles and tumbling flower beetles, but no native species of phytophagous Scarabaeidae or leaf beetles.

Further, Minami-iwoto is an oceanic island in pristine condition and is considered invaluable for what it has to teach us about the development and evolution of biodiversity and ecosystems on an oceanic island. Because of all these interesting ecological characteristics of the Ogasawara Islands and the insights they can give into evolutionary processes in oceanic islands, research is currently under way in wide range of biological fields.

### 3.a.3 Criterion (x)

The Ogasawara Islands have a rich diversity of species of fauna and flora including endemic ones within a limited area of land. The islands provide habitats for many endangered species of global significance and are particularly invaluable for the conservation of biodiversity in the northwest Pacific region.

Climatically, the Ogasawara Islands fall within the subtropical zone. While the annual variation in temperature is small, the islands receive little precipitation. In addition, differences in altitude, aspect and wind direction result in a variety of localized micro-climates. These diverse climatic conditions and topographical features have given rise to a number of unique ecosystems for each island group. For example, Chichijima Island Group is characterized by sclerophyllous scrub forests and Hahajima Island Group by subtropical rain forests. Also, the origins of biota reaching the Ogasawara Islands are quite diverse, including from Oceania, Southeast Asia, and the main island of Japan.

A diverse biota has uniquely evolved in these isolated islands, and the Ogasawara Islands have a large number of species of fauna and flora per unit area of land, including many endemic and rare species. For example, 441 taxa (including species, subspecies and varieties) of native vascular plants grow in the nominated property, of which 161 taxa are endemic (an endemic ratio of 36.5%). Based on this large



*Calanthe hattorii (photo:Fumie Uemura)*

number of native and endemic plant species, the Ogasawara Islands are listed as a Centre of Plant Diversity (CPD Site PO1) by WWF/IUCN (Davis et al., 1995). The Red List 2007 compiled by the Ministry of the Environment, Japan (MOE) lists 144 taxa of plants in the Ogasawara Islands, making the islands an important habitat for endangered plant species.

A remarkable number of 106 native taxa of land snails have been recorded, of which 100 are endemic. For the insect fauna, 1,380 taxa have been recorded to date, 379 of which are endemic (with an endemic ratio of 27.5%). In particular, there are a large number of beetles (442 taxa are recorded, of which 146 are endemic). Further, as a result of evolution unique to each island or island group, the individual islands and island groups are home to many endemic insect species, such as *Chlorophorus kusamai*, which is endemic to Mukojima Island Group, *Morion boninense*, which is endemic to Hahajima Island, and *Satozo minamiiwoensis*, endemic to Minami-iwoto Island.

BirdLife International has recognized the islands as one of the Endemic Bird Areas of the World, because they are the habitats for the endemic Bonin honeyeater (*Apalopteron familiare*) and the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*). In addition, each of five serial component groups of the nominated property is identified as an Important Bird Area. Among the 14 species of seabirds breeding in the nominated property, Matsudaira's storm-petrel (*Oceanodroma matsudairae*) breeds only on one island in the world, Minami-iwoto, although it has a wide home range from the African coast through Southeast Asia to the western Pacific Ocean. The black-footed albatross (*Phoebastria nigripes*) breeds on both the Ogasawara Islands and Hawaiian Islands, but the Hawaiian group differs genetically from the one which breeds on the Ogasawara Islands (Eda et al., 2008). These examples show that the Ogasawara Islands are important habitats not just for the endemic land birds but for wider-ranging seabirds as well.

The Ogasawara Islands also provide irreplaceable habitats for 57 species ranked as vulnerable (VU), endangered (EN), or critically endangered (CR) on the IUCN Red List (2008). These include the Bonin flying fox (CR), the black-footed albatross (EN), an endemic dragonfly *Boninthemis insularis* (CR), and an endemic land snail *Hirasea chichijimana* (EN).



*Phoebastria nigripes (photo:Tomomi Anzai)*

## 3.b Proposed Statement of Outstanding Universal Value

The Ogasawara Islands are oceanic islands located 1,000 km away from the main islands of Japan. Geologically, the islands are unique in the world in that they provide a rare opportunity to directly observe, on land, the normally hard-to-observe phases of the development of an oceanic island arc. Their large areas of exposed rock strata tell the tectonic story from the beginning of plate subduction 48 million years ago, through transitional periods, and into a stable phase 40 million years ago. The islands are the subject of the world's latest research into the development of island arcs, and are extremely valuable from a scientific perspective in that they provide insights into the evolutionary history of the earth, especially the mechanisms behind the formation of continents.

Biologically and ecologically, the Ogasawara Islands are peculiar island ecosystems with many endemic species as a result of unique processes of adaptive radiation and speciation on the oceanic islands formed in the way mentioned above. The Ogasawara Islands preserve the common characteristics of isolated oceanic islands, and offer the opportunity to witness the ongoing evolutionary process of speciation. They are also valuable as one of the few isolated land masses in the northwest Pacific Ocean region conserving globally significant species, making it very important to maintain this characteristic island ecosystem.

In short, the Ogasawara Islands preserve a valuable source of information on the evolution of the earth and the life on it.

## 3.c Comparative analysis

### 3.c.1 Comparative analysis on geological value

***< Comparison among oceanic island arcs >***

There are many places in the world where oceanic plates are subducted under continental plates. However, most examples of oceanic island arcs that have developed where one oceanic plate is subducted under another oceanic plate, are located in the western Pacific Ocean; for example, the New Britain-New Hebrides and Tonga-Kermadec island arcs, in addition to the Izu-Ogasawara (Bonin)-Mariana (IBM) arc (Fig. 3-1, Table 3-1).

Among these oceanic arcs, only a few have land exposures of a series of volcanic rocks that represent the development of a subduction zone from its birth to the present day. Boninite-series rocks in particular, which develop during the initial stages of formation of subduction zones, most commonly exist under water and are usually covered with younger strata, making them difficult to observe *in-situ* on land. In the New Britain-New Hebrides and Tonga-Kermadec arcs, for example, most of the boninite lies below the seafloor and there are very few places where boninite is exposed on land.

In the IBM arc, with the beginning of plate subduction, volcanism with similar magma compositions to the boninite-series rocks of the Ogasawara Archipelago simultaneously occurred over a broad area. However, today the boninite is observed on land only in the Ogasawara Islands. This is because that the submarine volcanoes (which became current Mukojima and Chichijima Island Groups) formed a volcanic front in the Paleogene and were upraised due to the subduction of the Ogasawara Plateau. The rocks exposed on the

Izu Islands, as well as on Saipan and Guam of the Mariana Islands, are only the product of either the transitional period or 'steady-state' ongoing arc volcanic activity, and here the boninite is found only under the sea floor.

Only in the Ogasawara Islands can a series of volcanic materials that represents the full chronological development of an oceanic island arc be seen on land; these rocks grade from boninite and high-magnesium (Mg) andesite, followed by primitive arc tholeiite and calc-alkaline andesite magmas, to ordinary arc basalt-andesite.

### *< Comparison with other areas where similar rocks to boninite occur >*

High-Mg andesites, including boninite, have formed in subduction zones found in a number of island arcs, including the Aleutian-Alaska arc, Kamchatka-Chishima (Kurile) arc, and the Southwest Japan arc. They are also known from ophiolites and greenstone belts in Cape Vogel, Papua New Guinea; Nepui Pass and Massif de Koh in New Caledonia; Arakapas, Limassol in Cyprus (Troodos ophiolite); the Sohar region in the northern Oman mountains (Oman ophiolite); Baja California in Mexico; the Canadian Appalachia (including Gros Morne National Park, a World Heritage Property); Tasmania to the southeast of Australia; and other sites (Fig. 3-1, Table 3-1).

However, in these areas the geological records are fragmentary or lost because tectonic disturbances and metamorphism have modified the primary mineralogy and chemical compositions. Furthermore, complicated histories have obscured the original geological settings in which these geological features were formed, including how the magmas changed theirl compositions with the establishment of the subduction zone and growth of the arc. In addition, in many cases geological relationships between their individual rock types are not always clear because of poor outcrops. The boninite of Papua New Guinea, for example, is not observable in outcrops, but rather only as residual boulders (Dallwitz, 1967). As for the Oman ophiolite, there are conflicting models leaving ambiguity around the tectonic setting of its boninitic magma genesis.

In contrast, on the Ogasawara Islands the primary geological features (such as structures and stratigraphy) are extremely well-preserved and exposed. They span several millions of years since the beginning of subduction, and have not been destroyed by subsequent tectonic disturbance and metamorphic processes.

### *< Comparison with other World Heritage sites with outstanding tectonic features >*

The Ogasawara Islands constitute a part of the Pacific Ring of Fire, and the constituent rocks of the islands are mostly arc volcanic ejecta. The Nishinoshima Island and the Kazan Island Group are made up of much younger Quaternary volcanoes. However, the geological value of the nominated property does not lie in its volcanic features. There are many World Heritage properties with volcanoes as principal feature of outstanding universal value (OUV), such as the Volcanoes of Kamchatka (Russian Federation) and Tongariro National Park (New Zealand); these sites have characteristics typical of active volcanoes including: topography, diversity, scale, distinctive depositional structure, and hydrothermal phenomena. The geological value of the Ogasawara Islands lies in their record of the evolutionary history of the earth. Their rocks show just how an oceanic island arc above oceanic crust developed since the initiation of plate subduction, and how continental

crust, which is the ultimate building block of continents, came into being. In this respect, the Ogasawara Islands fall under the theme of 'tectonic and structural features' proposed in the IUCN geological thematic study (Dingwall et al., 2005) and possess important geological features not seen at other natural World Heritage sites with volcanic properties.

In the IUCN thematic study, other than the Gros Morne National Park mentioned above, Macquarie Island (Australia), Uluru-Kata Tjuta National Park (Australia), and the Three Parallel Rivers of Yunnan Protected Areas (China) are listed as examples of a heritage site with 'tectonic and structural features' as one of principal features of OUV. Macquarie Island is made up of oceanic crust and mantle that has been thrust up to the surface along a transform fault. Uluru-Kata Tjuta National Park is characterized by huge sandstone monoliths created by the folding of the strata.

The Three Parallel Rivers of Yunnan Protected Areas is the place where two continental plates collide and a variety of rocks including ophiolites show the evidence of the evolution of the Tethys seas. Accordingly, these areas differ from the Ogasawara Islands in terms of both the processes behind its formation and its constituent rocks. Macquarie Island and Uluru-Kata Tjuta National Park represent the results of tectonic activity for a relatively short period, while the Three Parallel Rivers of Yunnan Protected Areas and the Ogasawara Islands encompass relatively long-term tectonic activities.

Ophiolites outcrops can be found in other natural World Heritage properties such as Tasmanian Wilderness (Australia) and Te Wahipounamu - Southwest New Zealand (New Zealand); however, these rocks are metamorphosed and the histories exemplified in mineral composition of rocks are different from the Ogasawara Islands.

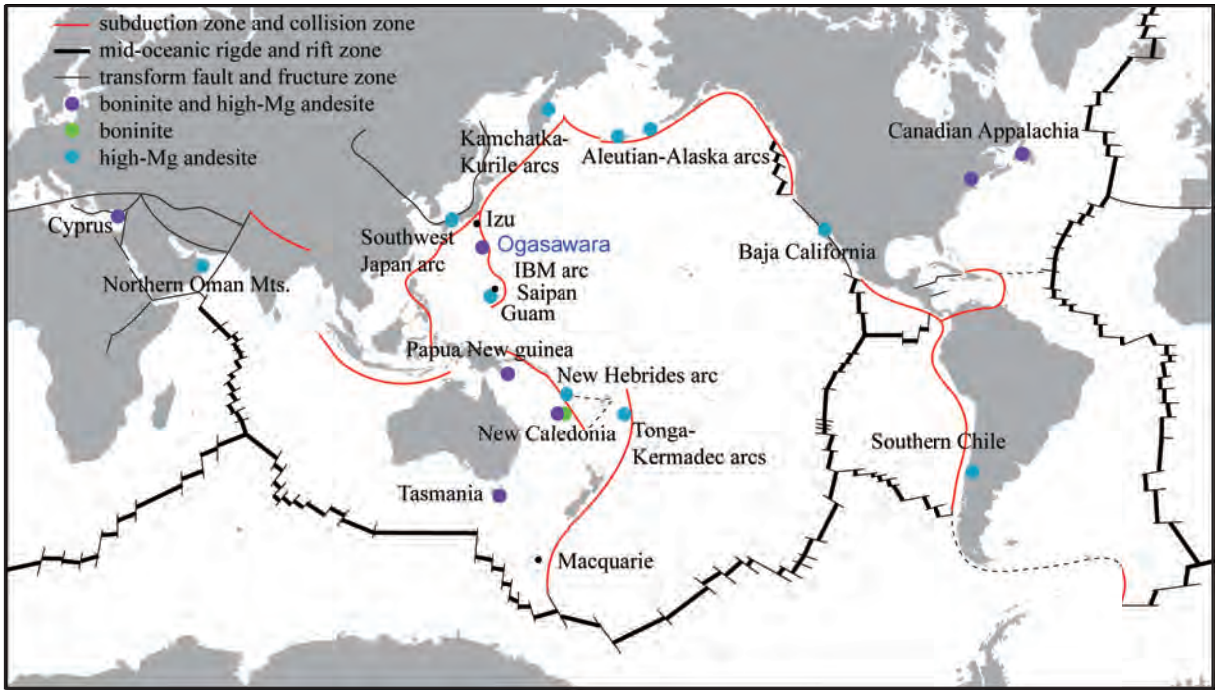



Fig. 3-1 Major plate boundaries and distribution of boninite and high-Mg andesite
*(Modified from Umino, 2008)*

## Table 3-1 Global comparison of sites with rocks containing boninite of high-Mg andesite

| Area | Location | Geologic body, current tectonic setting | Outcrops of boninite[1] on land | Outcrops of other high-Mg andesite[2] on land | Tectonic setting or mechanism of formation of boninite or high-Mg andesite | Age of volcanism | Note | References |
|---|---|---|---|---|---|---|---|---|
| Oceanic island arcs | | | | | | | | |
| Izu Islands | IBM (Izu-Ogasawara (Bonin)- Mariana arc) | Island arc | None | None | Current volcanic arc | Pleistocene-Holocene | Eocene-Oligocene high-Mg andesite beneath the fore-arc | Wood et al. (1981) |
| Ogasawara ridge | IBM | Fore-arc | Present (widely exposed, well preserved primary structure, fresh and non metamor-phosed) | Present | Volcanic front in an incipient stage of subduction zone development | Eocene (48-45 Ma) | Type locality of boninite: Ogiura, Chichijima; Boninite also found from Hahajima seamount on the landward slope of trench" | Ishiwatari et al. (2006),Ishizuka et al. (2006) |
| Saipan Island | IBM | Fore-arc | None | None | Volcanic front in an incipient stage of subduction zone development | Eocene | Boninite found from landward slope of the trench | Bloomer & Hawkins (1987). Dietrich et al. (1978).Reagan et al. (2008) |
| Guam Island | IBM | Fore-arc | None | Present (well preserved primary structure non-metamor-phosed) | Volcanic front in an incipient stage of subduction zone development | Eocene | Boninite found from landward slope of the trench | Bloomer & Hawkins (1987),Reagan & Meijer (1984) |
| Tonga-Kermadec forearcs | Tonga-Kermadec arcs | Fore-arc | None | Present | Melting of hydrous mantle during the arc splitting | Estimated to be in late Tertiary, present | Boninite found from landward slope of the trench, and high-Ca boninite found from back-arc spreading center | Falloon et al. (1989), Rubin et al. (2009) |
| Hunter Ridge protoisland arc | New Hebrides arc | Not clear | None | Present | Subduction beneath the wedge mantle heated by hot asthenosphere upwelling beneath the North Fiji Basin spreading center | Not clear | Boninite found from the back arc | Meffre et al. (1996) |
| Other island arcs | | | | | | | | |
| Adak Island, Near Island, Aleutian Ridge | Aleutian- Alaska arcs | Island arc | None | Present (Adakite) | Splitting of subducted oceanic rigde axis | Miocene | | Rogers & Saunders (1989) |
| Shiveluchi Volcano | Kamchatka-Kurile arcs | Island arc | None | Present (Adakite) | Splitting of subducted oceanic rigde axis | Holocene | | Churikova et al. (2001) |
| Setouchi Belt | Southwest Japan arc | Island arc | None | Present (Sanukitoid) | Hot slab subduction induced by the opening of the Japan Sea | Miocene | | Tatsumi & Maruyama (1989) |
| Continental arc | | | | | | | | |
| Austral Volcanic Zone | Southern Chile | Continental arc | None | Present | Subduction of oceanic ridge | Holocene | | Rogers & Saunders (1989) |
| Baja California | Mexico | Continental arc | None | Present | Subduction of oceanic ridge | Miocene-Holocene | | Rogers & Saunders (1989) |
| Ophiolites | | | | | | | | |
| Cape Vogel | Papua New Guinea | Ophiolite | Present (deeply weathered; fresh samples are boulders only) | Present | Tectonic setting of the boninite petrogenesis is not known in detail | Paleocene (59 Ma) | | Dallwitz (1967) |
| Nepui Pass | New Caledonia | Ophiolite | Present (small scale outcrops) | None | Not clear | Paleocene-Eocene | In fault contact with the surrounding formations | Cameron (1989). Sameshima et al. (1983) |

1) Glassy bronzite andesite without plagioclase; 2) Including "boninite" in a broad sense

**Table 3-1 Global comparison of sites with rocks containing boninite of high-Mg andesite (contd.)**

| Area | Location | Geologic body, current tectonic setting | Outcrops of boninite[1] on land | Outcrops of other high-Mg andesite[2] on land | Tectonic setting or mechanism of formation of boninite or high-Mg andesite | Age of volcanism | Note | References |
|---|---|---|---|---|---|---|---|---|
| Massif de Koh | New Caledonia | Ophiolite | Present (boulders only; metamorphosed) | Present | Remelting of the upper mantle by hot asthenosphere upwelling preceding the back-arc spreading | Permian-Triassic | Metamorphosed under greenschist facies | Cameron (1989).Meffre et al. (1996) |
| Arakapas, Limassol | Cyprus Island | Ophiolite | None | Present | Obduction/fore-arc spreading | Cretaceous | Troodos ophiolite | McCulloch & Cameron (1983) |
| Sohar | Northern Oman mountains | Ophiolite | None | Present | Temporal subduction zone caused by obduction/fore-arc spreading | Cretaceous | Oman ophiolite | Ishikawa et al. (2002) |
| Dundas Trough | Tasmania | Nappe (accretionary complexes of continent- arc collision) | Present (metamorphosed under greenschist facies) | Present (metamorphosed under greenschist facies) | Not clear | Cambrian | | Brown & Jenner (1989) |
| Gros Morne Newfound-land | Canadian Appalachia | Ophiolite | Present (metamorphosed under greenschist facies) | Present (metamorphosed under greenschist facies) | Oceanic crust, mantle, Mohorovicic discontinuity | Cambrian-Ordovician | Betts Cove ophiolite, Bay of Island ophiolite, Pacquet Harbour Complex | Coish (1989) |
| Thetford Mines Complex | Canadian Appalachia | Ophiolite | Present (metamorphosed under greenschist facies) | Present (metamorphosed under greenschist facies) | Oceanic crust, mantle, Mohorovicic discontinuity | Cambrian-Ordovician | | Coish (1989) |

1) Glassy bronzite andesite without plagioclase; 2) Including "boninite" in a broad sense

## 3.c.2 Comparison with other island groups in terms of their ecological/biological features and biodiversity

### 3.c.2.1 Domestic comparisons

In Japan, other than the Ogasawara Islands, the islands with the richest endemic biota and unique ecosystems are the Nansei Islands which are continental islands. One of the islands of the Nansei Islands , Yakushima, is inscribed on the World Heritage List based on criteria (vii) and (ix). Its main value for criterion (ix) rests on the outstanding vertical distribution of vegetation and not on the evolution in an isolated ecosystem. The Amami Archipelago and the Ryukyu Islands, that are included in the Nansei Islands, are rich in endemic and rare species with great biodiversity, yet they exhibit a completely different set of ecological and biological processes from the Ogasawara Islands.

Other oceanic islands in Japan include the Daito Islands (Kitadaito, Minamidaito and Okinodaito Islands: total area of about 43.6 km$^2$). The Daito Islands, however, are uplifted coral reef islands. Like the Ogasawara Islands, the Daito Islands have many endemic species, but their natural environment has not been preserved to the degree of that of the Ogasawara Islands, where one can observe ongoing adaptive radiation and speciation.

### 3.c.2.2 Global comparison of ecological and biological features of evolution

According to Udvardy's biogeographic classification system (1975), the Ogasawara Islands belong to the Micronesian Province of the Oceanian Realm (5.2.13). Currently, there is no World Heritage property in this province. There are 25 natural sites listed on the World Heritage list that belong to the same biome, i.e. mixed island system, and about 45 island

natural heritage properties when one includes those that do not belong to the 'mixed island system' biome.

Of these 45 island natural heritage sites, there are 16 properties that were inscribed based on criterion (ix), and which consist of oceanic islands or islands having histories of isolation comparable in length to oceanic islands. When one excludes the areas with completely different climatic conditions such as subpolar regions, or islands whose main value lies in the marine ecosystem around them, the following seven sites remain (Table 3-2, Fig. 3-2). All of these sites feature evolutionary processes or ongoing evolution, but the scale and contents vary.

- **The Galápagos Islands**
  (Ecuador) (criteria (vii), (viii), (ix) and (x)):

  Located in the eastern Pacific, the site is famous for research into biological evolution and for its extensive examples of adaptive radiation (especially giant tortoise and finches). A large number of tourists visit the site every year, and because of severe problems relating to human settlement and the introduction of alien species, Galápagos is currently inscribed on the list of World Heritage in Danger. The major difference of the Ogasawara Islands from this site is the former's lack of large scale islands and multiple origins of biota (most of the biota in Galápagos originated from the South American continent). Consequently, the processes of evolution observed and the species involved in the Galápagos Islands are different from the Ogasawara Islands.

- **East Rennell**
  (Solomon Islands) (criterion (ix)):

  The property occupies about half of Rennell Island, which is located in the south-western Pacific. The marine, coastal and forest ecosystems are well preserved, and it plays a role as a stepping-stone in the migration and evolution of bird species in the western Pacific. East Rennell is called "a true natural laboratory for scientific study". The property is a high coral island with a major feature being a large brackish lake with many endemic species. The lake occupies more than 40% of the property and is the largest lake in the Pacific region. Its characteristic ecosystem is different from the Ogasawara Islands, and unlike Ogasawara, there are many fields where little research work has been done.

- **Aldabra Atoll**
  (Seychelles)(criteria (vii), (ix) and (x)):

  Located in the western Indian Ocean, it shows distinct evolutionary features in giant tortoises and flightless birds. Aldabra Atoll is a small group of tropical atolls - flat islands with mangrove forests, scrubs and grasslands. There are large differences in its ecosystems and evolutionary processes compared with the subtropical environment and volcanic origin of the Ogasawara Islands.

- **Vallée de Mai Nature Reserve**
  (Seychelles) (criteria (vii), (viii), (ix) and (x)):

  This site is a relatively small scale reserve (20ha) on Praslin Island which is located in the western Indian Ocean. The islands of Seychelles are continental origin but have a long history of isolation. There are six endemic palm species found in the property, showing an earlier stage in the evolution of the world's flora. There are also many endemic or endangered species, and it is called a "living museum". There are no known examples of adaptive radiation over several islands (such as seen in Ogasawara and other islands).

• **The Laurisilva of Madeira**
(Portugal) (criteria (ix) and (x)):

Located in the eastern Atlantic, southwest of Portugal, this property preserves a large area of laurel forest previously widespread in Europe. It has rich biodiversity and many of plants and animals are unique to the laurel forest. The variety of evolutionary processes is poor compared to the Ogasawara Islands because of its longer history of human development and lesser number of islands.

• **Garajonay National Park**
(in Canary Islands of Spain) (criteria (vii) and (ix)):

Located in the eastern Atlantic, off the African continent and south of the Madeira Archipelago, this park also has an old-type laurel forest. The site features many examples of woodiness in herbaceous plants and many endemic species. The Canary Islands are rather close to the African continent, and they do not exhibit the characteristic evolutionary processes of long-isolated oceanic islands like the Ogasawara Islands.

• **Alejandro de Humboldt National Park**
(Cuba) (criteria (ix) and (x)):

This national park is located in eastern Cuba in the western Atlantic region. It was a refuge site during the glacial era. Also, it is an excellent example of ongoing processes in the evolution of species and communities adapting to toxic rocks. The area has become an isolated "island" because of the special geological features, but its ecological processes are different from those of true isolated oceanic islands.

Further, another four sites are compared;

• **The Hawaiian Islands** (USA) (criterion(viii)):

Located in the middle of the Pacific Ocean, the islands are famous for the evolutionary research carried out here into an oceanic island system isolated by great distance from the continents. The Hawaiian Islands have many unique endemic species. Hawaii Volcanoes National Park located on the largest island, Hawaii, is a World Heritage property based on the geological value of its volcanoes. The value of Hawaiian biological evolution was not recognized in the inscription because of the degree of anthropogenic change and the severe impact of invasive alien species on the indigenous ecosystems. The Ogasawara Islands differ from this site due to their lack of any large scale islands and the absence of Hawaii's long history and intensity of development pressure.

• **Papahanaumokuakea Marine National Monument**
(The Northwestern Hawaiian Islands of USA, listed on the tentative list and to be discussed with respect to the inscription at the 34th World Heritage Committee in 2010):

This site comprises a chain of small scale islands located to the northwest of the Hawaiian Islands. The site is nominated for a mix of cultural and natural values, and the natural value is focused on the breeding sites of seabirds and the rich diversity of marine life. The islands are located at similar latitudes as the Ogasawara Islands but the land scale of each island is smaller, and their terrestrial evolutionary processes are not as diverse as in the Ogasawara Islands.

• **The Kermadec Islands**
(New Zealand, listed on the tentative list):

These islands are a volcanic island arc situated 1,000 km north-east of the North Island of

New Zealand in the south-western Pacific. They have rich marine biodiversity and on land, many endemic species and examples of adaptive radiation are seen. This site has similar conditions as the Ogasawara Islands though it is in the southern hemisphere. Successful control programs on invasive alien species have been progressively conducted for more than 15 years. Research work on its terrestrial ecosystems is not as far advanced as in the Ogasawara Islands.

- **The Juan Fernández Islands**

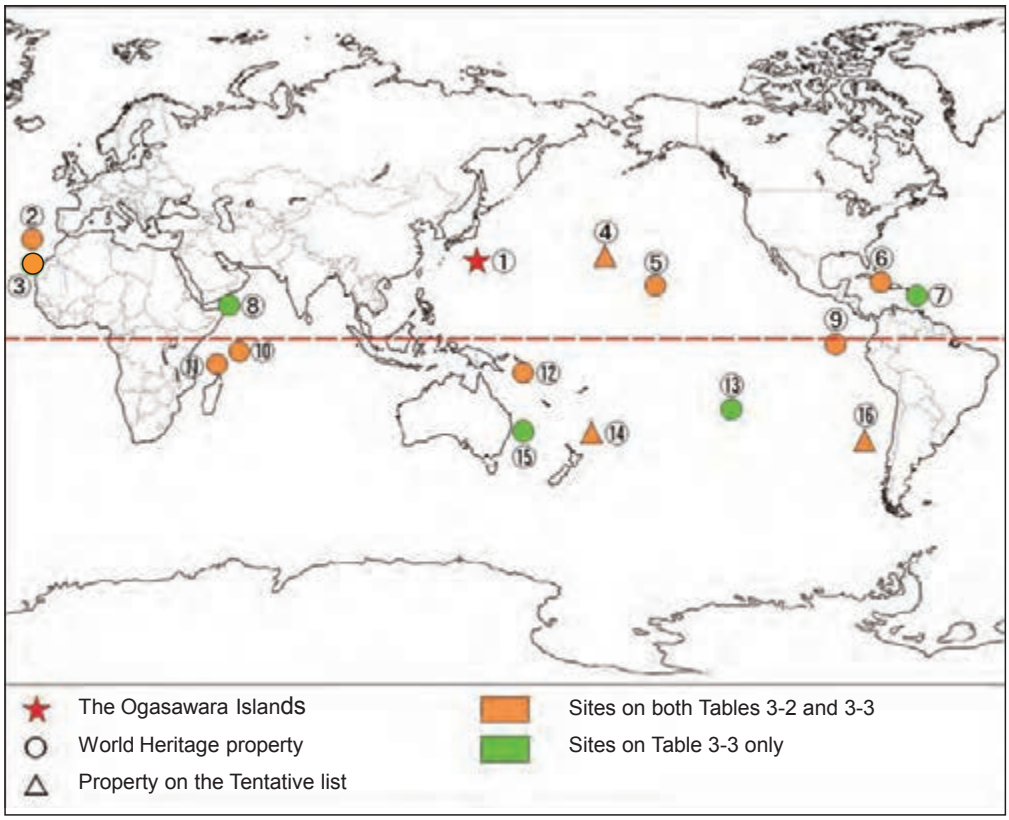
(Chile, listed on the tentative list):

Located in the south-eastern Pacific, off Chile, this site has many endemic species and even an endemic family. It has diverse origins of species, including South America, Antarctic, Asia and Australia. The major geographical differences from the Ogasawara Islands are the shorter distance from a continent and the smaller number of islands involved.

**Table 3-2 Geographical comparisons regarding criterion (ix)**

| Area | Latitude | Distance from a continent (km) | Age of islands (million years)* | Area of the largest island ($km^2$) | Highest peak (m) | Number of islands (>1$km^2$) | References |
|---|---|---|---|---|---|---|---|
| Ogasawara Islands | 24-28°N | 1,000 | 3 - 5 | 24 | 916 | 11 + | |
| Madeira Archipelago | 32-33°N | 650 | | 741 | 1,862 | 4 | |
| Canary Islands | 28-29°N | 96 | 12 - 20 | 2,034 | 3,718 | 7 | Whittaker and Fernández-Palacios (2007) |
| Northwestern Hawaiian Islands | 22-30°N | ca.4,000 | 7-30 | 6 | 275 | 4 + | State of Hawaii et al. (2009) |
| Hawaiian Islands | 19-23°N | 4,100 | 0.5 - 70 | 10,337 | 4,206 | 8+ | Whittaker and Fernández-Palacios (2007), Loope et al. (1988), Neall and Trewick (2008) |
| Cuba | 20-21°N | 150 | | 110,000 | 1,974 | 1 | |
| Galápagos Islands | 2°S-2°N | 920 | 3 - 4.5 | 4,670 | 1,707 | 19 + | Whittaker and Fernández-Palacios (2007), Loope et al. (1988), Neall and Trewick (2008) |
| Seychelles Islands (Inner Islands) | 4-5°S | 1,450 | | 153 | 912 | 41 | The Seychelles Tourist Board (2009), WCMC, Peck (2006) |
| Aldabra Atoll | 9-10°S | 420 | 0.125 | 116 | 8 | 4 | WCMC, Peck (2006) |
| Rennell Island | 11-12°S | 1,488 | 2.5 | 684 | 180 | 2 | Gov. Solomon Islands (1997), Neall and Trewick (2008) |
| Kermadec Islands | 29-32°S | 1,100 | 0.5 - 1.5 | 29 | 516 | 15 | DOC (2006), Anthoni (2002) |
| Juan Fernández Islands | 33 -34°S | 667 | 2 - 4 | 50 | 916 | 3 | Stuessy et al. (1998), Chilean Government (1994) |

*Here, age does not mean the year after the creation of islands but it means estimated periods during which the islands stand constantly above ocean.




| | | | |
|---|---|---|---|
| 1 | Ogasawara Islands | 9 | Galápagos Islands |
| 2 | Madeira Archipelago | 10 | Seychelles Islands |
| 3 | Canary Islands | 11 | Aldabra Atoll |
| 4 | Northwestern Hawaiian Islands | 12 | Rennell Island |
| 5 | Hawaiian Islands | 13 | Henderson Islands |
| 6 | Cuba | 14 | Kermadec Islands |
| 7 | Dominica | 15 | Lord Howe Island Group |
| 8 | Socotra Archipelago | 16 | Juan Fernández Islands |

**Fig. 3-2 Map of the areas for comparison** *(The areas on Tables 3-2 and 3-3)*

The evolutionary process on oceanic islands is affected by the magnitude of geological and temporal isolation, the size and number of islands, the complexity of their ecosystems and other factors. When the distance from continental landmasses is large, the frequency of introduction of new species or individuals will be less, the disproportion of the species composition of fauna and flora will be greater, and the number of endemic species will be larger. When the size and number of islands is large, or the ecosystem is complex, speciation will be promoted; consequently, the number of endemic species will be large and the island will be relatively rich in biodiversity. When the duration of isolation is longer, this evolutionary process will proceed further. The typical isolated oceanic islands with this rich biodiversity and high levels of endemism are the Hawaiian Islands and the Galápagos Islands.

In comparison, Table 3-2 shows that the Ogasawara Islands have the following characteristics:

- their geological and temporal isolation is comparatively large,
- they lack any large sized island or any island with high altitude, and
- they consist of many small islands spread over a distance of 400 km, with an interval of 30 - 150 km between each group in the archipelago.

In general, smaller islands have fewer species, and more of them are likely to become extinct. Compared with the Hawaiian Islands or the Galápagos Islands, the Ogasawara Islands are at a disadvantage in the survival and evolution of their biota since the archipelago lacks any large island with complex ecosystems, although their geological and temporal isolation is of a similar order. In spite of these disadvantages, many species have reached the Ogasawara Islands, survived, and progressed through a unique evolution. The Ogasawara Islands rival the Hawaiian Islands or the Galápagos Islands in scientific research outcomes which have given valuable insights into the diverse evolutionary processes in terrestrial ecosystems involving multiple islands. The Ogasawara Islands maintain a fairly good state of conservation, and are indeed precious laboratories of evolution.

### 3.c.2.3 Global comparison of numbers of species and endemic species

Using a similar comparison approach to the previous section, 17 of the currently-listed oceanic island natural heritage sites are inscribed based on criterion (x). When one excludes the subpolar regions or islands whose main value lies in their marine ecosystem, this number is reduced to the following nine sites. All these island sites feature biodiversity in the terrestrial ecosystem, but the degree and attributes vary.

- The Laurisilva of Madeira (Portugal) (criteria (ix) and (x)),
- Alejandro de Humboldt National Park (Cuba) (criteria (ix) and (x)),
- Morne Trois Pitons National Park (Dominica) (criteria (viii) and (x)),
- Socotra Archipelago (Yemen) (criterion (x)),
- The Galápagos Islands (Ecuador) (criteria (vii), (viii), (ix) and (x)),
- Aldabra Atoll (Seychelles) (criteria (vii), (ix) and (x)),
- Vallée de Mai Nature Reserve (Seychelles) (criteria (vii), (viii), (ix) and (x)),
- Henderson Island (UK) (criteria (vii) and (x)), and
- Lord Howe Island Group (Australia) (criteria (vii) and (x)),

Furthermore, additional six island groups (the Canary Islands, the two Hawaiian islands, Rennell island, the Kermadec islands, and the Juan Fernández Islands) are included in the comparison (Table 3-3, Fig. 3-2). Unfortunately, for some properties, detailed information on the number of species could not be found and consequently direct comparison was not possible.

The number of species on any islands has a close relationship with the area of the islands and their distance from the continents. The number will increase as the area increases, and it will decrease as the distance increases. Generally, it is known that the number of species increases exponentially with island area (the logarithms of each form a linear function with a positive slope) (MacArthur and Wilson, 1967). So, in comparing island size and number of species, consideration was given to the above issue and comparisons have been made by drawing the following graphs with exponential axes. As a result, it is apparent that the Ogasawara Islands have a greater number of plant, land snail and insect species than other oceanic islands as explained below, and that the Ogasawara Islands are oceanic islands with high biodiversity.

**Table 3-3 Geographical features of the sites chosen for comparing the number of species**

| Area | Latitude | Distance from a continent (km) | Age of islands (million years)* | Terrestrial Area ($km^2$) | References |
|---|---|---|---|---|---|
| Ogasawara Islands | 24-28°N | 1,000 | 3 - 5 | 80** | |
| Madeira Archipelago | 32-33°N | 650 | | 797 | |
| Canary Islands | 28-29°N | 96 | 12-20 | 7,447 | Whittaker and Fernández-Palacios (2007) |
| Northwestern Hawaiian Islands | 22-30°N | ca.4,000 | 7-30 | 14 | State of Hawaii et al. (2009) |
| Hawaiian Islands | 19-23°N | 4,100 | 0.5-70 | 16,504 | Whittaker and Fernández-Palacios (2007), Loope et al. (1988), Neall and Trewick (2008) |
| Cuba | 20-21°N | 150 | | 110,000 | |
| Dominica | 15-16°N | 550 | | 754 | |
| Socotra Archipelago | 12-13°N | 250 | 6 | 2,775 | Yemeni Government (2006) |
| Galápagos Islands | 2°S-2°N | 800 | 3-4.5 | 7,856 | Whittaker and Fernández-Palacios (2007), Loope et al. (1988) |
| Seychelles Islands (Whole country) | 4-10°S | 480-1,600 | 0.1 - >100 | 455 | The Seychelles Tourist Board (2009), WCMC, Peck (2006) |
| Rennell Island | 11-12°S | ca.2000 | 2.5 | 684 | Gov. Solomon Islands (1997) |
| Henderson Island | 24°S | 4,800 | 0.38 | 37 | Brooke et al. (2004) |
| Kermadec Islands | 29-32°S | 1,100 | 0.5 - 1.5 | 33 | DOC (2006), Anthoni (2002) |
| Lord Howe Island Group | 31-32°S | 700 | 6.5 - 7 | 15 | Australian Government (1981, 2002), Whittaker and Fernández-Palacios (2007) |
| Juan Fernández Islands | 33 -34°S | 667 | 2 - 4 | 100 | Stuessy et al.(1998), Chilean Government (1994) |

* Here, age does not mean the year after the creation of islands but it means estimated periods during which the islands stood constantly above the ocean. For the Socotra Archipelago, it means the year after its separation from the continent.

** The terrestrial area of the Ogasawara Islands used for comparison includes the whole of Chichijima and Hahajima Islands as well as Iwoto Island which is outside of the nominated property, in accordance with the area covered by the data used.

***< Plants >***

Table 3-4 compares the total numbers of plant species, numbers of endemic species, and numbers of species per unit area for the different island groups. The Hawaiian Islands have 1,110 species of vascular plants, 956 of which are endemic, giving a high endemic ratio of 86.9%. Other island groups with more plant species overall and more endemic species compared to the Ogasawara Islands are the Canary Islands, the Galápagos Islands and Socotra Archipelago, yet these four island groups are up to many hundreds of times larger in area than the Ogasawara Islands.

**Table 3-4 Comparison of the numbers of overall species and endemic species of vascular plants for a range of oceanic islands.**

| Area | Number of species | Number of endemic species | Endemic ratio | No. of species/ area (km²) | No. of endemic species/ area (km²) | References |
|---|---|---|---|---|---|---|
| Ogasawara Islands | 441 N | 161 | 36.5 | 5.5 | 2.01 | Nature Conservation Bureau, MOE (2004) |
| Ototojima | 186 | 84 | 45.2 | 36 | 16.15 | |
| Anijima | 184 | 95 | 51.6 | 23 | 12.03 | |
| Chichijima | 356 | 129 | 36.2 | 15 | 5.38 | |
| Hahajima | 278 | 122 | 43.9 | 14 | 6.10 | |
| Kita-iwoto | 132 | 46 | 34.8 | 24 | 8.21 | |
| Minami-iwoto | 129 | 32 | 24.8 | 36 | 8.89 | |
| Madeira Archipelago 1) | 793 | 118 | 14.9 | 1.0 | 0.15 | Whittaker and Fernández-Palacios (2007) |
| Canary Islands 2) | 1,300 | 570 | 43.8 | 0.2 | 0.08 | Whittaker and Fernández-Palacios (2007) |
| Northwestern Hawaiian Islands 3) | | 6 | | | 0.43 | State of Hawaii et al. (2009) |
| Hawaiian Islands 4) | 1,110 N | 956 | 86.9 | 0.1 | 0.06 | Loope et al. (1988) |
| Socotra Archipelago | 825 | 307 | 37.2 | 0.3 | 0.11 | Yemeni Government (2006) |
| Galápagos Islands | 541 N | 229 | 42.3 | 0.1 | 0.03 | Loope et al. (1988) |
| Seychelles Islands | ca. 200 N | 70 | 35.0 | 0.4 | 0.15 | Davis et al. (1994) |
| Rennell Island | | 10 | | | 0.01 | Gov. Solomon Islands (1997) |
| Henderson Island | 71 | 10 | 14.1 | 1.9 | 0.27 | Brooke et al. (2004) |
| Kermadec Islands | 115 N | 23 | 20 | 3.5 | 0.70 | DOC (2006) |
| Lord Howe Island Group | 241 | 105 | 43.6 | 16.1 | 7.00 | Australian Government (2002) |
| Juan Fernández Islands | 210 N | 127 | 60.5 | 2.1 | 1.27 | Davis et al. (1995) |

N: number of native species.

Figures for the numbers of species include subspecies and varieties.

1) World Heritage Property is "Laurisilva of Madeira" which is about 19% of the islands.
2) World Heritage Property is "Garajonay National Park" which is about 0.5% of the islands, and "Teide National Park" which is about 2.6% of the islands.
3) "Papahanaumokuakea Marine National Monument" covers the whole area and is listed on the tentative list.
4) World Heritage Property is "Hawaii Volcanoes National Park" which covers about 5.6% of the islands.

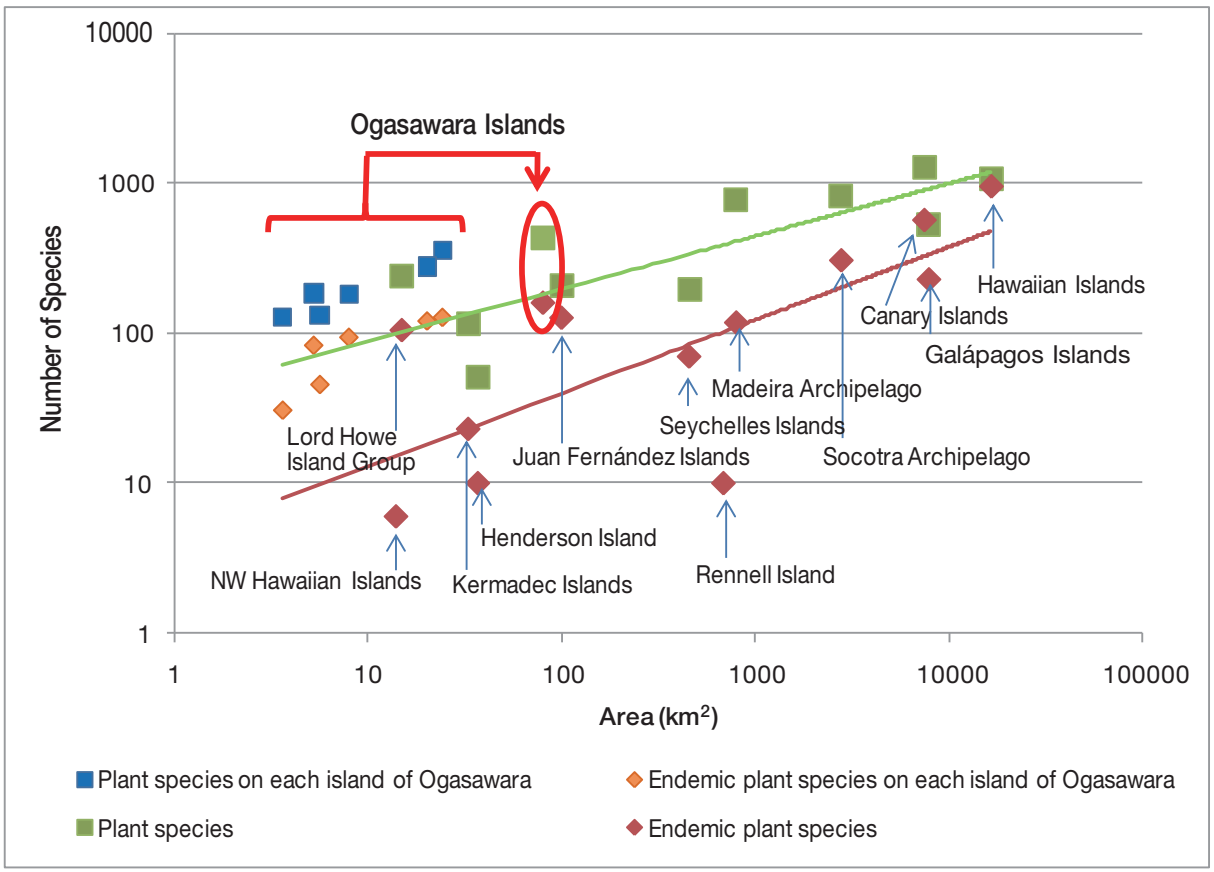



**Fig. 3-3 Number of plant species by area of islands** *(On a logarithmic scale)*

When considering the relationship of the area and the number of vascular plant species by graph (Fig. 3-3), the Ogasawara Islands plot clearly higher in both the number of total species and endemic species than the other islands (the regression line in the graph). Further, when one looks at the number of plant species on each island of the Ogasawara Islands, it can be seen that the level of each individual Ogasawara island is in the same range as Lord Howe Island, which is recognized as a group of small islands of extremely high biodiversity.

### < *Land snails* >

Table 3-5 compares the numbers of native species and endemic species of land snails on the Ogasawara Islands with 13 oceanic island groups. In general, the endemic ratio of land snails is high in most oceanic islands, but the ratio of over 90% for the Ogasawara Islands is equivalent to that of the Hawaiian Islands or the Galápagos Islands. Also, Fig.3-4 shows that the number of species is very high in the Ogasawara Islands when considering the small area of the islands, indicating that a high degree of speciation in land snails has taken place. In this respect, the Ogasawara Islands are equivalent to the Lord Howe Island Group, well known as small islands of high biodiversity.

Furthermore, the important characteristic of land snails on the Ogasawara Islands is that the extinction rate for endemic species is far lower than for the other oceanic islands (Table 3-5). When one considers that human settlement and alien species have devastated land snails on most Pacific islands, such as Hawaii (extinction rate: 90%) and Society Islands (extinction rate: 90%), the land snails in the Ogasawara Islands with their high survival rate (extinction rate: about 24%) are extremely important.

**Table 3-5 Land Snails: numbers of overall native species, endemic species, and extinction rates for groups of oceanic islands.**

| Area (country) | Number of native species / Number of endemic species | Endemic ratio (%) | Reference for No. of species | Terrestrial areas ($km^2$) | No. of native species / area ($km^2$) / No. of endemic species / area ($km^2$) | Extiction rate of endemic species | Reference for Extinction rate |
|---|---|---|---|---|---|---|---|
| Ogasawara Islands (Japan) | 106 / 100 | 94,34 | Chiba (2009a, b) | 80 | 1.33 / 1.25 | 24% | Chiba (2009a, b) |
| Anijima | 33 / 32* | 96.97* | Chiba (2009a, b) | 8 | 4.18 / 4.05 | – | |
| Chichijima | 50 / 44* | 88.00* | Chiba (2009a, b) | 24 | 2.08 / 1.83 | – | |
| Hahajima | 57 / 51* | 89.47* | Chiba (2009a, b) | 20 | 2.85 / 2.55 | – | |
| Madeira Archipelago (Portugal) | 194 / 171 | 88.14 | Cameron and Cook (1992) | 797 | 0.24 / 0.21 | – | |
| Canary Islands (Spain) | 260 / 210 | 80.77 | Ibanez et al. (1997) | 7,447 | 0.03 / 0.03 | – | |
| Northern Mariana Islands (USA) | 16 / – | – | Kurozumi (1994) | 1,590 | 0.01 / – | 50% | Kurozumi (1994) |
| Hawaiian Islands (USA) | 768 / 748 | 97.40 | Cowie et al. (1995) | 16,504 | 0.05 / 0.05 | 90% | Lydeard et al. (2004) |
| Socotra Archipelago (Yemen) | 96 / 91 | 94.79 | Yemeni Government (2006) | 2,775 | 0.03 / 0.03 | – | |
| Galápagos Islands (Ecuador) | 83 / 80 | 96.39 | Tye et al. (2002) | 7,856 | 0.01 / 0.01 | – | |
| Seychelles Islands (Seychelles) | 69 / 50 | 72.46 | Gerlach (2006) | 455 | 0.15 / 0.11 | – | |
| Rennell Island (Solomon Islands) | 27 / 9 | 33.33 | Gov. Solomon Islands (1997) | 684 | 0.04 / 0.01 | – | |
| Western Samoa Islands (Samoa) | 62 / 42 | 67.74 | Cowie and Robinson (2003) | 3,007 | 0.02 / 0.01 | – | |
| Society Islands (France) | 160 / 140 | 87.50 | Lydeard et al. (2004) | 1,539 | 0.10 / 0.09 | 90% | Coote and Loeve (2003) |
| Henderson Island (UK) | 16 / 8 | 50.00 | Preece (1998) | 37 | 0.43 / 0.22 | – | |
| Norfolk Island (Australia) | 68 / – | – | Ponder (1997) | 36 | 1.89 / – | – | |
| Lord Howe Island Group (Australia) | 69 / – | – | Ponder (1997) | 15 | 4.60 / – | – | |

Figures for the numbers of species include subspecies.

* The figures indicate the number of species or ratio of species endemic to the Ogasawara Islands on each island (not the species endemic to each island).

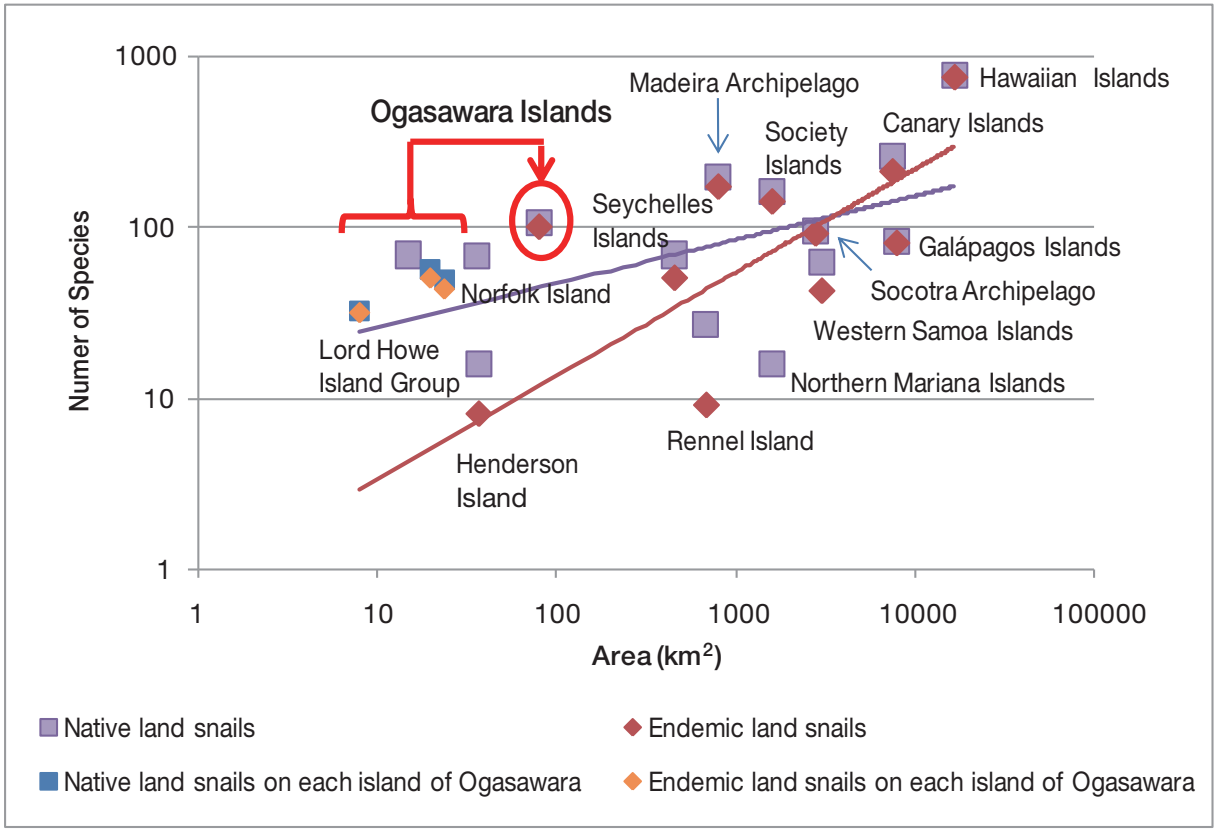



**Fig. 3-4 The relationship between island area and land snail species numbers on different island groups**

* The number of species includes the extinct ones. *(Figure produced with the assistance of Satoshi Chiba)*

### < *Insects* >

The insect fauna of the Ogasawara Islands consists of 1,380 species. However, there are only a limited number of islands where entomological surveys have been conducted and detailed information on insect fauna is available. When compared with other oceanic islands with available data, the number of insect species in the Ogasawara Islands is of the same order as the Hawaiian Islands and the Galápagos Islands, and far more than Rennell Island or Socotra Archipelago which are much larger (Table 3-6). Considering the relationship between the area and the number of species (Fig. 3-5 left), the diversity of insect fauna for the small Ogasawara Islands is clearly higher than most of the other oceanic islands shown.

Insect fauna is diverse and taxonomic composition differs depending on the islands' environment; for example, Rennell Island is reported to have 246 species of moths. One useful insect richness indicator is the number of beetles (order Coleoptera), as there is a relative wealth of research on them throughout the world (Table 3-6). The number of endemic beetle species for the Ogasawara Islands is comparatively low, but considering the scale of islands, the total number of species is about the same level as that for the Hawaiian Islands and is far higher than that for the Galápagos Islands (Fig. 3-5 right).



*Figulus boninensis* *(photo:Toshio Kishimoto)*

### Table 3-6 Comparison of numbers of species of insects

| Area | Insecta | | | | | Coleoptera | | | | | References |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of species | Number of endemic species | Endemic ratio (%) | Number of species/ area ($km^2$) | Number of endemic species/ area ($km^2$) | Number of species | Number of endemic species | Endemic ratio (%) | Number of species/ area ($km^2$) | Number of endemic species/ area ($km^2$) | |
| Ogasawara Islands | 1.380 | 379 | 27.5 | 17.25 | 4.74 | 442 | 146 | 33.0 | 5.53 | 1.83 | |
| Madeira Archipelago | | | | | | c.900 | c.351 | 39.0 | 1.13 | 0.44 | Peck (2006) |
| Canary Islands | | | | | | 1,948 | 1,104 | 56.7 | 0.26 | 0.15 | Peck (2006) |
| Hawaiian Islands | 7,982 | 5,293 | 66.3 | 0.48 | 0.32 | 1,872 | 1,278 | 68.3 | 0.11 | 0.08 | Nishida (1997) |
| Socotra Archipelago | 600 | | | 0.22 | | | | | | | Yemeni Government (2006) |
| Galápagos Islands | 2,059 | 1,071 | 52.0 | 0.26 | 0.14 | 486 | 266 | 54.7 | 0.06 | 0.03 | Peck (2006) |
| Seychelles Islands[1)] | | | | | | | 65 | | | | Peck (2006) |
| Aldabra Atoll[2)] | | | | | | 176 | | | | | Peck (2006) |
| Rennell Island | 731 | | | 1.07 | | 180 | 45 | 25.0 | 0.26 | 0.07 | Gov. Solomon Islands (1997) |
| Society Islands | | | | | | 473 | 256 | 54.1 | 0.31 | 0.17 | Nishida (2008) |
| Henderson Island | 180 | 36 | 20.0 | 4.86 | 0.97 | | | | | | Brooke et al. (2004) |
| Lord Howe Island Group | 1,089 | 420 | 38.6 | 72.60 | 28.00 | 464 | 277 | 59.7 | 30.93 | 18.47 | Cassis et al. (2003) |
| Juan Fernández Islands | | | | | | 235 | 190 | 80.9 | 2.35 | 1.90 | Peck (2006) |

* Figures for the numbers of species include subspecies.
1) The area of Seychelles Island covered in this report is 404 $km^2$.
2) The area of Aldabra Atoll covered in this report is 155 $km^2$.

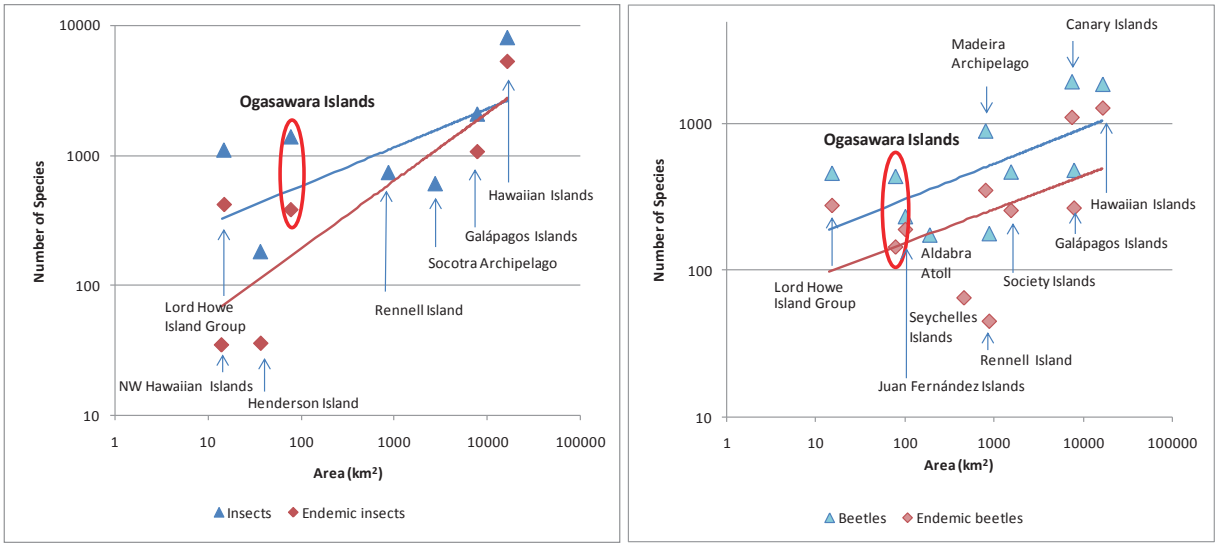



Fig. 3-5 Species numbers for insects (left) and beetles (right) by area of islands

*< Birds >*

There are 195 species of birds that have been recorded on the Ogasawara Islands. This number is second to the Hawaiian Islands' 336 species, and is higher than other oceanic islands in the Pacific and Socotra Archipelago in the Indian Ocean (Table 3-7). All the areas listed on Table 3-7 except for Rennel Island and the Kermadec Islands are designated as Endemic Bird Area by BirdLife International.

However, some of these numbers include alien or vagrant species, and it is likely that the method of aggregate calculation is different for each island group. So, the number of endemic species and the number of breeding birds were compared, since they are assumed to better reflect the value of the property (Table 3-7). The Ogasawara Islands have relatively high numbers of breeding seabirds similar to the other larger oceanic islands.

**Table 3-7 Comparison of number of bird species**

| Area | Number of recorded species | Number of extant endemic species | Number of breeding landbirds | Number of breeding seabirds | References |
|---|---|---|---|---|---|
| Ogasawara Islands | 195 | 1 | 8 | 14 | |
| Northwestern Hawaiian Islands | 172 | 4 | | 21 | State of Hawaii et al. (2009) |
| Hawaiian Islands | 336 | 40 | 39 | 13 | Pyle (2002) |
| Lord Howe Island Group | 129 | 4 | 18 | 14 | Australian Government (2002) |
| Socotra Archipelago | 182 | 6 | 31 | 10 | Yemeni Government (2006) |
| Galápagos Islands | 58 | 34 | 29 | 18 | Tye et al. (2002), Rothman, R., Galapagos Online Tours |
| Seychelles Islands (Whole country) | 247 | 15 | 43 | 13 | Seychelles Bird Records Committee (2009), Avibase |
| Rennell Island | 83 | 4 | 38 | 5 | Gov. Solomon Islands (1997), Avibase |
| Henderson Island | 32 | 4 | 4 | 12 | Brooke et al. (2004) |
| Kermadec Islands | 35 | 5 | 2 | 14 | DOC (2006) |
| Juan Fernández Islands | 58 | 5 | 9 | 6 | Oikonos, Avibase |

## 3.d Integrity

As described below, the nominated property includes all of the elements necessary to demonstrate the World Heritage value of the serial island site. Furthermore, the necessary area to maintain its value over the long term and to completely attest to its significance has been strictly protected by law. The site is being adequately managed for conservation, and thus it fulfills the condition of integrity for inscription on the World Heritage List as specified in Paragraph 88 of the Operational Guidelines.

### 3.d.1 Inclusion of all key elements

#### 3.d.1.1 Criterion (viii) (Operational Guidelines, Para. 93)

The nominated property includes all the typical terrestrial areas, namely those containing well-preserved strata exposed on land spanning several millions of years, including the

beginning of the oceanic plate subduction period, as well as the whole series of rocks showing the typical formation processes of an oceanic island arc. Furthermore, the site includes the islands at the modern-day volcanic front, i.e., Kita-iwoto Island and Nishinoshima Island. On Nishinoshima, people can witness ongoing volcanic activity .

#### 3.d.1.2 Criterion (ix) (Operational Guidelines, Para. 94)

The nominated property includes most of the sclerophyllous scrub and subtropical rain forests and other habitats which are distinctive elements of the ecosystems of the different island groups. The areas chosen are inhabited by many endemic species of plants, land snails and other organisms which exhibit the kinds of unique adaptive radiation and speciation that are distinctive for these oceanic islands. The areas nominated are large enough for the purposes of conserving these ecosystems and the organisms living in them over the long term.

#### 3.d.1.3 Criterion (x) (Operational Guidelines, Para. 95)

Although the nominated property is comprised of small islands, it includes areas that serve as habitat for 57 globally important endangered species on the IUCN Red List (2008), including the Bonin flying fox (CR), *Boninthemis insularis* (CR), and *Ogasawarana yoshiwarana* (CR). The islands are important breeding grounds for albatrosses, boobies, terns, and other seabirds. The nominated property includes habitats for endemic species that are very important for biodiversity, including most of the important areas containing sclerophyllous scrub with high degrees of endemism.

### 3.d.2 Appropriate scope and adequate size

The "Ogasawara Islands" is the collective term for the Ogasawara Archipelago, Nishinoshima Island, the Kazan Island Group, Okino-torishima Island, and Minami-torishima Island. Administratively, they are part of Ogasawara Village of Tokyo Metropolitan Government (TMG). Because Minami-torishima is an uplifted coral reef and differs in the way it was formed from the rest, it has been removed from the nominated property. Some populated areas of Chichijima and Hahajima Islands, as well as Iwoto and Okino-torishima Islands, have also been removed from the nominated property on the grounds that they have been substantially altered by human activity.

As a result, the geographical scope of the nominated property covers areas in which - although they may have been subject to human influence for short periods of time in the past - the processes of nature are well-preserved. Essentially, the nominated site consists of those areas with little human influence that preserve the topography and oceanic island ecosystems unique to the Ogasawara Islands (Operational Guidelines, Para. 90).

### 3.d.3 Site free of any adverse effects of development and neglect

As described in "5.b. Protective designation", the nominated property is subject to the most stringent protection measures out of all the protected natural areas in Japan, and this guarantees long-term, appropriate protection.

Among the protected areas of IUCN categories I and II, Minami-iwoto Island is both a Wilderness Area (IUCN Protected Area category Ib) protected under the Nature Conservation Law, as well as a Preservation Zone (IUCN Protected Area category Ia) of the Forest Ecosystem Reserve protected under the National Forest Administration and Management Bylaw.

The other components of the nominated property are designated as Preservation Zone of the Forest Ecosystem Reserve, or Special Protection Zone or Class I Special Zone of National Park (IUCN Protected Area category II) protected under the Natural Parks Law. Further, the nominated area is designated as National Wildlife Protection Areas based on the Wildlife Protection and Appropriate Hunting Law, as well as Natural Monuments based on the Law for the Protection of Cultural Properties.

The surrounding areas of the nominated property include the areas with legal regulations such as Special Zones or Ordinary Zone of National Park as well as Preservation Zone or Conservation and Utilization Zone of Forest Ecosystem Reserve.

Since around the end of the 1990's, various protection measures have been undertaken to prevent any adverse effects of external influences on the nominated property. These have been applied both inside and outside the nominated area, and have included:

- control of invasive alien species by cooperation and coordination of all stakeholders including relevant authorities, scientists, NGOs, and citizens
- conducting ecotourism in accordance with voluntary rules
- awareness-raising campaigns held on the passenger ferry to the islands
- monitoring and implementation of species conservation program for endangered species

The "Ogasawara Islands Management Plan (2009)" links these numerous conservation management efforts in an attempt to comprehensively conserve ecosystems over a wide area, both inside and outside of the nominated property. The World Heritage Management Area, a main target area of the management plan is shown in Fig. 1-6. The conservation measures are detailed in "4.b Factors affecting the property".

With these protective arrangements, the Ogasawara Islands are properly protected. One indication of the successful application of protection measures is the low extinction rate of the land snails. The populations of land snails of many Pacific islands have been devastated by the impact of development and invasive alien species. In contrast, however, the low extinction rate of the land snails of the Ogasawara Islands indicates that the islands' land snail habitats have been extremely well preserved. Minami-iwoto is also designated as a Restricted Entry Zone by the Nature Conservation Law and remains unaffected by human influence, leaving its natural environment untouched.

### 3.d.4 Justification of a serial approach to achieve site integrity

For the following reasons, the serial nomination of the Ogasawara Islands is justified:

- The component parts demonstrate the complete series of evolutionary processes of an oceanic island arc. In addition, all the elements exhibit diverse ecological features within the same biogeographic zone. As the example of adaptive radiation between the island groups shows, a mere part of the nominated area would not be sufficient to represent the value of the whole.

- Among the component parts, there exist functional links due to the correlations among geological formation processes and the movement and spread of biota.

- The protection of the islands' natural heritage is the responsibility of multiple management organizations. But, just as with other natural World Heritage sites in Japan, the management organizations coordinate with each other under the Regional Liaison Committee and manage the area according to the prescriptions of a single management plan with the advice from the Scientific Council.

# 4

## *State of Conservation and factors affecting the Property*

4.a Present state of conservation

4.b Factors affecting the property



Subtropical rain forest in Sekimon/Hahajima *(hoto:Akira Ozono)*

## 4.a Present state of conservation

As mentioned in "2.b History and development", people started to live on the Ogasawara Islands in the late 19th century, and since then the vegetation of the islands have been altered by deforestation, controlled burning, and cultivation. In addition, the area suffered the effects of World War II, and the introduction of alien species such as goats (*Capra hircus*) for food and Bischofia (*Bischofia javanica*) for fuel (Toyoda, 2003); these actions resulted in the extinction of some native and endemic species, and the population reduction of many others.

However, the whole area of the nominated property is currently designated a protected area based on domestic legislation and bylaw. Some of the species in the area have been protected as Natural Monuments or National Endangered Species of Wild Fauna and Flora. For the latter, species conservation programs are underway based on the law (cf. 5.c Means of implementing protective measures). Tremendous efforts are underway to control invasive alien species with the cooperation of relevant organizations, and nature restoration projects are being implemented to actively rehabilitate the area to get close to its original natural state (cf. 4.b Factors affecting the property). The current state of conservation of major biological attributes of the nominated property is outlined in the following sections.

### 4.a.1 Plants

#### 4.a.1.1 Sclerophyllous scrub

The sclerophyllous scrub covering the gentle slopes atop Chichijima Island (locality: Mt. Chuosan-Higashidaira area and Yoakedaira area) and Anijima Island (whole area) have so far not been largely disturbed by human activity. Current distribution area is around 477 ha on Anijima (about 60% of the island) and 481 ha on Chichijima (about 20% of the island).

In Ogasawara Islands, 69 endemic species have been confirmed in sclerophyllous scrub. This translates into the high endemic ratio of 67% (80.6% for woody plants) (cf. 2.a.3. Plants).

Most of the sclerophyllous scrublands are legally protected, and current threats include drought, typhoon, and grazing impacts of feral goats. Measures being undertaken against these threats are outlined in "4.b Factors affecting the property".

#### 4.a.1.2 Threatened endemic plant species

Among the endemic plant species, a survey shows that while *Calanthe hattorii* grows well, the number of wild individuals of *Melastoma tetramerum* and *Crepidiastrum grandicollum* has decreased and are critically endangered in some areas (Nature Conservation Bureau, Ministry of the Environment (MOE) and the Tokyo Metropolitan Government (TMG), 2006). For monitoring purposes, almost all wild individuals are counted in some scrub species and others (Table 4-1).

Among these species, declines in numbers are reported for *Malaxis boninensis*, *Symplocos kawakamii*, *Stachyurus macrocarpus*, and *Eurya japonica* var. *boninensis* (South Kanto Regional Office for Nature Conservation, Nature Conservation Bureau, MOE, 2005; Oi et al., 1999). Further, declines in the number of individuals in their major habitats are reported in *Symplocos pergracilis*, *Pittosporum chichijimense*, *Gardenia boninensis*, *Euodia nishimurae*, and others (Shimizu, 1999). Diminishing distribution and decline in the number of individuals are also reported for *Callicarpa glabra* and *Callicarpa parvifolia* (Toyoda, 2003).

**Table 4-1 Examples of endangered plant species (the individual numbers of which in the wild are almost known).**

| Species | Number of individual plants | Reference |
|---|---|---|
| *Rhododendron boninense* | 1 on Chichijima | South Kanto Regional Office for Nature Conservation, Nature Conservation Bureau, MOE, 2005 |
| *Pittosporum parvifolium* | ca. 6 on Chichijima and a few on Anijima | South Kanto Regional Office for Nature Conservation, Nature Conservation Bureau, MOE, 2005 |
| *Malaxis boninensis* | ca. 8 on Chichijima | Nature Conservation Bureau, MOE and TMG, 2008 |
| *Claoxylon centenarium* | ca. 10 on Hahajima | Fujita, 2004 |
| *Stachyurus macrocarpus* var. *prunifolius* | 15 on Hahajima | Abe & Hoshi, 2008 |
| *Symplocos kawakamii* | ca. 12 on Chichijima | Nature Conservation Bureau, MOE and TMG, 2008 |
| *Eurya japonica* var. *boninensis* | ca. 28 on Chichijima and a few on Anijima | ex. Oi et al., 1999 |
| *Stachyurus macrocarpus* | 68 on Chichijima and a few on Anijima | Abe et al., 2008 |
| *Pittosporum chichijimense* | ca. 195 on Chichijima | South Kanto Regional Office for Nature Conservation, Nature Conservation Bureau, MOE, 2005 |
| *Symplocos pergracilis* | ca. 328 on Chichijima and a few on Anijima | South Kanto Regional Office for Nature Conservation, Nature Conservation Bureau, MOE, 2005 |
| *Metrosideros boninensis* | 353 on Chichijima and 2 on Anijima | Nobushima, 2000 |

It is of real concern that almost no fruition or seedlings have been observed recently among many of the endangered plants and they cannot alter a generation. The causes of this serious situation are considered to be:

- the impacts of dryness,
- typhoons or other climatic factors,
- increased shading by alien trees,
- breeding incapability because of the small population size,
- illegal collection,
- impacts from alien animals including feral goats,
- decline in the number of pollinators, and others.

(e.g., Fujita, 2004; South Kanto Regional Office for Nature Conservation, Nature Conservation Bureau, MOE, 2005; Shimizu, 1999)

Under the endangered species conservation program, the TMG, the Koishikawa Botanical Gardens of the University of Tokyo, and other organizations commissioned by the MOE conduct a wide variety of projects. These include a current status survey and study of their growth characteristics, re-introduction

or transplantation of species to appropriate habitats, and the prevention of feeding damage by alien species such as feral goats and black rats. The Review Committee on the Conservation Program for the Endangered Plant Species of the Ogasawara Islands was established by the MOE to give advice and coordinate these projects.

The following examples illustrate the successful effect of these projects, to date:

- 324 *Melastoma tetramerum* survived out of 1,045 planted between 1984 and 2006,
- 65 *Rhododendron boninense* survived out of 500 planted between 1986 and 2006, and
- 92 *Calanthe hattorii* survived out of 227 planted between 1990 and 2002.

The Forestry Agency also studies the status of endangered plant species, and removes invasive alien plants which suppress endangered species, as well as undertakes patrols for the prevention of illegal collection of plants.



*Rhododendron boninense* (photo:Takaya Yasui)



*Claoxylon centinarium* (photo:Hideyuki Chiba)

## 4.a.2 Mammals

### 4.a.2.1 Bonin flying fox

Research into the present status of the Bonin flying fox (*Pteropus pselaphon*) is conducted by the Ogasawara Village supported by the Agency for Cultural Affairs and TMG, and a local nonprofit organization (NPO). Their distribution has confirmed to date on Chichijima, Hahajima, Kita-iwoto, Iwoto, and Minami-iwoto in the Ogasawara Islands. There have been sporadic reports of this species on islands surrounding known habitats, such as Anijima, but established populations in such places have not been confirmed (Abe et al., 1995).

In terms of the Chichijima population, after nearly becoming extinct following the war, the number recovered to a certain extent in the 1990's and have continued to remain around 100 in recent years (Abe et al., 1995; Institute of Boninology, 2008). On Hahajima, the population was relatively abundant in the postwar period but it decreased due to the reduction in nesting places caused by redevelopment after the retrocession of the islands to Japan. Currently, only a small number of individuals have been confirmed. Inaba (2001) reported 26 individuals on Kita-iwoto, and another study in 2008 also estimated the population size there as a few dozen (Institute of Boninology, 2009). The flying fox was not found on Iwoto in 1966 (Hasuo, 1969), but several individuals were confirmed during a survey conducted in January 2008 (Ogasawara Islands Branch Office, TMG, 2008).

On Minami-iwoto, a survey conducted in 1982 confirmed about 100 individuals (Ishii, 1982), and in the next survey conducted a quarter century later, in 2007, at least 100 individuals were also confirmed on the island (Suzuki et al., 2007).

On inhabited Chichijima, the area that flying foxes use frequently overlaps with human activity areas, such as agricultural land and settlements. The challenges for the conservation of this species include:

- accumulation of ecological knowledge,
- impacts from alien species,
- agricultural damage caused by this species, and
- anthropogenic disturbance such as development and eco-tourism (Inaba et al., 2002).

Given these challenges above, it is necessary to implement conservation measures which assume harmonious coexistence between humans and the flying fox in the same area.



*Pteropus pselaphon* *(photo:Studio Mononofu!)*

Current conservation measures include the monitoring of populations, measures against feral cats which are the main predation pressure on this species, and measures to minimize agricultural damage by this species. Supported by the Agency for Cultural Affairs and TMG, Ogasawara village conducts studies on the selection and the setting methods of tangle-free bat-proof nets so that both the prevention of agricultural damage and the protection of this species can be achieved.

In addition, this species is protected as a natural monument designated in 1969 under the Law for the Protection of Cultural Properties. In 2009, areas of species' collective nesting have been designated as Special Protection Area and as Designated Special Protection Area, based on Wildlife Protection and Appropriate Hunting Law. Certain development acts are restricted in Special Protection Area, and acts like mere observation of fauna and flora by photographing are restricted in Designated Special Protection Area. Additionally in the same year, the species has been designated as a National Endangered Species of Wild Fauna and Flora based on Law for the Conservation of Endangered Species of Wild Fauna and Flora, by which protection efforts for this species were intensified. Discussion toward formulation of the Species Conservation Program based on the Law for this species is currently underway.

## 4.a.3 Birds

### 4.a.3.1 Endemic subspecies of Japanese wood-pigeon

*Columba janthina nitens* is a subspecies of the Japanese wood-pigeon endemic to the Ogasawara Islands. They have been found on islands of Mukojima, Ototojima, Anijima, Chichijima, Hahajima, Mukohjima, Anejima and Imotojima of the Ogasawara Archipelago and Kita-iwoto, Iwoto and Minami-iwoto of the Kazan Island Group (Kanto Regional Forest Office, Forestry Agency, 2006, 2007, 2009). Their total population is estimated to be less than 40 (Kanto Regional Forest Office, Forestry Agency, 2006).

In the Mt. Chuosan-Higashidaira area on Chichijima, one of the breeding grounds of the bird, the Forestry Agency has established a wood-pigeon sanctuary. Together with Ogasawara Nature Observation Instructor Association and other interested bodies, the Forestry Agency implements measures to conserve and maintain the suitable forest habitat of this subspecies, and to formulate rules and regulations for people entering there. In addition, the MOE is constructing feral-cat-proof fences surrounding the area including the sanctuary. The MOE, the Forestry Agency, and the Institute of Boninology jointly conduct research on the subspecies' food resources, monitoring of its status, and banding individuals (Kanto Regional Forest Office, Forestry Agency, 2006, 2007, 2008, 2009). This Mt. Chuosan-Higashidaira area is one of the two focal areas of anti-feral cat operation.

As a part of the protection measures for this subspecies, the TMG started an artificial breeding program in fiscal 2001 at the Ueno Zoological Gardens and other facilities under its jurisdiction. At present, there are 23 birds in captivity including one founder initially captured, but the program has not yet reached a stage whereby it can implement the reintroduction of individual captive-bred birds to the wild or reinforcement of existing wild populations.

### 4.a.3.2 Albatrosses

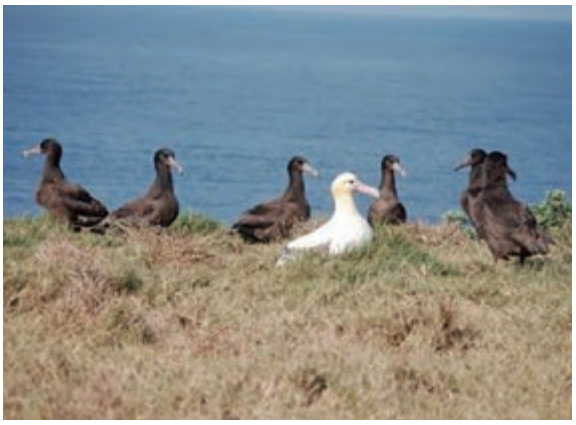
The short-tailed albatross (*Phoebastria albatrus*) used to breed on the Mukojima Island Group, the Hahajima Island Group, and on Nishinoshima (Ogasawara Islands Branch Office, TMG, 2001), but overexploitation in the 1930's eliminated these islands as breeding grounds. The black-footed albatross (*Phoebastria nigripes*) used to breed in the whole Ogasawara Islands (Ogasawara Islands Branch Office, TMG, 2001; Chiba et al., 2007), but their breeding grounds were also reduced, and in 2001, 397 pairs were observed breeding only on the Mukojima Island Group (Ogasawara Islands Branch Office, TMG, 2001).

The potential threats to albatrosses include the modified habitat environment and predation by alien species. Since 1978, the TMG has been continually monitoring the breeding status of albatrosses (population size, the number of chicks, distribution, etc.) and their situation is improving.

In 2004, the black-footed albatross was confirmed to be again breeding on the Hahajima Island Group (Institute of Boninology, 2004); this breeding population shows a tendency to increase in number. The recent estimate of the number of breeding pairs in the nominated property is around 730 (Eda et al. 2008). The Laysan albatross (*Phoebastri immutabilis*) was confirmed to breed on Torishima Island of the Mukojima Island Group in the 1970's, and then on Mukojima. Today, this species continuously breeds on these two islands (Ogasawara Islands

Branch Office, TMG, 2001, 2002, 2003; Institute of Boninology, 2004, 2005). The short-tailed albatross is occasionally observed flying over Yomejima Island (in Mukojima Island Group) since 2000 (Ogasawara Islands Branch Office, TMG, 2008). In addition, Mukojima is expected to return as breeding ground in the future, given the fact that three subadult individuals of short-tailed albatross reached the island and their courtship behaviors were observed (Deguchi, 2009).

In cooperation with the US Fish and Wildlife Service, the MOE and the Yamashina Institute for Ornithology started a new program in 2005 to create a new breeding ground for the short-tailed albatross in the Mukojima Island Group other than their two natural breeding grounds: Izu Islands and the Senkaku Islands. The main techniques employed in this program are: translocation of chicks, the artificial rearing of those chicks, and attracting birds using physical decoys and audio mimicking devices (Deguchi et al., 2008). The artificial rearing of chicks translocated from Torishima Island of the Izu Islands to Mukojima in 2008, was successfully carried out and all ten birds fledged. Five of those birds have been fitted with transmitters and their movements are being tracked (Ozaki et al., 2008). This program was continued in 2009 and 15 birds successfully fledged (Website of Yamashina Institute for Ornithology, 2009).



Juvenile of short-tailed albatrosses (adult bird in center is a decoy)
*(photo:MOE)*



***Phoebastria immutabilis*** *(photo:Masaaki Takiguchi)*

## 4.a.4 Insects

### 4.a.4.1 Endemic dragonflies

Five endemic species of dragonflies live in the Ogasawara Islands. They are: *Boninagrion ezoin*, *Indolestes boninensis*, *Rhinocypha ogasawarensis*, *Hemicordulia ogasawarensis*, and *Boninthemis insularis*. On Chichijima, all of these five species were found until the 1970's, but their populations decreased dramatically since the middle 1980's, and all of them are now extinct or on the edge of extinction. On Hahajima where four of these five endemic species were previously found, all but one species are extinct or nearly extinct (Karube, 2001; 2004; Yoshimura et al., 2005). The major threats to these dragonflies are the predation by the alien green anole (*Anolis carolinensis*), and drought.



*Hemicordulia ogasawarensis* (photo:Akira Ozono)

Ototojima is important as the only island where all five endemic species of dragonfly are currently distributed. The MOE, the Kanagawa Prefectural Museum of Natural History, and other interested bodies are setting up artificial ponds called "dragonfly pond" on Ototojima and Anijima, so that dragonflies can breed even in the period of drought. In those ponds, *Indolestes boninensis* and *Hemicordulia ogasawarensis* mainly breed on Ototojima, while *Hemicordulia ogasawarensis* breeds mainly on Anijima. *Indolestes boninensis* is currently distributed only on Ototojima, and was threatened with extinction, but now it breeds steadily thanks to these dragonfly ponds. *Hemicordulia ogasawarensis*, which has a relatively high flight capacity, reappears even on Chichijima for the first time since its last confirmation in1996. Given these developments, it is expected that *Hemicordulia ogasawarensis* will recover its population which in turn will lead to the restoration of its distribution throughout Chichijima.

### 4.a.4.2 Endemic butterfly

Lycaenid butterfly (*Celastrina ogasawaraensis*) is endemic to the Ogasawara Islands, and was once commonly observed on both Chichijima and Hahajima. However, due to predation by the green anole, its distribution is limited to some areas in Hahajima.

Therefore, the MOE has cleared alien tress to protect the food trees of the butterfly and, in fiscal 2007 the MOE installed fences to prevent the penetration of green anoles at the butterfly's current habitat area, where the eradication of green anoles, experimental plantation of the food trees of the butterfly are ongoing. All of these come as a part of the MOE's efforts to conserve entomofauna there.

In fiscal 2005, relevant administrative bodies, researchers, and local NPOs jointly formed the Lycaenid Butterfly Conservation Committee to cooperate and coordinate their projects. On Hahajima, residents created the Lycaenid Butterfly Society and help the conservation efforts in the butterfly's habitat. In addition, an ex-situ breeding program is being conducted at the Tama Zoological Park of TMG.



*Celastrina ogasawaraensis* (photo:Shin-ichi Suda)

## 4.a.5 Land snails

Land snails are distributed throughout almost all of the islands in the nominated property. However, some of the populations are on the decline because of the impact of alien species, such as the predatory flatworm (*Platydemus manokwari*) and black rat (*Rattus rattus*).

On Anijima, many shells of land snails indicating the predation by black rats can be found. There are some places on the island where *Mandarina anijimana* is severely impacted by predation (Fig. 4-1). In areas where frequent predation is confirmed, the predation itself exerts selection pressure, causing shell morphology change (Chiba, 2007). Habitat areas of land snails on Chichijima have shrunk dramatically in the past 20 years due to the predatory flatworm (Fig. 4-2) (Ohbayashi et al., 2007).

Steps against these alien species are undertaken. More information is becoming available on the flatworm species that feed on snails on each island. Measures, such as washing shoe soles with salt water at inter-island travel, are taken in order to prevent alien flatworm from spreading to other islands along with human activities (see 4.b.2). Extirpation projects of black rats are being undertaken in Nishijima, Higashijima, and Mukojima Islands using toxic bait.



Adult, juvenile, and egg of ***Mandarina mandarina*** *(photo:Hideaki Mori)*

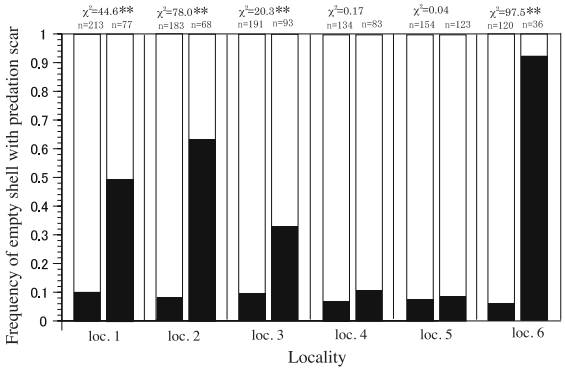



Fig. 4-1 Changes over time in frequency of live ( □ ) and dead ( ■ ) *Mandarina anijimana* at six sites on Anijima Is. Left: 1987-1989; right: 2006 *(Adapted from Chiba, 2007)*

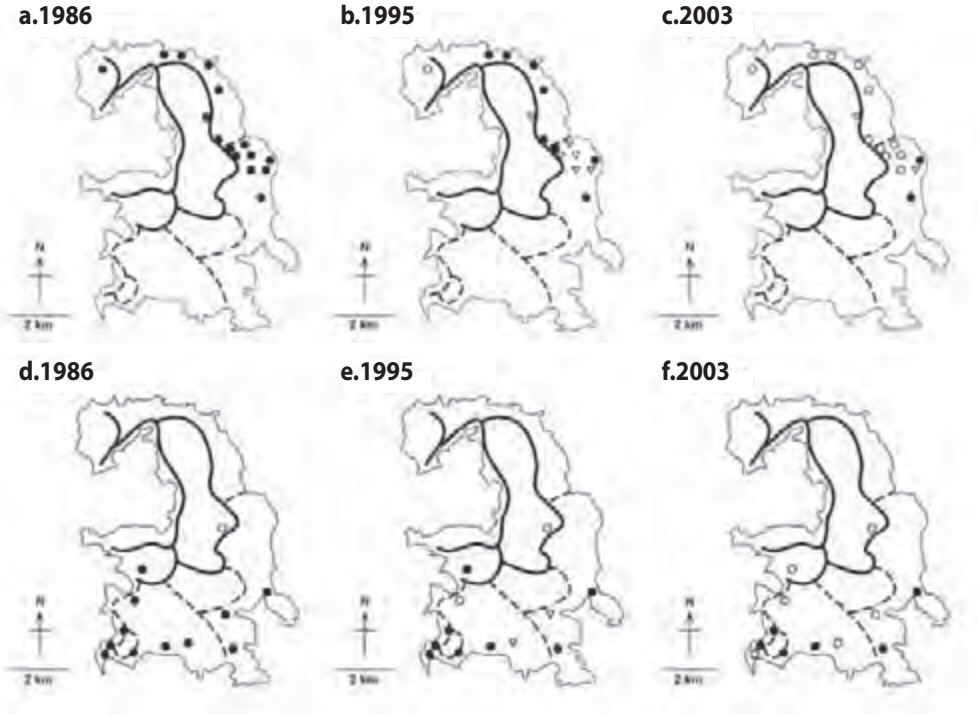



Fig. 4-2 Temporal transition in the distribution of two species of *Mandarina* on Chichijima a-c: ***Mandarina mandarina***; d-f: ***Mandarina chichijimana***. ● : Live snails present; ○ : No live snails present; ▽ : Not surveyed *(Adapted from Ohbayashi et al., 2007)*

## 4.b Factors affecting the property

### 4.b.1 Development pressures

All the nominated property is properly protected as designated protected areas, and there are stringent restrictions placed on development activities. Details of the legal regulations are described in "5. Protection and Management of the Property." An overview of the major development activities in the surrounding areas of the nominated property is presented below.

#### 4.b.1.1 Establishment of air route under consideration

At present, the only way to get to and from the Ogasawara Islands is by ship of every six days. In December, 2007, Ogasawara Village conducted a questionnaire survey to ask the residents about the necessity of air route. As a result, about 70% of the respondents either replied that an air route "is necessary" or "is necessary but needs to satisfy certain requirements". Based on this result, Ogasawara Village requested the TMG to establish an Air Route Committee.

The TMG, together with Ogasawara Village, set up the Ogasawara Air Route Committee in February 2008 to assess the feasibility of setting up an air route with giving full consideration to harmony with the natural environment. The Committee formulated an Action Plan of Public Involvement (PI) in the Ogasawara Air Route Project, to provide an opportunity for the local residents and others to express their opinions. The intent is to incorporate the expressed opinion into the project plan from the very conceptual and planning stages of the air route. The committee is to study several options in the surrounding areas of the nominated property, including a proposal to utilize the Susaki area as a candidate air port, as well as potential options provided by the development of new technology.

#### 4.b.1.2 Road construction

The more-inhabited island of Chichijima has one prefectural road (about 21.9 km in length) and 39 municipal roads (about 11.1 km in total), while Hahajima has one prefectural road (about 13.5 km in length) and 16 municipal roads (about 3.5 km in total). The roads are nearly all paved (Ogasawara Village, 2006).

In general, road construction and maintenance involves a certain amount of environmental impact risk in the form of water contamination or the introduction of alien plant species sprayed for erosion control of road cuttings. To minimize the impacts of construction projects on the natural environment or landscapes, in August 2004 the TMG formulated the "Guidelines for Environment-conscious Public Works in the Ogasawara Islands". The guidelines lay out how to implement environment-friendly methods at the planning, design, construction, and maintenance phases in TMG ordered construction works .

#### 4.b.1.3 River works

In Ogasawara Village, there are several river works such as enforcement of river banks and erosion control work to prevent disasters caused by overflow, mudflow or collapse of bank due to typhoon or localized torrential rain. For example, at the Yatsuse River, a relatively large-scale river in Chichijima, the river bank was reinforced in 1998 so as to prevent the damage caused by the rain-swollen river flooding over agricultural land, followed by management road construction between 1991 and 1999. Other than this, five rivers (the Omura, Okumura and Fukiage Rivers on Chichijima, and the Otani and Teppozawa Rivers on Hahajima) were

designated as erosion control areas and erosion control works were subsequently carried out (Ogasawara Islands Branch Office, TMG, 2008).

In general, the disruption of riverine habitat by river improvement work and artificial construction has the potential to cause qualitative change in river water and river bed that is detrimental to native species. The TMG is trying to minimize such impacts of river works on the natural environment or landscapes with the "Guidelines for Environment-conscious Public Works in the Ogasawara Islands" in a similar way to the road construction mentioned above.

## 4.b.2 Environmental pressure

Oceanic islands generally have ecosystems consisting of unique flora and fauna, which are extremely vulnerable to alien species. In Ogasawara Islands, it is said that over 300 alien species of vascular plants have already invaded. A comparison of the composition ratios of alien plant species to the whole for each island shows that ratios for the inhabited Chichijima (43%) and Hahajima (38%) are higher, while the ratios for uninhabited islands such as Anijima (20%) and Mukohjima (19%) are lower, with the ratio for Minami-iwoto (12%) being the lowest (Nature Conservation Bureau, MOE, 2004). The major alien animal species confirmed in the Ogasawara Islands comprise six mammals, one bird, one reptile, two amphibians, four fish, four insects, three land snails, and one flatworm (MOE, 2007).

The impacts of these alien species on biodiversity are varied in nature and extent. For example, Bischofia takes up habitats of native plant species, *Morus australis* causes disturbance at the genetic level, and feral goats and green anoles inflict feeding damage on native plants and animals.

There have been many efforts made to eliminate or control alien species problems, by the national government as well as local governments, researchers and their institutions, local NPOs, and other organizations. However, given the urgent need for measures against the serious impacts from alien species on the unique and vulnerable ecosystems of Ogasawara Islands, it was essential that effective and efficient measures be achieved through collaboration among related institutions and concerned parties.

To facilitate such collaboration, the "Basic Plan for the Conservation and Restoration of the Natural Environment of Ogasawara" (MOE - 2007) was formulated compiling fundamental concepts for the conservation and restoration of the natural environment as well as the technical methods and policies in specific efforts such as measures against alien species. In addition, the "Conservation and Management Plan for the Ogasawara Islands Forest Ecosystem Reserve" (Forestry Agency - 2008) was formulated to provide comprehensive guidance for planned measures against alien species in the Ogasawara Islands Forest Ecosystem Reserve. Based on these two plans, in 2009, the Ogasawara Islands Management Plan (MOE, Forestry Agency, Cultural Agency, TMG, and Ogasawara Village) was formulated under an agreement of the related parties at Ogasawara Regional Liaison Committee, having advice from the Scientific Council for the Ogasawara Islands World Heritage Nominated Property (established in November 2006). The management plan describes the general policy and the way to coordinate the related organizations.

Currently, based on these plans, relevant organizations cooperate in instituting conservation measures, which have already brought successful results including the

complete eradication of feral goats on all islands except Chichijima and Ototojima.

The following sections address the current state of and measures against respective alien species that have the serious impacts on Ogasawara's endemic species or unique ecosystems. Details of control strategies and measures against alien species for each island are described in the "Ogasawara Islands Management Plan" and "Ogasawara Islands Ecosystem Conservation Action Plan" (see Appendix 1).

### 4.b.2.1 Invasion of alien animal species

***< Feral goats >***

It is said that goats (*Capra hircus*) were first introduced to the Ogasawara Islands for food in 1830 by immigrants from Hawaii. There is another theory that goats were introduced by the crews of whaling ships, which had visited the islands beforehand. In 1946, during the era of American occupation following World War II, the residents of Western descent were allowed to come back to the islands, and at that time, goats for food were brought from Mukojima and Yomejima and once again released on Chichijima and other islands. In addition, Saanen goats were brought in from the main land Japan and some goats were transferred from the larger islands to the satellite islands in Ogasawara.

The goats released onto the islands became feral, foraged on native plants, and spread alien seeds which had attached to their coats. In the Mukojima Island Group, their trampling resulted in the widespread destruction of vegetation, exposing the bare land, and soil erosion. On Nakodojima Island, an island in the Mukojima Island Group where their impact was particularly extreme, soil erosion progressed to such a degree that caused large amounts of sediment runoff into the ocean. This not only had a detrimental effect on the land but also a major impact on the surrounding marine ecosystems, including coral reefs.

In 1970, the Ogasawara Islands Branch Office, TMG, initiated eradication of feral goats from Minamijima Island, which was selected first as it was the most damaged island in the Chichijima Island Group. The operation was completed the following year (1970: 18 captured; 1971: two captured). In 1997, the office began removing feral goats from the Mukojima Island Group, and in fiscal 2003 eradication was completed. In the Chichijima Island Group, there were feral goats on Chichijima, Anijima, Ototojima, and Nishijima, where efforts were likewise made to remove them. They have been completely eradicated from Nishijima, and almost eradicated from Anijima (Table 4-2). On Chichijima, endemic and threatened plants are protected from feral goats by fencing at the same time as a survey is conducted and the feral goats are captured.

Gradual vegetation recovery can be observed on the islands where feral goats have been eradicated, as herbaceous plants have begun to grow again, and young woody plants of species such as *Terminalia catappa*, *Pandanus boninensis*, and *Rhaphiolepis indica* var. *umbellata* have begun to appear. On Minamijima where the eradication of feral goats was completed in 1971, a monitoring survey in 1993 confirms that the endemic *Ixeris longirostrata* and *Cirsium boninense* have expanded their distribution, and widely-distributed species such as *Limonium wrightii* and *Lycium sandwicense* also grow on the island (Toyoda, 2003). On the Mukojima Island Group, some endangered plant populations, including *Ficus nishimurae*, *Hedyotis grayi*, and *Cirsium boninense*, are recovering (Ogasawara Islands Branch Office, TMG, 2009).

**Table 4-2 Number of feral goats captured per island**

| Island \ FY | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nakodojima[1] | 136 | 137 | 144 | | | | | | | | EC | | |
| Yomejima[2] | | | | 79 | 2 | | | | | | EC | | |
| Mukojima[1] | | | | 656 | 265 | 17 | 2 | | | | EC | | |
| Nishijima[1] | | | | | | 39 | 2 | | | | EC | | |
| Anijima[1] | | | | | | | | 78 | 161 | 87 | 61 | | EC |
| Ototojima | | | | | | | | | | | | 197[3] | 92[4] |

EC: Eradication confirmed
1: Operation done by TMG
2: Operation done by The Ogasawara Wildlife Research Society
3: Operation done by MOE (72 goats) and TMG (125 goats)
4: Operation done by MOE (9 goats) and TMG (83 goats) as of Oct. 2009

Nature restoration efforts have been undertaken in severely-eroded Nakodojima. For example, after the eradication of feral goats in 1999, local native plants have been planted to prevent soil erosion and stabilize the land. The progress of vegetation recovery is monitored regularly. The vegetation is now recovering and the number of breeding pairs of brown booby (*Sula leucogaster*, which breed on the ground) and of wedge-tailed shearwater (*Puffinus pacificus*, which breed in the burrow) are on the increase. (Ogasawara Islands Branch Office, TMG, 2009).

***< Feral cats >***

Cats (*Felis catus*) accompanied the first settlers to the islands, either as pets or to control damage to crops by rats, but eventually many became feral. They live mainly on the inhabited islands of Chichijima and Hahajima. Their existence has also been reported on the uninhabited islands of Anijima, Ototojima, and Mukohjima (Kawakami, 2002), however, a survey conducted in 2008 found no cats on Anijima (Japan Wild Life Research Center (JWRC), 2008a).

Feral cats are known predators of the threatened *Columba janthina nitens*, the endemic Bonin honeyeater, various seabirds, and the endemic Bonin flying fox (Kawakami and Higuchi, 2002; Kawakami and Fujita, 2004). Consequently, measures against feral cats have been undertaken.

Since 1999, registration and proper husbandry of household cats are required by the Ogasawara Village Ordinance for Proper Husbandry of Household Cats, the first regulation of its kind in Japan. Based on the Ordinance, awareness-raising activities to promote the controlled husbandry of cats have been successfully implemented. To distinguish feral cats from household cats, implantation of microchips has been encouraged. With these provisions in place, the capture of feral cats became possible. The captured cats are given for adoption on the island, or shipped off the islands for taming and adoption with the assistance of the Tokyo Veterinary Medical Association.

Currently, the relevant organizations work together in capturing feral cats and promoting proper management of household cats. There are two focal areas of the capturing operation - Minamizaki area on Hahajima and Mt. Chuosan-Higashidaira area on Chichijima - both inside the nominated property.

The Minamizaki area is a known breeding ground for seabirds including the brown booby and wedge-tailed shearwater. From the result of interview surveys conducted by the Institute of Boninology in 2005, it was found that feral cats had been preying upon wedge-tailed shearwaters in the area for several decades, and in 2004 no wedge-tailed shearwaters were observed breeding in the area. So in 2005 a seabird survey was conducted only to confirm the predation of parent birds by feral cats, which resulted in devastation of the seabirds' breeding area (Horikoshi et al., 2006).

To rectify the issue at Minamizaki, the MOE, the Forestry Agency, the TMG, the Ogasawara Village, the Ogasawara Village Board of Education, and the Institute of Boninology held deliberations and formed the Ogasawara Cat Liaison Committee in 2005. Subsequently, four feral cats were captured as an emergency countermeasure in 2005 through the cooperation of the Institute of Boninology and local volunteers. In 2006, a fence was set up around the seabirds' breeding grounds to keep out cats, and two feral cats were captured inside and outside of the fence the same year. In fiscal 2007, six were captured. As a result, for the first time in several years, successful nesting and fledging of wedge-tailed shearwaters and nesting of brown boobies were confirmed, indicating progress towards the recovery of reproduction. In 2008, the MOE took over the project, replacing the fences with one capable of excluding both feral cats and green anoles. The MOE is continuing to monitor the feral cats both inside and outside the fences (Nakayama, 2009; Horikoshi et al., 2006, 2009).

At Mt. Chuosan-Higashidaira area, a feral cat removal project has been carried out since 2005 to protect the breeding ground of endemic and endangered *Columba janthina nitens*. In this project, the public administrations, NPOs, and local resident volunteers worked together based on the discussions at the Ogasawara Cat Liaison Committee. As a result, 14 feral cats were captured in fiscal 2006 as well as 13 feral cats in fiscal 2008.

For the uninhabited islands, the MOE has been conducting the status survey on feral cats on Anijima and Ototojima Islands, and captured two feral cats on Ototojima (JWRC, 2009). It is planned to continue the survey and to conduct capturing operation aiming the eradication of feral cats.

***< Black rats >***

Black rats (*Rattus rattus*) probably reached the islands in the cargo from ships. They have been reported on almost all islands in the nominated property except islands of Minami-iwoto, Nishinoshima and Kitanoshima. The rats feed on the seeds and fruit of endemic plants such as *Elaeocarpus photiniaefolius* and *Pandanus boninensis*, having an adverse effect on the native vegetation (Hashimoto, in press). Black rats also significantly affect the fauna of the nominated property in a variety of ways: they compete for food with endemic species including the subspecies of Japanese wood-pigeon, and prey on land snails, bird's eggs, and small birds (Chiba et al., 2007). On the other hand, the black rat is a food source for feral cats and an endemic subspecies of Eurasian buzzard (*Buteo buteo toyoshimai*).

On Nishijima in fiscal 2007, the Forestry and Forest Products Research Institute, and the JWRC carried out a black rat extermination project using toxic baits. Since then the island has been regularly monitored for vegetation recovery and for the existence of black rats (Makino, 2009; Hashimoto, in press). In fiscal 2008, the MOE began two black rat extermination projects: one on Mukojima, where damages to endemic plants were concerned, and the other on Higashijima, where they have seriously damaged the seabird populations (Hashimoto, in press; Kawakami et al,. in press). In important areas of the inhabited islands of Chichijima and Hahajima, tests are being carried out to verify the effectiveness of fences to keep out black rats.

***< Feral pigs >***

The ancestors of the feral pigs (*Sus scrofa*) present today were a group of 10 pigs brought for food from Saipan to Chichijima in 1948. Descendents of that group were taken to Ototojima, which is the only place they subsequently inhabited.

Because feral pigs are omnivores, they feed on endemic land snails, insects, and green turtle eggs, and they also destroy vegetation on the forest floors by digging-up. As a result, feral pigs greatly disturbed the natural habitats of native animals and plants.

Given the possibility that feral pigs also feed on bullfrogs, another alien species on the island, the MOE put priority on the eradication of the latter. After the bullfrog population was reduced, traps and hunting rifles were used from 2005 to 2007 to get rid of feral pigs (Kanto Regional Environment Office of Japan, MOE, 2007). As of 2008, no traces of feral pigs have been detected, thus they are considered to be eradicated.

***< Green anoles >***

Green anoles (*Anolis carolinensis*) are alien reptiles originating from North America. It is thought that they were either transported to Ogasawara together with American military shipments or imported as pets. They were introduced onto Chichijima in the 1960's, and carried from Chichijima to Hahajima in the 1980's (Hasegawa et al., 1988; Suzuki, 2000). In the nominated property, they are distributed only in Chichijima and Hahajima, but have a broad distribution range within those islands.

They prey on insects, which include such threatened endemic species as a butterfly (*Celastrina ogasawaraensis*), dragonflies, a cicada (*Meimuna boninensis*), and threatened long-horned beetles (Karube and Suda, 2004; Makihara et al., 2004). In addition, as they prey on endemic bees, they are affecting the pollination and fruition of plants (Abe et al., 2008). Furthermore, they compete with the endemic Ogasawara snake-eyed skink (*Cryptoblepharus nigropunctatus*), thus threatening its survival (Suzuki and Nagoshi, 1999).

From 2002 to 2005, the MOE conducted a survey on the status of green anoles and field tests to establish methods for control, which showed that sticky traps were the most effective in capturing green anoles. After that, an improved trap was designed and developed to avoid bycatch of threatened birds and animals. Since the winter of 2006, measures to prevent green anoles spreading to uninhabited islands (where they do not exist) have been undertaken. Sticky traps have been placed at the port area of Chichijima, which is the "gateway" to the Ogasawara Islands. This operation is conducted with the cooperation of Ogasawara Village residents, both paid and volunteer. As a result,

in the autumn of 2007, it was confirmed that the density of green anoles in the priority capture areas had fallen to 35% of that in the autumn of 2006.

Furthermore, in 2007 the MOE developed fences that are difficult for anoles to climb up. From 2008, they installed these anole-proof fences at the Shin-Yuhigaoka and Minamizaki areas on Hahajima, where threatened insects such as lycaenid butterfly are distributed, and removed anoles from inside the fences (Toda et al., in press).

***< Bullfrogs >***

Bullfrogs (*Rana catesbeiana*) were introduced into Japan in 1918, and although it is unclear precisely how, they were brought to the Ogasawara Islands sometime after that (JWRC, 2008b). Because the Ogasawara Islands have few large ponds, the confirmed bullfrog distribution is limited to the northern part of Ototojima. Bullfrogs feed on aquatic insects such as endemic dragonflies as well as crustaceans such as land hermit crabs and land snails.

In 2004, the MOE began a population survey and extermination programs; basket traps and sound recording devices were used for the validation of the program since 2005. As of the end of 2008 from the summer of 2007, there have neither been frogs caught nor traces detected, suggesting that they have been eradicated.

***< Cane toads >***

The current population of cane toads (*Bufo marinus*) can be traced back to around 10 toads imported from Saipan in 1949 for control of large centipedes (*Scolopendra* sp.) and scorpions. They were released on Chichijima, where they thrived in the wild. In 1974 some were taken from Chichijima to Hahajima to control centipedes and cockroaches there (Matsumoto et al., 1984; Miyashita, 1980). They have a large impact on small animals that crawl on the ground, especially insects and isopods.

Cane toads are currently distributed on Chichijima and Hahajima, and are now subject to control programs together with green anoles.

***< Predatory flatworm >***

The predatory flatworm (*Platydemus manokwari*) is a species of terrestrial planarian that was introduced to control the alien African giant land snail (*Achatina fulica*) which ruins crops. The flatworm has only been reported on Chichijima, where it has had serious consequences for the land snails throughout the island, devastating their populations and even driving some to extinction.

The flatworm has not invaded the southern part of Chichijima yet, where some endemic land snails live. The flatworm is found in Yoakeyama and Ishinoura areas which are important as land snail habitat. To protect endemic land snail species, a number of control measures against the flatworm are being studied and under trial (Kanto Regional Environment Office, MOE, 2008), including:

- Creation of bare ground or installation of electric fences as effective barriers against their intrusion,
- installation of goat-proof fences to prevent goats carrying flatworms from entering into non-infested areas,
- establishment of "controlled utilization areas" or "entry restricted areas" to prevent inadvertent introduction by people, and
- publicity and awareness-raising to prevent the introduction of flatworms along with human movements.

Currently, the MOE, the TMG, the Ogasawara Village, and the Hahajima Tourism Association are jointly taking measures to prevent the spread of flatworms to Hahajima and other islands in its group. These measures include the placement of brush mats to remove any mud or dirt which may contain flatworms from shoe soles in the passenger waiting room at dock and on the deck of the Hahajima Maru (the ferry to Hahajima), and awareness raising through posters and information brochures.

### 4.b.2.2 Invasive alien plant species

***< Bischofia >***

Bischofia (*Bischofia javanica*) was imported before 1905 for use as fuel wood for sugar production from sugarcane, which was successfully cultivated on Hahajima in 1889 (Toyoda & Kawaoka, 2005; Tanaka et al., in press). Of all the alien plant species in the nominated property, this evergreen tree is especially invasive; it grows quickly, reaches heights of over 20 meters, and inhibits the growth of native plants once it dominates in the forest. Consequently, this tree has a major adverse impact on the forest ecosystems (Tanaka et al., in press).

Bischofia is distributed on islands of Chichijima, Hahajima, Ototojima, and Hirajima (Tanaka et al., in press). In fiscal 2002, the Forestry Agency started clearing Bischofia in the national forest on Hahajima. The agency also has been conducting clearing operation in Sekimon and other areas in Hahajima since 2008, based on the Bischofia Control Plan formulated by the review committee of academic experts in fiscal 2007. At the wood-pigeon (*Columba janthina nitens*) sanctuary in Mt. Chuosan-Higashidaira area on Chichijima, clearing of Bischofia is underway based on an agreement on the management of the forest between the Forestry Agency and the Ogasawara Nature Observation Instructor Association. The clearing of Bischofia in this area is expected to be completed by the end of fiscal 2009 and the remaining seedlings will be removed after that.

In 2005, the MOE started clearing Bischofia inside the national park on Ototojima, Hirajima, and Hahajima. On Ototojima, there were 550 Bischofia trees taller than 0.5m but now, it is almost eradicated using herbicides. Eradication was also achieved on Hirajima in 2008. On Hahajima, which is larger, eradication efforts have been prioritized, beginning with areas where efforts are most effective, such as ecologically important areas and sites where invasion is still in its early stages. In fiscal 2006, herbicide injection was employed to clear Bischofia from the Higashidai area and the southern tip of Minamizaki area on Hahajima, and in some areas mature trees have successfully been eradicated. Using an amino acid herbicide whose safety has been established, eradication and monitoring are ongoing (South Kanto Regional office for Nature Conservation, Nature Conservation Bureau, MOE, 2005; Tanaka et al., in press).

***< Casuarina >***

Casuarina (*Casuarina equisetifolia*) is an evergreen tree that is suited to dry conditions and can grow even in poor soils. They grow quickly and their litter covers the ground, inhibiting the germination and growth of other plants thus adversely affecting the forest ecosystem. In the nominated property, Casuarina has a wide distribution throughout the Chichijima and Hahajima Island Groups; its distribution is expanding especially on Anijima and Ototojima.

In order to address the problems caused by Casuarina, since fiscal 2006 the MOE has been

conducting its experimental eradication, together with *Pinus luchuensis*, another alien species, on the gentle slopes in the inland areas of Anijima. At the same time, the Forestry Agency conducted surveys of the distribution and standing stock of Casuarina and other species in national forests on the Ogasawara Islands. The agency began eradication programs on Hahajima in fiscal 2007 and Anijima and other islands in fiscal 2009. The Ogasawara Wildlife Research Society (NPO) is likewise working to eradicate the species on Chichijima.

***< Leucaena >***

Leucaena (*Leucaena leucocephala*) is widely-distributed in the Ogasawara Archipelago. It was introduced in the 19th century as a shade tree for coffee and other crops, and after World War II it expanded in distribution, particularly in abandoned fields. Once Leucaena has established, the plant succession will be distorted for the long-term (Yoshida and Oka, 2000), thereby affecting the restoration of native forest ecosystems.

After the mass death of Leucaena on Chichijima triggered by the emergence and infestation of a psyllid *Heteropsyra cubana* in 1980's, the plant has been on an overall decline (Yamamura et al., 1999). However, the distribution of Leucaena on Mukojima and Nakodojima expanded after the eradication of feral goats. In 2008, the TMG started an eradication operation targeted at Leucaena as well as alien bamboo and dwarf bamboo species on Mukojima and Nakodojima.

#### 4.b.2.3 Genetic disturbance

There is always a possibility of causing genetic disturbance by introducing a closely related species from outside or by translocating an endemic species within the Ogasawara Islands. Such an example of genetic disturbance of an endemic species caused by the introduction of the closely related species in the Ogasawara Islands is intercross of the mulberry *Morus boninensis* with *Morus australis*. The number of *Morus boninensis* was reduced by overexploitation before World War II, and currently only 19 individuals remain on Chichijima, 110 on Hahajima (including planted individuals), and 35 on Ototojima (Kawahara, 2003). There has been no regeneration for some time and mature trees are suffocated by the shade of Bischofia and by other factors. The tree is therefore listed as critically endangered (CR) on the Red List of the MOE. Furthermore, intercross with *Morus australis*, which was introduced before the war for the purpose of silk cultivation, is progressing and maintenance of a genuine population is of grave concern (Kawahara and Yoshimaru, 2002).

For the purpose of *Morus boninensis* conservation, a study was conducted to understand the current extent of genetic disturbance and a genetic marker was developed to identify the genuine tree from the intercrossed. Establishment of a management unit based on this result is suggested (Tani et al., 2006). A research on propagation techniques is also ongoing.

## 4.b.3 Natural disasters and precautions

#### 4.b.3.1 Landslides

Landslides caused by earthquakes or heavy rain pose adverse effects on marine life and its habitat due to the flows of mud and rock debris into coastal waters. The effects of landslides are particularly evident on the eastern coast of Hahajima. In 1997, a typhoon brought massive

rainfall to the area caused large-scale collapse of landforms, including parts of the limestone terrace (Oka, 2004), which drastically changed the topography there. Bare hillsides still remain exposed.



Landslide in Hahajima *(photo:Eri Nakajima)*

### 4.b.3.2 Tsunami

Tsunami records for Chichijima list the Ogasawara Earthquake Tsunami of 1826, the Showa Tonankai Earthquake Tsunami of 1944, and the Chile Earthquake Tsunami of 1960. The latter two earthquakes were recorded as the magnitude ranged from 7.9 to 8.5 on the Richter scale and their tsunamis reached three to four meters in height (TMG website on disaster prevention).

In the event of simultaneous Tonankai/Nankai earthquakes (a major earthquakes off Honshu-Shikoku with predicted magnitude of 8.65 on the Richter scale), the ensuing tsunami is expected to travel from Honshu and reach the Ogasawara Islands an hour and a half later, and sea level is expected to rise up to 13.8 meters on the coast of Chichijima and 15.4 meters on Hahajima (TMG, 2005).

### 4.b.3.3 Droughts

Severe droughts struck the Ogasawara Islands in 1980 and 1990, causing extensive damage to vegetation and serious water shortages for island residents. In 1980, the period from May to October became dry and subhumid, especially there was no rainy season for the first three months of the period until late July, meaning an extended dry period. In the most affected areas of Mt. Chuosan ridge near Higashidaira in Chichijima, this lack of water is reported to have caused the death of 50 to 70% of the trees making up forest canopies (Shimizu, 1982). The drought situation in 1990 was similar. Except humid period in late May, dry period was dominant and frequent throughout the summertime (Iijima, 2004).

The occurrence of such droughts potentially threatens the species which live in fresh and brackish water, especially aquatic insects such as the endemic dragonflies that spend a part of their lifecycle in water. As mentioned before, the setting up of artificial "dragonfly ponds" has achieved some success.

### 4.b.3.4 Typhoons

Because they are located close to the center of high-pressure area, the Ogasawara Islands are less susceptible to the effects of typhoons than the Ryukyu Islands. However, in case a typhoon approaches, a relatively strong typhoon makes landfall with its strength maintained due to high seawater temperature around Ogasawara Islands. For example in 1983, Typhoon No. 17 caused many trees to fall on Hahajima, leading to the rapid expansion of alien Bischofia (Shimizu, 1988). It is considered that damages from several other strong typhoons accelerated the intrusion and growth of Bischofia (Tanaka et al., 2009). In addition, a powerful Typhoon No.

25 of 1997 severely affected rare plant species there. The most shattering was the impact to the eastern shore area where *Melastoma tetramerum* grows, and the surviving trees of *Melastoma tetramerum* suffered serious damage (Nature Conservation Bureau, MOE and the TMG, 2006).

There are a range of concerns when typhoons approach nearby or hit directly the islands, such as:

- direct wind and seawater damage to endemic plants,
- adverse effects on the fruit bearing (Kanto Regional Forest Office, 2008),
- intrusion of alien species,
- disturbance of the feeding and resting sites for the endemic animals such as Bonin honeyeater and Bonin flying fox.

It is empirically observed that seawater damage caused by typhoons has a great impact not only on the growth of intolerant plants but also on insects (Takakuwa, 2004). Landslides potentially damage not only the habitats of terrestrial endemic fauna and flora, but also the habitats of marine life in coastal areas through mud and rock debris cast into the ocean.

### 4.b.3.5 Climate change

There are many reports on the long-term changes in climate at the Ogasawara Islands (e.g. Oka et al., 2001; Iijima et al., 2005; Yoshida et al., 2006a). An analysis of the temperature and precipitation data spanning the past 78 years on Chichijima (Yoshida et al., 2006b) shows that the mean annual temperature after 1945 has been 0.4 to 0.6 °C higher than before. Furthermore, the annual rainfall after 1968 (when the islands were returned to Japan) has decreased by about 20% compared to pre-1945 levels. The same report also points out that after 1968 the summer months marked by water shortages have tended to be longer, and that there is a possibility that long-term climate changes characterized by longer and drier periods result in major changes to the ecosystem.

Further accumulation and analysis of meteorological data is necessary in order to forecast the changes to the island ecosystem expected to occur as a result of future climate change. In the nominated property, the Japan Meteorological Agency has installed weather stations on Chichijima and Hahajima, and continuously collects meteorological data. The Chichijima Weather Station began its observations in May 1906 (Yoshida et al., 2006b), and continues to collect data at the same site to this date except a roughly two-decade blank (from 1944 to 1968) caused by World War II. In recent years meteorological data can be accessed through the Internet and other media. In addition, the TMG and some research institutions have installed automatic weather stations on other islands including Anijima and Nakodojima and climatic data is continuously observed.

The MOE conducts long-term collection of basic environmental data for the early detection of any qualitative or quantitative degradation in Japan's natural environment by setting up about 1,000 monitoring sites throughout the country. Some of these monitoring sites are within the nominated property, including a sand beach on Chichijima, the Mukojima Island Group, and the Sekimon area of Hahajima.

## 4.b.4 Visitor/tourism pressures

### 4.b.4.1 Impacts of Tourism

Most tourists come to the Ogasawara Islands to learn about Ogasawara's unique natural features and history. They enjoy diving, sea kayaking, whale watching, trekking, visiting historical sites, and other activities in the natural surroundings. Because of the limited accessibility, the number of visitors to the islands for sightseeing purpose is not large (around 17,000 per year). With public transportation, tourists can visit only Chichijima and Hahajima, and the number of visitors (excluding the residents) to Hahajima is only around 6,000 to 7,000 per year. Usually tourists depend on tour operators or guides for their activities, because of limited transportation availability and the local knowledge and facility-based nature of their activities. Consequently, tourists are well managed. With the current scale of tourism, there have been no observed negative impacts on the ecosystem of the islands. However, there are potential impacts including introduction of alien species, illegal collection of endangered species and other damage to the islands' ecosystem.

### 4.b.4.2 Utilization rules

In order to promote tourism while conserving the rich natural environment, the concepts of ecotourism have been adopted, and conservation activities are promoted through voluntary rules.

In 1999, with the aim of protecting the valuable Ogasawara fauna and flora for future generations, the MOE laid out basic rules for utilization, called the "Ogasawara Country Code". The Code consists of 10 basic rules, such as: "1. Hand over the valuable Ogasawara to future generations," "2. Never litter; take trash back with you," "3. Do not deviate from the paths," and "4. Do not collect, bring in, or take away any animals and plants." To raise awareness of these rules among visitors, the codes are listed in a booklet called the *Ogasawara Rulebook*, a compilation of various codes of conduct for tourists in the Ogasawara Islands (Ogasawara Ecotourism Association, 2005).

In July 2002, the TMG established the Guidelines for the Protection and the Appropriate Use of Nature on the Islands of Tokyo (Governor's Decision Making), and designated Minamijima and the Sekimon area of Hahajima as the first Nature Conservation Promotion Areas. For each Promotion Area, rules for proper use are set to regulate the number of visitors per day, tourism routes, timeframes, and so on. To enter the Promotion Area, tourists have to be accompanied by a Tokyo Nature Guide and follow his or her instructions. The TMG and Ogasawara Village concluded an agreement concerning implementation of this system, and from April 2003, in these two areas, eco-tourism based on the Rules for Appropriate Use in Ogasawara Islands started (TMG website).

In 2002, the TMG started training and certifying the Tokyo Nature Guides, who play a practical role in ecotourism in the Nature Conservation Promotion Area. As of March 2008, the number of certified guides is 204 for the Minamijima and 31 for the Sekimon area. The TMG conducts training courses for applicants for a guide license as well as the renewal courses for licensed guides (Ogasawara Islands Branch Office, TMG, 2008). Further, there are whale-watching interpreter license systems (licensed by the Ogasawara Whale Watching Association) and Hahajima Forest Guide system (certified by Hahajima Tourist Association). These guides are informed of potential negative impacts caused by the introduction of alien species

along with the tourists, and whenever tourists move between islands guides are encouraged to ensure that the tourists wash the shoe soles to remove flatworms contained in dirt.

Based on the Conservation and Management Plan for the Ogasawara Islands Forest Ecosystem Reserve, the Forestry Agency introduced utilization rules in September 2008. The intention was to reduce impacts on the endemic ecosystems from the recreational use. Under the rules, entry into the Preservation Zone of the Forest Ecosystem Reserve is, in principle, restricted to the designated routes so as not to impact the threatened animals and plants. In addition, the rules stipulate that even when entering these designated routes, visitors are obliged to be accompanied by a guide who has been issued an entry permit upon completion of a training course on conservation and proper use of the habitats of threatened species.

Furthermore, many organizations have established their own rules as a part of ecotourism promotion in Ogasawara Islands, and local tourism associations and operators are committed to comply. Table 4-3 shows a list of voluntary rules compiled in the Ogasawara Rulebook (Ogasawara Ecotourism Association, 2005; Ogasawara Ranger Office for Nature Conservation, MOE, 2007).



**Whale watching tours** *(photo:OWA)*

**Table 4-3 Voluntary rules in practice on the Ogasawara Islands**

| Names of rules | Listing organizations |
|---|---|
| Marine life prohibited to catch | Industry section, Ogasawara Islands Branch Office, TMG |
| Marine park map: The protection of marine wildlife | Civil and Industry sections, Ogasawara Islands Branch Office, TMG |
| Ten rules for the coexistence with nature: The Ogasawara Country Code | MOE |
| Whales: Voluntary rules of the Ogasawara Whale Watching Association | Ogasawara Whale Watching Association/Ogasawara Village Tourist Association |
| Sea turtles: Guidelines for what to do when encountering a turtle while night watching | Ogasawara Village Tourist Association |
| Spotted and barred knifejaws: Catch & release guidelines | Ogasawara Hahajima Fisheries Cooperative |
| Albatrosses: Rules for watching, and what you can do for the birds | Producers of the pamphlet *Making Ogasawara Full of Albatrosses* |
| Green Pepe - About the Nagatani green Pepe - | Ogasawara Village Tourist Association/ Guide Section, Ogasawara Village Tourist Association/ Bonin Flying Fox Society |
| Bonin flying fox: Watching guidelines | Ogasawara Village Tourist Association/ Guide Section, Ogasawara Village Tourist Association/ Bonin Flying Fox Society |
| Akagashira-karasubato *Columba janthina nitens:* Rules of the Higashidaira wood-pigeon sanctuary | National Forest Division, Ogasawara General Office / Ogasawara Nature Observation Instructor Association |
| Rules for the appropriate utilization of Minamijima and Hahajima's Sekimon area: Ecotourism for Minamijima and Hahajima's Sekimon area by the TMG | TMG |
| Guidelines for Hahajima's Sekimon area | Hahajima Nature Guide Administration Council |

## 4.b.5 Number of inhabitants within the property and the surrounding area

There are no permanent residents within the nominated property.

The numbers of inhabitants in the surrounding area as of June, 2009 are;
Chichijima: 2,009 persons (1,086 households)
Hahajima: 453 persons (235 households)
Total: 2,462 residents (1,321 households).
(General Affairs Division, Policy Office, Ogasawara Village, 2009).

# 5

## *Protection and Management of the Property*

5.a Ownership
5.b Protective designation
5.c Means of implementing protective measures
5.d Existing plans
5.e Property management plan or other management system
5.f Sources and levels of finance
5.g Sources of expertise and training in conservation and management techniques
5.h Visitor facilities and statistics
5.i Policies and programmes related to the presentation and promotion of the property
5.j Staffing levels



*Pteropus pselaphon* (photo:Studio Mononofu!)

## 5.a Ownership

National forest, which is under the authority of the Forestry Agency, accounts for about 80% of the nominated property. Other than the national forest, the property includes state-owned land administered by the Ministry of Finance, the Ministry of the Environment (MOE), etc., and land owned by the Tokyo Metropolitan Government (TMG) and Ogasawara Village, as well as privately owned land. Contact information for the MOE, the Forestry Agency, the TMG and Ogasawara Village, which are the major owners of the land, is listed in Section 8.

## 5.b Protective designation

The nominated property is appropriately protected according to domestic laws and systems. The main protected area systems for the nominated property encompass the following: the Minami-iwoto Wilderness Area, Special Protection Zone and Class I Special Zone of the Ogasawara National Park, Preservation Zone of the Ogasawara Islands Forest Ecosystem Reserve, and Natural Monuments. Table 5-1 shows detailed information on the protected areas, such as designation date and legal foundation. Maps of each of the protected areas are shown in Figs. 5-1 through 5-3.

As for the surrounding areas of the nominated property, marine parts are designated as the Marine Park Zone and Ordinary Zone of the Ogasawara National Park, and Wildlife Protection Area, while terrestrial parts include the Special Zone of the Ogasawara National Park, the Ogasawara Islands Forest Ecosystem Reserve, and Wildlife Protection Area.



*Distylium lepidotum* (photo:Hideo Maruoka)

**Table 5-1 Designation details for protected areas in the nominated property**

| Name of protected area (Date of designation) | Legal foundation (Date of promulgation) | Objectives of system |
|---|---|---|
| Minami-iwoto Wilderness Area (May 17, 1975) Restricted Entry Zone (June 2, 1983) 367 ha | Nature Conservation Law (June 22, 1972) | Areas that are in particular need of protection to maintain their virgin natural environments that are not influenced by human activities |
| Ogasawara National Park (October 16, 1972) Total terrestrial area : 6,629 ha ( area extended by notification on November 12, 2009) Special Protection Zone : 4,934ha Special Zone: 1,677 ha Ordinary Zone: 18 ha<br><br>Total marine area: 121,380 ha Marine Park Zones: 780 ha Ordinary Zone: 120,600ha | Natural Parks Law (June 1, 1957) | Places of natural scenic beauty representing the natural beauty of Japan as designated by the Minister of the Environment for the purpose of protecting natural landscapes and promoting its use as a resource for health, recreation and education of the people |
| Ogasawara Islands Forest Ecosystem Reserve (April 1, 2007) Total area: 5,580 ha Preservation Zone: 5,319 ha Conservation and Utilization Zone: 261 ha | Law on the Administration and Management of National Forests (June 23, 1951) National Forest Administration and Management Bylaw (January 21, 1999) | Areas to preserve natural forests in virgin condition in order to maintain a natural environment of the forest ecosystem, protect plants and animals, preserve genetic resources, develop forest operation and management technique, and promote scientific research etc. |
| Ogasawara Archipelago National Wildlife Protection Area (March 31, 1980) Total area: 5,899 ha (including marine area; area extended on November 1, 2009) Special Protection Area: 1,331 ha | Wildlife Protection and Appropriate Hunting Law (July 12, 2002) | Areas designated to prohibit the capture of wildlife and the collecting of bird eggs, to ensure their stable existence, and protect birds by conserving, managing, and maintaining habitats for diverse wildlife |
| Nishinoshima National Wildlife Protection Area (August 1, 2008) 29 ha (entire area is designated as Special Protection Area) | Same as above | Same as above |
| Kita-iwoto National Wildlife Protection Area (November 1, 2009) Total area: 860ha (including marine area) Special Protection Area: 557ha | Same as above | Same as above |
| National Natural Monuments: Minami-iwoto (November 12, 1972) Submerged Karst at Minamijima (March 28, 2008) | Law for the Protection of Cultural Properties (May 30, 1950) | Animals, Plants, and geological features and minerals of high scientific value for the country |

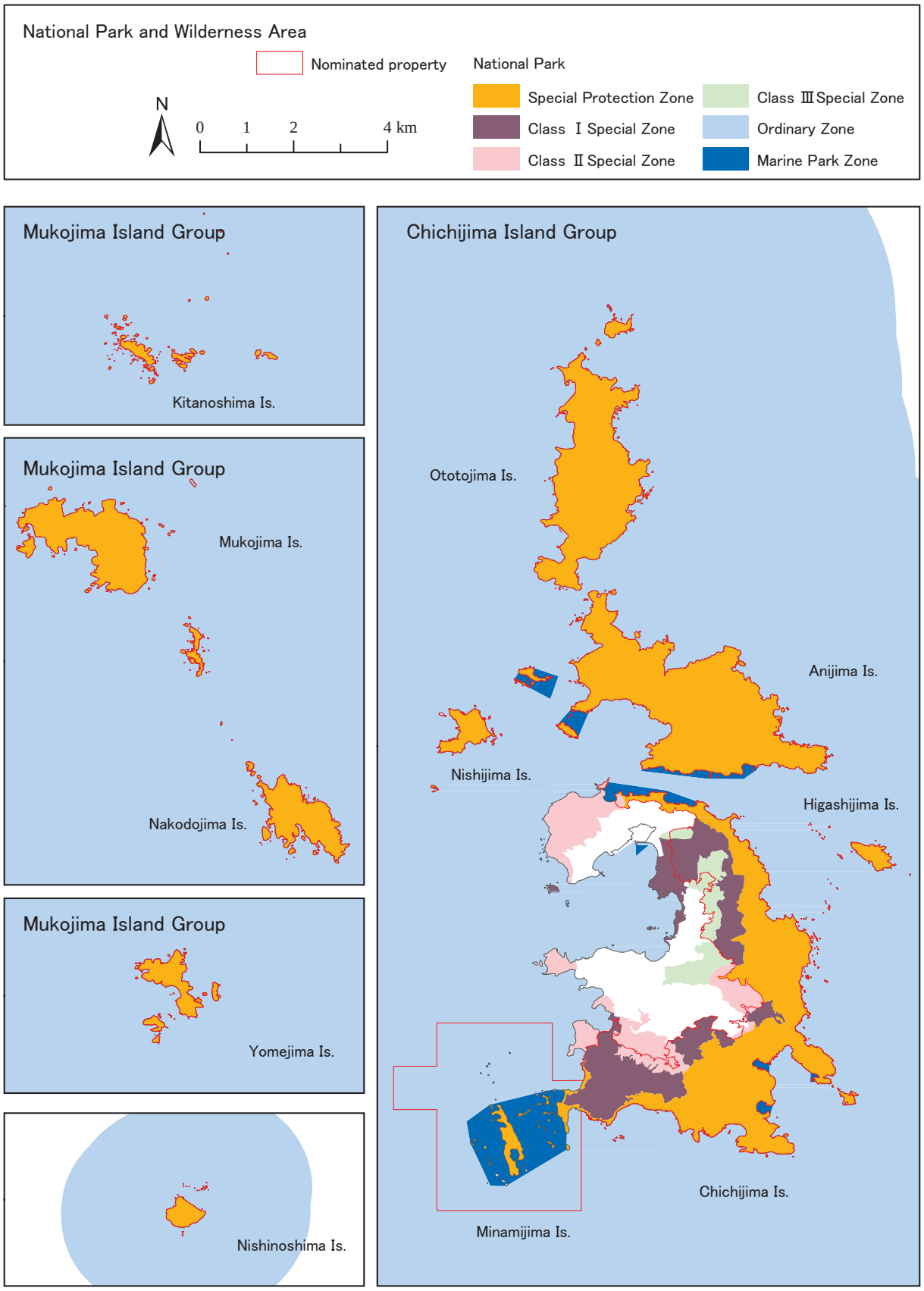



**Fig. 5-1-1 Ogasawara National Park**
**(Mukojima Island Group, Chichijima Island Group, and Nishinoshima)**

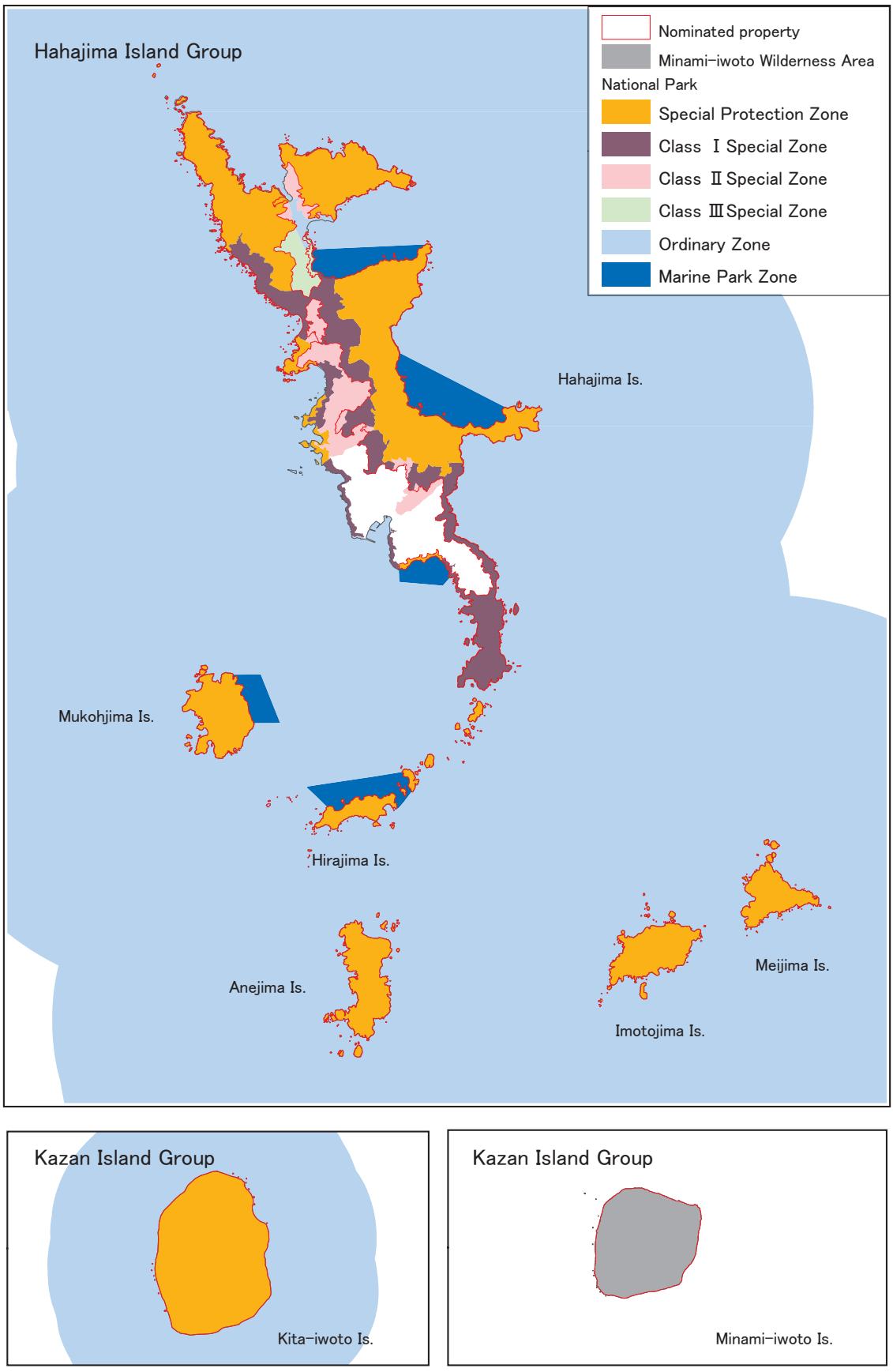



Fig. 5-1-2 Minami-iwoto Wilderness Area and Ogasawara National Park
(Hahajima Island Group, Kita-iwoto, and Minami-iwoto)

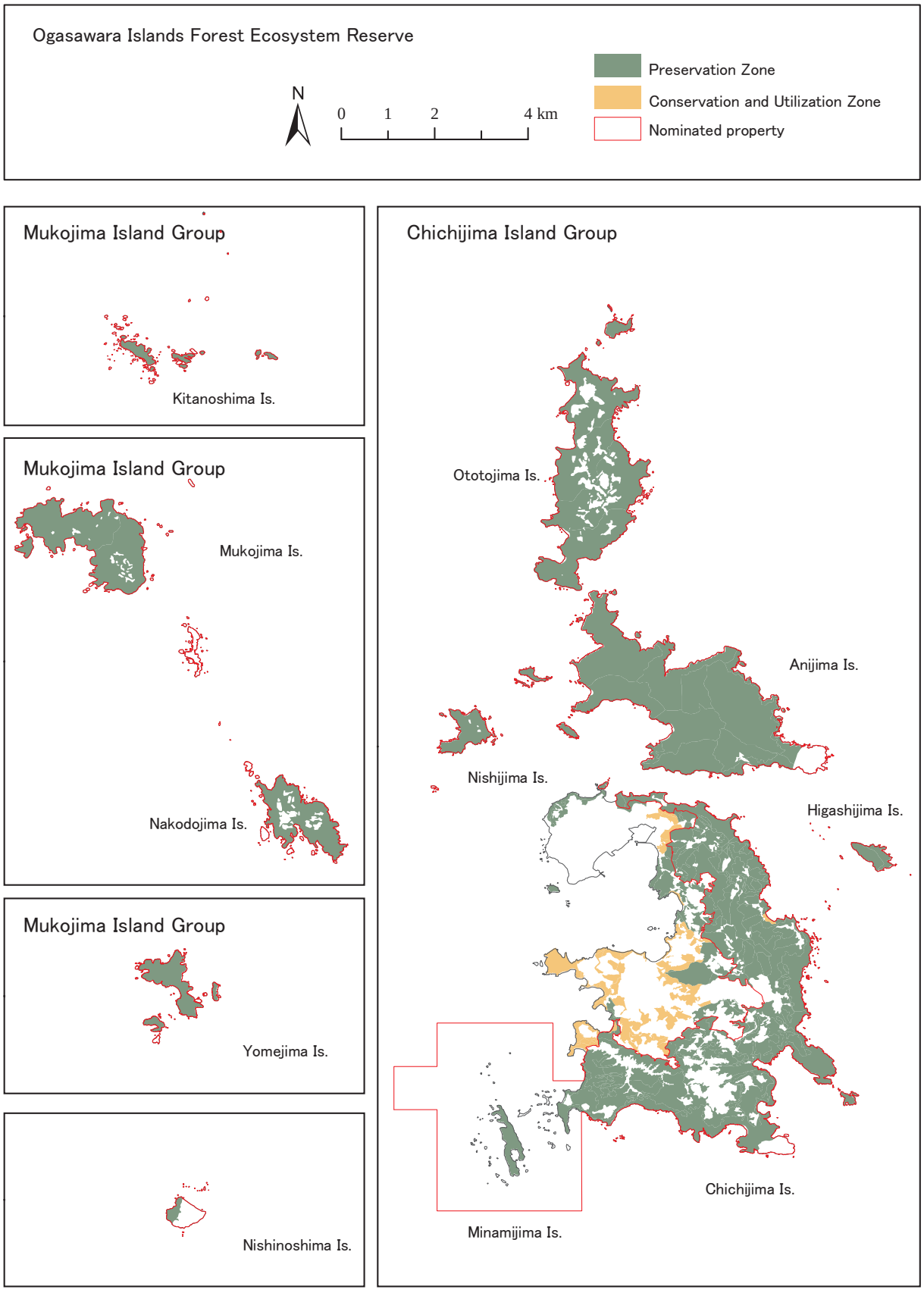



Fig. 5-2-1 Ogasawara Islands Forest Ecosystem Reserve
(Mukojima Island Group, Chichijima Island Group, and Nishinoshima)

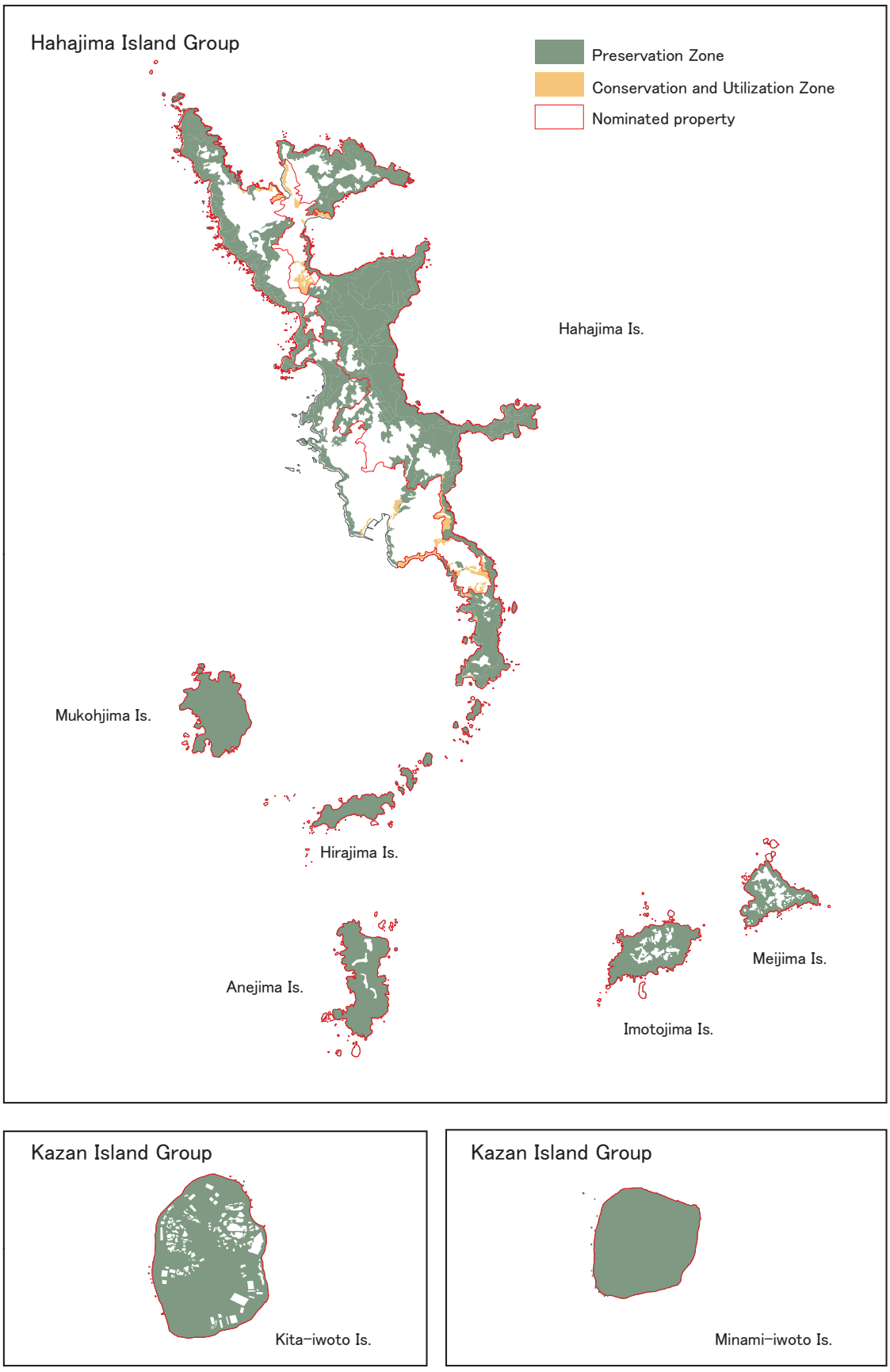



Fig. 5-2-2 Ogasawara Islands Forest Ecosystem Reserve
(Hahajima Island Group, Kita-iwoto, and Minami-iwoto)

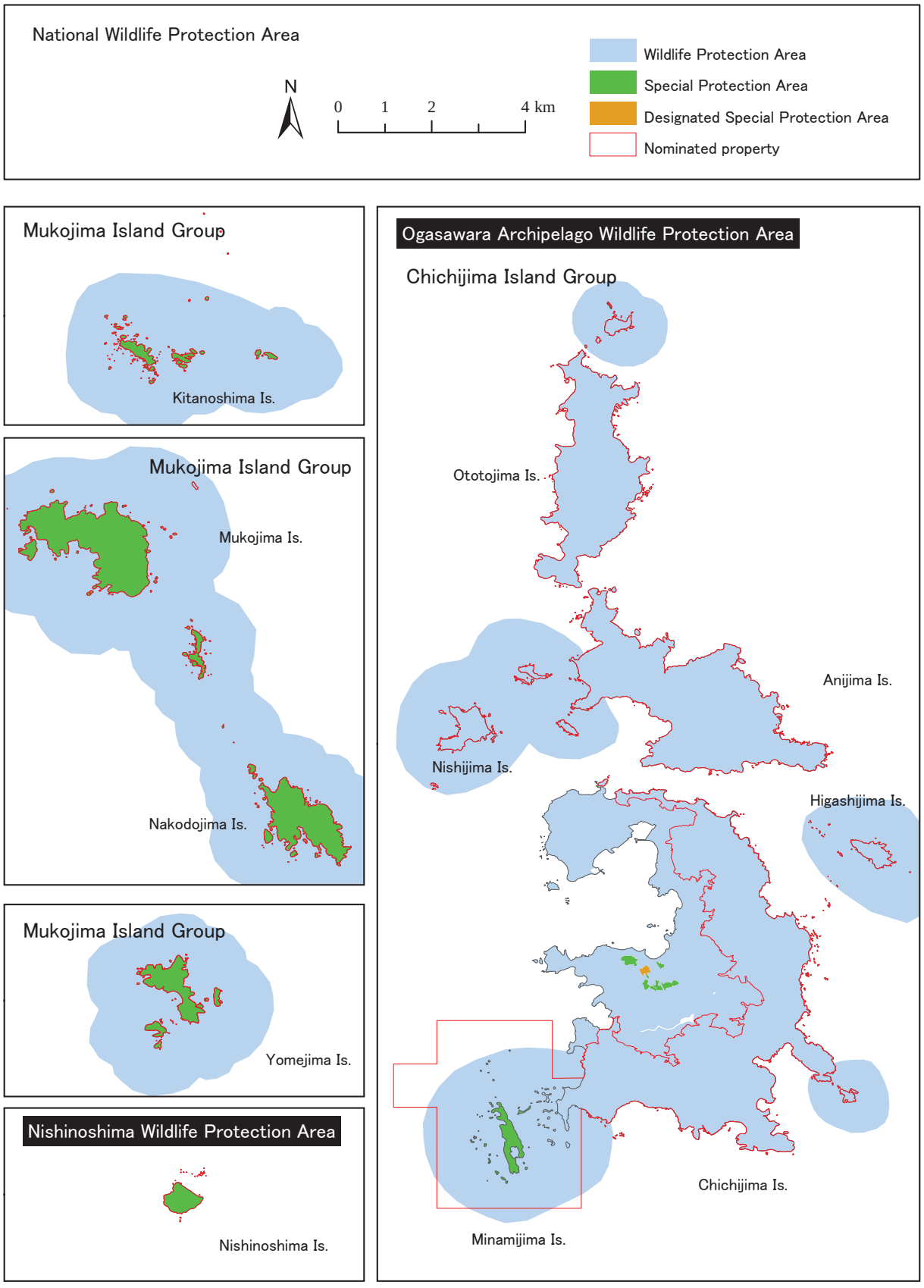



Fig. 5-3-1 National Wildlife Protection Area
(Ogasawara Archipelago, Nishinoshima)

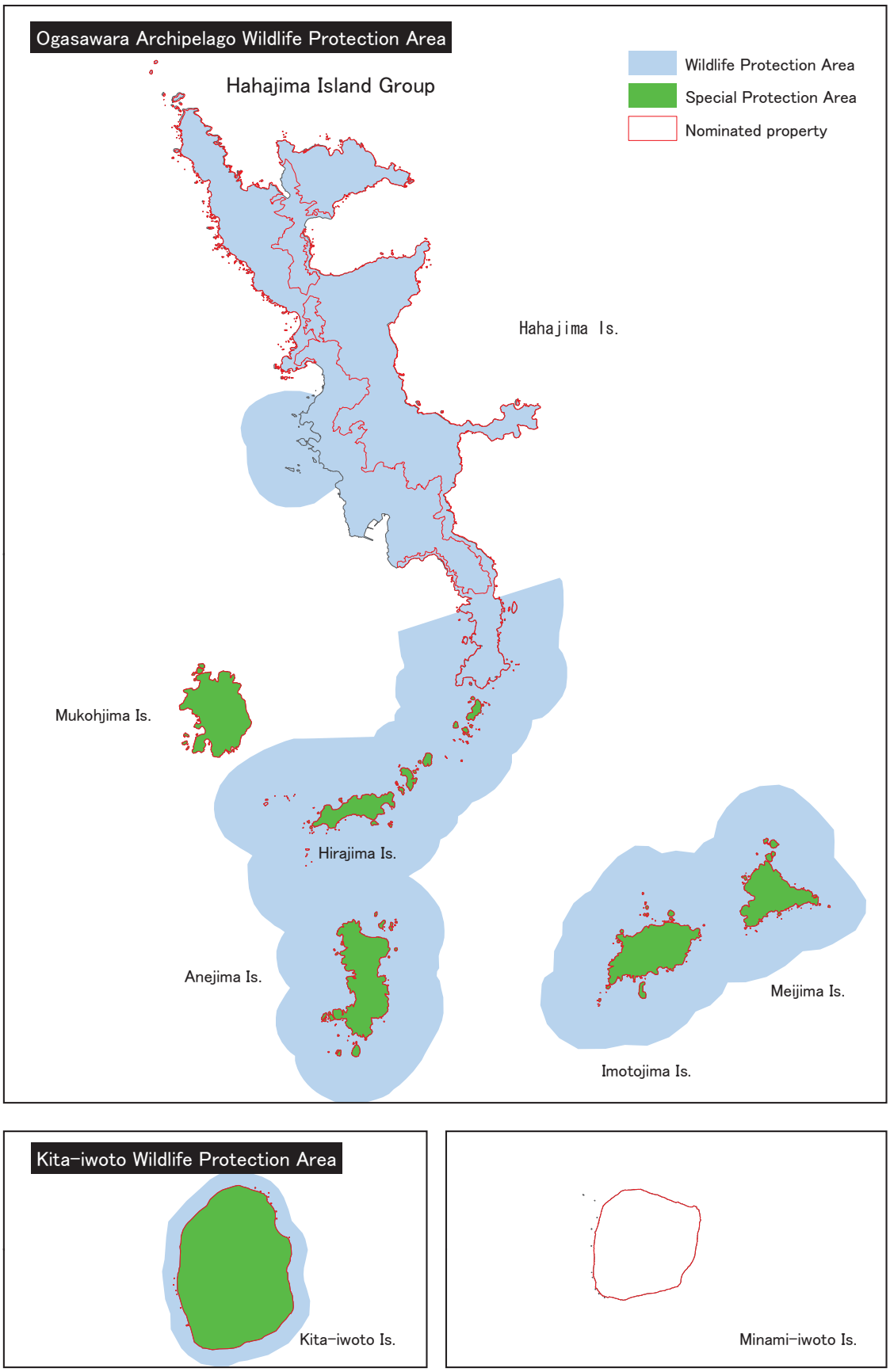



Fig. 5-3-2 National Wildlife Protection Area
(Ogasawara Archipelago, Kita-iwoto)

## 5.c Means of implementing protective measures

The nominated property is protected by domestic laws conferring the designations shown in Table 5-1. Many of the protected areas overlap and complement each other, which raises the level of protection in the property.

Many endemic wildlife species live or grow within the nominated property. Some of these species are designated and protected as National Endangered Species of Wild Fauna and Flora under the Law for the Conservation of Endangered Species of Wild Fauna and Flora or as Natural Monuments under the Law for the Protection of Cultural Properties.

The following is an outline of the protective measures.

### 5.c.1 Minami-iwoto Wilderness Area

Wilderness Areas are designated and administered by the Minister of the Environment based on the Nature Conservation Law. Its purpose is to provide necessary protection for virgin natural environments of a significant scale without being influenced by human activities.

Based on this law, the whole area of Minami-iwoto was designated as the Minami-iwoto Wilderness Area in 1975. The entire Wilderness Area is included in the nominated property.

In this Wilderness Area, acts that may affect the conservation of the natural environment are prohibited, except for special reasons such as scientific research. Examples of prohibited acts are shown in the table below. In addition, the entire area has been designated as a Restricted Entry Zone under the law, which prohibits the entry into the area except for special reasons such as academic study.

**Prohibited acts in Wilderness Areas**

(except in cases deemed necessary by the Minister of the Environment for scientific research and so on)

1. Constructing, reconstructing, or expanding buildings or other structures.
2. Making housing lots, clearing land, or changing the feature of the land.
3. Mining minerals or extracting soil and stones.
4. Reclaiming the surface of water or reclaiming by drainage.
5. Causing increase or decrease in the water-level or quantity of water of rivers, lakes, marshes, swamps and wetlands etc.
6. Felling or damaging trees and bamboos.
7. Collecting or damaging plants, or collecting fallen leaves or branches.
8. Planting and seeding plants.
9. Capturing, killing or wounding animals, or collecting or damaging their eggs.
10. Pasturing livestock.
11. Setting or making fire.
12. Accumulating or storing things in the open air.
13. Using horses, vehicles or power-driven vessels, or landing aircrafts.
14. Releasing animals.
15. Dumping of wastes

Entering "Restricted Entry Zones" is prohibited.

## 5.c.2 Ogasawara National Park

National Park is a designation that protects places of natural scenic beauty and promotes their utilization for the purposes of the health, recreation and education of the people, as well as ensuring the conservation of biodiversity. The Minister of the Environment designates and manages National Parks based on the Natural Parks Law.

National Parks are operated according to park plans, which divide parks into different classification, including Special Zones for areas of preserving their distinguished state of nature, Special Protection Zones within Special Zones for such areas of most stringent protection for their sate of virgin nature, Marine Park Zones for such areas of characteristic seabed topography and of rich marine fauna and flora, and Ordinary Zones for protection of integrated landscape and seascape with above-mentioned zones. Each zone has certain restrictions that apply.

Most of the terrestrial area designated as Ogasawara National Park in 1972 based on the Natural Parks Law is included within the nominated property. A large part of the property is classified into Special Protection Zone, which is the most stringently protected designation. Acts that could impact the natural environment are regulated. For example, there are restrictions on collecting fallen leaves, which serve as an important habitat for land snails. Furthermore, many portions of Chichijima and Hahajima in the nominated property are designated as Class I Special Zones, where quasi protective measures of Special Protection Zones are taken.

There are 51 families and 138 species of vascular plants, including endemic species such as *Rhododendron boninense* and *Callicarpa parvifolia*, which are legally protected from collection or damage as "designated plants" within the Special Zone. In the same way, *Indolestes boninensis* and *Hemicordulia ogasawarensis* are protected as "designated animals" and their capture or harm are restricted. A list of designated species is attached in the Appendix 5-2.

In addition, walkways, recreational sites and such have been built and maintained according to the Visitor Facility Plan of the National Park in order to conserve the natural environment and at the same time encourage visitation in a proper manner.



**Chichiijima** *(photo:Hideo Maruoka)*

**Regulation contents for each area**

| Acts that require the permission of the Minister of the Environment in Special Zone | Acts that require the permission of the Minister of the Environment in Special Protection Zone, in addition to the acts listed on the left | Acts that require notification to the Minister of the Environment in Ordinary Zone |
|---|---|---|
| 1. Constructing, reconstructing or extending structures.<br>2. Felling trees and bamboos.<br>3. Mining minerals or extracting soil and stones.<br>4. Causing increase or decrease in the water level or quantity of water of rivers, lakes, marshes, swamps and wetlands etc.<br>5. Discharging polluted or waste water into designated lakes etc.<br>6. Putting up or setting up advertisements etc.<br>7. Accumulating or storing soil and stones or other designated items in the open air.<br>8. Reclaiming the surface of water or reclaiming by drainage.<br>9. Clearing land or changing the feature of land.<br>10. Collecting or damaging the designated plants etc.<br>11. Capturing the designated animals etc.<br>12. Changing the colors of roofs and walls etc.<br>13. Entering into designated wetlands etc.<br>14. Using horses, vehicles or power-driven vessels, or landing airplanes. | In addition to 1 through 6, 8, 9, 12, 13 to the left;<br>1. Damaging trees and bamboos.<br>2. Planting and seeding plants.<br>3. Pasturing livestock.<br>4. Accumulating or storing things in the open air.<br>5. Setting or making fire.<br>6. Collecting or damaging plants, or collecting fallen leaves or branches.<br>7. Capturing, killing or wounding animals, or collecting or damaging their eggs.<br>8. Using horses, vehicles or power-driven vessels, or landing airplanes off of roads and public open spaces.<br>9. Releasing animals. | 1. Constructing, reconstructing or extending large-scale structures.<br>2. Causing increase or decrease in the water-level or quantity of water of rivers, lakes, marshes, swamps and wetlands etc. of the Special Zone<br>3. Putting up or setting up advertisements etc.<br>4. Reclaiming the surface of water or reclaiming by drainage.<br>5. Mining minerals or extracting soil and stones.<br>6. Changing the feature of the land.<br>7. Changing the feature of the seabed. |

### 5.c.3 Ogasawara Islands Forest Ecosystem Reserve

Forest Ecosystem Reserve is a designation for areas of primitive natural forests representative of forest zones in Japan that exist in a reasonably large scale. Its purpose is to maintain the natural environment of the forest ecosystem, protect plants and animals, preserve genetic resources, develop forest operation and management technique, and promote scientific research etc. In its planned administration and management of the national forests based on the Law on the Administration and Management of National Forests, the Forestry Agency designates and administers the reserve as stated in National Forest Operation Plan, created in accordance with the National Forests Administration and Management Bylaw which stipulates details on plan creation for the actual administration and management activities of each region.

In 1994, the eastern coast of Hahajima was designated forest ecosystem reserve. Then, in 2007, after a review of the areas covered by the system, the area was expanded to cover national forests on nearly all of the main and satellite islands of the Ogasawara Islands (aside from areas being used for public works projects), in order to conserve the unique forest ecosystems of the Ogasawara Islands for future generations. Forest Ecosystem Reserve now covers more than 80% of the nominated property.

The Preservation Zone subcategory in Forest Ecosystem Reserve includes the area where the typical biota as well as endemic and threatened species is found. Its purpose is to maintain, restore, and properly preserve forest ecosystems in their original form. This designation allows for acts deemed necessary based on established scientific evidence to preserve or restore endemic diversity or forest ecosystems, but in principle dictates that the area is left to follow its course of nature, without human interference. Beginning in 2008, utilization is limited as a rule to predetermined designated routes, so as not to diminish the value of vulnerable ecosystems in the Preservation Zone. Furthermore, persons entering these designated routes need to be accompanied by a guide who has been issued a permit to enter the area upon completion of the training courses on the conservation and utilization of threatened wildlife and their habitats.

The Conservation and Utilization Zone subcategory is designed as a buffer zone that prevents the direct influence of external environmental changes that might affect the forest ecosystem of the Preservation Zone. As a general rule, the Conservation and Utilization Zone aims to conserve and restore forest ecosystems of the same quality as the Preservation Zone and is thus treated in a similar manner. Additionally, the use of forests is permitted for educational and other purposes to the extent that such use does not adversely affect its function. In order to ensure proper utilization and protection, persons wishing to enter parts of Zone that are not along the designated routes must likewise obtain a permit to enter the area and complete a course on conservation and utilization.

### 5.c.4 National Wildlife Protection Areas

National Wildlife Protection Areas are designated by the Minister of the Environment based on the Wildlife Protection and Appropriate Hunting Law. The purpose is to provide protection to wildlife and enforce appropriate requirements on hunting, thereby ensuring the conservation of biodiversity that in turn enables people to enjoy the blessings

and benefits of nature. Hunting is prohibited in Wildlife Protection Areas. In addition, the areas where the protection of wildlife and their habitats is deemed especially necessary are designated as Special Protection Areas to restrict certain development acts. Furthermore, areas in need of particular protection within Special Protection Areas are designated as Designated Special Protection Areas where acts like mere observation of fauna and flora by photographing are restricted, as acts that may adversely affect wildlife protection.



*Apalopteron familiare* (photo:Hideaki Mori)

**Regulations for each area**

| National Wildlife Protection Area | Acts that require the permission of the Minister of the Environment within a Special Protection Area: | Acts requiring permission from the Minister of the Environment in a Designated Special Protection Area designated based on the act No. 4 in the left column |
|---|---|---|
| Capture of wildlife is prohibited. | 1. Construction, reconstruction and extension of structure<br>2. Reclamation of surface of water or land reclamation by drainage<br>3. Felling of trees or bamboo<br>4. Acts that may adversely affect wildlife protection as designated in the government ordinance | 1. Gathering plants, capturing animals, etc.<br>2. Clearing by fire, other types of open fires<br>3. Use of horses or vehicles<br>4. Use of motor-powered boats<br>5. Entering with dogs or other animals that may be threatening to the wildlife<br>6. Wildlife observation activities by photographing etc.<br>7. Outdoor sports and other recreational activity |

- **Ogasawara Archipelago National Wildlife Protection Area:**

The Ogasawara Islands National Wildlife Protection Area was designated based on the above law in 1980 because of the islands' status as habitats for threatened wildlife, such as *Buteo buteo toyoshimai*, *Apalopteron familiare hahasima* (a subspecies of the Bonin honeyeater), *Columba janthina nitens*, *Carduelis sinica kittlitzi*, and short-tailed albatrosses (*Phoebastria albatrus*). In 2009, the area expanded as Ogasawara Archipelago National Wildlife Protection Area to include surrounding ocean area. The nominated property includes most of the terrestrial parts of this Wildlife Protection Area.

- **Nishinoshima National Wildlife Protection Area:**

  Nishinoshima was designated as a National Wildlife Protection Area in 2008 because it is a breeding ground for the colonies of the masked booby (*Sula dactylatra*), Tristram's storm-petrel (*Oceanodroma tristrami*), the great crested tern (*Thalasseus bergii*), and others. All of this National Wildlife Protection Area is included in the nominated property.

- **Kita-iwoto National Wildlife Protection Area:**

  Kita-iwoto and its surrounding ocean area were designated as a National Wildlife Protection Area in 2009, because of its importance as habitats or a breeding site for seabirds including red-tailed tropicbird (*Phaethon rubricauda*), red-footed booby (*Sula sula*), Matsudaira's storm-petrel (*Oceanodroma matsudairae*), brown booby (*Sula leucogaster*), white-tailed tropicbird (*Phaethon lepturus*), bridled tern (*Onychoprion anaethetus*), and brown noddy (*Anous stolidus*). The site also provides habitats for such threatened species as *Columba janthina nitens*, *Carduelis sinica kittlitzi*, and Bonin flying fox (*Pteropus pselaphon*). The nominated property includes all of the terrestrial parts of this Wildlife Protection Area.

## 5.c.5 National Endangered Species of Wild Fauna and Flora

National Endangered Species of Wild Fauna and Flora refer to species of wild fauna and flora that are in danger of extinction. These species are designated by government ordinance based on the Law for the Conservation of Endangered Species of Wild Fauna and Flora (hereinafter called the Species Conservation Law).

Of the wildlife in the nominated property, one species of mammals (*Pteropus pselaphon*), five species of birds including *Columba janthina nitens*, five species of insects including tiger beetle (*Cicindela bonina*), and 12 species of plants including *Hymenasplenium cardiophyllum*, have been designated as National Endangered Species of Wild Fauna and Flora. It is therefore illegal to capture, harm, kill, collect, damage, transfer, etc. these species.

Based on the Species Conservation Law, Species Conservation Programs have been drawn up for 19 of these National Endangered Species of Wild Fauna and Flora, including *Columba janthina nitens* and *Rhododendron boninense*. These programs are for due and effective implementation of projects to promote the propagation of individuals and maintenance of their habitat. Under these programs, population studies, habitat maintenance and improvement, artificial reproduction, etc. are currently conducted, aiming for the stable and natural continuation of these species (see also Appendix 5-5).



*Rhinocypha ogasawarensis* (photo:Hideaki Mori)

**Table 5-2 List of National Endangered Species of Wild Fauna and Flora in the nominated property**

| Classification | Family | Species Name | Designated date | Species Conservation Program |
|---|---|---|---|---|
| Plant | PIPERACEAE | *Piper postelsianum* | Government ordinance No.222 (July 2, 2004) (Enforcement: July 15, 2004) | ● |
| | PITTOSPORACEAE | *Pittosporum parvifolium* | Same as above | ● |
| | MELASTOMATACEAE | *Melastoma tetramerum* | Same as above | ● |
| | ERICACEAE | *Rhododendron boninense* | Same as above | ● |
| | VERBENACEAE | *Callicarpa parvifolia* | Same as above | ● |
| | ORCHIDACEAE | *Calanthe hattorii* | Same as above | ● |
| | ORCHIDACEAE | *Calanthe hoshii* | Same as above | ● |
| | ORCHIDACEAE | *Malaxis boninensis* | Same as above | ● |
| | ASPLENIACEAE | *Hymenasplenium cardiophyllum* | Government ordinance No.238 (July 25, 2008) (Enforcement: August 15, 2008) | ● |
| | SYMPLOCACEAE | *Symplocos kawakamii* | Same as above | ● |
| | LABIATAE | *Ajuga boninsimae* | Same as above | ● |
| | COMPOSITAE | *Crepidiastrum grandicollum* | Same as above | ● |
| Mammal | PTEROPODIDAE | *Pteropus pselaphon* | Government ordinance No.273 (December 2, 2009) (Enforcement: December 15, 2009) | |
| Bird [1)] | DIOMEDEIDAE | *Phoebastria albatrus* | Government ordinance No.17 (February 10, 2003) (Enforcement: April 1, 2003) | ● |
| | ACCIPITRIDAE | *Buteo buteo toyoshimai* | Same as above | |
| | COLUMBIDAE | *Columba janthina nitens* | Same as above | ● |
| | MELIPHAGIDAE | *Apalopteron familiare hahasima* | Same as above | |
| | FRINGILLIDAE | *Carduelis sinica kittlitzi* | Same as above | |
| Insect | LESTIDAE | *Indolestes boninensis* | Government ordinance No.238 (July 25, 2008) (Enforcement: August 15, 2008) | ● |
| | LIBELLAGINIDAE (CHLOROCYPHIDAE AUCT.) | *Rhinocypha ogasawarensis* | Same as above | ● |
| | CORDULIIDAE | *Hemicordulia ogasawarensis* | Same as above | ● |
| | CICINDELIDAE | *Cicindela bonina* | Same as above | ● |
| | LYCAENIDAE | *Celastrina ogasawaraensis* | Same as above | ● |

1) In regard to birds, uncertain records and accidental migrants are excluded from the list.

## 5.c.6 Natural Monuments

Natural Monuments are designated by the Minister of Education, Culture, Sports, Science and Technology based on the Law for the Protection of Cultural Properties. Its purpose is to protect animals or plants (including their habitats, breeding sites, stopover points for migratory birds and native habitats) and geological minerals (including areas of unique natural phenomenon) which have significant scientific value for the country.



*Cicindela bonina* *(photo:Koji Ishibashi)*

Of the animals that occur in the nominated property, short-tailed albatross and the Bonin honeyeater are designated as Special Natural Monument. In addition, two bird species including *Columba janthina nitens*, one mammal species of the Bonin flying fox, 10 insect species including *Celastrina ogasawaraensis* and a land snail group of Ogasawara Islands including 12 families such as Helicinidae family, as well as two other species have been designated as National Natural Monuments. There are two regional designations of National Natural Monument, i.e., Minami-iwoto wich has pristine natural environment, and the submerged karst at Minamijima which shows typical and distinctive submerged karst formations.

Acts which change the current state of Natural Monuments or affect their preservation require permission from the Commissioner of the Agency for Cultural Affairs.



Submerged karst around Minamijima *(photo:MOE)*

**Table 5-3 Designation of Natural Monuments**

| Designation type | Classification | Name of Natural Monument | Designation date | Designation date for Special natural monument |
|---|---|---|---|---|
| Regional designation (Ogasawara Village) | Natural Monument (NM) | Minami-iwoto | November 24, 1972 | |
| Regional designation (Minamijima Ogasawara Village) | NM | Submerged Karst at Minamijima, Ogasawara Islands | March 28, 2008 | |
| Species designation (area not limited) | Special Natural Monument (SNM) | Short-tailed albatross *(Phoebastria albatrus)* | April 25, 1958 | April 19, 1962 |
| Same as above | NM | *Columba janthina nitens* | April 12, 1969 | |
| Same as above | NM | Bonin flying fox *(Pteropus pselaphon)* | Same as above | |
| Same as above | SNM | Bonin honeyeater *(Apalopteron familiare hahasima)* | Same as above | March 15, 1977 |
| Same as above | NM | Lycaenid butterfly *(Celastrina ogasawaraensis)* | Same as above | |
| Same as above | NM | *Boninthemis insularis* | Same as above | |
| Same as above | NM | *Hemicordulia ogasawarensis* | Same as above | |
| Same as above | NM | *Boninagrion ezoin* | Same as above | |
| Same as above | NM | *Rhinocypha ogasawarensis* | Same as above | |
| Same as above | NM | *Chrysochroa holstii* | Same as above | |
| Same as above | NM | Land snails (12 families such as Helicinidae etc.) | November 12, 1970 | |
| Same as above | NM | *Copelatus ogasawarensis* | Same as above | |
| Same as above | NM | *Neogerris boninensis* | Same as above | |
| Same as above | NM | *Xylocopa ogasawarensis* | Same as above | |
| Same as above | NM | *Meimuna boninensis* | Same as above | |
| Same as above | NM | *Cellana mazatlandica* | Same as above | |
| Same as above | NM | Genus *Coenobita* | Same as above | |
| Same as above | NM | *Buteo buteo toyoshimai* | May 19, 1971 | |

* In regard to birds, uncertain records and accidental migrants are excluded from the list.

## 5.c.7 Systems for the control of alien species

According to the Invasive Alien Species Act, animals and plants introduced into Japan from overseas that harm or may harm ecosystems are designated as "Invasive Alien Species".

Among alien species that are found in the nominated property, the green anole (*Anolis carolinensis*), the cane toad (*Bufo marinus*), the bullfrog (*Rana catesbeiana*), and the predatory flatworm (*Platydemus manokwari*) have been designated as Invasive Alien Species, and pursuant to the above Act, the importation, rearing, growing, storage, transport, etc. of these species are restricted.

## 5.d Existing plans

Plans involving the conservation and use of the nominated property include the Park Plan for Ogasawara National Park, which stipulates protective regulations and visitor facility plans, and the Regional Administration and Management Plan, which outlines the management policies of the Ogasawara Islands Forest Ecosystem Reserve. The related plans are listed in Table 5-4.

**Table 5-4 Plans related to the nominated property**

| Plan | Legal foundation | Responsible body | Purpose | Outline |
|---|---|---|---|---|
| Conservation Plan for Minami-iwoto Wilderness Area | Nature Conservation Law, Article 15 | MOE | Plans relating to regulations or facilities for the preservation of natural environments in Wilderness Area. | Presents an overview of Minami-iwoto, designates restricted entry areas, etc. and clarifies basic aspects of the conservation of the natural environment. |
| Park Plan for Ogasawara National Park | National Parks Law, Article 7 | MOE | Basic guidelines for the proper administration of parks by clarifying policies for maintaining scenic beauty in National Park and for constructing and maintaining facilities thereof. | Outlines restrictions necessary for properly protecting the unique ecosystems, fauna, flora, and landscapes of Ogasawara National Park as well as plans for promoting the utilization of the Park. |
| Management Plan for Ogasawara National Park | Director General, Nature Conservation Bureau, MOE, Japan, Notification No. 051003001, October 3, 2005 | MOE | Promoting the proper protection and utilization of National Park in order to enhance the National Park management based on the characteristics of the area. | Outlines park management policies to promote balance between nature conservation and human activities, and to create comfortable utilization opportunities of the park, taking into consideration the topographical, geographical, and ecosystem features of the Ogasawara National Park. Furthermore, promotes proper use of the natural environments of the park, in accordance with the actual situations of the area. |

**Table 5-4 Plans related to the nominated property (contd.)**

| Plan | Legal foundation | Responsible body | Purpose | Outline |
|---|---|---|---|---|
| Basic Plan for the Conservation and Restoration of the Natural Environment of Ogasawara | | MOE | Outlines the fundamental policies as well as the discrete technical methods and measures in dealing with alien species in particular, in the conservation and restoration of the natural environment of Ogasawara. | • Outlines basic policies towards the conservation and restoration of the natural environment of Ogasawara.<br>• Presents objectives and overall strategies for each island.<br>• Clarifies principles, technical methods and issues for each invasive alien species.<br>• Suggests future directions for the development of the islands and mechanisms therefore. |
| Regional Administration and Management Plan (Izu Islands Forest Planning Area) | Law on the Administration and Management of National Forests, Article 6 Paragraph 1 | Forestry Agency | A five-year plan stipulating the basics for the administration and management of the Izu Islands Forest Planning Zone based on the principles of the administration and management plan for national forests. Based on this plan, the administration and management of national forests in the Ogasawara Islands is to be properly implemented. | To restructure existing protected forests, incorporate those changes into the Ogasawara Islands Forest Ecosystem Reserve, and institute the proper protections so that the extended area of unique ecosystems of the Ogasawara Islands can be preserved in an integrated manner. In addition, take proper measures against invasive species such as Bischofia in order to protect the invaluable endemic fauna and flora of the Ogasawara Islands. |
| Conservation Management Plan for the Ogasawara Islands Forest Ecosystem Reserve | | Forestry Agency | Clarifies directions of national forest conservation and management on the Ogasawara Islands, taking into consideration the unique characteristics of the area. The Plan aims to prevent further degradation of the natural environments for future generations as well as to gradually restore the islands' primitive nature. | • Promotes systematic measures against alien species to protect endemic ecosystems of the Ogasawara Islands.<br>• Achieves a good balance between use and protection, in order to mitigate impact on endemic ecosystem caused by use. |

| Plan | Legal foundation | Responsible body | Purpose | Outline |
|---|---|---|---|---|
| Ogasawara Archipelago National Wildlife Protection Area Plan, Ogasawara Archipelago Special Protection Zone Plan; same for Nishinoshima and Kita-iwoto | Wildlife Protection and Appropriate Hunting Law | MOE | Protection of wildlife and their habitats that are important from international and domestic perspectives. | List the designated areas, their size in area, wildlife that inhabit there, protection guidelines and others. |
| Species Conservation Program based on the Species Conservation Law *(Rhododendron boninense, Melastoma tetramerum,* short-tailed albatrosses, etc.) | Law for the Conservation of Endangered Species of Wild Fauna and Flora | MOE, Ministry of Agriculture, Forestry and Fisheries (Forestry Agency) | To contribute to the appropriate and effective implementation of Species Conservation Programs. | Indicates the objectives, areas, program content, and related matters to effectively implement the Program. |
| Ogasawara Islands Promotion and Development Plan | Act on Special Measures for the Ogasawara Islands Promotion and Development | TMG | Clarifies directions of promotion and development of Ogasawara Islands based on national guidelines. | Setting the basic philosophy of promotion and development of Ogasawara Islands as the goal of self-sustaining development based on the proper balance between environmental conservation and promotion of industry, and describes strategies such as establishing conditions for fixed residency that achieves peaceful coexistence with nature. |

## 5.e Property management plan or other management system

### 5.e.1 Management plan for the nominated property

The "Ogasawara Islands Management Plan" (hereinafter the "Management Plan") has been drafted in order to properly conserve and manage well into the future the natural environment of the nominated property, which is characterized by outstanding diversity and unique value.

The Management Plan clarifies basic policies related to the implementation of the systems

and promotion of projects to facilitate the smooth and proper management of the nominated property. It requires close cooperation between the relevant management bodies that have authority over the islands (the MOE, the Forestry Agency, the Agency for Cultural Affairs, the TMG, and Ogasawara Village), and other related government organizations, local residents, bodies engaged in tourism, agriculture, or fisheries, as well as researchers and NPOs (hereinafter referred to collectively as "stakeholders").

The outline of the Management Plan is as follows. The full text of the Management Plan is included in the Appendix 1.

### a. Scope of the Management Plan

In order to conserve the natural environment in the nominated property, it is necessary to take steps such as preventing the invasion of new alien species, but such steps cannot be properly effective if taken only in the nominated property. For this reason, the scope of the Management Plan includes not only the nominated property but its surrounding areas. Main scope of the Management Plan is shown in Fig. 1-6.

### b. Management framework and systems

In addition to properly implementing the protective measures in Section 5.c above and conserving the outstanding value of the natural environment of the nominated property, conservation and management steps such as measures against alien species shall be taken according to the Management Plan through collaboration between relevant management authorities and stakeholders. Systems to achieve that objective are outlined in 5.e.3 through 5.e.5.

### c. Basic concept of the management and measures

#### ● Conservation of natural environments

Outstanding value pursuant to criterion (viii) for geological and topographic features and outstanding value pursuant to criteria (ix) and (x) for ecosystem and biodiversity shall be protected through the proper application of existing protective systems described in 5.c. As for outstanding value relevant to criteria (ix) and (x), islands shall be treated as individual units. The individual goals and measures of each island's ecosystem conservation shall be indicated with special attention paid, in implementing steps for eradicating alien species, to not being limited to specific species, so that steps for the conservation and management shall be taken in a strategic manner with due consideration of the interaction of different species among different islands while accumulating related findings and technique.

#### ● Steps to prevent further invasion by and spread of alien species

In order to prevent the introduction of new alien species and the spread of such species to previously uninfluenced areas, strategies will be developed and clarified for specific types of activities that pose the threat of introduction, including ecosystem conservation and management activities, greening/construction and other public works, utilization such as ecotourism, the keeping of pets, agricultural activities, the movement of people and transport of supplies via ferry liners, etc, thereby encouraging concerned bodies including local residents to recognize the risks caused by alien species and to avoid or mitigate impacts of these activities.

### ● Adaptive implementation of conservation and management

Conservation and management shall be conducted in an adaptive manner. For this purpose, monitoring shall be carried out in order to properly identify changes to the natural environment caused by the steps for the conservation and management. The result shall be reflected in future steps after scientific assessment.

## 5.e.2 The Ogasawara Islands Ecosystem Conservation Action Plan

A short-term action plan shall be followed in order to conserve and manage ecosystems in collaboration with the management authorities in a strategic manner that gives due consideration to the interaction of different species on the different islands.

The action plan clarifies relationships such as predation and competition among different species from a scientific perspective. Based on this data, short-term goals and areas of priority shall be determined for each approach that the management authorities implement to mitigate human impact, including alien species management strategies.

## 5.e.3 Ogasawara Islands Natural World Heritage Nominated Property Scientific Council

The nominated property comprises a complex oceanic island ecosystem characterized by a disharmonic species composition in which diverse species, including alien ones, interact with each other. In managing the nominated property, it is necessary to monitor the site, assess the data gathered, and provide feedback based on the latest scientific knowledge. For this reason, the Ogasawara Islands Natural World Heritage Nominated Property Scientific Council, consisting of experts with extensive knowledge of the nature of Ogasawara, has been established. Its mission is to support the development of management and action plans, review them, and present expert advice regarding the implementation of the various programs.

## 5.e.4 Ogasawara Islands Natural World Heritage Nominated Property Regional Liaison Committee (the Regional Liaison Committee)

There are 2,009 residents on Chichijima and 453 residents on Hahajima (as of June 1, 2009). Most of the residents live outside the nominated property, making their living in the tourism, agricultural and similar industries. The understanding and cooperation of island residents is absolutely essential for the proper management of the nominated property since it must be coordinated with their daily lives and industries. To this end, the Ogasawara Islands Natural World Heritage Nominated Property Reginal Liaison Committee has been established. Its membership consists of government and administrative bodies, tourist associations, NPOs, and other concerned bodies. The Liaison Committee coordinates the sharing of duties among the various constituents and encourages their cooperation in order to facilitate the management of the nominated property.

## 5.e.5 Efforts by individual organizations

The MOE, the Forestry Agency, the Agency for Cultural Affairs, the Tokyo Metropolitan

Government, Ogasawara Village, and the concerned bodies of the Regional Liaison Committee shall act based on an appropriate division of duties, in accordance with the plans mentioned above and the decisions made by the committees.

## 5.f Sources and levels of finance

The management of the nominated property is undertaken by the administrative authorities that oversee the various systems, facilities, etc. Sources and levels of funding by each in fiscal 2009 are as listed below.

### 5.f.1 The Ministry of the Environment

The management of the Wilderness Area, National Park, and National Wildlife Protection Area is carried out by the MOE, for which it has an annual budget of about 375,000,000 yen (about 4.17 million dollars). As for National Park, the MOE shares the management with the TMG.

The following items are included in the budget above:

- The development of adaptive conservation management systems
- Scientific research and habitat improvements for *Columba janthina nitens* and threatened insects
- Protection and population increase of *Pittosporum parvifolium*, *Rhododendron boninense*, and other threatened plant species
- Prevention and eradication of green anoles, cane toads, and other alien species
- Installation of fences to keep out feral cats and feral goats
- Management of black rats
- Studies for countermeasures against Bischofia, feral cats, and invasion by other alien species, etc.
- Management and maintenance of the Ogasawara Ranger Office for Nature Conservation
- Expenses necessary for patrolling the areas

The budget above is wholly funded by the national government and the necessary budget will continue to be provided.

### 5.f.2 The Forestry Agency

The Forest Ecosystem Reserve, which occupies about 80% of the nominated property, and the surrounding national forests are under the jurisdiction of the Forestry Agency. The Agency has an annual budget of about 157,000,000 yen (about 1.74 million dollars).

The following items are included in the budget above:

- Scientific research and habitat improvements for *Columba janthina nitens*
- Patrolling for the purpose of protecting and conserving threatened wild plants and animals
- Scientific studies of *Buteo buteo toyoshimai* and *Carduelis sinica kittlitzi*
- Eradication and monitoring of alien plants such as Bischofia, Casuarina (*Casuarina equisetifolia*) etc.
- Analysis of alien plants distribution using aerial photographs
- Expenses necessary for patrolling the areas

In addition, studies are conducted (28,000,000 yen annually; about 310 thousand dollars) into effective measures against alien species that involve the interactions between invasive alien species and native species in the forest ecosystem of the nominated property.

The budget above is wholly funded by the national government and the necessary budget will continue to be provided.

### 5.f.3 The Tokyo Metropolitan Government

The management and maintenance of the National Park are carried out by the TMG in conjunction with the MOE, for which there is an annual budget of about 503,638,000 yen (about 5.6 million dollars).

The following items are included in the budget above:

- Management of natural park facilities
- Installation of natural park facilities
- Patrolling, guiding visitors
- Promoting ecotourism (training of nature guides licensed by the TMG)
- Alien species countermeasures (elimination of feral goats from Anijima and Ototojima)
- Vegetation restoration (Mukojima, Nakodojima, and Minamijima)
- Natural environment monitoring studies (Mukojima Island Group, Minamijima, Hahajima Sekimon area, and Anijima)
- Conservation and population increase of threatened plants
- Natural environment surveys of peripheral islands
- Awareness promotion for nomination as a World Natural Heritage Site
- Research on short-tailed albatross

The budget above is supplied through the Ogasawara Islands Development Project (half of the project funds come from the national government, and the other half from the TMG) as well as through funds independently provided by the TMG. The necessary budget will continue to be provided.

### 5.f.4 Ogasawara Village

The local administrative government of Ogasawara Village undertakes campaigns to help local residents understand the importance and value of the natural environment of Ogasawara and to raise awareness of the need for individuals to take steps to conserve their precious natural environment and live in harmony with it. For this purpose, the village has an annual budget of about 6,285,000 yen (about 70 thousand dollars).

The following items are included in the budget:

- World Natural Heritage Site nomination promotion projects
- Expenses for resident volunteers to eradicate alien species
- Public relations expenses

The budget above is wholly funded by the Village funds and the necessary budget will continue to be provided.

## 5.g Sources of expertise and training in conservation and management techniques

### 5.g.1 The Ministry of the Environment

The Ogasawara Ranger Office for Nature Conservation and the MOE's Kanto Regional Environment Office are staffed with employees well-versed in the nature protection systems and conservation management techniques necessary for the conservation and management of the nominated property. The staff provide expert advice to contractors and project administrators concerning approval procedures required by the relevant laws and regulations (such as the Natural Parks Law) and to implement nature restoration projects or programs for the protection and breeding of endemic fauna and flora.

The Office also conducts awareness-raising activities such as nature tours and training volunteer rangers.

The Office staff seek advice from outside specialists and universities as necessary, thereby securing higher levels of expertise.

● **Study groups to facilitate duties**

| Names of study groups | Topics |
|---|---|
| Wildlife Conservation Study Group, *Columba janthina nitens* | Studies concerning how to protect and breed for *Columba janthina nitens* (protection of habitats and breeding sites, etc.). |
| Wildlife Conservation Study Group, *Phoebastria albatrus* | Studies concerning how to protect and breed for albatrosses (building of new nesting areas, etc.) |
| Ogasawara Endangered Wild Flora Conservation Study Group | Studies concerning how to protect and breed for threatened flora (commissioned). |

## 5.g.2 The Forestry Agency

The Kanto Regional Forest Office and National Forest Division, Ogasawara General Office of Ministry of Land, Infrastructure, Transport and Tourism are staffed with employees well-versed in the systems and techniques necessary for the conservation and management of forests and wildlife. These staffs manage the national forests properly in accordance with the Forest Law and other laws and regulations pertinent to the administration and management of national forests and provide the expert advice needed in the concerned operations.

Over the course of their work in managing the Ogasawara Islands Forest Ecosystem Reserve, implementing measures to protect threatened wildlife species (such as *Columba janthina nitens*), and eradicating alien plants, the staff seek advice from outside specialists and universities as necessary, in order to secure higher levels of expertise.

● **Study groups to facilitate duties**

| Names of study groups | Topics |
|---|---|
| The Ogasawara Islands Forest Ecosystem Reserve Conservation and Management Committee | Studies on how to conserve and manage the unique and primitive nature of the Ogasawara Islands for future generations in a healthy state (preservation and management plans, management and use). |
| Threatened Wildlife Protection and Management Review Committee | Studies to examine the current status of threatened wildlife species such as *Columba janthina nitens* (concrete methods including banding survey, habitat surveys, etc.) |
| Committee for Feed Plants for *Columba janthina nitens* and others | Studies on how to compile breeding techniques of the native plants that *Columba janthina nitens* and other animals feed on in a manual. |
| Endemic Forest Ecosystem Restoration Review Committee | Studies on eradication of Bischofia and Casuarina etc. to restore endemic ecosystems (monitoring methods, basic concepts for eradication, etc.). |

## 5.g.3 The Tokyo Metropolitan Government

The Natural Environment Division and Ogasawara Islands Branch Office, TMG are staffed with employees well-versed in the nature protection systems and conservation management techniques necessary for the conservation and management of the nominated property. These employees manage and install natural park facilities, carry out nature restoration projects, programs for the protection and breeding of threatened fauna and flora: they handle permission and approval procedures based on the Natural Parks Law.

The Office staffs seek advice from outside specialists as necessary, thereby securing higher levels of expertise.

● **Study groups to facilitate duties**

| Names of study groups | Topics |
|---|---|
| Study Committee for feral goat eradication of Anijima /Ototojima in Ogasawara National Park | Eliminate feral goats efficiently from Anijima and Ototojima and minimize the project's environmental impact. |
| Environment Monitoring Group (specialist consultants) of Hahajima Sekimon Area in Ogasawara National Park | Monitors vegetation and soil around travel routes and the status of use, studies the current rules, impact caused by use, and other matters necessary to realize proper use and protection of the natural environment. |
| Monitoring Review Committee of Minamijima | Studies the natural environment of Minamijima, the impact of visitation, and vegetation restoration and alien species countermeasure projects. Also considers research items and monitoring system. |
| Vegetation Restoration Study Committee of Mukojima Island Group in Ogasawara National Park | Evaluates the restoration of vegetation after feral goats have been cleared from Mukojima and Nakodojima, identifies issues and reviews them. |
| Vegetation Restoration Measurement and Design Committee of Nakodojima in Ogasawara National Park | Vegetation destruction and soil erosion advanced even after feral goats were eradicated from Nakodojima. For this reason, in order to establish the basement for natural vegetation restoration, the Committee reviews the issues related to the establishment of the vegetation restoration facility and monitoring needed. |

## 5.g.4 Ogasawara Village

The Ogasawara Village Office is staffed with specialists who provide local residents with accurate information on the conservation and management of the nominated property, coordinate with other administrative agencies, and promote conservation activities that can only be carried out in the community.

### ● Study groups and organizations

| Names of study groups | Topics |
|---|---|
| Ogasawara Ecotourism Association | Discusses ways of creating and promoting forms of ecotourism unique to Ogasawara based on consensus by the entire community. |
| Ogasawara Cat Liaison Committee | Studies and coordinates with relevant organizations concerning protective measures in the breeding period of *Columba janthina nitens*. |

## 5.h Visitor facilities and statistics

The number of visitors to the Ogasawara Islands (including tourists and returning residents) is shown in table 5-5. A survey conducted in 2004 indicates, as one of the characteristics of tourists to Ogasawara, that many are relatively young, mainly in their 20's or 30's. Tourists 24 to 40 years of age account for over half of all visitors. In addition, 30% of tourists to Ogasawara have been there at least once before, a phenomenon particularly prominent in people in their 30's and 40's.

More than half of the tourists to Ogasawara list the beauty of the natural environment as the reason for visiting. A large proportion of tourists list marine activities such as diving and whale watching, and "on-land" activities like guided tours, trekking, night tours, and historic battle site tours as their reasons for visiting. This demonstrates that many tourists come hoping not only to enjoy the natural scenery, but to do things actively in natural surroundings (Japan Travel Bureau Foundation, 2006).

**Table 5-5 Number of visitors to Ogasawara** *(fiscal year (FY) base)*

| Year | FY2003 | FY2004 | FY2005 | FY2006 | FY2007 | FY2008 |
|---|---|---|---|---|---|---|
| **<Tokyo - Chichijima>** Number of passengers using Ogasawara Maru (regular liner) | 22,856 | 21,211 | 21,680 | 22,539 | 24,755 | 22,906 |
| Of them, number of visitors excluding the residents of the islands | 19,161 | 17,574 | 17,856 | 18,854 | 20,834 | 19,011 |
| Of them, visitors for sightseeing purpose | 15,012 | 13,361 | 13,986 | 14,367 | 15,981 | 14,619 |
| Number of passengers using sightseeing ship (Visitors for sightseeing purpose) | 2,152 | 2,683 | 2,399 | 2,422 | 1,991 | 2,554 |
| Grand total of passengers to Chichijima | 25,008 | 23,894 | 24,079 | 24,961 | 26,746 | 25,460 |
| Grand total of visitors for sightseeing purposes | 17,164 | 16,044 | 16,385 | 16,789 | 17,972 | 17,173 |
| **<Chichijima - Hahajima>** Number of passangers using Hahajima Maru (regular liner) | 9,048 | 8,550 | 8,706 | 8,509 | 8,951 | 8,783 |
| Of them, visitors excluding the residents | 7,145 | 6,595 | 6,698 | 6,095 | 5,596 | 5,388 |

*(Industries and Tourism Division, Ogasawara Village)*

## 5.h.1 Local museums and visitor centers

Chichijima has the Ogasawara Visitor Center, the Ogasawara Subtropical Branch of Tokyo Metropolitan Agricultural Experiment Station, the Ogasawara Fisheries Research Center, and the Ogasawara Marine Center, all of which tourists can visit freely.

### 5.h.1.1 The Ogasawara Visitor Center (Tokyo Metropolitan Government)

The Visitor Center exhibits the history of the Ogasawara Islands since their initial formation, as well as examples of beautiful seascapes, rare plants and animals. It provides information on marine life, and information of conservation efforts, using models, preserved specimens, visual images, panels, and explanations by Center employees. The Center also hosts a variety of exhibits, lectures, hands-on workshops, and nature tours. The displays and events of the center not only promote a deeper appreciation and understanding of Ogasawara's natural environment, they can also be enjoyed by children and adults alike. Displays are open for viewing at no charge.

Visitors to the Center have been on a slight decline in recent years, but for about 60% of the visitors to Ogasawara it is still a central source of information (Table 5-6).

● **Overview of the facility:**

| | |
|---|---|
| **Address** | Nishi-machi, Ogasawara-mura, Tokyo |
| **Year of opening** | 1988 |
| **Structure and size** | Single floor, reinforced concrete; 924.12 $m^2$ (floor area) |
| **Exhibits** | Guide to the islands (entrance zone); representative displays (Exhibit Room 1); history and culture (Exhibit Room 2); natural science, nature conservation, ecotourism (Exhibit Room 3); planned exhibit |
| **Other facilities** | Multipurpose room, reading room, study room, storage space |
| **Number of staff** | 2-6 |



**The Ogasawara Visitor Center** *(photo:Masaaki Takiguchi)*

**Table 5-6 Number of visitors to the Islands and visitors to the Center**

| Year | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|
| Island visitors | 25,008 | 23,894 | 24,079 | 24,961 | 26,746 | 25,460 |
| Center visitors | 17,783 | 16,233 | 15,345 | 14,289 | 15,585 | 14,498 |
| Ratios | 71.1% | 67.9% | 63.7% | 57.2% | 58.3% | 57.3% |

*(TMG)*

### 5.h.1.2 Other facilities

#### 1. The Ogasawara Subtropical Branch of Tokyo Metropolitan Agricultural Experiment Station

The Ogasawara Subtropical Branch of Tokyo Metropolitan Agricultural Experiment Station is run by the TMG. Since its inception in 1970, it has been a center for promoting agriculture in Ogasawara, undertaking various experimental researches related to advancements in the production technologies of brand-name agricultural products, stable in-house cultivation technologies, the selection and introduction of superior seedlings, and the prevention of pests such as the East African land snail. These technologies in effect give something back to farm producers and Tokyo residents. The Station also places examples of cultivation methods on display and holds training courses for farmers to help them achieve more stability in the management of their farms as well as higher levels of productivity. In addition, the Station stores specimens of endemic species that grow on the Ogasawara Islands, introduces and grows garden crops suited to the area, and introduces, grows, and displays tropical plants useful as genetic resources. The greenhouses, gardens and palm grove on display are open to public at no charge.

● **Overview of the facility:**

| | |
|---|---|
| **Address** | Ogasawara Subtropical Branch of Tokyo Metropolitan Agricultural Experiment Station: Chichijima Komagari, Ogasawara-mura, Tokyo<br>Livestock Guidance Center: Motochi, Hahajima, Ogasawara-mura (main facility), Hyougidaira (No. 2 Grounds)<br>Farm Management Training Center: Hyougidaira, Hahajima, Ogasawara-mura, Tokyo |
| **Grounds** | Ogasawara Subtropical Branch of Tokyo Metropolitan Agricultural Experiment Station: 189,000m$^2$ (20,000 m$^2$ of which is garden space on display)<br>Livestock Guidance Center: 42,343 m$^2$ (15,000 m$^2$ of which is grazing area)<br>Farm Management Training Center: 14,326 m$^2$ Total: 245,670 m$^2$ |
| **Facilities** | Ogasawara Subtropical Branch of Tokyo Metropolitan Agricultural Experiment Station: 3,885 m$^2$<br>Greenhouses (RC): 10; 2,778 m$^2$ (418 m$^2$ of which are on display)<br>Greenhouses (plastic): 16; 1,107 m$^2$<br>Farm Management Training Center: 1,354 m$^2$<br>Greenhouses (RC): 4; 477 m$^2$<br>Greenhouses (plastic): 11; 877 m$^2$<br>Livestock Guidance Center (Manure processing plant, etc.): 638 m$^2$ |
| **Number of staff** | Ogasawara Subtropical Branch of Tokyo Metropolitan Agricultural Experiment Station: 1 director, 7 regular employees<br>Livestock Guidance Center: 3 employees; Farm Management Training Center: 2 employees; Total: 13 employees |
| **Number of visitors** | About 12,000 annually |

## 2. The Ogasawara Fisheries Research Center

Since its establishment in 1973, the Ogasawara Fisheries Center has been a base center for promoting the fisheries industries in the Ogasawara Islands marine area. It has served in the development of fishing grounds and the improvement and promotion of fishing equipment and methods, and as a research and teaching facility that places an emphasis on the conservation and management of marine resources and the development of artificial culture technologies. Furthermore, it is responsible for operating a land-based radio station designed to help keep the professional fisheries operations stable. The Center responds to requests and inquiries from fishermen, ordinary citizens, and students concerning specific technical questions and general guidance. The Center also has programs to raise knowledge and awareness about fish and fisheries, to protect natural environments and promote the fisheries industry. The Center makes its cultivation wing available to the general public as a kind of aquarium.

### Overview of the facility:

| | |
|---|---|
| **Address** | Kiyose, Chichijima , Ogasawara-mura |
| **Grounds** | 6,427 $m^2$ |
| **Facilities** | Control wing/radio station: 323 $m^2$<br>Work wing: 111 $m^2$<br>Diving storehouse: 24 $m^2$<br>Cultivation wing (aquarium): 314 $m^2$<br>Chlorella wing: 240 $m^2$<br>Pump room/elevated tank wing: 46 $m^2$<br>Feed processing wing: 126 $m^2$<br>Temporary power generator room: 49 $m^2$ |
| **Number of staff** | Fishery researchers: 5 employees; land radio operators: 3 employees; fishery research and teaching crew: 9 employees<br>Total: 17 employees |
| **Number of visitors** | 6,099 annually |

## 3. The Ogasawara Marine Center

The Ogasawara Marine Center was established in April of 1982 by the Tokyo Marine Environment Conservation Society, and was handed over to Ogasawara Village in April of 2001. At present, it is operated and managed by the NPO Everlasting Nature of Asia. Since its founding, the Center has focused on research into green turtles, humpback whales, and other marine life. Since April of 2006 it has focused on research, museum display work, educational/awareness campaigns, and museum installation/maintenance. The Center accepts many volunteers, trainees, and interns, whose number now exceeds 500 annually.



*Chelonia mydas* (photo:Yuji Takafuji)

● **Overview of the facility:**

| | |
|---|---|
| **Address** | Byoubutani, Chichijima, Ogasawara-mura |
| **Grounds** | 1913.43 $m^2$ |
| **Facilities** | Display area: 522 $m^2$<br>Cultivation tank: 221.43 $m^2$<br>Pump room: 32 $m^2$ |
| **Number of staff** | 1 director, 1 regular employee, 2 part-time employees<br>Total: 4 employees |
| **Number of visitors** | About 3,500 annually |

## 5.h.2 Trails, guides, signs, and explanatory printed matter

Because ferry liners serving the nominated property only allow direct access to the inhabited Chichijima and Hahajima, visitation is chiefly limited to these two islands. Based on park plans for Ogasawara National Park, walkways and roads are designed and constructed on Chichijima and Hahajima as appropriate.

### 5.h.2.1 Trails

Use of the facilities in the Natural Park:
The following trails and recreational areas are established and managed appropriately in the nominated property.

| Main trails | |
|---|---|
| • Chichijima Shore trail | This is the most popular path on Chichijima. Beginning at Kopepe Beach, it traverses the Kominato recreation area and Nakayama-toge mountain pass, and leads to John Beach. Scenic sights along the way include Nakayama-toge mountain pass and Takayama (elevation 228.5 m). Limestone formations, which are rare on Chichijima, can be seen in the John Beach area. |
| • Denshin-yama trail | Beginning at the Miyanohama Beach recreation area, this path leads to the Anijima-seto Straits along the sclerophyllous scrub-filled ridge, and reaches the Nagasaki overlook area. There are trenches and searchlights used during World War II and many other war relics. The views of Anijima, the Anijima-seto Straits, and Higashijima from Nagasaki are spectacular. |
| • Mt. Asahi trail | This route starts from Yoake Road at the east side of Mt. Asahi, cuts through a *Schima mertensiana* forest, then forks into two paths, one leading up Mt. Asahi proper (267 m) and the other up Mt. Asahi's southern ridge (272 m). Trekkers can see threatened endemic plant species like *Santalum boninense* and *Juniperus taxifolia* along the way.<br>The view of Futami Port from the overlook at the tip of the island is stunning. |

| Main trails | |
|---|---|
| • Hatsuneura trail | This path begins halfway along Yoake Road, leads through sclerophyllous scrub, and down to Hatsuneura Beach, which is the main breeding ground for green sea turtles on Chichijima. Hatsuneura Beach has a well-developed seaside forest made up of *Calophyllum inophyllum, Terminalia Catappa* and *Hernandia nymphaeifolia* trees. |
| • Minamizaki trail | This path takes visitors to the coastwise areas of Miyukinohama Beach and Nankinhama Beach as well as from Omoto Bridge to Minamizaki, the southernmost point on Hahajima. There are several side paths along the way. The side paths lead to Omoto Beach, Horaine Coast, Wai Beach, and other beaches, in addition to Kofuji, a hill (86.3 m) with a view of the southern part of Hahajima and adjacent islands. |
| • Hahajima ridge trail | This is a round route that begins from Motomachi Okimura Community area, and leads up Mt. Chibusa (462.6 m), the tallest mountain on the Ogasawara Archepelago. Many endangered endemic plant species grow along the paths, such as *Melastoma tetramerum* var. *pentapetalum and Dendrocacalia crepidifolia.* |
| **Recreation areas** | |
| • Mt. Mikazuki recreation area | This recreation area is located at Mt. Mikazuki (204 m) on the northwest side of Chichijima, close to the community area. There are toilets, and rest house. It is an excellent spot to view Futami Port and Anijima, as well as the sunset, which attract many visitors. |
| • Sakaiura recreation area | This recreation area is located at the east corner of Futami Port and noted for its beautiful seaside forest of Alexandrian laurel and tropical almond trees. The remains of the *Hinko Maru*, a ship bombed and run aground by Allied forces during the World War II, are slightly rising out of the water. |
| • Mt. Chuosan recreation area | This recreation area is at Mt. Chuosan (317.9 m), which literally means "central mountain", almost at the center of Chichijima. All of Chichijima can be viewed from its peak. Near the summit there is a rusted radar mount and a pillbox. The endangered bird *Columba janthina nitens* occurs in this area. |
| • Kominato recreation area | This area is in Kominato, which has the largest beach on Chichijima. There is a well-developed seaside forest of *Calophyllum inophyllum*, *Terminalia catappa*, and *Hernandia nymphaeifolia*. Pillow lava can be seen along the seashore, which makes the area a center for geological and topographical observation. Many tourists visit this site during the national holiday and summer vacation. |
| • Miyanohama Beach recreation area | This recreation area is on Miyanohama Beach on the north side of Chichijima facing Anijima-seto Straits. It is also the starting point for the Denshin-yama trail. Because the beach is an inlet and close to the community area, it is popular with families. The inlet is rich in coral and tropical fish, making it a popular spot for snorkeling as well. |
| • Miyukinohama Beach recreation area | Located in the center of Hahajima, the whole of Miyukinohama Beach has been made into a recreation area. It is a spot for visiting the Marine Park, gazing at adjacent islands in the Hahajima Island Group, and whale watching. Nummulites can be seen on the beach. |
| • Samegasaki recreation area | This recreation area is located in Samegasaki on the tip of Oki Port nearby the local community of Okimura. It is a good location to enjoy sunset, whale watching, or viewing adjacent islands of Hahajima. |

### 5.h.2.2 Explanations from guides, signs, and printed matter

Many private companies have begun to offer guided tours since whale watching tours began in Ogasawara in 1988. There are tours for whale watching off the waters of Chichijima and trekking on Hahajima.

There are about 25,000 visitors to Chichijima annually, 6,000 - 9,000 of which go on to visit Hahajima. Most of the tourists who visit Ogasawara join eco-tours offered by Ogasawara's tourism businesses.

There are 54 tourism business operators that offer guided tours on land and sea. Almost all businesses are individual operators. Aside from diving companies, there are few major businesses that employ multiple guides.

A number of guidebooks and pamphlets related to the nominated property have been published by public organizations. The main ones are as follows:

**Table 5-7 Publications and other sources of information related to the nominated property**

| Title | Publisher |
|---|---|
| What we can do for Ogasawara's natural environment | MOE |
| Nature Conservation Projects for Ogasawara Islands Working plans in the past and now on: For the inscription of Ogasawara Islands as World Natural Heritage | MOE |
| The illegal kayaker: Green anoles | MOE |
| Animals introduced into the Ogasawara Islands: Green anoles | MOE |
| Moving house of Michael , a feral cat (picture book) | MOE |
| Animals introduced into the Ogasawara Islands: Cane toads and bullfrogs | MOE |
| Nature we must leave for future generations: The Ogasawara Islands Forest Ecosystem Reserve | Kanto Regional Forest Office, Forestry Agency (MAFF) |
| Ogasawara's national forests: The protection of threatened wild fauna and flora | Kanto Regional Forest Office, MAFF |
| Natural Monuments of Japan | Monuments and Sites Division, Cultural Properties Department, Agency for Cultural Affairs |
| Ogasawara Nature Guide: The beauty and mystery of the oceanic Ogasawara Islands | TMG |
| Ogasawara National Park leaflet | TMG |
| *Nature of the Ogasawara Islands* "Footprints of Evolution through Immeasurable Time": Towards Inscription on the World Heritage List | TMG |

| Title | Publisher |
|---|---|
| Towards the listing of Ogasawara as a World Natural Heritage Site | Ogasawara Village |
| Eco-tourism Ogasawara | Ogasawara Village |
| Ogasawara Rulebook (2005 Edition) | Ogasawara Ecotourism Association |
| Newsletter of the Ogasawara Nature Information Center | Ogasawara Islands Natural World Heritage Nominated Property Regional Liaison Committee |
| Ogasawara ecosystem management manual for restoring the ecosystem of Ogasawara | Forestry and Forest Products Research Institute |
| The culture and nature of Ogasawara | Tokyo Metropolitan University |
| Ogasawara Nature Information Center http://ogasawara-info.jp/isan.html | MOE |
| Ogasawara Ecotourism http://www.eco-ogasawara.com/ | Ogasawara Village |

## 5.h.3 Lodging facilities

The main centers for lodging are on Chichijima and Hahajima. Camping is prohibited by the Natural Parks Law and by Ogasawara Village ordinances, so visitors to Ogasawara must stay in a lodging facility within the islands. As of August of 2008, there were 54 lodging facilities on Chichijima and 15 on Hahajima (Ogasawara Islands Branch Office, TMG, 2008).

While these lodging facilities are ideally capable of accommodating 1,100 persons per day, this capacity is sufficient due to the fact that the only way to get to the islands is by ferry, and there are a mere 25,000 people who visit the islands per year.

**Table 5-8 Number of lodging facilities and capacities**

| location | Number of lodging facility | occupancy |
|---|---|---|
| Chichijima | 54 | 1,008 |
| Hahajima | 15 | 181 |

*(Ogasawara Islands Branch Office, TMG, 2008)*

**Table 5-9 Number of lodgers**

| Year | FY2002 | FY2003 | FY2004 | FY2005 | FY2006 | FY2007 |
|---|---|---|---|---|---|---|
| Number of lodging user | 78,334 | 78,696 | 71,933 | 76,397 | 85,472 | 86,610 |
| Overnight stay in ship※ | 1,104 | 1,113 | 491 | 487 | 529 | 373 |

※ The regular liner *Ogasawara Maru*

*(Ogasawara Islands Branch Office, TMG, 2008)*

### 5.h.4 Restaurants or refreshment facilities

Outside the nominated property, there are 54 eating and drinking establishments on Chichijima and eight on Hahajima (Ogasawara Islands Branch Office, TMG, 2008).

## 5.i Policies and programmes related to the presentation and promotion of the property

Ecotourism and other ventures that benefit both nature and the community development shall be proactively pursued so as to ensure that the value of the nominated property is properly managed while sustaining people's social, productive, and economic activities in the future. In order to achieve this, awareness programs directed at visitors and service providers regarding the concept of ecotourism and its rules shall be improved further, and nature guides to facilitate these eco-tours shall continue to be trained.

In addition, information is provided to users of the nominated property about the value of nature, etc. of the Ogasawara Islands through exhibits in the visitor facilities, explanations by guides, and signs posted at major pathways and recreation areas used by visitors as listed in 5.h. above.

In Ogasawara, there are many rules that guides voluntarily abide by (i.e. "voluntary rules") when conducting eco-tours. In the Ogasawara Islands Tourism Promotion Plan (2000), Ogasawara Village places ecotourism as its center policy for encouraging tourism. Based on this plan, in 2002 the Ogasawara Ecotourism Association was founded with a membership made up of tourism-related organizations. The association created the *Ogasawara Rulebook*, which lists various self-imposed codes of conduct, as well as the "Master Plan for Ecotourism". Through these activities, the Commission explores unique modes of ecotourism for Ogasawara and asks that island residents, guides, etc. strictly follow established rules.



**Ecotourism in Sekimon** *(photo:Hiromi Umeno)*

## 5.j Staffing levels

Numbers of staff for professional, technical, and maintenance work are as follows:

**(1) The Ministry of the Environment**

| | |
|---|---|
| Kanto Regional Environment Office of Japan | |
| National park and park facilities division | 2 persons |
| Wildlife division | 2 persons |
| Ogasawara Ranger Office for Nature Conservation | 5 persons |

**(2) The Forestry Agency**

| | |
|---|---|
| Kanto Regional Forest Office | |
| Policy department | 4 persons |
| Office of the Ogasawara Islands forest ecosystem conservation | 1 person |
| Policy division | 3 persons |
| Extension division | 3 persons |
| Ministry of Land, Infrastructure, Transport and Tourism | |
| National Forests Division, Ogasawara Integrated Office | 4 persons |

**(3) The Tokyo Metropolitan Government**

| | |
|---|---|
| Natural Environment Division, Bureau of Environment | 5 persons |
| Civil Section, Ogasawara Islands Branch Office | 13 persons |
| Office of Education | 2 persons |

**(4) Ogasawara Village**

| | |
|---|---|
| General Affairs Division, Policy Office | 4 persons |
| Board of Education | 4 persons |

# 6

## *Monitoring*

6.a Key indicators for measuring state of conservation

6.b Administrative arrangements for monitoring property

6.c Results of previous reporting exercises



*Ogasawarazo lineatus* (photo:Hideaki Mori)

## 6.a Key indicators for measuring state of conservation

In order to measure the state of conservation of the nominated property, scientific studies, research and long-term monitoring is conducted to collect the basic data necessary for proper management.

The Ministry of the Environment (MOE) has set up about 1,000 monitoring sites throughout Japan to gather fundamental environmental data over the long term for the purpose of detecting and understanding adverse qualitative or quantitative changes in the country's natural environment as quickly as possible. From the standpoint of promoting sustainable management of forests, the Forestry Agency has been studying the status of trees and understory vegetation over the long term to detect any changes in biodiversity, forest ecosystem productivity, and function of forests relating to carbon cycle, by setting up about 15,700 sampling plots systematically within the country. As the Ogasawara Islands are home to six of these stations for both surveys, the islands already have in place a foundation for long-term ecosystem observation.

Table 6-1 lists the major indicators thought to be effective in evaluating the state of conservation.

## 6.b Administrative arrangements for monitoring property

For organizations in charge of monitoring, refer to the contact information for managing authorities listed in Section 8.

## 6.c Results of previous reporting exercises

Many surveys and studies of the nominated property have already been conducted. Table 6-2 presents an overview of comprehensive papers and reports from surveys and studies with regard to the state of conservation of the nominated property.



*Calanthe hoshii* (photo:Takaya Yasui)

**Table 6-1 Major indicators for measuring the state of conservation**

| Category | Contents/Indicator | Frequency | Location of Records |
|---|---|---|---|
| Climate | Weather conditions for Chichijima and Hahajima (atmospheric pressure, precipitation, temperature, humidity, wind direction / velocity, daylight hours) | Daily | Japan Meteorological Agency (JMA) |
| | Weather conditions at Mt. Hatsune, Chichijima (temperature, humidity, wind direction /velocity, amount of solar radiation, precipitation, ground temperature, amount of soil moisture) | Irregular (from Aug. 1999) | Yokohama National University |
| | Weather conditions at Anijima (atmospheric pressure, precipitation, temperature, humidity, wind direction / velocity) | Irregular (from Dec. 2006) | Tokyo Metropolitan Government (TMG) |
| | Weather conditions at Minamijima (wind direction /velocity, precipitation, ground temperature, amount of soil moisture) | Irregular (from Apr. 2002) | TMG |
| | Weather conditions at Nakodojima (temperature, precipitation, wind velocity) | Irregular | TMG |
| Geology and topography | Volcanic activity observation | | JMA |
| Plants | Population/distribution status and rehabilitation of endangered plant species (*Rhododendron boninense, Melastoma tetramerum, Calanthe hattorii*, etc.) | Annually | MOE<br>Kanto Regional Forest Office, Forestry Agency (FA / MAFF)<br>TMG |
| | Distribution survey of vegetation (National Survey on the Natural Environment) | Every five years | Biodiversity Center of Japan (BIODIC / MOE) |
| | Forests, lower layer vegetation, soil erosion, pest insects, weather damage (Forestry Resources Monitoring Program) | Every five years | FA / MAFF<br>TMG |
| | Forest survey in the protected forests (Protected Forest Monitoring Program) | Every five years | FA / MAFF |
| | Tree census in Sekimon on Hahajima (Monitoring Sites 1000; Forests / Grasslands) | Every five years | BIODIC / MOE |
| Mammals | Distribution survey of mammals (National Survey on the Natural Environment) | Every five to ten years | BIODIC / MOE |
| | Mammal survey in the protected forests (Protected Forest Monitoring Program) | Every five years | FA / MAFF |

**Table 6-1 Major indicators for measuring the state of conservation (contd.)**

| Category | Contents/Indicator | Frequency | Location of Records |
|---|---|---|---|
| Mammals | Status survey of Bonin flying fox (*Pteropus pselaphon*) | Annually | Board of Education, Ogasawara Village<br>Institute of Boninology |
| Birds | Distribution survey of birds (National Survey on the Natural Environment) | Every five to ten years | BIODIC / MOE |
| | Avian survey in the protected forest (Protected Forest Monitoring Program) | Every five years | FA / MAFF |
| | Status survey of short-tailed albatross (*Phoebastria albatrus*) | Annually | MOE<br>Yamashina Institute for Ornithology |
| | Status survey of *Columba janthina nitens* | Irregular | TMG |
| | | Annually | Kanto Regional Forest Office, FA / MAFF |
| | | Annually (Monitoring) | MOE |
| | Status survey of *Buteo buteo toyoshimai* | Irregular | Kanto Regional Forest Office, FA / MAFF |
| | | Until the end of project | TMG |
| | Status survey of *Apalopteron familiare* and *Carduelis sinica kittlitzi* | Irregular | Kanto Regional Forest Office, FA / MAFF |
| | Banding survey (*Phoebastria nigripes, Phoebastria immutabilis, Sula leucogaster* on Minamijima) | Annually | Ogasawara Islands Branch Office, TMG<br>Institute of Boninology<br>Yamashina Institute for Ornithology |
| | Terrestrial birds survey in Sekimon on Hahajima (Monitoring Sites 1000; Forests / Grasslands) | Every five years | BIODIC / MOE |
| | Seabirds survey on Mukojima Island Group (Monitoring Sites 1000; Small Islands ) | Every five years | BIODIC / MOE |
| Amphibians / Reptiles | Distribution survey of amphibians and reptiles (National Survey on the Natural Environment) | Every five to ten years | BIODIC / MOE |
| | Status of egg production of green turtles (*Chelonia mydas*) | Every five to ten years | Industry and tourism division, Ogasawara Village<br>Everlasting Nature |

| Category | Contents/Indicator | Frequency | Location of Records |
|---|---|---|---|
| | Green turtles survey in Hatsuneura and Kitahatsuneura on Chichijima, and on Minamijima (Monitoring Sites 1000; Beaches) | Annually | BIODIC / MOE |
| Freshwater fish | Distribution survey of freshwater fish (National Survey on the Natural Environment) | Every five to ten years | BIODIC / MOE |
| Insects | Distribution survey of insects (National Survey on the Natural Environment) | Every five to ten years | BIODIC / MOE |
| | Insect survey in the protected forest (Protected Forest Monitoring Program) | Every five years | FA / MAFF |
| | Status survey of endangered insects (*Cicindela bonina, Hemicordulia ogasawarensis, Indolestes boninensis, Rhinocypha ogasawarensis, Celastrina ogasawaraensis*) | Annually | MOE |
| | Status survey of beetles (endemic longhorn beetles, weevils, etc, at Shin-yuhigaoka on Hahajima) | Until end of the project | MOE |
| | Restoration monitoring for beetles on Ototojima (stag beetles in particular) | Until end of the project | MOE |
| | Restoration monitoring for insects on Mukojima | Until end of the project | Ogasawara Islands Branch Office, TMG |
| Land snails | Distribution survey of land snails (National Survey on the Natural Environment) | Every five to ten years | BIODIC / MOE |
| | Status survey of land snails on each island | Irregular | Tohoku University, Graduate School of Life Sciences |
| | Status survey of land snails on Anijima and Ototojima | Until end of the project | MOE<br>Ogasawara Islands Branch Office, TMG |
| Use | Use of Visitor Center, etc. (Number of visitors to the islands, Visitor Center, the Ogasawara Subtropical Agriculture Center, the Ogasawara Marine Center, etc.) | Annually | Ogasawara Islands Branch Office, TMG<br>Ogasawara Village |
| | Survey on use of protected forest (Protected Forest Monitoring Program) | Every five years | FA / MAFF |

**Table 6-2 Results of previous reports**

| Paper/report title | Summary | Authors/ editors | Publisher |
|---|---|---|---|
| The Nature of Ogasawara (1970) | This volume presents the results of a two-year survey (1968-1969) of the Ogasawara Islands Natural Park conducted by a joint team from the TMG and the Ministry of Welfare. The work is in two volumes: one of an exposition of nature, and the other of color photographs. A broad range of topics were surveyed, including climate, topography and geology, plants, land animals, sea animals, and culture. | Takashi Tsuyama & Shigeo Asami | Hirokawa-Shoten |
| Report on the Current State of the Natural Environment in the Ogasawara Islands, Vols. 1-3 (1980-1982) | This work, which covers a range of topics on the natural environment of the Ogasawara Islands, is an academic and comprehensive report of the contemporary state of the islands. The first year was dedicated to a study of animal status on Chichijima and Hahajima, the second to a study of endemic plant species, microorganisms in the soil, and the topography/geology of those islands, while the third year was dedicated to the plants and topography/geology of Iwoto and Kita-iwoto. | Tokyo Metropolitan University Natural Environment Research Team | Pollution Affairs Bureau, TMG |
| The Endemic Plants and Vegetation of Ogasawara (1985) | This work is a more detailed study of endemic plant species presented in the report above. It outlines the botanical and geological position of the Ogasawara Islands, and details individual endemic species (and subspecies). It also includes a distribution list of these species for the islands as well as a searchable list for the identification of species. | Mikio Ono & Kiyoshi Okutomi | Aboc Co. (Publishing) |
| Second Report on the Current State of the Natural Environment in the Ogasawara Islands (1990-1991) | This work reports on the changes to the natural environment that occurred in the decade since the previous survey. It also reports on Anijima and Ototojima, which were not included in the original report. | Ogasawara Research Committee of Tokyo Metropolitan University | Tokyo Metropolitan University |
| Minami-iwoto Wilderness Area Report (1982) | This was the first report of scientific studies of the natural environment (topography, geology, soil, flora and fauna) of the Minami-iwoto Wilderness Area. | | Nature Conservation Bureau, Environment Agency |
| Report on Natural Environment of Minami-iwoto (2008) | This is a report of natural environment survey, which was conducted on Minami-iwoto for the first time in 25 years. The survey included a wide range of items such as geology, vegetation, flora, mammals, avifauna, insects, land snails, and marine animals. | | TMG Tokyo Metropolitan University (editing) |

| Paper/report title | Summary | Authors/ editors | Publisher |
|---|---|---|---|
| Report on Natural Environment of Kita-iwoto (2009) | This work reports on animals of Kita-iwoto (forest birds, ecology of small seabirds, impact of rats on breeding behavior of birds, status of land snails, meteorological data, and vegetation). | Institute of Boninology | Natural Park Staff, Civil Section, Ogasawara Islands Branch Office, TMG |
| Ogasawara Yearly Research Bulletin Nos. 1-32 (1977-2008) | This is a collection of survey and research reports dealing with a variety of natural and social environment-related topics of Ogasawara. | | Ogasawara Research Committee of Tokyo Metropolitan University |
| Ogasawara Research Nos. 1-34 (1977-2008) | Same as above | | same as above |
| An Account of Vegetation in Japan: Okinawa and Ogasawara (1989) | A report of studies on the natural characteristics of Ogasawara, with a focus on vegetation, but also including the climate, topography, geology, soil, etc. | Akira Miyawaki (lead author) | Shibundo Co. |



*Elaeocarpus photiniaefolius* *(photo:Eri Nakajima)*



*Cyathea mertensiana* *(photo:Takaya Yasui)*

# 7

## Documentation

7.a Photographs, Image inventory and authorization table

7.b Texts relating to protective designation, copies of property management plans and extracts of other plans relevant to the property

7.c Form and date of most recent records or inventory of property

7.d Address where inventory, records and archives are held

7.e Bibliography



*Phoebastria nigripes* (photo:Keiko Ando)

## 7.a Photographs, Image inventory and authorization table

| No. | Fomat | Caption | Date | Photographer | Copyright owner (if different than photographer/ director of video) | Contact detail of copyright owner | None xclusive cession of rights |
|---|---|---|---|---|---|---|---|
| 1 | jpg | *Mandarina suenoae* | 2008 | *Hideaki Mori* | | JWRC 1) | yes |
| 2 | jpg | *Pandanus boninensis* | 2004 | *Naomi Nakagawa* | | same as above | yes |
| 3 | jpg | Elaeocarpus photiniaefolius | 2006 | *Hideyuki Chiba* | | same as above | yes |
| 4 | jpg | Chichijima Island Group | 2009 | *Hideo Maruoka* | | same as above | yes |
| 5 | jpg | Mukojima Island Group | 2008 | *Masaaki Takiguchi* | | same as above | yes |
| 6 | jpg | Boninites-series rocks in Mukojima | 2007 | *Hideo Maruoka* | | same as above | yes |
| 7 | jpg | Minami-iwoto | 2005 | *Ryuji Nakayama* | MOE 2) | MOE | yes |
| 8 | jpg | Sclerophyllous scrub | 2007 | *Hideyuki Chiba* | | JWRC | yes |
| 9 | jpg | *Morus boninensis* | 2007 | *Hideyuki Chiba* | | same as above | yes |
| 10 | jpg | Subtropical rain forest | 2006 | *Mitsuhiko Toda* | | same as above | yes |
| 11 | jpg | *Schima mertensiana* | 2006 | *Mitsuhiko Toda* | | same as above | yes |
| 12 | jpg | *Juniperus taxifolia* | 2009 | *Keita Fukasawa* | | same as above | yes |
| 13 | jpg | *Symplocos pergracilis* | 2006 | *Hideyuki Chiba* | | same as above | yes |
| 14 | jpg | *Callicarpa parvifolia* | 2006 | *Eri Nakajima* | | same as above | yes |
| 15 | jpg | *Callicarpa subpubescens* | 2008 | *Hideaki Mori* | | same as above | yes |
| 16 | jpg | *Columba janthina nitens* | 2007 | *Hideyuki Chiba* | | same as above | yes |
| 17 | jpg | Green turtle which returns to the sea after laying eggs | 2009 | *Hiroo Takahashi* | | same as above | yes |
| 18 | jpg | *Cryptoblepharus nigropunctatus* | 2009 | *Hideaki Mori* | | same as above | yes |
| 19 | jpg | *Stenomelania boninensis* | 2009 | *Hitoshi Imai* | | same as above | yes |
| 20 | jpg | Hermatypic corals | 2009 | *Yuji Takafuji* | | same as above | yes |
| 21 | jpg | *Boninthemis insularis* | 2008 | *Hideaki Mori* | | same as above | yes |
| 22 | jpg | *Indolestes boninensis* | 2007 | *Yuji Takafuji* | | same as above | yes |
| 23 | jpg | *Chlorophorus kobayashii* | 2009 | *Hideaki Mori* | | same as above | yes |
| 24 | jpg | *Boninosuccinea ogasawarae* | 2008 | *Hideaki Mori* | | same as above | yes |
| 25 | jpg | *Hirasea operculina* | 2009 | *Hideaki Mori* | | same as above | yes |
| 26 | jpg | *Mandarina ponderosa* | 2009 | *Hideaki Mori* | | same as above | yes |
| 27 | jpg | *Boninena hiraseana chichijimana* | 2006 | *Hideaki Mori* | | same as above | yes |
| 28 | jpg | *Ogasawarana discrepans* | 2009 | *Hideaki Mori* | | same as above | yes |
| 29 | jpg | Semifossil of *Mandarina* | 2008 | *Hideaki Mori* | | same as above | yes |
| 30 | jpg | *Ligia yamanishii* | 2009 | *Masaaki Takiguchi* | | same as above | yes |
| 31 | jpg | *Ligia boninensis* | 2009 | *Hideaki Mori* | | same as above | yes |
| 32 | jpg | Historic battle site | 2008 | *Yuji Takafuji* | | same as above | yes |
| 33 | jpg | *Phoebastria nigripes* | 2007 | *Tomomi Anzai* | | same as above | yes |
| 34 | jpg | *Figulus boninensis* | 2008 | *Toshio Kishimoto* | | same as above | yes |
| 35 | jpg | Sclerophyllous scrub | 2005 | *Hideo Maruoka* | | same as above | yes |
| 36 | jpg | *Claoxylon centinarium* | 2006 | *Hideyuki Chiba* | | same as above | yes |
| 37 | jpg | *Phoebastria immutabilis* | 2009 | *Masaaki Takiguchi* | | same as above | yes |
| 38 | jpg | *Apalopteron familiare* | 2009 | *Hideaki Mori* | | same as above | yes |
| 39 | jpg | *Rhinocypha ogasawarensis* | 2008 | *Hideaki Mori* | | same as above | yes |
| 40 | jpg | Ten-nohana | 2009 | *Yukihiro Haisa* | MOE | MOE | yes |
| 41 | jpg | Chichijima and Minamijima | 2007 | *Takahiro Okano* | MOE | same as above | yes |
| 42 | jpg | The Ogasawara Visitor Center | 2009 | *Masaaki Takiguchi* | | JWRC | yes |
| 43 | jpg | *Chelonia mydas* | 2009 | *Yuji Takafuji* | | same as above | yes |
| 44 | jpg | *Ogasawarazo lineatus* | 2008 | *Hideaki Mori* | | same as above | yes |
| 45 | jpg | Kita-iwoto | 2007 | *Takahiro Okano* | MOE | MOE | yes |
| 1 | DVD | Explanatory image data on the Ogasawara Natural World Heritage Nominated Property | 2009 | Ogasawara Islands Natural World Heritage Nominated Property<br>Regional Liaison Committee Secretariat<br>Scientific Council Secretariat | | 3) | no |

1) Japan Wildlife Research Center

2) Ministry of the Environment

3) Kanto Regional Environment Office, MOE / Kanto Regional Forest Office, Forestry Agency / Tokyo Metropolitan Government / Ogasawara Village

## 7.b Texts relating to protective designation, copies of property management plans and extracts of other plans relevant to the property

Appendix 4: Legal instruments of protection applying to the nominated property
Appendix 1 & 5: Management Plan and other plans applying to the nominated property

## 7.c Form and date of most recent records or inventory of property

| Article | Content | Implementing organization | Form | Date |
|---|---|---|---|---|
| Topography / geology | Geological map of Japan (1/50,000) Chichijima Rettō | Geological survey of Japan, AIST | Map | 2006 |
| | Geological map of Japan (1/20,000) Ogasawara shotō | Geological survey of Japan, AIST | Map | 2009 |
| Climate | Automated Meteorological Data Acquisition System(AMeDAS) (In order to observe weather conditions such as rain, wind, snow, observations at manned stations cover amount of precipitation, wind direction/speed, air temperature, sunshine duration. All of these elements are observed automatically.) | Japan Meteorological Agency (JMA) | http://www.data.jma.go.jp/obd/stats/data/mdrr/index.html | every 10 minutes - hours |
| | AMeDAS Annual Report (Amount of precipitation, wind direction/speed, air temperature, sunshine duration) | JMA | CD−ROM | 2008 |
| | Radar-AMeDAS rainfall | JMA | DVD | 2008 |
| Plants | Vegetation map (satellite islands around Hahajima ) (Report on the Plan for Promotion for the Nature Restoration in Ogasawara ) | Ministry of the Environment (MOE) | http://ogasawara-info.jp/pdf/h16_houkoku2/02_h16_2.pdf | 2006 |
| | Vegetation map (Chichijima, Hahajima and satellite islands around Chichijima ) (Report on the Plan for Promotion for the Nature Restoration in Ogasawara ) | MOE | http://ogasawara-info.jp/pdf/h17_houkoku/02_h17.pdf | 2007 |
| | The National Survey on the Natural Environment - Vegetation Survey, etc. | Biodiversity Center of Japan (BIODIC / MOE) | http://www.biodic.go.jp/kiso/fnd_f.html | 2001 |
| | Revised: Threatened Wildlife of Japan -Red List - Plants I (Vascular Plants) | BIODIC / MOE | http://www.biodic.go.jp/rdb/rdb_f.html | 2007 |
| | Revised: Threatened Wildlife of Japan -Red List - Plants II (Non-vascular Plants) | BIODIC / MOE | http://www.biodic.go.jp/rdb/rdb_f.html | 2007 |

| Article | Content | Implementing organization | Form | Date |
|---|---|---|---|---|
| Mammals | Distribution map<br>Report of the Distributional Survey of Japanese Animals (Mammals), The National Survey on the Natural Environment | BIODIC / MOE | http://www.biodic.go.jp/kiso/fnd_f.html | 2002 |
| | Revised: Threatened Wildlife of Japan - Red List - Mammals | BIODIC / MOE | http://www.biodic.go.jp/rdb/rdb_f.html | 2007 |
| Birds | Revised: Threatened Wildlife of Japan - Red list - Birds | BIODIC / MOE | http://www.biodic.go.jp/rdb/rdb_f.html | 2006 |
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| | Revised: Threatened Wildlife of Japan - Red - List Amphibians / Reptiles | BIODIC / MOE | http://www.biodic.go.jp/rdb/rdb_f.html | 2006 |
| Insects | Distribution map<br>Report of the Distributional Survey of Japanese Animals (Beetles), The National Survey on the Natural Environment | BIODIC / MOE | http://www.biodic.go.jp/kiso/fnd_f.html | 2002 |
| | Distribution map<br>Report of the Distributional Survey of Japanese Animals (Cicadas / Aquatic Hemiptera), The National Survey on the Natural Environment | BIODIC / MOE | http://www.biodic.go.jp/kiso/fnd_f.html | 2002 |
| | Distribution map<br>Report of the Distributional Survey of Japanese Animals (Moths / Butterflies), The National Survey on the Natural Environment | BIODIC / MOE | http://www.biodic.go.jp/kiso/fnd_f.html | 2002 |
| | Distribution map<br>Report of the Distributional Survey of Japanese Animals (Dragonflies / Damselflies), The National Survey on the Natural Environment | BIODIC / MOE | http://www.biodic.go.jp/kiso/fnd_f.html | 2002 |
| | Revised: Threatened Wildlife of Japan - Red List - Insects | BIODIC / MOE | http://www.biodic.go.jp/rdb/rdb_f.html | 2007 |

| Article | Content | Implementing organization | Form | Date |
|---|---|---|---|---|
| Arachnida / Myriapoda | Revised: Threatened Wildlife of Japan - Red List - Arachnida / Myriapoda | BIODIC / MOE | http://www.biodic.go.jp/rdb/rdb_f.html | 2006 |
| Land and freshwater mollusks | Distribution map<br>The National Survey on the Natural Environment<br>Report of the Distributional Survey of Japanese Animals (Land / Freshwater Mollusks) | BIODIC / MOE | http://www.biodic.go.jp/kiso/fnd_f.html | 2002 |
| | Revised: Threatened Wildlife of Japan - Red List - Land / Freshwater Mollusks | BIODIC / MOE | http://www.biodic.go.jp/rdb/rdb_f.html | 2007 |
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| | Revised: Threatened Wildlife of Japan - Red List - Brackish / Freshwater Fish | BIODIC / MOE | http://www.biodic.go.jp/rdb/rdb_f.html | 2007 |
| Crustaceans | Revised: Threatened Wildlife of Japan - Red List - Crustaceans, etc. | BIODIC / MOE | http://www.biodic.go.jp/rdb/rdb_f.html | 2006 |



**Kita-iwoto** *(photo:MOE)*

## 7.d Address where inventory, records and archives are held

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### ● Makino Herbarium, Tokyo Metropolitan University

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### ● Koishikawa Botanical Gardens, Botanical Gardens, Graduate School of Science, The University of Tokyo

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(Note: English translations of titles in Japanese are tentative, unauthorized, and only for information purposes)

## 2 Description

### 2.a Description of Property

#### 2.a.1 Geological features


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*Phoebastria nigripes* *(photo:Takaya Yasui)*

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OGASAWARA ISLANDS





# Appendix 1

**Management Plan applying to the nominated property**

1-1 : Ogasawara Islands Management Plan

1-2 : Ogasawara Islands Ecosystem Conservation Action Plan

# *1-1. Ogasawara Islands Management Plan*

***(English translation for World Heritage nomination)***

January 2010

Ministry of the Environment
Forestry Agency
Agency for Cultural Affairs
Tokyo Metropolitan Government
Ogasawara Village
Japan

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# 1. Introduction

The Ogasawara Islands, located in the northwestern Pacific Ocean to the south of the Japanese Archipelago, consist of sporadically distributed islands extending approximately 400 km from north to south. Each component island is an oceanic island that, since time of origin, has never been connected by land to the continent. The Ogasawara Islands were uninhabited until 1830 and were therefore called the "Bonin Islands" ("bonin" derives from the Japanese word meaning no inhabitation). The ecosystems of these oceanic islands have been preserved very well.

The Ogasawara Islands were formed by island arc volcanic activities approximately 48 to 44 million years ago. In no other place in the world is it is possible to observe on-land records of the initial stages of-island arc formation at the subduction zone of oceanic tectonic plates. In addition, the organisms of the Ogasawara Islands have diverse origins. Not only have many endemic species been produced through unique evolutionary processes, but many of these species still survive today, providing the opportunity for us to observe their ongoing evolutionary processes.

In recognition of the value of the natural environment of the Ogasawara Islands, which feature globally rare ecosystems and geologic characteristics, and to pass this environment on to future generations as the common property of all humanity, the Ogasawara Islands Management Plan (hereafter referred to as the "Management Plan") has been prepared and is presented herein.

# 2. Basic Information of the Plan

## 1) Objectives of the Management Plan

The objectives of the Management Plan are to clarify basic policies concerning the enforcement of various conservation and management instruments and to promote appropriate and smooth conservation and management of the natural environment of all the Ogasawara Islands (for the purpose of this Management Plan, the phrase "Ogasawara Islands" refers to the Ogasawara Archipelago, the Kazan Island Group (known as Volcano Islands), Nishinoshima Island, and the surrounding marine area), including the area constituting the natural property nominated for inscription on the World Heritage List (hereafter referred to as the "nominated property"). The Ministry of the Environment, the Forestry Agency, the Agency for Cultural Affairs, the Tokyo Metropolitan Government, and Ogasawara Village (hereafter referred to as the "management authorities") are responsible for the various instruments for conservation and management of the natural environment.

For the conservation and management of the Islands, the management authorities aim to achieve close mutual communication and cooperation with other administrative agencies, the residents of the Ogasawara Islands, business stakeholders engaged in tourism, agriculture, and fishery, researchers, nonprofit organizations (NPOs), visitors including tourists, and other stakeholders (hereafter referred to collectively as "stakeholders").

## 2) Scope of the Management Plan

The nominated property is composed of all the islands of the Ogasawara Archipelago excluding Chichijima and Hahajima, most parts of Chichijima and Hahajima, as well as the whole islands of Nishinoshima, Kita-iwoto, and Minami-iwoto.

For the purpose of conservation and management of the natural environment of the nominated property, actions such as the removal of the impacts of alien species need to be taken. Because most of these actions must be implemented integrally without distinction between the nominated property and its surroundings, this Management Plan covers the entire Ogasawara Islands including the nominated property, surrounding land, and marine areas, in addition to ship navigation routes.

The geographical area covered by this Management Plan is shown in the figure below, together with the area that is nominated for inscription on the World Heritage List.

## 3) Goal and Target Period of the Management Plan

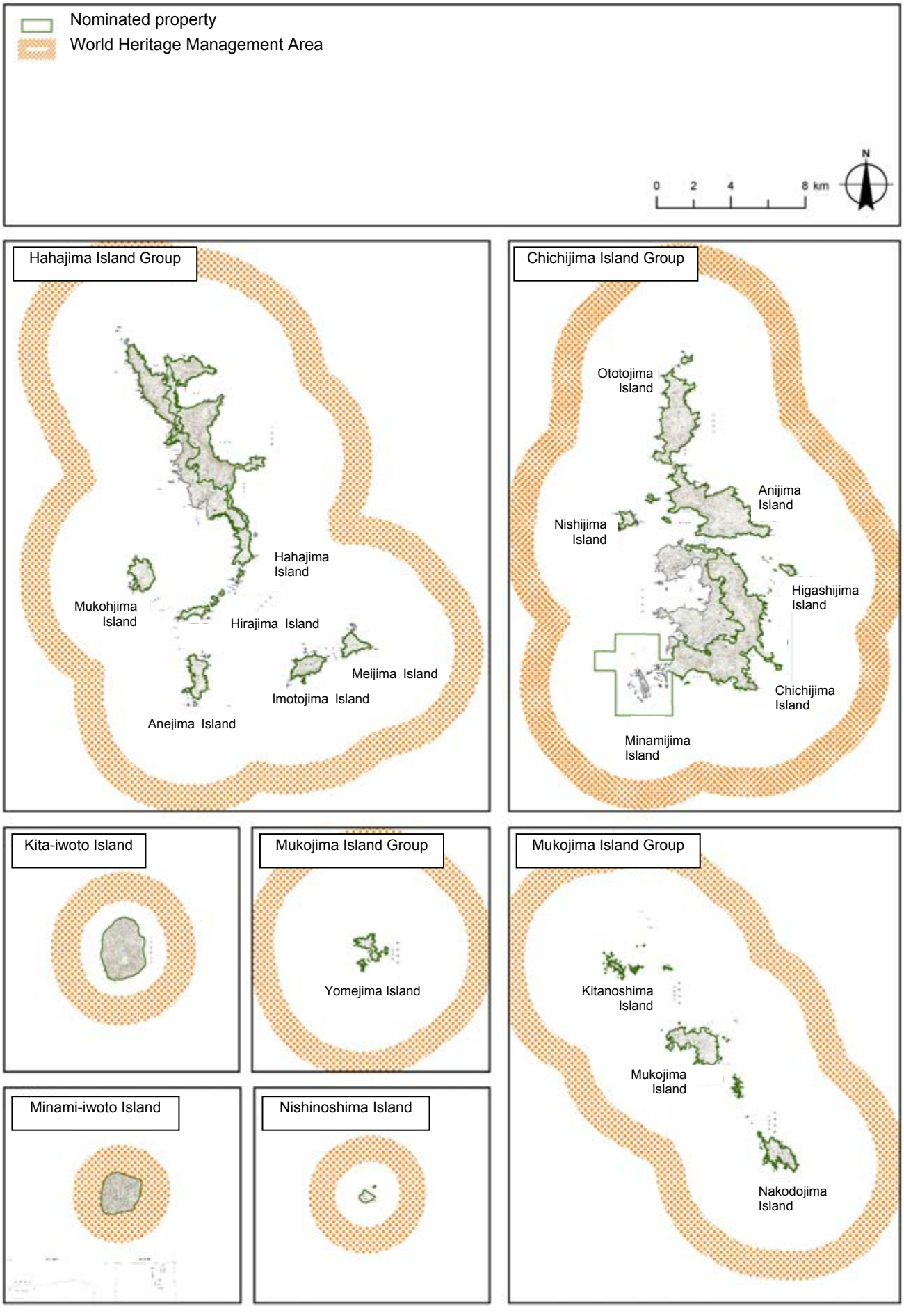
This Management Plan contains management measures necessary to achieve the overall management goal. It sets out activities to be implemented over the next 5 to 10 years to achieve long-term goals. The plan will be reviewed and revised as necessary, in response to changes in the natural environment and social circumstances.

## 4) Relation with the Action Plan and Other Plans

The Action Plan is a detailed plan under the Management Plan that complements the Management Plan. The Action plan demonstrates the priority sequence and process of short-term targets and activities.

Individual plans based on different laws created by each management authority and individual project implementation plans shall take into account the Management Plan and Action Plan. Consolidated planning framework shall therefore be established.

Fig. 1-1 World Heritage Management Area



# 3. Overview of the Ogasawara Islands

## 1) Location of the Ogasawara Islands

The Ogasawara Islands lie in the northwestern Pacific to the south of the Japanese Archipelago, with Chichijima Island, located approximately 1,000 km from Tokyo, and other islands sporadically distributed over 400 km from north to south. The islands are divided into the Ogasawara Archipelago (consisting of the Chichijima Island Group, the Hahajima Island Group, and the Mukojima Island Group), and the Kazan Island Group and surrounding isolated islands such as Nishinoshima. Chichijima, the home of the local government office of Ogasawara Village, is located at 27°40'N latitude, 142°1' E longitude. The central point of Hahajima is located at 26°0'N latitude, 142°44' E longitude.

## 2) General Information

The Ogasawara Islands are oceanic islands located 1,000 km away from the main islands of Japan. Geologically, the islands are unique in the world in that they provide a rare opportunity to directly observe, on land, the normally hard-to-observe phases of the development of an oceanic island arc. Their large areas of exposed rock strata tell the tectonic story from the beginning of plate subduction 48 million years ago, through transitional periods, and into a stable phase 40 million years ago. The islands are the subject of the world's latest research into the development of island arcs, and are extremely valuable from a scientific perspective in that they provide insights into the evolutionary history of the earth, especially the mechanisms behind the formation of continents.

Biologically and ecologically, the Ogasawara Islands are peculiar island ecosystems with many endemic species as a result of unique processes of adaptive radiation and speciation on the oceanic islands formed in the way mentioned above. The Ogasawara Islands preserve the common characteristics of isolated oceanic islands, and offer the opportunity to witness the ongoing evolutionary process of speciation. They are also valuable as one of the few isolated land masses in the northwest Pacific Ocean region conserving globally significant species, making it very important to maintain this characteristic island ecosystem.

The Ogasawara Islands are protected by designation as a Wilderness Area under the Nature Conservation Law, a National Park under the Natural Parks Law, a Natural Monument under the Law for the Protection of Cultural Properties, a Forest Ecosystem Reserve under the National Forests Administration and Management Bylaw, and a National Wildlife Protection Area under the Wildlife Protection and Appropriate Hunting Law. As a result, the characteristic topological and geological features and unique ecosystems of these oceanic islands are securely conserved.

## 3) Natural Environment

### i) Geology

The Ogasawara Islands make up an oceanic island arc that was formed on an oceanic crust (Fig. 2-1). The Izu-Ogasawara (Bonin) Arc, on which the Ogasawara Archipelago and the Kazan Island Group rest, is an island arc-trench system extending 1,500 km in length that was formed along the eastern edge of the oceanic Philippine Sea plate as a result of the subduction of the Pacific plate 48 Ma (Ma: *megaannum*, or million years ago). The Izu-Ogasawara Arc is one of the most studied in terms of geophysics, geology, and petrology because of its scientific importance as a typical example of an oceanic island arc.

Within the geological features of the Izu-Ogasawara Arc, a continuous history of island arc growth, from its birth to the present date, is recorded in the form of changes in Chemical magma composition and volcanic activity. In addition, midlle crust, origin of continental crust, has been formed beneath the arc, which demonstrates the ongoing evolution procees from an oceanic island arc to a continent.

The geology of the Ogasawara Islands exhibits the typical growth process for an oceanic island arc, from the formation of the subduction zone until settling into a steady state, which is the why the islands provide an evolutionary record of how continental crust formed and grew on the earth.

### ii) Climate

The nominated property belongs to a relatively warm subtropical climatic zone. Because both the annual and diurnal temperature ranges are small and the level of humidity is high, the climate there is considered to have maritime nature. The mean annual temperature of Chichijima in the nominated property is 23.0° C. The mean temperature of the coldest month (February) is 17.7° C, and the mean of the hottest month (August) is 27.6° C. The mean annual precipitation is 1,276.7 mm. As for precipitation by month, February receives the least (61.4 mm) and May receives the most (174.4 mm).

The nominated property is located at the center of the Ogasawara High that develops at the western edge of the North Pacific High. Because of this, the area is slightly affected by typhoon raifall, and the amount of precipitation is low. In the summer months, the amount of evaporation exceeds that of precipitation, and the soil and topographic conditions are characterized by shallow soils and precipitous coast areas, so the soil moisture condition becomes extremely dry in this season. In addition, because of the differences in elevation and wind direction whithin the nominated property, there is a wide range of climatic characteristics seen locally. As an example, cloud belts develop at the elevated area of relatively tall Minami-iwoto.

iii) Plants

Many oceanic islands of the world are tropical, but the nominated property is located in a milder subtropical zone. For this reason, it has many plant species that have origins in the subtropical regions of Southeast Asia, such as *Schima mertensiana*, *Planchonella obovata*, *Elaeocarpus photiniaefolius*, *Rhaphiolepis indica* var. *umbellata*, *Distylium lepidotum*, *Syzygium buxifolium*, and *Ardisia sieboldii*. In addition, there are many northern species that have originated in the mainland of Japan, such as *Stachyurus praecox* var. *macrocarpus* and *Rubus nakaii,* as well as southern species including *Meterosideros boninensis* and *Santalum boninense*. These species with diverse origins are a characteristic feature of the property and have achieved unique speciation, so despite the islands being oceanic and of small size, there are many plant species and the proportion of endemic species is high. A total of 138 families, 445 genera, and 745 species of vascular plants (including subspecies, and varieties) have been recorded, of which, 441 are native, and 161 are endemic.

The typical vegetation of the nominated property includes sclerophyllous scrub that adapted to dry climates, and subtropical rainforest that occurs in cloud belts at high elevations.

Sclerophyllous scrub is a forest composed of the shrubs and small trees range in height from around five to eight meters. Three types of sclerophyllous scrub communities can be seen covering the relatively gentle slopes atop Chichijima and Anijima: Distylio-Pouterietum dubiae, *Distlium lepidotum* variant of Machilus kobu-Schimetum mertensianae, and *Osteomeles lanata* association (sclerophyllous scrub), the latter being one of the plant communities in rocky desert on a continent. On Hahajima Island Group, *Pittosporum parvifolium* var. *beecheyi*, endemic to this island group, grows in the sclerophyllous scrub of Wikstroemio-Pouterietum dubiae dominated by *Planchonella obovata* var. *dubia*, *Rhaphiolepis indica* var. *umbellata* and other such species. These characteristic sclerophyllous scrubs of the Hahajima Island Group have formed on steep slopes, ridges, and wind-beaten terrain with poorly developed soil

In the Sekimon locality of Hahajima, the Pisonio-Elaeocarpetum photiniaefoliae subtropical rainforest community grows to a height of 20 m or so. It contains many plants of Southeast Asian origin, such as *Elaeocarpus photiniaefolius*, *Pisonia umbellifera*, *Ardisia sieboldii*, *Planchonella obovata Morus boninensis*, *Celtis boninensis* and *Melia azedarach*. The forests dominated by *Ardisia sieboldii* and *Schima mertensiana* are the Machilus boninensis-Ardisietum sieboldii and are spread over a large area in Hahajima. Sclerophyllous shrubs of Dendrocacalietum crepidifoliae dominated by *Dendrocacalia crepidifolia* (Asteraceae), the species endemic to the Ogasawara Islands, occur on the steep slopes and wind-beaten terrain in the cloud belts of Hahajima.

iv) Animal

【Terrestrial animals】

The structure of the fauna on Ogasawara Islands is quite distinctive: some taxa are completely absent, or conversely proportions of certain taxa are large. These phenomena account for the extremely disharmonic biological communities typical of oceanic islands. As for the terrestrial fauna on the Ogasawara Islands (except birds, which can migrate relatively easily), there are only one mammal species, the Bonin flying fox (*Pteropus pselaphon*), two reptile species, the Ogasawara snake-eyed skink (*Cryptoblepharus nigropunctatus*) and the Micronesian gecko (*Perochirus ateles*), and no amphibians.

On the other hand, it is clear that the area is characterized by an abundance of endemic species and subspecies that evolved on the islands.

BirdLife International has recognized the islands as one of the Endemic Bird Areas of the World, because they are the habitats for the endemic Ogasawara Islands honeyeater (*Apalopteron familiare*) and the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*). The five regions of the nominated property is identified as Important Bird Area. Matsudaira's storm-petrel (*Oceanodroma matsudairae*) breeds only on one island in the world, Minami-iwoto, although it has wide home range from the African coast through Southeast Asia to the western Pacific Ocean. The black-footed albatross (*Phoebastria nigripes*) breeds on both the Ogasawara Islands and Hawaiian Islands, but the Hawaii group differs genetically from the one which breeds in the Ogasawara Islands. These examples show that the Ogasawara Islands are important habitats for wider-ranging seabirds as well.

106 native species of land snails have been recorded, of which 100 are endemic. For the insect fauna, 1,380 species have been recorded to date, 379 of which are endemic species (with an endemic ratio of 27.5%). There are a large number of beetles in particular, 442 species are recorded. Further, as a result of evolution unique to each island or island group, the islands are home to many insect species, such as *Chlorophorus kusamai*, which is endemic to Mukojima Island Group, *Morion boninense*, which is endemic to Hahajima Island, and *Satozo minamiiwoensis*, endemic to Minami-iwoto Island.

In addition, with respect to freshwater animals, 40 fish species, 17 gastropod species, nine shrimp species, seven crab species, and six hermit crab species have been reported. These include some peculiar species whose life histories were marked by transitions from coastal waters to brackish water or from brackish water to fresh water, making the Ogasawara Islands a valuable area to study the evolutionary processes from saltwater to fresh water.

【Marine animals】

With regard to marine fauna, although 23 whale species, 795 fish species, 1031 gastropod species, and 226 hermatypic coral species have been reported

around the coastal waters of the Ogasawara Islands, barriers such as ocean currents and distance from continental coasts have limited the number of species. Most of the component species arrived at the islands coincidentally. In addition, fewer endemic species of marine animals are generally seen in small areas compared with terrestrial animals. However, in areas separated from large land masses by large distances, such as the Ogasawara Islands, a number of endemic species exist, most notably those that inhabit coastal and brackish water environments.

Among these, six families and 23 species of whales have been recorded in waters adjacent to the Ogasawara Islands. Eighty-six known species of cetaceans exist in the world. Excluding the four species that spend their entire lives in freshwater, 82 species are found in the world's oceans. This means that about 30% of all Cetacean species inhabit waters adjacent to the Ogasawara Islands. These species represent nearly all cetacean species that are distributed or migrate in the subtropical waters of the North Pacific. The number of species is comparable to that observed in the Gulf of California, the Gulf of Mexico, and the coastal waters of the Hawaiian Islands and Ryukyu Islands, indicating that the waters off the nominated property are an important habitat for cetaceans.

## 4) Social Environment

### i) History of human settlement

The Ogasawara Islands are traditionally said to have been discovered in 1593 by Sadayori Ogasawara. The first settlements on the Ogasawara Islands were established on Chichijima in 1830 by five Westerners and about ten Pacific Islanders, mainly from the Hawaiian Islands. Surveys and pioneering efforts by the Edo Shogunate and later by the Meiji government of Japan followed. In 1876, the islands were internationally recognized as Japanese territory.

In the late Taisho and early Showa Periods, from the 1920s to the 1930s, the subtropical climate was exploited to grow fruits and maintain a supply of vegetables during winter. The fishery industry grew, with bonito, tuna, whales, and coral as the chief products. At its height during these periods, the population of the islands exceeded 7,000 people.

In 1944, as the tide of the Pacific War turned against Japan, all island residents (6,886 persons) except for military personnel were forcibly evacuated to the mainland of Japan.

In 1945, after the end of the war, Ogasawara was placed under the control of US military forces and island residents of Western descent were allowed to return to the island. The islands were returned to Japan in 1968, after which Japanese former island residents began to return. On August 20, 1970, the Ogasawara Islands Reconstruction Plan was announced, based on the Act on Special Measures for the Ogasawara Islands Reconstruction (enacted in December, 1969). The Plan included the land use plan, which designated the areas for residents, agriculture, and nature conservation. Approximately 2,400 people now live on the islands of Chichijima and Hahajima.

### ii) Visitors

The only way to get to the islands is by boat. Most commonly, visitors take the *Ogasawara Maru* ocean liner, a journey that takes about 25.5 hours one way from Tokyo Takeshiba Pier to Chichijima. Under this condition, about 25,000 people visit the islands per year.

### iii) Major economic activities

The main industries of the Ogasawara Islands are tourism, agriculture, and fisheries. For tourism, appropriate use of nature has been promoted through ecotourism. Out of 25,000 tourists per year, approximately 16,000 people visit Ogasawara for its unique ecosystems and the beautiful sea. On the other hand, farming in the area takes advantage of the warm climate to produce agricultural products such as fruits and vegetables, and inshore fishing mainly of swordfish has been conducted.

### iv) Land ownership

National forest, which is under the authority of the Forestry Agency, accounts for about 80% of the

nominated property. Other than the national forest, the property includes state-owned land administered by the Ministry of Finance, the Ministry of the Environment (MOE), etc., and land owned by the Tokyo Metropolitan Government (TMG) and Ogasawara Village, as well as privately owned land.

# 4. Management Goals and Basic Principles

## 1) Management Goals

The management authorities and stakeholders share the overall goal stated below.

■Overall goal

The Ogasawara Islands are a globally precious place that records the evolutionary processes of the Earth and life. They illustrate the formation process of a marine island arc, which was the origin of the continental crusts characterized by unique ecosystems consisting of endemic species in the ongoing evolutionary process of adaptive speciation. Through proper understanding of this place of outstanding universal value, and with co-existence between nature and people, the exceptional natural environment of the Ogasawara Islands shall be passed on in sound condition to future generations.

## 2) Basic Principles

To achieve this overall goal, the management authorities will implement systematic management of the entire Ogasawara Islands area, with the understanding and proactive cooperation of all stakeholders, based on the basic principles listed below.

### (1) Conservation of the Outstanding Natural Environment

#### i) Conservation of "evidence" of the process of oceanic island arc formation

The Ogasawara Islands are the only area where the development process of an oceanic island arc, which triggered the formation of continental crusts, can be observed from its formation to the present day. Topographical and geological features of the Ogasawara Islands including boninite, dike, pillow lava, and sulfide ore deposits will be protected by appropriate enforcement of protective instruments. These resources will protected also by raising awareness to promote adequate understanding of their values among stakeholders such as island residents.

#### ii) Conservation of endemic species, threatened species, and unique ecosystems

The management authorities will protect the endangered endemic species that have evolved on the Ogasawara Islands, the unique ecosystems that have developed on individual islands, and the breeding sites for various marine species and subtropical seabirds by introducing appropriate protection systems and conservation and management measures.

Thus, conservation and management measures shall focus on removing factors such as alien species that adversely affect the mechanisms of the islands' unique ecosystems, protecting endemicity on a genetic level, and conserving the ecosystems over the long term.

### (2) Removal and Avoidance of Impacts of Alien Species

#### i) Promotion of alien species countermeasures based on integrated ecosystem management

Since 1830 when the first settlers arrived, the Ogasawara Islands have been affected by the combined impacts of alien species deliberately or accidentally brought to the islands by the movements of island residents and government or economic activities.

It is now known that once an environment has allowed alien species to enter and establish certain direct or indirect interspecific relationships, such as an ecological food chain or symbiosis, expelling only the specific alien species can increase the number of other alien species or adversely affect the endemic species that have become dependent on the expelled alien species. Therefore, it is crucial to adaptively manage the islands' ecosystems by monitoring any change in the ecological dynamics among all species after implementing alien species countermeasures.

Thus, the alien species countermeasures introduced on the Ogasawara Islands shall not include only the expulsion of specific alien species. Rather, efficient and effective measures aimed at removing the adverse effects of the alien species will be implemented based on knowledge and methodologies for sound conservation obtained through the study of regionally different and complex interspecific relationships.

#### ii) Prevention of the introduction and dispersion of new alien species

In addition to removing pre-existing alien species, prevention of the introduction and dispersion of new alien species is also important. Prevention of the introduction and dispersion of new alien species must be promptly undertaken by all management authorities and stakeholders, such as island residents, visitors, and businesspeople as part of their daily activities on the Ogasawara Islands.

Therefore, all people on the Ogasawara Islands must recognize how their activities may risk introducing alien species that adversely affect island ecosystems and act appropriately to avoid or reduce this risk to prevent the introduction and dispersion of new alien species.

### (3) Harmony between Daily Life of Humans and Nature

#### i) Environmental considerations when implementing individual projects

When conducting projects and research, including conservation and management measures, on the Ogasawara Islands, not only the alien species but also all possible risks shall be adequately considered, and projects shall be carefully and meticulously conducted to avoid any detrimental effects to the unparalleled natural environment.

### ii) Lifestyle and livelihood in harmony with nature

Lifestyle and livelihood in harmony with the islands' natural environment will be promoted. This measure will focus on island residents to ensure that they adequately appreciate the value of the outstanding natural environment of the Ogasawara Islands, consider the natural environment in daily or commercial activities, and actively participate in ecosystem conservation and management activities. At the same time, island residents will be able to enjoy the benefits of these measures.

## (4) Adaptive Conservation and Management

### i) Adequate monitoring and information

Preliminary data will be obtained before introducing any conservation and management measure, and monitoring will be carried out to detect any change of the natural environment after implementing such a measure. Thus, it will be possible to implement adaptive conservation and management activities that utilize the information obtained from monitoring results based on the island-specific long-term goals described in this document.

In addition to long-term monitoring of ecosystem dynamics and continuous implementation of alien species measures for some species, the growing concern about the effects of climate change on World Heritage sites must be taken into account. Therefore, a long-term continuous monitoring program will be implemented to determine the effects of climate change.

### ii) Scientific approach and consensus building

To implement conservation and management measures for the Ogasawara Islands in an adaptive manner, each step of a conservation and management measure needs to be scientifically evaluated. For this purpose, scientific advice will be obtained from the Ogasawara Islands Natural World Heritage Nominated Property Scientific Council (hereafter referred to as the Scientific Council), established in 2006. Research findings and recommendations will be shared with the management authorities, and the measures will be continuously implemented.

On the other hand, to effectively implement conservation and management activities, not only the management authorities concerned, but also all island residents need to understand, agree upon, and participate in the conservation activities. For this purpose, mutual understanding will be promoted for issues that require coordination with the life of residents etc. via the Ogasawara Islands Natural World Heritage Nominated Property Liaison Committee (hereafter referred to as the Regional Liaison Committee), established in 2006 to serve as a liaison and coordinate between the management authorities and stakeholders.

# 5. Management Measures

## 1) Proper Enforcement of Protective Instruments

To conserve and manage the outstanding natural environment of the Ogasawara Islands, which includes exceptional geological and topographical features of island arc formation and unique ecosystems composed of endemic or threatened plants and animals, the management authorities will engage in mutual collaboration and obtain understanding and cooperation from stakeholders to enforce the protective instruments described below.

### (1) Wilderness Areas

Wilderness Areas are designated and administered by the Minister of the Environment based on the Nature Conservation Law. Its purpose is to provide necessary protection for virgin natural environments of a significant scale without being influenced by human activities. In these wilderness areas, acts that may affect the conservation of the natural environment, such as constructing, reconstructing, or expanding buildings or other structures, felling trees and bamboos, collecting animals and plants, collecting fallen leaves and branches, and making fire, are prohibited, except for special cases such as scientific research. For areas where human entry is likely to cause impact on the environment, strict conservation measures, such as designating these areas as Restricted Entry Zones, will be implemented.

Minami-iwoto, one of the Ogasawara Islands, has been designated as the Minami-iwoto Wilderness Area since 1975, and the entire Minami-iwoto area became a Restricted Entry Zone in 1983 to statutorily protect the pristine ecosystems unique to the oceanic island.

### (2) National Parks

National Park is a designation that protects places of natural scenic beauty and promotes their utilization for the purposes of the health, recreation and education of the people, as well as ensuring the conservation of biodiversity. The Minister of the Environment designates and manages National Parks based on the Natural Parks Law.

National Parks are operated according to park plans, which divide parks into different classification, including Special Zones for areas of preserving their distinguished state of nature, Special Protection Zones within Special Zones for such areas of most stringent protection for their sate of virgin nature, Marine Park Zones for such areas of characteristic seabed topography and of rich marine fauna and flora, and Ordinary Zones for protection of integrated landscape and seascape with above-mentioned zones. Each zone has certain restrictions that apply.

In a Special Zone, permission from the Minister of the Environment is required for acts such as constructing, reconstructing or extending structures, felling trees and bamboos, mining minerals, extracting soil and stones, clearing land or changing the feature of land, and collecting designated plants. In a Special Protection Zone, in addition to the acts listed above, acts such as collecting and capturing plants and animals, collecting fallen leaves or branches, and making fire require permission from the Minister of the Environment. In a Marine Park Zone, permission from the Minister of the Environment is required for acts such as collecting and capturing tropical fish and coral, and changing the feature of the seabed. In an Ordinary Zone, acts such as constructing large-scale structures beyond a certain limit and reclaiming the surface of the sea require sending a notification to the Minister of the Environment.

Most of the terrestrial area of the Ogasawara Islands was designated as Ogasawara National Park in 1972 based on the Natural Parks Law. Most parts of the islands are designated as Special Protection Zones, which are the most stringently protected areas, or Class I Special Zones, where protective measures similar to these of Special Protection Zones are taken.

There are 51 families and 138 species of vascular plants, including endemic species such as *Rhododendron boninense* and *Callicarpa parvifolia*, which are legally protected from collection or damage as “designated plants” within the Special Zone. In the same way, the endemic damselfly (*Indolestes boninensis*) and the endemic dragonfly (*Hemicordulia ogasawarensis*) are protected as “designated animals” and their capture or harm are restricted.

These measures statutorily conserve unique topographical and geological features, plants, and animals, including endemic or threatened species, and the habitat environments of these species.

### (3) Forest Ecosystem Reserves

Forest Ecosystem Reserve is a designation for areas of primitive natural forests representative of forest zones in Japan that exist in a reasonably large scale. Its purpose is to maintain the natural environment of the forest ecosystem, protect plants and animals, preserve genetic resources, develop forest operation and management technique, and promote scientific research etc. In its planned administration and management of the national forests based on the Law on the Administration and Management of National Forests, the Forestry Agency designates and administers the reserve as stated in National Forest Operation Plan, created in accordance with the National Forests Administration and Management Bylaw which stipulates details on plan creation for the actual administration and management activities of each region.

In 1994, the eastern coast of Hahajima was designated forest ecosystem reserve. Then, in 2007, after a review of the areas covered by the system, the area was expanded to cover national forests on nearly all of the main and subsidiary islands of the Ogasawara Islands (aside from areas being used for public works projects), in order to conserve the

unique forest ecosystems of the Ogasawara Islands for future generations. Forest Ecosystem Reserve now covers more than 80% of the nominated property.

The Preservation Zone subcategory in Forest Ecosystem Reserve includes the area where the typical biota as well as endemic and threatened species is found. Its purpose is to maintain, restore, and properly preserve forest ecosystems in their original form. This designation allows for acts deemed necessary based on established scientific evidence to preserve or restore endemic diversity or forest ecosystems, but in principle dictates that the area is left to follow its course of nature, without human interference.

The Conservation and Utilization Zone subcategory is designed as a buffer zone that prevents the direct influence of external environmental changes that might affect the forest ecosystem of the Preservation Zone. As a general rule, the Conservation and Utilization Zone aims to conserve and restore forest ecosystems of the same quality as the Preservation Zone and is thus treated in a similar manner. Additionally, the use of forests is permitted for educational and other purposes to the extent that such use does not adversely affect its function.

These areas represent approximately 70% of the entire (land) area covered by the Management Plan, which systemically conserves the forest ecosystem that sustains biological communities and endemic and threatened species etc.

### (4) National Wildlife Protection Areas

National Wildlife Protection Areas are designated by the Minister of the Environment based on the Wildlife Protection and Appropriate Hunting Law to protect wildlife of national and international importance. The purpose is to provide protection to wildlife and enforce appropriate requirements on hunting, thereby ensuring the conservation of biodiversity that in turn enables people to enjoy the blessings and benefits of nature. Hunting is prohibited in Wildlife Protection Areas. In addition, the areas where the protection of wildlife and their habitats is deemed especially necessary are designated as Special Protection Areas and permission must be obtained from the Minister of the Environment to carry out certain development acts.

The Ogasawara Islands National Wildlife Protection Area was designated in 1980 because of the islands' status as habitats for threatened wildlife, such as the endemic subspecies of Eurasian buzzard (*Buteo buteo toyoshimai*), the Bonin honeyeater (*Apalopteron familiare*), the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*), the endemic greenfinch (*Carduelis sinica kittlitzi*), and the albatrosses. In 2009, the area was renewed with extension as Ogasawara Archipelago National Wildlife Protection Area to include the surrounding marine area. Nishinoshima was designated as a National Wildlife Protection Area in 2008 because it is a breeding ground for the colonies of the masked booby (*Sula dactylatra*), the Tristram's storm-petrel (*Oceanodroma tristrami*), the great crested tern (*Thalasseus bergii*), and others. Kita-iwoto and its surrounding marine area were designated as a National Wildlife Protection Area in 2009, because of its importance as habitats or a breeding site for seabirds including the red-footed booby (*Sula sula*) and the red-tailed tropicbird (*Phaethon rubricauda*). As described above, most areas of the Ogasawara Islands and marine areas surrounding the islands have been designated as a national wildlife protection area, and birds including seabirds and animals including the Bonin flying fox (*Pteropus pselaphon*) are statutorily protected.

### (5) National Endangered Species of Wild Fauna and Flora

National Endangered Species of Wild Fauna and Flora are the designated species of wild fauna and flora that are in danger of extinction based on the Law for the Conservation of Endangered Species of Wild Fauna and Flora. It is therefore illegal to capture, harm, kill, collect, damage, transfer, etc. these species, except for activities such as scientific research for which permission is obtained. Conservation program defined by the law will be implemented, including activities such as breeding and habitat maintenance, as necessary to preserve National Endangered Species of Wild Fauna and Flora.

Of the wildlife on the Ogasawara Islands, one species of mammals, the Bonin flying fox (*Pteropus pselaphon*) (designated in December 2009), five species of birds including the albatrosses, the endemic subspecies of the Eurasian buzzard (*Buteo buteo toyoshimai*) and the Japanese wood-pigeon (*Columba janthina nitens*), five species of insects including an endemic tiger beetle (*Cicindela bonina*), and 12 species of plants including *Rhododendron boninense* and *Callicarpa parvifolia*, have been designated as National Endangered Species of Wild Fauna and Flora. Conservation programs as defined by the Law for the Conservation of Endangered Species of Wild Fauna and Flora have been drawn up for 19 species, including the wood-pigeon and the endemic orchid (*Calanthe hattorii*), by the Minister of the Environment and the heads of national administrative agencies, and these programs are being implemented. For the Bonin flying fox, designated as national endangered species in 2009 (designated in December), the conservation program is currently being prepared.

Conservation and management of these species within their habitats will be conducted in coordination with the conservation programs defined by the law for the Conservation of Endangered Species of Wild Fauna and Flora and the Management Plan.

Table 1-1 List of designated species in the conservation program defined by the law for the Conservation of Endangered Species of Wild Fauna and Flora

| Group | Species |
|---|---|
| Plant | *Hymenasplenium cardiophyllum* |
| | *Piper postelsianum* |
| | *Pittosporum parvifolium* |
| | *Melastoma tetramerum* |
| | *Rhododendron boninense* |
| | *Symplocos kawakamii* |
| | *Callicarpa parvifolia* |
| | *Ajuga boninsimae* |
| | *Crepidiastrum grandicollum* |
| | *Calanthe hattorii* |
| | *Calanthe hoshii* |
| | *Malaxis boninensis* |
| Birds | *Phoebastria albatrus* |
| | *Columba janthina nitens* |
| Insects | *Indolestes boninensis* |
| | *Rhinocypha ogasawarensis* |
| | *Hemicordulia ogasawarensis* |
| | *Cicindela bonina* |
| | *Celastrina ogasawaraensis* |

### (6) Natural Monuments

Natural Monuments are designated by the Minister of Education, Culture, Sports, Science and Technology based on the Law for the Protection of Cultural Properties. Its purpose is to protect animals or plants (including their habitats, breeding sites, stopover points for migratory birds and native habitats) and geological minerals (including areas of unique natural phenomenon) which have significant scientific value for the country. Acts which change the current state of Natural Monuments or affect their preservation require permission from the Commissioner of the Agency for Cultural Affairs.

Of the animals that occur on the Ogasawara Islands, one mammal species of the Bonin flying fox, (*Pteropus pselaphon*), four bird species including the Bonin honeyeater (*Apalopteron familiare*) (a special natural monument) and the endemic subspecies of Japanese wood-pigeon, 10 insect species including *Celastrina ogasawaraensis* and *Boninthemis insularis*, and a land snail group (including 12 families such as Helicinidae and Euconulidae), as well as two other species have been designated as National Natural Monuments. The entire area of Minami-iwoto is a Nature Protection Area and designated as a National Natural Monument, and the submerged karst at Minamijima is also designated as a National Natural Monument for its geological features and minerals. The protective instruments described above statutorily protect the outstanding natural environments that sustain unique land snails and topographical or geological characters showing adaptive divergence radiation.

### (7) Systems Related to Alien Species Measures

According to the Invasive Alien Species Act, animals and plants introduced into Japan from overseas that harm or may harm ecosystems are designated as “Invasive Alien Species”.

Among alien species that are found in the nominated property, the green anole, the cane toad, the American bullfrog, and the predatory flatworm (*Platydemus manokwari*) have been designated as Invasive Alien Species, and pursuant to the above Act the importation, rearing, growing, storage, transport, etc. of these species are restricted.

## 2) Strategic Conservation of Ecosystems by Island

Various activities focused on alien species countermeasures have been initiated by the management authorities on the Ogasawara Islands. Based on the results of these activities, the management authorities will continue effective conservation of Ogasawara ecosystems through cooperation and close coordination of stakeholders based on long-term goals and activities.

As a short-term strategy, an Ecosystem Conservation Action Plan under the Management Plan has been evaluated and prepared. The action plan presents short-term targets, priorities, and details of countermeasures based on knowledge of interspecific relationships that vary by island. Ecosystem conservation and management measures, including alien species countermeasures, will be appropriately and systematically implemented based on this action plan. (Interspecific relationships on Anijima are described below as an example.)

### ◊ Strategic conservation of ecosystems by island based on interspecific interactions

The Ogasawara Islands are composed of many small oceanic islands, and island-specific species differentiation has occurred such that each island has its own ecosystem and unique species composition. In addition, relationships between humans and the environment, changes in the relationships, and the effects of alien species have affected each island differently. Therefore, each island is taken as a base unit, and island-specific goals and activities have been defined for each island. Ecosystem conservation and management measures will be implemented based on these individual goals and directions.

For the ecosystem conservation and management, knowledge and expertise will be developed, and by focusing on island-specific complex interspecific relationships, changes in interspecific relationships that accompany project implementation on each island will be estimated. Based on these estimates, efficient and effective measures will be implemented, including measures to protect endemic species and remove the adverse effects of alien species, concurrently or alternately.

### ◊ Ecosystem conservation with a focus on the movement of wide-ranging species between islands

Ecosystems on the Ogasawara Islands are influenced by and connected to each other in a complex manner by flying mammalian, avian, and insect species and by the "flying" seeds of plant species.

Flying animals, including the endemic subspecies of Japanese wood-pigeon, Bonin flying fox, albatrosses, seabirds, and endemic dragonflies, migrate among islands and play important roles in the ecosystems of oceanic islands (e.g., by seed dispersal or "seeding"). To preserve these flying creatures and sustain their roles, including seeding, and to conserve and manage the entire Ogasawara Islands region, the adverse effects of alien species must be eliminated, and breeding sites and habitats must be preserved in coordinated efforts among islands.

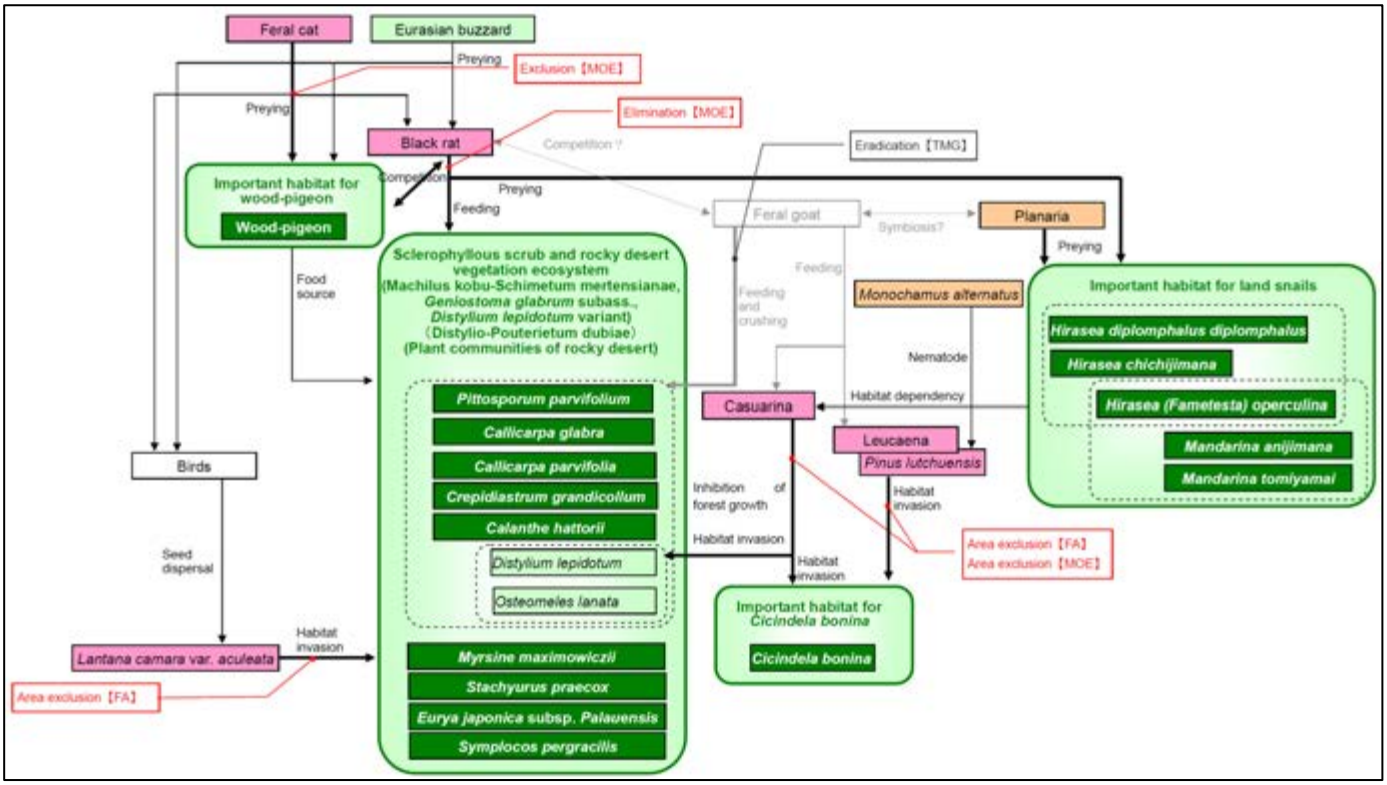



Fig. 1-2 Interspecific Relationship by Island (Example of Anijima Island)
MOE: Ministry of the Environment, FA: Forestry Agency, TMG: Tokyo Metropolitan Government
Refer to the Ogasawara Islands Ecosystem Conservation Action Plan (page 12) for the original figure.

## (1) Chichijima Island（Chichijima Island Group）

### (i) Existing condition

Chichijima is the largest island of the Ogasawara Islands and has diverse environmental aspects including a mountain peak of approximately 300 m above sea level. This island is home to more than 80% (129 species) of all endemic plant species on the Ogasawara Islands. Dense sclerophyllous scrubs, distributed from the Higashidaira and Mt. Chuosan region to the Yoakedaira and Nagasaki region, are important habitat for various threatened endemic plants and animals and are important for conservation of biodiversity on Chichijima.

Chichijima also provides important habitats for the endemic subspecies of Japanese wood-pigeon and Bonin flying fox. The southern and eastern regions of the island have important habitats for endemic land snails although adverse effects of alien species have been noted.

### (ii) Long-term goals

- ●To conserve sclerophyllous scrubs and other ecosystems
- ●To conserve *Schima mertensiana* forests and other ecosystems
- ●To conserve the habitats of the endemic subspecies of Japanese wood-pigeon, with the goal of stabilizing the habitation of this species in combination with actions to be implemented on the other islands
- ●To conserve the habitats of land snails.
- ●To conserve the habitats of the Bonin flying fox, with the goal of stabilizing the habitation of this species in combination with actions to be implemented on the other islands

### (iii) Activities

*Conservation of sclerophyllous scrub and* Schima mertensiana *forest*【target area: Y / H / S】*

The sclerophyllous scrub vegetation in the entire Higashidaira region, where Chichijima's original vegetation is still well preserved, will be appropriately conserved. In *Schima mertensiana* forests, which are widely distributed in the central to southern parts of the island, conservation and management measures such as elimination of alien species will continue to be conducted in an adaptive manner, considering already established interspecific relationships. Feral goats are the major impact factor. Expulsion of goats will be conducted (e.g., by setting up fences) in conservation priority areas of endemic plant species. In addition, alien plants such as Casuarina and Bischofia will be eliminated mainly in important regions for conservation, and sclerophyllous scrub and *Schima mertensiana* forest will be conserved.

For endemic plants such as *Rhododendron boninense*, *Symplocos kawakamii*, *Pittosporum parvifolium*, *Melastoma tetramerum*, and *Calanthe hattorii*, habitat conservation will involve the continuation of periodic patrols, monitoring, and alien species measures that build on already obtained results.

*Habitat conservation for wood-pigeon*【H / S】

A sanctuary to conserve important habitat for the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*) has already been established in Higashidaira by the Forestry Agency. Various protective measures are being employed, such as securing water holes and conducting patrols. Other additional measures to recover and conserve the wood-pigeon breeding grounds and habitat will include a preliminary exclusion of feral cats, for example by setting up fences, and the removal of other alien species impacts.

Because the wood-pigeon moves among islands, including Hahajima, Anijima, and Ototojima, unified conservation measures will be conducted for habitats in all these areas with the aim of achieving steady habitation.

*Habitat conservation for land snails*【S / Y】

The southern region and Yoakedaira are important habitat for land snails such as *Mandarina chichijimana*, which are valuable in ecological and evolutionary biology studies. In these regions, measures will focus on preventing the introduction of predatory flatworm and conserving the habitat of existing land snails.

*Habitat conservation for the Bonin flying fox*

Chichijima has the largest population of the Bonin flying fox (*Pteropus pselaphon*) in Ogasawara. This species is designated as a National Endangered Species of Wild Fauna and Flora and a Natural Monument and legally protected.

Their main habitat overlaps with areas of human activities including farmlands and residential areas. Various conservation issues exist, including entanglement in nets set up to protect against crop damage by the flying fox. Groups of Bonin flying foxes use group gregarious resting sites especially in winter, which is assumed to be related to their breeding behavior; thus, conservation of resting sites is very important for conservation of the species. However, concerns have been raised that tourists' coming too close to roosts or feeding sites may have adverse effects.

For this situation, conservation measures for this species should be created assuming co-existence with humans in the same place. The population of this endemic animal is continuously monitored, and activities such as selecting suitable agricultural nets and correct installation methods, and providing these instructions to farmers in nearby areas are currently carried out to reduce entanglement in nets. In addition, the bat resting sites were designated as a Designated Special Protection Area of a Special Protection Area of a Wildlife Protection Area in 2009 and activities

which may impact the species, such as taking photographs, are now prohibited. Henceforth, building awareness among farmers as well as farmer-support measures will continue to be carried out and measures that allow for coexistence and coordination of conservation and ecotourism use within the resting site and its surroundings will be promoted.

As this species was designated as the National Endangered Species of Wild Fauna and Flora in 2009, the conservation program defined by the Law for the Conservation of Endangered Species of Wild Fauna and Flora will be created for the species to achieve steady habitation on Ogasawara Islands and collection of scientific information and habitat maintenance will be promoted for conservation of this species, in addition to the measures mentioned above.

*Habitat conservation for endemic insects*

Habitat conservation for endemic insects will be promoted by area exclusions of the green anole and cane toad, and re-colonization by insects flying from nearby islands such as Anijima is anticipated.

*Other measures*

At Futami Port, the gateway to the Ogasawara Islands, and nearby areas, an intensive campaign will be conducted to reduce green anole numbers to a low-density level and prevent them from spreading to peripheral islands.

For all of Chichijima, countermeasures against cats, including those in residential areas, will be prepared based on the action plan established by the Ogasawara Cat Liaison Committee. Based on the action plan, cat -keeping codes will be enforced to decrease the number of feral cat supply sources. In addition, programs to catch feral cats will be continuously carried out in mountain areas around the designated exclusion zone.

Coordinated feral goat measures covering all of Chichijima are currently being prepared; the elimination will be based on evaluations of elimination methods. Henceforth, continuous implementation of strategic elimination will be conducted to promptly reduce the population to a low-density level, with the ultimate aim of island-wide eradication.

**Target area codes:【H】Higashidaira and Mt. Chuosan region,【Y】Yoakedaira and Nagasaki region,【S】Southern region*

## (2) Anijima Island（Chichijima Island Group）

### (i) Existing condition

Anijima has a dry climatic condition. This island supports the largest sclerophyllous scrub forests among the Ogasawara Islands, as well as rocky desert plant communities. Of the vascular plants on the island, approximately 41.3% (95 species) are endemic. Rare endemic plants and animals inhabit Anijima, including the tiger beetle *Cicindela bonina*, which is found only on Anijima, and a number of land snails. The level of human-induced disruption is also lower than that on other islands.

### (ii) Long-term goals

- To conserve sclerophyllous scrub and other ecosystems as well as the habitats of *Cicindela bonina*
- To conserve the habitats of land snails
- To conserve the habitats of the endemic subspecies of Japanese wood-pigeon with a view to stabilizing the habitation of this species in combination with actions to be implemented on the other islands

### (iii) Activities

*Conservation of sclerophyllous scrub*

Among alien animals, feral goats, which had been the main impact factor for sclerophyllous scrub vegetation, have nearly been eradicated. Now, elimination of the black rat targeting its eradication is planned. Appropriate conservation measures will also be carried out for the sclerophyllous scrub including rocky desert vegetation and natural *Schima mertensiana* forests distributed in surrounding hollows and ravine bottoms through the removal of impact factors, including the black rat, and monitoring.

In addition, the habitats of precious endemic animal and plant species, including *Cicindela bonina*, *Crepidiastrum grandicollum*, and *Callicarpa parvifolia*, will be conserved by eliminating invasive plants such as *Casuarina*, focusing on areas where suppressive pressure by alien species is anticipated, and maintaining rocky desert vegetation.

*Habitat conservation for land snails*

Anijima is an important habitat for many land snails, such as *Mandarina anijimana*, which are important for ecological and evolutionary biology studies. Elimination of the black rat, which is believed to cause grazing damage, is planned, targeting its eradication. However, the black rat is also a known food of the endemic subspecies of Eurasian buzzard; thus, careful and adequate measures are being conducted under continued monitoring.

*Habitat conservation for wood-pigeon*

Anijima is one of the habitats of the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*). Wood-pigeon habitat is being conserved by excluding feral cats, which are assumed to inhabit the wood-pigeon habitat in small numbers. In addition, because the wood-pigeon moves among islands such as Chichijima and Ototojima, unified conservation measures are being conducted in these habitats with the goal of achieving steady habitation.

### (iv) Verification model focusing on interspecific interaction

An Ecosystem Conservation Action Plan has

been prepared for the Ogasawara Islands focusing on interspecific interactions in all islands and regions based on the results etc. of various surveys and studies. On the basis of this action plan, ecosystem conservation measures are being promoted.

A typical ecosystem of Anijima is sclerophyllous scrub, and Anijima is one of the important islands for conservation. However, multiple alien species have been identified that required urgent measures. Therefore, comprehensive monitoring surveys have been conducted on Anijima, and a verification model focused on interspecific interaction is being developed. Based on this model, conservation measures are being developed through estimation, implemented, evaluated, and improved. Using this proactive approach, carried out on Anijima as a model, efficient and effective measures will be developed considering interspecific interactions and adaptation for all the other islands and regions.

### (3) Ototojima Island (Chichijima Island Group)

#### (i) Existing condition

Ototojima has a moderately humid climate and relatively rich soil compared to the other islands of the Chichijima Island Group. *Schima mertensiana* forests are widely distributed on Ototojima. These forests provide the habitats and breeding sites for biological communities of woodland. Ototojima is currently the only island that has all five dragonfly species endemic to Ogasawara, including *Indolestes boninensis*. In addition, a pure population of *Morus boninensis* is also found on the island.

#### (ii) Long-term goals

- To conserve *Schima mertensiana* forests and other ecosystems
- To conserve the habitats of endemic dragonflies
- To conserve the habitats of the endemic subspecies of Japanese wood-pigeon with a view to stabilizing the habitation of this species in combination with actions to be implemented on the other islands

#### (iii) Activities

*Conservation of* Schima mertensiana *forests*

Activities such as exclusion of alien species will continue to be conducted in an adaptive manner in highly natural forests of *Schima mertensiana* that occupy a large area of Ototojima, particularly in the central part of the island, considering already established interspecific relationships..

Extensive invasion by Bischofia was a concern. However, this species has been eradicated at the early stage of its invasion. Now, feral goat, black rat, and Casuarina will be eliminated. However, as the black rat is a food source of the endemic subspecies of Eurasian buzzard, an appropriate approach is required.

In addition, the forests will be conserved as the habitats of other endemic species such as *Morus boninensis*.

*Habitat conservation for endemic insects including five endemic-species of dragonfly*

Bullfrogs and feral pigs, which likely impacted endemic dragonfly species, have been eradicated. Endemic insect habitats will be conserved by removing alien impacts while conducting ongoing monitoring. Additional measures include preventing desiccation of waterside areas that serve as dragonfly breeding grounds.

*Habitat conservation for wood-pigeon*

Ototojima includes the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*) habitat, which is being conserved by removing the impact of feral cats.

Because the wood-pigeons move to other islands such as Chichijima and Anijima, unified conservation measures will be implemented to attain steady habitation.

### (4) Nishijima Island (Chichijima Island Group)

#### (i) Existing condition

Nishijima is one of the peripheral islands of Chichijima and has a relatively small total area. Endemic plant species including *Cirsium boninense*, and various endemic land snails have been found on this island. As feral goats have been eradicated, ecosystems recovery is expected on the island.

#### (ii) Long-term goals

- To conserve ecosystems of native vegetation as a long-term effort

#### (iii) Activities

*Ecosystem management considering endemic species*

Endemic species such as land snails still inhabit Nishijima. For conservation of endemic species, elimination of alien species such as black rats, Casuarina species, and Leucaena will be conducted in an adaptive manner considering the already developed interspecific relationships on the island.

In addition, ecosystems of this island will be conserved as the habitats of endemic plants such as *Cirsium boninense*.

### (5) Higashijima Island (Chichijima Island Group)

#### (i) Existing condition

Although Higashijima is a peripheral island of the Chichijima group and has a relatively small total area, it provides the breeding grounds for seabirds such as Audubon's shearwater (*Puffinus lherminieri bannermani*), an endemic breeding subspecies of the Ogasawara Islands, and the wedge-tailed shearwater (*Puffinus pacificus*). As feral goats and black rats have been completely eliminated, ecosystem recovery is expected.

(ii) Long-term goals

- To conserve the breeding sites of seabirds
- To conserve the ecosystems of native vegetation as a long-term effort

(iii) Activities

*Conservation of seabird breeding grounds*

To conserve the breeding grounds of seabirds such as Audubon's shearwater (*Puffinus lherminieri bannermani*), the wedge-tailed shearwater (*Puffinus pacificus*), and Bulwer's petrel (*Bulweria bulwerii*) that currently breed on Higashijima, monitoring and follow-up measures will be conducted following the elimination of black rats, which preyed on seabirds.

*Ecosystem management considering endemic species*

For conservation of endemic species still inhabiting the island, measures such as elimination of alien plants will be conducted in an adaptive manner considering the already established interspecific relationships.

Habitats and colonies of endemic plants such as *Lobelia boninensis* and *Ixeris longirostra* will be conserved.

## (6) Minamijima Island (Chichijima Island Group)

(i) Existing condition

Minamijima is one of the peripheral islands of Chichijima. The island has a relatively small total area. It is formed of elevated coral reef containing limestone and has characteristic drowned karst topography. The island also provides breeding grounds for seabirds including the wedge-tailed shearwater (*Puffinus pacificus*). Feral goats have been eradicated and its vegetation is starting to recover. Minamijima is used for ecotourism in accordance with the applicable rules for appropriate use.

(ii) Long-term goals

- To conserve the breeding sites of seabirds
- To conserve the ecosystems of native vegetation as a long-term effort

(iii) Activities

*Conservation of seabird breeding grounds*

To conserve the breeding grounds of seabirds such as the wedge-tailed shearwater (*Puffinus pacificus*) and Bulwer's petrel (*Bulweria bulwerii*) that breed on Minamijima, appropriate conservation will be promoted by elimination of alien species such as the black rat, which creates predation pressure on seabirds, with continued monitoring, and by complying with the current utilization rules to avoid impacts from human use.

*Ecosystem management considering endemic species*

For conservation of endemic species still inhabiting the island, elimination of alien plants such as *Cenchrus echinatus* will be continued in an adaptive manner, considering already established interspecific relations. Approaches such as limiting utilization will also be enforced.

Conservation of the island also protects the habitats of endemic and threatened plants such as *Lobelia boninensis*, *Ixeris longirostra*, and *Lycium sandwicense*.

## (7) Hahajima Island (Hahajima Island Group)

(i) Existing condition

Hahajima is the second largest island after Chichijima among the Ogasawara Islands. It has a humid climate, including a cloud belt that forms at a mountain peak approximately 400 m above sea level. Under this climatic condition, a subtropical rainforest, vegetation unique to Hahajima has developed in the Sekimon region, and *Ardisia sieboldii* forests cover a large area of the island. Various endemic plants and animals including *Procris boninensis* and *Celastrina ogasawaraensis* inhabit these areas of advanced forest vegetation. In addition, this island also provides important habitats for the endemic subspecies of Japanese wood-pigeon.

(ii) Long-term goals

- To conserve subtropical rainforest and other ecosystems
- To conserve *Ardisia sieboldii* forest and other ecosystems
- To conserve the sclerophyllous scrub typical of the Hahajima Island Group and other ecosystems
- To conserve the habitats of endemic insects such as *Celastrina ogasawaraensis*
- To conserve the breeding sites and habitats of *Carduelis sinica kittlitzi* and seabirds
- To conserve the habitats of the endemic subspecies of Japanese wood-pigeon with a view to stabilizing the habitation of this species in combination with other actions to be implemented on the island
- To conserve the habitats of land snails

(iii) Activities

*Conservation of subtropical rainforest,* Ardisia sieboldii *forest, and sclerophyllous scrub typical of the Hahajima Island Group*【S / NC / M】*

Activities such as exclusion of alien species will continue in an adaptive manner considering the already established interspecific relationships in the following areas: subtropical rainforest covering the entire area of Sekimon, where Hahajima's original vegetation is still well preserved; the *Ardisia sieboldii* forest and the *Schima mertensiana* forest, which occupy a large area and widely distributed in the north-central part of the island.

Among these activities, minimizing the impact of Bischofia, the major impact factor, is particularly important. Bischofia elimination is being strategically carried out.

In addition, conservation of the island protects the habitats of threatened and endemic plants, including *Piper postelsianum*, *Claoxylon centinarium*, *Morus boninensis*, *Hymenasplenium cardiophyllum*, *Dendrocacalia crepidifolia*, and *Calanthe hoshii*, and animals, such as endemic land snails.

In the Minamizaki region, which tends to be a relatively dry part of Hahajima, sclerophyllous scrub typical of the Hahajima Island Group is found, similar to on many of the peripheral islands of Hahajima. To conserve existing endemic species such as land snails, considering already established interspecific relationships, alien species such as Casuarina will continue to be eliminated.

*Habitat conservation for endemic insects including* Celastrina ogasawaraensis【S / NC / M】

Although the green anole has impacted the endemic insects of Hahajima, precious endemic insects such as *Celastrina ogasawaraensis*, *Parnara ogasawarensis*, and *Rhinocypha ogasawarensis* still inhabit the island. Area exclusions of the green anole, as well as of the cane toad, have already been carried out. Conservation measures for the food plants of these insects have also been conducted. As these activities continue and expand, the existing habitat for endemic insects on the island will be conserved.

*Habitat conservation for* Carduelis sinica kittlitzi *and seabirds*【M】

Feral cats have been removed from certain areas of the Minamizaki region, which is an important habitat for *Carduelis sinica kittlitzi* and seabirds such as the wedge-tailed shearwater (*Puffinus pacificus*). As feral cat expulsion continues and expands, seabird habitat will be conserved.

*Habitat conservation for wood-pigeon*【S / NC】

In the Sekimon region, an important habitat for the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*), no major impact by alien species has been observed to date. However, because wood-pigeons move between the Hahajima and Chichijima island groups, impacts of feral cats and other alien species will be removed to achieve steady wood-pigeon habitation within the Ogasawara Islands as a whole.

*Habitat conservation for land snails*【S / NC / M】

On Hahajima, the entire southern area around Minamizaki, the ridge area including the Sekimon region, and the western coastal area are important habitat for land snails. By removing the impacts of alien species such as black rats and by continuing to conduct monitoring, habitat for the characteristic land snails will be conserved.

*Other measures*

As a preventive measure to keep predatory flatworm (*Platydemus manokwari*) from invading Hahajima from Chichijima, visitors' shoe soles will continue to be completely cleaned when they board and disembark from the *Hahajima Maru*, a cargo–passenger boat connecting the islands. Information will continue to be provided to raise public awareness of this issue.

Feral cat measures for all of Hahajima, including residential areas, will be prepared based on the action plan established by the Ogasawara Cat Liaison Committee. Based on the action plan, appropriate rules for keeping domestic cats will be enforced to reduce the number of feral cat sources. Catching activities will also continue in mountain areas around the designated exclusion zone for feral cats.

**Target area codes:【S】Sekimon region, 【NC】North-Central region, 【M】Minamizaki region*

## (8) Mukohjima Island (Hahajima Island Group)

### (i) Existing condition

Mukohjima, one of the peripheral islands of Hahajima, is surrounded by sea cliffs and has a very dry environment. It includes the sclerophyllous scrub typical of the Hahajima Island Group, which has been preserved in a good condition, with little apparent disturbance by human influences or alien species. The island is also extremely important as a habitat for endemic plants including *Symplocos boninensis*, which grows only in this island. In addition, the endemic subspecies *Carduelis sinica kittlitzi* inhabits Mukohjima, and the endemic subspecies of Japanese wood-pigeon has also been identified.

### (ii) Long-term goals

- To conserve the sclerophyllous scrub typical of the Hahajima Island Group and other ecosystems
- To conserve the habitats of *Carduelis sinica kittlitzi* and the Bonin honeyeater (*Apalopteron familiare*)

### (iii) Activities

*Conservation of sclerophyllous scrub typical of the Hahajima Island Group*

To conserve the sclerophyllous scrub typical of the Hahajima Island Group, which remains in good condition, the impacts of alien species such as Casuarina will be removed in an adaptive manner considering already established interspecific relationships. In addition, the forest will be conserved as the habitats of endemic plants such as *Symplocos boninensis*.

*Habitat conservation for endemic birds*

Mukohjima is an important habitat for endemic birds such as *Carduelis sinica kittlitzi* and the Bonin honeyeater (*Apalopteron familiare*). The habitat will be conserved by excluding the impacts

of alien species and by continued monitoring.

### (9) Anejima Island (Hahajima Island Group)

(i) Existing condition

Anejima is a peripheral island of Hahajima. It is a long island, stretching from north to south. Forests originating from forestation by early settlers are still widely distributed, and sclerophyllous scrub typical of the Hahajima Island Group also occurs on the island. Endemic plants including *Juniperus taxifolia* and *Euonymus boninensis* inhabit this island.

(ii) Long-term goals

- To conserve the sclerophyllous scrub typical of the Hahajima Island Group and other ecosystems

(iii) Activities

*Conservation of sclerophyllous scrub typical of the Hahajima Island Group*

Sclerophyllous scrub typical of the Hahajima Island Group is distributed on the plateau. This scrub forest will be conserved through activities such as removing the impacts of alien species such as Casuarina in an adaptive manner, considering already established interspecific relationships.

In addition, the forest will be conserved as the habitats of endemic plants such as *Juniperus taxifolia*, *Lobelia boninensis*, and *Euonymus boninensis*.

### (10) Imotojima Island (Hahajima Island Group)

(i) Existing condition

Imotojima, a peripheral island of Hahajima, is the most humid island among the relatively dry peripheral islands. It includes the sclerophyllous scrub typical of the Hahajima Island Group, which has been preserved in a good condition, with little apparent disturbance by human influences or alien species. This island is important as a habitat for endemic plants and includes species such as *Crepidiastrum linguifolium*, *Crepidiastrum ameristophyllum*, and *Ajuga boninsimae*. Endemic terrestrial birds including *Carduelis sinica kittlitzi* have also been identified on this island.

(ii) Long-term goals

- To conserve the sclerophyllous scrub typical of the Hahajima Island Group and other ecosystems
- To conserve the habitats of *Carduelis sinica kittlitzi* and the Bonin honeyeater (*Apalopteron familiare*)

(iii) Activities

*Conservation of sclerophyllous scrub typical of the Hahajima Island Group*

To conserve the sclerophyllous scrub typical of the Hahajima Island Group, which remains in good condition, the impacts of alien species such as Leucaena will be removed in an adaptive manner considering already established interspecific relationships.

In addition, the forest will be conserved as the habitats of endemic plants such as *Crepidiastrum linguifolium*, *Crepidiastrum ameristophyllum*, and *Ajuga boninsimae*.

*Habitat conservation for endemic birds*

Imotojima is an important habitat for endemic birds such as *Carduelis sinica kittlitzi* and the Bonin honeyeater (*Apalopteron familiare*). Their habitats will be conserved by excluding the impacts of alien species and by continued monitoring.

### (11) Meijima Isalnd (Hahajima Island Group)

(i) Existing condition

Meijima is a peripheral island of Hahajima with a highly dry environment. sclerophyllous scrub typical of the Hahajima Island Group is widely distributed on the island, which is inhabited by endemic plants including *Crepidiastrum linguifolium*. This island is also a habitat for endemic dragonflies including *Boninagrion ezoin* and *Boninthemis insularis*.

(ii) Long-term goals

- To conserve the sclerophyllous scrub typical of the Hahajima Island Group and other ecosystems

(iii) Activities

*Conservation of sclerophyllous scrub typical of the Hahajima Island Group*

Sclerophyllous scrub typical of the Hahajima Island Group is distributed on the plateau of Meijima. To conserve the scrub forest, which remains in good condition, the impacts of alien species such as Leucaena will be removed in an adaptive manner considering already established interspecific relationships.

In addition, the forest will be conserved as the habitats of endemic plants such as *Juniperus taxifolia*, *Lobelia boninensis*, and *Crepidiastrum linguifolium*, and endemic insect fauna.

### (12) Hirajima Island (Hahajima Island Group)

(i) Existing condition

Hirajima is a peripheral island of Hahajima. It has a relatively small total area and is the closest island to Hahajima. Bischofia has been eradicated. Endemic plants including *Lobelia boninensis* also inhabit the *Miscanthus boninensis* community distributed along the edges of the island.

(ii) Long-term goals

- To conserve the native vegetation and other ecosystems as a long-term effort

(iii) Activities

*Ecosystem management considering endemic species*

To conserve endemic species still inhabiting the island, the impacts of other alien species will be removed in an adaptive manner considering already established interspecific relationships. This activity will be accompanied by ongoing monitoring.

### (13) Mukojima Island (Mukojima Island Group)

(i) Existing condition

Although feral goats used to inhabit Mukojima, their eradication has been completed. Now, grassland vegetation covers most parts of the island; some areas of *Ardisia sieboldii* forest and other plants are distributed at various locations on the island. Insect species endemic to Mukojima, including *Chlorophorus kusamai* and *Tamamushia virida fujitai* (an endemic subspecies), inhabit these forests.

In addition, the black-footed albatross (*Phoebastria nigripes*) and the Laysan albatross (*Phoebastria immutabilis*) breed on Mukojima and Torishima. In addition to them, the short-tailed albatross (*Phoebastria albatrus*) once bred there, and the sub-adult individuals of the species are still observed flying in from outside the island. Efforts to create a new albatross breeding site are currently underway. This island is therefore an important breeding ground for albatrosses.

(ii) Long-term goals

- To conserve *Ardisia sieboldii* forest and other ecosystems
- To conserve the breeding sites of three species of albatross

(iii) Activities

*Ecosystem management of* Ardisia sieboldii *forest and other habitat types*

On Mukojima, ecosystem management of *Ardisia sieboldii* forest and other habitat types will be carried out in an adaptive manner.

Feral goats, a major impact factor, have been eradicated, and other alien species will also be eliminated, including black rats, Leucaena, and alien bamboo and dwarf bamboo species; these species are inhibiting factors for forest recovery.

*Habitat conservation for endemic insects*

Mukojima is an important habitat for endemic insect species of the Mukojima Island Group, such as *Chlorophorus kusamai* and *Tamamushia virida fujitai* (a Mukojima subspecies), both of which are forest insects. Therefore, insect habitat will be conserved by removing the impacts of alien species.

*Conservation and creation of breeding grounds for three albatross species*

Mukojima and the adjacent island of Torishima are breeding grounds of two species of albatross, the Laysan albatross (*Phoebastria immutabilis*) and black-footed albatross (*Phoebastria nigripes*). On Mukojima, following the Albatross Protection and Breeding Project Plan, continuous activities have been carried out to create a new breeding ground for the short-tailed albatross (*Phoebastria albatrus*) that formerly bred on the island. Toward the goal of steady breeding and habitation by the three albatross species, overgrowth by alien plants will be removed and the site will be conserved to serve as a persistent breeding ground.

### (14) Kitanoshima Island (Mukojima Island Group)

(i) Existing condition

Kitanoshima, a peripheral island of Mukojima, includes much sloped land. Most of the island is covered by natural grassland that includes endemic plants such as the endemic thistle (*Cirsium boninense*). The island has not been invaded by feral goats and rats and it provides good breeding grounds for seabirds including the wedge-tailed shearwater (*Puffinus pacificus*).

(ii) Long-term goals

- To conserve the breeding sites of seabirds
- To conserve the native vegetation and other ecosystems

(iii) Activities

*Conservation of seabird breeding grounds*

Kitanoshima is an important breeding ground for seabirds such as the wedge-tailed shearwater (*Puffinus pacificus*) and Bulwer's petrel (*Bulweria bulwerii*). Ongoing monitoring is being conducted to conserve their breeding grounds.

*Ecosystem management considering endemic species*

For conservation of endemic species currently inhabiting the island, suppressing factors will be excluded in an adaptive manner considering already established interspecific relationships.

### (15) Nakodojima Island (Mukojima Island Group)

(i) Existing condition

Nakodojima is one of the peripheral islands of Mukojima. It has a concave landscape with cliffs on its eastern and western edges. This island was once inhabited by feral goats, however, they have already been eradicated. Although forest vegetation is distributed at the eastern end of the island, soil erosion has occurred in some parts of the island, and soil erosion prevention measures have been initiated. In addition, the island provides breeding grounds for seabirds including the black-footed albatross (*Phoebastria nigripes*).

(ii) Long-term goals

- To conserve the breeding sites of seabirds

- To conserve the native vegetation and other ecosystems as a long-term effort

(iii) Activities

*Conservation of seabird breeding grounds*

Nakodojima is a breeding ground for seabirds such as the black-footed albatross (*Phoebastria nigripes*) and brown booby (*Sula leucogaster*). To conserve their breeding grounds, the impacts of alien species such as black rats, which cause predation damage, will be removed, and ongoing monitoring will be conducted.

*Ecosystem management considering endemic species*

Following feral goat eradication, measures to prevent soil erosion and to eliminate alien plants have been conducted to recover vegetation and conserve endemic species. These activities will continue in an adaptive manner considering already established interspecific relationships.

### (16) Yomejima Island (Mukojima Island Group)

(i) Existing condition

Yomejima, one of the peripheral islands of Chichijima, is composed largely of gently sloped land. This island was once inhabited by feral goats, however, they have already been eradicated. Now, most of the island is covered by grassland vegetation including endemic plants such as the endemic grass (*Paspalidium distans*). The island also provides breeding grounds for seabirds including the black-footed albatross (*Phoebastria nigripes*).

(ii) Long-term goals

- To conserve the breeding sites of seabirds
- To conserve the native vegetation and other ecosystems as a long-term effort

(iii) Activities

*Conservation of seabird breeding grounds*

Yomejima is a breeding ground for seabirds such as the black-footed albatross (*Phoebastria nigripes*) and wedge-tailed shearwater (*Puffinus pacificus*). To conserve their breeding grounds, predation impacts by alien species such as black rats will be removed, and monitoring will continue.

*Ecosystem management considering endemic species*

To conserve endemic species that still inhabit the island, elimination of alien species such as black rats will be conducted considering already established interspecific relationships, in an adaptive manner.

### (17) Nishinoshima Island (Other Islands)

(i) Existing condition

Nishinoshima is the youngest of the Ogasawara Islands, and its current shape was created by a volcanic eruption in 1973. Because it is isolated, has only a short history as an island, and is still under the influence of active volcanic activity, the vegetation coverage is poor. On the other hand, the island provides breeding grounds for many seabirds including the wedge-tailed shearwater (*Puffinus pacificus*) and brown booby (*Sula leucogaster*).

(ii) Long-term goals

- To conserve ecosystems unique to oceanic islands

(iii) Activities

*Determine the existing condition*

Nishinoshima is a young island. Thus, it is expected that vegetation succession has been progressing since land formation and will eventually create a complex ecosystem. The ecosystem will be maintained appropriately, with surveys conducted as necessary to determine the existing condition. By these surveys, successional changes in vegetation will be observed, and the status of possible alien species introduction will be monitored.

### (18) Kita-iwoto Island (Other Islands)

(i) Existing condition

Kita-iwoto is surrounded by steep coastal cliffs and has a hilly landscape. The highest mountain of the islands peaks at 792 m above sea level, where a cloud belt forms with a characteristic humid climate. Various endemic plants and animals inhabit the island, including endemic species of the Kazan Island Group such as the endemic tree-fern (*Cyathea tuyamae*), epiphyllous fern, and the Bonin flying fox (*Pteropus pselaphon*).

(ii) Long-term goals

- To conserve ecosystems unique to oceanic islands

(iii) Activities

*Determine the existing condition*

Kita-iwoto features ecosystems characteristic of oceanic islands. Research to determine the existing condition will be continued.

*Conservation of seabird breeding grounds*

Seabirds are an extremely important characteristic of the oceanic island ecosystem found on Kita-iwoto. Seabird habitat will be conserved by eliminating alien species such as black and brown rats and also by continued monitoring.

### (19) Minami-iwoto Island (Other Islands)

(i) Existing condition

Minami-iwoto is a steeply sloped conically shaped island surrounded by steep coastal cliffs and containing the highest peak (916 m above sea level) of the Ogasawara Islands. A cloud belt forms around the mountain peak, where a

characteristic humid environment exists. There is no record of past human settlement on Minami-iwoto, and ecosystems typical to oceanic islands exist in a pristine condition. Species endemic only to Minami-iwoto include *Satozo minamiiwoensis*. The island is also home to many other endemic plants and animals including *Cyathea tuyamae*, the Bonin flying fox (*Pteropus pselaphon*) and seabirds.

(ii) Long-term goals

● To conserve ecosystems unique to oceanic islands that remain in a primeval condition

(iii) Activities

*Determine the existing condition*

On Minami-iwoto, an ecosystem characteristic of oceanic islands is maintained in primeval condition. Any possibility of human influence on the environment will continue to be avoided as much as possible, and surveys will be conducted as necessary to determine the existing condition. By clarifying the mechanisms of the primeval ecosystem of oceanic islands through these activities and also by continuously monitoring the introduction of alien species, the ecosystem of Minami-iwoto will be maintained.

## 3) Prevention of Introduction and Dispersion of New Alien Species

To achieve the long-term goals listed below, the management authorities will implement the following actions against the introduction and dispersion of new alien species on the Ogasawara Islands with profound understanding and active voluntary involvement from the stakeholders.

■ Long-term goals

The management authorities and stakeholders will deepen their understanding of the unique ecosystems of the oceanic Ogasawara Islands, proactively prevent risks of their own activities' causing the introduction and spread of new alien species, and work toward sustainable conservation of the ecosystems of the Ogasawara Islands in coexistence with human activities.

As people and commodities move within the Ogasawara Islands, attention must be paid to the introduction and dispersion of alien species, depending on the subjects and nature of the activities, routes, and targets. Main activities and introduction routes are presented below.

### (1) Ecosystem Conservation, Management, and Research

i) History of past efforts

- As a part of ecosystem conservation and management measures, various activities, including measures against alien species as part of nature restoration projects, threatened species conservation activities, and various surveys and research projects, are carried out on the Ogasawara Islands.
- When initiating a nature restoration project, the administrative agency executing the project orders the project contractor to comply with all applicable laws and regulations. In 2004, the Tokyo Metropolitan Government has prepared Guidelines for Environment-conscious Public Works in the Ogasawara Islands, which describes precautionary measures to prevent the introduction and dispersion of alien species and to promote awareness.
- Survey or research activities present the risk that an alien species may attach itself to or contaminate study equipment and luggage carried by the investigators, or to human bodies or clothing.
- To deal with this risk, information on alien species that require attention and preventive measures has been promptly distributed and shared using researchers' information networks (e.g., mailing list) to promote awareness. Each investigator or researcher implements these preventive measures voluntarily.
- During the surveys conducted on Minami-iwoto in 2007 and Kita-iwoto in 2008, preventive measures against alien species were reviewed in detail, and dispersion prevention measures were practiced by all participants.

・When conducting a survey or study in a Forest Ecosystem Reserve of a national forest, permission must be obtained to enter the forest based on the utilization rules stipulated by the Conservation Management Plan. All study members are obliged to attend a training seminar regarding forest use before permission is granted. In addition, researchers must submit an activity report.

ii) Future actions

*Preparation of common requirements applied to all investigations and projects*

Once the dispersion prevention measures and their details are clarified, agreement from relevant administrative agencies will be obtained, and the measures will be documented as common requirements.

*Making the common requirements mandatory for investigations and projects*

Compliance with the common requirements will be made mandatory for all contractors involved in conservation and management measures conducted by administrative agencies, such as projects for nature restoration, protection, and breeding projects.

In addition, for survey or research activities, applicants are strictly instructed to follow the common requirements for the Ogasawara Islands; instructions are given during legal processes such as when applying for permission to enter a Forest Ecosystem Reserve and permission based on Natural Parks Law and other regulations.

*Provision of facilities required to carry out preventive measures*

Facilities and other items needed to carry out preventive measures will be assessed and prepared.

*Execution of additional measures for a specific area or action*

For each individual nature restoration project, a review committee of researchers will be assembled as necessary to define additionally required measures and ensure their implementation.

For peripheral islands and other areas such as Minami-iwoto that require especially careful approaches, additional measures will be reviewed and implemented as needed.

*Establishing a collection and management system for information on the introduction and dispersion of alien species*

A system to allow investigators, researchers, and project contractors to rapidly share information on the introduction and dispersion of new alien species identified during monitoring surveys or project executions will be established.

In addition, all information sources will collected into one system. Information on the progress, results, and effects of all activities, including restoration projects, surveys, and research on the Ogasawara Islands will be integrated, and the data will be appropriately managed.

## (2) Greening and Construction Works

### i) History of past efforts

【Greening and landscaping work】

・Landscaping, “greening”, and windbreak creation pose the risk of alien species dispersion if using plants from places such as the mainland of Japan or the Ryukyu Island Group.

・To address this issue, the Tokyo Metropolitan Government has developed Guidelines for Public Facilities, which give due consideration to the scenery of the Ogasawara(Chichijima and Hahajima) in 2008. The recommended tree species list identifies tree species that cause no adverse effect to the ecosystems endemic to Ogasawara; these tree species are currently produced on the Ogasawara Islands or expected to be produced in the future based on advice from academic experts.

・In addition, to avoid genetic mixing, environmental considerations are enforced during the construction of public facilities; examples include using only domestic tree species that were produced within the islands and avoiding the use of closely related species that may crossbreed with endemic species.

・Among private operations, the Chichijima Futami Port area is designated as a Special Scenic Zone by the Tokyo Cityscape Plan. Parties involved in port landscaping are given instructions based on the recommended tree species list described above.

【Construction works】

・Construction work carries some risks. For example, alien species may be attached to or contaminate construction materials, machinery, and other vehicles and may be dispersed by the construction work.

・The Tokyo Metropolitan Government has prepared Guidelines for Environment-conscious Public Works in the Ogasawara Islands, which describes precautions to prevent the introduction and dispersion of alien species. In addition, the Handbook for Construction Work in Ogasawara Islands has been prepared to promote awareness.

### ii) Future actions

*Strict enforcement of government guidance and enrichment of management schemes*

Greening and construction operations are often implemented outside the World Heritage nominated properties on Chichijima and Hahajima. To conserve the nominated properties, guidance on preventative measures for alien species dispersal will be thoroughly provided for various types of operations conducted on these islands. In addition, details of the existing guidelines will be reviewed and revised as necessary based on the latest information.

Greening and construction operations carried out by other administrative agencies shall be conducted in the manner applied to the projects of the Tokyo Metropolitan Government.

## (3) Tourism Use on the Ogasawara Islands

### i) History of past efforts

- Tourism use of the natural environment on the Ogasawara Islands carries a risk of dispersing alien species attached to tourists' shoes and clothing. In addition, although the number of incidents may be limited, a risk of contamination of the boats and other vehicles used for transportation between peripheral islands must be considered.
- To prevent the dispersion of predatory flatworms, the tourist associations, guides, and other related parties carry out measures such as cleaning passengers' shoe soles with seawater prior to landing.
- In addition, to promote awareness, the Ogasawara Ecotourism Association has prepared the Ogasawara Rulebook and has been distributing it to island residents, guides, and other stakeholders. Furthermore, relevant administrative agencies and other parties have been preparing and distributing materials such as booklets, posters, and videos to raise awareness among island residents and tourists of how the use of the natural environment poses risks of alien species introduction and dispersion. Awareness-raising seminars are also held for guides and other groups.
- On Minamijima and in the entire Sekimon region of Hahajima, tourists are requested to follow a "Tokyo Nature Guide" approved by the Tokyo Metropolitan Government as defined in Ecotourism by the TMG and to obey the Rules for Appropriate Use. In addition, in the Sekimon region, tourists are requested to follow the Guidelines for Hahajima's Sekimon area established by Hahajima Nature Guide Administration Council.
- In Forest Ecosystem Reserves in national forests, the routes available for tourists are limited by the Conservation Management Plan. Utilization rules are set, such as requiring tourists to attend a training course or to be accompanied by a guide etc. who has completed the training course. In addition, guides etc. must submit activity reports for any conducted activities.

### ii) Future actions

*Enhanced guidance for execution of preventive measures for tourism use*

The rules that must be adhered to and the actions that must be taken to prevent the introduction and dispersion of alien species will be compiled and documented as a comprehensive action guideline (guidebook) for tourists, island residents, tourism-related businesses, guides etc. Instruction and guidance will continue to be provided through training courses and other measures.

## (4) Agricultural Activities

### i) History of past efforts

- Agricultural seeds and plant supplies from the mainland of Japan, the Ryukyu Islands, or foreign countries carry a risk of alien species dispersal from farmland and gardens. Alien species may also be attached to or contaminate agricultural supplies including seeds and seedlings, agricultural products, commercial soil, livestock, and livestock feed.
- However, undertaking an integrated investigation to collect information on seed and supply types and routes is difficult because no limit exists on purchasing routes, and farmers often purchase supplies directly from seed and seedling companies on the mainland of Japan.
- On the other hand, the Plant Protection Act prohibits the transfer of certain important designated pests. To enforce this act, the Tokyo Metropolitan Government is conducting insect pest control activities in cooperation with relevant agencies to promote sound agricultural practices in Ogasawara.
- To control the introduced fruit fly (*Bactrocera dorsalis*), insect pest control projects had been carried out since 1969, and complete eradication of this pest was confirmed in 1984. To avoid reinvasion, monitoring has been carried out continuously, and systematic countermeasures have been established for early detection and control in case of reinvasion. For the alien snail (*Achatina* (*Lissachatina*) *fulica*), surveys and research have been conducted, and pest control activities are currently being carried out focusing mainly on Hahajima, where endemic land snails have been designated National Monuments.
- In addition, the Tokyo Metropolitan Government provides farmers with information on preventing alien species introduction.

### ii) Future actions

*Providing information and technical assistance for the prevention of existing alien species dispersion*

With regard to the plant species that have already been introduced for agricultural purposes, on the precondition that stakeholders undertake responsible management of those species, a list of significantly invasive agricultural plant species has been prepared and is provided to farmers and other stakeholders, along with information on appropriate management methods to prevent dispersion. Technical assistance on control techniques will be provided as necessary.

*Providing information and technical assistance to prevent dispersion of alien species that are not yet introduced*

To help guard against the introduction of new invasive plant species for agricultural purposes, a list of significantly invasive agricultural plant species will be prepared and released. Farmers planning to introduce new agricultural plant species will be advised to have a preliminary consultation with the management authorities, who will provide guidance on whether the species should be introduced and how to manage it.

*Handling of plants with soil*

Transporting seedlings, plants, and other materials in soil presents the risk of introducing predatory flatworm or unknown pathogens. In addition to conducting technical evaluations and providing information, building a facility for safe handling of such materials will be considered.

*Preparation and operation of a control system against alien species introduction*

In cooperation among the management authorities and other stakeholders, a management system will be prepared to conduct activities such as: provision of risk information regarding the introduction of new plant species or plants in soils from areas off the islands; technical assistance on management methods following the introduction of such plants; removal of alien species that may be attached to or contaminating plants and soil; and measures to reduce risks. Measures to encourage the sustainable development of agriculture that supports conservation of the outstanding natural environment of the Ogasawara Islands will be considered.

## (5) Introduction of Domesticated Animals and Garden Plants

### i) History of past efforts

- Domestic animals present a number of risks in regard to alien species dispersal. Domestic animals may be abandoned or released by their owners or may carry pathogens. Because pets can be purchased by mail order etc. or brought directly onto the islands by island residents and visitors, it is difficult to collect integrated information on domestic animals on the islands.
- Research conducted in 2008 identified almost all domestic animals kept on Chichijima and Hahajima.
- Domestic dogs must be registered by their owners at their municipal government under the Rabies Prevention Act.
- For domestic cats, the Ogasawara Village Domestic Cats Raising Ordinance stipulates that cats must be registered, and it prohibits behavior such as the abandonment of domestic cats.
- The Ogasawara Cat Liaison Committee was established when predation on wild animals and plants were identified. The committee has recently been promoting awareness of appropriate cat ownership behavior and microchip implantation for domestic cats.

### ii) Future actions

*Enhancement of appropriate cat ownership*

Compliance with the Ogasawara Village Domestic Cats Raising Ordinance will be enhanced and necessary measures to promote appropriate care and management of domestic cats, such as promoting microchip implantation for domestic cats, will be carried out.

*Promoting awareness of the importance of appropriate pet ownership*

Information on the effects of abandoned pets on local ecosystems will be conveyed to island residents to further their understanding and cooperation regarding appropriate care and management of domestic animals.

In addition, information will be provided to island residents who bring in new domestic animals and tourists who bring along domestic animals when visiting the islands to build awareness of risks associated with bringing in domestic animals and precautions and to promote strict pet management on the islands.

*Ensuring strict pet management*

For all pet animals, including not only cats and dogs but also birds, tropical fish, insects, and other types of pets, island residents and tourists must responsibly care for and manage their pets to avoid the dispersion of abandoned or released pets.

Regarding pets etc. brought in from outside the islands, a control system will be prepared to provide appropriate measures including preliminary consultations and guidance.

The management authorities will compile comprehensive action guidelines, creating social imperatives original to the Ogasawara Islands as described above. The management authorities will also continue to promote awareness among island residents to make sure that these guidelines will be followed by the residents and visitors thereafter.

*Handling gardening plant species in the same manner as agricultural species*

For plant species used in areas such as private gardens, island residents will be provided with information and technical assistance on highly invasive garden plant species and on handling plants with soil and awareness-building will be promoted, in the same manner as for agricultural species.

## (6) Movement of Goods and People

### i) History of past efforts

- Regular cargo and passenger ship services bring commodities and people to the islands. People may bring in alien species deliberately; however, these activities may also cause accidental introduction of alien species attached to vehicles such as cars and motorcycles, carried on the luggage, clothes, and shoes of island residents and tourists, or contaminating foods and other materials.
- To address this issue, when passengers disembark from the *Ogasawara Maru* or *Hahajima Maru*, visual inspection is conducted on products brought into Chichijima and Hahajima from the mainland of Japan, to determine whether any animals or plants are being brought in. As a preventive measure to keep the predatory flatworm (*Platydemus manokwari*), which has already invaded Chichijima, from entering Hahajima, passengers' shoe soles are cleaned with sea water before they disembark from the *Hahajima Maru*.

- The management authorities and other stakeholders are also promoting awareness by activities such as distributing booklets and displaying posters that inform island residents and visitors about how to prevent alien species introduction. Integrated lessons are also being presented in elementary and junior high schools. In addition, an informational video is played on the *Ogasawara Maru* ocean liner and in the waiting area of for the *Hahajima Maru*. On the *Hahajima Maru*, an announcement cautions passengers on the risks of bringing in soil.
- Alien species including the tropical fire ant (*Solenopsis geminate*) and the paper wasp (*Ropalidia marginata*) that have not been identified on islands such as Chichijima and Hahajima have been found on Iwoto. No regular transport of people or supplies to or from Iwoto occurs; therefore, awareness of the accidental introduction of alien species is being promoted among stakeholders associated with some of the limited activities on the island, including those by the Self Defense Forces or those visiting graves on the island.

ii) Future actions

*Continuously promoting awareness among island residents and visitors*

On the Ogasawara Islands, Futami Port on Chichijima is the only port that allows persons and supplies from the mainland of Japan to be brought in, and the only route connecting Chichijima and Hahajima is the sea route between Futami Port and Oki Port.

Programs to promote awareness of alien species introduction will be enriched and reinforced and shared with residents and visitors travelling between Chichijima, Hahajima, and the mainland of Japan. Awareness-promoting activities will also be actively initiated for tourism businesses and other parties.

Stakeholders engaged in the limited activities on Iwoto will be continuously reminded to strictly follow precautions to prevent alien species from Iwoto from being transported to Chichijima and Hahajima via luggage, clothes, and other belongings.

*Development of conditions that will allow for successful execution of waterfront countermeasures*

To prevent the introduction and dispersion of new alien species with the movement of persons and supplies, activities to promote awareness and understanding among island residents and visitors will be carried out. With regard to periodical boat services, notification procedures concerning in-coming goods, animals and plants as well as the system necessary for their inspection and treatment will be considered and tested on a trial basis in an effort to put in place the infrastructure for effective border controls. In addition, conditions allowing for successful implementation of the same border controls will be developed for the irregularly scheduled boat services to the Ogasawara Islands.

## 4) Environmental Considerations in Individual Projects and Research

To achieve the long-term goals listed below, the management authorities and participants in various projects and surveys shall enforce the environmental considerations described below, with understanding and cooperation among stakeholders including researchers.

### i) Long-term goals

**●Thorough incorporation of environmental consideration in individual projects and surveys**

The individual projects and surveys that are conducted on the Ogasawara Islands must not only fulfill their own purposes but also avoid and minimize negative impact on the environment; in this regard, the management authorities are responsible for ensuring that activity plans are carefully checked beforehand, due consideration is incorporated thoroughly in the implementation phase, and post-implementation evaluations are made.

### ii) Past efforts and future actions

#### 【Strictly executing environmentally conscious measures】

*Preparation and adjustment of action plans for various projects and studies*

When executing projects and surveys including public work projects, coordination and collaboration among the management authorities and other stakeholders shall be instituted prior to the initiation of a project or survey.

In addition, a review meeting will be organized as necessary to acquire advice from researchers in various fields and also to obtain understanding among island residents and stakeholders when executing projects and surveys.

*Strictly executing environmentally conscious measures based on characteristics of a project or study*

When executing projects and surveys, the management authorities and project contractors must ensure careful and meticulous implementation based on the characteristics of each project so as not to harm the natural environment.

The management authorities and other stakeholders that implement projects or surveys will continuously enhance awareness-promoting activities and provide appropriate information, with advice and cooperation from researchers etc. The management authorities and other stakeholders will also promote understanding of the natural environment among all project workers and implement environmentally conscious measures. The Tokyo Metropolitan Government has already implemented environmentally conscious measures based on the Guidelines for Environment-conscious Public Works in the Ogasawara Islands. The management authorities and other stakeholders will share and update this information when executing environmentally conscious measures in their projects and surveys.

#### 【Countermeasures against risks other than alien species】

*Prevention of water pollution and conservation of river environments when executing a project*

The rivers in and around the nominated property on Chichijima provide important habitats for endemic species including the endemic freshwater shrimp (*Paratya boninensis*) and the endemic freshwater gobi fish (*Rhinogobius* sp. BI.). When executing a project such as river improvement work, these habitats shall be considered in the project design, and the project contractors will be instructed to conduct environmentally conscious measures including prevention of water pollution.

*Countermeasures against the risk of genetic disruption posed by planting or reintroduction for reinforcement*

Planting and reintroduction for reinforcement as part of ecosystem conservation and management purposes must be carefully evaluated and implemented considering the risk of genetic disruption. Therefore, such planting or reintroduction projects must be planned carefully by evaluating the purpose, methods, sites, risks, effect, etc. of each project individually based on scientific knowledge.

## 5) Promotion of Lifestyle in Harmony with Nature

To achieve the long-term goals listed below, the management authorities will promote deep understanding and support from and will cooperate closely with island residents and business entities engaged in tourism, agriculture, and fisheries on the Ogasawara Islands. Activities related to the conservation and management of natural environment will be promoted, as described below.

### i) Long-term goals

**●Realization of lifestyle in harmony with nature**

Toward the establishment of the symbiotic lifestyle and industry of the Ogasawara Islands, every resident and business understands the value of the excellent natural environment of the Ogasawara Islands and the need for its conservation and management, participates in activities for the conservation and management of the natural environment, and makes efforts to build the symbiotic living environment so that people can enjoy bountiful life in harmony with nature.

**●Training human resources to support the future of the Ogasawara Islands**

Toward the vision of harmony with nature, training is provided to build the human resources to care for the islands into the future; this includes strengthening the education of children at school and in the home.

### ii) Past efforts and future actions

*Awareness-promoting activities for island residents*

When conducting activities, especially measures against alien species, purposes and methodologies have been fully explained to island residents to build common awareness, understanding, and cooperation.

Information on the value of the Ogasawara Islands' outstanding natural environments (e.g., topographical and geological features, ecosystems, and biodiversity) and on the conservation and management of the natural environments (e.g. alien species measures) will continue to be provided through various media. Opportunities to exchange opinions will also be expanded to build further understanding and ongoing cooperation among island residents. In addition, environmental awareness among island residents will be promoted through activities such as promoting an Ogasawara Islands lifestyle that achieves good harmony with nature.

To raise awareness among all the island residents, new residents in Ogasawara Village will be provided with information on the rules for environmental conservation and other issues.

*Declaration of lifestyle with consideration of the natural environment of oceanic islands*

Prevention of the introduction and dispersion of new alien species greatly related to island residents' daily activities, including their agricultural practices and pet care activities. Understanding, cooperation, and participation of island residents are indispensable for conservation and management activities including measures against alien species. Therefore, all island residents will be asked to participate in the preparation of a declaration to establish a lifestyle that considers the natural environment of oceanic islands and to realize a livelihood in coexistence with nature.

*Conducting educational activities for children*

Numerous educational activities for children have been conducted to teach local children the value of the Ogasawara Islands' outstanding natural environment and ways to conserve and manage that environment. For example, researchers have been invited to classrooms.

To continue to teach the children who will take over the environmental conservation and management of the Ogasawara Islands in the future, sound educational materials will be developed and provided. For this purpose, educational institutions, administrative agencies, researchers, local NPOs, and other stakeholders will cooperate to prepare educational programs for schools and homes, strengthen understanding among teachers, and enrich the base of natural environment education. Other possible activities include providing opportunities for children to voluntarily participate in environmental conservation and management activities.

*Elimination of alien species by volunteers*

From the perspective of the involvement of residents in the conservation and management of the natural environment of the Ogasawara Islands, voluntary participation of island residents in alien species elimination have been promoted, including projects to eliminate alien plants and lower the green anole population around residential areas.

Such activities will be continued, and efforts will be made to ensure that the participants and other island residents properly understand these activities.

In addition, to promote understanding of peripheral islands among island residents, implementation of alien species elimination activities by volunteers on peripheral islands will also be considered and initiated.

*Industrial development in harmony with the natural environment*

Activities such as proper utilization of natural resources, inhibition and elimination of alien species, and appropriate management of land including fallow lands will be promoted. Various projects for self-directive regional development and economic growth on the Ogasawara Islands will also be initiated through industrial development that incorporates conservation of the

natural environment as an added value. An example is a farming enterprise that increases its asset value by executing appropriate countermeasures against alien species, confining adverse effects, or reducing impacts on threatened wild plants and animals.

*Preparation of a structure to support good life among island residents*

To achieve "Sustainable Islands" as presented as a future vision in the Third Ogasawara Village Comprehensive Plan, Ogasawara Village will take the role of contact point for island residents and prepare a structure to support life on the islands that includes factors such as awareness raising, education, volunteering, pet management, and promotion of industrial undertakings that contribute to conservation and management of the natural environment. This structure will be created in full coordination with activities conducted by the management authorities.

## 6) Promotion of Wise Use and Ecotourism

To achieve the long-term goals listed below, the management authorities will promote understanding and cooperation among visitors coming to the Ogasawara Islands for sightseeing or other purposes in close coordination with tourism business entities. Activities will be implemented to promote wise use and ecotourism, as described below.

### i) Long-term goals

●Sustainable use of the natural environment through the promotion of wise use and ecotourism

To conserve the natural environment of the Ogasawara Islands vulnerable to the impacts of human activities and to achieve sustainable tourism, rules for appropriate use will be set out and enforced, as well as nature-experiencing activities and voluntary activities being promoted.

### ii) History of past efforts

【Terrestrial Areas】

Tourism use of the Ogasawara Islands has been carried out by establishing and enforcing rules for appropriate use, such as rules in place since 2003 requiring visitors to be accompanied by a nature guide etc. on Minamijima and the Sekimon region of Hahajima.

For example, Minamijima, a peripheral island of Chichijima, has drowned karst terrain, a characteristic landscape that has become an important sightseeing spot on the Ogasawara Islands. Tourism use of the island without any utilization rules had led to severe degradation of vegetation. For this reason, based on the Guidelines for the Protection and the Appropriate Use of Nature on the Islands of Tokyo, the Rules for Appropriate Use were defined to allow for the coexistence of both tourism use and ecosystem conservation. These rules stipulate that tours must be accompanied by a nature guide, and they define the number of visitors allowed and the available routes for visitors, etc. Conservation measures, monitoring, and surveillance by park rangers have also been conducted. As a result, the island's vegetation is recovering.

In addition, to prevent tourism from harming the value of the fragile ecosystems in Preservation Zones of Forest Ecosystem Reserves, visitors are generally limited to a designated route and asked to accompany a guide etc. who has attended a mandatory seminar and has been certified to enter these areas; this measure was developed in 2008 to form a balance between use and conservation.

In addition to these rules based on applicable guidelines, various voluntary rules, including the Ogasawara County Codes, have been defined and appropriately enforced.

【Marine Areas】

Almost all of the whales that inhabit and migrate within the subtropical North Pacific (composed of 23 species in 6 families) have been identified in the ocean surrounding the Ogasawara Islands. The humpback whale (*Megaptera novaeangliae*) and sperm whale (*Physeter macrocephalus*) have also been observed to breed in adjacent ocean areas, making this an important marine area.

To utilize the value of this marine area, the first whale watch in Japan was held on the Ogasawara Islands in 1988. As part of developing whale watching as an aspect of local tourism, voluntary rules for conservation of whale habitats have been introduced and successfully established. In addition, various voluntary rules related to other marine uses, such as dolphin swims and diving, have been defined and enforced appropriately.

iii) Future actions

*Voluntary rules etc.*

Voluntary rules for appropriate use of the natural environment, including the Ogasawara Country Code and whale watching rules, are now deeply rooted in the local communities, contributing to ecosystem conservation on the Ogasawara Islands. These rules will be strictly enforced, and will be revised and supplemented as necessary.

The Rules for Appropriate Use, based on the Guidelines for the Protection and the Appropriate Use of Nature on the Islands of Tokyo, for Minamijima and for the Sekimon region of Hahajima, and rules from the Conservation Management Plan to properly conserve Forest Ecosystem Reserves, will continue to be applied adequately.

*Promotion of wise use by guides*

In areas where visitors must be accompanied by a certified guide, utilization rules will continue to be enforced. In other routes or areas with relatively pristine conditions, visitors will be recommended to accompany a certified guide.

It is also a goal to be achieved in the future that all the residents recognize and understand their role as guides, as excellent guides help people understand correctly the value of the excellent natural environment including geological features and ecosystems and thereby contributes to the appropriate use of the natural environment. In addition, a registration system will be established for professional guides in order to improve their skills.

*Promotion of nature-experience activities and volunteer activities*

Nature-experience activities and volunteer activities by island residents and visitors are important in furthering understanding of the natural environments of the Ogasawara Islands and advancing citizen participation in conservation and management activities. On the other hand, the impacts associated with such activities in important areas must be minimized.

Therefore, ecotours or other activities that include the elimination of alien species as an activity will be planned and developed with due consideration of the natural environments and regulation by laws etc. Environments and systems that can accommodate such activities will be prepared.

In addition, information on outstanding natural environments (e.g., topographical or geological features, ecosystems, and biodiversity) which are the subjects of interest should be provided so that island residents and visitors can experience these environments in nearby places without stepping into important areas.

*Ogasawara Ecotourism Association and promotion of ecotourism*

Ecosystem-promotion activities will be led by the Ogasawara Ecotourism Association composed of commerce and industry associations, tourist associations, the Ogasawara Whale Watching Association, agricultural cooperatives, fisheries cooperatives, local NPOs, and administrative agencies in the village. Such activities will be expanded in close coordination with ecosystem conservation and management based on the Master Plan for Ecotourism.

## 7) Monitoring and Information

To achieve long-term goals, the management authorities will promote monitoring activities and use of the information described below in close collaboration with researchers and NPOs and with understanding and cooperation from other stakeholders.

### i) Long-term goals

●Monitoring and research

To obtain basic information for the adaptive conservation and management of the Ogasawara Islands, monitoring and research by the management authorities, researchers, and others shall be conducted to understand long-term changes in the natural environment etc.

●Promotion of information sharing and use

By gathering, accumulating, and sharing the information, findings, and techniques obtained or developed by monitoring and studying the natural environment of the Ogasawara Islands, the management authorities and researchers can establish more effective and sustainable conservation and management measures.

### ii) Past efforts and future actions

*Monitoring of conservation and management activities*

When conducting conservation and management measures, including those to remove alien species, the effects of these measures on natural environments have been monitored and evaluated, and the results have been reflected in subsequent measures as necessary.

In the future, to further promote adaptive management, changes in natural environments will be evaluated, and possible impacts of measures against alien species will be predicted beforehand considering interspecific interactions. These estimates will then be reflected in the implemented measures.

In addition, findings from previous activities will be reflected in subsequent conservation and management measures, with the help of advice from researchers of the Scientific Council or other academic groups.

To combat alien species, multiple measures are sometimes conducted in parallel. Therefore, when conducting monitoring, the management authorities shall appropriately share roles, collaborate with one another, and endeavor not to cause any burden to ecosystems.

*Monitoring of use*

Use of the Ogasawara Islands has been monitored to avoid impact to the natural environment in areas including Minamijima and Forest Ecosystem Reserves. In addition, the numbers of persons using the connecting ocean liners and main facilities, as well as the dynamics of use, are being monitored.

In the future, in addition to these monitoring activities, planning and implementation of projects that influence the dynamics of use (e.g., sidewalk and road construction, consideration of flight service establishment) will also be monitored.

*Long-term monitoring*

To identify unexpected impacts on the natural environment caused by factors such as the introduction and dispersion of new alien species, climate change, or tsunami, drought, or typhoon events, long-term monitoring of the natural environment of the Ogasawara Islands will be initiated.

This long-term monitoring will be conducted in conjunction with ongoing monitoring activities, such as the Monitoring Sites 1000 (by the Ministry of the Environment) and Forest Resource Monitoring Program (by the Forestry Agency and the Tokyo Metropolitan Government).

*Promotion of study and research activities*

Because studies of the natural environment are indispensable when executing adaptive conservation and management, the management authorities and researchers will collaboratively promote research and survey activities.

Researchers shall conduct studies that will have clear implications for conservation and management of the natural environment of the Ogasawara Islands and will contribute to the Ogasawara Islands by sharing the study results with relevant parties in Japan and overseas.

To minimize the effects posed by entering important areas or other actions during these studies, voluntary rules for researchers, describing precautions applicable to each study field, have been prepared and are enforced among researchers on an experimental basis.

*Sharing and utilization of information obtained through monitoring, study, and research*

When implementing conservation and management measures, access to the latest information on an implementation site and its surrounding area is indispensable. Therefore, a database system to archive, update, search, and browse information, including geographic information, has been developed and is being continuously maintained.

As a part of effectively reflecting study results in conservation and management measures, database users can browse and share information on the website. Information will be continuously updated and maintained to successfully achieve adaptive management. In addition, to strengthen bidirectional information exchange between the management authorities and researchers, a system of mailing lists and bulletin boards has been created. Using this system, progress and mutual effects are monitored in a cross-sectional manner at various steps from planning to post-implementation of each measure; this helps the management authorities and researchers effectively and comprehensively implement

projects and studies in concert with one another.

To promptly correspond about an incident that requires an urgent response, such as the introduction of a new alien species, the mechanism of information sharing described above will be utilized to quickly report and share information among the management authorities and researchers. The management authorities and researchers will implement appropriate measures by sharing roles based on the management system described below.

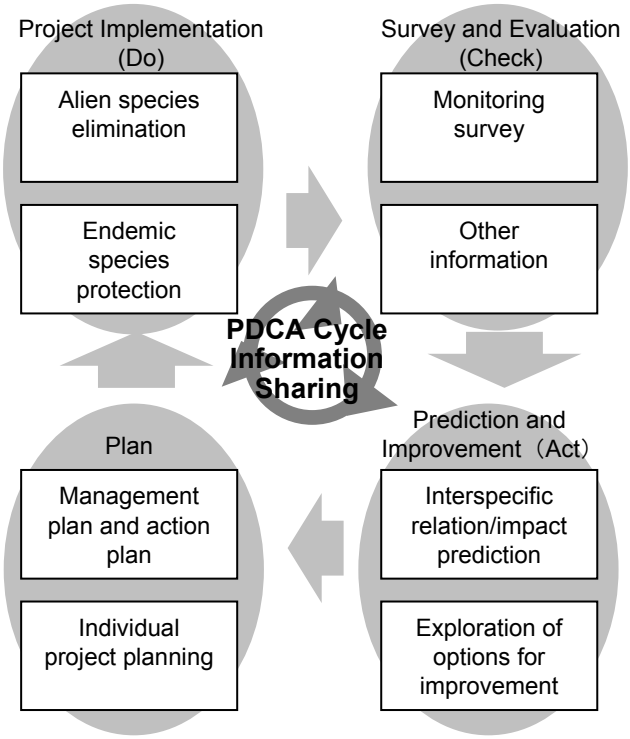



Fig. 1-3 Cycle of Adaptive Management

# 6. Management System

Appropriate sharing of roles and close collaboration and cooperation among the management authorities and stakeholders are necessary to adequately and smoothly implement conservation and management of the natural environment of the Ogasawara Islands.

Therefore, conservation and management of the Ogasawara Islands shall be conducted under a system that promotes close collaboration and cooperation among the members of the Regional Liaison Committee, with advice from researchers of the Scientific Council.

The Management Plan shall be reviewed as necessary based on the results of monitoring surveys and changes in the social environment. Such revision will reflect appropriate scientific advice from the Scientific Council and consensus from the Regional Liaison Committee.

## 1) Coordination among Stakeholders

Conservation and management of the Ogasawara Islands will be conducted through close collaboration and cooperation among the management authorities and stakeholders.

The Regional Liaison Committee, established in 2006, will serve as a liaison for coordination among the management authorities and stakeholders, including other related organization, for conservation and management of the Ogasawara Islands.

In addition, to achieve a good balance between conservation of the outstanding natural environment and the life of island residents, opinions and suggestions from island residents and related organizations will be widely heard, and coordination and consensus formation will be promoted.

On the other hand, among the conservation and management measures targeting individual species, for those requiring collaboration and cooperation of the management authorities and stakeholders (e.g., conservation of the Bonin flying fox, *Pteropus pselaphon*; measures against feral cats, feral goats, Bischofia, and Casuarina), individual liaison systems or other appropriate schemes will be established so that the measures will be conducted effectively.

## 2) Adaptive Management System based on Scientific Findings

Adaptive conservation and management of the Ogasawara Islands based on research, surveys, monitoring, and evaluations of the natural environment and their results will be conducted based on advice from the Scientific Council established in 2006, the same year the Regional Liaison Committee was established.

A system of close collaboration and cooperation with the Regional Liaison Committee will be formed and maintained, and collaboration, cooperation, and information exchange with local NPOs and researchers will also be promoted.

As necessary, review meetings will be held for each measure implemented by each of the management authorities; collaboration between the Scientific Council and those involved in the review meeting will be encouraged to establish an adaptive conservation and management system that deals with a range of measures from individual projects to overall conservation and management.

## 3) Management Authorities

The management authorities will collaboratively implement the conservation and management measures described in the Management Measures of this Plan.

Collaboration, cooperation, and role sharing among the authorities involved in various projects and surveys will also be further enhanced.

### i) Ministry of the Environment (Kanto Regional Environment Office of Japan and Ogasawara Ranger Office)

Ministry of the Environment manages various systems related to areas such as the designated Wilderness Areas, National Parks, and National Wildlife Protection Areas. It carries out the management at Kanto Regional Environment Office of Japan and the Ogasawara Rangers' Office. In addition, the Basic Plan for the Conservation and Restoration of the Natural Environment of Ogasawara was drawn up. Based on this plan, various projects, including measures against alien species and the conservation program defined by the law for the species designated as National Endangered Species of Wild Fauna and Flora, are being promoted. Surveys of preventive measures against the introduction and dispersion of new invasive alien species are also implemented.

### ii) Forestry Agency (Kanto Regional Forest Office and National Forest Division, Ogasawara General Office, Ministry of Land, Infrastructure, Transport and Tourism)

Forestry Agency manages various systems related to areas such as designated Forest Ecosystem Reserves. The Kanto Regional Forest Office of the Forestry Agency and the National Forest Division, Ogasawara General Office, Ministry of Land, Infrastructure, Transport and Tourism are currently conserving and managing the national forests including the areas designated as the Ogasawara Islands Forest Ecosystem Reserves. In 2008, the Conservation Management Plan was defined as the comprehensive guideline for the Ogasawara Islands Forest Ecosystem Reserves based on the recommendation of the Ogasawara Islands Forest Ecosystem Reserve Conservation and Management Committee composed of scientists. Conservation and management of the unique forest ecosystems of the Ogasawara Islands are being carried out based on this plan.

Activities such as measures against alien species, the conservation program defined by the law for the species designated as National Endangered Species of

Wild Fauna and Flora, population survey and monitoring for the endemic subspecies of Japanese wood-pigeon, as well as coordination of utilization and protection are also carried out.

### iii) Agency for Cultural Affairs (and Tokyo Metropolitan Government Board of Education and Ogasawara Village Board of Education)

The Agency for Cultural Affairs conserves and manages Natural Monuments and provides related technical assistance. Its authority is partly transferred to the Tokyo Metropolitan Government Board of Education, and its activities are exercised through the Ogasawara Village Board of Education.

The Agency for Cultural Affairs also provides support and instruction to projects aimed at coexistence of the Bonin flying fox (*Pteropus pselaphon*) and agriculture implemented by the Ogasawara Village.

### iv) Tokyo Metropolitan Government (Ogasawara Islands Branch Office etc.)

The Tokyo Metropolitan Government shares the responsibility for the management of National Parks with the Ministry of the Environment and implements projects such as measures against alien species, erosion control, vegetation restoration, the conservation program defined by the law for the species designated as National Endangered Species of Wild Fauna and Flora, and environmental monitoring surveys. It also shares management of Natural Monuments with Ogasawara Village. In addition, it establishes and implements rules for the appropriate use of Minamijima and of the Sekimon region of Hahajima in collaboration with Ogasawara Village and works to promote awareness on preventing alien species introduction and dispersion.

The Tokyo Metropolitan Government, as a main executer of public works, endeavors to conduct these activities in high compliance with the Guidelines for Environment-conscious Public Works in the Ogasawara Islands.

### v) Ogasawara Village

Ogasawara Village is conducting various projects including measures against alien species, raising environmental awareness, eliminating damage by alien species to livelihoods and agriculture, registering domestic cats, and controlling feral cat populations.

The Ogasawara Village Board of Education shares the management of Natural Monuments with the Tokyo Metropolitan Government.

## 4) Management of Implementation of the Plan

This Management Plan as well as the Ecosystem Conservation Action Plan and individual project plans are evaluated by the Scientific Council*, a subordinate body organized as necessary under the Scientific Council, or by an individual evaluation organization. Evaluations are based on assessments and estimates from monitoring surveys. Results of evaluations are reflected in each plan, and project progress is managed.

*Although the organization that conducts the overall evaluation of this plan is the Regional Liaison Committee, evaluation and progress management from the scientific viewpoint are led by the Scientific Council.

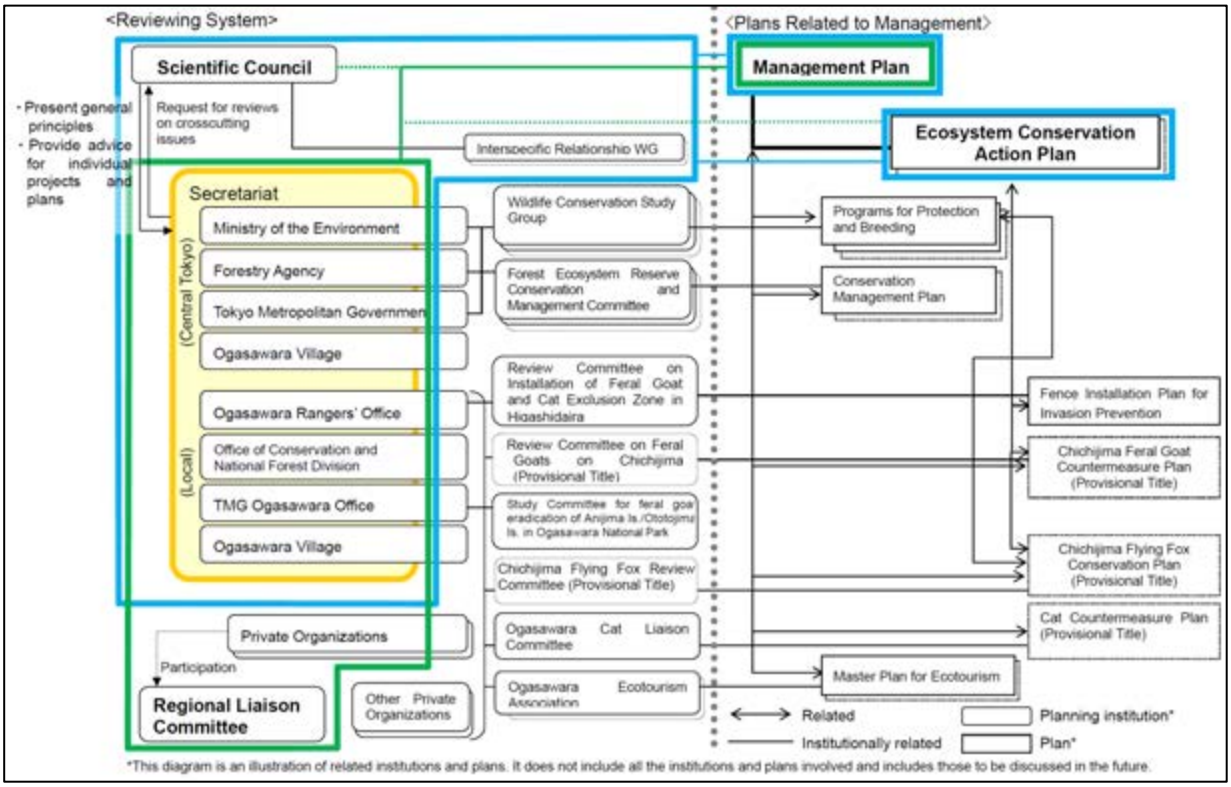



Fig. 1-4 Conceptual framework of relationships among reviewing systems and various plans

# 7. Conclusion

All of the Ogasawara Islands are oceanic islands, and each features a unique ecosystem consisting of many endemic species that have undergone unique processes of speciation. The islands provide a glimpse of the magnificent experiments of biological evolution. In addition, island arc volcanic activities that played an important role in the history of the Earth from its early stage up to the present activities can be seen on these islands.

On the Ogasawara Islands with globally peerless natural environments, various actions shall be taken with the aim of increasing the beauty both of the natural environment of the Ogasawara Islands and of the local communities existing in harmony with that natural environment not only through coordination among the management authorities, but also through the active participation and cooperation of stakeholders.

# *1-2. Ogasawara Islands*

# *Ecosystem Conservation Action Plan*

***(English translation for World Heritage nomination)***

January 2010

Kanto Regional Environment Office of Japan
Kanto Regional Forest Office
Tokyo Metropolitan Government
Ogasawara Village
Japan

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## 1. What Is the Ecosystem Conservation Action Plan?

### 1) Background and Objective

- Human influences, including alien species introductions, threaten parts of the Ogasawara Islands. Therefore, to institute necessary measures for correcting such influences, the "Ecosystem Conservation Action Plan" providing specific action plans has been prepared according to Paragraph 116 of the "Operational Guidelines for the Implementation of the World Heritage Convention".
- This Action Plan is supplemental material for the "Ogasawara Islands Management Plan" and will be attached to the nomination dossier.

【UNESCO Operational Guidelines for the Implementation of the World Heritage Convention (excerpt)】

116. Where the intrinsic qualities of a property nominated are threatened by action of man and yet meet the criteria and the conditions of authenticity or integrity set out in paragraphs 78–95, an action plan outlining the corrective measures required should be submitted with the nomination file. Should the corrective measures submitted by the nominating State Party not be taken within the time proposed by the State Party, the property will be considered by the Committee for delisting in accordance with the procedure adopted by the Committee.

### 2) Relation to Other Plans

- This action plan corresponds to the "Ecosystem Conservation Action Plan" provided in the Management Plan, and its effectiveness is thereby guaranteed.

【Management Plan "5. Management Measures"(excerpt)】

2) Strategic Conservation of Ecosystems by Island

Various activities focused on alien species countermeasures have been initiated by management authorities on the Ogasawara Islands. Based on the results of these activities, the management authorities will continue effective conservation of Ogasawara ecosystems through cooperation and close coordination of stakeholders based on long-term goals and activities.

As a short-term strategy, an Ecosystem Conservation Action Plan under the Management Plan has been evaluated and prepared. The action plan presents short-term targets, priorities, and details of countermeasures based on knowledge of interspecific relationships that vary by island. Ecosystem conservation and management measures, including alien species countermeasures, will be appropriately and systematically implemented based on this action plan.

- On the basis of the above description from the Management Plan, the Action Plan and Management Plan will play the following roles.

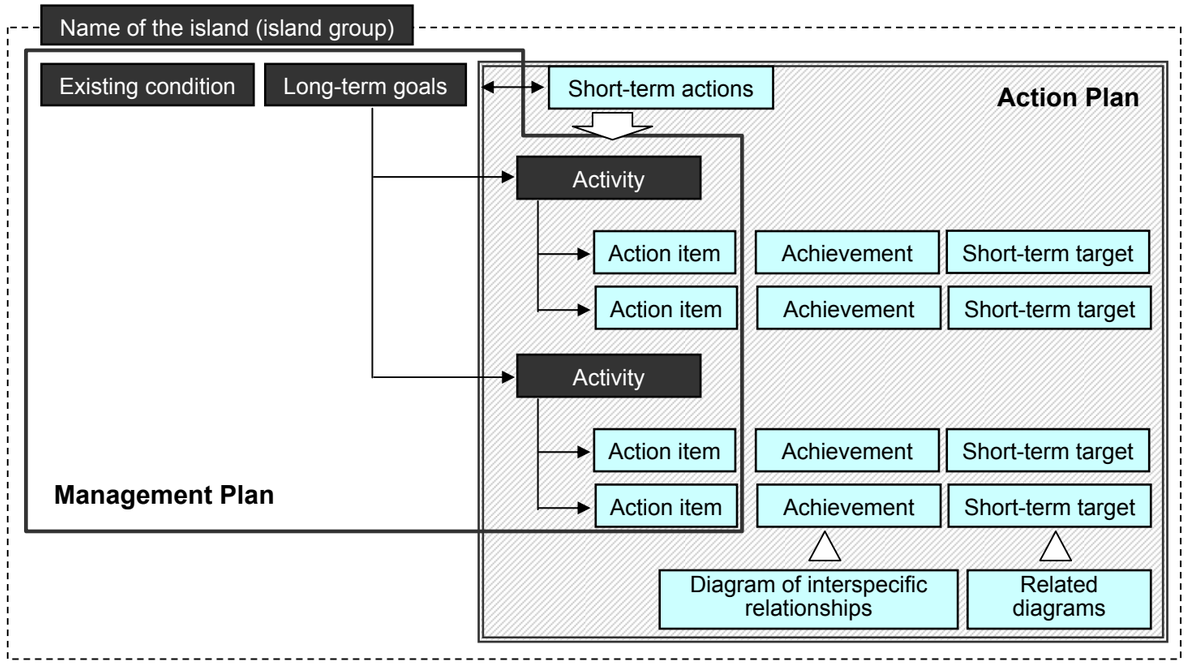
| | Management Plan | Action Plan |
|---|---|---|
| Target Area | Comprehensive plan related to conservation and management of the natural environment of the Ogasawara Islands | Specific action plans to correct human influences (mainly plans concerning ecosystem conservation on each island). |
| Target Period | Demonstrate the activities for the next approximately 5–10 years to achieve long-term goals. Revised as necessary, in response to changes in the natural environment and social circumstances. | Detailed plan that complements the Management Plan and demonstrates the priority sequence and process of short-term objectives and measures. |
| Promoting Agencies | All parties related to the Ogasawara Islands | Mainly the management authorities (bodies implementing the projects and surveys) |

### 3) Structure and Content

- According to the Management Plan, the following 19 islands, which are the main islands of the Ogasawara Islands, are set as the targets for the Action Plan.
- For Chichijima Island and Hahajima Island, specific action plans are given for three regions of important conservation value on each island.

| | |
|---|---|
| Chichijima Island Group | Chichijima, Anijima, Ototojima, Nishijima, Higashijima, Minamijima<br>*On Chichijima, specific action plans are given for the Higashidaira Region, Yoakedaira and Nagasaki Region, and Southern Region. |
| Hahajima Island Group | Hahajima, Mukohjima, Anejima, Imotojima, Meijima, Hirajima<br>*For Hahajima, specific action plans are given for the Sekimon Region, North-Central Region, and Minamizaki Region. |
| Mukojima Island Group and others | Mukojima, Kitanoshima, Nakodojima, Yomejima, Nishinoshima, Kita-iwoto, Minami-Iwoto |

- The Action Plan for each target island is composed of two main components: "Short-term target up to FY 2012" and "Diagram of interspecific relationships". In addition, "Activity" is also described and is linked to the Management Plan. "Envisaged achievement (e.g., completion or onset of measures)" is also described.
- The specific connections among the contents of the Management Plan and Action Plan are as follows.




＊To clearly connect the Management Plan and Action Plan, linked content is contained in both plans.

: Content considered in the Management Plan

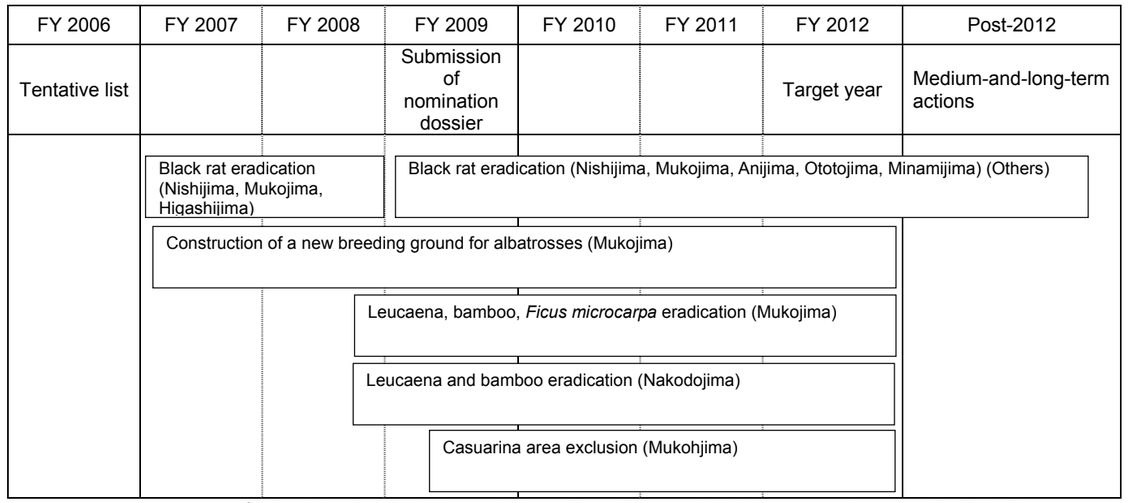
: Content considered in the Action Plan

## 2. Short-term Approaches for the Entire Ogasawara Islands

- Sclerophyllous scrub (eastern part of Chichijima and on Anijima) and subtropical rainforest (Sekimon region of Hahajima) foster a number of endemic species; these ecosystems are representative of the Ogasawara Islands and have extremely high heritage value. Therefore, conservation measures, including those to eliminate alien species, are considered giving priority to these areas. On Anijima, area exclusion* of alien species such as Casuarina, *Pinus lutchuensis*, and Leucaena will be carried out while monitoring the entire gently sloped land of the plateau, which is inhabited by *Cicindela bonina*; these measures will be carried out by FY 2012, the target year of the Action Plan. On Hahajima, alien species with the largest impact, such as Bischofia, will be eliminated by area exclusion* measures conducted through the cooperation of the MOE and FA, starting from the northern part of the island.

  (*Refer to the following page for the definition of "area exclusion" as used here.)
- Precious endemic species inhabit Anijima and Ototojima, and greater efforts and achievements in eradicating alien species have occurred on these islands than on other islands. Therefore, these islands serve as models for the ecosystem conservation framework. On both of these islands, the aim is complete strategic eradication of alien animals and area exclusion of alien plants by FY 2012. Through application of adaptive management principles based on a plan-do-check-action (PDCA) cycle, including monitoring and evaluation, the effectiveness of the mechanisms will be demonstrated.
  - Anijima: Feral goat, black rat, feral cat, alien plans such as Casuarina (area exclusion)
  - Ototojima: Bischofia, bullfrog, feral pig, feral goat, black rat, feral cat, and alien plants that need to be eliminated (area exclusion)
- Feral goats have had large impacts on the flora and distribution of seabird breeding habitat. Much time and effort have been invested in efforts to eradicate feral goats on many islands including those of the Mukojima Island Group. As eradication had been achieved on Anijima by FY 2008, elimination was also initiated on Ototojima in FY 2008, with eradication targeted to be completed by FY 2011. On Chichijima, area exclusion has been initiated since FY 2009 as a short-term approach. Eradication is planned through continuous implementation of strategic elimination targeting the whole island thereafter.
- Black rats have impacted native flora and fauna such as endemic land snails. The black rat is also considered to play a role in inhibiting vegetation recovery on islands where feral goat eradication had been completed. Black rat elimination was initiated on Nishijima in FY 2007. In FY 2008, elimination was also initiated on Mukojima, where vegetation had not recovered satisfactorily even after feral goat eradication, and on Higashijima, where black rat predation pressure on seabirds had been identified. For Higashijima, complete eradication is targeted by FY 2009. Elimination will continue on Nishijima and Mukojima with the aim of complete eradication by FY 2012. Elimination on Anijima and Ototojima, where vegetation recovery is expected after feral goat eradication, will be initiated by FY 2009. Following work on those islands, elimination will be initiated, one island at a time, on the other peripheral islands of Chichijima (e.g., Minamijima, Hitomarujima, and Hyotanjima), which are important breeding grounds for seabirds. According to completion status, elimination will then be carried out on peripheral islands such as Mukohjima, Imotojima, Nakodojima, and Yomejima, which are important habitat for endemic birds and seabirds. The black rat is an important food source of the endemic subspecies of Eurasian buzzard. Therefore, in areas of the Chichijima and Hahajima island groups where the Eurasian buzzard inhabitation has been identified, monitoring surveys of the Eurasian buzzard will be conducted with the island group as a survey unit, along with the black rat elimination.
- Feral cats inhabit Chichijima and Hahajima, with smaller numbers also living on Anijima and Ototojima. As the black rat is the major food source for feral cats, the exclusion of feral cats will be carried out simultaneously with the elimination of black rats on Anijima and Ototojima, to prevent birds such as the endemic subspecies of Japanese wood-pigeon becoming the next predation target of feral cats once black rats are eradicated. In addition, as Higashidaira on Chichijima and Minamizaki on Hahajima are important habitats for the wood-pigeon and seabirds, fences will be installed around these areas to prevent feral cat invasion from the outside. Exclusion will also be conducted by removing live animals from inside the fenced areas. For effective implementation of island-wide measures against feral cats on Chichijima and Hahajima, separate implementation plans will be established for each island, and proper measures for keeping domestic cats will be promoted.
- Albatrosses as well as many other seabirds breed in the Mukojima Island Group. The black-footed albatross (*Phoebastria nigripes*) and the Laysan albatross (*Phoebastria immutabilis*) have known breeding grounds on Mukojima. Activities to create a new breeding ground for the short-tailed albatross (*Phoebastria albatrus*) have been conducted since FY2007 and are planned to be continued. Mukojima is also an important habitat for endemic forest insects of Mukojima Island Group, and thus forest recovery is an important issue. Eradication of feral goats has already been completed on Mukojima, and elimination for the black rat has begun, with complete eradication targeted by FY 2012. At the same time, ongoing elimination is being carried out to remove alien plants, including Leucaena and alien bamboo and dwarf bamboo species. After the completion, other alien plants will be monitored and will be managed adaptively.
- Although feral goat eradication has been completed on Nakodojima as well as Mukojima, soil erosion due to vegetation damage caused by feral goat continues. Therefore, measures such as vegetation restoration have been implemented to recover the soil basement. Along with these measures, eradication of major alien plans such as Leucaena and alien bamboo and dwarf bamboo species is to be completed by FY 2012.
- Sclerophyllous scrub typical of the Hahajima Island Group in relatively healthy condition covers extensive portions of the Hahajima peripheral islands. Conservation of this vegetation is particularly important on Mukohjima for various reasons, including as *Symplocos boninensis* habitat. Therefore, elimination of Casuarina will be implemented on Mukohjima before on other Hahajima peripheral islands. The elimination will be preceded by and conducted on the basis of research on the dependency of species such as *Carduelis sinica kittlitzi* and endemic land snails on Casuarina.
- With regard to rat eradication on Kita-iwoto, necessary measures will be considered once black rat eradication efforts have been completed on other islands.
- Minami-iwoto has an extremely high heritage value as it remains in primeval condition, has experienced only small impact by alien species, and has not yet been invaded by the black rat. For this reason, in principle, human influences will continue to be excluded as much as possible, and long-term monitoring will be conducted.

- When eliminating alien species, the removal of one impact factor from the current interspecific relations may lead to unexpected problems such as expansion of new alien species. On the other hand, in some cases, the endemic or threatened species to be conserved have become dependent on an alien species as their habitat or food source. Therefore, when implementing measures against alien species, it is necessary to use an adaptive management approach based on monitoring conducted before and after the elimination.
- Currently, modeling of changes n interspecific relations due to alien species eliminations within the sclerophyllous scrub ecosystems of Anijima and Chichijima is being conducted by an expert working group established by the FA. Results from these analyses will be applied to alien species elimination projects throughout the Ogasawara Islands, hereafter.




*Schedules for Chichijima, Anijima, Ototojima, and Hahajima are given on the following pages

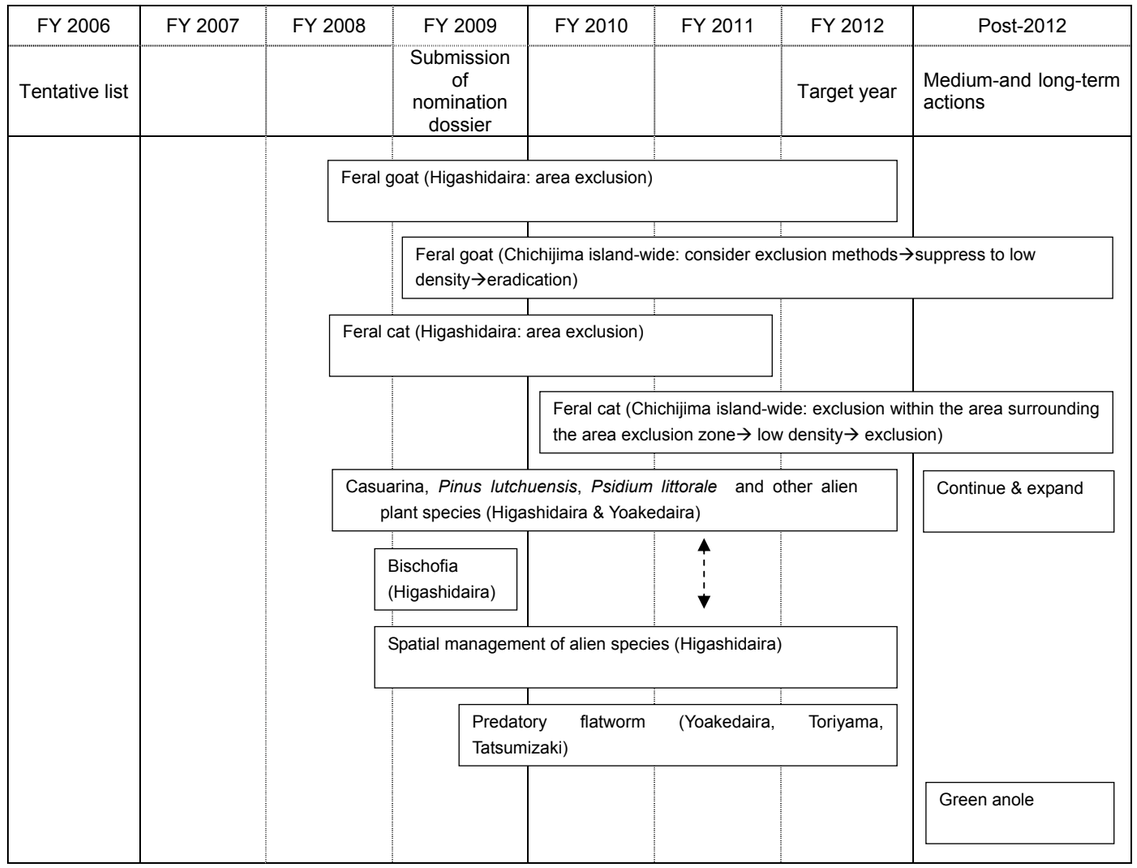
*Definitions within the text

- With regard to animals, "eradication" is a "condition" where no individual is left on an island. With regard to plants, "eradication" is a "condition" where the main trees for woody plants and the main colony for herbaceous plants are kept to zero or in extremely low -density on an island.
- With regard to animals, "area exclusion" is an "action" to remove individuals to achieve a "condition" where no individual is left within a specific area. With regard to plants, "area exclusion" is an "action" to maintain the main trees for woody plants and the main colony for herbaceous plants to zero or in extremely low -density status within a specific area.
- Especially for plants, after "eradication" or "area exclusion", monitoring will be continuously carried out, and measures such as scraping off shoots, extracting young trees, and preventing the introduction of other alien plant species will be implemented.
- The "specific area" mentioned above for the area exclusion is an area of sufficient scale for effective conservation, in which certain objectives of the work plan have been achieved.
- The following abbreviations are used within this Action Plan: MOE: Ministry of the Environment, FA: Forestry Agency, TMG: Tokyo Metropolitan Government, and FFPRI: Forestry and Forest Products Research Institute.

## 3. Island-by-Island Ecosystem Conservation Action Plan

| Island | (Chichijima Island Group) | Short-term actions |
|---|---|---|
| **Chichijima Island** | | |

- Feral goats impact native and endemic vegetation and especially affect the sustainability of the sclerophyllous scrub ecosystem spread across the Higashidaira and Mt. Chuosan region of Chichijima, which contains endemic species such as *Callicarpa parvifolia* and *Crepidiastrum grandicollum*. Therefore, the MOE is considering setting up feral goat and feral cat fences. The installation work is planned to begin from FY 2009, following coordination with related agencies and experts, with the aim of project completion by FY 2012. The fences will achieve area exclusion of feral goats within the Higashidaira and Mt. Chuosan region.
- With regard to island-wide feral goat measures on Chichijima, related agencies such as the MOE, FA, TMG, and Ogasawara Village are cooperating to consider feral goat elimination for the island. Coordination among agencies will be obtained, and starting in FY 2010, continuous implementation of strategic elimination will be initiated to rapidly decrease the number of individuals to a low density and ultimately achieve eradication.
- The entire area of Higashidaira is an important habitat and breeding ground for the endemic subspecies of Japanese wood-pigeon. Thus, the FA has designated the region as a wood-pigeon sanctuary. Local NPOs and other parties are cooperating to conserve and maintain suitable forest habitat for the wood-pigeon by activities such as elimination of alien species and promotion of appropriate forest use. These efforts will be continued. Furthermore, because feral cat present a predation risk, the MOE is planning to erect feral goat and feral cat fences to achieve complete area exclusion of both animals within the Higashidaira region by FY 2011. In addition, based on the implementation plan established by the Ogasawara Cat Liaison Committee, capturing of feral cats will be continuously implemented in the surrounding mountain region in parallel with the aim of achieving island-wide exclusion.
- On Chichijima and Hahajima, to cut off a source of new feral cats, appropriate measures for keeping domestic cats will also be strictly implemented by the Ogasawara Cat Liaison Committee, Tokyo Veterinary Medical Association, and other parties. Thus, the measures against feral cats will be conducted in cooperation with measures regarding domestic cats.
- As the sclerophyllous scrub in the Higashidaira and Mt. Chuosan region is a habitat for particularly threatened endemic plant species, the FA, in cooperation with local NGOs and other parties, has eliminated alien plants such as Bischofia, Casuarina, and *Pinus lutchuensis* and will continue this work. Area exclusion of Bischofia will be completed by FY 2009, and measures such as extraction of young trees will be carried out as necessary thereafter. In addition, implementation of elimination to achieve island-wide eradication of Bischofia will be considered.
- With regard to *Psidium littorale*, *Ficus microcarpa*, and Leucaena, conservation targets, and introduction status will be determined and their elimination along with species such as Casuarina will be considered. Elimination activities aimed at species such as Casuarina and *Pinus lutchuensis* will be expanded to the whole area of Yoakedaira where sclerophyllous scrub is distributed.
- With regard to predatory flatworm, area defense measures to block unaided movement of planaria species will be established, and area defense measures will be implemented in un-invaded areas that are still inhabited by endemic land snails (especially *Mandarina* species). These areas include Yoakedaira, Toriyama, Tatsumizaki, and Nishikaigan. These measures will be implemented by the target date of FY 2012.
- Habitat of the endemic species *Ogasawarazo lineatus* is found in the southern region of Chichijima, but is under predation pressure by the green anole. Measures against green anoles and cane toads will be considered for important areas for conservation. These include *Ogasawarazo lineatus* habitat, areas near water bodies where natural replenishment of dragonflies such as *Hemicordulia ogasawarensis* from Anijima is expected, and rocky desert vegetation in the entire Higashidaira area where natural re-colonization of *Cicindela bonina* is anticipated.
- With regard to the Bonin flying fox on Chichijima, the population size is being continuously monitored, and measures to reduce agricultural damage by the flying fox are being tested. Awareness raising and supportive measures for farmers and other related parties will be continued hereafter. For conservation of Bonin flying fox group gregarious resting sites, measures for co-existence and coordination with tourism use in the surrounding region are being developed and expanded to include evaluation of the protective measures for regional conservation.



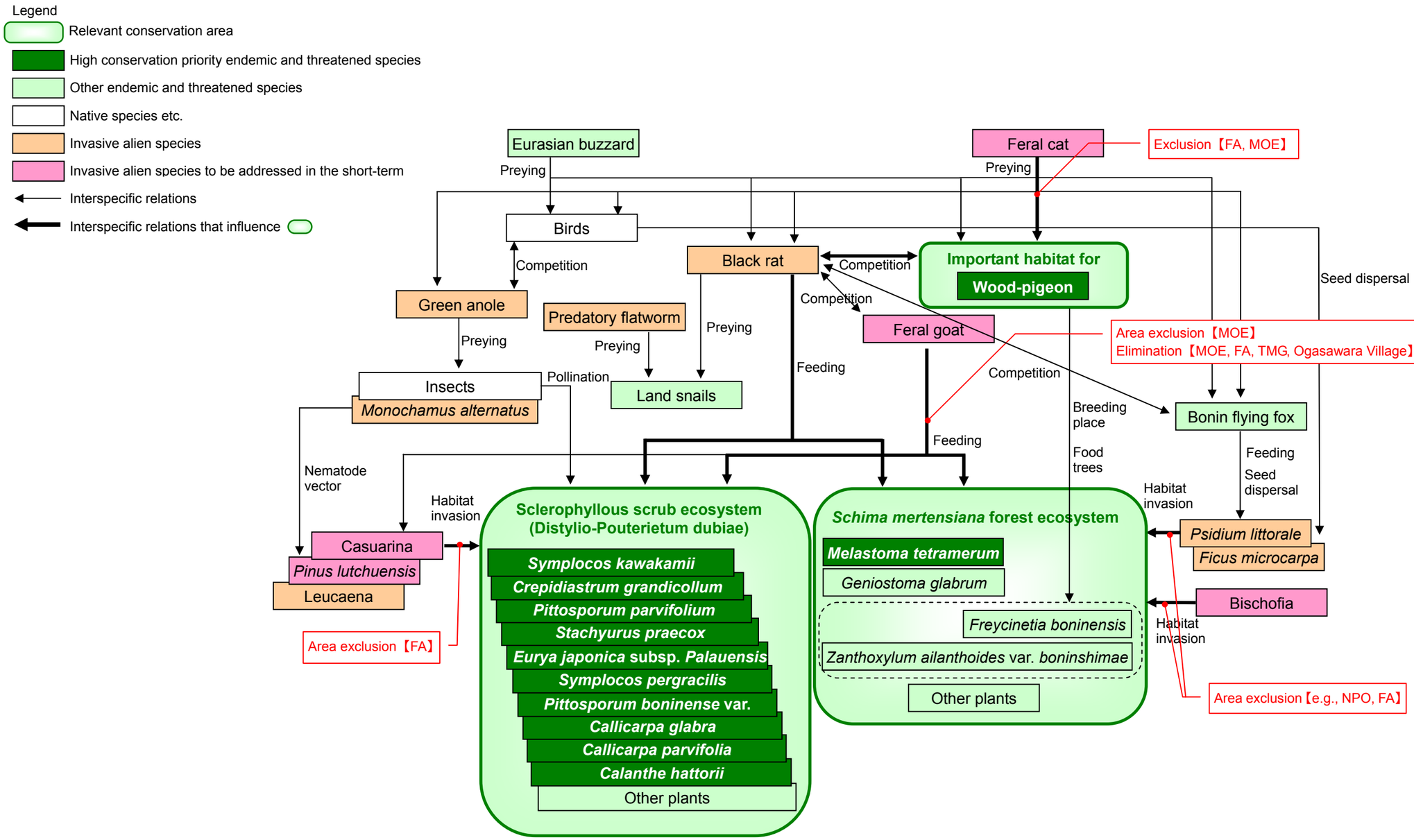
## (1) Chichijima Island (Chichijima Island Group)

| Island (region) (Chichijima Island Group) | Activity | |
|---|---|---|
| **Chichijima Island (Higashidaira and Mt. Chuosan Region)** | **1. Conservation of sclerophyllous scrub and Schima mertensiana forest** | The sclerophyllous scrub vegetation in the entire Higashidaira region, where Chichijima's original vegetation is still well preserved, will be appropriately conserved. In *Schima mertensiana* forests, which are widely distributed in the central to southern parts of the island, conservation and management measures such as elimination of alien species will continue to be conducted in an adaptive manner, considering already established interspecific relationships.<br>Feral goats are the major impact factor. Expulsion of goats will be conducted (e.g., by setting up fences) in conservation priority areas of endemic plant species. In addition, alien plants such as Casuarina and Bischofia will be eliminated mainly in important regions for conservation, and sclerophyllous scrub and *Schima mertensiana* forest will be conserved.<br>For endemic plants such as *Rhododendron boninense*, *Symplocos kawakamii*, *Pittosporum parvifolium*, *Melastoma tetramerum*, and *Calanthe hattorii*, habitat conservation will involve the continuation of periodic patrols, monitoring, and alien species measures that build on already obtained results. |
| | **2. Habitat conservation for wood-pigeon** | A sanctuary to conserve important habitat for the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*) has already been established in Higashidaira by the Forestry Agency. Various protective measures are being employed, such as securing water holes and conducting patrols. Other additional measures to recover and conserve the wood-pigeon breeding grounds and habitat will include a preliminary exclusion of feral cats, for example by setting up fences, and the removal of other alien species impacts.<br>Because the wood-pigeon moves among islands, including Hahajima, Anijima, and Ototojima, unified conservation measures will be conducted for habitats in all these areas with the aim of achieving steady habitation. |
| | **5. Habitat restoration for endemic insects** | Habitat conservation for endemic insects will be promoted by area exclusions of the green anole and cane toad, and re-colonization by insects flying from nearby islands such as Anijima is anticipated. |

| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description |
|---|---|---|---|---|---|
| **1. Conservation of sclerophyllous scrub and Schima mertensiana forest** | Elimination of feral goats | ➢ Initiating area exclusion<br>➢ Initiating strategic measures with cooperation among management authorities | ➢ Setting up and partially complete erection of fences to prevent the invasion of feral goats and feral cats in the Higashidaira area, targeting completion in 2010.【MOE】<br>➢ Implementation of elimination as a countermeasure against agricultural damage on Chichijima.【Ogasawara Village】<br>➢ Carrying out research on inhabitation status, and initiating studies of effective eradication procedures.【MOE, FA, TMG, and Ogasawara Village】 | ➢ Complete area exclusion<br>➢ Initiate and continue elimination | ➢ Implement feral goat elimination within fenced areas.【MOE】<br>➢ Continue with the activities listed on the left.【Ogasawara Village】<br>➢ Initiate strategic eradication activities (in the whole region) with cooperation among management authorities, starting from FY 2009.【MOE, FA, TMG, and Ogasawara Village】 |
| | Elimination of Casuarina and *Pinus lutchuensis* | ➢ Initiating area exclusion | ➢ Beginning elimination of alien species such as Casuarina in the Higashidaira area, targeting area exclusion. Implementation of monitoring surveys (e.g., of birds, insects, land snails, and plants) before conducting elimination in Higashidaira and Yoakedaira.【FA】 | ➢ Continue and expand area exclusion | ➢ Continue with the activities listed on the left. 【NPO, FA, and others.】 |
| | Elimination of Bischofia | ➢ Completion of area exclusion | ➢ Promoting area exclusion in Higashidaira.【NGOs and others】 | ➢ Continue area exclusion | ➢ Area exclusion planned to be completed by FY 2009, with germination treatment and other follow-up work thereafter. (Higashidaira wood-pigeon sanctuary)【NPO, FA, and others.】 |
| | Elimination of *Psidium littorale* | ➢ Initiating a survey to determine the existing condition | ➢ Estimating the distribution status of alien woody plants using aerial photographs.【FA】<br>➢ Consideration of implementing elimination measures to be conducted during the elimination of species such as Casuarina.【FA】 | ➢ Continue area exclusion | ➢ Continue with the activities listed on the left. 【NPO, FA, and others 】 |
| | Protection of threatened plants | ➢ Setting up protective nets | ➢ Setting up protective nets around threatened plants growing in Higashidaira to protect them from feral goat grazing. 【TMG】 | ➢ Continue protection | ➢ Continue with the activities listed on the left.【MOE】 |
| **2. Habitat conservation for wood-pigeon** | Exclusion of feral cats | ➢ Initiating area exclusion<br>➢ Initiating exclusion | ➢ Establishment of fences to prevent invasion by feral goats and cats in Chichijima's Higashidaira region, targeting completion in 2010. Removing (excluding) feral cats from within and also at outside of the fenced areas.【MOE】<br>➢ Implementation of emergency captures of feral cats in cooperation with the Ogasawara Cat Liaison Committee (targeting all of Chichijima).【FA】 | ➢ Complete area exclusion | ➢ Complete feral cat exclusion within fences in the Higashidaira area.【MOE】<br>➢ Based on the effectiveness of fencing and capturing measures in Higashidaira, consider exclusion measures of the island.【MOE, FA, TME, Ogasawara Village】 |
| | Elimination of black rats | | | (To be addressed on medium- and long-term bases) | |
| **5. Habitat restoration for endemic insects** | Elimination of the green anole | | | (To be addressed on medium- and long-term bases) | |

*Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.
(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012


Legend
Relevant conservation area
High conservation priority endemic and threatened species
Other endemic and threatened species
Native species etc.
Invasive alien species
Invasive alien species to be addressed in the short-term
Interspecific relations
Interspecific relations that influence
Eurasian buzzard
Preying
Feral cat
Preying
Exclusion【FA, MOE】
Birds
Black rat
Competition
Competition
Important habitat for
Wood-pigeon
Seed dispersal
Competition
Green anole
Predatory flatworm
Preying
Preying
Preying
Feral goat
Area exclusion【MOE】
Elimination【MOE, FA, TMG, Ogasawara Village】
Insects
Pollination
Land snails
Feeding
Competition
Monochamus alternatus
Breeding place
Bonin flying fox
Feeding
Food trees
Feeding
Seed dispersal
Nematode vector
Habitat invasion
Habitat invasion
Sclerophyllous scrub ecosystem
(Distylio-Pouterietum dubiae)
Schima mertensiana forest ecosystem
Psidium littorale
Ficus microcarpa
Casuarina
Pinus lutchuensis
Leucaena
Symplocos kawakamii
Crepidiastrum grandicollum
Pittosporum parvifolium
Stachyurus praecox
Eurya japonica subsp. Palauensis
Symplocos pergracilis
Pittosporum boninense var.
Callicarpa glabra
Callicarpa parvifolia
Calanthe hattorii
Other plants
Melastoma tetramerum
Geniostoma glabrum
Freycinetia boninensis
Zanthoxylum ailanthoides var. boninshimae
Other plants
Bischofia
Habitat invasion
Area exclusion【FA】
Area exclusion【e.g., NPO, FA】

(1) Chichijima Island (Chichijima Island Group)

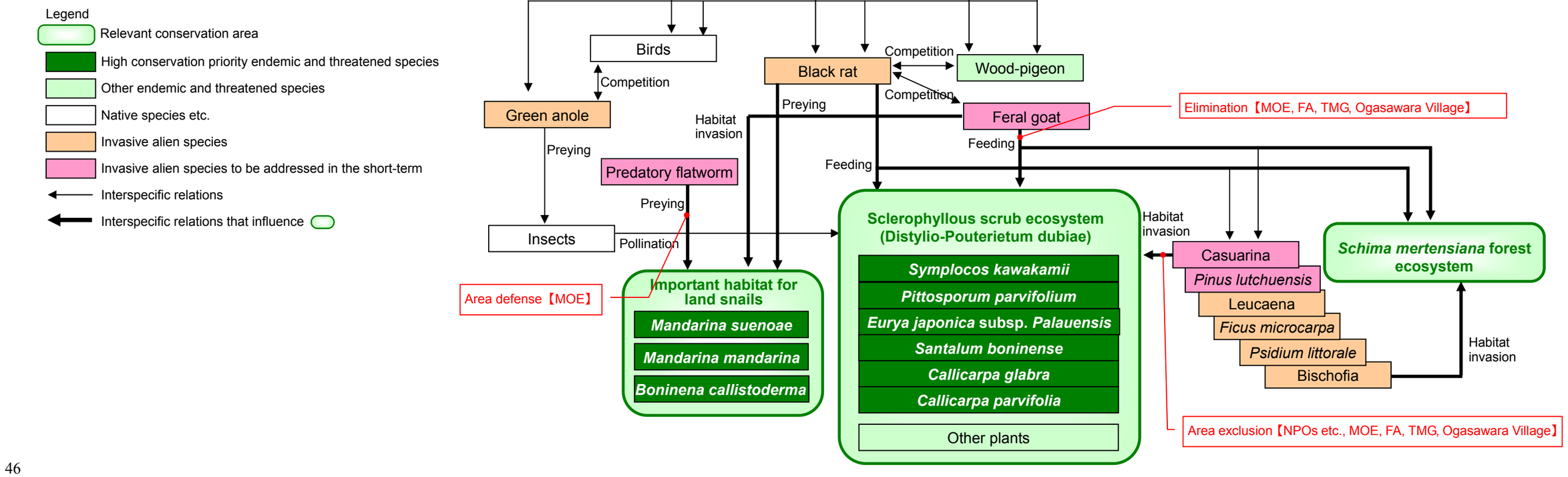
| Island (region) | (Chichijima Island Group) | Activity |
|---|---|---|
| **Chichijima Island (Yoakedaira and Nagasaki Region)** | **1. Conservation of sclerophyllous scrubs and Schima mertensiana forests** | The sclerophyllous scrub vegetation in the entire Higashidaira region, where Chichijima's original vegetation is still well preserved, will be appropriately conserved. In *Schima mertensiana* forests, which are widely distributed in the central to southern parts of the island, conservation and management measures such as elimination of alien species will continue to be conducted in an adaptive manner, considering already established interspecific relationships.<br>Feral goats are the major impact factor. Expulsion of goats will be conducted (e.g., by setting up fences) in conservation priority areas of endemic plant species. In addition, alien plants such as Casuarina and Bischofia will be eliminated mainly in important regions for conservation, and sclerophyllous scrub and *Schima mertensiana* forest will be conserved. |
| | **3. Habitat conservation for land snails** | The southern region and Yoakedaira are important habitat for land snails such as *Mandarina chichijimana*, which are valuable in ecological and evolutionary biology studies. In these regions, measures will focus on preventing the introduction of predatory flatworm and conserving the habitat of existing land snails. |

| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|
| **1. Conservation of sclerophyllous scrub and *Schima mertensiana* forest** | Elimination of feral goats | ➢ Initiating strategic measures with cooperation among management authorities | ➢ Implementation of elimination as a countermeasure against agricultural damage on Chichijima.【Ogasawara Village】<br>➢ Carrying out research on inhabitation status, and initiating studies of effective eradication procedures.【MOE, FA, TMG, and Ogasawara Village】 | ➢ Initiate and continue elimination | ➢ Continue with the activities listed on the left.【Ogasawara Village】<br>➢ Initiate strategic eradication activities (in the whole region) with cooperation among management authorities, starting from FY 2009.【MOE, FA, TMG, and Ogasawara Village】 |
| | Elimination of Casuarina and *Pinus lutchuensis* | ➢ Initiating area exclusion | ➢ Implementation of elimination in the Nagasaki region of Chichijima.【NPO】<br>➢ Concluding a maintenance agreement with NPOs and other groups for Yoakedaira and promoting the elimination of Casuarina and other alien species.【FA】Implementation of monitoring surveys (e.g., of birds, insects, land snails, plants) before beginning elimination measures in Higashidaira and Yoakedaira.【FA】 | ➢ Continue and expand area exclusion | ➢ Continue with the activities listed on the left.【NPO, FA, and others】 |
| | Elimination of *Ficus microcarpa*, Leucaena, *Psidium littorale*, and other alien invasive species. | ➢ Initiating a survey to determine the existing condition | ➢ Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | ➢ Initiate area exclusion | ➢ With cooperation among management authorities, strategically initiate elimination where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| **3. Habitat conservation for land snails** | Elimination of predatory flatworm | ➢ Initiating area defense | ➢ Conducing trials of specific measures for area defense within the Yoakedaira region of Chichijima (installation of electric fences to interrupt unaided movement), examining the effectiveness of measures, and carrying out demonstration experiments to establish proven area defense measures.【MOE】 | ➢ Continue area defense measures | ➢ Set up sanctuaries in land snail habitats (e.g., Yoakedaira), and implement preventive measures against introduction.【MOE】 |
| | Elimination of black rats | | | (To be addressed on medium- and long-term bases) | |

*Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

*(Gray): Almost complete at present
(Blue): Planned to be completed by the end of FY 2012



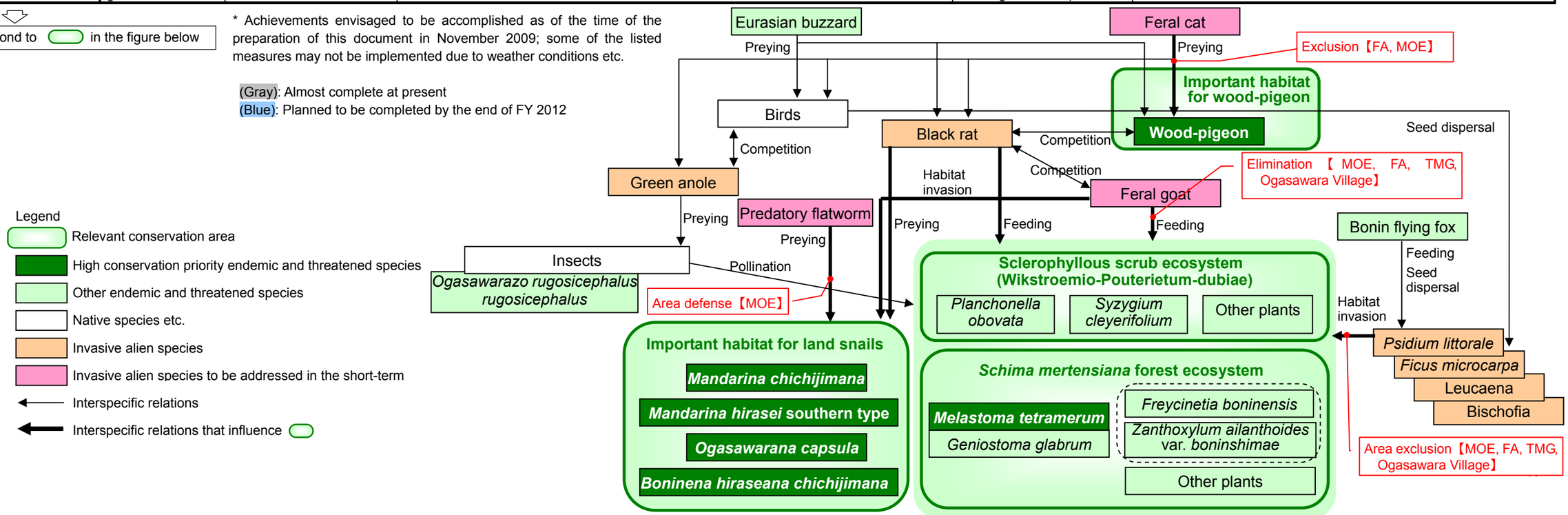
| Island (region) | (Chichijima Island Group) | Activity | |
|---|---|---|---|
| **Chichijima Island (Southern Region)** | | **1. Conservation of sclerophyllous scrub and *Schima mertensiana* forest** | The sclerophyllous scrub vegetation in the entire Higashidaira region, where Chichijima's original vegetation is still well preserved, will be appropriately conserved. In *Schima mertensiana* forests, which are widely distributed in the central to southern parts of the island, conservation and management measures such as elimination of alien species will continue to be conducted in an adaptive manner, considering already established interspecific relationships.<br>Feral goats are the major impact factor. Expulsion of goats will be conducted (e.g., by setting up fences) in conservation priority areas of endemic plant species. In addition, alien plants such as Casuarina and Bischofia will be eliminated mainly in important regions for conservation, and sclerophyllous scrub and *Schima mertensiana* forest will be conserved. |
| | | **2. Habitat conservation for wood-pigeon** | A sanctuary to conserve important habitat for the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*) has already been established in Higashidaira by the Forestry Agency. Various protective measures are being employed, such as securing water holes and conducting patrols. Other additional measures to recover and conserve the wood-pigeon breeding grounds and habitat will include a preliminary exclusion of feral cats, for example by setting up fences, and the removal of other alien species impacts.<br>Because the wood-pigeon moves among islands, including Hahajima, Anijima, and Ototojima, unified conservation measures will be conducted for habitats in all these areas with the aim of achieving steady habitation. |
| | | **3. Habitat conservation for land snails** | The southern region and Yoakedaira are important habitat for land snails such as *Mandarina chichijimana*, which are valuable in ecological and evolutionary biology studies. In these regions, measures will focus on preventing the introduction of predatory flatworm and conserving the habitat of existing land snails. |
| | | **5. Habitat conservation for endemic insects** | Habitat conservation for endemic insects will be promoted by area exclusions of the green anole and cane toad, and re-colonization by insects flying from nearby islands such as Anijima is anticipated. |

| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description |
|---|---|---|---|---|---|
| **1. Conservation of sclerophyllous scrub and *Schima mertensiana* forest** | Elimination of feral goats | ➢ Initiating strategic measures with the cooperation among management authorities | ➢ Implementation of elimination as a countermeasure against agricultural damage on Chichijima. 【Ogasawara Village】<br>➢ Carrying out research on inhabitation status, and initiating studies of effective eradication procedures.【MOE, FA, TMG, and Ogasawara Village】 | ➢ Initiate and continue elimination | ➢ Continue with the activities listed on the left.【Ogasawara Village】<br>➢ Initiate strategic eradication activities (in the whole region) with cooperation among management authorities, starting from FY 2009.【MOE, FA, TMG, and Ogasawara Village】 |
| | Elimination of *Ficus microcarpa*, Leucaena, *Psidium littorale*, and other alien plants | ➢ Initiating a survey to determine the existing condition | ➢ Estimating the distribution status of alien woody plants based on aerial photographs.【FA】 | ➢ Initiate area exclusion | ➢ With cooperation among management authorities, initiate strategic elimination measures where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| **2. Habitat conservation for wood-pigeon** | Exclusion of feral cats | ➢ Initiating exclusion | ➢ Implementation of emergency captures of feral cats in cooperation with the Ogasawara Cat Liaison Committee (targeting all of Chichijima).【FA】 | ➢ Continue exclusion | ➢ Implement exclusion of cats focusing on the important southern region (the known breeding ground of the wood-pigeon and –surrounding areas) and decrease feral cat density on Chichijima.【MOE】 |
| | Elimination of black rats | | | (To be addressed on medium- and long-term bases) | |
| **3. Habitat conservation for land snails** | Elimination of predatory flatworm | ➢ Initiating area defense | ➢ Carrying out trials of specific measures for area defense at important areas within the un-invaded region of Chichijima, and examining the effectiveness of measures.【MOE】 | ➢ Continue area defense | ➢ Set up sanctuaries in land snail habitats (e.g., Tatsumizaki, Toriyama, Yoakedaira) and implement preventive measures against alien species introductions.【MOE】 |
| | Elimination of black rats | | | (To be addressed on medium- and long-term bases) | |
| **5. Habitat conservation for endemic insects** | Elimination of the green anole | | | (To be addressed on medium- and long-term bases) | |

*Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present
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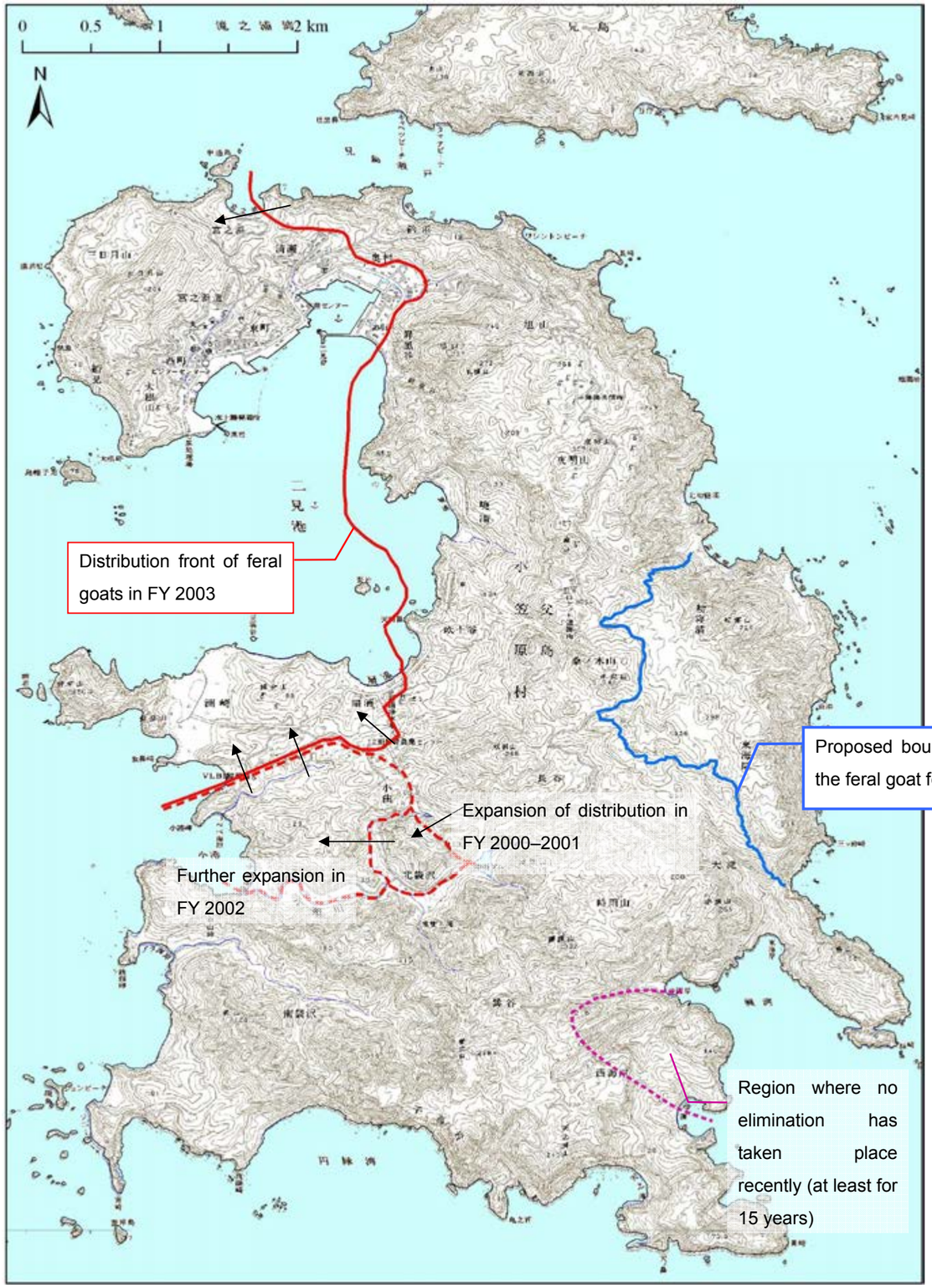
(1) Chichijima Island (Chichijima Island Group)

## 【Reference】 Vegetation of Chichijima Island




- 01 Machilio boninensisi-Ardisietum sieboldii, typical subass., typical variant
- 02 Machilio boninensisi-Ardisietum sieboldii, *Schima mertensiana* subass.
- 03 Machilus kobu-Schimetum mertensianae, *Psidium littorale* subass.
- 04 Machilus kobu-Schimetum mertensianae, *Geniostoma glabrum* subass, typical variant / *Freycinetia boninensis* variant
- 06 Pisonio-Elaeocarpetum photiniaefoliae
- 14 Distylio-Pouterietum dubiae
- 15 Wikstroemio-Pouterietum dubiae
- 16 Machilus kobu-Schimetum mertensianae, *Geniostoma glabrum* subass. , *Distylium lepidotum* variant
- 17 *Hernandia nymphaeifolia -Terminalia catappa* community
- 18 Liyistonia chinensis var. boninensis-Pandanus boninensis
- 19 *Hibiscus tiliaceus* community
- 21 *Sophora tomentosa* community
- 22 *Terminalia catappa* community
- 23 *Celtis boninensis-Sapindus boninensis* community
- 25 *Pandanus boninensis* community
- 29 Cyathetum mertensianae (secondary stand)
- 30 *Freycinetia boninensis* community
- 31 *Bischoffia javanica* community
- 32 *Leucaena leucocephala* community
- 33 *Pinus lutchuensis* community
- 35 *Casuarina equisetifolia* forest (includ. secondary forest)
- 36 Evergreen broadleaved planted forest
- 37 *Bambusa vulgaris* forest *etc.*
- 38 *Derris elliptica* community
- 40 Plant communities in rocky desert
- 41*Nephrolepis cordifolia* community
- 42 Miscanthetum condensati var. boninensis (includ. *Pennisetum sordidum* community, typical under units etc.)
- 44 *Ipomoea pes-caprea* community
- 45 *Vitex rotundifolia* community
- 47 *Limonium wrightii* community (includ. Lycidetum griseolae)
- 48 *Zoysia tenuifolia* community (natural grassland)
- 49 Myoporetum boninensis
- 52 *Nephrolepis cordifolia -Pteridium aquilinum var. latiusculum* community
- 53 *Histiopteris incisa* community
- 56 *Arundo donax* community
- 57 *Agave americana* community / *Agave sisalana* community
- 58 *Arundinaria simonii* community / *Pseudosasa japonica* community etc.
- 59 *Cyperus alternifolius-Calonyction aculeatum* community
- 60 *Bryophyllum pinnatum* community
- 61 *Stachytarpheta jamaicensis* community
- 62 *Paspalum orbiculare-Paspalum dilaltatum* community (include. *Pennisetum sordidum* community, *Paspalum orbiculare* under units)
- 65 Weed communities of the open area (*Bidens pilosa var. radiata* community etc.)
- 66 Field weed communities (*Amaranthus lividus* community etc.)
- 67 Artificial grassland
- 68 Park etc. (Planted trees, lawn etc.)
- 69 Residence, factory etc.
- 70 Concrete pavement site
- 71 Artificial bareland
- 72 Natural bareland
- 73 Open water

【Reference】 Additional information pertaining to feral goats on Chichijima




## Information on the fences for feral cat and goat exclusion in the Higashidaira area

**1. Goals**

Prevent the invasion of feral cats to protect the wood-pigeon.

Prevent the invasion of feral goats to protect rare plants.

**2. Location**

Fences were installed in the vicinity of the Higashidaira wood-pigeon sanctuary, established inside the national forest (along a road), toward the coastline. (The initial route was modified to detour around sclerophyllous scrub and endemic land snail habitat.)

**3. Structure**

The fences are 2.5 m tall and extend 4.6 km in total.

To exclude feral cats, a climb-proof structure will be fixed at the top of the fence. The fences are designed using a simple framework of posts installed in the ground without a foundation; once the island-wide eradication and measures against domestic cat and others are completed, these fences will be removed.

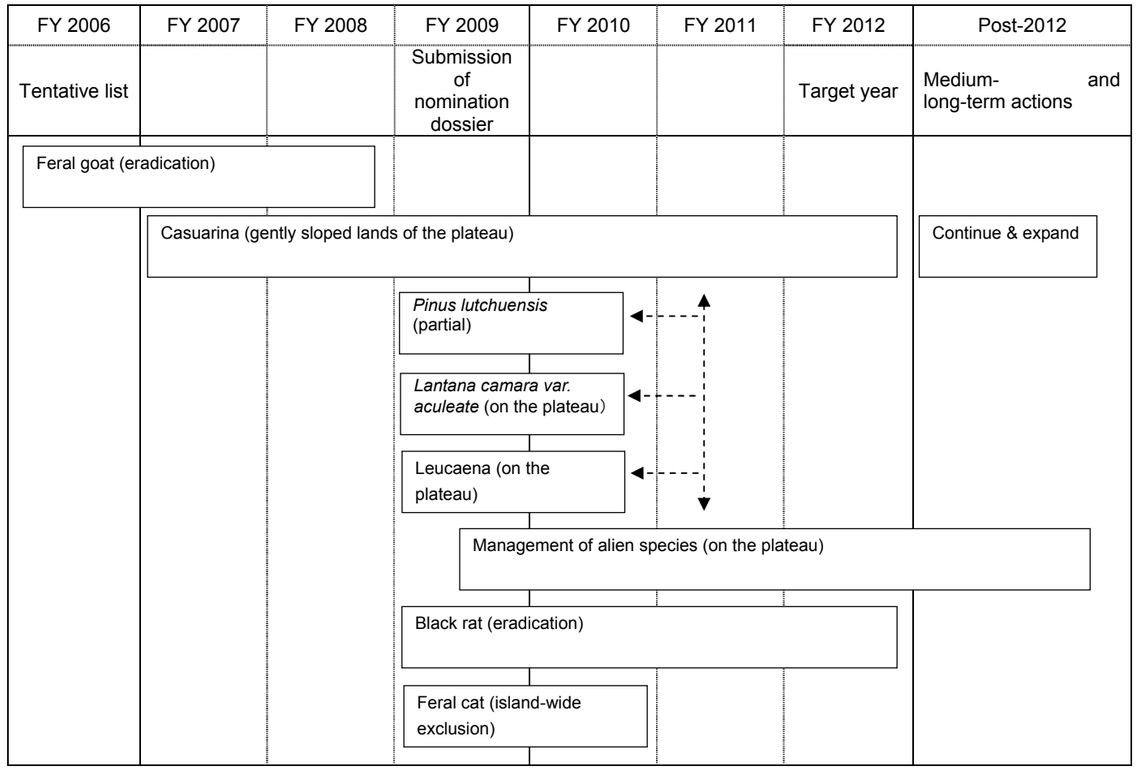
**4. The course to be taken**

- Construction partially completed in FY 2009.
- From FY 2009, elimination of feral goats and feral cats will be implemented both within and outside the fences.
- Once the effectiveness of the fences in Higashidaira has been verified, fences will be installed in the central mountain region.

(2) Anijima Island (Chichijima Island Group)

| Island | (Chichijima Island Group) | Short-term actions |
|---|---|---|
| **Anijima Island** | | |

- Anijima has the largest area of sclerophyllous scrub among the Ogasawara Islands, as well as many threatened endemic plants and insects. Therefore, it is a high-priority island for the elimination of alien species such as feral goats and Casuarina. Necessary conservation measures will be urgently promoted hereafter.
- Casuarina and *Pinus lutchuensis* are expanding in distribution and thereby stressing endemic plants within the sclerophyllous scrub and rocky desert vegetation; these invasive alien species are also stressing the habitat of *Cicindela bonina* by their leaf litter. Therefore, the MOE and FA are currently conducting area exclusion measures on the gently sloped land of the plateau.
- Feral goats have been eradicated by the TMG, and vegetation such as rocky desert vegetation and endemic plant species including *Callicarpa parvifolia*, *Crepidiastrum grandicollum*, and *Aristida cumingiana* are recovering as a result. It is also expected that seabirds will start breeding on the island again. On the other hand, since the grazing pressure of feral goats has been removed, plants such as Leucaena and *Lantana camara* var. *aculeata* have been increasing and invading the gently sloped land on the plateau.
- To address the above situation, area exclusion of alien plants such as Casuarina, *Pinus lutchuensis*, Leucaena, and *Lantana camara* var. *aculeata* on the gently sloped land of the plateau is targeted by FY 2012, based on monitoring (described below) of interspecific interactions and other information. As the soil seed bank of alien plants remains within the steeply sloped land on the seacoast, monitoring for new introduction and overgrowth of alien species and adaptive measures will be continued after area exclusions. With regard to Leucaena and *Lantana camara* var. *aculeata*, technical examinations of elimination methodologies will be conducted.
- The FA is analyzing models and surveys of the sclerophyllous scrub ecosystem on Anijima to determine the interspecific interactions on Ogasawara Islands and to predict the impacts of alien species elimination. Based on monitoring data, researchers will predict, evaluate, and analyze the recovery status of endemic plants and the status of introduction and overgrowth by new alien species at sites where alien species such as feral goat and Casuarina have been eliminated. The results obtained from these analyses will be utilized for the area exclusion mentioned above.
- Black rats have impacted the overall vegetation and species such land snails. To increase the effect of feral goat eradication, elimination of black rats will also be initiated by the MOE from FY 2009, with eradication targeted by FY 2012. As black rat elimination involves risks as well as benefits, monitoring will be implemented, and measures will be considered throughout the processes as necessary. In addition, because the black rat is an important food source for the endemic subspecies of Eurasian buzzard, the impact of black rat eradication on the Eurasian buzzards will also be monitored.
- Although feral cats were not identified in the survey conducted by the MOE, and an extremely small number of (or no) feral cats are estimated to inhabit Anijima, monitoring to identify feral cats will continue and, if cats are found, exclusion measures will be implemented.
- The overgrowing colony of *Lantana camara* var. *aculeata* at Takinoura Bay, the landing port of the island, is also the seed source of this alien plant within the island. Therefore, elimination is currently being implemented by volunteers, NPOs, and other parties. This elimination will continue through cooperation among management authorities.



| Island | (Chichijima Island Group) | Activity | |
|---|---|---|---|
| **Anijima Island** | | **1. Conservation of sclerophyllous scrub** | Among alien animals, feral goats, which had been the main impact factor for sclerophyllous scrub vegetation, have nearly been eradicated. Now, elimination of the black rat targeting its eradication is planned. Appropriate conservation measures will also be carried out for the sclerophyllous scrub including rocky desert vegetation intermingled within and natural *Schima mertensiana* forest distributed in surrounding hollows and ravine bottoms through the removal of impact factors, including the black rat, and monitoring.<br>In addition, the habitats of precious endemic animal and plant species, including *Cicindela bonina*, *Crepidiastrum grandicollum*, and *Callicarpa parvifolia*, will be conserved by eliminating invasive plants such as *Casuarina*, focusing on areas where suppressive pressure by alien species is anticipated, and maintaining rocky desert vegetation. |
| | | **2. Habitat conservation for land snails** | Anijima is an important habitat for many land snails, such as *Mandarina anijimana*, which are important for ecological and evolutionary biology studies. Elimination of the black rat, which is believed to cause grazing damage, is planned, targeting its eradication. However, the black rat is also a known food of the endemic subspecies of Eurasian buzzard; thus, careful and adequate measures are being conducted under continued monitoring. |
| | | **3. Habitat conservation for wood-pigeon** | Anijima is one of the habitats of the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*). The wood-pigeon habitat is being conserved by excluding feral cats, which are assumed to inhabit the wood-pigeon habitat in small numbers. In addition, because the wood-pigeon moves among islands such as Chichijima and Ototojima, unified conservation measures are being conducted in these habitats with the goal of achieving steady habitation. |

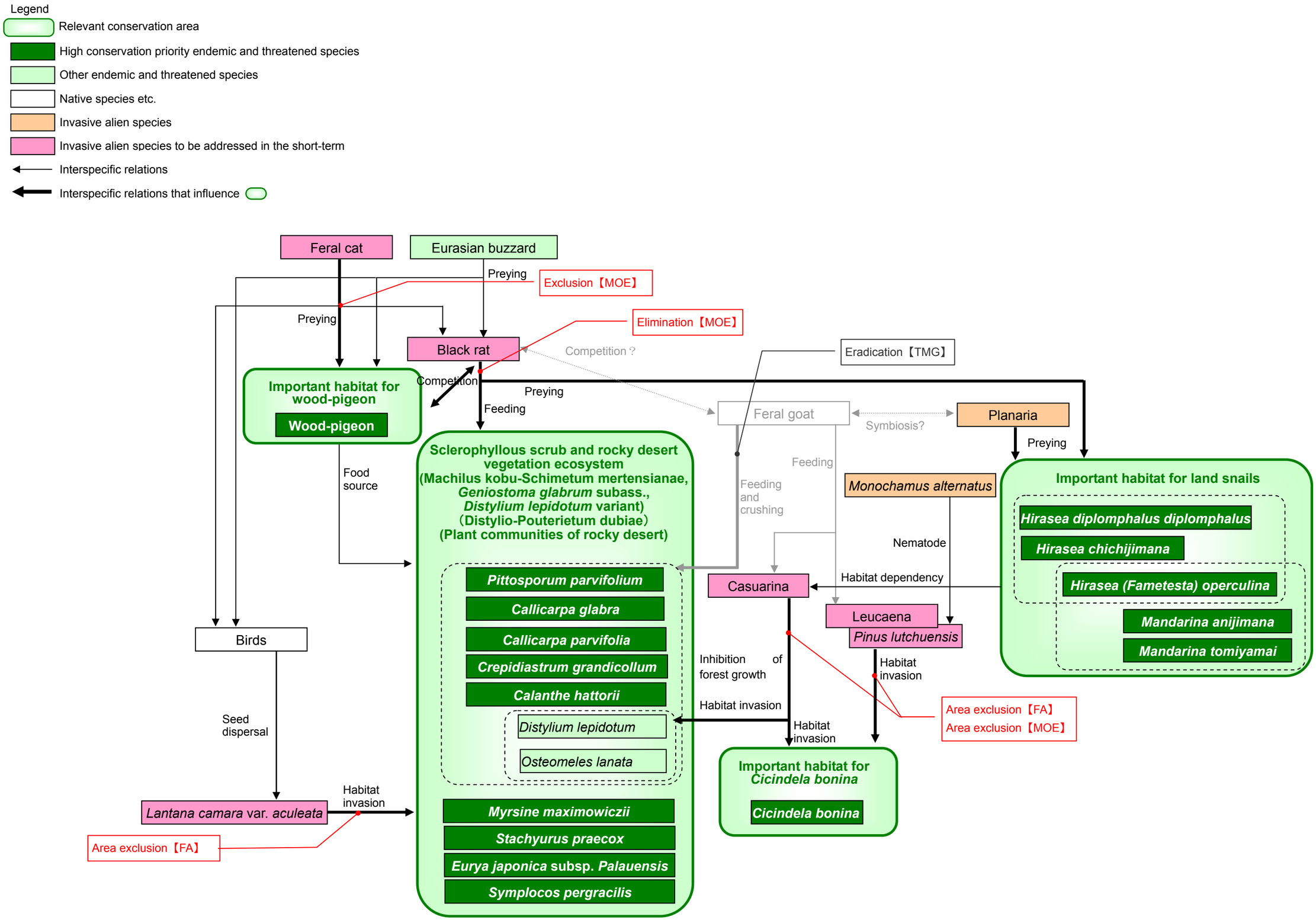
| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|
| **1. Conservation of sclerophyllous scrubs** | Elimination of feral goats | ➢ Completion of eradication | ➢ Completion of eradication.【TMG】 | – | – |
| | Elimination of black rats | ➢ Initiating elimination | ➢ Initiating elimination in FY 2009 based on the status of elimination efforts on Mukojima.【MOE】 | ➢ Complete eradication | ➢ Complete eradication on the island and also on its peripheral islands.【MOE】 |
| | Elimination of Casuarina and other alien plants | ➢ Completion and expansion of area exclusion | ➢ Implementation of monitoring following experimental elimination on the Anijima plateau, and Initiating new elimination experiments.【MOE】<br>➢ Implementation of monitoring surveys (e.g., of birds, insects, land snails, and plants) before the elimination, and implementation of elimination, targeting area exclusion in the central region of Anijima.【FA】 | ➢ Complete and expand area exclusion | ➢ Implement elimination with the aim of complete area exclusion within the gently sloped land on the plateau.【FA】 |
| | Elimination of Leucaena | ➢ Establishment of elimination methods<br>➢ Initiating a survey to determine the existing condition (on the plateau) | ➢ Implementation of experiments to establish effective technical elimination methods using chemicals.【MOE】<br>➢ Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | ➢ Complete area exclusion | ➢ Initiate elimination in FY 2010, with the aim of complete area exclusion within the gently sloped land of the plateau by FY 2012.【FA】 |
| | Elimination of *Lantana camara var. aculeata* | ➢ Establishment of elimination methods<br>➢ Initiating a survey to determine the existing condition on the plateau<br>➢ Initiating area exclusion (Takinoura Bay) | ➢ Implementation of experiments to establish effective technical elimination methods using chemicals.【MOE】<br>➢ Estimating the distribution status of alien woody plants using aerial photographs.【FA】<br>➢ Initiating elimination in Takinoura Bay.【Resident volunteers and NPO】 | ➢ Complete area exclusion | ➢ From FY 2010 within the gently sloped land of the plateau, implement elimination of Casuarina and other plants as well as experimental elimination in a small area with monitoring thereafter.【FA】<br>➢ With cooperation among volunteers, NPOs, and management authorities, implement elimination in Takinoura Bay. |
| **2. Habitat conservation for land snails** | Elimination of black rats | ➢ Initiating elimination | * Same as above | ➢ Complete eradication | * Same as above |
| **3. Habitat conservation for wood-pigeon** | Elimination of black rats | ➢ Initiating elimination | * Same as above | ➢ Complete eradication | * Same as above |
| | Exclusion of feral cats | ➢ Completion of exclusion | ➢ Carrying out exclusion by FY 2009 on the basis of research on inhabitation status.【MOE】 | - | - |

*Correspond to ⬭ in the figure below

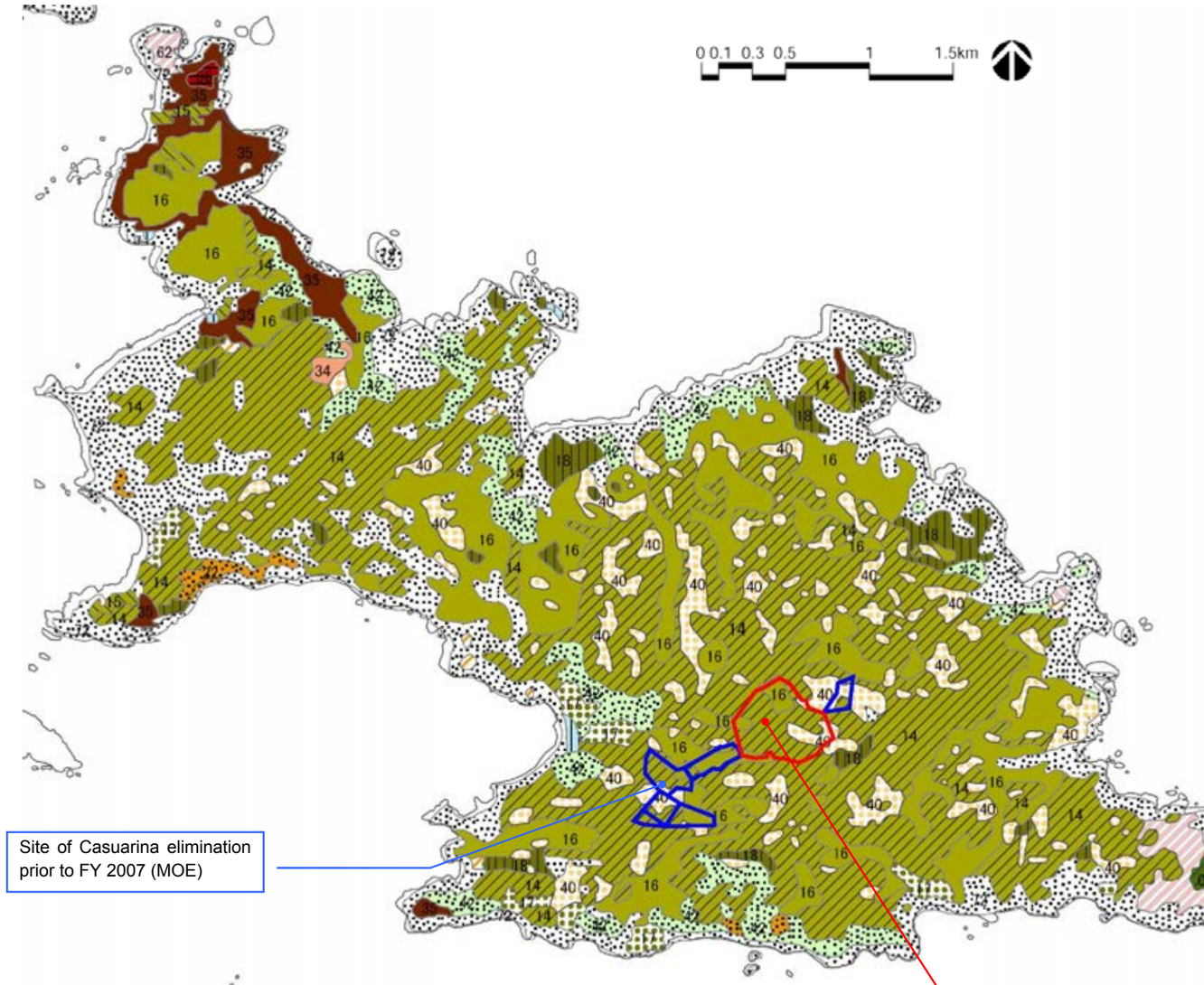
* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

*(Gray):Almost complete at present (Blue):Planned to be completed by the end of FY 2012

## (2) Anijima Island (Chichijima Island Group)



【Reference】 Vegetation of Anijima and related information

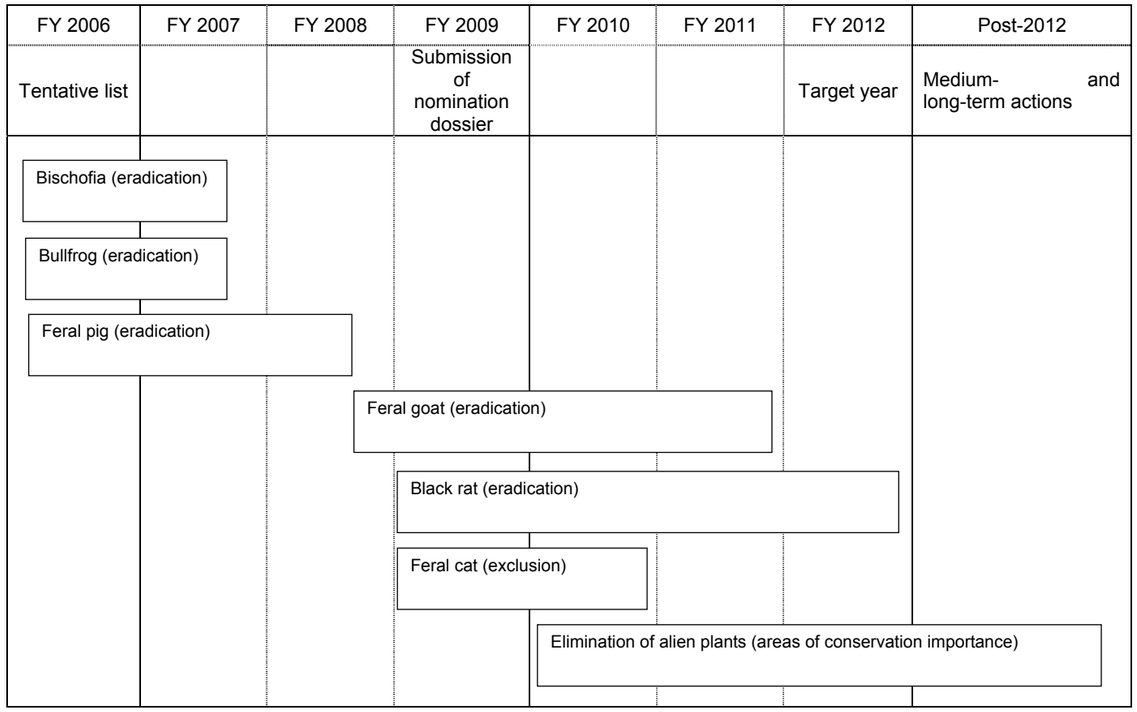



- 01 Machilio boninensisi-Ardisietum sieboldii, typical subass., typical variant
- 14 Distylio-Pouterietum dubiae
- 15 Wikstroemio-Pouterietum dubiae
- 16 Machilus kobu-Schimetum mertensianae, *Geniostoma glabrum* subass. , *Distylium lepidotum* variant
- 17 *Hernandia nymphaeifolia -Terminalia catappa* community
- 18 Liyistonia chinensis var. boninensis-Pandanus boninensis
- 22 *Terminalia catappa* community
- 25 *Pandanus boninensis* community
- 34 *Lantana camara* community
- 35 *Casuarina equisetifolia* forest (includ. secondary forest)
- 36 Evergreen broadleaved planted forest
- 40 Plant communities in rocky desert
- 42 Miscanthetum condensati var. boninensis (includ. *Pennisetum sordidum* community, typical under units etc.)
- 45 *Vitex rotundifolia* community
- 62 *Paspalum orbiculare-Paspalum dilaltatum* community (include. *Pennisetum sordidum* community, *Paspalum orbiculare* under units)
- 63 *Zoysia tenuifolia* community (secondary grassland)
- 72 Natural bareland

(3) Ototojima Island (Chichijima Island Group)

| Island (Chichijima Island Group) | Short-term actions |
|---|---|
| **Ototojima Island** | |

- On Ototojima, the only island inhabited by the five endemic dragonflies of Ogasawara, the MOE has nearly achieved eradication of the bullfrog, followed by that of the feral pig. Therefore, the main alien-animal impact factors on this island have been removed. From now on, together with actions to secure and manage lentic environments to mitigate risks such as drought, conservation of the forest environment (mentioned below) will be carried out.
- Elimination of feral goats has also been started on Ototojima by the TMG, following the completion of feral goat eradication on Anijima. In the northern part of Ototojima, where a pure population of *Morus boninensis* is distributed (northwestern part of Mt. Hirone), soil erosion caused by feral goats has been observed. Therefore, strategic and adaptive elimination measures will be developed based on the feral goat exclusion plan, with the goal of rapid reduction in goat numbers. The aim is to reduce the goat population to a low density by FY 2010, with complete eradication aimed for by FY 2011. After that, measures to prevent soil erosion will be considered and implemented, as will monitoring for the introduction of *Morus australis*, which presents the potential risk of cross-fertilization.
- Black rats impact both flora and fauna, including endemic land snails. On Ototojima, the MOE initiated black rat elimination in FY 2009, with the aim of complete eradication by FY 2012. Because rat elimination has potential risks as well, the effects will be monitored, and measures will be considered as necessary. In addition, as the black rat is an important food source for the endemic subspecies of Eurasian buzzard, the impact of black rat eradication on the Eurasian buzzard will be monitored.
- Feral cats have a predation impact on birds including the endemic subspecies of Japanese wood-pigeon. Among the Chichijima Island Group, Ototojima is the second most important island for wood-pigeon habitat, following Chichijima. Feral cats have been found on the island, and complete exclusion of feral cats is targeted by FY 2010.
- To recover *Schima mertensiana* vegetation and avoid stress on the habitats of woodland endemic insects and land snails, the MOE has already completed the eradication of Bischofia at the early stage of its invasion. For other alien plants such as Casuarina, *Ficus microcarpa*, and Leucaena, once their distributions are understood, elimination will be initiated through agency cooperation, prioritizing areas of conservation importance.



| Island (Chichijima Island Group) | Activity | |
|---|---|---|
| **Ototojima Island** | **1. Conservation of *Schima mertensiana* forests** | Activities such as exclusion of alien species will continue to be conducted in an adaptive manner in highly natural forests of *Schima mertensiana* that occupy a large area of Ototojima, particularly in the central part of the island, considering already established interspecific relationships.<br>Extensive invasion by Bischofia was a concern. However, this species has been eradicated at the early stage of its invasion. Now, feral goat, black rat, and Casuarina will be eliminated. However, as the black rat is a food source of the endemic subspecies of Eurasian buzzard, an appropriate approach is required.<br>In addition, the forests will be conserved as the habitats of other endemic species such as *Morus boninensis*. |
| | **2. Habitat conservation for endemic insects including five endemic species of dragonfly** | Bullfrogs and feral pigs, which likely impacted endemic dragonfly species, have been eradicated. Endemic insect habitats will be conserved by removing alien impacts while conducting ongoing monitoring. Additional measures include preventing desiccation of waterside areas that serve as dragonfly breeding grounds. |
| | **3. Habitat conservation for wood-pigeon** | Ototojima includes the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*) habitat, which is being conserved by removing the impact of feral cats. Because the wood-pigeons move to other islands such as Chichijima and Anijima, unified conservation measures will be implemented to attain steady habitation. |

| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description |
|---|---|---|---|---|---|
| **1. Conservation of *Schima mertensiana* forests** | Elimination of Bischofia | ➢ Completion of eradication | ➢ Achieving eradication by chemical injection at the initial stage of invasion. Implementation of monitoring.【MOE】 | - | - |
| | Elimination of feral goats | ➢ Continuation of elimination | ➢ Implementation of elimination, targeting eradication from Ototojima.【TMG】 | ➢ Complete eradication | ➢ Continue with the activities listed on the left.【TMG】 |
| | Elimination of black rats | ➢ Initiating elimination | ➢ Initiating elimination in FY 2009 based on the implementation status of elimination on Mukojima.【MOE】 | ➢ Complete eradication | ➢ Complete eradication on the island and also on its peripheral islands.【MOE】 |
| | Elimination of Casuarina, Leucaena, and other invasive alien plants | ➢ Initiating a survey to determine the existing condition | ➢ Estimating the distribution status of alien woody plants using aerial photographs.【FA】<br>➢ Implementation of monitoring surveys (e.g., of birds, insects, land snails, and plants) before conducting elimination.【FA】 | ➢ Initiate area exclusion | ➢ With cooperation among management authorities, initiate elimination strategically where necessary.【MOE, FA, TMG, Ogasawara Village】<br>➢ Research the distribution status of alien species (e.g., Casuarina, Leucaena) in the national forest and analyze the effects of area exclusion based on the results of eliminating Leucaena and other alien species on Anijima and elsewhere. Initiate area exclusion beginning in FY 2010.【FA】 |
| **2. Habitat conservation for endemic insects including five endemic species of dragonfly** | Elimination of bullfrogs | ➢ Completion of eradication | ➢ Achieving eradication.【MOE】 | - | - |
| | Elimination of feral pigs | ➢ Completion of eradication | ➢ Achieving eradication.【MOE】<br>➢ Implementation of measures to recover vegetation, land snail fauna, and insect fauna. Implementing recovery projects for threatened insect species.【MOE】 | - | - |
| | Recovery of lentic environments | ➢ Construction of lentic environments | ➢ Construction of lentic environments to recovery the site together with the implementation of monitoring of aquatic insects, such as dragonflies.【MOE】 | ➢ Construction of lentic environments | ➢ Continue with the activities listed on the left.【MOE】 |
| | Elimination of Casuarina and other alien plants | ➢ Initiating a survey to determine the existing condition | * Same as above | ➢ Initiate area exclusion | * Same as above |
| **3. Habitat conservation for wood-pigeon** | Elimination of black rats | ➢ Initiating elimination | * Same as above | ➢ Complete eradication | * Same as above |
| | Exclusion of feral cats | ➢ Initiating exclusion | ➢ Implementation of exclusion prior to measures against black rats from FY 2009.【MOE】 | ➢ Complete exclusion | ➢ Complete exclusion by FY 2010.【MOE】 |

*Correspond to ⬭ in the figure below

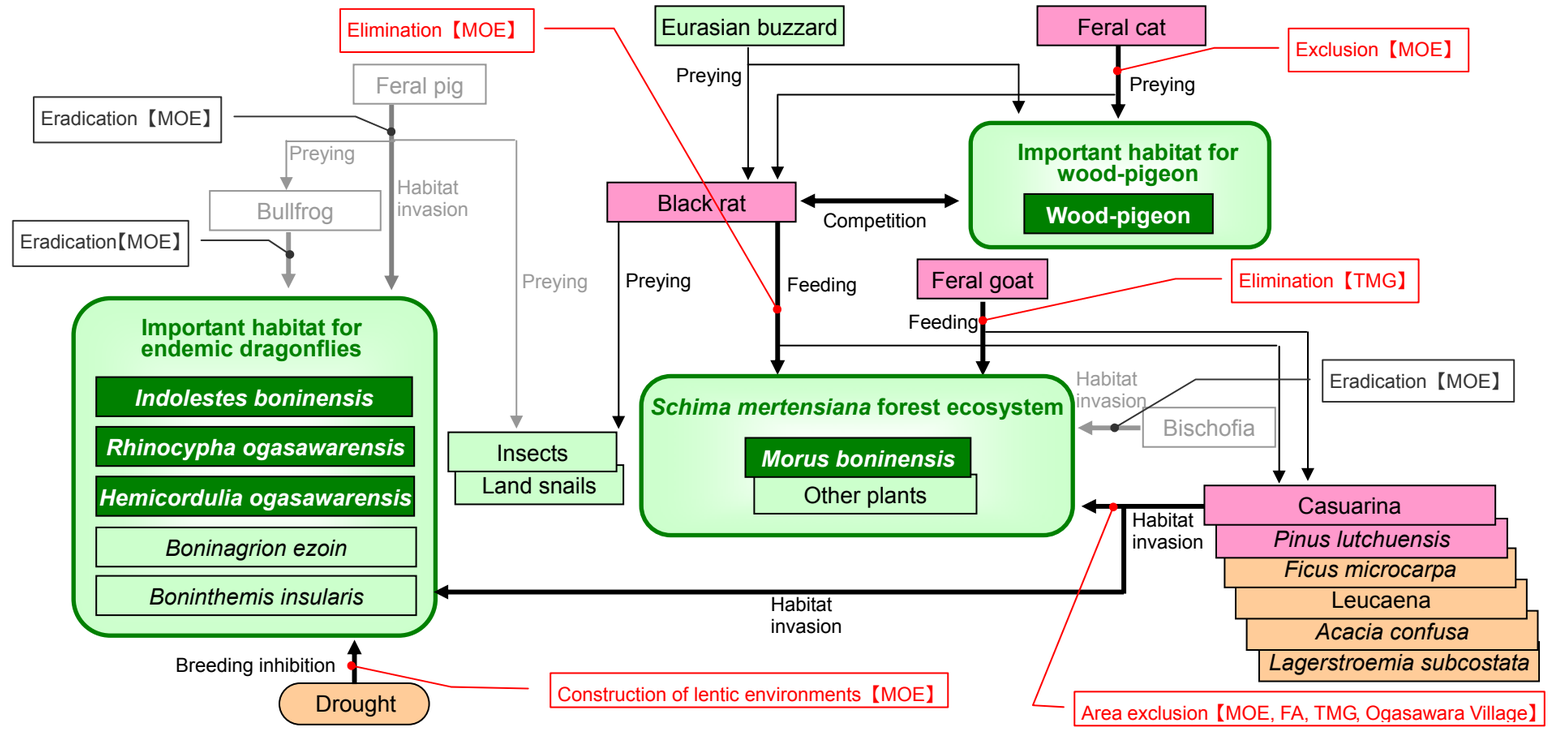
* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

*(Gray):Almost complete at present (Blue):Planned to be completed by the end of FY 2012

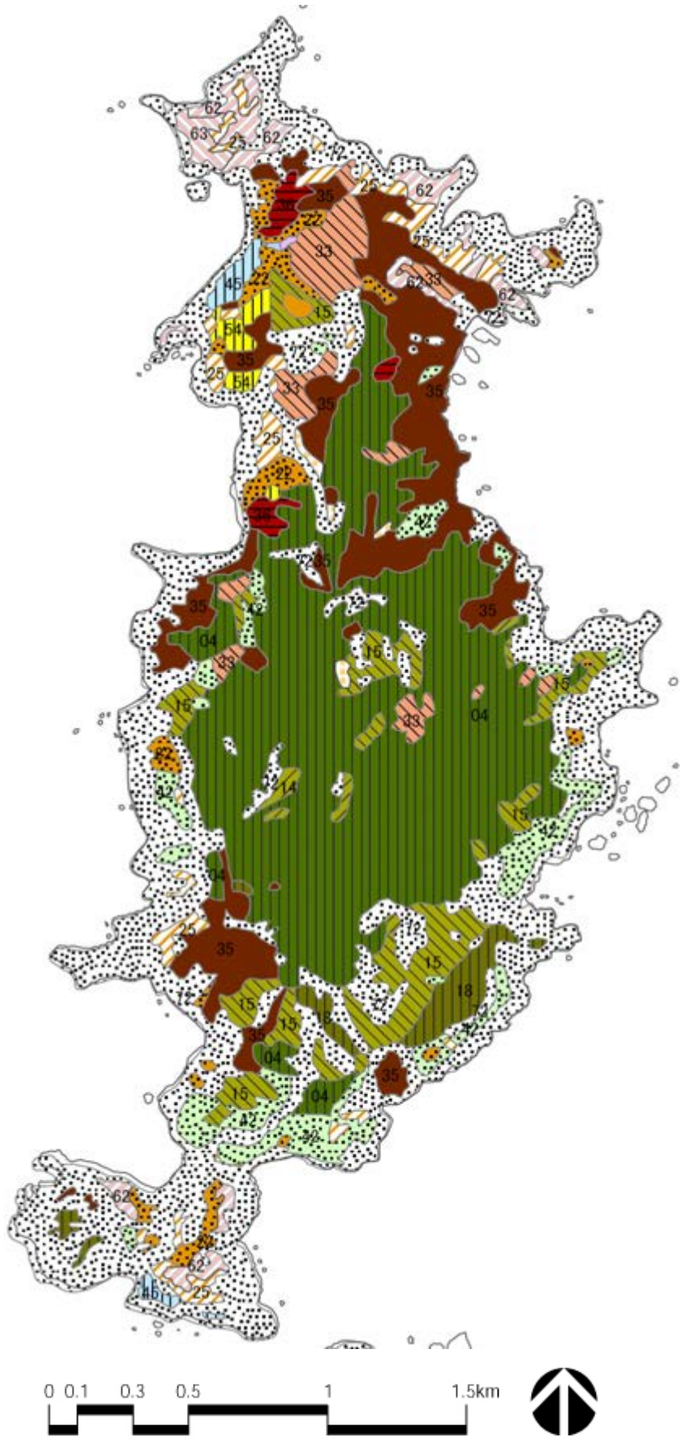
## (3) Ototojima Island (Chichijima Island Group)

Legend

- Relevant conservation area
- High conservation priority endemic and threatened species
- Other endemic and threatened species
- Native species etc.
- Invasive alien species
- Invasive alien species to be addressed in the short-term
- Interspecific relations
- Interspecific relations that influence



## 【Reference】 Vegetation of Ototojima




- 04 Machilus kobu-Schimetum mertensianae, *Geniostoma glabrum* subass, typical variant / *Freycinetia boninensis* variant
- 14 Distylio-Pouterietum dubiae
- 15 Wikstroemio-Pouterietum dubiae
- 18 Liyistonia chinensis var. boninensis-Pandanus boninensis
- 22 *Terminalia catappa* community
- 24 *Morus boninensis* community
- 25 *Pandanus boninensis* community
- 33 *Pinus lutchuensis* community
- 35 *Casuarina equisetifolia* forest (includ. secondary forest)
- 36 Evergreen broadleaved planted forest
- 40 Plant communities in rocky desert
- 42 Miscanthetum condensati var. boninensis (includ. *Pennisetum sordidum* community, typical under units etc.)
- 45 *Vitex rotundifolia* community
- 54 *Imperata cylindrica* var. *major* community (includ. Paspalum conjugatum comm.)
- 62 *Paspalum orbiculare-Paspalum dilaltatum* community (include. *Pennisetum sordidum* community, *Paspalum orbiculare* under units)
- 63 *Zoysia tenuifolia* community (secondary grassland)
- 72 Natural bareland

## (4) Nishijima Island (Chichijima Island Group)

| Island | (Chichijima Island Group) | Activity | |
|---|---|---|---|
| **Nishijima Island** | | **1. Ecosystem management considering endemic species** | Endemic species such as land snails still inhabit Nishijima. For conservation of endemic species, elimination of alien species such as black rats, Casuarina species, and Leucaena will be conducted in an adaptive manner considering the already developed interspecific relationships on the island.<br>In addition, ecosystems of this island will be conserved as the habitats of endemic plants such as *Cirsium boninense*. |

| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description |
|---|---|---|---|---|---|
| **1. Ecosystem management considering endemic species** | Elimination of black rats | ➢ Initiation of elimination | ➢Rat poison being set out as an elimination effort.【FFPRI】 | ➢ Complete the eradication | ➢ Complete eradication. 【MOE】 |
| | Elimination of Casuarina and Leucaena | ➢ Initiation of a survey to determine the existing condition | ➢Estimating the distribution status of alien woody plants using aerial photographs.【FA】<br>➢Conducting a survey of Casuarina distribution in the central part of the island.【FA】 | ➢ Initiate elimination | ➢ With cooperation among management authorities, initiate strategic elimination where necessary.【MOE, FA, TMG, Ogasawara Village】<br>➢ For national forest areas, establish maintenance arrangements with NPOs and other groups to promote the elimination of Casuarina and other alien species starting in FY 2010.【NPO, FA】 |

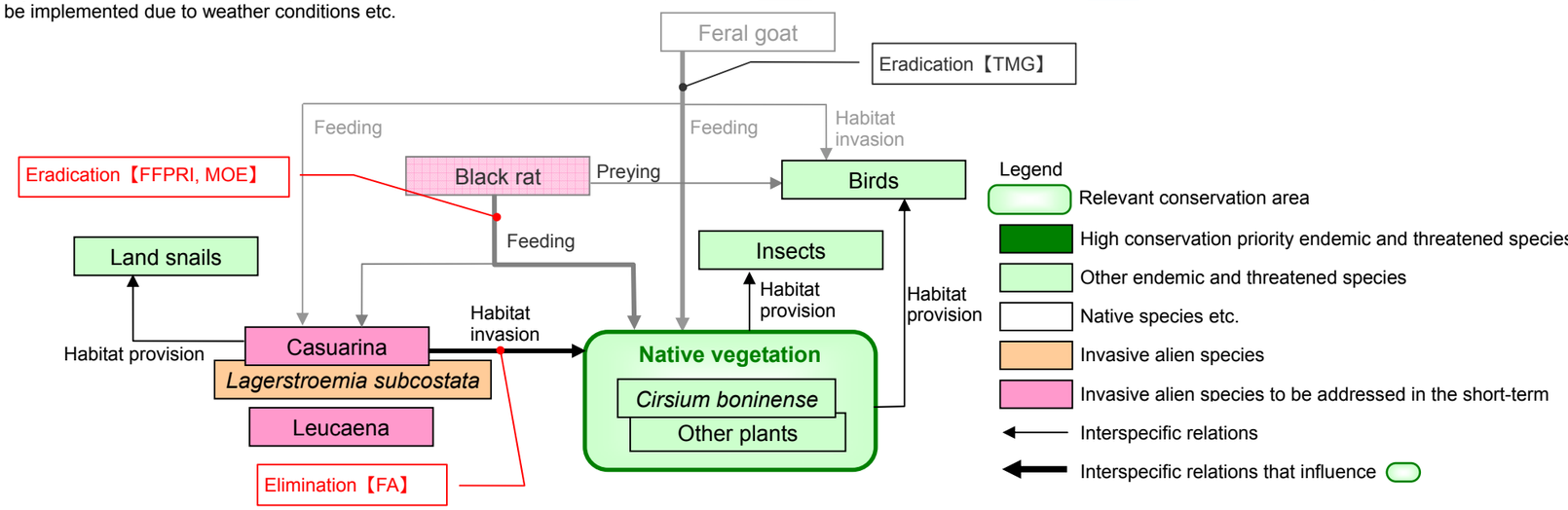
*Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

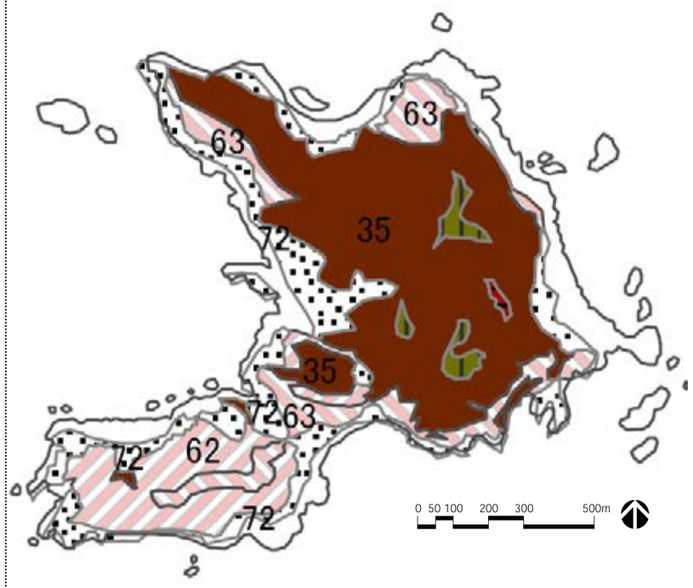
(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

■Short-term actions

- On Nishijima, eradication of feral goats, which had heavy impacts on the vegetation, has been achieved.
- It is important to recover the native vegetation, which will also benefit insect conservation. Therefore, in addition to ongoing efforts to eliminate black rats with the goal of complete eradication, elimination of alien plants such as Casuarina and Leucaena will be initiated.
- On the other hand, some land snails have become adapted to Casuarina. Therefore, care must be taken when conducting elimination of alien plants. For example, monitoring should be conducted, and activities such as clear-cutting should be avoided.




Legend
- ⬭ Relevant conservation area
- High conservation priority endemic and threatened species
- Other endemic and threatened species
- Native species etc.
- Invasive alien species
- Invasive alien species to be addressed in the short-term
- ← Interspecific relations
- ⬅ Interspecific relations that influence ⬭




Reference: Vegetation of Nishijima Island

- 35 *Casuarina equisetifolia* forest (includ. secondary forest)
- 54 *Imperata cylindrica* var. *major* community (includ. Paspalum conjugatum comm.)
- 62 *Paspalum orbiculare-Paspalum dilaltatum* community (include. *Pennisetum sordidum* community, *Paspalum orbiculare* under units)
- 63 *Zoysia tenuifolia* community (secondary grassland)
- 72 Natural bareland

| Island | (Chichijima Island Group) | Activity | |
|---|---|---|---|
| **Higashijima Island** | | **1. Conservation of seabird breeding grounds** | To conserve the breeding grounds of seabirds such as Audubon's shearwater (*Puffinus lherminieri bannermani*), the wedge-tailed shearwater (*Puffinus pacificus*), and Bulwer's petrel (*Bulweria bulwerii*) that currently breed on Higashijima, monitoring and follow-up measures will be conducted following the elimination of black rats, which preyed on seabirds. |
| | | **2. Ecosystem management considering endemic species** | For conservation of endemic species still inhabiting the island, measures such as elimination of alien plants will be conducted in an adaptive manner considering the already established interspecific relationships.<br>Habitats and colonies of endemic plants such as *Lobelia boninensis* and *Ixeris longirostra* will be conserved. |

| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|
| **1. Conservation of seabird breeding grounds** | Elimination of black rats | ➢ Completion of eradication | ➢ Conducting experimental elimination on Higashijima on a pilot basis.【MOE】 | – | – |
| **2. Ecosystem management considering endemic species** | Elimination of Casuarina and Leucaena | ➢ Initiating a survey to determine the existing condition | ➢ Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | ➢ Initiate elimination | ➢ Based on the results from elimination of Leucaena and other alien species on islands such as Anijima, consider whether to implement experimental elimination with the aim of achieving area exclusions.【FA】 |

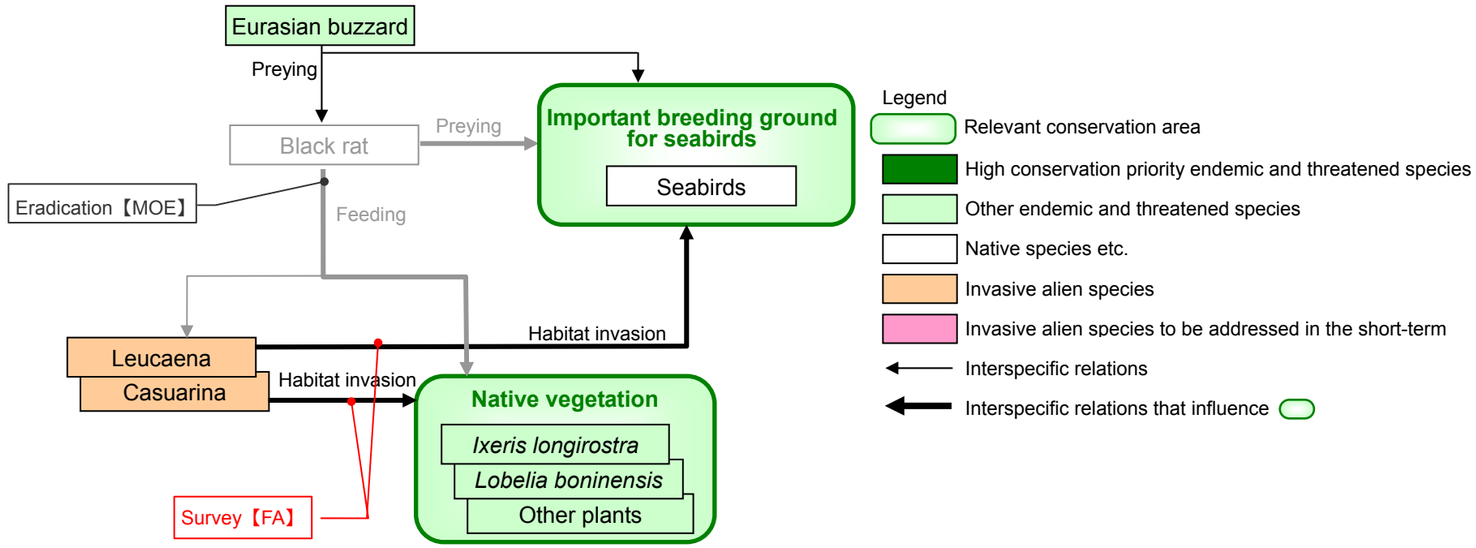
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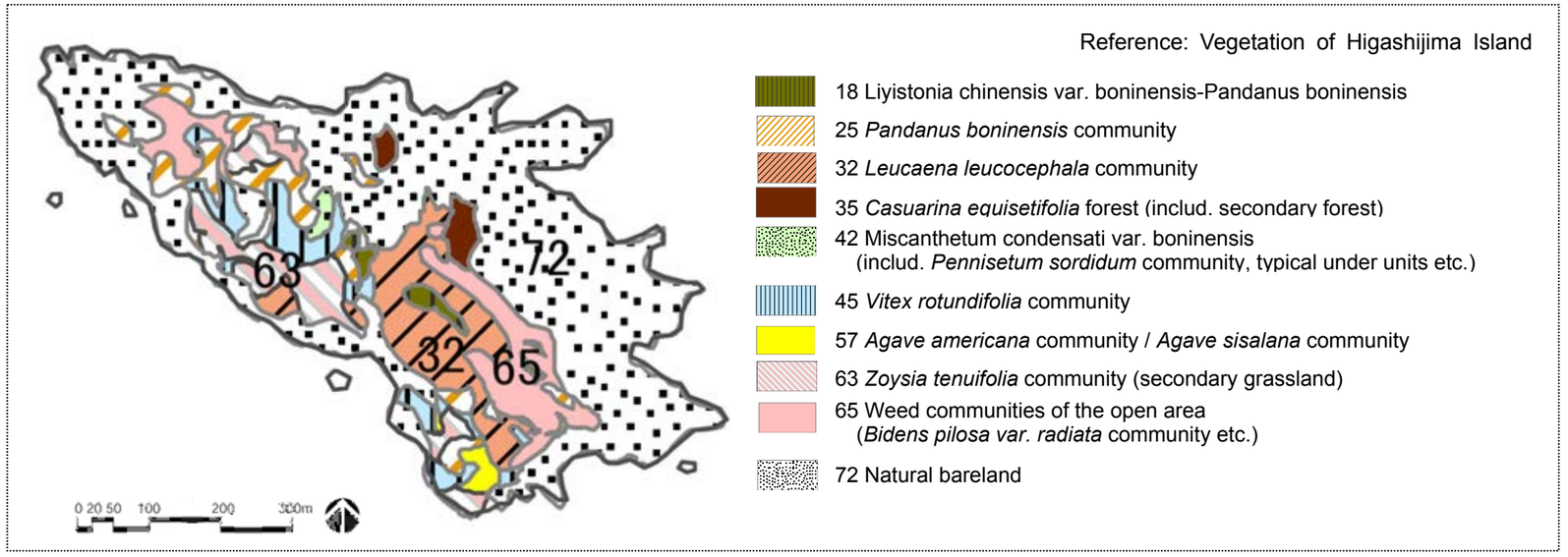
* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

■Short-term actions

- On Higashijima, eradication of black rats, which were impacting seabirds and vegetation, has been completed.
- The distributions of alien plants such as Casuarina and Leucaena will be determined and implementation of measures including experimental elimination aimed at achieving area exclusions will be discussed.



## (6) Minamijima Island (Chichijima Island Group)

| Island | (Chichijima Island Group) | Activity | |
|---|---|---|---|
| **Minamijima Island** | | **1. Conservation of seabird breeding grounds** | To conserve the breeding grounds of seabirds such as the wedge-tailed shearwater (*Puffinus pacificus*) and Bulwer's petrel (*Bulweria bulwerii*) that breed on Minamijima, appropriate conservation will be promoted by elimination of alien species such as the black rat, which creates predation pressure on seabirds, with continued monitoring, and by complying with the current utilization rules to avoid impacts from human use. |
| | | **2. Ecosystem management considering endemic species** | For conservation of endemic species still inhabiting the island, elimination of alien plants such as *Cenchrus echinatus* will be continued in an adaptive manner, considering already established interspecific relations. Approaches such as limiting utilization will also be enforced.<br>Habitats of endemic and threatened plants such as *Lobelia boninensis*, *Ixeris longirostra*, and *Lycium sandwicense* will be conserved. |

| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description |
|---|---|---|---|---|---|
| **1. Conservation of seabird breeding grounds**<br>**2. Ecosystem management considering endemic species** | Elimination of *Cenchrus echinatus* and other alien plants | Continuation of elimination | ➢ Implementation of elimination of highly invasive alien plants on Minamijima.【TMG, FA, Ogasawara Village, NPO】<br>➢ Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | ➢ Continue elimination | ➢ Continue the activities listed on the left.【TMG, FA】 |
| | Elimination of black rats | | | ➢ Complete eradication | ➢ After eradication is completed on Anijima and Ototojima, consider management measures.【MOE】 |

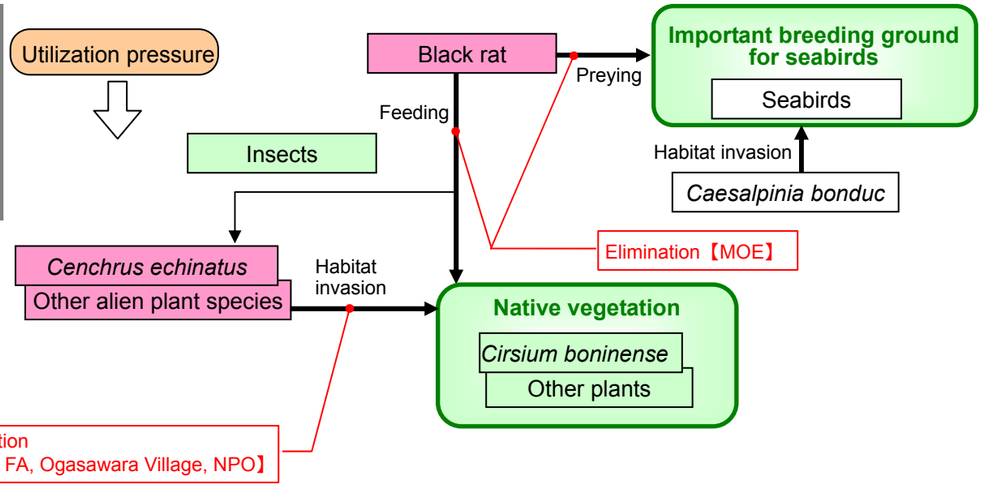
*Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

■Short-term actions

- Implement black rat eradication to protect important seabird habitats on Minamijima.
- Continue to eliminate alien plants such as *Cenchrus echinatus* in an adaptive manner under ongoing monitoring.




Legend

- Relevant conservation area
- High conservation priority endemic and threatened species
- Other endemic and threatened species
- Native species etc.
- Invasive alien species
- Invasive alien species to be addressed in the short-term
- Interspecific relations
- Interspecific relations that influence ⬭

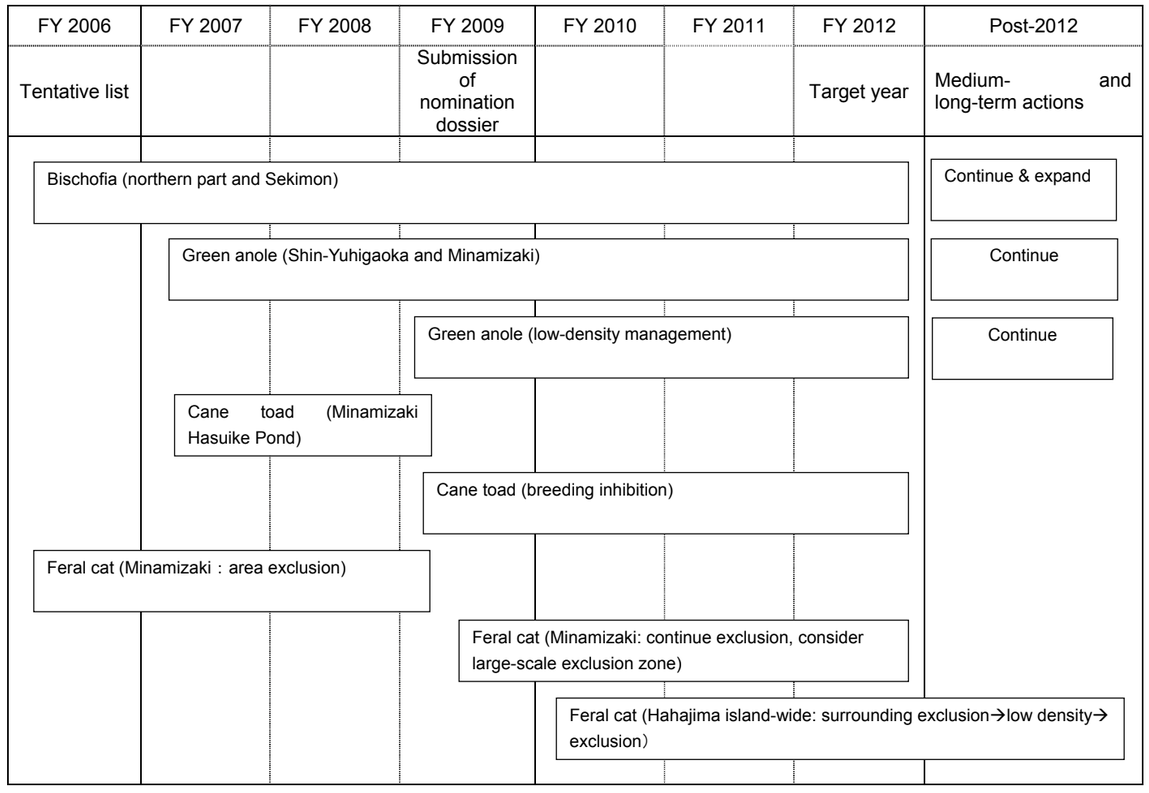
Reference: Vegetation of Minamijima Island




- 20 *Scaevola sericea* community
- 25 *Pandanus boninensis* community
- 45 *Vitex rotundifolia* community
- 46 *Sporobolus virginicus* community
- 47 *Limonium wrightii* community (includ. Lycidetum griseolae)
- 48 *Zoysia tenuifolia* community (natural grassland)
- 49 Myoporetum boninensis
- 65 Weed communities of the open area (*Bidens pilosa var. radiata* community etc.)
- 72 Natural bareland
- 73 Open water

| Island | (Hahajima Island Group) | Short-term actions |
|---|---|---|
| **Hahajima Island** | | |

- Bischofia is distributed throughout Sekimon and has large impacts on the sustainability of the subtropical rainforest and *Ardisia sieboldii* forest distributed widely in the north-central part of Hahajima. Based on the land ownership structure, the FA, MOE, and other parties are sharing in the work of eliminating Bischofia. The FA is conducting Bischofia exclusion in the entire areas of Sekimon and Nishidai, and the MOE is expanding its exclusion area from the northern part of the island (Higashidai and Nishidai) toward the south. The elimination will be continued in cooperation between the FA and MOE. Adaptive management will be carried out, while monitoring the impacts of elimination and the recovery of endemic vegetation. To achieve eradication of Bischofia, which is the long-term goal, actions such as extracting young trees will also be continued in parallel.
- Although endemic insects have been greatly impacted by green anole and cane toad predation pressures, threatened insects such as lycaenid butterfly (*Celastrina ogasawaraensis*), *Parnara ogasawarensis*, and *Ogasawarazo lineatus* still remain on the island. The MOE has set up fences around nature restoration areas to exclude green anole in Shin-Yuhigaoka and Minamizaki (fences in Minamizaki are also designed to exclude feral cat). Extremely low alien species densities having no damaging impact on the insect ecosystem was achieved in FY 2009. Hereafter, management will continue to keep the density low. Vegetation and ecosystem management such as elimination of alien plants will also be conducted. Within sites and areas important for conservation, traps will be set up intensively as an urgent measure to reduce the population density of green anole. In addition, elimination of alien species such as Bischofia will be implemented to conserve *Machilus kobu* and *Callicarpa subpubescens*, which are the food trees for *Celastrina ogasawaraensis*.
- By setting up fences around lentic environments that serve as breeding grounds of the cane toad and thereby preventing its breeding, habitat will be conserved for endemic dragonflies and land snails, as well as *Chlaenius ikedai*, in Minamizaki. Fences have already been set up at Minamizaki Hasuike Pond by the MOE. Considering the importance and urgency of conservation of target species, the fence installation work will continue to be carried out to prevent cane toad breeding; a cane toad capture-and-kill program will also be promoted. The target date for certain parts of the project is FY 2012.
- Hahajima is a habitat for the endemic subspecies of Japanese wood-pigeon, and the area around Sekimon, Mt Chibusa, and Kitako is especially important. Sekimon is also an important habitat for the Bonin honeyeater. In addition, Minamizaki is an important habitat for *Carduelis sinica kittlitzi* and seabirds. To achieve habitat conservation for these birds, measures against feral cats are necessary.
- On Minamizaki, although area exclusion of feral cats has already been completed by a local NPO, from the viewpoint of conserving the habitats of *Carduelis sinica kittlitzi* and seabirds, the MOE is considering the establishment and implantation of a large-scale exclusion zone including areas surrounding the existing area exclusion zone. In addition, based on the implementation plan established by the Ogasawara Cat Liaison Committee, capturing activities will be continuously implemented in the surrounding mountain region to achieve island-wide eradication.
- On Chichijima and Hahajima, approaches to cut off a source of new feral cats through strict implementation of appropriate domestic cat-keeping measures are also being implemented by the Ogasawara Cat Liaison Committee, Tokyo Veterinary Medical Association, and other related parties. Therefore, the measures against feral cats will be conducted in conjunction with measures for domestic cats.
- As Hahajima is an important habitat for endemic land snails, the MOE will determine the inhabitation of endemic land snails on Hahajima, establish an individual project review committee, and discuss conservation policies for the land snails. Predatory flatworms, which are assumed to have a great impact on endemic land snails, have not yet invaded Hahajima. Therefore, after obtaining the understanding and cooperation of Hahajima islanders, measures to prevent the introduction from Chichijima will be enforced. When conducting elimination projects for other alien species, workers will enter important habitat of endemic land snails, such as the entire Sekimon and Minamizaki areas. Therefore, such work should be designed to minimize impacts (e.g., such as soil movement) on endemic land snails. Dispersion of snail-eating planaria attached to equipment and clothing should be strictly prevented.



(7) Hahajima Island (Hahajima Island Group)

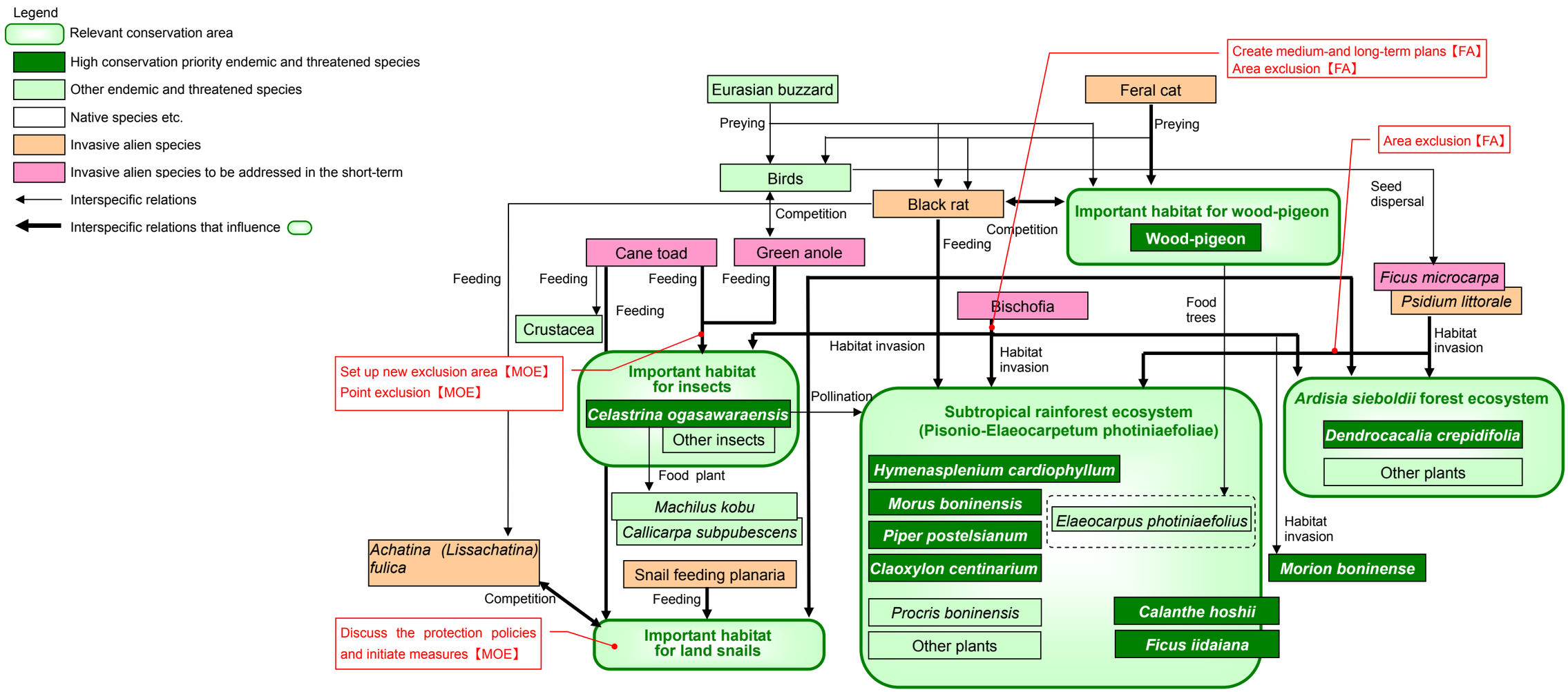
| Island (region) (Hahajima Island Group) | Activity | |
|---|---|---|
| **Hahajima Island (Sekimon Region)** | **1. Conservation of subtropical rainforest and *Ardisia sieboldii* forest** | Activities such as exclusion of alien species will continue in an adaptive manner considering the already established interspecific relationships in the following areas: subtropical rainforest covering the entire area of Sekimon, where Hahajima's original vegetation is still well preserved; the *Ardisia sieboldii* forest and the *Schima mertensiana* forest, which occupy a large area and widely distributed in the north-central part of the island.<br>Among these activities, minimizing the impact of Bischofia, the major impact factor, is particularly important. Through cooperation among related agencies, Bischofia elimination is being strategically carried out.<br>In addition, conservation of the island protects the habitats of threatened and endemic plants, including *Piper postelsianum*, *Claoxylon centinarium*, *Morus boninensis*, *Hymenasplenium cardiophyllum*, *Dendrocacalia crepidifolia*, and *Calanthe hoshii*, and animals, such as endemic land snails. |
| | **2. Habitat conservation for endemic insects including *Celastrina ogasawaraensis*** | Although the green anole has impacted the endemic insects of Hahajima, precious endemic insects such as *Celastrina ogasawaraensis*, *Parnara ogasawarensis*, and *Rhinocypha ogasawarensis* still inhabit the island. Area exclusions of the green anole, as well as of the cane toad, have already been carried out. Conservation measures for the food plants of these insects have also been conducted. As these activities continue and expand, the existing habitat for endemic insects on the island will be conserved. |
| | **4. Habitat conservation for wood-pigeon** | In the Sekimon region, an important habitat for the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*), no major impact by alien species has been observed to date. However, because the wood-pigeons move between the Hahajima and Chichijima island groups, impacts of feral cats and other alien species will be removed to achieve steady wood-pigeon habitation within the Ogasawara Islands as a whole. |
| | **5. Habitat conservation for land snails** | On Hahajima, the entire southern area around Minamizaki, the ridge area including the Sekimon region, and the western coastal area are important habitat for land snails. By removing the impacts of alien species such as black rats and by continuing to conduct monitoring, habitat for the characteristic land snails will be conserved. |

| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|
| **1. Conservation of subtropical rainforest and *Ardisia sieboldii* forest** | Elimination of Bischofia | ➢ Creation of medium- and long-term plans<br>➢ Initiating area exclusion | ➢ Implementation of elimination cording to the created medium- and long-term plans (e.g., Bischofia Control Plan) to achieve area exclusion in the Sekimon basin.【FA】<br>➢ Implementation of monitoring surveys (e.g., of birds, insects, land snails, and plants) before initiating elimination in Sekimon and other areas.【FA】 | ➢ Continue elimination | ➢ Continue the activities listed on the left.【FA】 |
| | Elimination of *Ficus microcarpa* | ➢ Initiating a survey to determine the existing condition | ➢ Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | ➢ Initiate area exclusion | ➢ With cooperation among management authorities, initiate elimination strategically where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| **2. Habitat conservation for endemic insects including *Celastrina ogasawaraensis*** | Elimination of the green anole | | | ➢ Set up new exclusion area<br>➢ Conduct point exclusions at the breeding grounds of threatened insects | ➢ Set up new nature restoration areas (areas as yet undecided).【MOE】<br>➢ At the breeding ground of *Celastrina ogasawaraensis*, continue point exclusion during the breeding season (area as yet undecided)【MOE】 |
| **4. Habitat conservation for wood-pigeon** | Exclusion of feral cats | | | (To be addressed on medium- and long-term bases) | (Coordinating with the schedule for island-wide exclusion, continue discussion of conservation measures) |
| | Elimination black rats | | | (To be addressed on medium- and long-term bases) | |
| **5. Habitat conservation for wood-pigeon** | Discussing conservation policies for endemic land snails | ➢ Discussion of conservation policies | ➢ Determining the inhabitation status of endemic land snails on Hahajima, establishing the individual project review committee, and discussing conservation policies for land snails.【MOE】 | ➢ Initiate specific measures | ➢ Based on outcomes of conservation policies found by the review committee, implement specific measures as necessary.【MOE】 |

*Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012


Legend
Relevant conservation area
High conservation priority endemic and threatened species
Other endemic and threatened species
Native species etc.
Invasive alien species
Invasive alien species to be addressed in the short-term
Interspecific relations
Interspecific relations that influence
Create medium-and long-term plans【FA】
Area exclusion【FA】
Eurasian buzzard
Feral cat
Preying
Preying
Birds
Black rat
Competition
Competition
Feeding
Important habitat for wood-pigeon
Wood-pigeon
Seed dispersal
Area exclusion【FA】
Cane toad
Green anole
Feeding
Feeding
Feeding
Feeding
Feeding
Ficus microcarpa
Psidium littorale
Bischofia
Food trees
Crustacea
Habitat invasion
Habitat invasion
Habitat invasion
Set up new exclusion area【MOE】
Point exclusion【MOE】
Important habitat for insects
Pollination
Subtropical rainforest ecosystem (Pisonio-Elaeocarpetum photiniaefoliae)
Ardisia sieboldii forest ecosystem
Celastrina ogasawaraensis
Other insects
Food plant
Hymenasplenium cardiophyllum
Dendrocacalia crepidifolia
Other plants
Machilus kobu
Callicarpa subpubescens
Morus boninensis
Elaeocarpus photiniaefolius
Piper postelsianum
Claoxylon centinarium
Habitat invasion
Morion boninense
Achatina (Lissachatina) fulica
Snail feeding planaria
Procris boninensis
Other plants
Calanthe hoshii
Ficus iidaiana
Competition
Feeding
Discuss the protection policies and initiate measures【MOE】
Important habitat for land snails

(7) Hahajima Island (Hahajima Island Group)

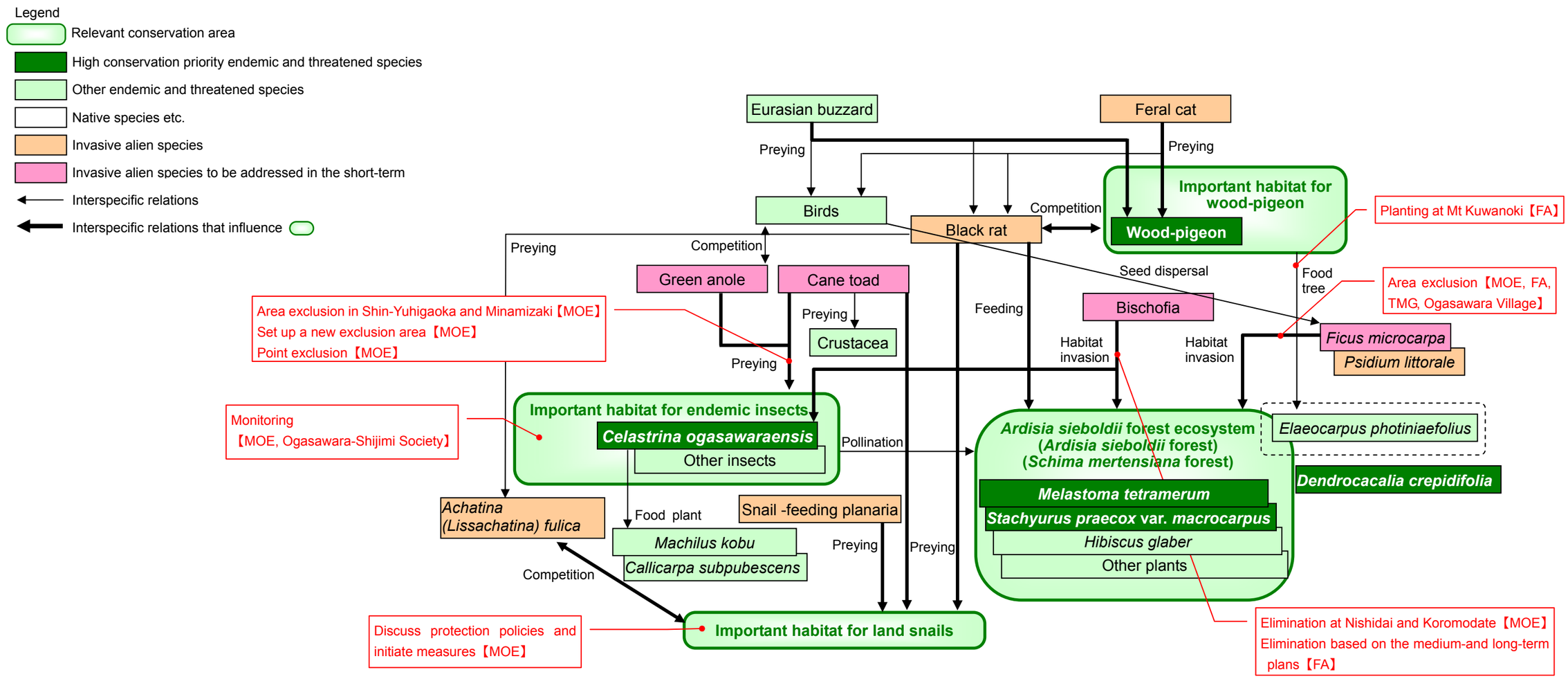
| Island (region) (Hahajima Island Group) | Activity | |
|---|---|---|
| **Hahajima Island (North-Central Region)** | **1. Conservation of *Ardisia sieboldii* forest** | Activities such as exclusion of alien species will continue in an adaptive manner considering the already established interspecific relationships in the following areas: subtropical rainforest covering the entire area of Sekimon, where Hahajima's original vegetation is still well preserved; the *Ardisia sieboldii* forest and the *Schima mertensiana* forest, which occupy a large area and widely distributed in the north-central part of the island.<br>Among these activities, minimizing the impact of Bischofia, the major impact factor, is particularly important. Through cooperation among related agencies, Bischofia elimination is being strategically carried out.<br>In addition, conservation of the island protects the habitats of threatened and endemic plants, including *Piper postelsianum*, *Claoxylon centinarium*, *Morus boninensis*, *Hymenasplenium cardiophyllum*, *Dendrocacalia crepidifolia*, and *Calanthe hoshii*, and animals, such as endemic land snails. |
| | **2. Habitat conservation for endemic insects including *Celastrina ogasawaraensis*** | Although the green anole has impacted the endemic insects of Hahajima, precious endemic insects such as *Celastrina ogasawaraensis*, *Parnara ogasawarensis*, and *Rhinocypha ogasawarensis* still inhabit the island. Area exclusions of the green anole, as well as of the cane toad, have already been carried out. Conservation measures for the food plants of these insects have also been conducted. As these activities continue and expand, the existing habitat for endemic insects on the island will be conserved. |
| | **4. Habitat conservation for wood-pigeon** | In the Sekimon region, an important habitat for the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*), no major impact by alien species has been observed to date. However, because the wood-pigeons move between the Hahajima and Chichijima island groups, impacts of feral cats and other alien species will be removed to achieve steady wood-pigeon habitation within the Ogasawara Islands as a whole. |
| | **5. Habitat conservation for land snails** | On Hahajima, the entire southern area around Minamizaki, the ridge area including the Sekimon region, and the western coastal area are important habitat for land snails. By removing the impacts of alien species such as black rats and by continuing to conduct monitoring, habitat for the characteristic land snails will be conserved. |

| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|
| **1. Conservation of *Ardisia sieboldii* forest** | Elimination of Bischofia | ➢ Creation of medium- and long-term plans<br>➢ Initiating area exclusions | ➢ Implementation of elimination according to the created medium- and long-term plans (e.g., Bischofia Control Plan) targeting area exclusion in the Sekimon region of Hahajima【FA】<br>➢ Implementation of a system to monitor persisting individuals in the Higashidai area of Hahajima.【MOE】<br>➢ Targeting area exclusion in the area north of the line between Hahajima Yashihama Beach and Nagahama Beach; implementation of elimination at Nishidai and Koromodate. In addition, partial implementation at Nishiura area.【MOE】 | ➢ Continue elimination | ➢ Continue with the activities listed on the left.【FA】<br>➢ By continuing the activities listed on the left, eliminate from private land in Nishidai and Koromodate; initiate elimination in the Koshinzuka region.【MOE】 |
| | Elimination of *Ficus microcarpa* | ➢ Initiating a survey to determine the existing condition | ➢ Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | ➢ Initiate area exclusion | ➢ With cooperation among management authorities, initiate elimination strategically where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| **2. Habitat conservation for endemic insects including *Celastrina ogasawaraensis*** | Elimination of the green anole | ➢ Completion of area exclusion | ➢ Achieving extremely low density of green anoles having almost no negative impact on the insect ecosystem by FY 2009 within the nature restoration area set up in Shin-Yuhigaoka and Minamizaki on Hahajima. In addition, consideration of establishing new nature restoration areas.【MOE】 | ➢ Set up new exclusion area<br>➢ Point exclusions at the breeding grounds of threatened insects | ➢ Set up a new nature restoration area (area undecided)【MOE】<br>➢ At breeding grounds of *Celastrina ogasawaraensis*, continue point exclusions during the breeding season (area as yet undecided).【MOE】 |
| | Elimination of the cane toad | ➢ Completion of area exclusion | ➢ Continuation of capture and exclusion measures within the nature restoration area set up in Shin-Yuhigaoka and Minamizaki on Hahajima. In addition, consider establishing new nature restoration areas.【MOE】(The measures above are implemented together with those against the green anole) | | |
| | Monitoring of the habitat for *Celastrina ogasawaraensis* and other endemic insects | ➢ Continuation of monitoring | ➢ Implementation of conservation and breeding measures for *Celastrina ogasawaraensis* and other endemic species, as well as continued monitoring of ecosystem recovery focusing on insects.【MOE, Ogasawara-Shijimi Society】 | ➢ Continue monitoring | ➢ Continue the activities listed on the left.【MOE, Ogasawara-Shijimi Society】 |
| **4. Habitat conservation for wood-pigeon** | Exclusion of feral cats | | | (To be addressed on medium- and long-term bases) | (Coordinating with the schedule for island-wide exclusion, continue discussion of conservation measures) |
| | Elimination of black rats | | | (To be addressed on medium- and long-term bases) | |
| | Planting of food trees | ➢ Continuation of elimination of Bischofia<br>➢ Planting of food trees | ➢ Continuation of eliminating competing juvenile trees of Bischofia on Mt Kuwanoki on Hahajima, in addition to eliminating Bischofia and planting food trees of wood-pigeon. In addition, creation of a manual for propagation techniques based on the achievements so far.【FA】 | ➢ Continue elimination of Bischofia | ➢ Continue elimination of juvenile trees and other measures listed on the left【FA】 |
| **5. Habitat conservation for land snails** | Discussing conservation policies for endemic land snails | ➢ Discussion of conservation policies | ➢ Determining the inhabitation status of endemic land snails on Hahajima, establishing the individual project review committee, and discussing conservation policies for land snails.【MOE】 | ➢ Initiate specific measures | ➢ Based on the outcomes of the conservation policies found by the review committee, implement specific measures as necessary.【MOE】 |

*Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012


Legend
Relevant conservation area
High conservation priority endemic and threatened species
Other endemic and threatened species
Native species etc.
Invasive alien species
Invasive alien species to be addressed in the short-term
Interspecific relations
Interspecific relations that influence
Eurasian buzzard
Feral cat
Preying
Preying
Birds
Black rat
Competition
Important habitat for wood-pigeon
Wood-pigeon
Planting at Mt Kuwanoki【FA】
Preying
Competition
Seed dispersal
Food tree
Green anole
Cane toad
Area exclusion【MOE, FA, TMG, Ogasawara Village】
Area exclusion in Shin-Yuhigaoka and Minamizaki【MOE】
Set up a new exclusion area【MOE】
Point exclusion【MOE】
Preying
Feeding
Bischofia
Crustacea
Habitat invasion
Habitat invasion
Ficus microcarpa
Psidium littorale
Preying
Important habitat for endemic insects
Celastrina ogasawaraensis
Other insects
Monitoring
【MOE, Ogasawara-Shijimi Society】
Pollination
Ardisia sieboldii forest ecosystem
(Ardisia sieboldii forest)
(Schima mertensiana forest)
Elaeocarpus photiniaefolius
Dendrocacalia crepidifolia
Melastoma tetramerum
Stachyurus praecox var. macrocarpus
Hibiscus glaber
Other plants
Achatina (Lissachatina) fulica
Food plant
Snail -feeding planaria
Machilus kobu
Callicarpa subpubescens
Preying
Preying
Competition
Discuss protection policies and initiate measures【MOE】
Important habitat for land snails
Elimination at Nishidai and Koromodate【MOE】
Elimination based on the medium-and long-term plans【FA】

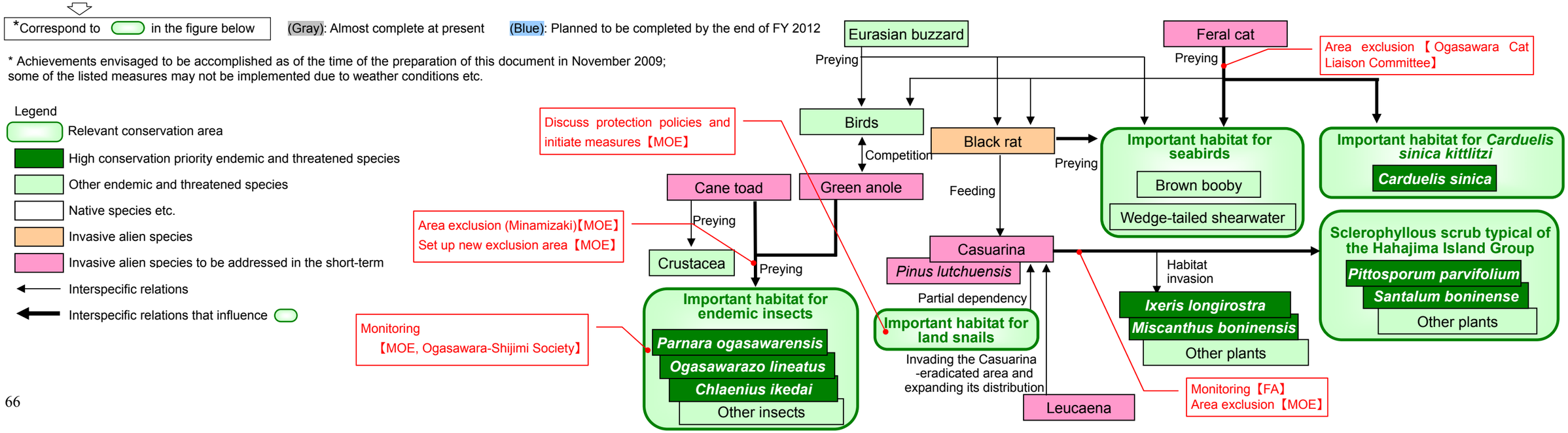
(7) Hahajima Island (Hahajima Island Group)

| Island (region) | (Hahajima Island Group) | Activity |
|---|---|---|
| **Hahajima Island (Minamizaki Region)** | **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | In the Minamizaki region, which tends to be a relatively dry part of Hahajima, sclerophyllous scrub typical of the Hahajima Island Group is found, similar to on many of the peripheral islands of Hahajima. To conserve existing endemic species such as land snails, considering already established interspecific relationships, alien species such as Casuarina will continue to be eliminated. |
| | **2. Habitat conservation for endemic insects including *Celastrina ogasawaraensis*** | Although the green anole has impacted the endemic insects of Hahajima, precious endemic insects such as *Celastrina ogasawaraensis*, *Parnara ogasawarensis*, and *Rhinocypha ogasawarensis* still inhabit the island. Area exclusions of the green anole, as well as of the cane toad, have already been carried out. Conservation measures for the food plants of these insects have also been conducted. As these activities continue and expand, the existing habitat for endemic insects on the island will be conserved. |
| | **3. Habitat conservation for *Carduelis sinica kittlitzi* and seabirds** | Feral cats have been removed from certain areas of the Minamizaki region, which is an important habitat for *Carduelis sinica kittlitzi* and seabirds such as the wedge-tailed shearwater (*Puffinus pacificus*). As feral cat expulsion continues and expands, seabird habitat will be conserved. |
| | **5. Habitat conservation for land snails** | On Hahajima, the entire southern area around Minamizaki, the ridge area including the Sekimon region, and the western coastal area are important habitat for land snails. By removing the impacts of alien species such as black rats and by continuing to conduct monitoring, habitat for the characteristic land snails will be conserved. |

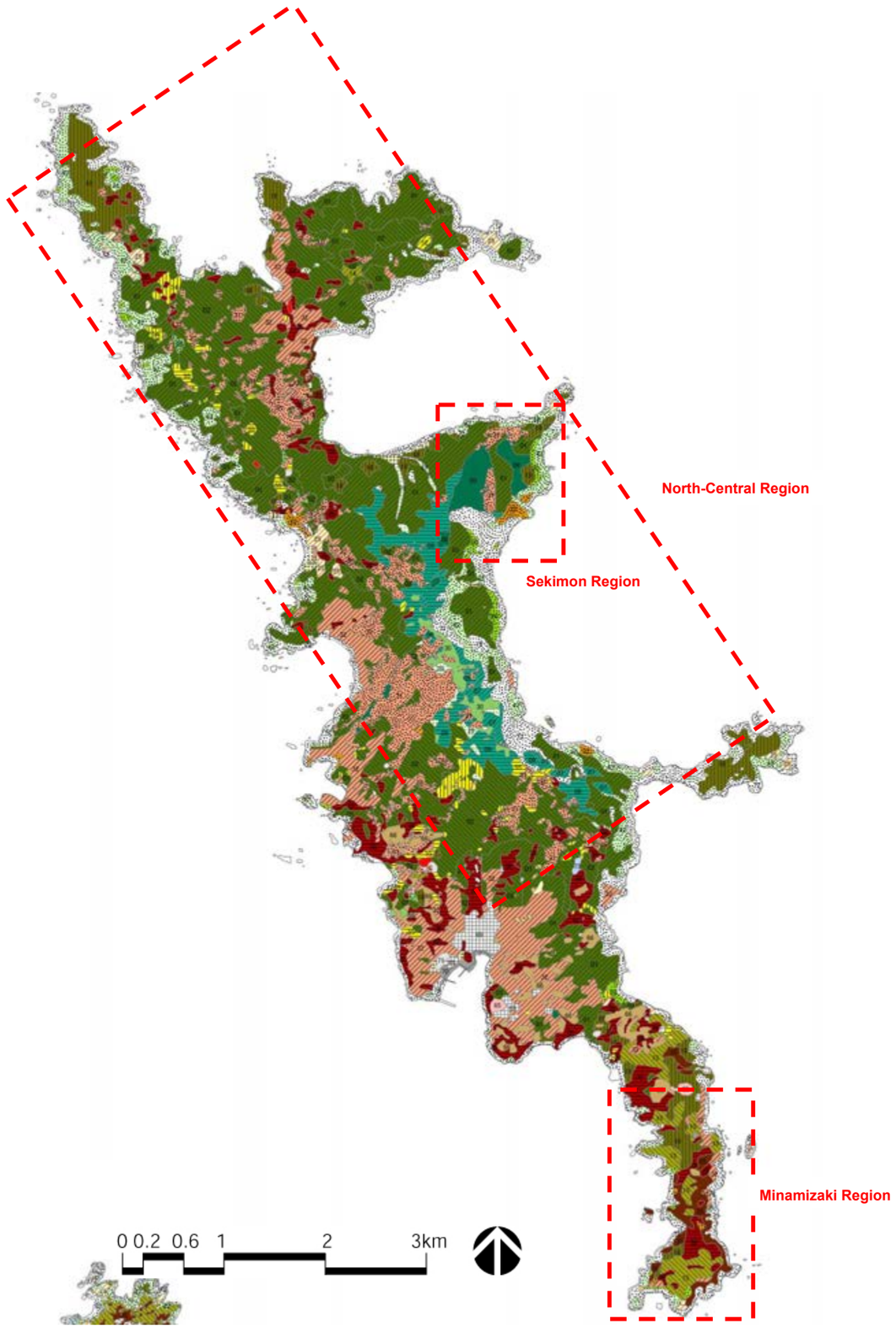
| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|
| **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | Elimination of Casuarina and Leucaena | ➢ Initiate area exclusion | ➢ Implementation of Casuarina elimination at Minamizaki on Hahajima, targeting area exclusion in FY 2007–2008. Elimination of Leucaena at the site where elimination of Casuarina was carried out in FY 2007 as Leucaena has invaded the site. Implementation of monitoring on the site.【FA】<br>➢ Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | ➢ Continue monitoring after the elimination | ➢ Continue monitoring the introduction status of alien species, such as Casuarina, in excluded areas. (Minamizaki region)【FA】<br>➢ With cooperation among management authorities, initiate elimination strategically where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| **2. Habitat conservation for endemic insects including *Celastrina ogasawaraensis*** | Elimination of green anole | ➢ Complete area exclusion | ➢ Achieving reduction of green anoles to an extremely low density having almost no negative impact on the insect ecosystem by FY 2009 within the nature restoration areas established in Shin-Yuhigaoka and Minamizaki on Hahajima, In addition, consideration of establishing new nature restoration areas.【MOE】 | ➢ Set up new exclusion area | ➢ Set up new nature restoration areas (area as yet undecided)【MOE】 |
| | Elimination of cane toad | ➢ Complete area exclusion | ➢ Implementation of capturing and exclusion within the nature restoration area set up in Shin-Yuhigaoka and Minamizaki in Hahajima. In addition, considering setting new nature restoration areas.【MOE】(These measures above are implemented together with those against the green anole) | ➢ Complete area exclusion | ➢ Almost complete area exclusion (Minamizaki Hasuike Pond area)【MOE】 |
| | Monitoring of *Celastrina ogasawaraensis* habitat | ➢ Continue monitoring | ➢ Implementation of conservation and breeding measures for *Celastrina ogasawaraensis* and other endemic species, as well as continuing to monitor ecosystem recovery focusing on endemic insects.【MOE, Ogasawara-Shijimi Society】 | ➢ Continue monitoring | ➢ Continue with the activities listed on the left.【MOE, Ogasawara-Shijimi Society】 |
| **3. Habitat conservation for *Carduelis sinica kittlitzi* and seabirds** | Exclusion of feral cats | ➢ Complete and expand area exclusion | ➢ Consideration of setting up a large-scale exclusion zone at Minamizaki. (an exclusion area has already been established at the point of Minamizaki and the exclusion has been completed).【MOE, Ogasawara Cat Liaison Committee】 | (To be addressed on medium- and long-term bases) | (Coordinating with the schedule for the island-wide exclusion, continue discussion of measures) |
| | Elimination of black rats | | | (*To be addressed on medium-and-long-term basis) | |
| **5. Habitat conservation for land snails** | Discussing conservation policies for endemic land snails | ➢ Discuss conservation policies | ➢ Determining the inhabitation status of endemic land snails on Hahajima, establishment of the individual project review committee, and discussing conservation policies for land snails.【MOE】 | ➢ Initiate specific measures | ➢ Based on the outcomes of conservation policies found by the review committee, implement specific measures as necessary.【MOE】 |

*Correspond to ⬭ in the figure below (Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

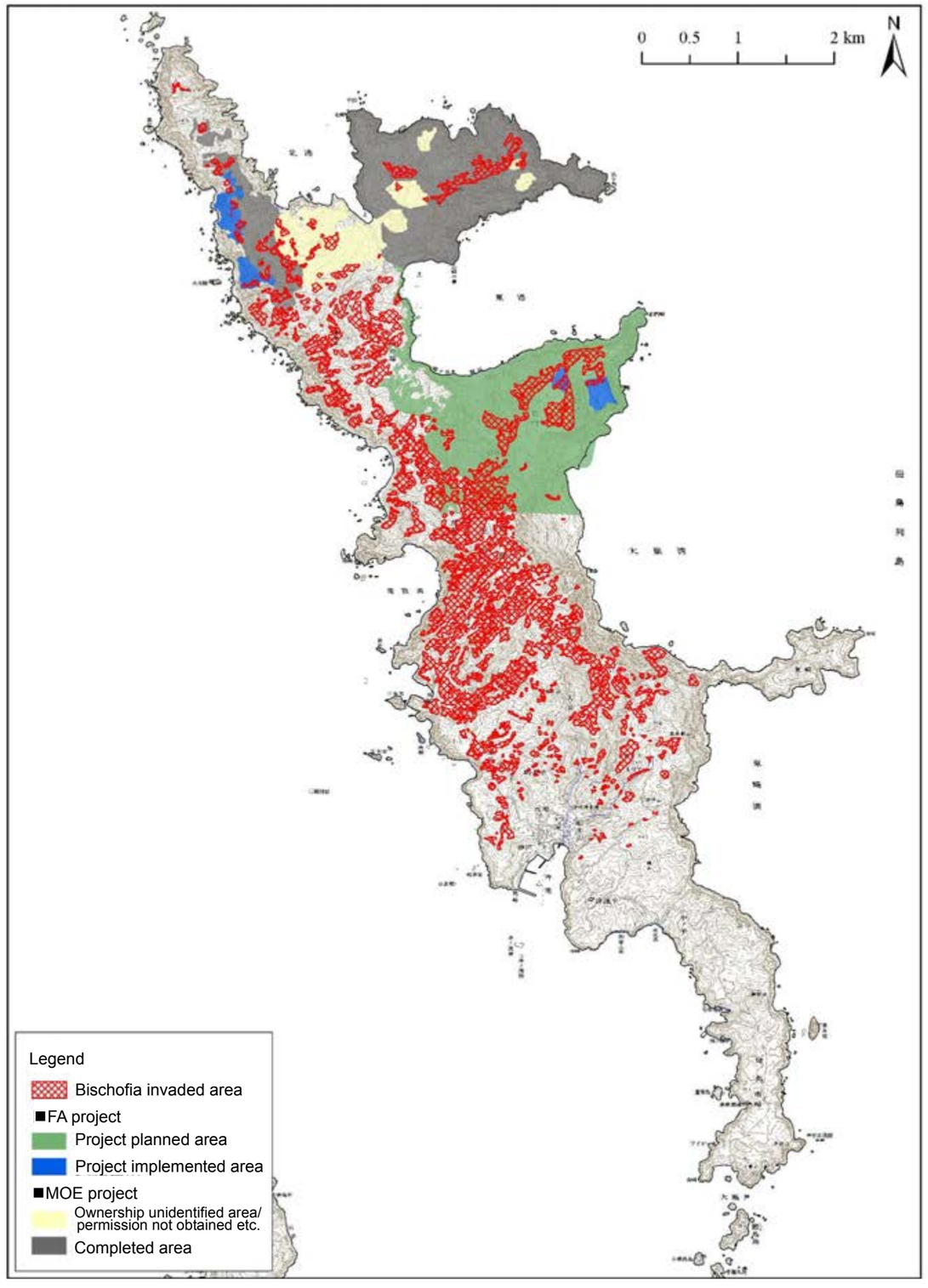


【Reference】 Vegetation of Hahajima and related information

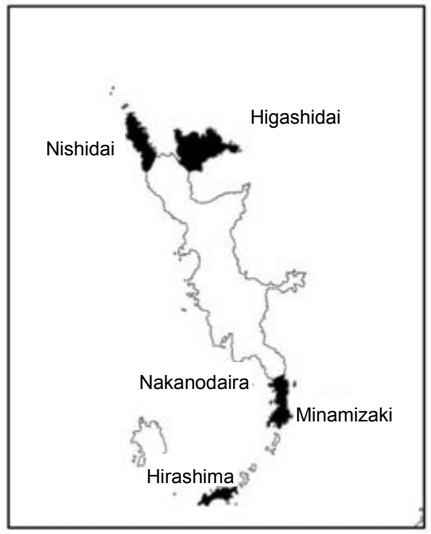


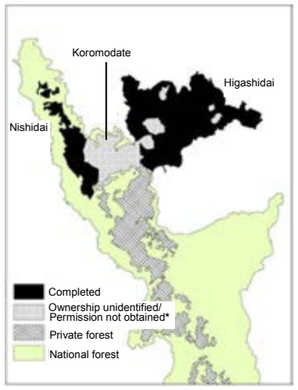

- 01 Machilio boninensisi-Ardisietum sieboldii, typical subass., typical variant
- 02 Machilio boninensisi-Ardisietum sieboldii, *Schima mertensiana* subass.
- 06 Pisonio-Elaeocarpetum photiniaefoliae
- 07 Dendrocacalietum crepidifoliae
- 09 Machilio boninensisi-Ardisietum sieboldii, typical subass., *Fatsia oligocarpella* variant
- 14 Distylio-Pouterietum dubiae
- 15 Wikstroemio-Pouterietum dubiae
- 17 *Hernandia nymphaeifolia -Terminalia catappa* community
- 18 Liyistonia chinensis var. boninensis-Pandanus boninensis
- 20 *Scaevola sericea* community
- 22 *Terminalia catappa* community
- 25 *Pandanus boninensis* community
- 28 *Trema orientalis* community (includ. Boehmeria boninensis association)
- 29 Cyathetum mertensianae (secondary stand)
- 30 *Freycinetia boninensis* community
- 31 Bischoffia javanica community
- 32 *Leucaena leucocephala* community
- 33 *Pinus lutchuensis* community
- 35 *Casuarina equisetifolia* forest (includ. secondary forest)
- 36 Evergreen broadleaved planted forest
- 38 *Derris elliptica* community
- 39 *Thunbergia laurifolia* community
- 40 Plant communities in rocky desert
- 42 Miscanthetum condensati var. boninensis (includ. *Pennisetum sordidum* community, typical under units etc.)
- 46 *Sporobolus virginicus* community
- 49 Myoporetum boninensis
- 52 *Nephrolepis cordifolia -Pteridium aquilinum var. latiusculum* community
- 53 *Histiopteris incisa* community
- 54 *Imperata cylindrica* var. *major* community (includ. Paspalum conjugatum comm.)
- 55 *Miscanthus condensatus* community (includ. *Saccharum officinalum* comm.)
- 58 *Arundinaria simonii* community / *Pseudosasa japonica* community etc.
- 60 *Bryophyllum pinnatum* community
- 65 Weed communities of the open area (*Bidens pilosa var. radiata* community etc.)
- 66 Field weed communities (*Amaranthus lividus* community etc.)
- 69 Residence, factory etc.
- 70 Concrete pavement site
- 71 Artificial bareland
- 72 Natural bareland
- 73 Open water

【Reference】 Additional information pertaining to Bischofia on Hahajima




## Progress of surveys related to Bischofia measures




* It has not been possible to obtain written permission from owners of some of the land within the Koromodate region; such land is distributed in a stepping-stone fashion. As it is difficult to identify the land boundaries on site, topographical boundaries were used to distinguish the lands where permission has not yet been obtained (the use of the topographic boundaries explains why the area is large).

Figure Places in which elimination experiments were implemented (MOE)

| Island | (Hahajima Island Group) | Activity | |
|---|---|---|---|
| **Mukohjima Island** | | **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | To conserve the sclerophyllous scrub typical of the Hahajima Island Group, which remains in good condition, the impacts of alien species such as Casuarina will be removed in an adaptive manner considering already established interspecific relationships. In addition, the forest will be conserved as the habitats of endemic plants such as *Symplocos boninensis*. |
| | | **2. Habitat conservation for endemic birds** | Mukohjima is an important habitat for endemic birds such as *Carduelis sinica kittlitzi* and the Bonin honeyeater (*Apalopteron familiare*). The habitat will be conserved by excluding the impacts of alien species and by continued monitoring. |

| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|
| **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | Elimination of Casuarina and other alien plants | ➢ Initiating a survey to determine the existing condition | ➢Carrying out aerial photography.【FA】<br>➢Implementation of surveys and other studies on the inhabitation status of *Carduelis sinica kittlitzi* and considering the elimination of alien species.【FA】<br>➢Implementation of monitoring surveys (e.g., of birds, insects, land snails, and plants) before beginning elimination. 【FA】 | ➢ Initiate area exclusion | ➢ Estimate the distribution status of alien woody plants using aerial photographs; based on the survey results, plan for area exclusions to be initiated in FY 2011.【FA】 |
| **2. Habitat conservation for endemic birds** | Elimination of black rats | | | ➢ Complete eradication | ➢ Considering the status of elimination throughout the Chichijima Island Group, initiate elimination as needed.【MOE】 |

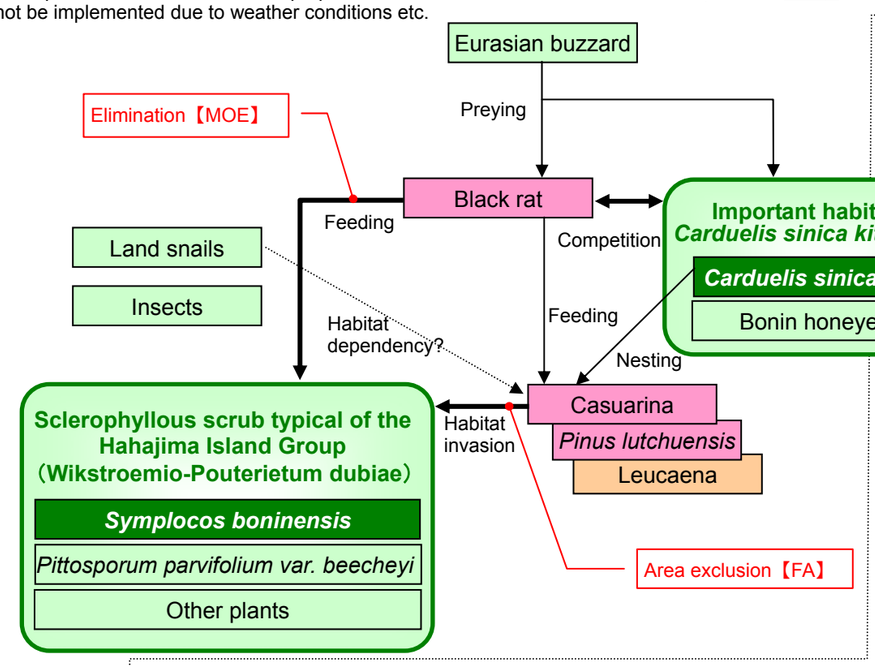
*Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

■Short-term actions

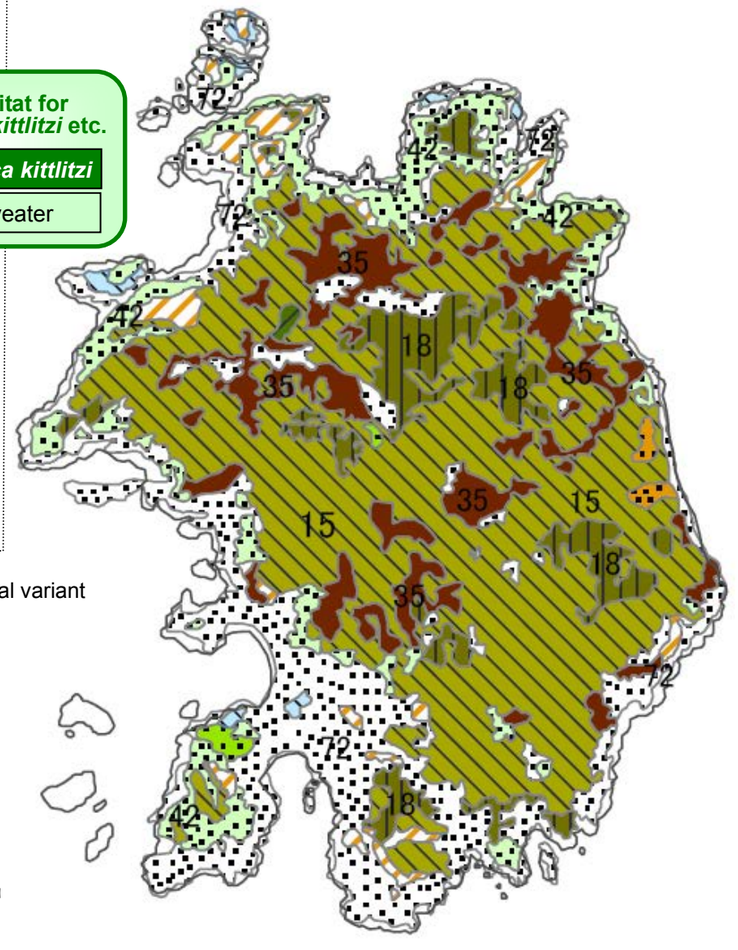
- Conservation of Mukohjima is particularly crucial because important species such as *Symplocos boninensis* inhabit this island. Elimination of Casuarina will be initiated on the island. However, *Carduelis sinica kittlitzi* and endemic land snails may have become dependent on Casuarina. Therefore, elimination should consider this possibility and pay close attention to interspecific interactions, based on research and scientific knowledge.
- Elimination of black rats, which compete with land birds such as *Carduelis sinica kittlitzi* and also impact vegetation, will be implemented.




Legend

- Relevant conservation area
- High conservation priority endemic and threatened species
- Other endemic and threatened species
- Native species etc.
- Invasive alien species
- Invasive alien species to be addressed in the short-term
- Interspecific relations
- Interspecific relations that influence ⬭

Reference: Vegetation of Mukojima Island



(9) Anejima Island (Hahajima Island Group)

| Island | (Hahajima Island Group) | Activity | |
|---|---|---|---|
| **Anejima Island** | | **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | Sclerophyllous scrub typical of the Hahajima Island Group is distributed on the plateau. This scrub forest will be conserved through activities such as removing the impacts of alien species such as Casuarina in an adaptive manner, considering the already established interspecific relationships.<br>In addition, the forest will be conserved as the habitats of endemic plants such as *Juniperus taxifolia*, *Lobelia boninensis*, and *Euonymus boninensis* will be conserved. |

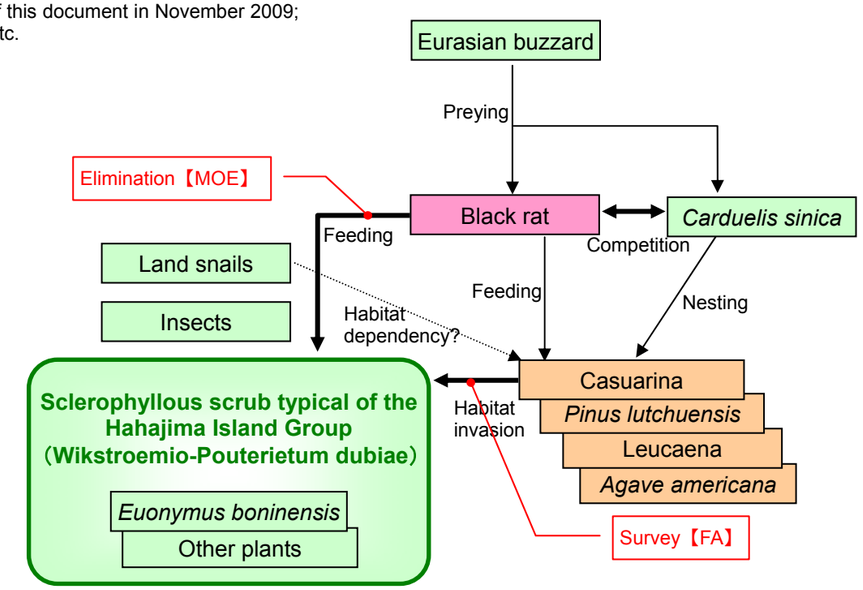
| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description |
|---|---|---|---|---|---|
| **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | Elimination of Casuarina and other alien plants | ➢ Initiating a survey to determine the existing condition | ➢ Carrying out aerial photography.【FA】 | ➢ Determine the existing condition | ➢ Implement research on the distribution status of alien species (e.g., Casuarina and Leucaena).【FA】 |
| | Elimination of black rats | | | ➢ Complete eradication | ➢ Based on the completion status of elimination in the Chichijima Island Group, initiate elimination.【MOE】 |

*Correspond to ⬭ in the figure below (Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

■Short-term actions

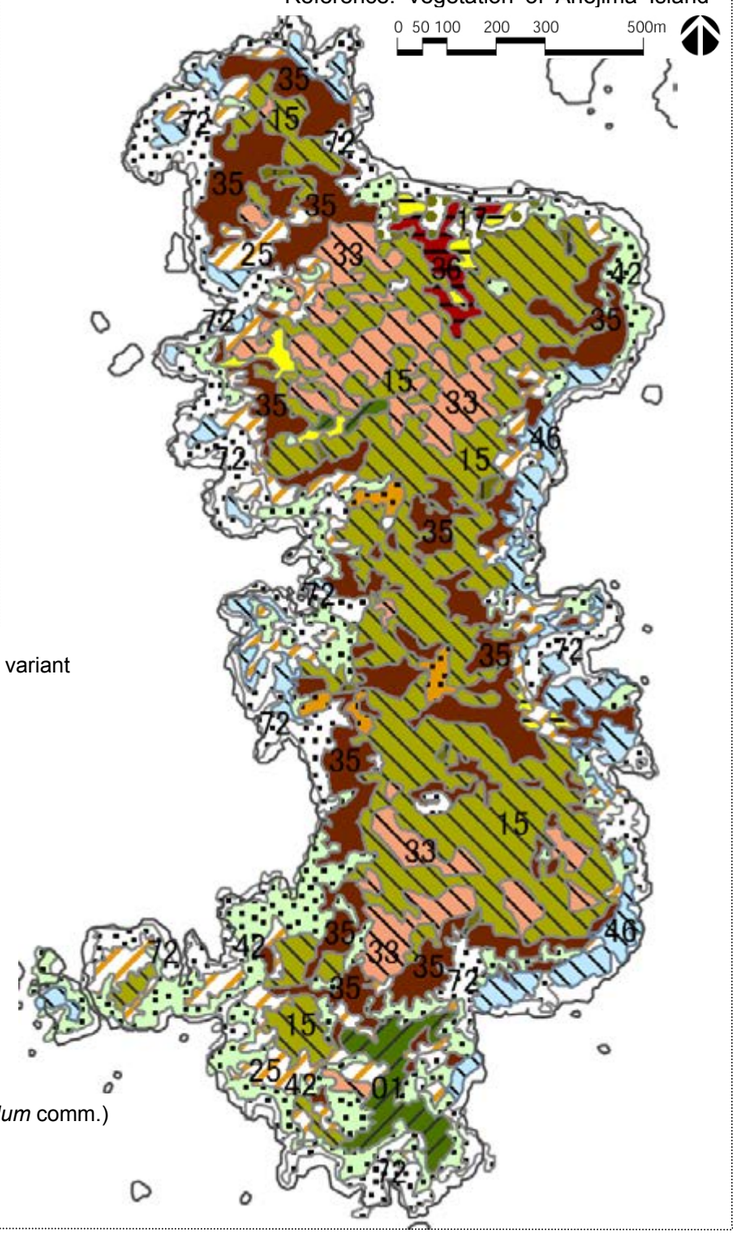
- Determine the present condition of alien plants such as Casuarina on Anejima. It is possible that *Carduelis sinica kittlitzi* and endemic land snails have become dependent on Casuarina. Therefore, Casuarina elimination will consider and account for interspecific interactions based on scientific research and knowledge.
- Elimination of black rats, which compete with land birds such as *Carduelis sinica kittlitzi* and also impact vegetation, will be implemented.




Legend

- Relevant conservation area
- High conservation priority endemic and threatened species
- Other endemic and threatened species
- Native species etc.
- Invasive alien species
- Invasive alien species to be addressed in the short-term
- Interspecific relations
- Interspecific relations that influence ⬭

Reference: Vegetation of Anejima Island




- 01 Machilio boninensisi-Ardisietum sieboldii, typical subass., typical variant
- 15 Wikstroemio-Pouterietum dubiae
- 17 *Hernandia nymphaeifolia -Terminalia catappa* community
- 22 *Terminalia catappa* community
- 25 *Pandanus boninensis* community
- 33 *Pinus lutchuensis* community
- 35 *Casuarina equisetifolia* forest (includ. secondary forest)
- 36 Evergreen broadleaved planted forest
- 42 Miscanthetum condensati var. boninensis (includ. *Pennisetum sordidum* community, typical under units etc.)
- 46 *Sporobolus virginicus* community
- 55 *Miscanthus condensatus* community (includ. *Saccharum officinalum* comm.)
- 57 *Agave americana* community / *Agave sisalana* community
- 72 Natural bareland

| Island | (Hahajima Island Group) | Activity | |
|---|---|---|---|
| **Imotojima Island** | | **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | To conserve the sclerophyllous scrub typical of the Hahajima Island Group, which remains in good condition, the impacts of alien species such as Leucaena will be removed in an adaptive manner considering already established interspecific relationships.<br>In addition, the forest will be conserved as the habitats of endemic plants such as *Crepidiastrum linguifolium*, *Crepidiastrum ameristophyllum*, and *Ajuga boninsimae*. |
| | | **2. Habitat conservation for endemic birds** | Imotojima is an important habitat for endemic birds such as *Carduelis sinica kittlitzi* and the Bonin honeyeater (*Apalopteron familiare*). Their habitats will be conserved by excluding the impacts of alien species and by continued monitoring. |

| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|
| **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group**<br>**2. Habitat conservation for endemic birds** | Elimination of Leucaena and other alien plants | ➢ Initiating a survey to determine existing condition | ➢ Carrying out aerial photography.【FA】 | ➢ Determine the existing condition | ➢ Implement research on the distribution status of alien species (e.g., Casuarina and Leucaena).【FA】 |
| | Elimination of black rats | | | ➢ Complete eradication | ➢ Based on the completion status of elimination in the Chichijima Island Group, initiate elimination.【MOE】 |

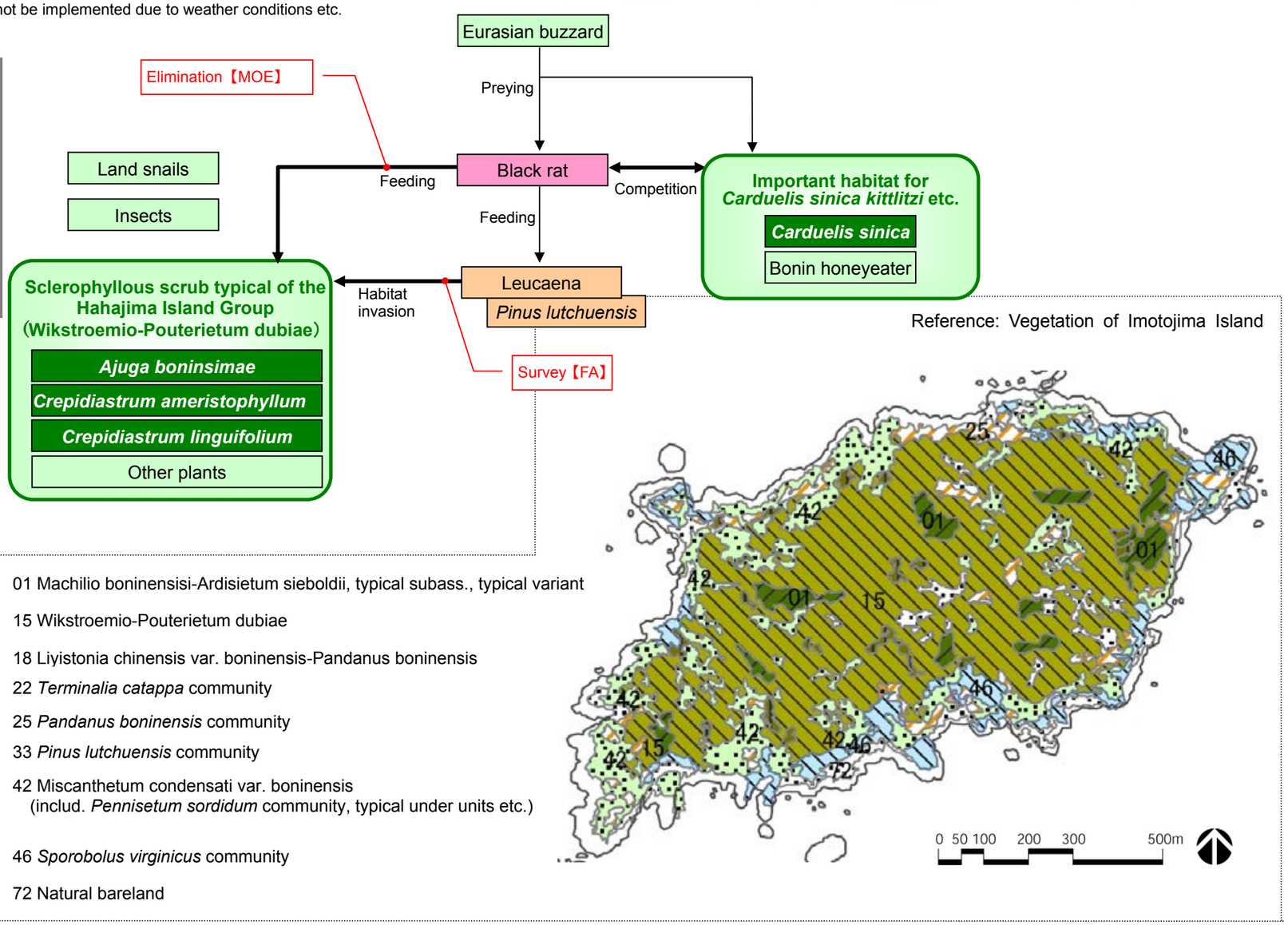
*Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

■Short-term actions

- The existing condition of alien plants such as Leucaena will be determined on Imotojima. Elimination will be initiated as necessary considering interspecific interactions and based on scientific research and knowledge.
- Implement elimination of black rats, which compete with land birds such as *Carduelis sinica kittlitzi* and also impact vegetation.




Legend

- Relevant conservation area
- High conservation priority endemic and threatened species
- Other endemic and threatened species
- Native species etc.
- Invasive alien species
- Invasive alien species to be addressed in the short-term
- Interspecific relations
- Interspecific relations that influence ⬭

Reference: Vegetation of Imotojima Island

(11) Meijima Island (Hahajima Island Group)

| Island | (Hahajima Island Group) | Activity | |
|---|---|---|---|
| **Meijima Island** | | **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | Sclerophyllous scrub typical of the Hahajima Island Group is distributed on the plateau of Meijima. To conserve the scrub forest, which remains in good condition, the impacts of alien species such as Leucaena will be removed in an adaptive manner considering already established interspecific relationships.<br>In addition, the forest will be conserved as the habitats of endemic plants such as *Juniperus taxifolia*, *Lobelia boninensis*, and *Crepidiastrum linguifolium*, and endemic insect fauna. |

| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|
| **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | Elimination of Leucaena and other alien plants | ➢ Initiating a survey to determine the existing condition | ➢ Carrying out aerial photography.【FA】 | ➢ Determine the existing condition | ➢ Implement research on the distribution status of alien species (e.g., Casuarina and Leucaena).【FA】 |
| | Elimination of black rats | | | ➢ Complete eradication | ➢ Based on the completion status of elimination in the Chichijima Island Group, initiate elimination.【MOE】 |

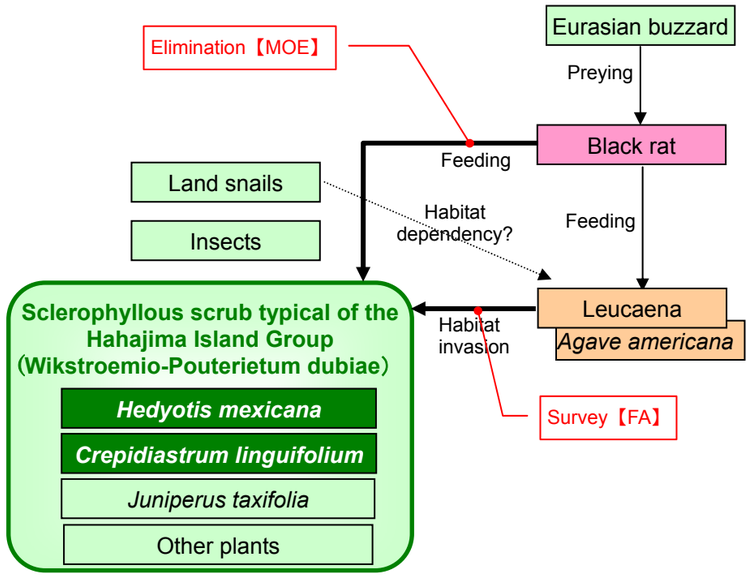
Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

■Short-term actions

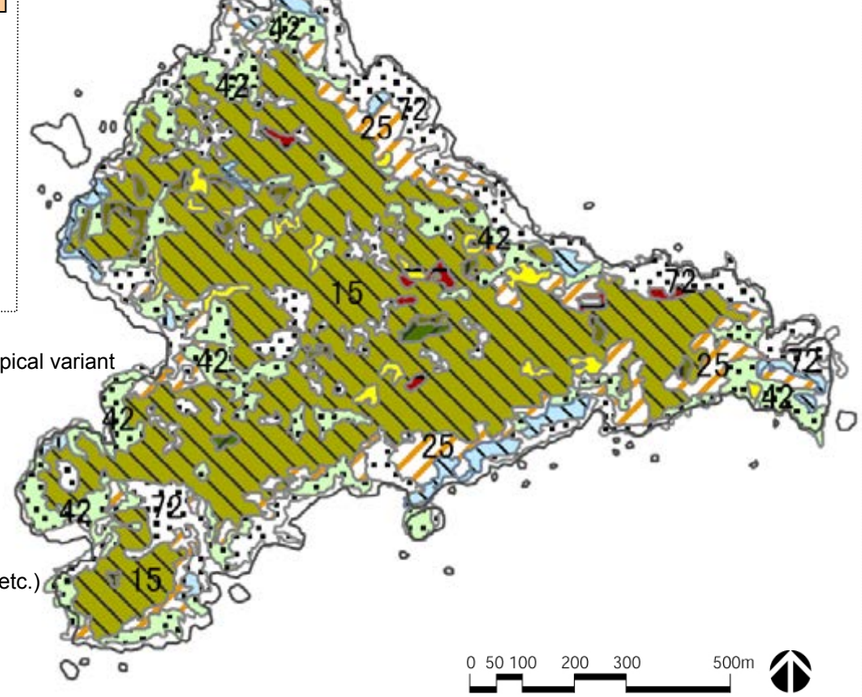
- Determine the existing condition of alien plants such as Leucaena on Meijima. Elimination will be initiated as necessary considering already established interspecific interactions, based on scientific research and knowledge.
- Elimination of black rats, which compete with land birds such as *Carduelis sinica kittlitzi* and also impact vegetation, will be implemented.




Legend

- Relevant conservation area
- High conservation priority endemic and threatened species
- Other endemic and threatened species
- Native species etc.
- Invasive alien species
- Invasive alien species to be addressed in the short-term
- Interspecific relations
- Interspecific relations that influence ⬭

Reference: Vegetation of Meijima Island



| Island | (Hahajima Island Group) | Activity | |
|---|---|---|---|
| **Hirajima Island** | | **1. Ecosystem management considering endemic species** | To conserve endemic species still inhabiting the island, the impacts of alien species will be removed in an adaptive manner considering already established interspecific relationships. This activity will be accompanied by ongoing monitoring. |

| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description |
|---|---|---|---|---|---|
| **1. Ecosystem management considering endemic species** | Elimination of Bischofia | ➢ Completion of eradication | ➢Elimination being completed and eradication achieved; approximately 20 individual plants were removed.【MOE】 | – | – |
| | Elimination of Casuarina and other alien plans | ➢ Initiating a survey to determine the existing condition | ➢Carrying out aerial photography.【FA】 | ➢ Determine existing condition | ➢ Implement research on the distribution status of alien species (e.g. Casuarina and Leucaena).【FA】 |
| | Elimination of black rats and other alien animals | | | ➢ Complete eradication | ➢ Based on the completion status of elimination in the Chichijima Island Group, initiate elimination.【MOE】 |

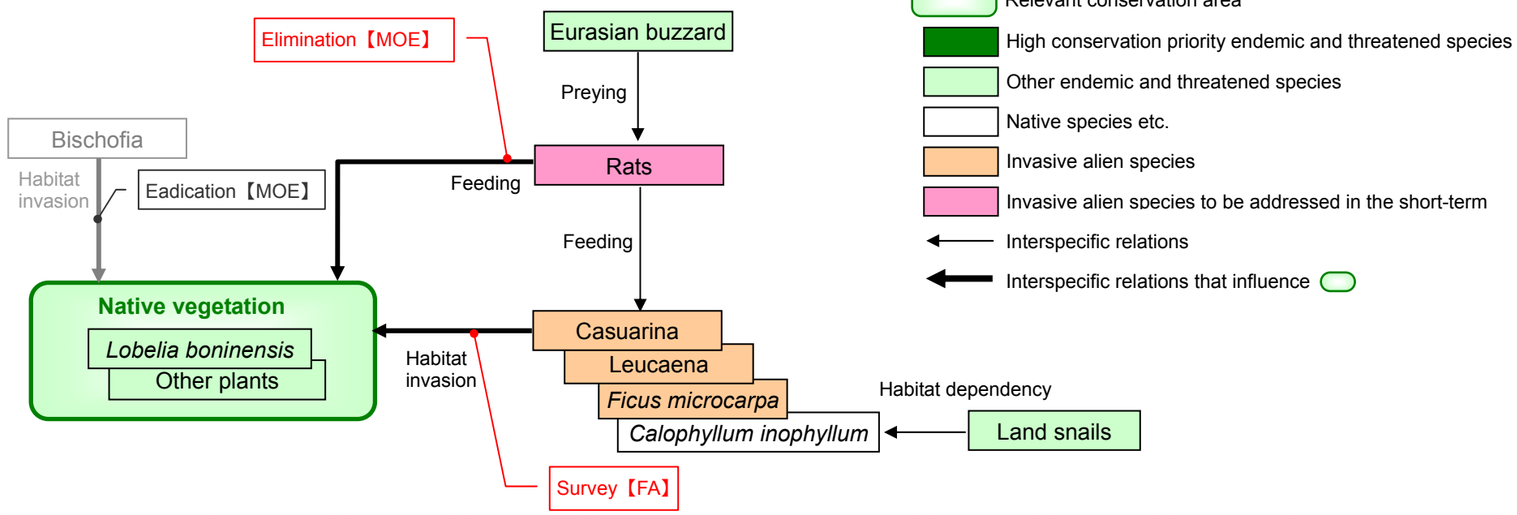
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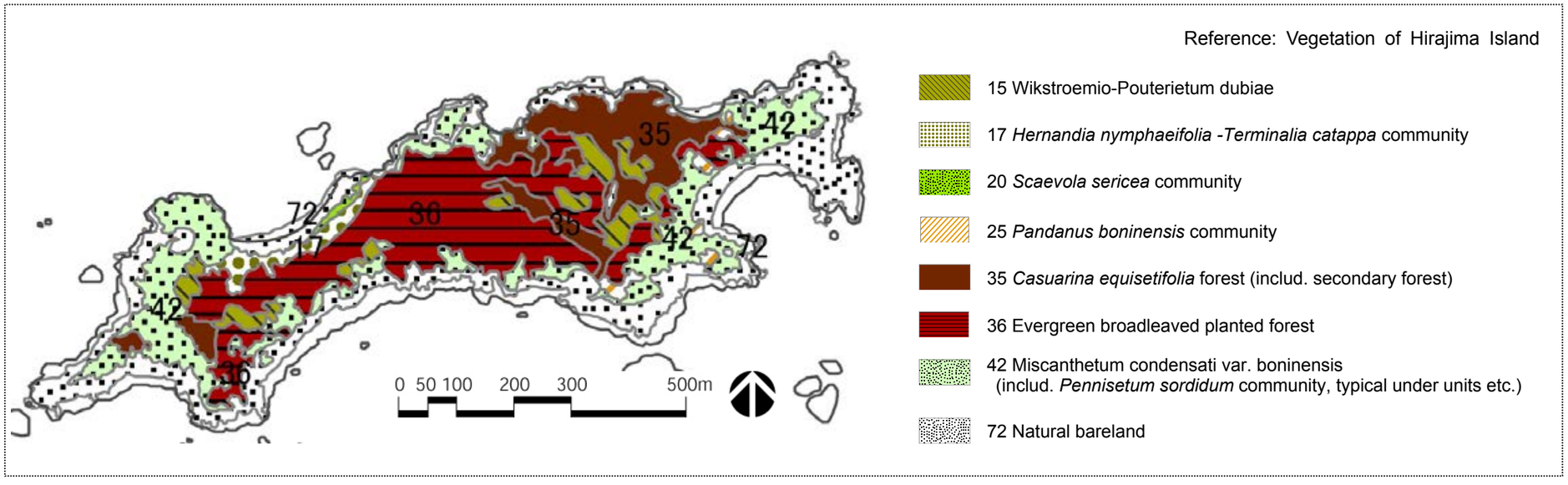
* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

■Short-term actions

- The existing condition of alien plants such as Casuarina will be determined on Hirajima. However, it is possible that endemic land snails have become dependent on Casuarina. Therefore, elimination will be initiated as necessary considering and making arrangements for already established interspecific interactions based on scientific research and knowledge.
- Elimination of black rats, which compete with land birds such as *Carduelis sinica kittlitzi* and also impact vegetation, will be implemented.



(13) Mukojima Island (Mukojima Island Group)

| Island (Mukojima Island Group) | Activity | |
|---|---|---|
| **Mukojima Island including Torishima Island** | **1. Ecosystem management of *Ardisia sieboldii* forest and other habitats** | On Mukojima, ecosystem management of *Ardisia sieboldii* forest and other habitats will be carried out in an adaptive manner. Feral goats, a major impact factor, have been eradicated, and other alien species will also be eliminated, including black rats, Leucaena, and alien bamboo and dwarf bamboo species; these species are inhibiting factors for forest recovery. |
| | **2. Habitat conservation for endemic insects** | Mukojima is an important habitat for endemic insect species of the Mukojima Island Group, such as *Chlorophorus kusamai* and *Tamamushia virida fujitai* (a Mukojima subspecies), both of which are forest insects. Therefore, insect habitat will be conserved by removing the impacts of alien species. |
| | **3. Conservation and creation of breeding grounds for three albatross species** | Mukojima and the adjacent island of Torishima are breeding grounds of two species of albatross, the Laysan albatross (*Phoebastria immutabilis*) and black-footed albatross (*Phoebastria nigripes*). On Mukojima, following the Albatross Protection and Breeding Project Plan, continuous activities have been carried out to create a new breeding ground for the short-tailed albatross (*Phoebastria albatrus*) that formerly bred on the island. Toward the goal of steady breeding and habitation by the three albatross species, overgrowth by alien plants will be removed and the site will be conserved to serve as a persistent breeding ground. |

| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|
| **1. Ecosystem management of *Ardisia sieboldii* forest and other habitats**<br>**2. Habitat conservation for endemic insects** | Elimination of Leucaena | ➢ Continuation of elimination | ➢ Implementation of elimination on Leucaena and alien bamboo and dwarf bamboo species to conserve the remaining forest on Mukojima.【TMG】 | ➢ Complete eradication | ➢ Continue the activities listed on the left and implement adaptive management, aiming to conserve the remaining forest【TMG】 |
| | Elimination of alien bamboo and dwarf bamboo species | ➢ Continuation of elimination | ➢ Implementation of elimination on Leucaena and alien bamboo and dwarf bamboo species to conserve the remaining forest on Mukojima.【TMG】 | ➢ Complete eradication | ➢ Continue the activities listed on the left and implement adaptive management, aiming to conserve the remaining forest【TMG】 |
| | Elimination of *Ficus microcarpa* | ➢ Initiating a survey to determine the existing condition | ➢ Carrying out aerial photography.【FA】 | ➢ Initiate area exclusion | ➢ With cooperation among management authorities, initiate elimination strategically where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| | Elimination of black rats | ➢ Initiating elimination | ➢ Implementation of preliminary experimental elimination on Mukojima.【MOE】 | ➢ Complete eradication | ➢ Complete the eradication on Mukojima.【MOE】 |
| **3. Conservation and creation of breeding grounds for three albatross species** | Creation of new albatross breeding ground | ➢ Continuation of activities | ➢ Transferring and releasing young albatrosses from the breeding ground on the island of Torishima in the Izu Island Group to Mukojima during the breeding season and implementing artificial rearing until the birds leave the nest.【MOE】 | ➢ Continue | ➢ Continue the activities listed on the left.【MOE】 |
| | Elimination of *Lantana camara* var. *aculeate* | ➢ Initiating a survey to determine the existing condition | ➢ Carrying out aerial photography.【FA】 | ➢ Determine the existing condition | ➢ Estimate the distribution status of alien woody plants using aerial photographs.【FA】<br>➢ With cooperation among agencies, initiate eliminations strategically where necessary.【MOE, FA, TMG, Ogasawara Village】 |

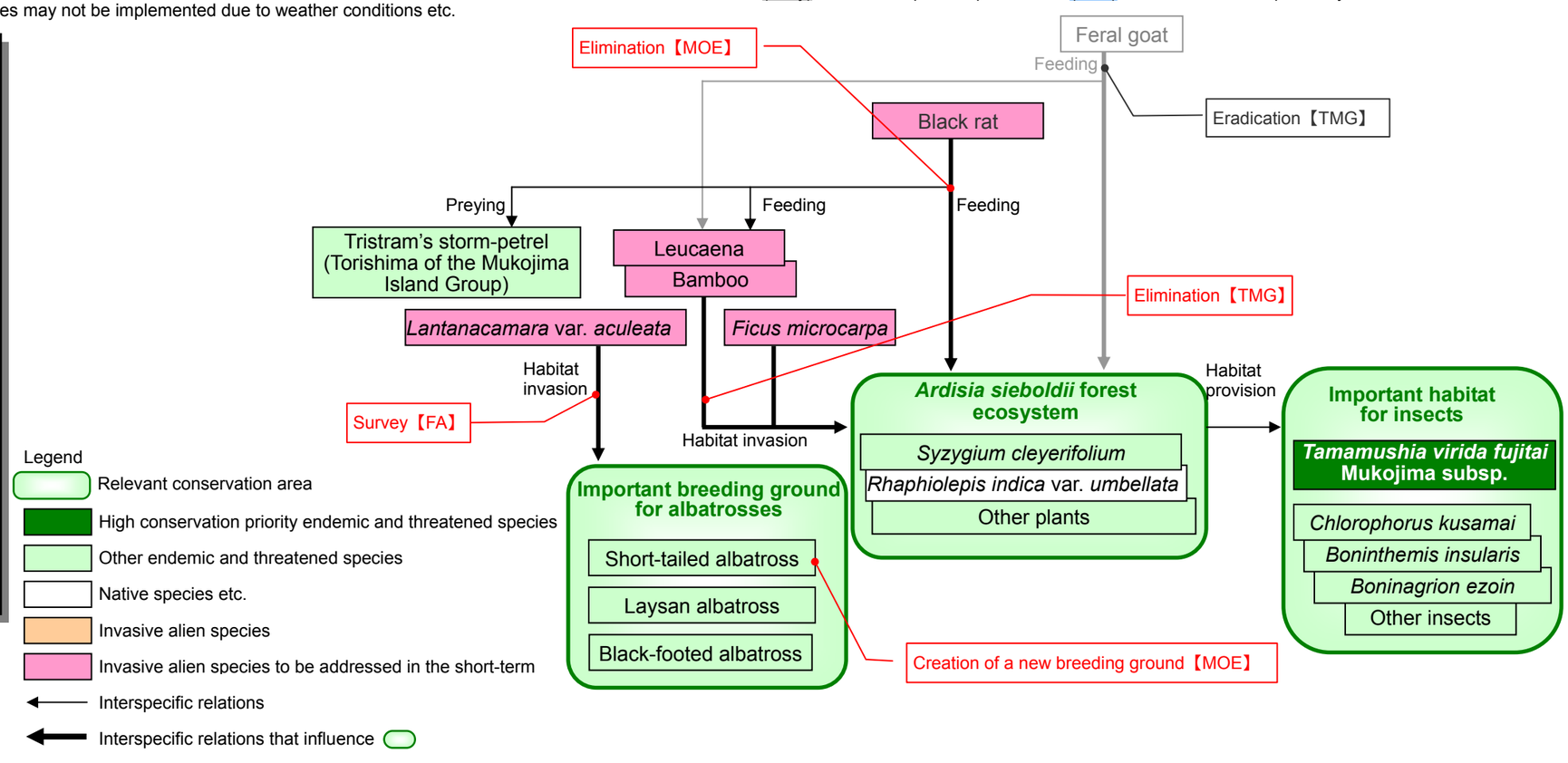
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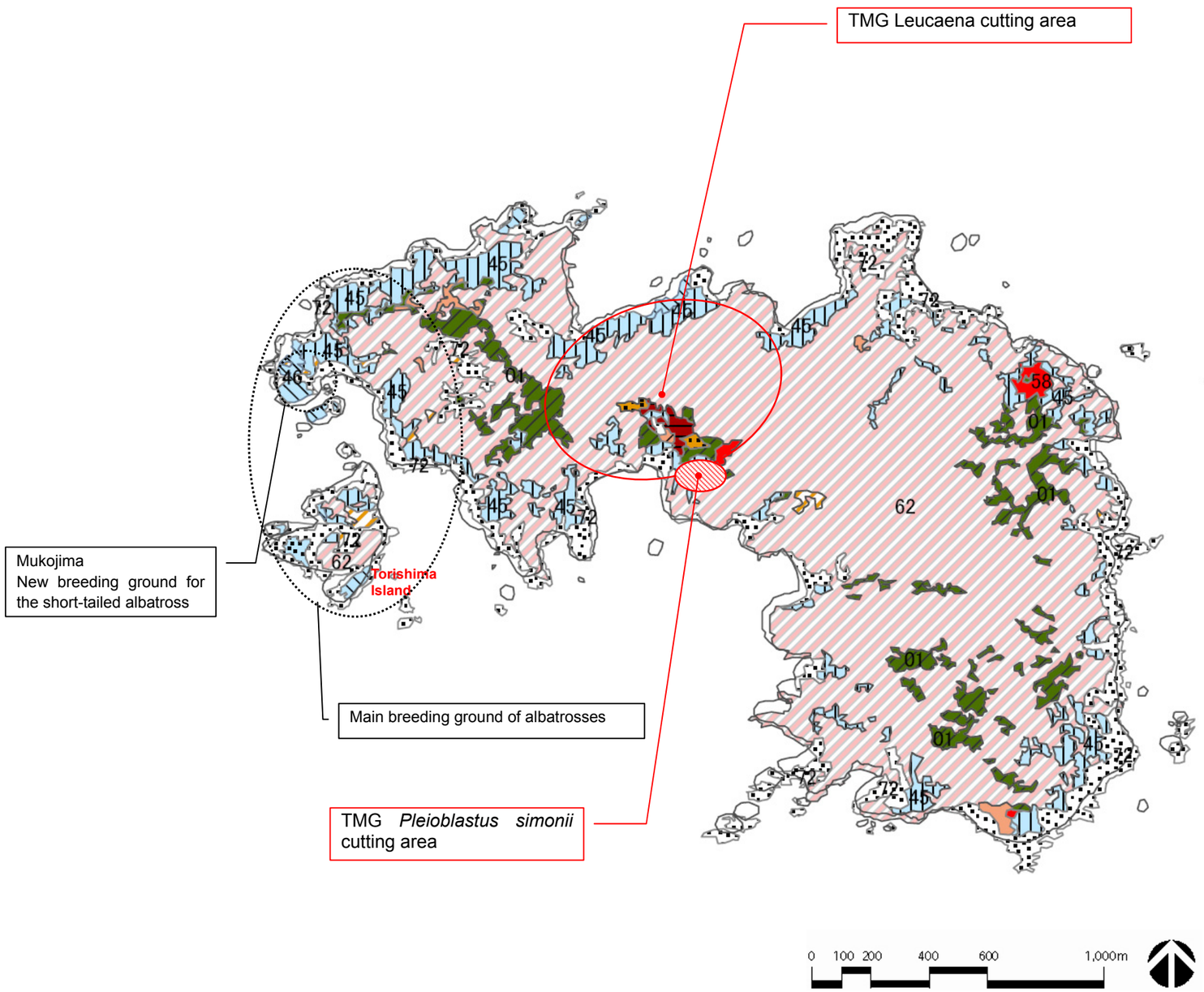
(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

■Flow of short-term approaches

- On Mukojima, eradication of feral goats, which were heavily impacting the vegetation, has already been completed.
- Elimination of black rats was begun in FY 2008 by the MOE, with the aim of eradication by FY 2012. As there are risks, such as overgrowth by alien plant species, as well as positive effects associated with black rat elimination, monitoring will be implemented, and measures will be considered as necessary.
- Great change in vegetation, including alien species, is anticipated in the future. Therefore, as well as completing the ongoing elimination of Leucaena, and alien bamboo and dwarf bamboo species by FY 2012, other alien plants will also be managed adaptively while monitoring is carried out.



【Reference】 Vegetation of Mukojima and related information




01 Machilio boninensisi-Ardisietum sieboldii, typical subass., typical variant

22 *Terminalia catappa* community

25 *Pandanus boninensis* community

32 *Leucaena leucocephala* community

34 *Lantana camara* community

36 Evergreen broadleaved planted forest

45 *Vitex rotundifolia* community

58 *Arundinaria simonii* community / *Pseudosasa japonica* community etc.

62 *Paspalum orbiculare-Paspalum dilaltatum* community
(include. *Pennisetum sordidum* community, *Paspalum orbiculare* under units)

72 Natural bareland

(14) Kitanoshima Island (Mukojima Island Group)

| Island | (Mukojima Island Group) | Activity | |
|---|---|---|---|
| **Kitanoshima Island** | | **1. Conservation of seabird breeding grounds** | Kitanoshima is an important breeding ground for seabirds such as the wedge-tailed shearwater (*Puffinus pacificus*) and Bulwer's petrel (*Bulweria bulwerii*). Ongoing monitoring is being conducted to conserve their breeding grounds. |
| | | **2. Ecosystem management considering endemic species.** | For conservation of endemic species currently inhabiting the island, suppressing factors will be excluded in an adaptive manner considering already established interspecific relationships. |

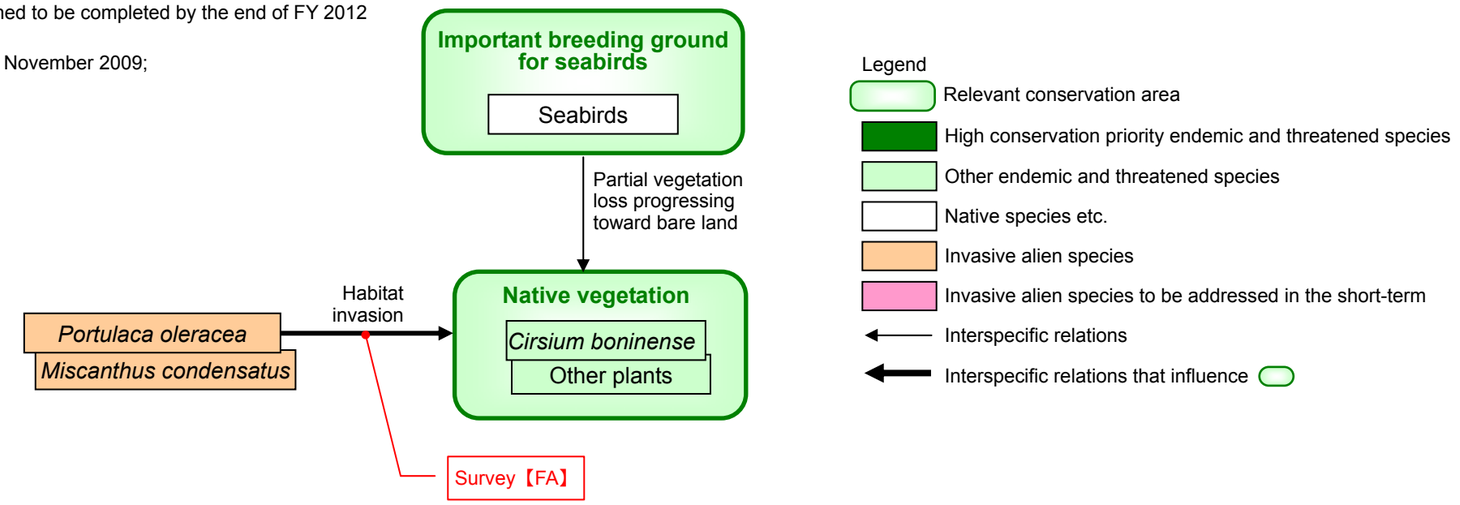
| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) | Short-term target after nomination | (by the end of FY 2012) |
|---|---|---|---|---|---|
| | | | Description | | Description |
| **1. Conservation of seabird breeding grounds**<br>**2. Ecosystem management considering endemic species** | Elimination of alien plants and other related measures | ➢ Initiating a survey to determine the existing condition | ➢ Carry out aerial photography.【FA】 | ➢ Determine existing condition | ➢ Estimate the distribution status of alien woody plants using aerial photographs.【FA】 |

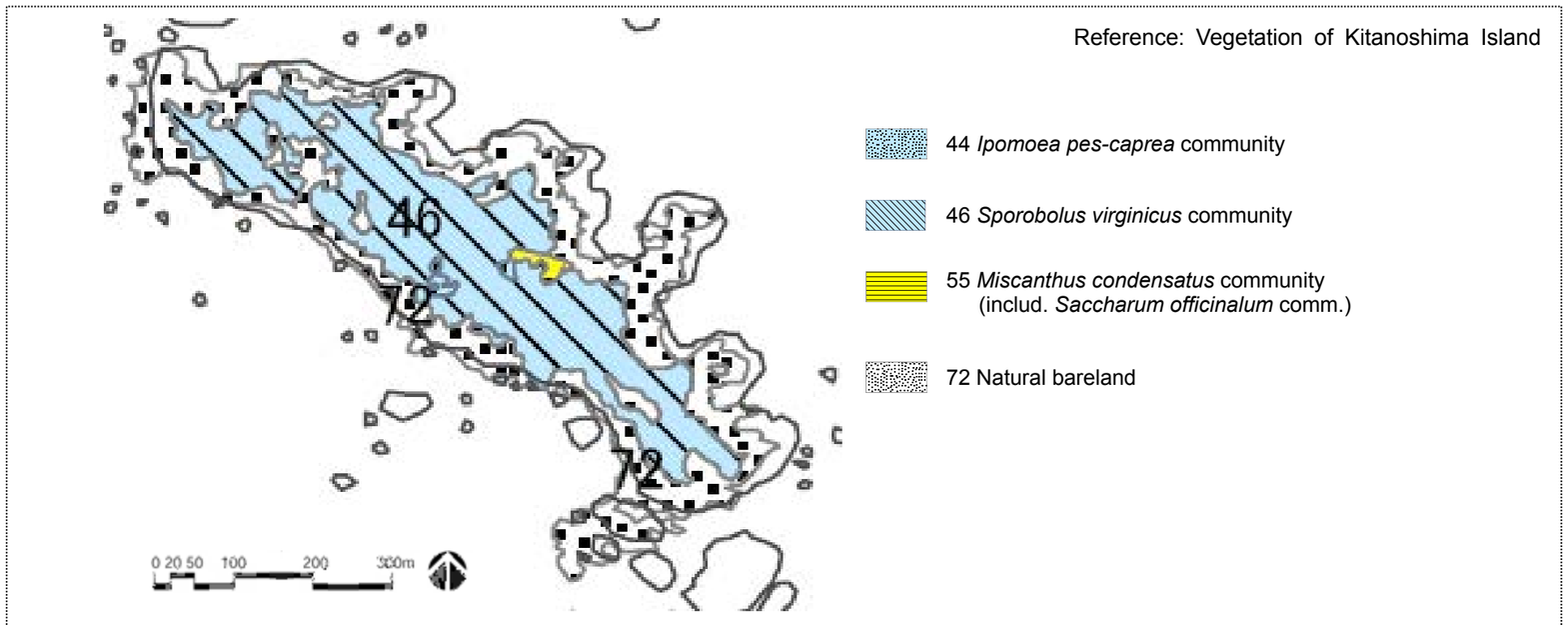
*Correspond to ⬭ in the figure below (Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

■Short-term actions

・Starting in FY 2009, work to determine the distribution status of alien species based on aerial photography will be carried out.



| Island | (Mukojima Island Group) | Activity |
|---|---|---|
| **Nakodojima Island** | **1. Conservation of seabird breeding grounds** | Nakodojima is a breeding ground for seabirds such as the black-footed albatross (*Phoebastria nigripes*) and brown booby (*Sula leucogaster*). To conserve their breeding grounds, the impacts of alien species such as black rats, which cause predation damage, will be removed, and ongoing monitoring will be conducted. |
| | **2. Ecosystem management considering endemic species** | Following feral goat eradication, measures to prevent soil erosion and to eliminate alien plants have been conducted to recover vegetation and conserve endemic species. These activities will continue in an adaptive manner considering the already established interspecific relationships. |

| Activity | Action item | Envisaged achievement* (by the end of FY 2009) Description | Short-term target after nomination (by the end of FY 2012) Description |
|---|---|---|---|
| **1. Conservation of seabird breeding grounds** | Elimination of Leucaena | ➢ Continuation of elimination<br>➢ On Nakodojima, in addition to measures to prevent soil erosion, the elimination of alien species such as Leucaena being implemented.【TMG】 | ➢ Complete eradication<br>➢ Continue the activities listed on the left and implement adaptive management to prevent soil erosion and conserve the remaining forest.【TMG】 |
| **2. Ecosystem management considering endemic species** | Elimination of alien bamboo and dwarf bamboo species. | ➢ Continuation of elimination<br>➢ On Nakodojima, as well as measures to prevent soil erosion, elimination of alien bamboo and dwarf bamboo species being implemented.【TMG】 | ➢ Complete eradication<br>➢ Continue the activities listed on the left and implement adaptive management to prevent soil erosion and conserve the remaining forest.【TMG】 |
| | Elimination of black rats | | ➢ Complete eradication<br>➢ Initiate elimination, considering the completion status of elimination efforts in the Chichijima Island Group.【MOE】 |

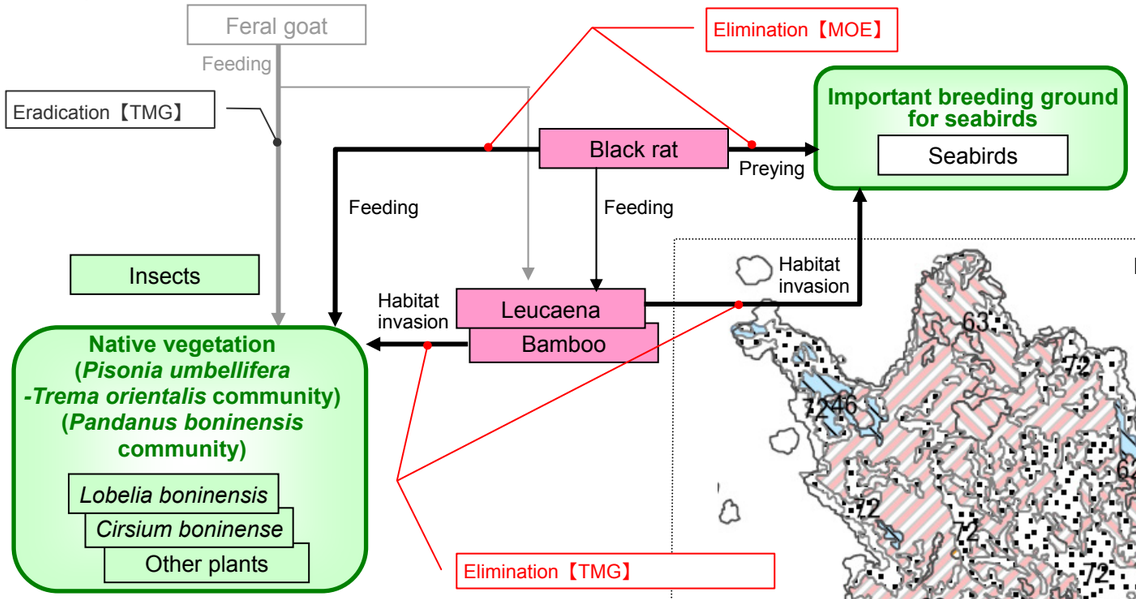
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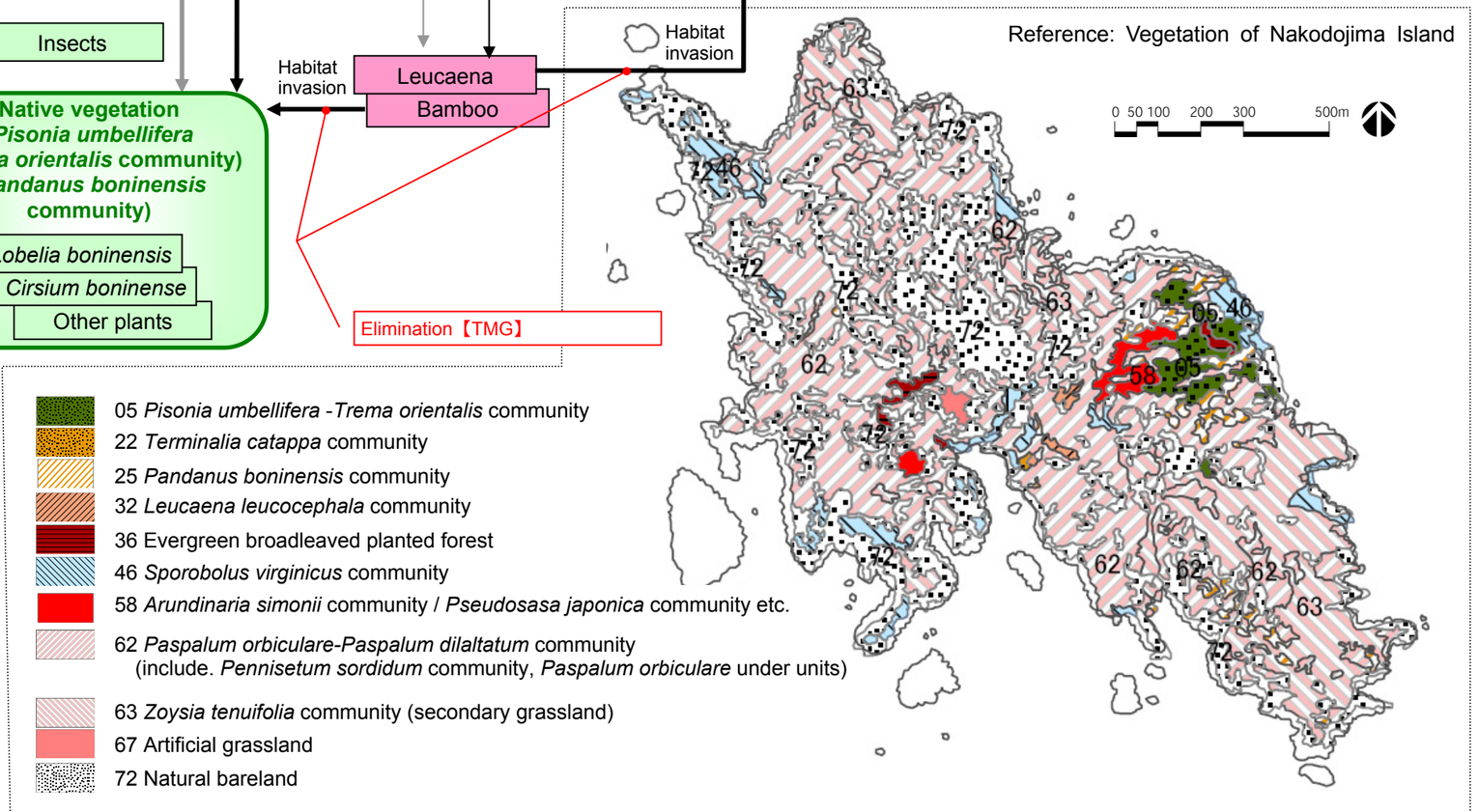
■Short-term actions

- Since the completion of feral goat eradication on Nakodojima, measures including vegetation recovery have been taken.
- By FY 2012, eradication of Leucaena and alien bamboo and dwarf bamboo species, which have been spreading rapidly since the feral goat eradication, will be completed.
- Elimination of black rats, which prey on the offspring and eggs of the seabirds and also act as a suffocating factor for vegetation recovery, will be implemented.




Legend

- Relevant conservation area
- High conservation priority endemic and threatened species
- Other endemic and threatened species
- Native species etc.
- Invasive alien species
- Invasive alien species to be addressed in the short-term
- Interspecific relations
- Interspecific relations that influence ⬭



## (16) Yomejima Island (Mukojima Island Group)

| Island | (Mukojima Island Group) | Activity | |
|---|---|---|---|
| **Yomejima Island** | | **1. Conservation of seabird breeding grounds** | Yomejima is a breeding ground for seabirds such as the black-footed albatross (*Phoebastria nigripes*) and wedge-tailed shearwater (*Puffinus pacificus*). To conserve their breeding grounds, predation impacts by alien species such as black rats will be removed, and monitoring will continue. |
| | | **2. Ecosystem management considering endemic species** | To conserve endemic species that still inhabit the island, elimination of alien species such as black rats will be conducted considering the already established interspecific relationships, in an adaptive manner. |

| Activity | Action item | Envisaged achievement* (by the end of FY 2009) | | Short-term target after nomination | (by the end of FY 2012) |
|---|---|---|---|---|---|
| | | | Description | | Description |
| **1. Conservation of seabird breeding grounds**<br>**2. Ecosystem management considering endemic species** | Elimination of alien bamboo, dwarf bamboo species and other alien plants | ➢ Initiating a survey to determine the existing condition | ➢ Carrying out aerial photography.【FA】 | ➢ Initiate elimination | ➢ Estimate the distribution status of alien woody plants using aerial photographs.【FA】<br>➢ Conclude maintenance arrangements with NPOs and other groups and promote the elimination of alien bamboo and dwarf bamboo species starting in FY 2010.【NPO, FA】 |
| | Elimination of black rats | | | ➢ Complete eradication | ➢ Initiate elimination considering the completion status of elimination in the Chichijima Island Group.【MOE】 |

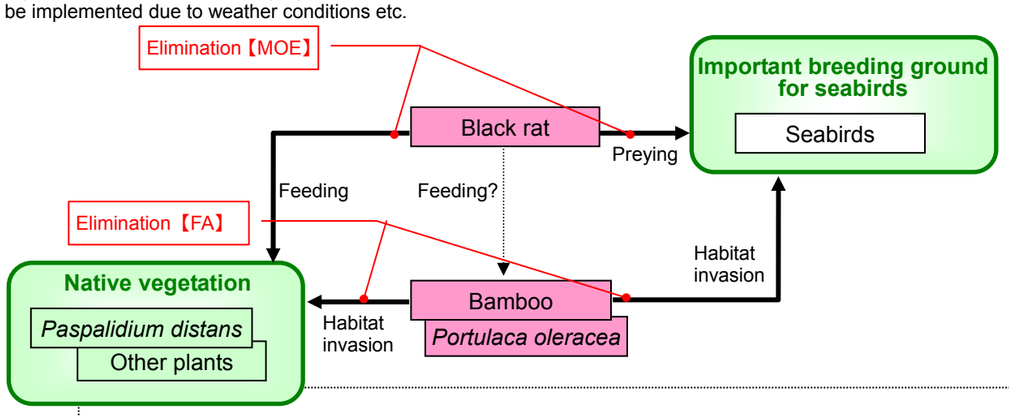
*Correspond to ⬭ in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

■Short-term actions

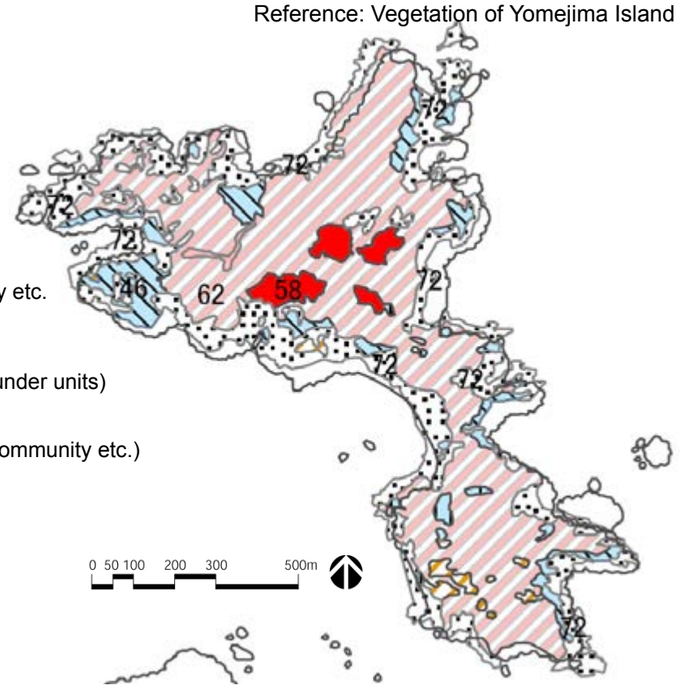
- Elimination of alien plants such as alien bamboo and dwarf bamboo species will be continued on Yomejima.
- Elimination of black rats, which prey on the offspring and eggs of seabirds, will be implemented.




Legend

- Relevant conservation area
- High conservation priority endemic and threatened species
- Other endemic and threatened species
- Native species etc.
- Invasive alien species
- Invasive alien species to be addressed in the short-term
- Interspecific relations
- Interspecific relations that influence ⬭

Reference: Vegetation of Yomejima Island



| Island | (Volcano Islands and Others) | Activity | |
|---|---|---|---|
| **Nishinoshima Island** | | **1. Determine the existing condition** | Nishinoshima is a young island. Thus, it is expected that vegetation succession has been progressing since land formation and will eventually create a complex ecosystem. The ecosystem will be maintained appropriately, with surveys conducted as necessary to determine the existing condition. By these surveys, successional changes in vegetation will be observed, and the status of possible alien species introduction will be monitored. |

| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description |
|---|---|---|---|---|---|
| **1. Determine the existing condition** | Implementation of a survey to determine the existing condition | ➢ Initiating a survey to determine the existing condition | ➢ Carrying out aerial photography.【FA】 | ➢ Determine the existing condition | ➢ Monitor the introduction status of alien species based on the existing condition.【FA】 |

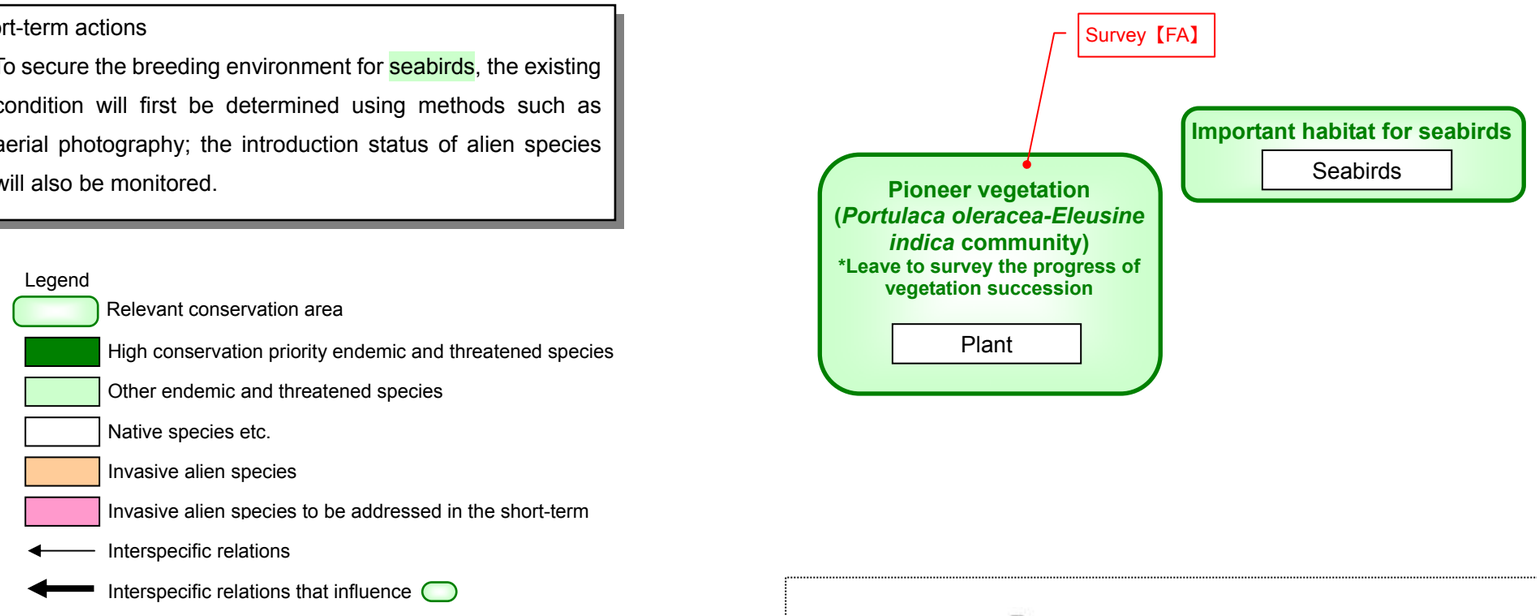
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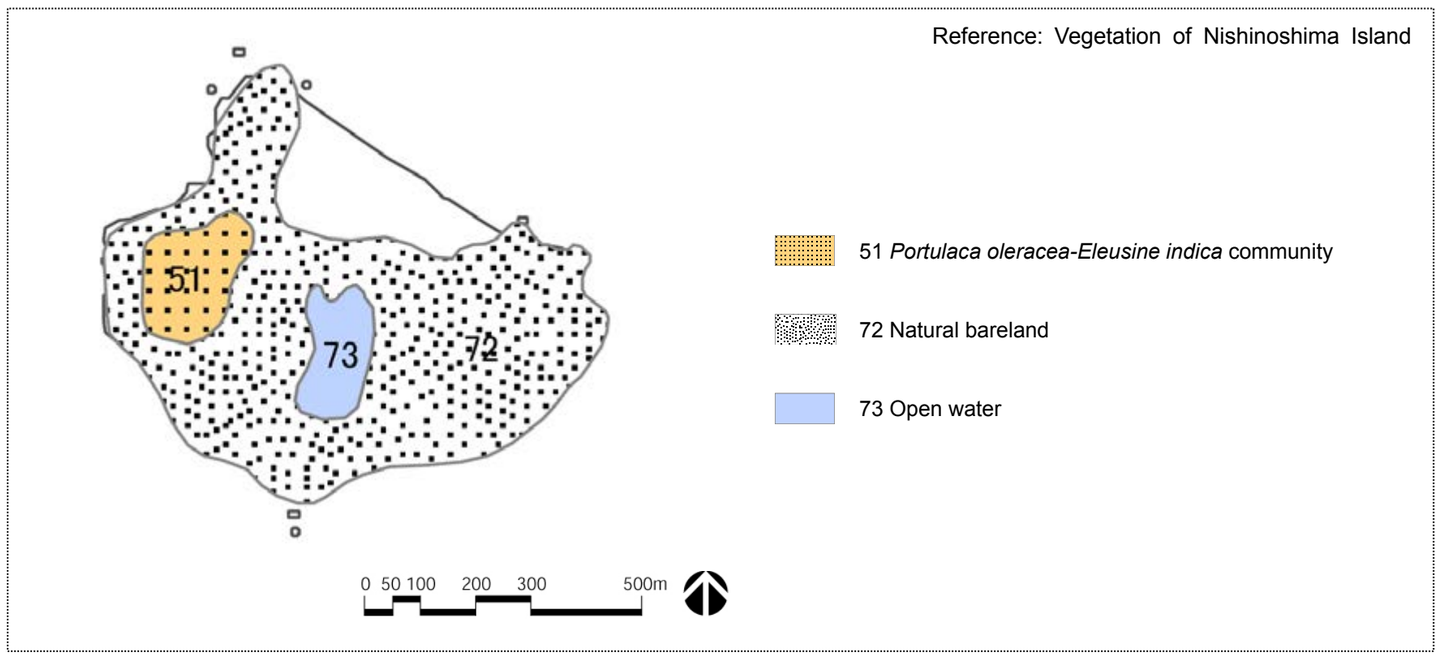
* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

■Short-term actions

・To secure the breeding environment for seabirds, the existing condition will first be determined using methods such as aerial photography; the introduction status of alien species will also be monitored.



(18) Kita-Iwoto Island (Others)

| Island | (Volcano Islands and Others) | Activity | |
|---|---|---|---|
| **Kita-iwoto Island** | | **1. Determine the existing condition** | Kita-iwoto features ecosystems characteristic of oceanic islands. Research to determine the existing condition will be continued. |
| | | **2. Conservation of seabird breeding grounds** | Seabirds are an extremely important characteristic of the oceanic island ecosystem found on Kita-iwoto. Seabird habitat will be conserved by eliminating alien species such as black and brown rats and also by continued monitoring. |

| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description |
|---|---|---|---|---|---|
| **1. Determine the existing condition** | Implementation of a survey to determine the existing condition | ➢ Initiating a survey to determine the existing condition | ➢ Carrying out aerial photography.【FA】 | (To be addressed on medium- and long-term bases) | |
| **2. Conservation of seabird breeding grounds** | Elimination of rats | | | (To be addressed on medium- and long-term bases) | |

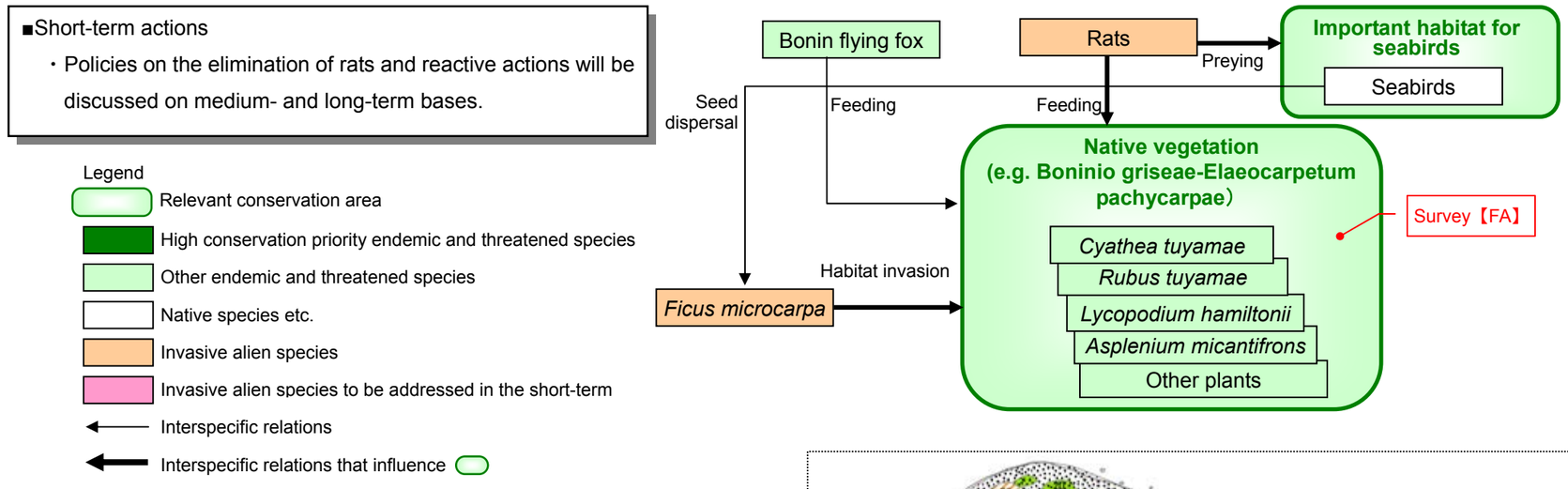
*Correspond to ⬭ in the figure below

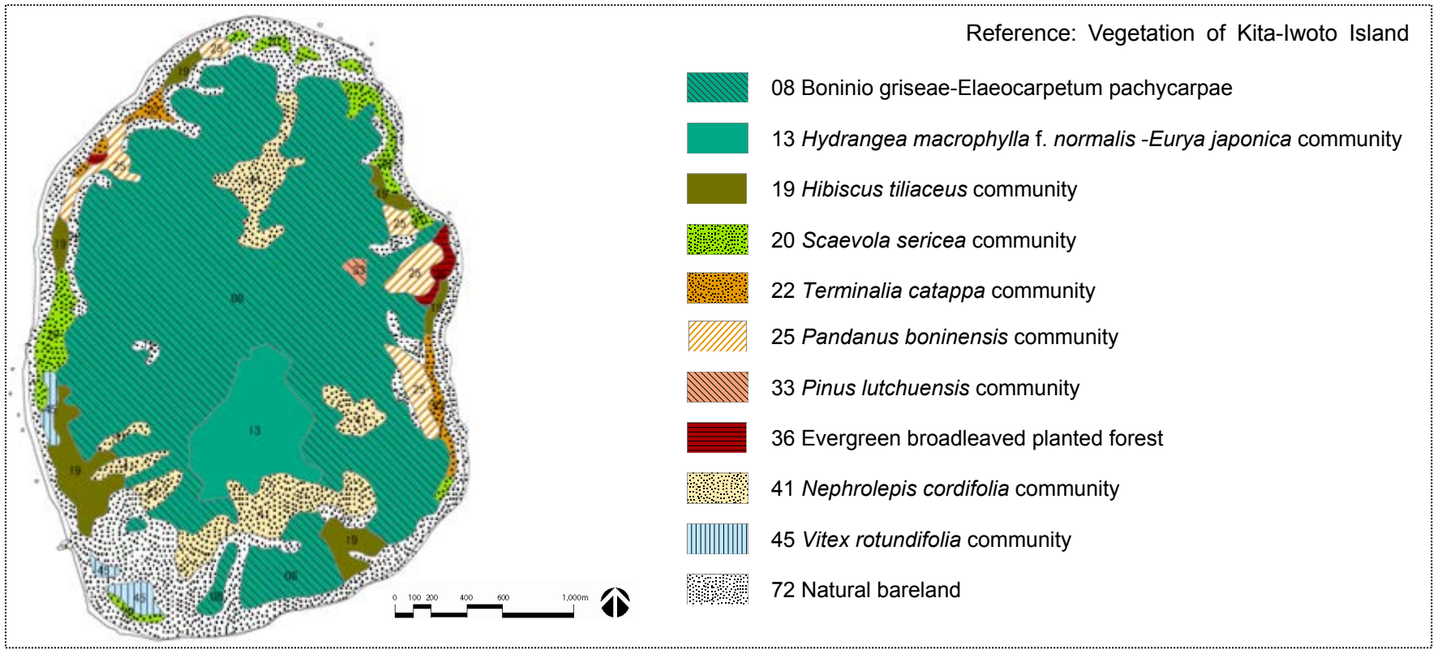
* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray):Almost complete at present (Blue):Planned to be completed by the end of FY 2012

■Short-term actions

・Policies on the elimination of rats and reactive actions will be discussed on medium- and long-term bases.



| Island | (Volcano Islands and Others) | Activity | |
|---|---|---|---|
| **Minami-iwoto Island** | | **1. Determine the existing condition** | On Minami-iwoto, an ecosystem characteristic of oceanic islands is maintained in primeval condition. Any possibility of human influence on the environment will continue to be avoided as much as possible, and surveys will be conducted as necessary to determine the existing condition. By clarifying the mechanisms of the primeval ecosystem of oceanic islands through these activities and also by continuously monitoring the introduction of alien species, the ecosystem of Minami-iwoto will be maintained. |

| Activity | Action item | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description |
|---|---|---|---|---|---|
| **1. Determine the existing condition** | Implementation of a survey to determine the existing condition | ➢ Initiating a survey to determine the existing condition | ➢ Carrying out aerial photography.【FA】 | (To be addressed on medium- and long-term bases) | |

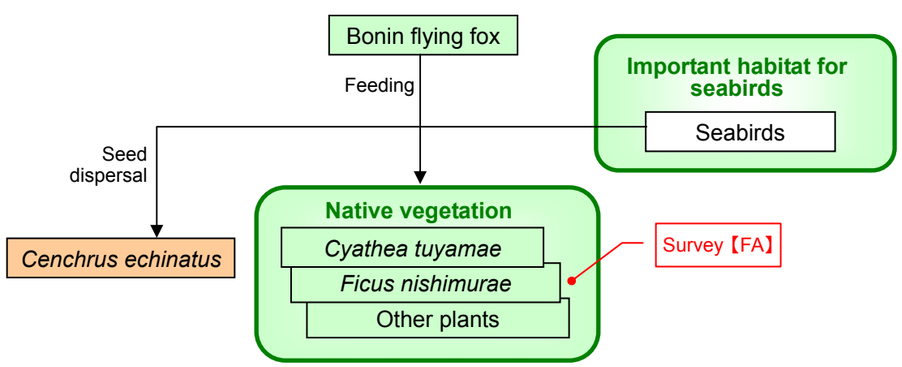
*Correspond to ( ) in the figure below

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

(Gray): Almost complete at present (Blue): Planned to be completed by the end of FY 2012

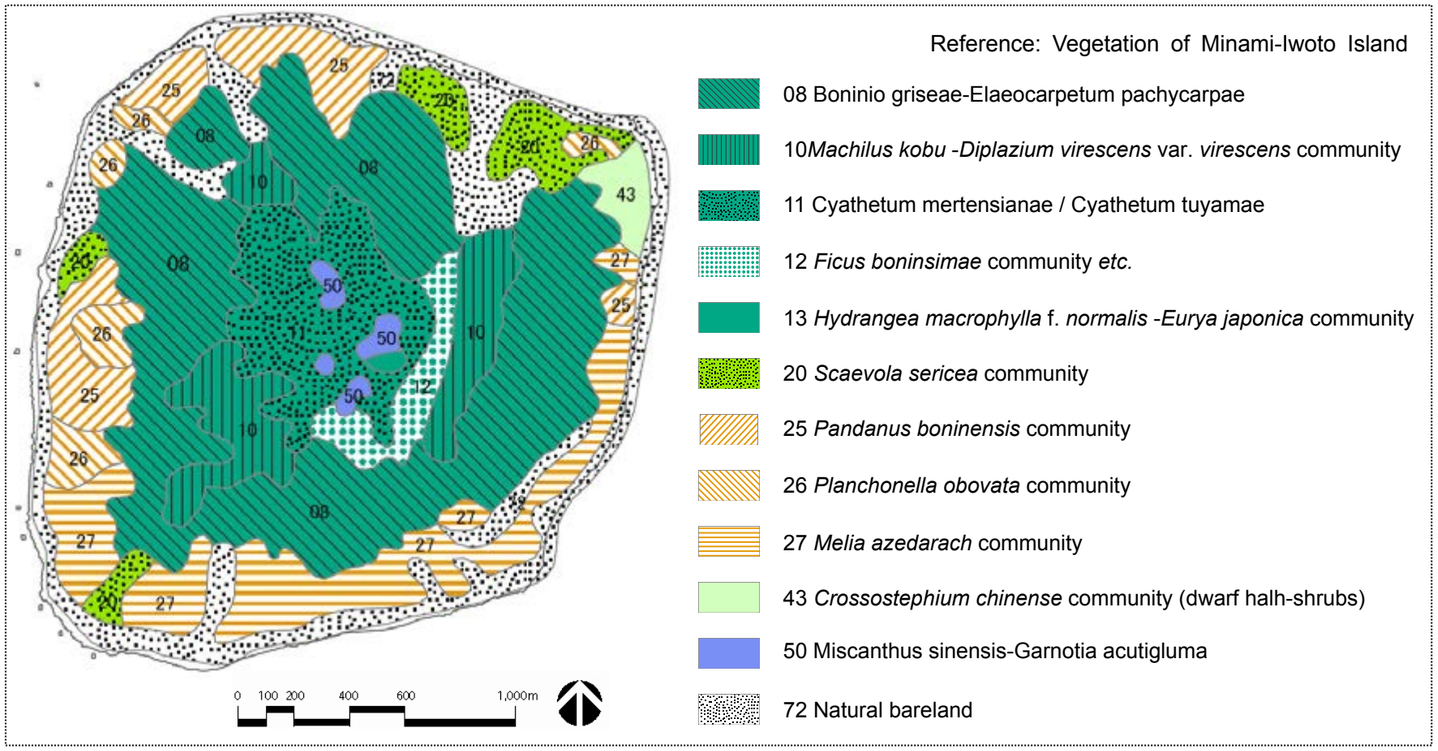
■Short-term actions

・Human influence will continue to be excluded as much as possible, and long-term monitoring will be conducted.




Legend

- Relevant conservation area
- High conservation priority endemic and threatened species
- Other endemic and threatened species
- Native species etc.
- Invasive alien species
- Invasive alien species to be addressed in the short-term
- Interspecific relations
- Interspecific relations that influence ( )



# Schedule 1. Summary Table of Actions by Island

## (1) Chichijima Island Group

| Island | Activity | Action Item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|---|
| Chichijima | 1. Conservation of sclerophyllous scrub and Schima mertensiana forest | Elimination of feral goats | > Initiating area exclusion<br>> Initiating strategic measures with cooperation among agencies | > Setting up and partially complete erection of fences to prevent the invasion of feral goats and feral cats in the Higashidaira area, targeting completion in 2010.【MOE】<br>> Implementation of elimination as a countermeasure against agricultural damage on Chichijima.【Ogasawara Village】<br>> Carrying out research on inhabitation status, and initiating studies of effective eradication procedures.【MOE, FA, TMG, and Ogasawara Village】 | > Complete area exclusion | > Implement feral goat elimination within fenced areas.【MOE】 |
| | | | | | > Initiate and continue elimination | > Continue with the activities listed on the left.【Ogasawara Village】<br>> Initiate strategic eradication activities (in the whole region) with cooperation among management authorities, starting from FY 2009.【MOE, FA, TMG, and Ogasawara Village】 |
| | | Elimination of *Casuarina* and *Pinus lutchuensis* | > Initiating area exclusion | > Beginning elimination of alien species such as Casuarina in the Higashidaira area, targeting area exclusion. Concluding a maintenance agreement with NPOs and other groups for Yoakedaira and promoting the elimination of Casuarina and other alien species.【FA】<br>> Implementation of elimination in the Nagasaki region of Chichijima.【NPO】<br>> Implementation of monitoring surveys (e.g., of birds, insects, land snails, and plants) before conducting elimination in Higashidaira and Yoakedaira.【FA】 | > Continue and expand area exclusion | > Continue with the activities listed on the left.【NPO, FA, and others.】 |
| | | Elimination of Bischofia | > Completion of area exclusion | > Promoting area exclusion in Higashidaira.【NGOs and others】 | > Continue area exclusion | > Area exclusion planned to be completed by FY 2009, with germination treatment and other follow-up work thereafter. (Higashidaira wood-pigeon sanctuary)【NPO, FA, and others.】 |
| | | Elimination of *Psidium littorale* | > Initiating a survey to determine the existing condition | > Estimating the distribution status of alien woody plants using aerial photographs.【FA】<br>> Consideration of implementing elimination measures to be conducted during the elimination of species such as Casuarina.【FA】 | > Continue area exclusion | > With cooperation among agencies, strategically initiate elimination where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| | | Elimination of *Ficus microcarpa* | > Initiating a survey to determine the existing condition | > Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | > Initiate area exclusion | > With cooperation among agencies, strategically initiate elimination where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| | | Elimination of Leucaena | > Initiating a survey to determine the existing condition | > Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | > Initiate area exclusion | > With cooperation among agencies, strategically initiate elimination where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| | | Protection of threatened plants | > Setting up protective nets | > Setting up protective nets around threatened plants growing in Higashidaira to protect them from feral goat grazing. 【TMG】 | > Continue protection | > Continue with the activities listed on the left.【MOE】 |
| | 2. Habitat conservation for wood-pigeon | Exclusion of feral cats | > Initiating area exclusion<br>> Initiating exclusion | > Establishment of fences to prevent invasion by feral goats and cats in Chichijima's Higashidaira region, targeting completion in 2010. Removing (excluding) feral cats from within and also at outside of the fenced areas.【MOE】<br>> Implementation of emergency captures of feral cats in cooperation with the Ogasawara Cat Liaison Committee (targeting all of Chichijima).【FA】 | > Complete area exclusion | > Complete feral cat exclusion within fences in the Higashidaira area.【MOE】<br>> Based on the effectiveness of fencing and capturing measures in Higashidaira, consider exclusion measures of the island.【MOE, FA, TME, Ogasawara Village】 |
| | | | | | > Continue exclusion | > Implement exclusion of cats focusing on the important southern region (the known breeding ground of the wood-pigeon and surrounding areas) and decrease feral cat density on Chichijima.【MOE】 |
| | 3. Habitat conservation for land snails | Elimination of predatory flatworm | > Initiating area defense | > Conducing trials of specific measures for area defense within the Yoakedaira region of Chichijima (installation of electric fences to interrupt unaided movement), examining the effectiveness of measures, and carrying out demonstration experiments to establish proven area defense measures.【MOE】<br>> Carrying out trials of specific measures for area defense at important areas within the southern region, the un-invaded region of Chichijima, and examining the effectiveness of measures.【MOE】 | > Continue area defense | > Set up sanctuaries in land snail habitats (e.g., Yoakedaira), and implement preventive measures against introduction.【MOE】 |
| | | Elimination of black rats | | | (To be addressed on medium- and long-term bases) | |
| | 4. Habitat conservation for the Bonin flying fox | Conservation measures for the Bonin flying fox | >Implementation of protective measures | >Achive compatibility with measures for agricultural damage and raising awareness among the local people.【Agency for Cultural Affairs, TMG, Ogasawara Village】<br>>Designation of region covering the winter roost area as a wildlife protection area.【MOE】 | > Expand protective measures | > Expand measures (e.g. discussing protective measures).【MOE, FA, Agency for Cultural Affairs, TMG, Ogasawara Village】 |
| | 5. Habitat restoration for endemic insects | Elimination of the green anole | | | (To be addressed on medium- and long-term bases) | |
| | | Elimination of Casuarina and Pinus lutchuensis | > Completion and expansion of area exclusion | * Same as above | > Continue and expand area exclusion | * Same as above |
| | 6. Other measures | Elimination of the green anole | > Continue area exclusion (prevent dispersion) | > Implementation of elimination, monitoring, and awareness-raising within the area surrounding Futami Port on Chichijima to prevent dispersion to peripheral islands. 【MOE】 | > Continue area exclusion (prevent dispersion) | > Continue with the activities listed on the left.【MOE】 |
| | | Elimination of cane toad | > Continuation of efforts to prevent dispersion | > Implementation of elimination, monitoring, and awareness-raising within the area surrounding Futami Port on Chichijima to prevent dispersion to peripheral islands. 【MOE】(This measure is implemented together with those against the green anole) | > Continue area exclusion (prevent dispersion) | > Continue with the activities listed on the left.【MOE】 |
| | | Exclusion of feral cats | > Raising awareness of proper pet care | > Raising awareness of proper domestic cat keeping on Chichijima and Hahajima.【Ogasawara Cat Liaison Committee】 | > Enforce the ordinance and enhance management | > Conduct measures to manage domestic and feral cats (achieving more than 95% castration, 60% microchip implantation, and revision of the cat ordinance)【Ogasawara Village, Ogasawara Cat Liaison Committee, Tokyo |
| | | Dispersion prevention of predatory flatworm | > Continuation of raising awareness and working to prevent dispersion | > Implementation of awareness-raising activities led by TMG rangers and other groups to prevent dispersion to Hahajima. 【TMG】 | > Continue work to prevent dispersion and raise awareness | > Continue with the activities listed on the left.【TMG】 |
| Anijima | 1. Conservation of sclerophyllous scrubs | Elimination of feral goats | > Completion of eradication | > Completion of eradication.【TMG】 | - | - |
| | | Elimination of black rats | > Initiating elimination | > Initiating elimination in FY 2009 based on the status of elimination efforts on Mukojima.【MOE】 | > Complete eradication | > Complete eradication on the island and also on its peripheral islands.【MOE】 |
| | | Elimination of Casuarina and other alien plants | > Completion and expansion of area exclusion | > Implementation of monitoring following experimental elimination on the Anijima plateau, and Initiating new elimination experiments.【MOE】<br>> Implementation of monitoring surveys (e.g., of birds, insects, land snails, and plants) before the elimination, and implementation of elimination, targeting area exclusion in the central region of Anijima.【FA】 | > Complete and expand area exclusion | > Implement elimination with the aim of complete area exclusion within the gently sloped land on the plateau.【FA】 |
| | | Elimination of Leucaena | > Establishment of elimination methods<br>> Initiating a survey to determine the existing condition | > Implementation of experiments to establish effective technical elimination methods using chemicals.【MOE】<br>> Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | > Complete area exclusion | > Initiate elimination in FY 2010, with the aim of complete area exclusion within the gently sloped land of the plateau by FY 2012.【FA】 |
| | | Elimination of *Lantana camara var. aculeata* | > Establishment of elimination methods<br>> Initiating a survey to determine the existing condition (on the plateau)<br>> Initiating area exclusion (Takinoura Bay) | > Implementation of experiments to establish effective technical elimination methods using chemicals. 【MOE】<br>> Estimating the distribution status of alien woody plants using aerial photographs. 【FA】<br>> Initiating elimination in Takinoura Bay.【Resident volunteers and NPO】 | > Complete area exclusion | > From FY 2010 within the gently sloped land of the plateau, implement elimination of Casuarina and other plants as well as experimental elimination in a small area with monitoring thereafter.【FA】<br>> With cooperation among volunteers, NPOs, and other agencies, implement elimination in Takinoura Bay. |
| | 2. Habitat conservation for land snails | Elimination of black rats | > Initiating elimination | * Same as above | > Complete eradication | * Same as above |
| | 3. Habitat conservation for wood-pigeon | Elimination of black rats | > Initiating elimination | * Same as above | > Complete eradication | * Same as above |
| | | Exclusion of feral cats | > Completion of exclusion | > Carrying out exclusion by FY 2009 on the basis of research on inhabitation status.【MOE】 | - | - |

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

: Almost complete at present
: Planned to be completed by the end of FY 2012

| Island | Activity | Action Item | Envisaged achievement* | (by the end of FY 2009) Description | (by the end of FY 2012) Short-term target after nomination | Description |
|---|---|---|---|---|---|---|
| **Ototojima** | **1. Conservation of Schima mertensiana forests** | Elimination of Bischofia | > Completion of eradication | > Achieving eradication by chemical injection at the initial stage of invasion. Implementation of monitoring.【MOE】 | - | - |
| | | Elimination of feral goats | > Continuation of elimination | > Implementation of elimination, targeting eradication from Ototojima.【TMG】 | > Complete eradication | > Continue with the activities listed on the left.【TMG】 |
| | | Elimination of black rats | > Initiating elimination | > Initiating elimination in FY 2009 based on the implementation status of elimination on Mukojima.【MOE】 | > Complete eradication | > Complete eradication on the island and also on its peripheral islands.【MOE】 |
| | | Elimination of Casuarina, Leucaena, and other invasive alien plants | > Initiating a survey to determine the existing condition | > Estimating the distribution status of alien woody plants using aerial photographs.【FA】<br>> Implementation of monitoring surveys (e.g., of birds, insects, land snails, and plants) before conducting elimination.【FA】 | > Initiate area exclusion | > With cooperation among management authorities, strategically initiate elimination where necessary.【MOE, FA, TMG, Ogasawara Village】<br>> Research the distribution status of alien species (e.g., Casuarina, Leucaena) in the national forest and analyze the effects of area exclusion based on the results of eliminating Leucaena and other alien species on Anijima and elsewhere. Initiate area exclusion beginning in FY 2010.【FA】 |
| | **2. Habitat conservation for endemic insects including five endemic species of dragonfly** | Elimination of bullfrogs | > Completion of eradication | > Achieving eradication.【MOE】 | - | - |
| | | Elimination of feral pigs | > Completion of eradication | > Achieving eradication. 【MOE】<br>> Implementation of measures to recover vegetation, land snail fauna, and insect fauna. Implementing recovery projects for threatened insect species. 【MOE】 | - | - |
| | | Recovery of lentic environments | > Construction of lentic environments | > Construction of lentic environments to recovery the site together with the implementation of monitoring of aquatic insects, such as dragonflies.【MOE】 | > Construction of lentic environments | > Continue with the activities listed on the left.【MOE】 |
| | | Elimination of Casuarina and other invasive alien plants | > Initiating a survey to determine the existing condition | * Same as above | > Initiate area exclusion | * Same as above |
| | **3. Habitat conservation for wood-pigeon** | Elimination of black rats | > Initiating elimination | * Same as above | > Complete eradication | * Same as above |
| | | Exclusion of feral cats | > Initiating exclusion | > Implementation of exclusion prior to measures against black rats from FY 2009.【MOE】 | > Complete exclusion | > Complete exclusion by FY 2010.【MOE】 |
| **Nishijima** | **1. Ecosystem management considering endemic species** | Elimination of black rats | > Initiating elimination | > Rat poison being set out as an elimination effort.【FFPRI】 | > Complete eradication | > Complete eradication.【MOE】 |
| | | Elimination of Casuarina and Leucaena | > Initiating a survey to determine the existing condition | > Estimating the distribution status of alien woody plants using aerial photographs.【FA】<br>> Conducting a survey of Casuarina distribution in the central part of the island.【FA】 | > Initiate elimination | > With cooperation among management authorities, initiate strategic elimination where necessary.【MOE, FA, TMG, Ogasawara Village】<br>> For national forest areas, establish maintenance arrangements with NPOs and other groups to promote the elimination of Casuarina and other alien species starting in FY 2010.【NPO, FA】 |
| **Higashijima** | **1. Conservation of seabird breeding grounds**<br>**2. Ecosystem management considering endemic species** | Elimination of black rats | > Completion of eradication | > Conducting experimental elimination on Higashijima on a pilot basis.【MOE】 | - | - |
| | | Elimination of Casuarina and Leucaena | > Initiating a survey to determine the existing condition | > Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | > Initiate elimination | > Based on the results from elimination of Leucaena and other alien species on islands such as Anijima, consider whether to implement experimental elimination with the aim of achieving area exclusions.【FA】 |
| **Minamijima** | **1. Conservation of seabird breeding grounds**<br>**2. Ecosystem management considering endemic species** | Elimination of *Cenchrus echinatus* and other alien plants | > Continuation of elimination | > Implementation of elimination of highly invasive alien plants on Minamijima.【TMG, FA, Ogasawara Village, NPO】<br>> Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | > Continue elimination | > Continue with the activities listed on the left.【TMG, FA】 |
| | | Elimination of black rats | | | > Complete eradication | > After eradication is completed on Anijima and Ototojima, consider management measures.【MOE】 |

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

: Almost complete at present
: Planned to be completed by the end of FY 2012

## (2) Hahajima Island Group

| Island | Activity | Action Item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|---|
| Hahajima | **1. Conservation of subtropical rainforest, Ardisia sieboldii forest, and sclerophyllous scrub typical of the Hahajima Island Group** | Elimination of Bischofia | > Creation of medium- and long-term plans<br>> Initiating area exclusion | > Implementation of elimination cording to the created medium- and long-term plans [e.g., “Bischofia Control Plan”] to achieve area exclusion in the Sekimon basin.【FA】<br>> Implementation of monitoring surveys (e.g., of birds, insects, land snails, and plants) before initiating elimination in Sekimon and other areas.【FA】<br>> Implementation of a system to monitor persisting individuals in the Higashidai area of Hahajima.【MOE】<br>> Targeting area exclusion in the area north of the line between Hahajima Yashihama Beach and Nagahama Beach; implementation of elimination at Nishidai and Koromodate. In addition, partial implementation at Nishiura area.【MOE】 | > Continue elimination | > Continue with the activities listed on the left.【FA】<br>> By continuing the activities listed on the left, eliminate from private land in Nishidai and Koromodate; initiate elimination in the Koshinzuka region.【MOE】 |
| | | Elimination of *Ficus microcarpa* | > Initiating a survey to determine the existing condition | > Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | > Initiate area exclusion | > With cooperation among management authorities, strategically initiate elimination where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| | | Elimination of Casuarina and Leucaena | > Initiating area exclusion | > Implementation of Casuarina elimination at Minamizaki on Hahajima, targeting area exclusion in FY 2007–2008. Elimination of Leucaena at the site where elimination of Casuarina was carried out in FY 2007 as Leucaena has invaded the site. Implementation of monitoring on the site.【FA】<br>> Estimating the distribution status of alien woody plants using aerial photographs.【FA】 | > Continue monitoring after the elimination | > Continue monitoring the introduction status of alien species, such as Casuarina, in excluded areas. (Minamizaki region)【FA】<br>> With cooperation among agencies, strategically initiate elimination where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| | **2. Habitat conservation for endemic insects including Celastrina ogasawaraensis** | Elimination of the green anole | > Completion of area exclusion | > Achieving extremely low density of green anoles having almost no negative impact on the insect ecosystem by FY 2009 within the nature restoration area set up in Shin-Yuhigaoka and Minamizaki on Hahajima. In addition, consideration of establishing new nature restoration areas.【MOE】 | > Set up new exclusion area<br>> Conduct point exclusions at the breeding grounds of threatened insects | > Set up new nature restoration areas (areas as yet undecided).【MOE】<br>> At the breeding ground of *Celastrina ogasawaraensis* , continue point exclusion during the breeding season (area as yet undecided)【MOE】 |
| | | Elimination of the cane toad | > Completion of area exclusion | > Continuation of capture and exclusion measures within the nature restoration area set up in Shin-Yuhigaoka and Minamizaki on Hahajima. In addition, consider establishing new nature restoration areas.【MOE】(The measures above are implemented together with those against the green anole) | > Complete area exclusion | > Almost complete area exclusion (Minamizaki Hasuike Pond area)【MOE】 |
| | | Monitoring of the habitat for *Celastrina ogasawaraensis* and other endemic insects | > Continuation of monitoring | > Implementation of conservation and breeding measures for Celastrina ogasawaraensis and other endemic species, as well as continued monitoring of ecosystem recovery focusing on insects.【MOE, Ogasawara-Shijimi Society】 | > Continue monitoring | > Continue with the activities listed on the left.【MOE, Ogasawara-Shijimi Society】 |
| | **3. Habitat conservation for Carduelis sinica kittlitzi and seabirds** | Exclusion of feral cats | > Complete and expand area exclusion | > Consideration of setting up a large-scale exclusion zone at Minamizaki. (an exclusion area has already been established at the point of Minamizaki and the exclusion has been completed).【MOE, Ogasawara Cat Liaison Committee】 | (To be addressed on medium- and long-term bases) | (Coordinating with the schedule for the island-wide exclusion, continue discussion of measures) |
| | | Elimination of black rats | | | (To be addressed on medium- and long-term bases) | |
| | **4. Habitat conservation for wood-pigeon** | Elimination of Bischofia | > Creation of medium- and long-term plans<br>> Initiating area exclusion | * Same as above | >Continue elimination | * Same as above |
| | | Exclusion of feral cats | | | (To be addressed on medium- and long-term bases) | * Same as above |
| | | Elimination of black rats | | | (To be addressed on medium- and long-term bases) | * Same as above |
| | | Planting of food trees | > Continuation of elimination of Bischofia<br>> Planting of food trees | > Continuation of eliminating competing juvenile trees of Bischofia on Mt Kuwanoki on Hahajima, in addition to eliminating Bischofia and planting food trees of wood-pigeon. In addition, creation of a manual for propagation techniques based on the achievements so far.【FA】 | > Continue elimination of Bischofia | > Continue elimination of juvenile trees and other measures listed on the left【FA】 |
| | **5. Habitat conservation for land snails** | Discussing conservation policies for endemic land snails | > Discussion of conservation policies | > Determining the inhabitation status of endemic land snails on Hahajima, establishing the individual project review committee, and discussing conservation policies for land snails.【MOE】 | > Initiate specific measures | > Based on outcomes of conservation policies found by the review committee, implement specific measures as necessary.【MOE】 |
| | **6. Other measures** | Exclusion of feral cats | > Raising awareness of proper pet care | > Raising awareness of proper domestic cat keeping.【Ogasawara Cat Liaison Committee】 | > Enforce the ordinance and enhance management | > Conduct measures to manage domestic and feral cats (achieving more than 95% castration, 60% microchip implantation, and revision of the cat ordinance)【Ogasawara Village, Ogasawara Cat Liaison Committee, Tokyo Veterinary Medical Association, NPO】 |
| | | Elimination of predatory flatworm | > Continuation of raising awareness and working to prevent dispersion | >Implementation of awareness-raising activities led by TMG rangers and other groups to prevent dispersion to Hahajima and peripheral islands and a measure of washing shoe soles when disembarking from the transport ship Hahajima Maru. 【TMG】 | > Continue work to prevent dispersion and raise awareness | > Continue with the activities listed on the left.【TMG】 |
| Mukohjima | **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group**<br>**2. Habitat conservation for endemic birds** | Elimination of Casuarina and other alien plants | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】<br>> Implementation of surveys and other studies on the inhabitation status of Carduelis sinica kittlitzi and considering the elimination of alien species.【FA】<br>> Implementation of monitoring surveys (e.g., of birds, insects, land snails, and plants) before beginning elimination.【FA】 | > Initiate area exclusion | > Estimate the distribution status of alien woody plants using aerial photographs; based on the survey results, plan for area exclusions to be initiated in FY 2011.【FA】 |
| | | Elimination of black rats | | | > Complete eradication | > Considering the status of elimination throughout the Chichijima Island Group, initiate elimination as needed.【MOE】 |
| Anejima | **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | Elimination of Casuarina and other alien plants | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | > Determine the existing condition | > Implement research on the distribution status of alien species (e.g., Casuarina and Leucaena).【FA】 |
| | | Elimination of black rats | | | > Complete eradication | > Based on the completion status of elimination in the Chichijima Island Group, initiate elimination.【MOE】 |
| Imotojima | **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group**<br>**2. Habitat conservation for endemic birds** | Elimination of Leucaena and other alien plants | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | > Determine the existing condition | > Implement research on the distribution status of alien species (e.g., Casuarina and Leucaena).【FA】 |
| | | Elimination of black rats | | | > Complete eradication | > Based on the completion status of elimination in the Chichijima Island Group, initiate elimination.【MOE】 |
| Meijima | **1. Conservation of sclerophyllous scrub typical of the Hahajima Island Group** | Elimination of Leucaena and other alien plants | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | > Determine the existing condition | > Implement research on the distribution status of alien species (e.g., Casuarina and Leucaena).【FA】 |
| | | Elimination of black rats | | | > Complete eradication | > Based on the completion status of elimination in the Chichijima Island Group, initiate elimination.【MOE】 |
| Hirajima | **1. Ecosystem management considering endemic species** | Elimination of Bischofia | > Completion of eradication | > Elimination being completed and eradication achieved; approximately 20 individual plants were removed.【MOE】 | - | - |
| | | Elimination of Casuarina and other alien plants | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | > Determine the existing condition | > Implement research on the distribution status of alien species (e.g., Casuarina and Leucaena).【FA】 |
| | | Elimination of black rats and other alien animals | | | > Complete eradication | > Based on the completion status of elimination in the Chichijima Island Group, initiate elimination.【MOE】 |

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

: Almost complete at present

: Planned to be completed by the end of FY 2012

## (3) Mukojima Island Group and Other Islands

| Island | Activity | Action Item | Envisaged achievement* (by the end of FY 2009) | Description | Short-term target after nomination (by the end of FY 2012) | Description |
|---|---|---|---|---|---|---|
| **Mukojima** | **1. Ecosystem management of Ardisia sieboldii forest and other habitats**<br>**2. Habitat conservation for endemic insects** | Elimination of Leucaena | >Continue elimination | > Implementation of elimination on Leucaena and alien bamboo and dwarf bamboo species to conserve the remaining forest on Mukojima.【TMG】 | > Complete eradication | > Continue the activities listed on the left and implement adaptive management, aiming to conserve the remaining forest【TMG】 |
| | | Elimination of alien bamboo and dwarf bamboo species | >Continue elimination | > Implementation of elimination on Leucaena and alien bamboo and dwarf bamboo species to conserve the remaining forest on Mukojima.【TMG】 | > Complete eradication | > Continue the activities listed on the left and implement adaptive management, aiming to conserve the remaining forest【TMG】 |
| | | Elimination of *Ficus microcarpa* | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | > Initiate area exclusion | > With cooperation among management authorities, initiate elimination strategically where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| | | Elimination of black rats | > Initiating elimination | > Implementation of preliminary experimental elimination on Mukojima.【MOE】 | > Complete eradication | > Complete the eradication on Mukojima.【MOE】 |
| | **3. Conservation and creation of breeding grounds for three albatross species** | Creation of new albatross breeding ground | > Continuation of activities | > Transferring and releasing young albatrosses from the breeding ground on the island of Torishima in the Izu Island Group to Mukojima during the breeding season and implementing artificial rearing until the birds leave the nest.【MOE】 | > Continue | > Continue with the activities listed on the left.【MOE】 |
| | | Elimination of *Lantana camara var. aculeata* | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | > Determine the existing condition | > Estimate the distribution status of alien woody plants using aerial photographs.【FA】<br>> With cooperation among agencies, strategically initiate elimination where necessary.【MOE, FA, TMG, Ogasawara Village】 |
| **Kitanoshima** | **1. Conservation of seabird breeding grounds**<br>**2. Ecosystem management considering endemic species** | Elimination of alien plants and other related measures | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | > Determine the existing condition | > Estimate the distribution status of alien woody plants using aerial photographs.【FA】 |
| **Nakodojima** | **1. Conservation of seabird breeding grounds**<br>**2. Ecosystem management considering endemic species** | Elimination of Leucaena | >Continue elimination | > On Nakodojima, in addition to measures to prevent soil erosion, the elimination of alien species such as Leucaena being implemented.【TMG】 | > Complete eradication | > Continue the activities listed on the left and implement adaptive management to prevent soil erosion and conserve the remaining forest.【TMG】 |
| | | Elimination of alien bamboo and dwarf bamboo species | >Continue elimination | > On Nakodojima, as well as measures to prevent soil erosion, elimination of alien bamboo and dwarf bamboo species being implemented.【TMG】 | > Complete eradication | > Continue the activities listed on the left and implement adaptive management to prevent soil erosion and conserve the remaining forest.【TMG】 |
| | | Elimination of black rats | | | > Complete eradication | > Initiate elimination, considering the completion status of elimination efforts in the Chichijima Island Group.【MOE】 |
| **Yomejima** | **1. Conservation of seabird breeding grounds**<br>**2. Ecosystem management considering endemic species** | Elimination of alien bamboo and dwarf bamboo species | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | > Initiate elimination | > Estimate the distribution status of alien woody plants using aerial photographs.【FA】<br>> Conclude maintenance arrangements with NPOs and other groups and promote the elimination of alien bamboo and dwarf bamboo species starting in FY 2010.【NPO, FA】 |
| | | Elimination of black rats | | | > Complete eradication | > Initiate elimination considering the completion status of elimination in the Chichijima Island Group.【MOE】 |
| **Nishinoshima** | **1. Determine the existing condition** | Implementation of a survey to determine the existing condition | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | > Determine the existing condition | > Monitor the introduction status of alien species based on the existing condition.【FA】 |
| **Kita-iwoto** | **1. Determine the existing condition** | Implementation of a survey to determine the existing condition | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | (To be addressed on medium- and long-term bases) | |
| | **2. Conservation of seabird breeding grounds** | Elimination of rats | | | (To be addressed on medium- and long-term bases) | |
| **Minami-iwoto** | **1. Determine the existing condition** | Implementation of a survey to determine the existing condition | > Initiating a survey to determine the existing condition | > Carrying out aerial photography.【FA】 | (To be addressed on medium- and long-term bases) | |

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

: Almost complete at present

: Planned to be completed by the end of FY 2012

# Schedule 2. Summary Table of Actions by Alien Species

←Top row: As of the time when the tentative list was submitted (end of FY 2006)→
←Middle row: As of the time of nomination (end of FY 2009)→
←Bottom row: As of three years after the nomination (end of FY 2012)→

| Name of alien species | Activity | Envisaged achievement* (by the end of FY 2009) | Description (by the end of FY 2009) | Short-term target after nomination (by the end of FY 2012) | Description (by the end of FY 2012) | Time period | Stages of the activities: Research / Verification Experiment / Project Development | Progress of the measures on each island: Chichijima Is. Group: Chichijima / Anijima / Ototojima / Nishijima / Higashijima / Minamijima | Hahajima Is. Group: Hahajima / Hirajima / Mukohjima / Anejima / Imotojima / Mejima | Mukojima Is. Group: Mukojima / Kitanoshima / Nakodojima / Yomejima | Others: Nishinoshima / Kita-iwoto / Minami-iwoto |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Feral goat | >The ultimate goal is eradication of feral goats on each island.<br>>Island-wide eradication will be conducted, prioritizing Anijima, followed by Ototojima.<br>>For the time being, on Chichijima, endemic species and threatened species will be conserved by erecting fences to prevent goat invasion. Once eradication measures are completed on Anijima and Ototojima, island-wide eradication will be conducted on Chichijima in coordination with other projects related to agriculture. | >Anijima: Completion of eradication<br>>Ototojima: Continuation of elimination<br>>Chichijima: Initiating area exclusions<br>>Chichijima: Initiating strategic measures with cooperation among various agencies | >Completion of eradication on Anijima.【TMG】<br>>Conducting elimination aimed at eradicating feral goats on Ototojima.【TMG】<br>>Setting up and partially complete erection of fences to prevent feral goat and cat invasions in the Higashidaira area of Chichijima, targeting completion in 2010. Achieving exclusion within the fenced areas.【MOE】<br>>Implementation of elimination work as a measure against agricultural damage on Chichijima.【Ogasawara Village】<br>>Carrying out research on inhabitation status, and initiating studies of effective eradication procedures.【MOE, FA, TMG, Ogasawara Village】 | >Ototojima: Complete eradication<br>>Chichijima: Complete area exclusion<br>>Chichijima: Initiate and continue elimination | >On Ototojima, continue with the activities listed on the left.【TMG】<br>>In the Higashidaira area of Chichijima, complete feral goat elimination within fenced areas.【MOE】<br>>Continue with the activities listed on the left.【Ogasawara Village】<br>>From FY 2009, initiate measures strategically with the cooperation of each agency. (Whole region )【MOE, FA, TMG, Ogasawara Village】 | ～End of FY 2006<br>～End of FY 2009<br>～End of FY 2012 | → | ◆ ● ×<br>◇ ○ ●<br>◇ ○ ○ | ○ ○ ○ - ○ - - ○ - - -<br>○ ○ ○ - ○ - - ○ - - -<br>○ ○ ○ - ○ - - ○ - - - | ○ - ○ ○ - -<br>○ - ○ ○ - - | - - -<br>- - - |
| Feral cat | >As an ultimate goal, eradication will be achieved on each island.<br>>Fences will be set up to prevent feral cat invasion and protect endemic and threatened species.<br>>Awareness raising will be promoted regarding the keeping of domestic cats and measures to control feral cats.<br>>On Anijima and Ototojima, feral cat eradication will be conducted in parallel with black rat eradication measures.<br>>On Chichijima and Hahajima, obtaining agreement on issues including adequate measures regarding domestic cats will be promoted. Once public agreement is obtained, future measures for feral cat exclusion and black rat elimination will be implemented. | >Anijima: Completion of exclusion<br>>Ototojima: Initiating exclusion<br>>Chichijima: Initiating area exclusion<br>>Hahajima: Completion and expansion of area exclusion<br>>Chichijima and Hahajima: Raising awareness of proper pet care | >Implementation of exclusion work on Anijima by FY 2009, based on the survey on feral cat inhabitation status.【MOE】<br>>Implementation of feral cat exclusion prior to black rat measures on Ototojima from FY 2009.【MOE】<br>>Erecting fences to prevent feral goat and cat invasions in the Higashidaira area of Chichijima, targeting completion in 2010. Removing (exclude) individuals within and outside the fences.【MOE】<br>>Implementation of emergency captures of feral cats in cooperation with the Ogasawara Cat Liaison Committee. (Targeting the entire Chichijima Is. ) 【FA】<br>>Considering to set up a large-scale exclusion zone at Minamizaki (an exclusion area has already been established at the point of Minamizaki and exclusion has been achieved).【MOE, Ogasawara Cat Liaison Committee】<br>>Raising awareness of proper domestic cat keeping on Chichijima and Hahajima.【Ogasawara Cat Liaison Committee】 | >Ototojima: Complete exclusion<br>>Chichijima: Complete area exclusion<br>>Chichijima: Continue exclusion<br>>Chichijima and Hahajima: Enforce the ordinance and enhance management | >On Ototojima, complete exclusion by FY 2010.【MOE】<br>>On Chichijima, complete exclusion within fenced areas in Higashidaira. In addition, implement feral cat exclusion in the important southern region of the island and decrease the inhabitation density on the island.【MOE】<br>>Based on verification of fence and capturing effectiveness in Higashidaira, discuss the exclusion measures on the island.【MOE, FA, TMG, Ogasawara Village】<br>>Conduct measures to manage domestic and feral cats (e.g., microchip implantation, revision of the cat ordinance)【Ogasawara Village, Ogasawara Cat Liaison Committee, Tokyo Veterinary Medical | ～End of FY 2006<br>～End of FY 2009<br>～End of FY 2012 | → | × × ?  ×<br>◇ ○ ●<br>◇ ○ ○ | - - - ◇ - - - - - - - - - - - -<br>◇ - - - - - - - - - - - - - - -<br>◇ - - - - - - - - - - - - - - - | - - - -<br>- - - - | - - -<br>- - - |
| Feral pig | >To eradicate feral pigs, elimination schemes will be initiated after completion of bullfrog elimination.<br>>Because feral pigs may become more difficult to capture if they become warier of humans, the exclusion work will be carried out intensively over a short period.<br>>The feral pig measures will be given priority over feral goat measures (to avoid exclusion work becoming more difficult due to vegetation recovery). | >Ototojima: Completion of eradication | >Completion of eradication.【MOE】<br>>Implementation of measures to allow for recovery of native vegetation, land snail fauna, and insect fauna. Initiating threatened insect recovery projects.【MOE】 | – | – | ～End of FY 2006<br>～End of FY 2009<br>～End of FY 2012 | →<br>Complete island-wide eradication<br>(Continue monitoring) | ○ - ●<br>○ - ○<br>○ - ○ | - - - - - - - - - - - - - - - - - - - - - - - - - - - | - - - -<br>- - - - | - - -<br>- - - |
| Black rat | >As an ultimate goal, eradication will be achieved on each island.<br>>Technical methods for eradication will be discussed and established, based on results from Nishijima and cases overseas.<br>>On important peripheral islands for conservation (Anijima, Ototojima), elimination work will be conducted with the goal of eradication.<br>>On Chichijima and Hahajima, area exclusions will implemented using fences to prevent invasion within important areas for conservation. | >Higashijima: Completion of eradication work<br>>Mukojima, Nishijima, Anijima and Ototojima: Initiating elimination | >Implementation of preliminary experimental elimination areas on Mukojima and Higashijima.【MOE】 Rat poison being set out as an elimination effort.【FFPRI】<br>>Initiating elimination on Anijima and Ototojima in FY 2009, based on the status of the elimination effort on Mukojima.【MOE】 | >Mukojima, Nishijima, Anijima and Ototojima: Complete eradication<br>>Other peripheral islands: Complete eradication | >On Mukojima, Nishijima, Anijima and Ototojima, complete the eradication.【MOE】<br>>Discuss measures for peripheral islands of the Chichijima Island Group, such as Minamijima, after eradication is completed on Anijima and Ototojima. For other islands, initiate elimination, based on the completion status in the Chichijima Island Group.【MOE】 | ～End of FY 2006<br>～End of FY 2009<br>～End of FY 2012 | →<br>→<br>→ | × × × ● × ×<br>× ● ● ◇ ○ ×<br>◇ ○ ○ ○ ○ ○ | × × × × × × × × × × × × × △ × ×<br>× × × × × × × × × × × ◇ △ × ×<br>○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | - × -<br>- × -<br>- Discuss - | - - -<br>- - - |
| Green anole | >As an ultimate goal, eradication will be achieved on each island.<br>>Dispersion of green anoles to islands other than Chichijima and Hahajima will be prevented.<br>>Prevention of dispersion to Anijima, Ototojima, and Minamijima will be particularly enforced.<br>>On Chichijima and Hahajima, areas important for conservation will be designated nature restoration areas, and anole invasion control, anole exclusion, and conservation measures for arthropods targeted for conservation will be carried out . | >Establishing elimination methods<br>>Chichijima: Continue area exclusion (prevent dispersion)<br>>Hahajima: Completion of area exclusion | >Implementation of elimination, monitoring and awareness raising within the area surrounding Futami Port on Chichijima to prevent the dispersion to peripheral islands .【MOE】<br>>Decreasing green anole inhabitation to an extremely low density and achieving a condition in which no damaging impacts are observed within the nature restoration areas in Shin-Yuhigaoka and Minamizaki on Hahajima by FY 2009. In addition, considered the establishment of new nature restoration areas.【MOE】<br>>In addition to continued monitoring of ecosystem restoration, mainly in regard to insects, implementing measures for the protection and proliferation of Celastrina ogasawaraensis and other insect species.【MOE, Ogasawara-Shijimi Society】 | >Chichijima: Continue area exclusion (to prevent the dispersion of green anoles)<br>>Hahajima: Set up a new exclusion areas<br>>Hahajima: Implement point exclusions at the breeding sites of threatened insects | >On Chichijima, continue with the activities listed on the left.【MOE】<br>>On Hahajima, establish new nature restoration areas. (Areas not yet decided)【MOE】<br>>Within *Celastrina ogasawaraensis* breeding sites on Hahajima, continue point exclusion during the breeding season. (Areas not yet decided)【MOE】 | ～End of FY 2006<br>～End of FY 2009<br>～End of FY 2012 | →<br>→<br>Discuss | ◆ - - - - - ◆ - - - - - - - - - - - -<br>◆ - - - - - ◇ - - - - - - - - - - - -<br>◆ - - - - - ◇ - - - - - - - - - - - - | | |
| Cane toad | >As the ultimate goal, eradication will be achieved on every island.<br>>Dispersion of cane toad to other islands other than Chichijima and Hahajima will be prevented.<br>>To prevent breeding, cane toad invasion of lentic environments will be prevented using exclusion fences.<br>>On Chichijima and Hahajima, areas important for conservation will be designated nature restoration areas, where cane toad populations will be diminished or completely excluded. | >Chichijima: Continuation of efforts to prevent dispersion<br>>Hahajima: Completion of area exclusion | >Implementation of elimination, monitoring, and awareness-raising within the area surrounding Futami Port on Chichijima to prevent dispersion to peripheral islands.【MOE】<br>>Implementation of capture and exclusion measures within the nature restoration area established in the Shin-Yuhigaoka and Minamizaki areas of Hahajima. In addition, considering the designation of new nature restoration areas.【MOE】<br>(The above measures are implemented together with those against the green anole) | >Chichijima: Continue area exclusion (prevent dispersion)<br>>Hahajima: Complete area exclusion | >On Chichijima, continue with the activities listed on the left.【MOE】<br>>On Hahajima, target almost complete area exclusion (Minamizaki Hasuike Pond area).【MOE】 | ～End of FY 2006<br>～End of FY 2009<br>～End of FY 2012 | →<br>→<br>→ | ◆ - - - - - ◆ - - - - - - - - - - - -<br>◆ - - - - - ◇ - - - - - - - - - - - -<br>◆ - - - - - ◇ - - - - - - - - - - - - | | |
| Bullfrog | >Continue elimination work with the goal of eradication (Past actions have already reduced the population size to near eradication) | >Ototojima: Completion of eradication | >Completion of eradication.【MOE】 | – | – | ～End of FY 2006<br>～End of FY 2009<br>～End of FY 2012 | →<br>Complete island-wide eradication<br>(Continue monitoring) | - - ●<br>- - ○<br>- - ○ | - - - - - - - - - - - - - - - - - - - - - - - - - - - | - - - -<br>- - - - | - - -<br>- - - |
| Predatory flatworm | >To prevent the dispersion of predatory flatworm from Chichijima to Hahajima and peripheral islands, measures for transporting soil (ideally, involving prohibition of transport) and goods (e.g., freezing treatment), and practices such as washing shoe soles prior to boarding transport ships will be promoted.<br>>For areas of conservation importance within the uninvaded zone of Chichijima, technical methodologies will be examined and established with the goal of area defense. | >Chichijima and Hahajima: Continuation of raising awareness and working to prevent dispersion<br>>Establishing area defense measures<br>>Chichijima: Initiating area defense measures | >Implementation of awareness-raising activities led by TMG rangers anc other groups to prevent dispersion to Hahajima and peripheral islands and a measure of washing shoe soles when disembarking from the transport ship Hahajima Maru.【TMG】<br>>Conducing trials of specific measures for area defense within the Yoakedaira region of Chichijima (installation of electric fences to interrupt unaided movement), examining the effectiveness of measures, and carrying out demonstration experiments to establish proven area defense measures.【MOE】<br>>Conducting trials of specific defense measures in important areas within the southern region, the un-invaded region of Chichijima, and examining their effectiveness.【MOE】 | >Chichijima and Hahajima: Continue work to prevent dispersion and raise awareness<br>>Chichijima: Continue area defense | >On Chichijima and Hahajima, continue with the activities listed on the left.【TMG】<br>>On Chichijima, establish sanctuaries of land snail habitats (e.g., in Tatsumizaki, Toriyama, Yoakedaira), and implement measures for area prevention.【MOE】 | ～End of FY 2006<br>～End of FY 2009<br>～End of FY 2012 | →<br>→<br>→ | × - - - - - - - - - - - - - - - - - - - - - - - - - - - | | |

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

- – No distribution of the alien species
- ○ Eradication nearly complete (Not distributed)→Continue monitoring
- ◇ Area exclusion nearly complete (Not distributed in some areas)→Continue monitoring
- ● Measures to achieve eradication already initiated
- ◆ Measures to achieve area exclusion already initiated
- × Serious damage to endemic species
- △ Damage to endemic species unknown (lack of surveys on existing conditions, alien species declining, etc. )

# Schedule 2. Summary Table of Actions by Alien Species

←Top row: As of the time when the tentative list was submitted (end of FY 2006)→
←Middle row: As of the nomination time (end of FY 2009)→
←Bottom row: As of three years after the nomination (end of FY 2012)→

| Name of alien species | Activity | Envisaged achievement* | (by the end of FY 2009) Description | Short-term target after nomination | (by the end of FY 2012) Description | Time period | Stages of the activities: Research | Verification Experiment | Project Development | Progress of the measures on each island: Chichijima Is. Group: Chichijima | Anijima | Ototojima | Nishijima | Higashijima | Minamijima | Hahajima Is. Group: Hahajima | Hirajima | Mukohjima | Anejima | Imotojima | Meijima | Mukojima Is. Group: Mukojima | Kitanoshima | Nakodojima | Yomejima | Others: Nishinoshima | Kita-iwoto | Minami-iwoto |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bischofia | >As the ultimate goal, achieve eradication on each island.<br>>Implement urgent and focused measures on Hahajima.<br>>Give priority to elimination work in important regions of highly natural conditions (e.g., subtropical rainforest) and where measures are expected to be highly effective, such as forest areas with relatively little invasion by Bischofia and areas surrounding invaded points. | >Ototojima and Hirajima: Completion of eradication<br>>Hahajima: Creation of medium- and long-term plans<br>>Hahajima: Initiating area exclusion<br>>Chichijima: Continuation of area exclusion | >Completion of eradication at the early stage of invasion on Ototojima and Hirajima. [MOE]<br>>Implementation of elimination with the target of area exclusion in the Sekimon basin of Hahajima, according to the established medium- and long-term plans [e.g., "Removal plan of the alien plant (Bischofia)"]. [FA]<br>>Implementation of monitoring of remaining individuals at Higashidai on Hahajima Island. [MOE]<br>>Implementation of elimination at Nishidai and Koromodate targeting area exclusion in the area north of the line between Yashihama Beach and Nagahama Beach on Hahajima. In addition, partial implementation at Nishiura area. [MOE]<br>>Promoting area exclusion in the Higashidaira region of Chichijima. [NGOs and others] | >Hahajima: Continue elimination<br>>Chichijima: Continue area exclusion | >On Hahajima, continue the activities listed on the left based on the medium- and long-term plans. [FA] In addition, continue with the activities listed on the left and eliminate Bischofia from private land in Nishidai and Koromodate, initiate exclusion in the Koshinzuka region. [MOE]<br>>The activities on Chichijima listed on the left are planned to be completed in FY 2009. Initiate measures to maintain exclusion (e.g., against germination) thereafter. (Higashidaira wood-pigeon sanctuary) [NPO, FA, etc.] | ～ End of FY 2006 | | | | × | - | × | - | - | - | ◆ | × | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | ～ End of FY 2009 | | | | ◆ | - | ○ | - | - | - | ◇ | ○ | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | ～ End of FY 2012 | | | | ◇ | - | ○ | - | - | - | ◇ | ○ | - | - | - | - | - | - | - | - | - | - | - | - |
| Casuarina (and *Pinus lutchuensis* ) | >As an ultimate goal, achieve eradication on each island.<br>>For elimination on peripheral islands, prioritize work on gentle slopes over areas that are difficult to access such as cliffs.<br>>For elimination on abraded cliffs and steep slopes, consider the adequacy of measures and coordinate with fishery parties. | >Anijima: Completion of and expantion of area exclusion<br>>Chichijima: Initiating area exclusion<br>>Hahajima: Initiating area exclusion<br>>All islands: Initiating a survey to determine the existing condition. | >Implementation of monitoring following experimental elimination on the plateau area of Anijima, and initiating new elimination experiments. [MOE]<br>>Implementation of monitoring surveys (e.g., of birds, insects, land snails, plants) before starting elimination work; implementation of elimination with the goal of area exclusion in the central region of Anijima. [FA]<br>>Implementation of elimination of Casuarina and other alien invasive plants in the Higashidaira region of Chichijima, targeting area exclusion. Also concluding a maintenance agreement with NPOs and other relevant parties to promote elimination of Casuarina and *Pinus lutchuensis* in Yoakedaira. Conducting monitoring surveys (e.g., of birds, insects, land snails, plants) before beginning elimination work in Higashidaira and Yoakedaira. [FA]<br>>Implementation of elimination in the Nagasaki region of Chichijima Island. [NPO]<br>> At Minamizaki of Hahajima Island, conducting monitoring of the site where elimination was conducted in FY 2007–2008. [FA]<br>>On Mukohjima, implementation of surveys and other studies on the inhabitation status of *Carduelis sinica kittlitzi* and considering the eliminatio of alien species. Implementation of monitoring surveys before the eliminatic [FA]<br>>Carrying out aerial photography on each island. [FA] | >Anijima: Complete and expand area exclusion<br>>Chichijima: Continue and expand area exclusion<br>>Hahajima: Continue monitoring after the elimination<br>>Mukohjima: Initiate area exclusion<br>>Nishijima: Initiate elimination<br>>Ototojima: Initiate area exclusion<br>>All islands: Initiate surveys to determine the existing condition | >On Anijima, complete area exclusion (within the gently sloped land on the plateau). 【FA】<br>>On Chichijima, continue conducting the activities listed on the left. 【FA and others】<br>>At Minamizaki on Hahajima, continue monitoring the invasion status of alien species in eliminated areas. [FA]<br>> On Mukohjima, determine the distribution status using aerial photographs; based on the survey results, plan for area exclusions to be initiated from FY 2011. [FA]<br>>On Nishijima, conclude the maintenance arrangement with NPOs and other groups and promote elimination from FY 2010. [NPO, FA]<br>> With cooperation among agencies, initiate strategic elimination where necessary. [MOE, FA, TMG, Ogawasara Village]<br>>On each island, determine the distribution status of alien woody plants using aerial photographs. 【FA】 | ～ End of FY 2006 | | | | ◇ | ◆ | × | × | × | × | × | × | × | × | - | - | - | - | - | - | - | - |
| | | | | | | ～ End of FY 2009 | | | | ◇ | ◇ | × | × | × | × | ◇ | × | ◆ | × | - | - | - | - | - | - | - | - | - | - |
| | | | | | | ～ End of FY 2012 | | | | ◇ | ◇ | ◆ | ◆ | Survey | Survey | ◇ | Survey | ◆ | Survey | Survey | Survey | Survey | Survey | Survey | Survey | - | - | - |
| Leucaena | >As an ultimate goal, achieve eradication on each island.<br>>In areas where urgent treatment is expected to be highly effective, such as peripheral islands in the early stage of invasion, determine the existing condition and implement measures. | >Establishing elimination methods<br>>Mukojima: Continuation of elimination<br>>Nakodojima: Continuation of elimination<br>>Hahajima: Initiating elimination<br>>All islands: Initiating surveys to determine existing conditions | >Implementation of experiments to establish effective technical elimination methods using chemicals on Anijima. [MOE]<br>>Implementation of exclusion to conserve the remaining forest on Mukojima. [TMG]<br>>Implementation of Leucaena exclusion on Nakodojima, as well as taking measures to prevent soil erosion. [TMG]<br>>Elimination of Leucaena that re-invaded the site where elimination was carried out in FY 2007 at Minamizaki of Hahajima. [FA]<br>>Carrying out aerial photography on each island. [FA] | >Anijima: Complete area exclusion<br>>Mukojima and Nakodojima: Complete eradication<br>>Hahajima: Continue monitoring<br>>Nishijima: Initiate elimination<br>>Ototojima: Initiate area exclusion<br>>All islands: Initiate surveys to determine existing conditions | >On Anijima, initiate elimination in FY 2010, with the aim of complete area exclusion by FY 2012. (on gently sloped land of the plateau) [FA]<br>>On Mukojima and Nakodojima, continue with the activities listed on the left and implement adaptive management measures to prevent soil erosion and conserve the remaining forest. [TMG]<br>>On Hahajima, continue monitoring the invasion status of alien species into Casuarina-eliminated areas. (Minamizaki region) [FA]<br>>On Nishijima, conclude a maintenance arrangement with NPOs and other groups and promote elimination from FY 2010. [NPO, FA]<br>>On Ototojima, with cooperation among agencies, initiate elimination strategically where necessary. [MOE, FA, TMG, Ogawasara Village]<br>>On each island, determine the distribution status of alien woody plants using aerial photographs. [FA] | ～ End of FY 2006 | | | | × | × | × | × | × | × | × | × | × | × | × | ◆ | - | ◆ | - | - | - | - |
| | | | | | | ～ End of FY 2009 | | | | × | × | × | × | × | × | ◆ | × | × | × | × | × | ◆ | - | ◆ | - | - | - | - |
| | | | | | | ～ End of FY 2012 | | | | Survey | ◇ | ◆ | ◆ | Survey | Survey | ◇ | Survey | Survey | Survey | Survey | Survey | ○ | Survey | ○ | Survey | - | - | - |
| Bamboo and dwarf bamboo species, *Lantana camara* var. *aculeata* , *Ficus microcarpa* , *Cenchrus echinatus* , etc. (Other alien plants) | >As the ultimate goal, achieve eradication on each island.<br>>For areas in which urgent treatments are expected to be highly effective, such as peripheral islands in the early stage of invasion, determine the condition and implement appropriate measures. | >Establishing elimination methods for *Lantana camara* var. *aculeata*<br>>Minamijima: Continuation of elimination of *Cenchrus echinatus* etc.<br>>Mukojima: Continuation of elimination of bamboo and dwarf bamboo species<br>>Nakodojima: Continuation of elimination of bamboo and dwarf bamboo species<br>>All islands: Initiating surveys to determine the existing conditions | >Implementation of experiments to establish effective technical methodologies for eliminating *Lantana camara* var. *aculeata* using chemicals on Anijima. [MOE]<br>>Implementation of elimination of highly invasive alien plants on Minamijima. [TMG, FA, Ogasawara Village, NPO]<br>>Implementation of elimination of alien bamboo and dwarf bamboo species on Mukojima to conserve the remaining forest. [TMG]<br>>Implementation of elimination of alien species such as bamboo and dwarf bamboo species on Nakodojima, in addition to taking measures to prevent soil erosion. [TMG]<br>>Carrying out aerial photography on each island. [FA] | >Anijima: Complete area exclusion of *Lantana camara* var. *aculeata*<br>>Minamijima: Continue alien plant elimination<br>>Mukojima and Nakodojima: Complete eradication of bamboo and dwarf bamboo species<br>>Yomejima: Initiate elimination of bamboo and dwarf bamboo species and other alien plants<br>>All islands: Initiate surveys to determine the existing conditions | >Implement small-scale elimination experiments of *Lantana camara var. aculeata* within the gently sloped land on the plateau on Anijima, together with the elimination of Casuarina and other alien plants, from FY 2010. Implement monitoring following the elimination.【FA and others】<br>>On Minamijima, continue with the activities listed on the left. 【TMG】<br>>On Mukojima and Nakodojima, continue with the activities listed on the left and to prevent soil erosion and implement adaptive management to conserve the remaining forest and to prevent soil erosion. 【TMG】<br>>On Yomejima, conclude a maintenance arrangement with NPOs and other parties and promote the elimination of alien bamboo and dwarf bamboo species from FY 2010. 【NPO, FA】<br>>On each island, determine the distribution status of alien woody plants using aerial photographs.【FA】 | ～ End of FY 2006 | | | | × | × | | | | ◆ | × | | | | | ◆ | | ◆ | × | | | |
| | | | | | | ～ End of FY 2009 | | | | × | × | | | | ◆ | × | | | | | | ◆ | | ◆ | × | | | |
| | | | | | | ～ End of FY 2012 | | | | ◆ | ◇ | Survey | Survey | Survey | ◆ | ◆ | Survey | Survey | Survey | Survey | Survey | ○ | Survey | ○ | ◆ | Survey | Survey | Survey |

* Achievements envisaged to be accomplished as of the time of the preparation of this document in November 2009; some of the listed measures may not be implemented due to weather conditions etc.

– No distribution of the alien species
○ Eradication nearly complete (Not distributed)→Continue monitoring
◇ Area exclusion nearly complete (Not distributed in some areas)→Continue monitoring
● Measures to achieve eradication already initiated
◆ Measures to achieve area exclusion already initiated
× Serious damage to endemic species
△ Damage to endemic species unknown (lack of surveys on existing conditions, alien species declining, etc. )

# Appendix 2

**Geological features of Ogasawara Islands**

2-1 : Geological overview and development history

2-2 : Outcrops of major geological features that characterize the Ogasawara Islands

2-3 : Geological maps

# *2-1. Geological overview and development history*

Dr. Susumu UMINO and Dr. Osamu ISHIZUKA

The Ogasawara Islands make up an oceanic island arc that was formed on an oceanic crust (Fig. 2-1-1). The Izu-Ogasawara (Bonin) arc, on which the Ogasawara Archipelago and the Kazan Island Group rest, is an island arc-trench system extending 1,500 km in length that was formed along the eastern edge of the oceanic Philippine Sea Plate as a result of the subduction of the Pacific Plate 48 Ma (Ma: *megaannum*, or million years ago). The Izu-Ogasawara arc is one of the most studied arc-trench system in terms of geophysics, geology, and petrology because of its scientific importance as a typical example of an oceanic island arcs.

On early Earth before four billion years ago, there was no land with continental crust but the Earth's ground surface is underlain solely by oceanic crust (Windley, 1983). Continets and cotinental crust have been first created on oceanic crust and have grown to the sizes now we see on the present Earth (Taylor, 1967; Tatsumi, 2003). An andesitic middle crust with the average composition of continental crust is still being formed through island arc magmatism beneath the Izu-Ogasawara arc (Fig 2-1-2, Kodaira et al., 2008; Suyehiro et al., 1996; Tatsumi et al., 2008). This suggests that continental crust is formed during the growth process of oceanic island arcs generated over oceanic crust. Within the geological features of the Izu-Ogasawara arc there is a continuous history of island arc growth recorded in the form of changes in magma composition and volcanic activity. This history of the island arc, a site of continental crust formation, extends from the present all the way back to its birth. However, because most of the Izu-Ogasawara arc lies under the deep ocean, it is practically impossible to directly obtain and examine these extremely valuable geological records. However, the Ogasawara Islands are unexceptional subaerial exposures of this geological strata that record the growth history of this oceanic island arc, making the Ogasawara Islands the only site in the world where these geological processes can be directly observed in detail.

The geology of the Ogasawara Islands fully exhibits the typical growth process for an oceanic island arc, from the initiation formation of the subduction zone through to its establishment of a subduction zone in steady state. This is why the Ogasawara Islands provide an outstanding evolutionary record of how continental crust formed and grew on the earth.

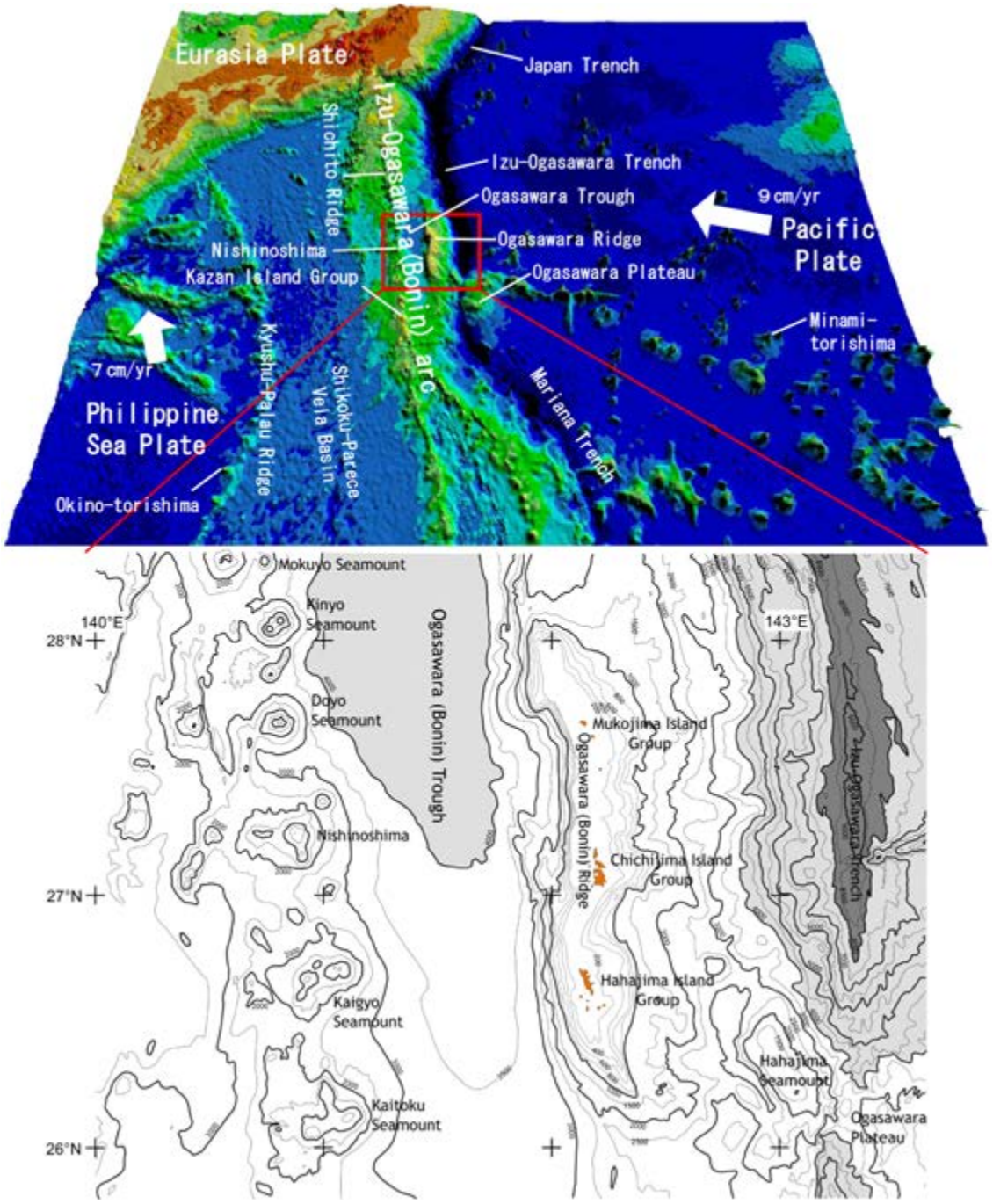



Fig. 2-1-1 Submarine topography around the Ogasawara Islands (above) and the Ogasawara Archipelago (below). (Revised from Umino, 2008)

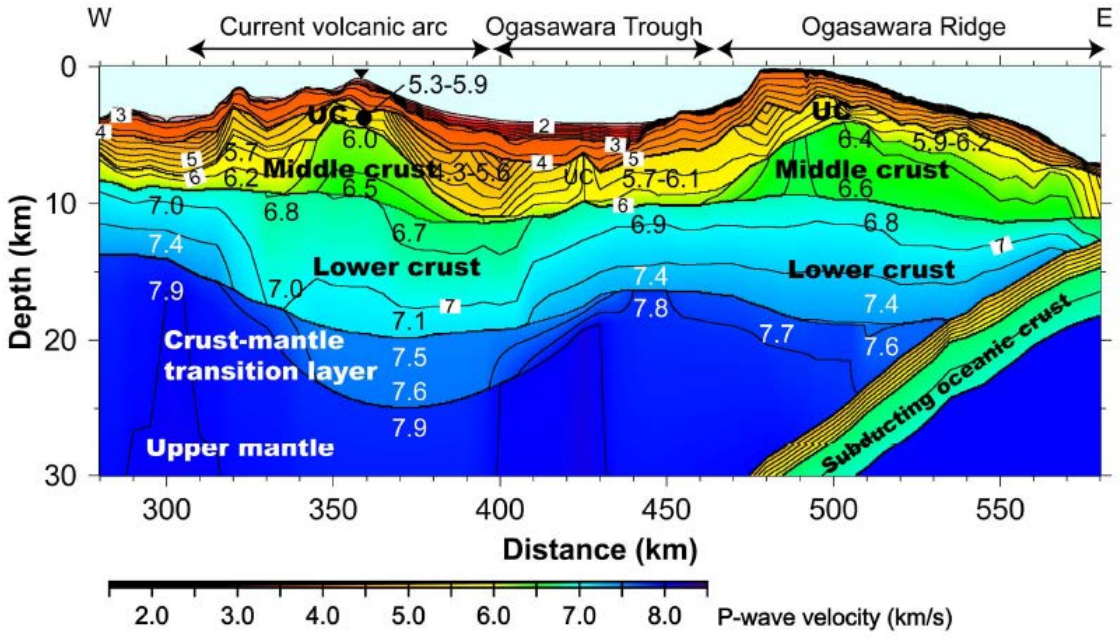



Fig. 2-1-2 Estimates for the crust structure of the Izu-Ogasawara arc (Takahashi et al., 2009)
The figure shows P wave velocity structure in the east-west cross section across the Izu-Ogasawara arc. The zone that has velocities of 6.0-6.6 km/s is the middle crust, which occurs only under the island arc.

### (1) Geological and topographical features

The main bathymetric features around the Ogasawara Islands, from the Izu-Ogasawara trench to its back-arc, are the Ogasawara Ridge, Ogasawara Trough, Shichito Ridge, Shikoku-Parece Vela Basin, and the Kyushu-Palau Ridge (Fig. 2-1-1). The islands of the Ogasawara Archipelago (from north to south, island groups of Mukojima, Chichijima, and Hahajima) are dotted over the Ogasawara Ridge, which form the fore-arc of the Izu-Ogasawara arc. They are submarine volcanoes of the Paleogene volcanic front that rose up above the sea surface. Quaternary volcanoes on the Shichito Ridge comprise the present volcanic front of the Izu-Ogasawara arc, and include the active volcanoes of Nishinoshima Island and the Kazan Island Group (from north to south, Kita-iwoto Island, Iwoto Island, and Minami-iwoto Island). The Shikoku-Parece Vela Basin is a back-arc basin between the Izu-Ogasawara arc and the Kyushu-Palau Ridge that developed and expanded from 30 to 15 Ma.

Many of the Ogasawara iIslands are surrounded by spectacular sea cliffs, which provide excellent outcrops for geological observation. Areas including Chihiroiwa of Chichijima Island and Okuzure Bay of Hahajima Island offer not only breathtaking scenery, but also rich sources of historical information about the geological events that formed the Ogasawara Islands.

## The Chichijima Island Group

Chichijima covers 23.79 $km^2$ in area. Its highest elevation is 326 m above sea level, with a low relief surface around 250 to 300 m. The eastern and southern parts are characterized by relatively precipitous slopes and sea cliffs, while the elevation descends gradually along the west coast, where there are sporadic beaches around the Kominato and Futami Port. There are satellite islands around Chichijima, such as Anijima Island, Ototojima Island, Nishijima Island, Minamijima Island, and Higashijima Island. The areas of Anijima and Ototojima are 7.92 $km^2$ and 5.18 $km^2$ respectively, while the rest of the islands are smaller than 1 $km^2$. These islands are all plateau-like in shape bounded by sea cliffs, except for the limestone Minamijima, which is a horst bounded on either side by faults running north to south.

The Chichijima Island Group was formed by submarine volcanic activity that began 48 Ma. This activity started with fairly calm eruptions forming pillow lava, which gradually gave way to more explosive phreatomagmatic eruptions as the volcanic edifice grew and became shallower (Fig. 2-1-3). The strata of the Chichijima Island Group are classified into four formations from bottom to top: the Maruberiwan, Asahiyama, Mikazukiyama, and Minamizaki Formations (Fig. 2-1-4). The Maruberiwan Formation is distributed over Chichijima, Anijima, Higashijima, and Nishijima, the Asahiyama Formation over Chichijima and Anijima, and the Mikazukiyama Formation on the north of Chichijima and Ototojima. The Minamizaki Formation is limited from the Minamizaki of Chichijima to Minamijima and its surrounding area.

The Maruberiwan Formation consists of boninite-series and arc tholeiitic volcanic rocks extruded 48 to 46 Ma, and exhibits the characteristic magma compositions produced in the incipient stage of subduction. The oldest strata are boninite pillow lavas exposed from the north to east and south shores of Chichijima as well as on Anijima and Higashijima (Fig. 2-1-3 a, b, 2-1-4 Mb). The edifice made of pillow lavas and pyroclastic rocks dips east and west from the midpoint between the east shore of Chichijima and Higashijima, where a swarm of parallel dikes runs intensively, indicating that this area was a center of eruptions. The dike swarm extends WNW-ESE along the north shore of Chichijima and the west shore of Anijima, Hitomarujima Island and Hyotanjima Island. In fact, Sujiiwa (literally means “Striated Rock”) Cape on Anijima gets its name from the striation patterns from dikes jutting out. As stated above, the eruptive style changed from quiet extrusions of lava into phreatomagmatic eruptions, which produced massive tuff breccias capping the boninite pillow lavas in the center and the north of Chichijima. The volcaniclastic materials ejected from explosive eruptions were inherently unstable and collapsed to flow downslope as turbidity currents (Fig. 2-1-3 c). The volcaniclastic materials deposited on the flank of the volcanic edifice now make up the alternating beds of sandstone and mudstone distributed along the west, south, and southeast shores of Chichijima (Fig. 2-1-4 Mt). Just prior to the initiation of the explosive phase, arc tholeiitic magma formed lava flows and a dike swarm exposed on Onikaigan Coast to Kinshihama Beach in the southwestern part of Chichijima (Fig. 2-1-4 Mj). On Kinshihama Beach, being near from then vent, remains of massive sulfide deposits precipitated from hydrothermal fluids at the submarine vent area can be observed in the form of clay containing pyrite and gypsum. The area spanning from the center

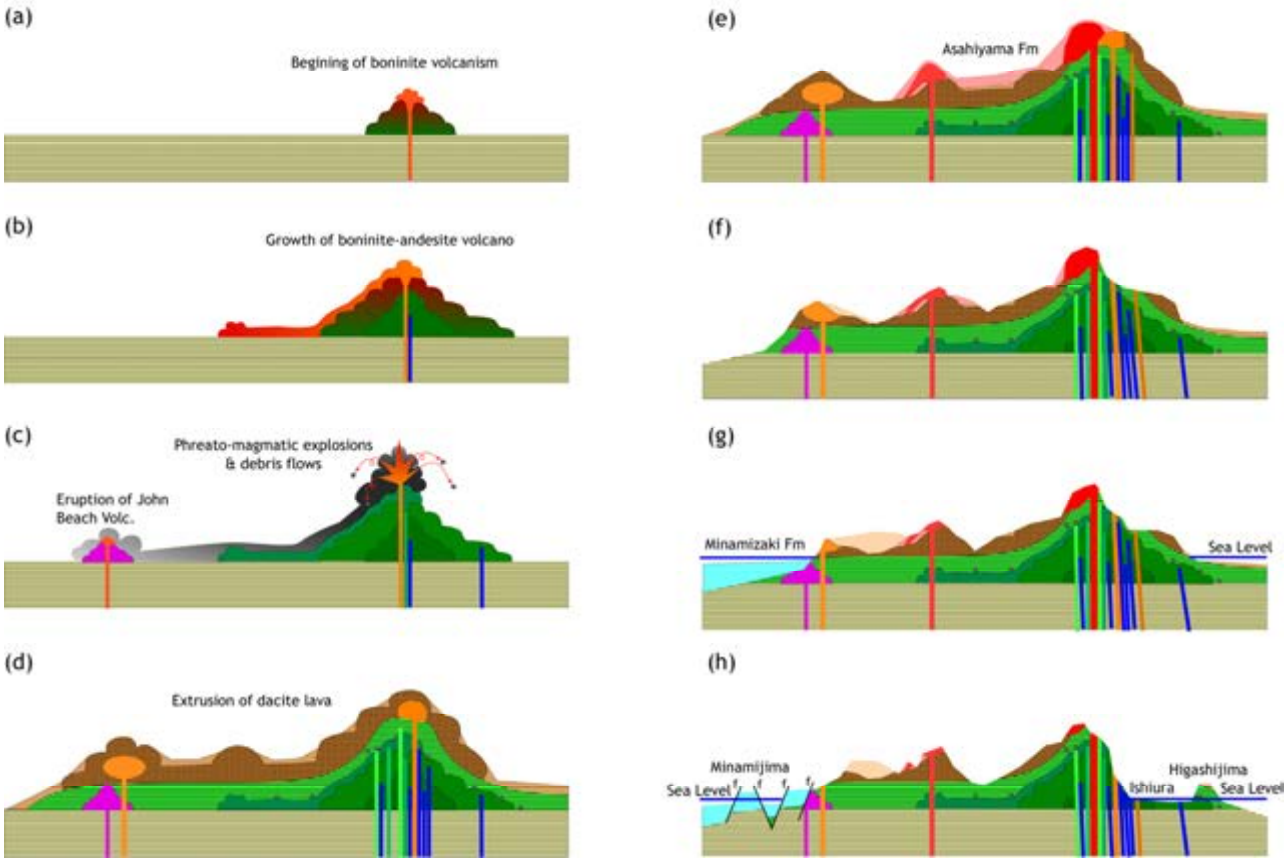



Fig. 2-1-3 Cartoons showing development of the Chichijima Volcano. The volcanic edifice grew under water (a to f), and then uplifted above water (g, h).

(a) Beginning of boninite volcanism. Quiet extrusion of lava formed pillowed cones along fissure vents under deep water.

(b) Construction of the volcanic edifice continued by stacking pillowed cones one after the other with occasional extrusion of long-traveling flows through lava tubes.

(c) As the volcano grew and the summit approached the surface, phreatomagmatic eruptions took place and deposited pyroclastic materials on top, which are unstable and collapsed to turn into volcaniclastic debris flows that transported volcaniclastic materials on the skirts of the volcano.

(d) Extrusion of dacite lava mainly as pillows and hyaloclastite through summit and lateral fissures, covering the most part of the volcano

(e) Volcanic activity significantly decreased and intervened by a short repose period, during which erosion of the volcanic edifice and deposition of conglomerate and sandstone took place. After the repose period, rhyolite lava (Asahiyama Formation) extruded to fill the topographic lows and cap the summit region.

(f) After an erosional period, volcanic activity changed to extrusion of high-Ca boninite magma on Ototojima. In addition to this, another volcanic center at a distant place from the Chichijima Islands initiated more frequent explosive eruptions of calc-alkalic magmas which formed a unknown submarine stratovolcano. This volcano collapsed to form debris avalanche which supplied volcanic materials to Chichijima Islands (Mikazukiyama Formation).

(g) Entire islands were uplifted and eroded. Surface rocks were weathered to laterite. Subsequently at least lower parts of the islands were submerged and a reef of corrals and foraminifers developed on the southwestern coast of Chichijima (Minamizaki Formation).

(h) During the last glacial age, the uplifted reef limestone was weathered and eroded to yield a karst, which is now partially submerged below the sea level.

to the south of Chichijima is underlain by dacite pillow lava and hyaloclastite (Fig. 2-1-3 d, 2-1-4 Md). In general, silicic magma extruded underwater rarely forms coherent lava but breaks into glassy fragmental materials called hyaloclastite. However, boninite-series dacite commonly forms typical close-packed pillow lava, a phenomenon rarely seen in other silicic magma. This is one of the boninite characteristics that are different from other volcanic rocks. On the cliff running from Ten-nohana Cape to Tatsumizaki there is an excellent exposure of dacite pillow lava.

The Asahiyama Formation spreads across the ridges of Mt. Asahi, Mt. Akahata, Mt. Ten-noura Cape, and Tatsumizaki (Fig. 2-1-4 A). It consists of boninite-series quartz-bearing dacite and rhyolite sheet lava and hyaloclastite. Like dacite lava, rhyolite also forms pillow lava, but less common (Fig. 2-1-3 e).

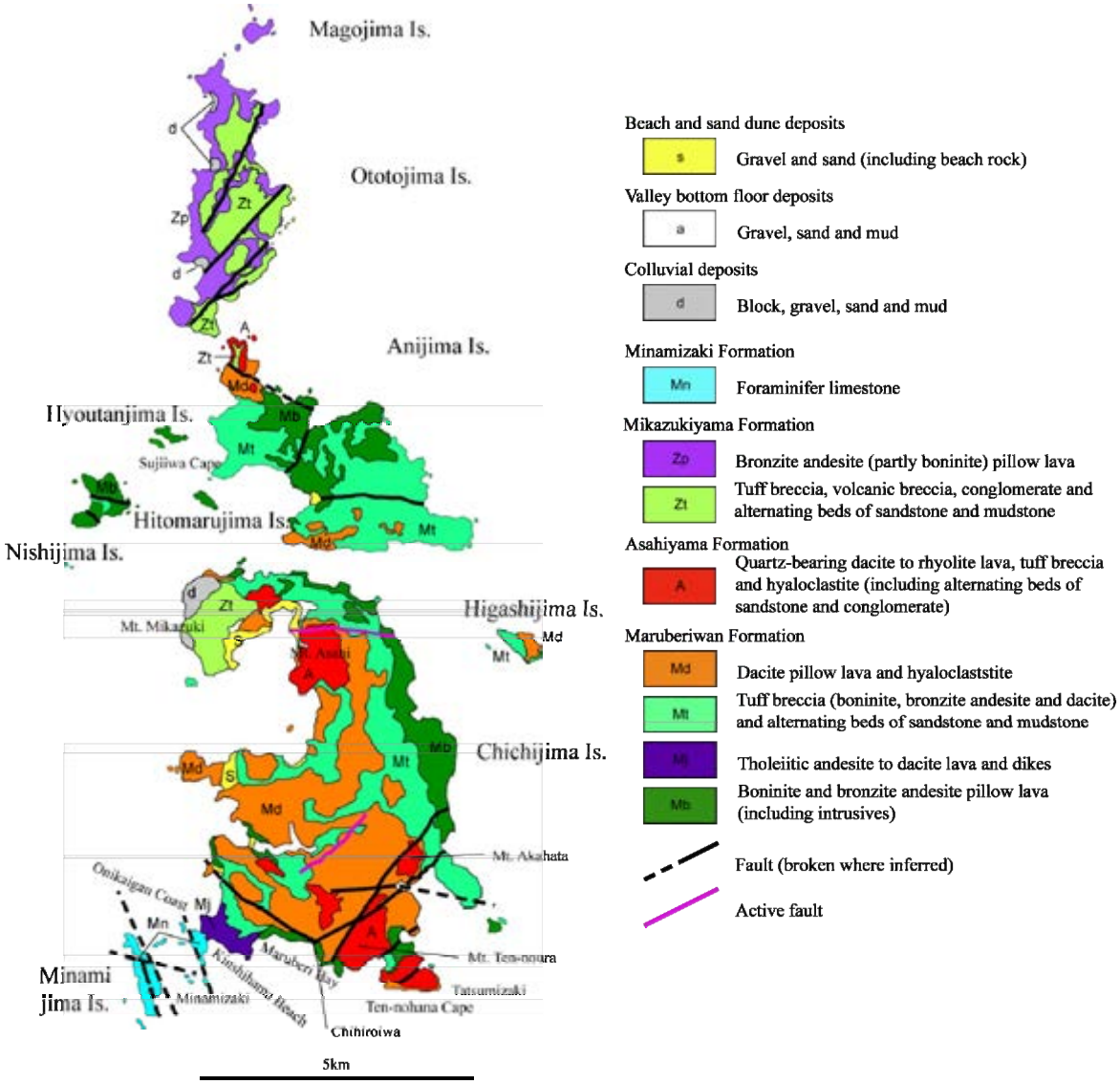



Fig. 2-1-4 Geological map of Chichijima Island Group (After Umino et al., 2009, AIST Permission No. 60635500-A-20091202-010)

The Mikazukiyama Formation consists of calc-alkaline andesite and dacite, high-Mg andesite and high-Ca boninite that were extruded 45 Ma. These magmas were erupted and formed above the subduction zone during the incipient stage of its development. The Mikazukiyama Formation can be seen on Mt. Mikazuki on Chichijima and on Ototojima, and it comprises bronzite andesite and boninite pillow lava (Fig. 2-1-4 Zp) interbedded with stratified tuff breccia formed by submarine debris flow deposits derived from a collapsed calc-alkaline volcanic edifice (Fig. 2-1-4 Zt) (Fig. 2-1-3 f).

Submarine volcanic activity at Chichijima ceased around 44 Ma and formed land by at least 34 Ma, after which limestone from reef-building organisms was deposited (Fig. 2-1-3 g). These limestone beds are what make up the Minamizaki Formation (Fig. 2-1-4 Mn), which covers an area from Minamijima to Minamizaki on Chichijima. The upper Minamizaki Formation yields fossilized benthic foraminifers such as *Spiroclypeus margaritatus* and *Miogypsinella boninensis* and the lower Minamizaki Formation has *Heterostegina borneensis* and *Lepidocyclina (Eulepidina)*, in addition to coral and shellfish fossils. Fossils of associated planktonic foraminifers indicate that the formation deposited 34 to 27 Ma. The Minamizaki limestone rose above sea level during the last glacial period and was eroded along a fault running north to south, creating a karst landform. Due to a rise in sea level in the postglacial period the limestone was partially submerged, becoming drowned karst (Fig. 2-1-3 h). Currently there are underwater dolines and uvalas off Minamijima and in the surrounding waters.

## The Mukojima Island Group

The Mukojima Island Group, located about 40 to 70 km north of Chichijima, is made up of Mukojima Island, Nakodojima Island, Yomejima Island, and several other islands. The areas of Mukojima, Nakodojima, and Yomejima are 2.56 $km^2$, 1.37 $km^2$, and 0.62 $km^2$, respectively. All of the islands are flat and surrounded by sea cliffs.

The Mukojima Island Group is raised submarine volcanoes formed at about the same time (48 to 46 Ma) as the Chichijima Island Group. Mukojima, Nakodojima, and Yomejima are composed mainly of boninite (Fig. 2-1-5 Sp and Yp), bronzite andesite pillow lava (Fig. 2-1-5 Np) and pyroclastic rocks (Fig. 2-1-5 Na), and rhyolite hyaloclastite (Fig. 2-1-5 Nr) erupted during the early period of plate subduction. Agglutinate (fall-out pyroclastic materials in the vicinity of a vent, which were hot and welded together to become hard rocks)(Fig 2-4 Ka) of arc tholeiitic andesite and dacite (Fig. 2-1-5 Kp) on Kitanoshima Island and Nakanoshima Island erupted concurrently with boninite-series rocks on other islands.

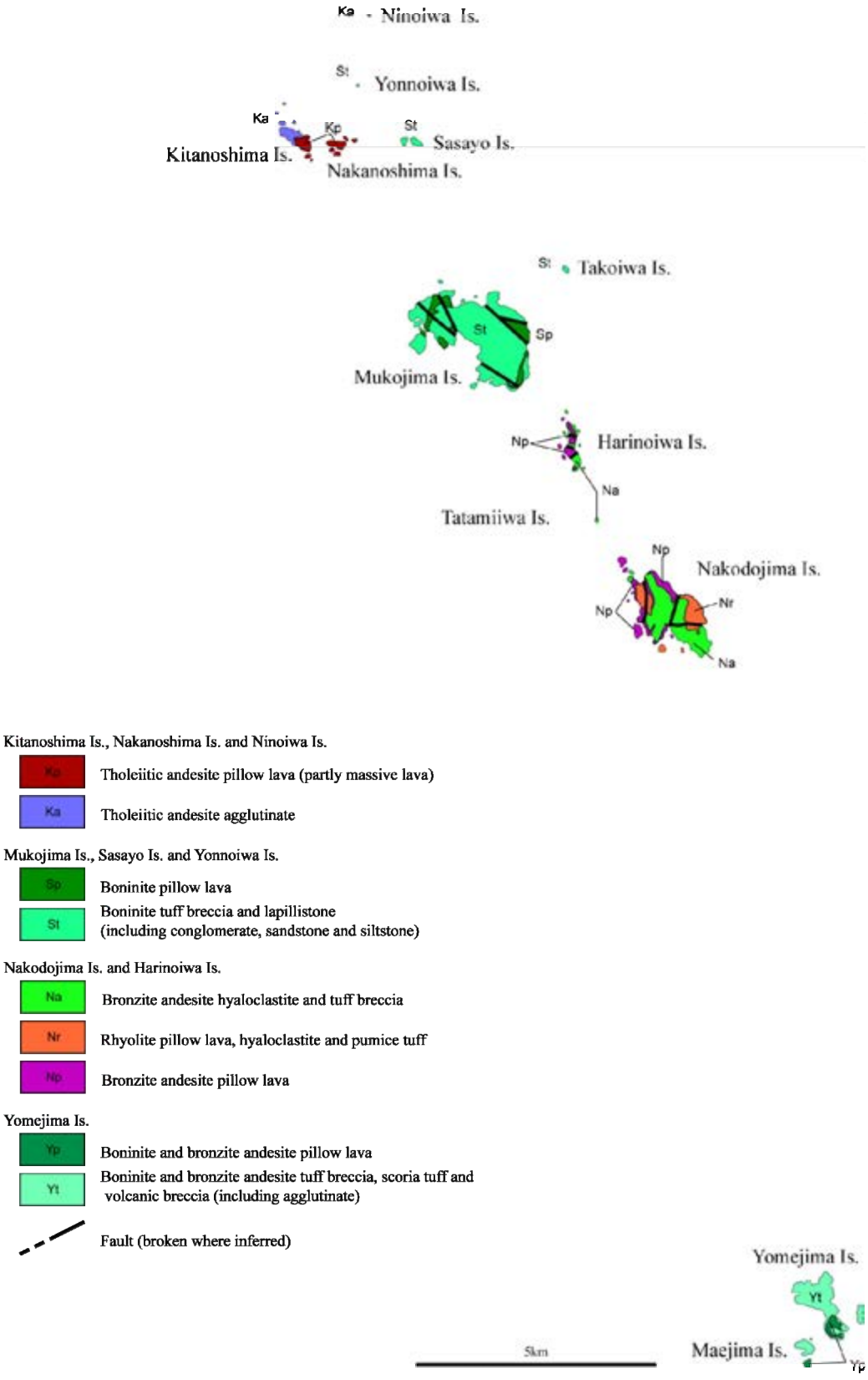



Fig. 2-1-5 Geological map of Mukojima Island Group (After Umino et al., 2009, AIST Permission No. 60635500-A-20091202-010)

## The Hahajima Island Group

The Hahajima Island Group is located about 40 to 60 km south of Chichijima. Hahajima Island covers 20.25 $km^2$ in area. Its highest elevation, Mt. Chibusa, is 462 m, making it the tallest of the low-lying Ogasawara Archipelago. It is characterized by relatively precipitous ridges, and is surrounded on all sides by sea cliffs of 100 m to 350 m in height, except for the west shore of the southern part of the island. The west shore of the island is relatively straight, while the east shore is characterized by indentations, such as Higashiko, Okuzure Bay, and Higashizaki Bay (from north to south). The Sekimon area is marked by the development of a karst landform. The southern cliff of Sekimon collapsed in July, 1997 to form fan-shaped talus deposits.

The Hahajima Island Group originated as volcanic islands which began with submarine eruptions under shallow water 44 Ma. After volcanic activity subsided, foraminifers (*Nummulites* spp.), calcareous algae, and other reef-building organisms were deposited near the Sekimon area and became limestone. The volcanic rocks of the Hahajima Island Group are mainly arc tholeiitic and calc-alkaline andesite. There is some undifferentiated basalt and dacite, but no boninite. Undifferentiated basaltic magma was produced by partial melting of the upper mantle at a depth of 35 km, deeper than the boninitic magmas which formed the Chichijima and Mukojima Island Groups. Continued plate subduction for four million years cooled the shallow mantle wedge and disabled generation of further boninitic magmas. This change in composition from boninitic to basaltic indicates the progress of the subduction zone to more advanced stages.

The strata of Hahajima are classified into three formations: Higashizakiwan, Motochi, and Sekimon (from bottom to top; Fig. 2-1-6). The lowermost Higashizakiwan Formation consists of submarine debris flow deposits and well-layered alternating beds of volcanic sandstone and conglomerate (Fig. 2-1-6 Hs), and exposes on the sea cliffs facing Higashizaki Bay.

The Motochi Formation covers the majority of Hahajima. It consists mainly of shallow marine and subaerial andesite flows and pyroclastic rocks (Fig. 2-1-6 Ht). Conglomerate and calcareous sandstone (Fig. 2-1-6 Hs) intervening hyaloclastites and lava contain fossil benthic and planktonic foraminifers such as *Nummulites* spp., *Discocyclina, Globigerina*. *Nummulites* is a large benthic foraminifer exceeding 25 mm in diameter, and is a well-known Eocene index fossil. *Nummulites* can be seen on the southwest shores of Hahajima (from Miyukinohama Beach to Nankinhama Beach). The lowermost Motochi Formation is a subaqueous pyroclastic flow and pumice fall deposit composed of white pumice formed by explosive eruption, which can be seen easily in Uratakane on the southeast shore of Hahajima. In addition, from Igumadani to Nishiura there is a pyroclastic flow deposit that exceeds 100 m in thickness (Fig. 2-1-6 Hp). The presence of a giant segregation pipe indicates that the pyroclastic flow was highly fluidized. From Iguma Bay to Nagahama Beach there are a number of dikes intruding into the lava. Thick piles of hydrothermally-altered agglutinate extend 4.5 km from Nagahama Beach to Inuisaki Cape. These facts suggest the presence of eruptive fissures along the northwestern coast of Hahajima. In addition to this, source vents are inferred around this area because of the existence of a swarm of dikes, agglutinate and vent breccia.

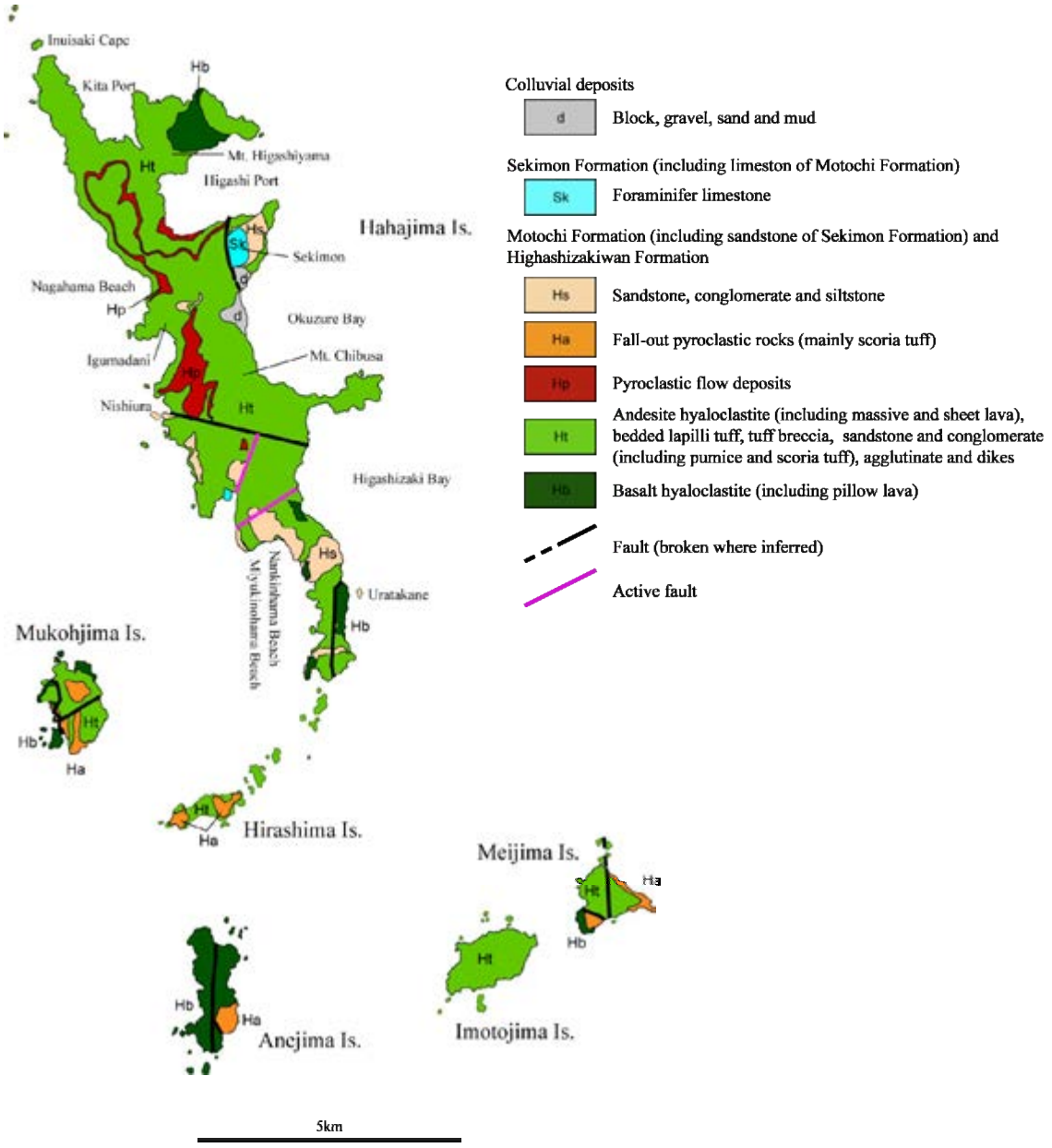



Fig. 2-1-6 Geological map of Hahajima Island Group (After Unimo et al., 2009, AIST Permission No. 60635500-A-20091202-010)

The Sekimon Formation is found in Sekimon in northwestern part of Hahajima and consists of strata of sandstone and conglomerate filling depressions on the eroded Motochi Formation, underlain by subhorizontal limestone (Fig. 2-1-6 Hs and Sk). A karst landform has developed on the upper limestone zone that yields the middle to late Eocene benthic and planktonic foraminifera (P.15-17) (Matsumaru, 1984, 1996).

Other islands in the Group, namely Mukojima Island, Anejima Island, Meijima Island, and Hirashima Island, which are spread out to the south of Hahajima, are made up mainly of basalt and

andesite hyaloclastite and pyroclastic rocks. Anejima is the only island in the Hahajima Island Group which has basalt pillow lava. On the west shore of Meijima, there is a section that exposes a volcanic structure just below a vent, illustrating how the volcano grew as it extrudes hyaloclastite from the vent. Imotojima is made up of andesitic hyaloclastite covering fall-out pyroclastic rocks. There are many dikes on the south shore of Imotojima facing Torishima Island.

## The Nishinoshima Island and Kazan Island Group

The Nishinoshima Island and Kazan Island Group are volcanic islands stretching north to south located about 130 to 330 km to the west and south-southwest of the main Ogasawara Archipelago. They make up the Quaternary volcanic front of the Izu-Ogasawara arc and were created by volcanic activity since the middle and late Pleistocene. The Kazan Island Group, unlike other volcanoes to the north and south, is characterized by high contents of alkaline elements (Yuasa and Nohara, 1992; Ishizuka et al., 2007). Although Kita-iwoto Island yields basalts with only slightly high in alkali contents, Iwoto Island, Minami-iwoto Island and Fukutoku-Okanoba have andesite called shoshonite characterized by extremely high concentrations of alkaline elements.

The Kazan Island Group is made up of Kita-iwoto, Iwoto, and Minami-iwoto (from north to south). Kita-iwoto covers 5.57 $km^2$ with its highest point of 792 m. Minami-iwoto covers only an area of 3.54 $km^2$, but with a peak elevation of 916 m, it is the tallest of the Ogasawara Islands. Kita-iwoto is actually the summit of a giant submarine stratovolcano which was composed of volcanic ejecta erupted from the later middle to the late Pleistocene (Fig. 2-1-7; Nakano and Furukawa, 2009; Nakano et al., 2009). The ejecta are composed of high-alkali tholeiitic basalt which mainly occurs as aa lava, surge deposits, rolling deposits, debris flow deposits, and fall-out pyroclastic materials. Minami-iwoto is a stratovolcano comprised of aa lava and pyroclastic rocks (Fig. 2-1-7). The constituent rocks are highly alkaline tholeiitic or alkaline basalts. Both islands have radial dikes exposed on the surrounding sea cliffs. In addition, neither island currently shows fumarolic activity, nor has historical records of eruptions. They are young and discrete stratovolcano islands lacking flat areas. Minami-iwoto is particularly void of flat terrain. Steep slopes exceeding 40 degrees from the shore to the summit makes the island inaccessible. This is why there has been little human activity and the original, natural state of the island has been well-preserved.

Nishinoshima lies on a peak of a large submarine volcano, rising 3,000 m above the seafloor with a basal diameter of 20 to 30 km. The island is flat and triangular, covering an area of 0.29 $km^2$. It is composed of products of the Nishinoshima Volcano and recent beach deposits (Fig. 2-1-7; Umino and Nakano, 2007). The island consists of Nishinoshima lava comprising andesite lava and a small amount of pyroclastic ejecta in the late Pleistocene or the Holocene as well as of welded pyroclastic deposits from the 1973-1974 eruptions. Volcanic eruptions and marine erosion are constantly changing the shape of the island.

Between Nishinoshima and Kita-iwoto are two submarine volcanoes: Kaikata-kaizan submarine volcano and Kaitoku-kaizan submarine volcano. Kaitoku-kaizan submarine volcano rises 2,500 m

above the seafloor and is 40 km in diameter at its base. Its most recent eruption was in 1984 (Tsuchide et al., 1985). Kaikata-kaizan submarine volcano has a base ranging from 45 to 52 km and juts out 2,350 m from the seafloor. Temperature anomalies and hydrothermal activity has been observed at the peak (Murakami et al., 1987; Tsuchida et al., 2001). Between Kita-iwoto and Minami-iwoto are submarine volcanoes with eruption records, including Kita-fukutokutai (Kaisenoba) and Fukutoku-okanoba. Fukutoku-okanoba submarine volcano is a particularly active volcano, repeating the process of new island formation and destruction through eruptions in 1904, 1914, and 1986.

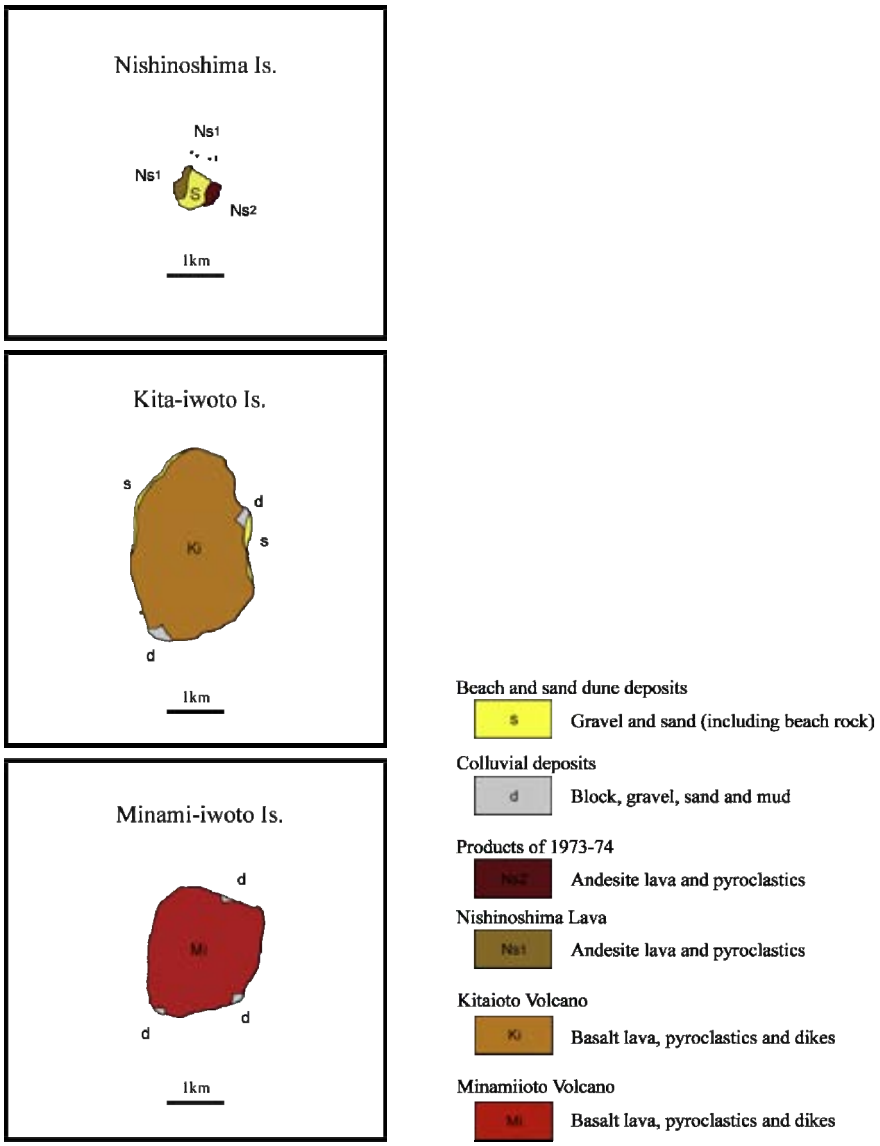



Fig. 2-1-7 Geological maps of Kita-iwoto and Minami-iwoto Islands (After Unimo et al., 2009, AIST Permission No. 60635500-A-20091202-010)

## (2) The development of the Ogasawara Islands

The formation of the Ogasawara Islands began as far back as 50 Ma, when the Pacific Plate initiated plate subduction (Figs. 2-1-8 and 2-1-9). Around this time the West Philippine Basin was spreading (Tatsumi and Maruyama, 1989), and the subduction of the Pacific Plate created a tension on the eastern edge of the upper Philippine Sea Plate, which caused its fore-arc spread (Stern and Bloomer, 1992; Ishizuka et al., 2006). These conditions resulted in the formation of much shallower mantle material of high temperature (Fig. 2-1-8). Around 48 Ma, the melting point of the wedge mantle dropped due to the fluid mainly consisting of water released from the subducted plate, and magma was produced. This was the beginning of island arc volcanism, which characterizes the early stage of the volcanism in Ogasawara (Fig. 2-1-9B; Umino and Kushiro, 1989; Ishizuka et al., 2006). As subduction continued, the mantle wedge beneath Ogasawara cooled and the depth of magma production shifted deeper (Fig. 2-1-9C). By 40 Ma the volcanic front retreated to the present site of the Izu-Ogasawara arc (where paleo-Izu-Ogasawara-Kyushu-Palau Ridge was located prior to its separation). This means that a stable subduction zone was established (Fig. 2-1-9D).

The development of the Ogasawara Islands can be explained in terms of the formation of an oceanic island arc (Figs. 2-1-9, 2-1-10, 2-1-11).

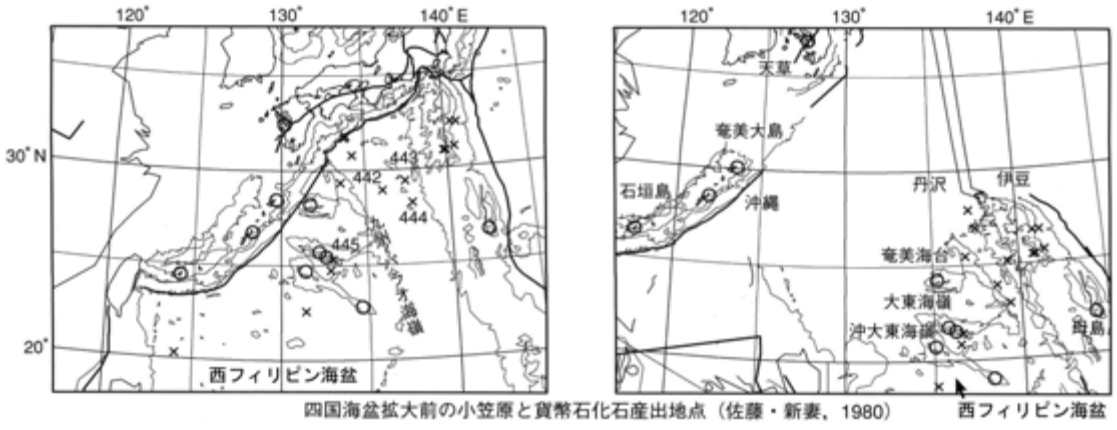
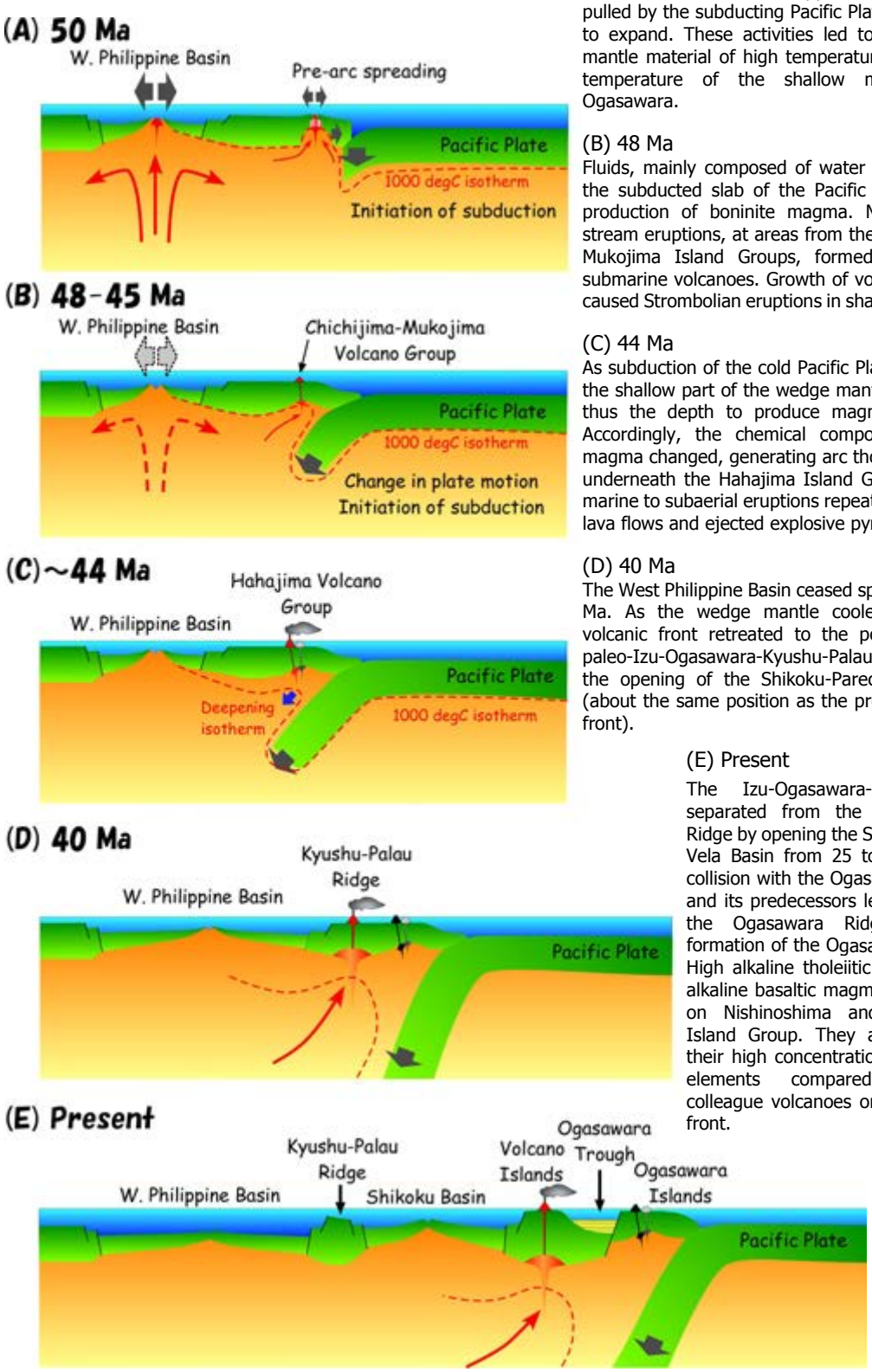



Fig. 2-1-8 Present (left) and restored positions of Ogasawara 48 Ma (right) (Revised from Niitsuma, 2006)

The figure on the left shows recovery sites of *Nummulites*, and the figure on the right represents the location of these sites 48 Ma before rifting of the Shikoku Basin. The Kyushu-Palau Ridge formed one subduction zone, and the West Philippine Basin to the west just started spreading in the north-south direction. ○: Sites of *Nummulites* recovery. ×: Deep-sea drilling sites. Bathymetry contours: 1,000/2,000/4,000 meters.




(A) Around 50 Ma

The Pacific Plate, which abuts on the Philippine Sea Plate, initiated subduction. At that time, the West Philippine Basin was spreading and the eastern edge of the Philippine Sea Plate was pulled by the subducting Pacific Plate and started to expand. These activities led to upwelling of mantle material of high temperature, raising the temperature of the shallow mantle under Ogasawara.

(B) 48 Ma

Fluids, mainly composed of water supplied from the subducted slab of the Pacific Plate, caused production of boninite magma. Moderate lava stream eruptions, at areas from the Chichijima to Mukojima Island Groups, formed a group of submarine volcanoes. Growth of volcanic edifices caused Strombolian eruptions in shallower waters.

(C) 44 Ma

As subduction of the cold Pacific Plate continued, the shallow part of the wedge mantle cooled and thus the depth to produce magma increased. Accordingly, the chemical composition of the magma changed, generating arc tholeiitic magma underneath the Hahajima Island Group. Shallow marine to subaerial eruptions repeatedly extruded lava flows and ejected explosive pyroclastics.

(D) 40 Ma

The West Philippine Basin ceased spreading by 40 Ma. As the wedge mantle cooled down, the volcanic front retreated to the position of the paleo-Izu-Ogasawara-Kyushu-Palau Ridge before the opening of the Shikoku-Parece Vela Basin (about the same position as the present volcanic front).

(E) Present

The Izu-Ogasawara-Mariana arc separated from the Kyushu-Palau Ridge by opening the Shikoku-Parece Vela Basin from 25 to 15 Ma. The collision with the Ogasawara Plateau and its predecessors led to a rise in the Ogasawara Ridge and the formation of the Ogasawara Trough. High alkaline tholeiitic andesite and alkaline basaltic magma are erupted on Nishinoshima and the Kazan Island Group. They are noted for their high concentrations of alkaline elements compared to their colleague volcanoes on the volcanic front.

Fig. 2-1-9 Schematic model of tectonic development of the Ogasawara Islands

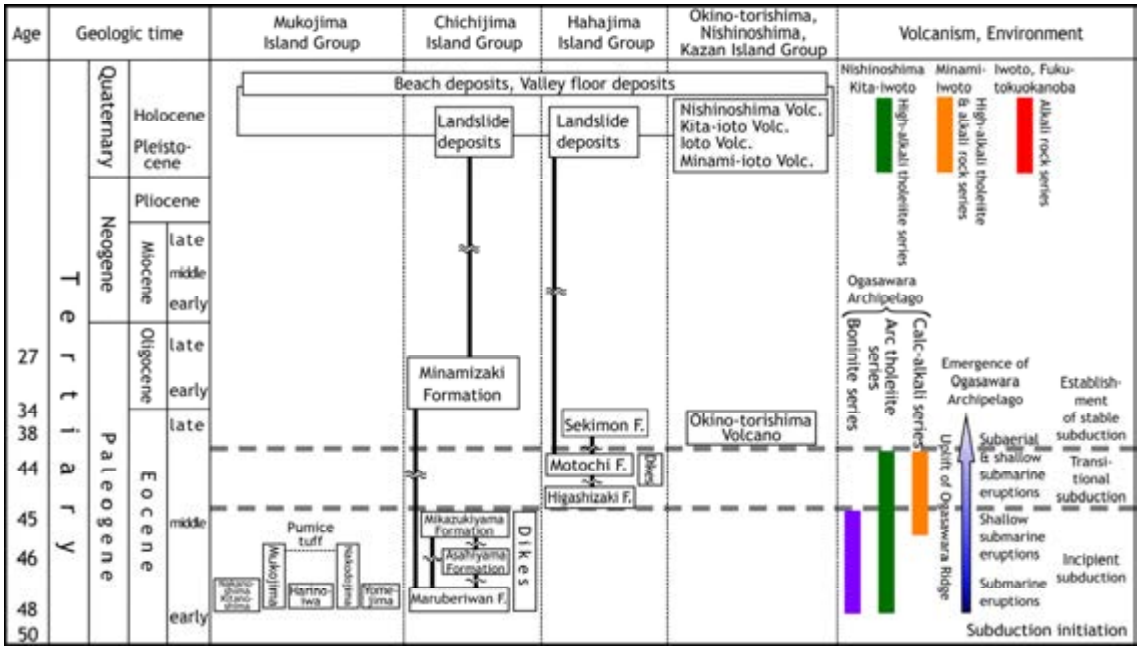



Fig. 2-1-10 A geological overview of the Ogasawara Islands (Revised from Umino et al., 2007)
The figure shows geographic times of each stratum, and its corresponding rock series.

## Incipient subduction stage (the birth of the island arc)

Island arc volcanic activity started at 48 Ma with the eruption of boninite magma, which continued up to 45 Ma (Fig. 2-1-9 A, B). During this incipient period of subduction intiation, the base of the Chichijima and Mukojima Island Groups were formed firstly through repeated non-explosive eruptions, producing gentle lava flows of boninite rock series (low-Ca boninite, bronzite andesite, two-pyroxene dacite and rhyolite) and arc tholeiitic rocks under slightly deep water (Figs. 2-1-9, 2-1-10). The shallow submarine volcanism continued, and the composition of erupted magma changed entirely to calc-alkaline andesite and dacite, bronzite andesite, and high-Ca boninite (Fig. 2-1-11C).

Boninite is a high-Mg andesite characterized by the absence of plagioclase and the presence of abundant orthopyroxene (bronzite-enstatite) embedded in the glassy matrix. Boninitic magma is produced under very specific temperature-pressure conditions; that is, melting of the hydrous upper mantle less than 30 km in depth (which is shallower than the generation depths of island arc basaltic magmas). Boninite magma is, therefore, considered to be produced in the incipient stage of a subduction zone formation, for example. In Ogasawara, water was supplied in the shallow mantle of high temperature beneath the West Philippine Basin by subduction of the plate, and boninite magma was produced (Tatsumi and Maruyama, 1989). Boninite was first discovered and described from Chichijima, and it was named after “Bunin”, which is a corrupt form of an archaic term *Munin,* meaning “uninhabited” (Petersen, 1981). Not only Chichijima, the type locality of boninite, but also

other islands of the Ogasawara Archipelago have the world's largest and best exposures of boninite.

Recent studies have demonstrated that boninite and similar high-Mg andesite volcanism took place broadly along the Izu-Ogasawara-Mariana arc for the first several million years (48 to 46 Ma) after the initiation of subduction (Ishizuka et al., 2006). Fig. 2-1-12 shows estimated areas of volcanism in the Ogasawara Ridge from the incipent subduction stage to the transitional stage. This shows widespread volcanism on the trench side of the Ogasawara Ridge 48 to 46 Ma. After that, areas of volcanism shifted to back-arc side as subduction zone developed.

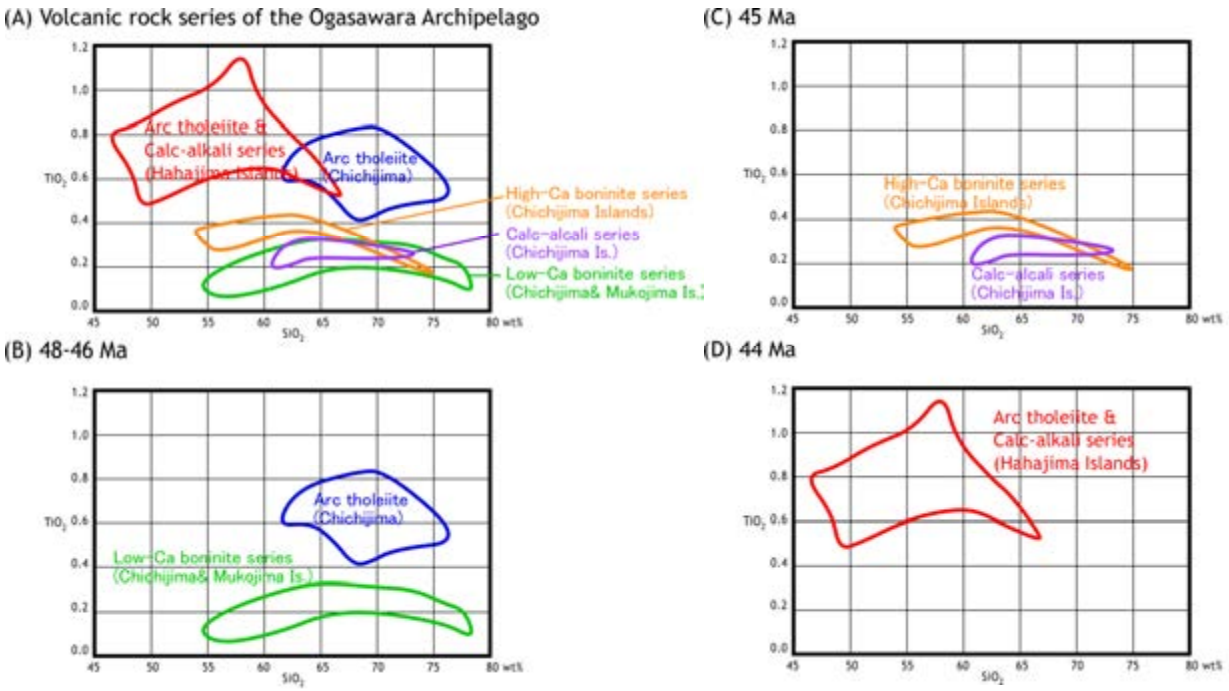



Fig. 2-1-11 Variations of the volcanic rock series of the Ogasawara Islands (Kanayama et al., 2009)
(A) shows the difference in $SiO_2$ and $TiO_2$ contents in volcanic rocks formed between 48 Ma and 44 Ma on the Ogasawara Islands. Figs. (B)-(D) show varied compositions of volcanic rocks at different activity periods. These variations reflect the changes in magmatic composition corresponding to the formation processes of the subduction zone.

### Transitional stage

This period experienced a transition of the subduction from its incipient stage to the steady-state stage 44 to 40 Ma (Figs. 2-1-8C, 2-1-9). The regions where magma was produced shifted from a shallow trench side to a deeper back-arc side (Fig. 2-1-12 d). The result of this was a change in magma composition from boninitic to common arc tholeiitic (Figs. 2-1-9, 2-1-10D). At this stage, volcanic eruptions in the shallow waters and on the ground formed the foundations for Hahajima Island Group. The Hahajima Island Group alternately experienced explosive and quiet eruptions that both extruded magmas of island arc tholeiitic and calc-alkaline compositions, characteristic of the transitional period.

Volcanism in the Ogasawara Archipelago came to an end before reaching the Steady-state stage. After the cessation of volcanic activity, foraminifers and others became deposited in the shallow seas around the Hahajima Island Group during the middle to late Eocene, and formed a limestone stratum. In the southwest of Chichijima, coral reefs developed in early to late Oligocene (34 to 27 Ma), eventually forming the limestone of the area around Minamijima and other islets.

## Steady-state stage

This is a period of island arc volcanism at the subduction zone from 40 Ma to the present day (Figs. 2-1-8D, 2-1-9). By 40 Ma, the volcanic front retreated almost to the present position of that of the Izu-Ogasawara arc and the thermal structure beneath the island arc reached a steady-state subduction. Okino-torishima Island, located above the Kyushu-Palau Ridge about 1,000 km southwest of the Ogasawara Archipelago, is a 5,000 m-tall submarine volcano formed above the steady-state subduction zone during that time. At about 30 Ma, the Izu-Ogasawara arc began to split, and the expansion of the Shikoku-Parece Vela Basin had separated the Kyushu-Palau Ridge from the Izu-Ogasawara-Mariana arc by 15 Ma.

As described above, the incipient oceanic arc volcanism can be summarized in three stages:

- It began with boninitic magmas that formed submarine volcanoes in the Chichijima and Mukojima Island Groups;
- then changed through calc-alkaline and tholeiitic submarine to subaerial volcanism in the Hahajima Island Group;
- to reach the steady-state subduction zone volcanism that formed submarine volcanoes on the Kyushu-Palau Ridge such as Okino-torishima.

This transition in arc volcanism reflects the change in pressure-temperature conditions and the source compositions of the wedge mantle beneath the subduction zone from its birth through transition to that of steady state. The andesitic middle crust beneath the Izu-Ogasawara arc was formed by the steady-state subduction during the last 40 million years since its establishment. Therefore, this transition is the manifestation of the development stages of the oceanic arc-trench system. The arc volcanism that transforms the oceanic crust into continental crust is still underway beneath the Izu-Ogasawara arc, as demonstrated by the recently-active volcano chains of Nishinoshima and the Kazan Island Group.

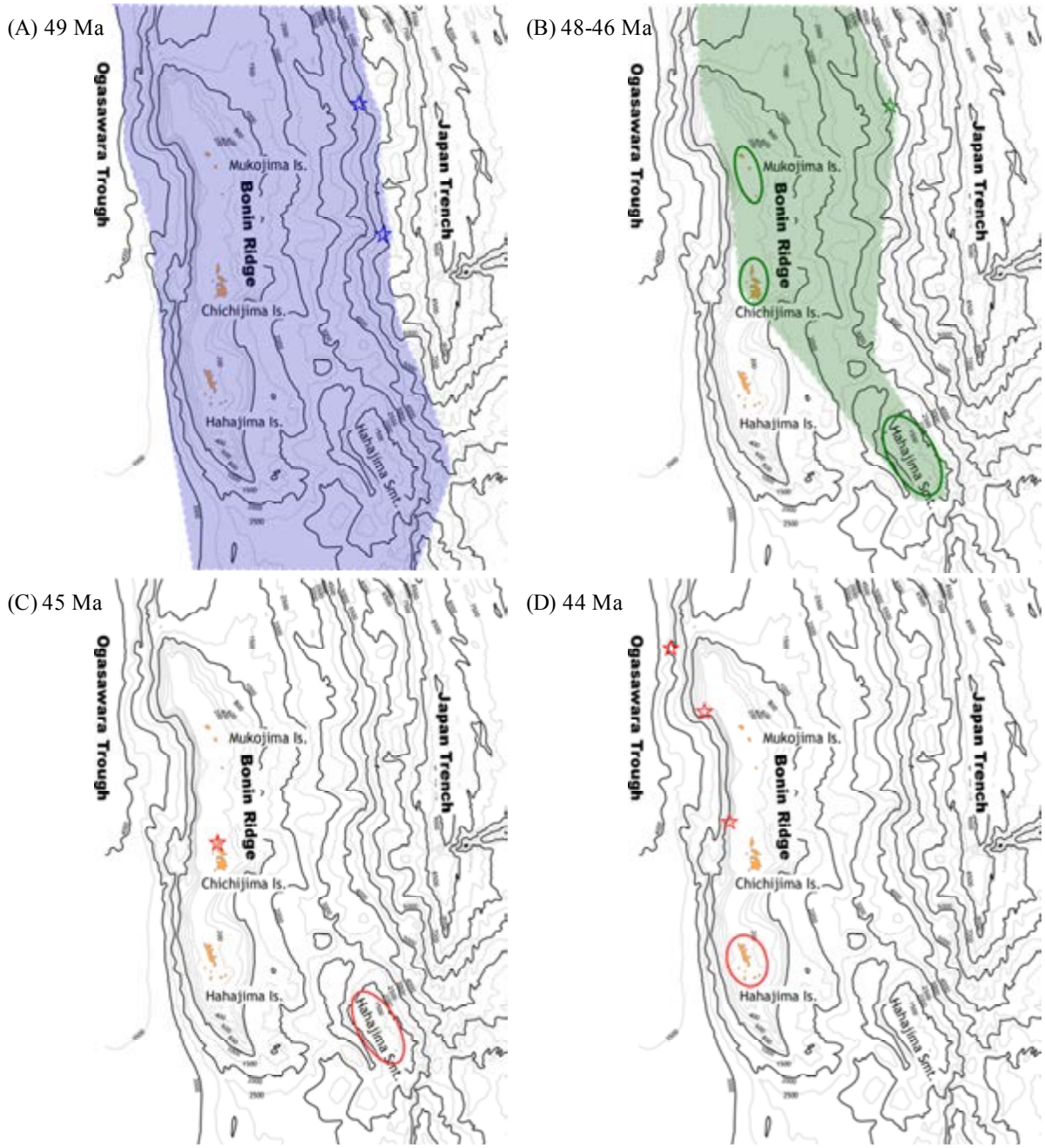



Fig. 2-1-12 Volcanic history in the Ogasawara Ridge

(A) 49 Ma: MORB-like basalt volcanism in a broad region related to fore-arc spreading (estimated area shaded in blue).

(B) 48-46 Ma: Boninitic and arc tholeiitic volcanism at some eruptive centers distributed in a relatively wide region over the Bonin Ridge (estimated area shaded in green).

(C) 45 Ma: Calc-alkalic and high-Ca boninite in limited eruptive centers (star and circle).

(D) 44 Ma and later: Calc-alkalic and tholeiitic volcanism in limited eruptive centers (stars and circle).

### (3) Boninites and high-Mg andesites (HMAs)

The Izu-Ogasawara (Bonin)-Mriana forearc region is extensively underlain by the middle Eocene volcanic products of boninitic affinity. The Ogasawara Islands, type locality of boninite, are the world largest exposures of boninite on land. Boninite is a glassy plagioclase-free bronzite andesite named after the old name of Chichi-Jima, "Munin", known as "Bonin Island" in western countries (Petersen, 1981). Boninite is a variety of high-Mg andesite depleted in high-field strength elements (HFSEs) and C1-chondrite-normalized rare earth element (REE)-patterns and enriched in large ion lithophile elements (LILEs) (e.g., Bloomer, 1987; Crawford et al., 1981; Dietrich et al., 1978; Hickey and Frey, 1982; Jenner, 1981; Walker and Cameron, 1983; Pearce et al., 1992; Taylor et al., 1994; Yajima and Fujimaki, 2001). Crawford et al. (1989) called magmas with $SiO_2$>53 wt%, Mg-number (100×Mg/[Mg + Fe]) >60 "boninitic", which include high-Mg andesites (e.g., sanukitoids) such as those from the Setouchi Volcanic Belt and Baja California. However, these high-Mg andesites are not always depleted in HFSEs and heavy REEs, which are rather different from typical boninite (Fig. 2-1-13). In terms of the bulk composition, IUGS recommends the usage of boninite for volcanic rocks with $SiO_2$>52 wt%, MgO>8 wt% and $TiO_2$<0.5 wt% (Le Maitre, 2002). However, "boninite" is rather loosely used for magnesian volcanic rocks in these days, irrespective of the distinguished characters of type boninite described above. We use "boninite" following the original definition, "glassy plagioclase-free bronzite andesite". For the general term of Mg-rich andesite (including boninite), we use "high-Mg andesite (HMA)" according to Tatsumi (1995).

Boninite contains four kinds of pyroxenes as a result of its unusual bulk compositions. Among these pyroxenes, bronzite is a dominat mineral phase which characterizes boninite and makes "Uguisu-Zuna", green sandy beaches of Ogasawara Islands. Some boninites from the Ogasawara Islands as well as Papua New Guinea and New Caledonia carry phenocrysts and/or microphenocrysts of clinoenstatite (Fig. 2-1-14) (Dallwitz et al., 1966; Sameshima et al., 1983; Komatsu, 1980; Shiraki et al., 1980). Boninite and its plutonic equivalents are the only terrestrial rocks that have clinoenstatite. In addition to these, pigeonite and augite occur as phenocrysts/microphenocrysts and as groundmass minerals.

Olivine in peridotite massifs and xenoliths in volcanic ejecta of the mantle origin has Fo content ranging from 89 to 92 (Olivine Mantle Arrey; Takahashi, 1986). Because Fe-Mg exchange partition coefficient between olivine and silicate melt is 0.3±0.03, irrespective to pressure and temperature (Takahashi and Kushiro, 1983; Ford et al., 1983; Brey and Kőhler, 1990), Mg-number (100×Mg/[Mg + Fe]) of magma in equilibrium with mantle olivine should be 69-78. HMAs generally have high Mg-numbers as expected of primary magmas and Fo-rich olivines and high-Cr/(Cr + Al) spinels identical to those of mantle peridotites, and therefore, they have been proposed to be primary andesite magmas formed by hydrous melting of mantle peridotite (Green, 1976; Kushiro, 1969, 1974; Kuroda and Shiraki, 1975; Nicholls and Ringwood, 1973; Shiraki et al., 1977). This is supported by high-P and –T experiments in 1980's (Tatsumi, 1981, 1982; Umino and Kushiro, 1989; Van der Laan et al., 1989).

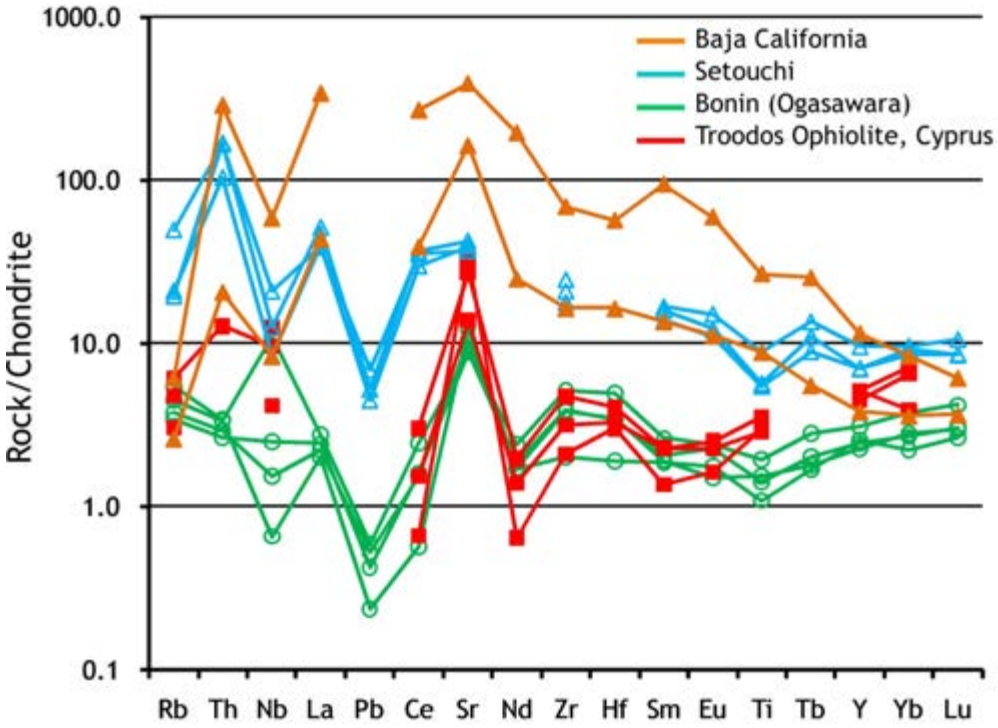



Fig. 2-1-13 Representative rare-earth element abundances of high-Mg andesites normalized to C1 chondrite.
Green circles, low-Ca and high-Ca boninite from Chichijima, Bonin Islands (Kanayama, 2009MS); orange triangles, Baja California (Rogers and Saunders, 1989); blue triangles, sanukitoid from Setouchi Volcanic Belt (Tatsumi et al., 2003); red squares, high-Ca boninite from Troodos ophiolite, Cyprus (Rogers et al., 1989).

Major element compositions of primary magmas are determined by phase relations of the source peridotite, which changes depending on pressure, temperature and volatile contents. Fig. 2-1-15 shows the possible P-T conditions for HMA magmas ($SiO_2$ >52 wt% on an anhydrous basis) based on the melting experiments on natural peridotites and HMAs which fulfill the above mentioned requirements of primary magmas. MgO content of melts produced by partial melting of natural peridotites under dry and wet conditions increases with the degree of melting (Hirose and Kawamoto, 1995). The degree of melting is a function of temperature, pressure and $H_2O$ content. Isopleths of MgO content in the melt make the subparallel lines from upper left to lower right (Fig. 2-1-15). The degree of melting increases with temperature, while $H_2O$ content in the melt decreases. On the contrary, the increase in pressure increases solubility of $H_2O$ in the melt and so increases the degree of melting. Clinopyroxene dissolves when the melt MgO exceeds 8 wt% and the residue becomes harzburgite. Besides high-Mg samples with accumulated olivine and pyroxene phenocrysts, primitive melt composition of HMAs has MgO ranging from 7 to 15 wt% (Tatsumi, 1981, 1982;

Umino, 1986). If these HMAs are of primary origin, they could be produced at 1030-1250°C and less than 1.7 GPa. However, because magmas produced at >1.5 GPa is almost saturated with water, they will solidify before reaching the surface during ascent due to the increase in the liquidus through degassing (Tatsumi, 1995; Tatsumi et al., 2002). The Ogasawara boninite sample CH414 crystallized olivine and orthopyroxene at pressures >0.3 GPa and a small amount of protoenstatite (now converted to clinoenstatite) at shallower depths (Umino and Kushiro, 1989). As pigeonite geothermometer indicates the eruptive temperature of CH414 boninite magma to be 1215°C (Umino, 1986), it should have segregated from the upper mantle between 0.3 and 1.2 GPa. Because the crustal thickness beneath the West Philippine Basin is 5-6 km as thick as common oceanic crust (Kasahara et al., 2008), the crustal thickness beneath the Ogasawara Ridge was also as thick as this. Then, the boninite magma segregated from (became chemically disequilibrium with) the mantle peridotite at depth 10-35 km in the uppermost mantle, and crystallized microphenocrysts below the Moho and rapidly ascended to extrude.

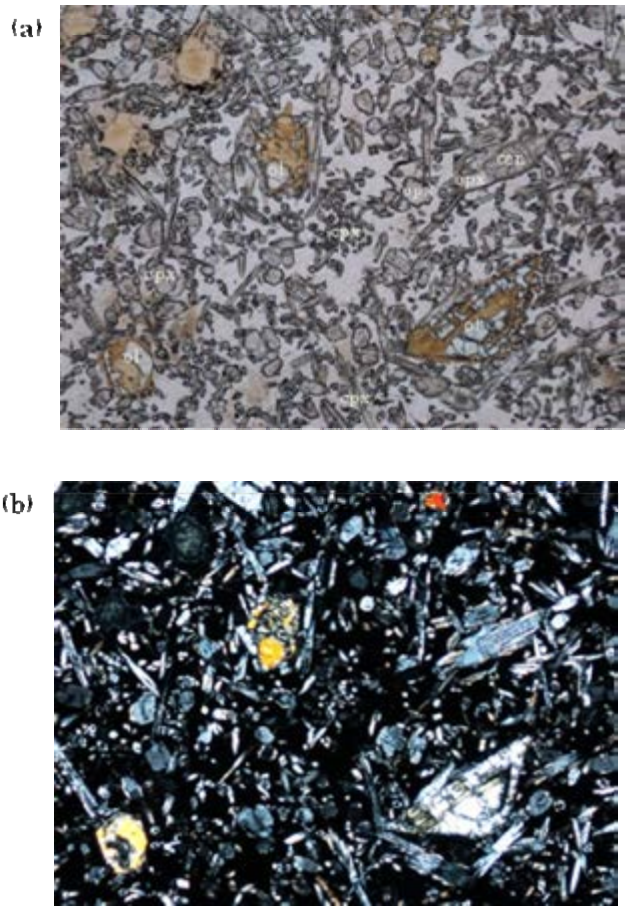



Fig. 2-1-14 Representative rare-earth element abundances of high-Mg andesites normalized to C1 chondrite.
Photomicrographs of boninite from Chichijima, Bonin (Ogasawara) Islands. Plain (a) and cross (b) polarized. Acicular clinopyroxene and microphenocrysts of orthopyroxene, clinoenstatite and olivine are set in a matrix of glass. Width is 1.7 mm. ol: olivine, opx: orthopyroxene, cpx: clinopyroxene, cen: clinoenstatite.

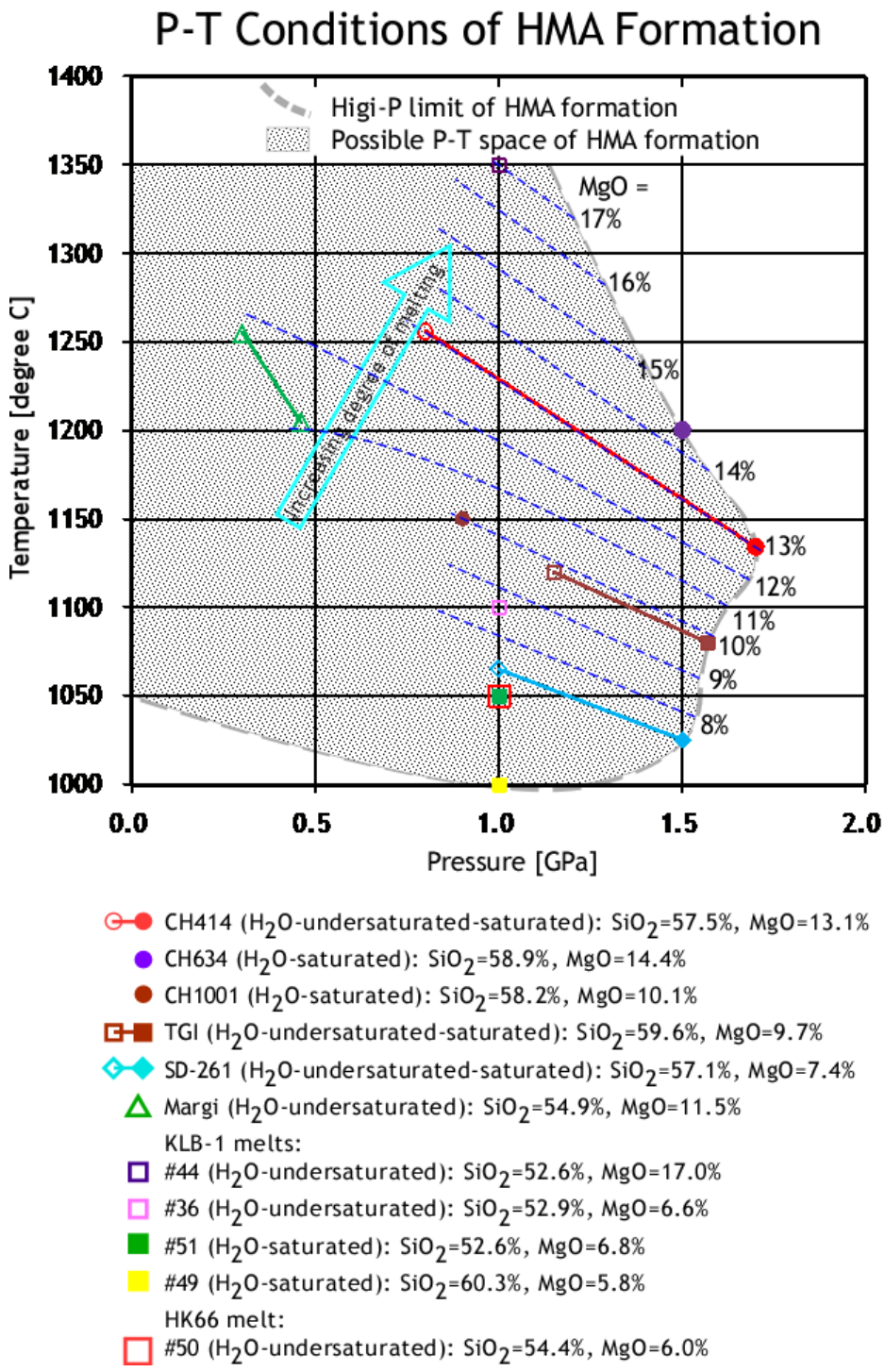



Fig. 2-1-15 Possible P-T conditions (stippled) for primary high-Mg andesites estimated based on melting experiments on high-Mg andesites and peridotites.
Data sources are Hirose and Kawamoto (1995), Hirose (1997), Hirose and Kushiro (1993), Takahashi (1986), Takahashi and Kushiro (1983), Tatsumi (1981), Tatsumi (1982), Umino and Kushiro (1989), Van der Laan et al. (1989).

Most boninites and other HMAs from the Ogasawara Islands and Setouchi Volcanic Belt have $CaO/Al_2O_3$ ratio <0.8 and belong to low-Ca boninite of Crawford (1989). On the contrary, boninites from the Troodos ophiolite are high-Ca boninites with $CaO/Al_2O_3$ ratio >0.8. In general, high-Ca boninites have high $CaO/Na_2O$ ratios (4-15) and lower $SiO_2$ (<56 wt%) than low-Ca boninites. Crawford (1989) proposed that high-Ca boninite magmas were generated by partial melting of moderately depleted mantle peridotite at <0.8 GPa under relatively dry conditions, and that low-Ca boninite magmas would form as the source depletion and water content increase. Dry melting of fertile Tinaquilo lherzolite at 0.2-0.5 GPa yields melts similar to high-Ca boninite (Duncan and Green, 1987). However, most low-Ca boninites have lower normative diopside than the tie line between normative olivine and the Tinaquilo lherzolite. This indicates that low-Ca boninite magmas cannot be generated by batch partial melting of less depleted peridotites like Tinaquilo lherzolite but requires more depleted sources (Crawford, 1989). High-Ca boninites from the Troodos ophiolite have spinel with a Cr/(Cr + Al) ratio less than 0.8, while spinel in low-Ca boninites have higher Cr/(Cr + Al) ratios, suggestive of higher source depletion for the latter. However, both low- and high-Ca boninites in the Ogasawara Islands are considered to have derived from similarly depleted sources because both of them are similarly depleted in heavy REEs, which is inherited from the depleted source.

Sr, Nd and Pb isotope ratios of HMAs (including boninite) from the Izu-Ogasawara forearc require mixing of three components as the source of these magmas: incompatible-element depleted mantle peridotite which experienced the Pacific MORB extraction, fluid released from subducted slab, and partial melt of subducted slab (either sediment or altered oceanic crust) (Pearce et al., 1992). High Zr/Ti and Zr/Sm ratios characteristic to low-Ca boninites suggest an addition of partial melt of the slab formed under the stability field of amphibole.

## (4) Forearc volcanism in the Izu- Ogasawara (Bonin)-Mariana region and the initiation of subduction zone

It is critical to understand the tectonic setting of the Izu- Ogasawara (Bonin) -Mriana forearc in order to understand the genetic conditions of the Eocene arc volcanism characterized by the presence of boninites. Although a number of tectonic models have been proposed, many of them stand on unreliable age constraints, inconsistent paleomagnetic data and insufficient stratigraphy as well as on less precise numerical models that failed to provide a unique model (Fig. 2-1-16) (Ben-Avraham and Uyeda, 1983; Pearce et al., 1992; Seno and Maruyama, 1984; Tatsumi and Maruyama, 1989). Critical constraints of these models are P-T-$H_2O$ conditions and geochemical characteristics of boninites. The genetic conditions of boninite magmas require lower-P and higher-T than ordinary arc magmas. The fundamental question is how to generate a hot mantle wedge for several million years during the specific Eocene time along the 1500-km long Izu-Ogasawara-Mariana forearc region.

(a)

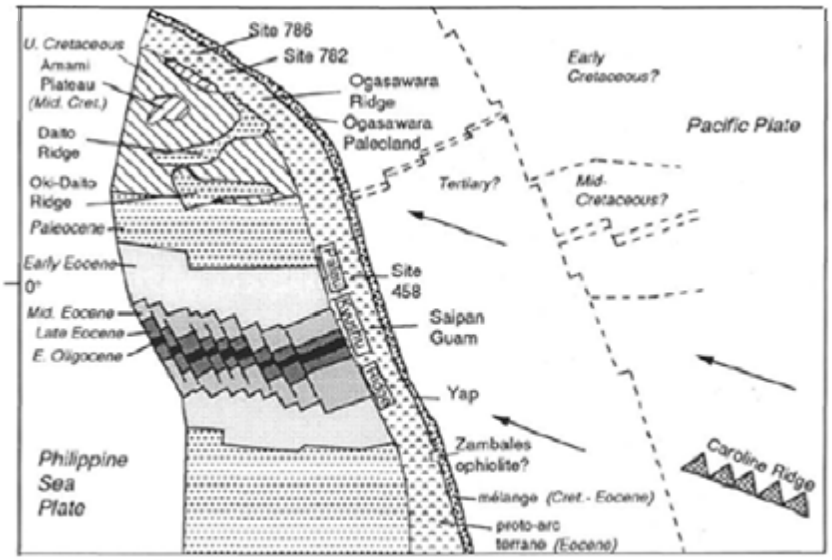



Figure 4. Representation of the Western Pacific at the end of the Eocene, based on references cited in the text, showing Leg 125 sites in their possible geologic context.

(b)

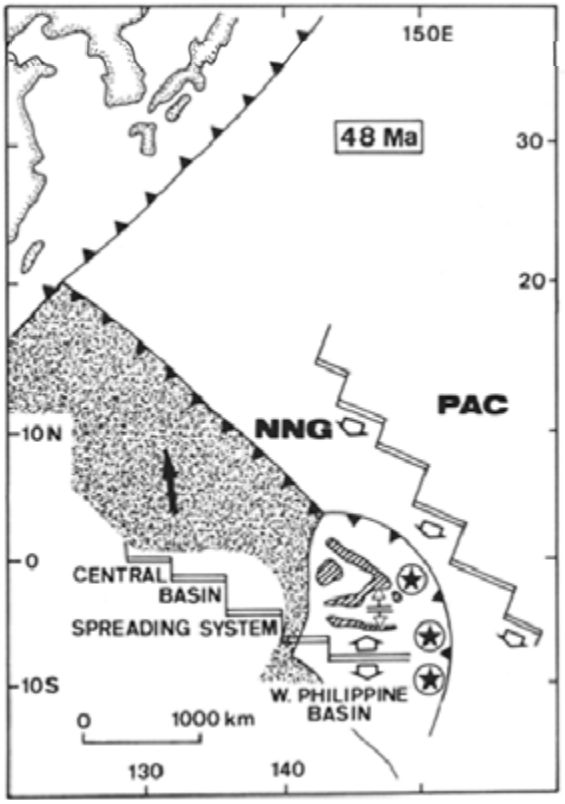



Fig. 2-1-16 Representative tectonic models of boninite genesis.

Both models assume that active spreading axis subducts beneath the actively spreading West Philippine Basin, but differ in that (a) a subduction zone initiates along the former transform fault and fracture zones (Pearce et al., 1992), or (b) a ridge subducts through the preexisting trench along the eastern margin of the West Philippine Basin (Tatsumi and Maruyama, 1989).

When boninites were formed at 48-45 Ma, the Central Basin Spreading Center (CBSC) was spreading (Hilde and Lee, 1984; Deschamps and Lallemand, 2002), which introduced warm upper mantle beneath the West Philippine Basin. Deschamps and Lallemand (2003) proposed that boninite magmas were formed at the intersection of the CBSC and the trench, and then boninitic crust was transported as the West Philippine Basin spread. Another hypothesis shows that the West Philippine Basin was located above the usual hot mantle provided by the upwelling Manus Basin plume (Macpherson and Hall, 2001). On the other hand, two conflicting models have been proposed for the subducted plate: one assumes the old and cool Pacific plate (Uyeda and Ben-Avraham, 1972; Macpherson and Hall, 2001; Stern, 2004: Stern and Bloomer, 1992), while the others propose a young and hot plate subduction (Pearce et al., 1992; Tatsumi and Maruyama, 1989). In addition to these, there is a debate on wheter the forearc magmas represented by boninites formed at the initiation of subduction (Ben-Avraham and Uyeda, 1983; Pearce et al., 1992; Stern, 2004: Stern and Bloomer, 1992), or boninite magmas were caused by an extraudinary thermal event that took place in the pre-existing Izu-Ogasawara-Mariana subduction zone at a specific period during the Eocene (Seno and Maruyama, 1984; Tatsumi and Maruyama, 1989).

Uyeda and Ben-Avraham (1972) proposed that the Pacific plate began to subduct beneath the Philippine Basin to yield boninite magma as the first arc volcanic product along the Izu-Ogasawara-Mariana forearc when the Pacific plate changed its motion, which was believed to be 43 Ma at that time. However, a boninite from Chichijima, Ogasawara Islands, is dated to be 48 Ma, consistent with the fossil age. Arc tholeiite from the northern Kyushu-Palau Ridge gives 48-49 Ma, which indicates the presence of subduction along the northern Kyushu-Palau paleoarc before the change in movement of the Pacific plate at 43 Ma. In addition to these ages, Seno and Maruyama (1984) used declination of rock paleomagnetic data from the Isu-Bonin-Mariana arc to proposed that the subduction zone along the northern Kyushu-Palau was aligned NW-SE at 48 Ma. Because the Pacific plate moved north-northwesterly at that time, the subducting plate beneath the Kyushu-Palau paleoarc was not the Pacific but unknown plate south of the Pacific, which was lost by subduction. They called the unknown plate “North New Guinea”. They thought that the Philippine Sea plate rotated clockwise since the Eocene as the trench retreated to the present position. However, the paleomagnetic inclinations on which their model stands are highly varied due to local block rotation, that does not definitely support the uniform rotation of the entire Philippine Sea plate (Koyama et al., 1992). Furthermore, the age of the Hawaii-Emperor Seamount Chain was recently revised to be ca. 50 Ma (Sharp and Clague, 2006), which coincides with the oldest arc volcanism in the northern Kyushu-Palau and Izu-Ogasawara regions. Therefore, there was no continuous subduction along the Izu-Ogasawara regions that predates the change in the Pacific plate movement.

Pearce et al. (1992) proposed that a high-T region capable of yielding boninite magmas can form in the shallow mantle wedge only when a young, hot plate began to subduct beneath the young and warm West Philippine Basin lithosphere based on a numerical model of thermal structure of a subduction zone. However, recent more accurate simulations suggest that a hot plate subduction

younger than 5 Ma causes extensive melting of subducted oceanic crust which produces a huge amount of granitic magmas (Iwamori, 2000). To the contrary, there is neither a trace of a large granitic plutons and felsic volcanism associated with boninite and other HMAs in the Izu-Ogasawara-Mariana forearc region, nor evidence of a young plate subduction prior to the old Pacific plate.

Recent progress in precise seismic structures beneath the Izu-Ogasawara-Mariana arc and the geological, petrological and geochemical studies supported by high-quality dating enabled interpretations of the magmatic evolution before and after the intiation of subduction combined with the crustal structure development. As a result, the forearc spreading model has become a most plausible theory that introuduces hot asthenopheric upwelling into the shallow mantle wedge upon the subduction initiation (Stern and Bloomer, 1992; Ishizuka et al., 2006; Takahashi et al., 2009).

Dredging and submersible dives on the seafloor around the Ogasawara Ridge identified the oceanic crust stratigraphy of the basement beneath the boninite volcanic edifices (Ishizuka et al., 2008; Shipboard scientists, 2009). The basement consisting of tholeiitic pillow lava, sheeted dikes, gabbro and depleted peridotite in descending order crops out on the landward wall of the trench due to tectonic erosion by the subducting Pacific plate (Shipboard scientists, 2009; Takahashi et al., 2009). The gabbro is dated as 52 Ma (Ken'ichiro Tani, unpublished data), which is consistent with the stratigraphy. Deep Sea Drilling Program Hole 458 drilled into the central Mariana forearc also recovered backarc-basin like basalt below 48-Ma boninitic rocks (Hickey and Frey, 1981). These pre-boninite lavas and dikes show major and trace element compositions like mid-ocean ridge or backarc basin basalt (Ishizuka et al., 2008; Reagan et al., 2008). However, they are more depleted in incompatible elements and are lower in Nb/Yb and light REE/heavy REE ratios than the basement of the West Philippine Basin, indicative of derivation from a fairly depleted source mantle. They also differ in Pb isotopic ratios. These lines of evidence show that pre-boninite basalts represent the fore-arc basement unrelated to the backarc basin formation of the West Philippine Basin.

The depleted forearc basaltic basement are considered to have formed by forearc spreading at the initiation of subduction (Stern and Bloomer, 1992; Ishizuka et al., 2006). A subduction boundary between two oceanic plates most likely initiates along a transform fault or fracture zone (Casey and Dewey, 1984). The Izu-Ogasawara-Mariana arc was located along a transform fault and a fracture zone between the hot and thin West Philippine Basin lithosphere younger than 2-3 Ma and the cool and thick Pacific lithosphere of Cretaceous age (Hilde and Lee, 1984; Uyeda and Ben-Avraham, 1972; Deschamps and Lallemand, 2002). Because the Pacific lithosphere was dense and unstable, it began to sink into the asthenosphere, forming an incipient trench (Fig. 2-1-9). Fall of the tip of the Pacific slab caused retreat of the trench, yielding an extensional stress field on the edge of the overriding West Philippine Basin lithosphere, which lead to a forearc spreading. Asthenosphere upwelling induced by the forearc spreading caused partial melting to produce mid-ocean ridge or backarc basin basalts. After a few million years at 48 Ma, the rise in temperature of the subducted slab produced felsic partial melt, which rose into the

mantle wedge and interacted with the peridotite to yield boninite magmas. The Izu-Ogasawara-Mariana subduction zone was established for the next 800 million years as described in the text.

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# *2-2. Outcrops of major geological features that characterize the Ogasawara Islands*

Produced under supervision of Dr. Susumu UMINO

Table 2-2-1 Outcrops of major geological features that characterize the Ogasawara Islands

| Rock series | Formation | Rocks | Age | Island | Locations of outcrop (No.) | Notes |
|---|---|---|---|---|---|---|
| Boninite series | Maruberiwan Formation | Boninite pillow lava, boninite, dacite and rhyolite dike swarm; Uguisu-zuna (pyroxene sand) | 48-46 Ma | Chichijima Is. | Miyanohama Beach, Tsurihama Beach (CH-3) | Clinoenstatite-bearing dikes and lava; bronzite sand beach |
| | | | | | Hatsuneura (CH-7) to Ishiura (CH-8) | The oldest stratum of Chichijima; clinoenstatite-bearing boninite dikes and lavas common; bronzite sand beach |
| | | Boninite pillow lava, dacite pillow lava, rhoyolite hyaloclastite, turbidite | | | Chihiroiwa (CH-16) | A splendid view of three hundred-meter high cliffs showing the entire sequence from the lowermost to the uppermost Maruberiwan Formation, which is displaced by faults more than 100 m, giving an impressive view of the strata |
| | | Master tube of boninite pillow lava, and brecciated pillow lava | | | West shore (Tatsumi Bay) (CH-13) | |
| | | Boninite pillow lava | | Anijima Is. | Northern and southern coasts of Takinoura Bay (AN-1) | Large clinoenstatite-bearing boninite pillow lava |
| | | bronzite andesite pillow lava | | Chichijima Is. | Nagasaki Loop Tunnel (CH-4), Kominato (CH-10) | Clinoenstatite-bearing bronzite andesite pillow lava |
| | | Tuff breccia and alternating beds of mudstone and sandstone (fossil Uguisu-zuna), consisting of bronzite crystals and glass shards | | | Butakaigan, North of Manju-misaki (CH-12) | Debris flow deposits and turbidite derived from explosive eruptions of the Chichijima submarine volcano |
| | | Dacite pillow lava | | | Kominato (CH-10) to Nakayamatoge mt. pass (CH-11), Ten-nohana Cape(CH-14) | Close-packed dacite pillows common, which is rare for ordinary high-silica magmas in areas other than the Bonin Islands |
| | | Dacite pillow lava, lava tube | | | Mt. Yagiyama (CH-9), Zouhana Cape | Large pillow lava >several meters in diameter; highly silicic dacite forming close-packed pillows |
| | | | | | Rocks between Mt. Yagiyama and Takoiwa (CH-9) | Lava filling a conduit; dissected remnant of an old crater |
| | | Dacite hyaloclastite | | | Mt. Ogami (CH-1) | |

Table 2-2-1 Outcrops of major geological features that characterize the Ogasawara Islands

| Rock series | Formation | Rocks | Age | Island | Locations of outcrop (No.) | Notes |
|---|---|---|---|---|---|---|
| Boninite series | Maruberiwan Formation | Dikes of dacite, rhyolite, bronzite andesite and boninite | 48-46 Ma | Chichijima Is. | Ridges, coast and valleys around Ishiura (CH-8) to Hatsuneura (CH-7); offshore reefs and rocks, Rosokuiwa Is. (CH-6) | Parallel dike swarm in the center of the Chichijima submarine volcano; one of loci of eruptions |
| | | | | Anijima Is. | Sujiiwa Cape (AN-2), Hyotanjima Is. (HY-1), Nekoiwa Is. (NK-1) and Hitomarujima Is. | Well exposed parallel dike swarm |
| | Asahiyama Formation | Rhyolite lava dome | | Chichijima Is. | Western wall of Ten-noura (CH-15) | |
| | | Dikes of quartz-bearing dacite and rhyolite | | | Rocky ridges of Tsurihama Beach and Nagasaki (CH-5) | |
| | | Sheet lava with hyaloclastite of quartz-bearing dacite and rhyolite | | | Mt. Asahi (CH-2), Hutamiiwa Rock (CH-2), Mt. Akahata, Mt. Ten-noura, Mt, Tsutsuji, Tatsumizaki | Rhyolite pillows on the southern peark of Mt. Asahi |
| | | Boninite pillow lava | 45.6±0.4 Ma | Mukojima Is. | Northwestern coast, Minamihama Beach (MU-1) | Clinoenstatite megacrysts in boninite pillows at Minamihama |
| | | Boninite tuff breccia | | | Northern and southern coasts (MU-2) | |
| | | Bronzite andesite pillow lava and hyaloclastite | 48 Ma | Harinoiwa Is. | Whole island (HR-1) | In-situ brecciated pillow lava (transitional type to hyaloclastite) |
| | | Alteration zone | | Nakodojima Is. | Central cove (NK-1) to Mt. Tsurugi | Several hydrothermal alteration zones run north to south; It is told that there is a copper trial boring trace at the depths of the opposite shore of Torishima |
| | | Rhyolite fall-out pumice tuff | | | Mt. Byobu (NK-2) | Explosive eruptions under shallow water in the late stage of Mukojima submarine volcano |
| | | Bedded tuff breccia > pillow lava and dikes of boninite and bronzite andesite | 46.9±0.4 Ma | Yomejima Is. | (YM-1) | |
| | | Base surge deposits | | | South of the island (YM-2) | |
| | | Alteration zone with hydrothermal veins in boninite breccia; dikes abundant | | Maejima Is. of Yomejima Is. | Cove of Maejima (MA-1) | Welded talus deposits filling a crater veined by pyrite |

Table 2-2-1 Outcrops of major geological features that characterize the Ogasawara Islands

| Rock series | Formation | Rocks | Age | Island | Locations of outcrop (No.) | Notes |
|---|---|---|---|---|---|---|
| Arc tholeiite series | Maruberiwan Formation (John Beach Volcanics) | Hydrothermal alteration zone | 48-46 Ma | Chichijima Is. | Kinshihama Beach (CH-17) | Cyprus-type massive sulphide deposits; pyrite, sphalerite, chalcopyrite, gypsum, sulfur, jasper |
| | | Lobate sheet flows and dikes of andesite and dacite | | | Kinshihama Beach and Onikaigan Coast (CH-17) | One of eruptive centers of Chichijima volcano; well exposed shallow levels beneath eruptive and hydrothermal vents showing a relationship between lavas, dikes and a hydrothermal alteration zone |
| | | Andesite agglutinate and pillow lava | | Kitanoshima Is. | Main island and surrounding reefs (KT-1) | |
| | | Andesite pillow lava | | Nakanoshima Is. | Whole island (NS-1) | |
| | Ejecta of Nishinoshima Volcano | Hypersthene-augite andesite lava and dikes, air-fall and surge deposits | Recent | Nishinoshima Is. | Whole island | Summit of a submerged stratovolcano |
| Calc-alkali series | Mikazukiyama Formation | Boninite pillow lava | | Ototojima Is. | Nishi Coast (OT-2) | |
| | | Hyperstheme-augite andesite and dacite tuff breccia and alternating beds of volcanic mudstone and sandstone | 45 Ma | Chichijima Is. | Mt. Mikazuki (CH-19, 20); seacliffs between Oonesaki Cape and Funami (CH-19) | Debris flow deposits and turbidite derived from submarine debris avalanch |
| | | Tuff breccia mainly consisting of porphyritic hypersthene-augite andesite and dacite clasts | | Ototojima Is. | Sporadic exposures on Higashi Coast (OT-3) and the ridges from Hironeyama through Tenkaisan to Sokuryogatake | |
| | | Turbidite including dacite pumice | | | Ridge to the west of Tobozaki Cape (OT-1) | Explosive eruptions under shallow water in the late stage of the Chichijima submarine volcano |
| Calc-alkali series, arc tholeiite series | Motochi Formation | Fall-out pumice tuff | | Hahajima Is. | Uratakane to Mt. Funaki (HH-2) | Lowermost Motochi Formation uncomformably overlying the Higashizakiwan Formation; fall-out tephra from an aerial eruption column |
| | | Submarine pyroclastic flow deposit | | | Uratakane (HH-2) | Products of submarine pyroclastic flows predeeding the pumice fall deposit above; showing double graded bedding of normally graded lithic and reversely graded pumice clasts |
| | | Fall-out pumice tuff and its reworked deposits | | | Higashizaki, Gagyukaku (HH-16) | product of an explosive eruption |
| | | Block and ash flow deposit | | | Road cuts around Nishiura (HH-10) | Large segregation pipe at Nishiura |

Table 2-2-1 Outcrops of major geological features that characterize the Ogasawara Islands

| Rock series | Formation | Rocks | Age | Island | Locations of outcrop (No.) | Notes |
|---|---|---|---|---|---|---|
| Calc-alkali series, arc tholeiite series | Motochi Formation | Basalt hyaloclastite | | Hahajima Is. | Mt. Suribachi (HH-1) | |
| | | Andesite lava and hyaloclastite | 44.0 Ma | | Miyukinohama Beach (HH-4) to Nankinhama Beach (HH-5), Samegasaki Cape | Subaerial lavas and pyroclastic flow deposits, and submarine autobrecciated lavas (sheet lava and hyaloclastite) |
| | | Submarine debris flow deposit | | | East coast facing Oki port (HH-7) | Derived from the block and ash flow around Nishiura |
| | | Base surge deposit | | | Nankinhama Beach (HH-5) to Omoto Beach | |
| | | Aa lava | | | Komoridani (HH8) | |
| | | Dikes | | | Kita Port (HH-14) | |
| | | Vent breccia | | | Osawa Coast (HH-13) | Volcanic and tuff breccia filling a fissure vent |
| | | Agglutinate | | | Mt. Higashiyama (HH-15) | Welded pyroclastic rocks in the vicinity of vent around Higashiyama |
| | | | | | Nagahama Beach to Inuizaki Cape (HH-12) | Spectacular piles of agglutinate extending 5 km along the coast; one of the eruptive centers of Hahajima volcano, indicating NNW-trending fissure vents subparallel to the main island |
| | | Plug | | | Minamizaki (HH-3) | |
| | | Basalt scoria tuff and dikes | | Mukohjima Is. | Kominato (MK-1) | |
| | | Uguisu-zuna and basalt dikes (pyroxene sand) | | | Kopepe Beach (MK-2) | Primitive basalt dikes with MgO>10 wt% (Kuroda et al. 1983). Clinopyroxene phenocrysts eroded out from basalt dikes form Uguisu-zuna (pyroxene sand) |
| | | Basalt pillow lava | | Anejima Is. | Western shore (ANE-1), southern shore (ANE-2) | |
| | | Basalt and andesite scoria tuff | | Meijima Is. | (ME-2) | |
| | | Feeder dikes and hyaloclastite | | | Northern wall of the western cove (ME-1) | Structure of a small volcanic edifice is well exposed, showing how it grew from a fissure vent |
| | | Basalt dikes | | Imotojima Is. | Opposite shore facing Torisima Is. (IM-1) | Dike swarm |
| Alkali rock series | Ejecta of Kita-iwoto Volcano | Alkali basalt lava and dikes, surge, rolling, debris flow and air-fall deposits | | Kita-iwoto Is. | Whole island | |

Table 2-2-1 Outcrops of major geological features that characterize the Ogasawara Islands

| Rock series | Formation | Rocks | Age | Island | Locations of outcrop (No.) | Notes |
|---|---|---|---|---|---|---|
| Tholeiitic to alkali rock series | Ejecta of Minami-iwoto Volcano | Basalt lava and dikes, pyroclastic flow, debris flow, air-fall and rolling deposits | | Minami-iwoto Is. | Whole island | |
| (Sedimentary rock) | Motochi Formation | Nummulites-bearing conglomerate and sandstone | 44.0-40.2 Ma | Hahajima Is. | Miyukinohama Beach (HH-4), Nankinhama Beach (HH-5), Okimura, Koumoridani | Intercalated with lava flows and hyaloclastite |
| | | Calcareous sandstone | | | North Okiko port to Motochi (HH-6) | Sediment in quiet period of the volcanism (Rose Stone)(P11-13; 45.9-40.2 Ma) |
| (Reef limestone) | Minamizaki Formation | Fossiliferous limestone yielding foraminifer and coral fossils | Early Oligocene (34-27 Ma) | Chichijima Is. | Chichijima Minamizaki (CH-18) | Limestone unconformably overlying laterite covering weathered surface of the John Beach Volcanics; karst |
| | | | | Minamijima Is. | Minamijima and surrounding reefs (CH-18) | Submerged karst |
| | Motochi Formation | Limestone yielding foraminifer and algae fossils | 40.2-38.5 Ma | Hahajima Is. | Tsukigaoka Shrine (HH-6) | Cave |
| | | Limestone and calcareous sandstone containing abundant fossils of foraminifer, algae, and shell | | | Nishiura; Sankakuiwa (HH-9) | |
| | Sekimon Formation | Reef limestone containing foraminifer and algae fossils and sandstone | Late Eocene (planctonic foraminifera; 38.5-33.8 Ma) | | Sekimon (HH-11) | Uppermost formation of the Hahajima Islands |

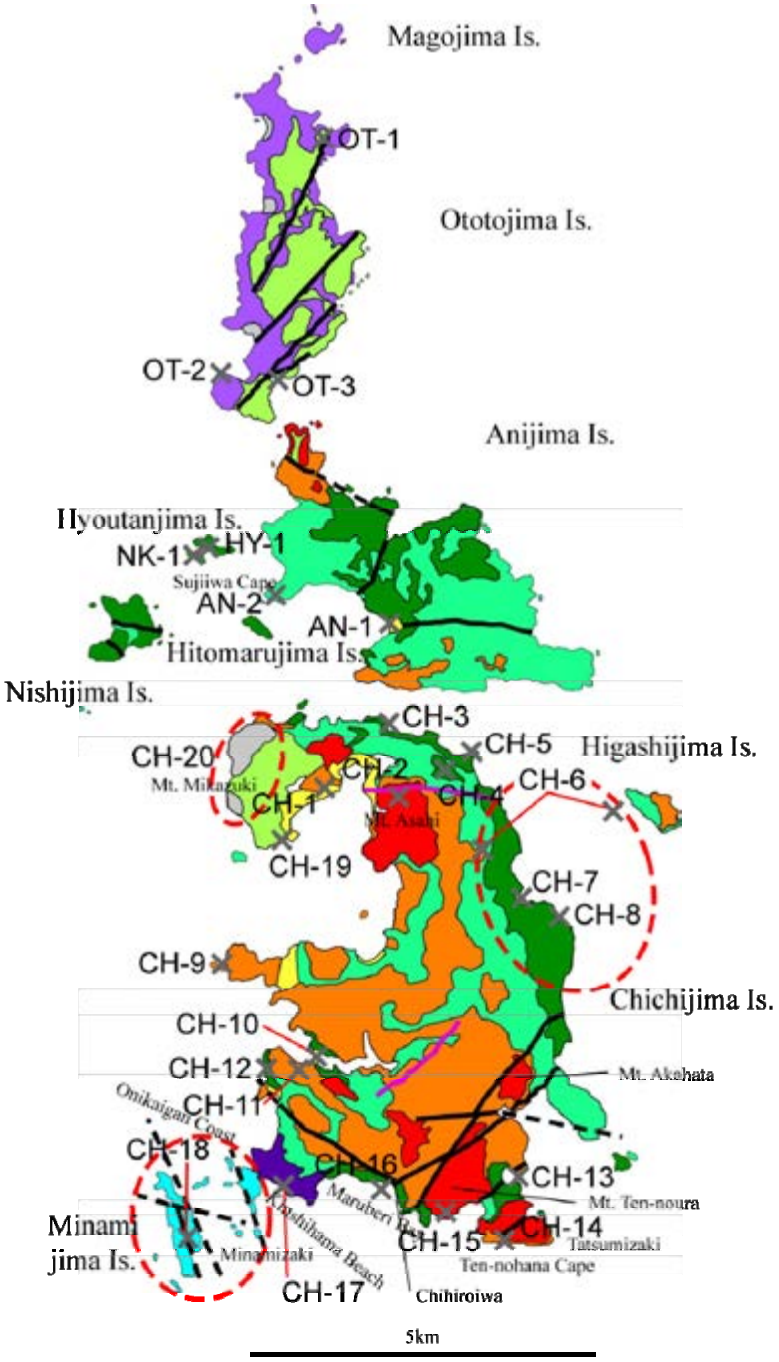



Fig. 2-2-1 Locations of outcrops in the Chichijima Island Group (Revised from Umino et al., 2009)

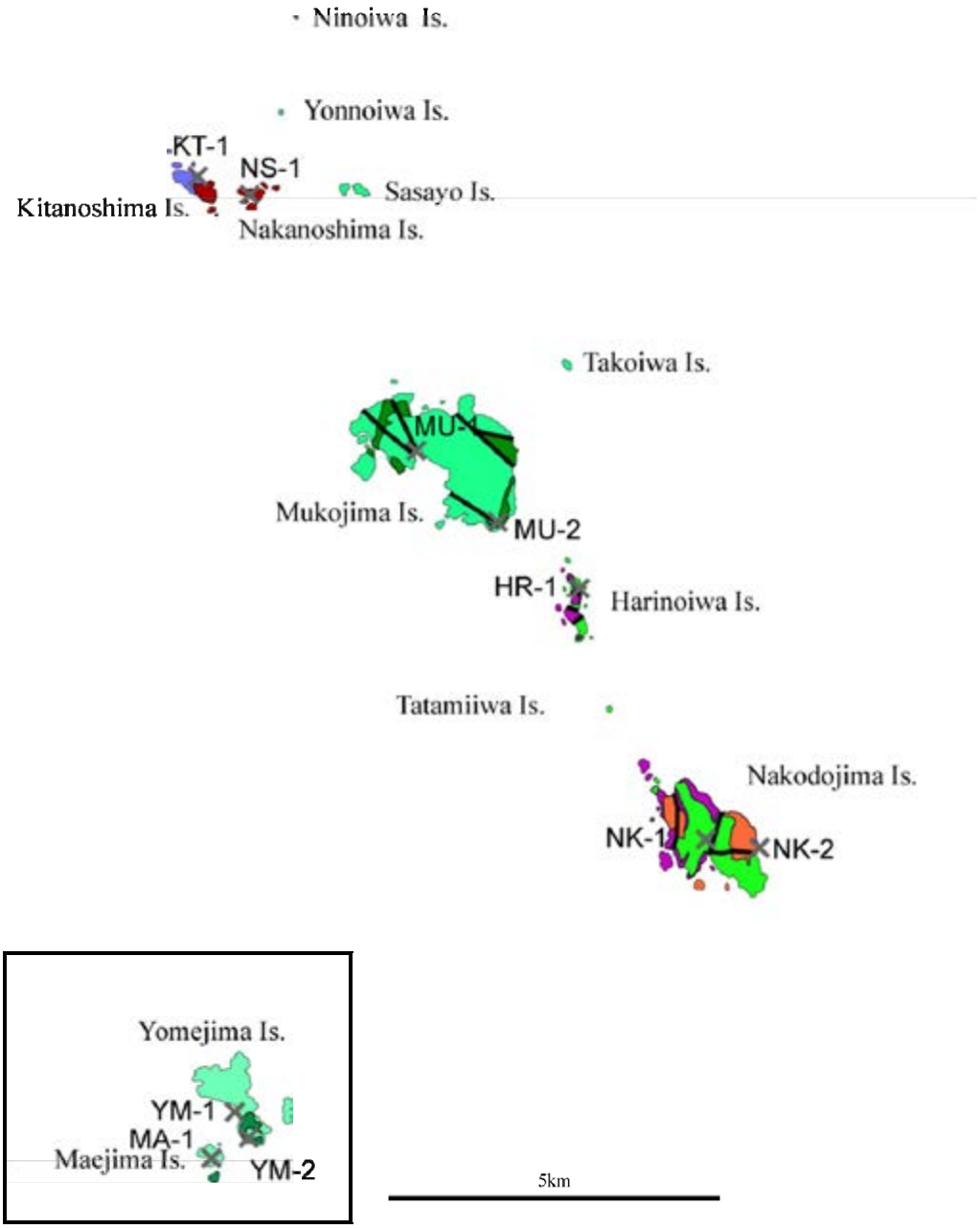



Fig. 2-2-2 Locations of outcrops in the Mukojima Island Group (Revised from Umino et al., 2009)

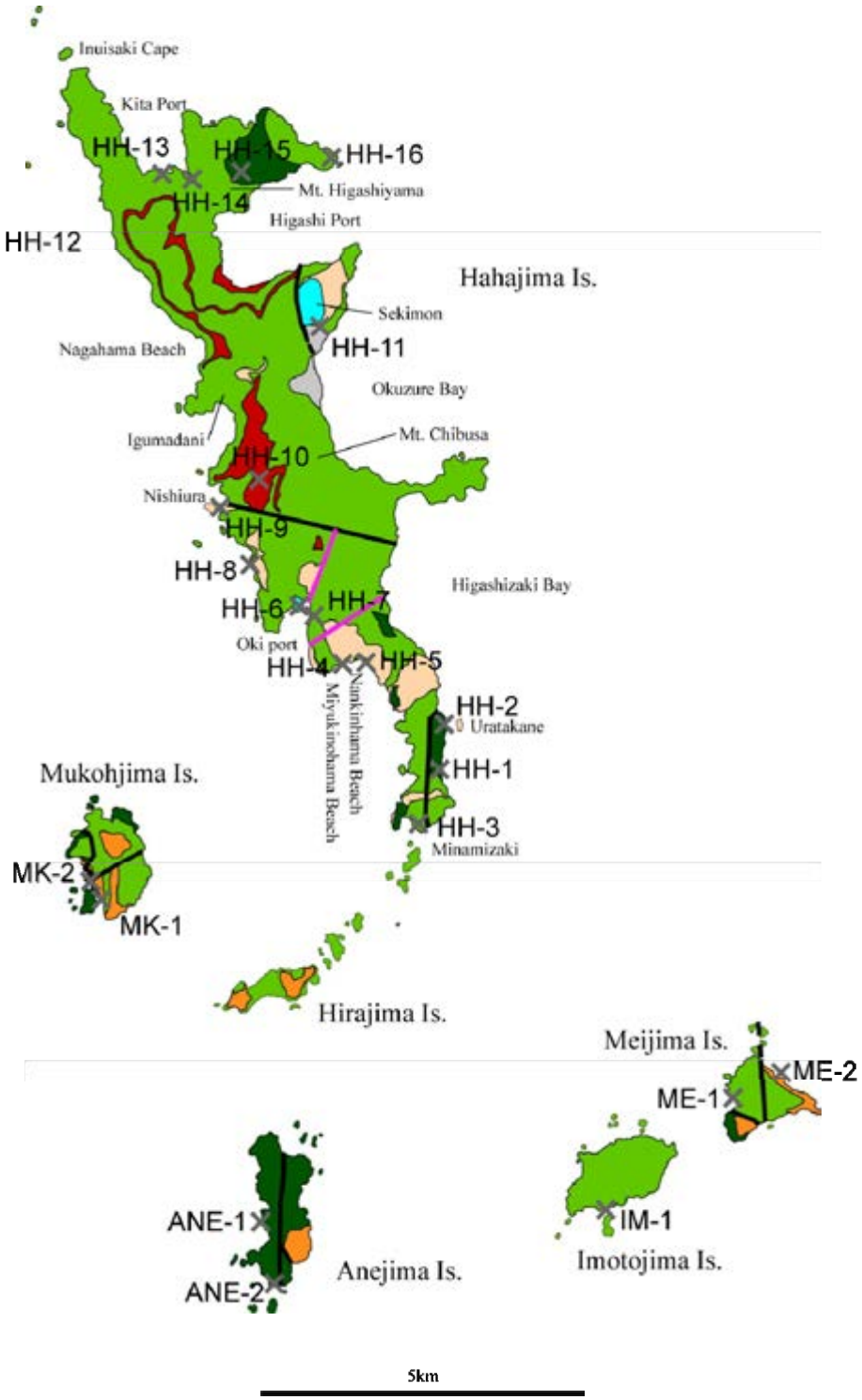



Fig. 2-2-3 Locations of outcrops in the Hahajima Island Group (Revised from Umino et al., 2009)

## Reference

Umino S., S. Nakano, O. Ishizuka and M. Komazawa. 2009. *Geological map of Japan 1:200,000 Ogasawara Shotō*, Geological Survey of Japan (in Japanese).

# *2-3. Geological maps*

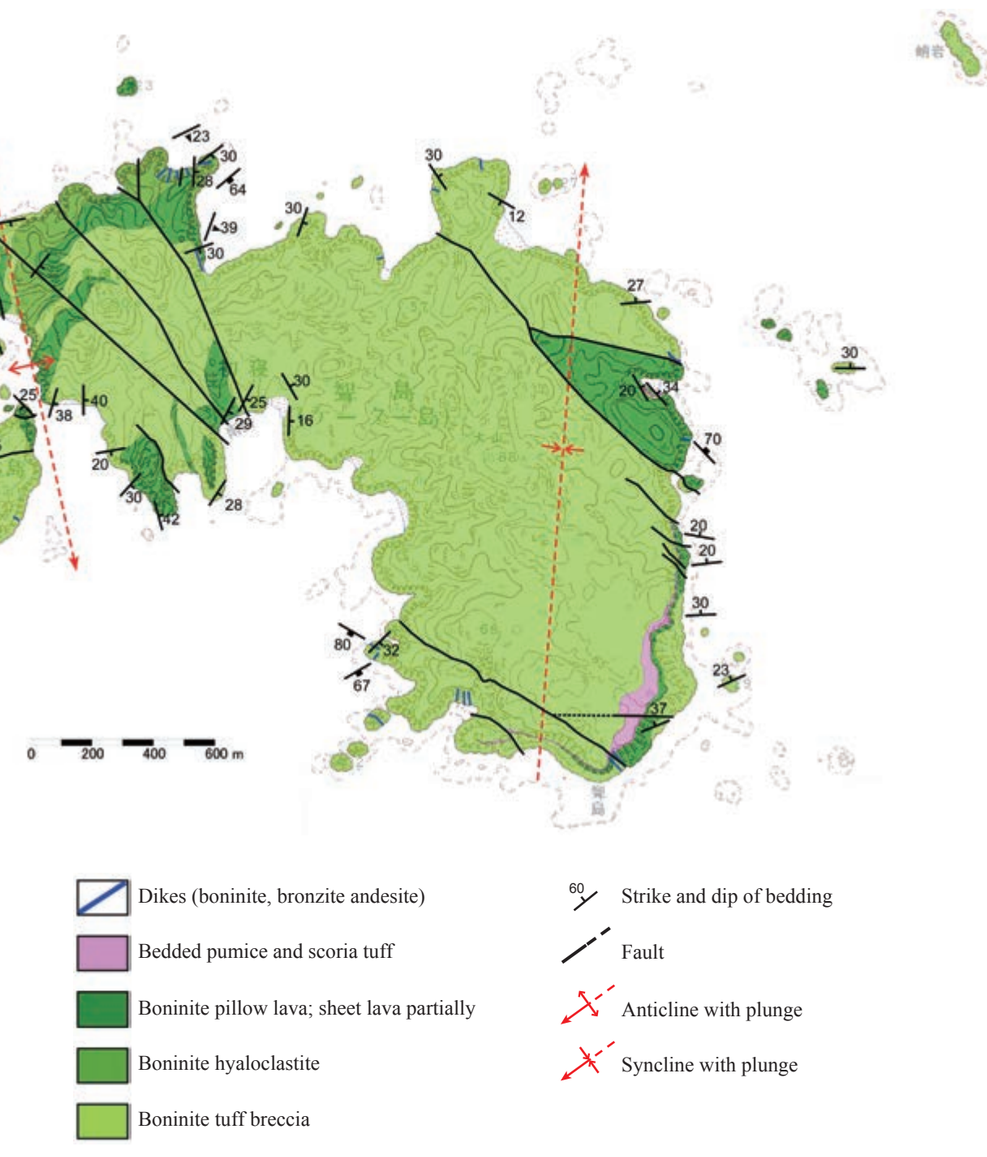
*2-3-1. Geological maps of Mukojima Island Group I*

Kitanoshima Is.




(Revised from Kanayama et al., 2009)

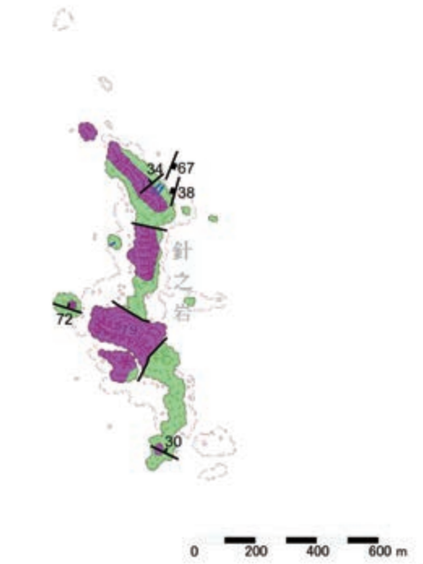
Mukojima Is.

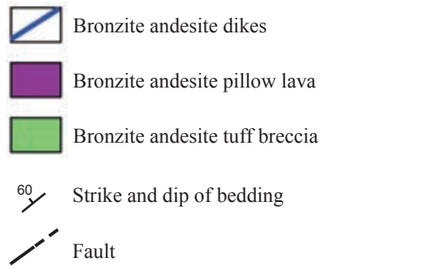



(Revised from Kanayama et al., 2009)

*2-3-2. Geological maps of Mukojima Island Group II*

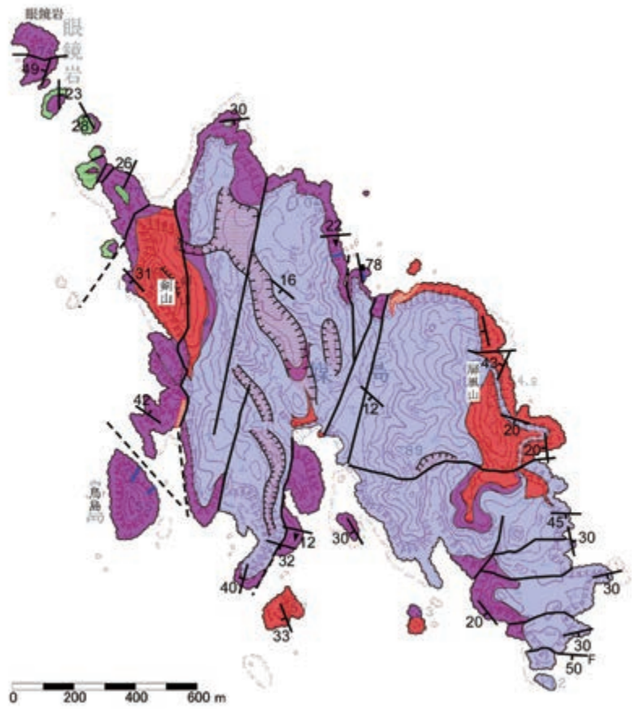
Harinoiwa Is.

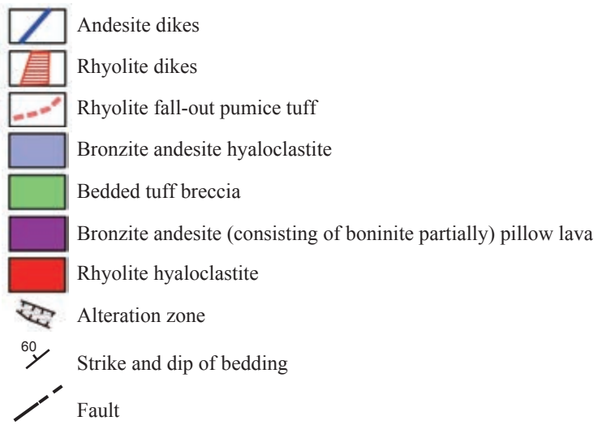



(Revised from Kanayama et al., 2009)

Nakodojima Is.

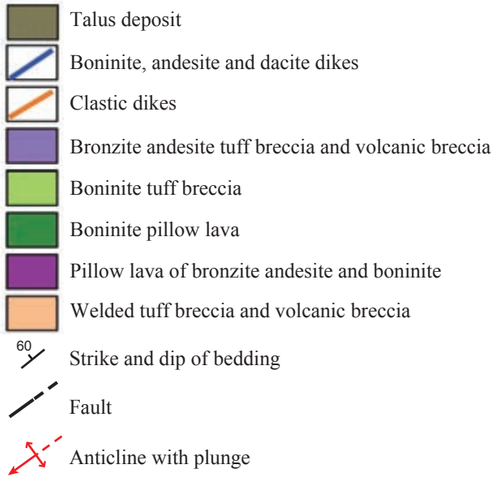



(Revised from Kanayama et al., 2009)

Yomejima Is.

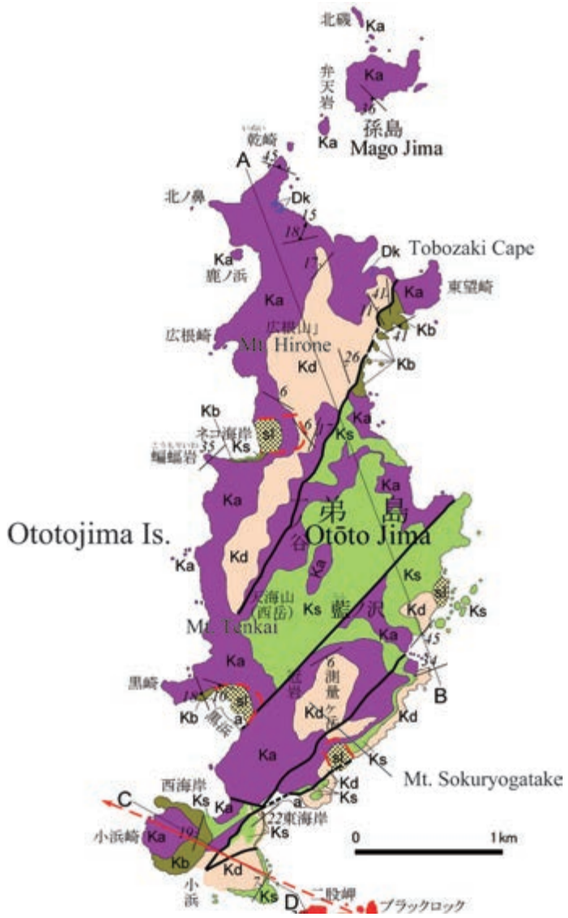


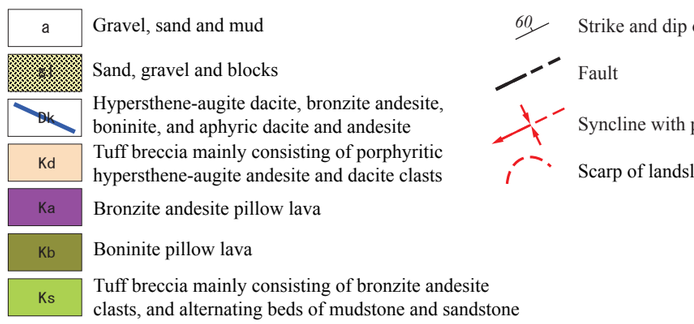




(Revised from Kanayama et al., 2009)

*2-3-3. Geological maps of Chichijima Island Group I*

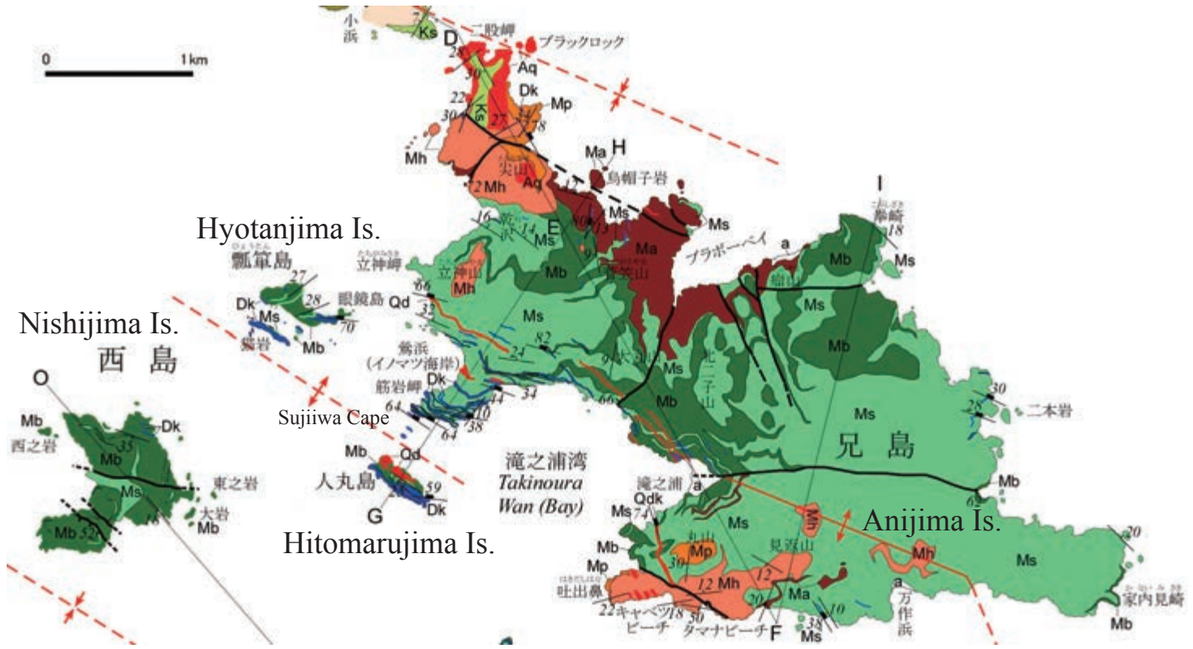
Ototojima Is.

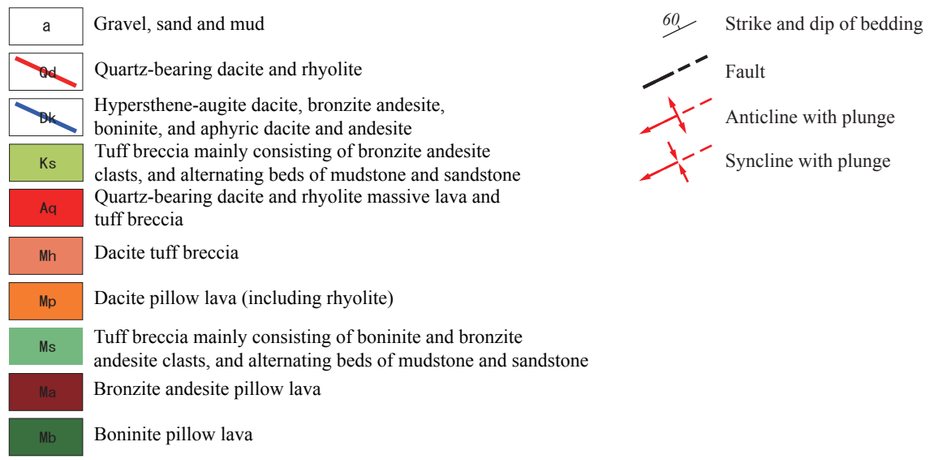



(Revised from Umino and Nakano, 2006, AIST Permission No. 60635500-A-20091202-010)

Anijima Is. and Nishijima Is.

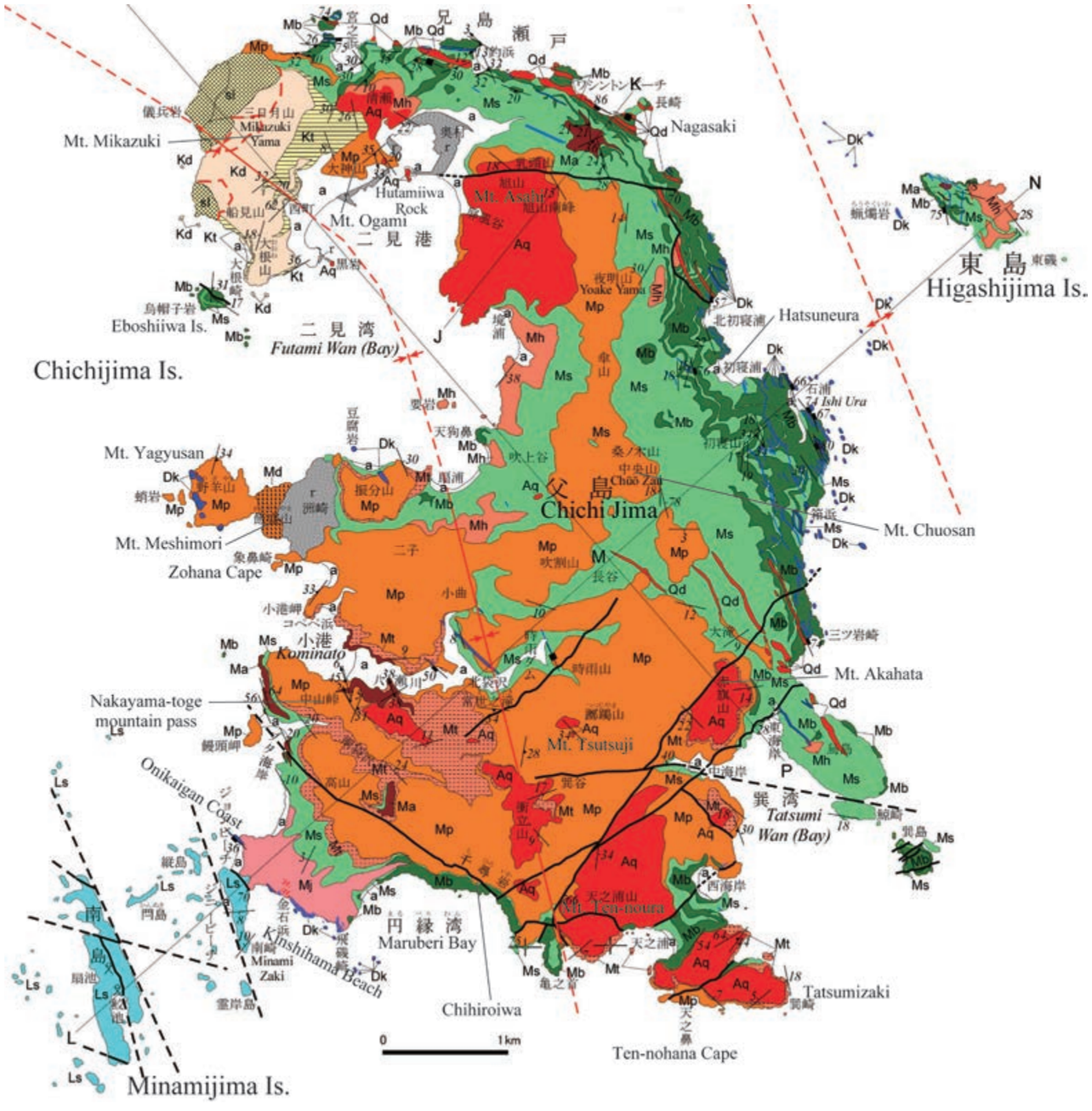



(Revised from Umino and Nakano, 2006, AIST Permission No. 60635500-A-20091202-010)

*2-3-4. Geological maps of Chichijima Island Group II*

Chichijima Is., Higashijima Is. and Minamijima Is.

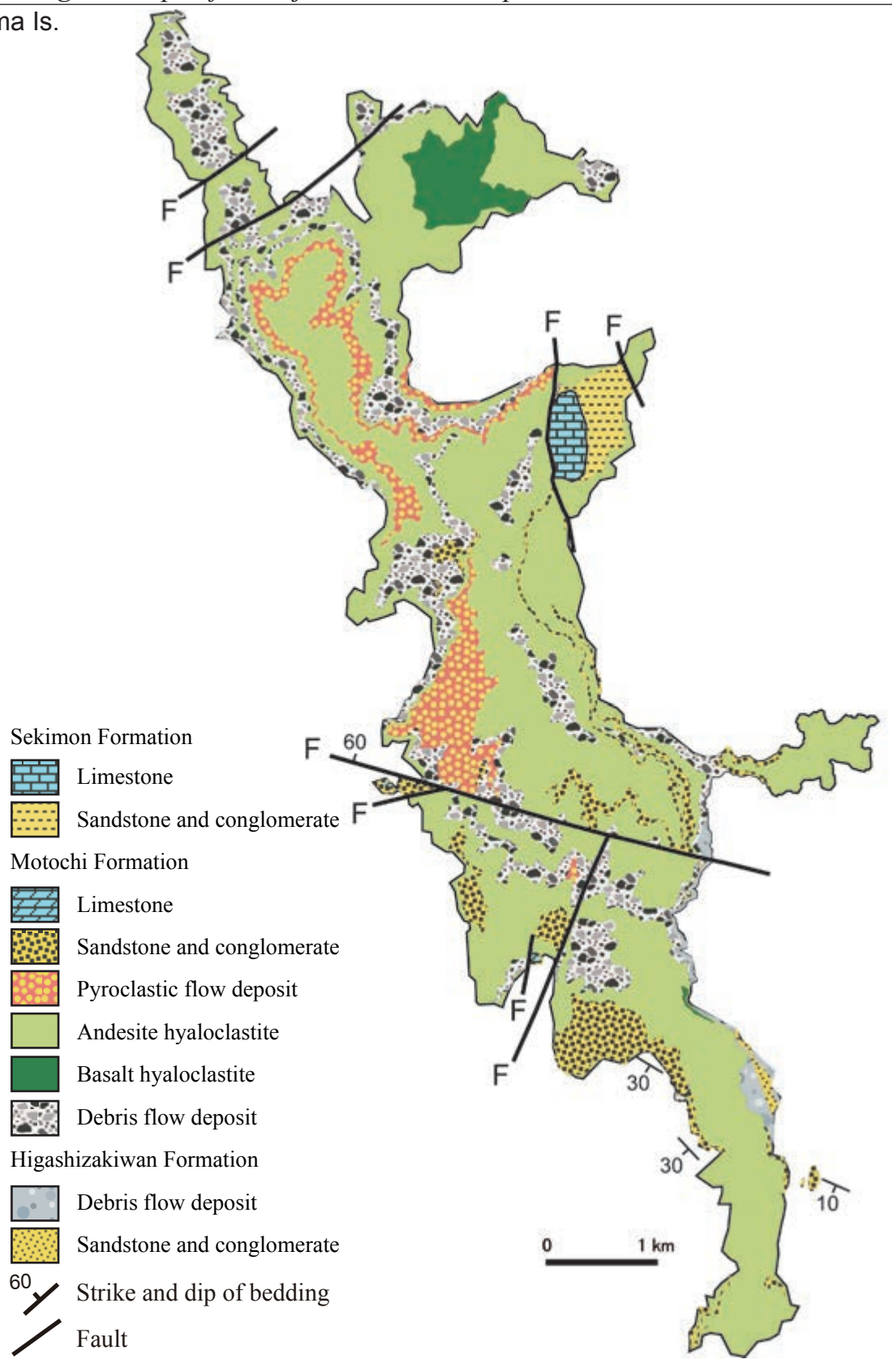



- Reclaimed land
- Gravel, sand and mud
- Sand, gravel and blocks
- Ls — Foraminifer limestone
- Qd — Quartz-bearing dacite and rhyolite
- Dk — Hypersthene-augite dacite, bronzite andesite, boninite, and aphyric dacite and andesite
- Kd — Tuff breccia mainly consisting of porphyritic hypersthene-augite andesite and dacite clasts
- Kt — Alternating beds of mudstone and sandstone
- Aq — Quartz-bearing dacite and rhyolite massive lava and tuff breccia
- Mt — Bedded tuff breccia mainly consisting of dacite clasts
- Mh — Dacite tuff breccia
- Mp — Dacite pillow lava (including rhyolite)
- Md — Dacite lava dome
- Ms — Tuff breccia mainly consisting of boninite and bronzite andesite clasts, and alternating beds of mudstone and sandstone
- Mj — Aphyric dacite and andesite pillow lava (John Beach Volcanics)
- Ma — Bronzite andesite pillow lava
- Mb — Boninite pillow lava
- 60 — Strike and dip of bedding
- Fault
- Anticline with plunge
- Syncline with plunge
- Scarp of landslide

(Revised from Umino and Nakano, 2006, AIST Permission No. 60635500-A-20091202-010)

*2-3-5. Geological maps of Hahajima Island Group I*

Hahajima Is.




Sekimon Formation
- Limestone
- Sandstone and conglomerate

Motochi Formation
- Limestone
- Sandstone and conglomerate
- Pyroclastic flow deposit
- Andesite hyaloclastite
- Basalt hyaloclastite
- Debris flow deposit

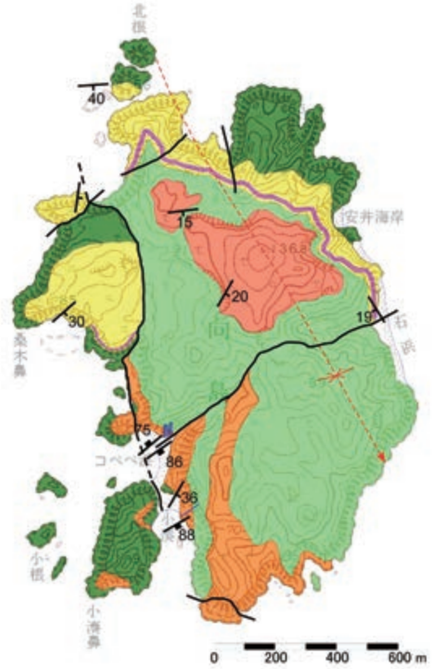
Higashizakiwan Formation
- Debris flow deposit
- Sandstone and conglomerate

60 Strike and dip of bedding

Fault

(Revised from Geological Society of Japan, 2006)

Mukohjima Is.




- Basalt dikes
- Andesite scoria tuff
- Andesite hyaloclastite
- Basalt scoria tuff
- Bedded pumice tuff
- Sandstone and conglomerate
- Basalt hyaloclastite

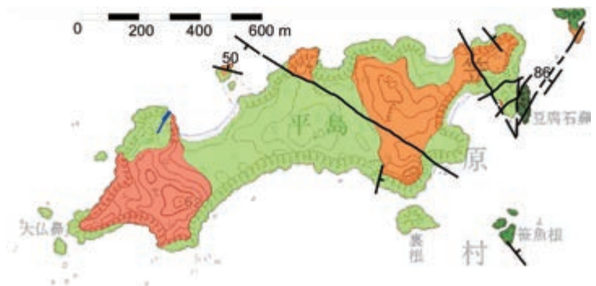
60 Strike and dip of bedding

Fault

Syncline with plunge

(Revised from Kanayama et al., 2009)

Hirajima Is.




- Dikes
- Andesite scoria tuff
- Andesite hyaloclastite
- Basalt scoria tuff
- Basalt block lava
- Basalt hyaloclastite

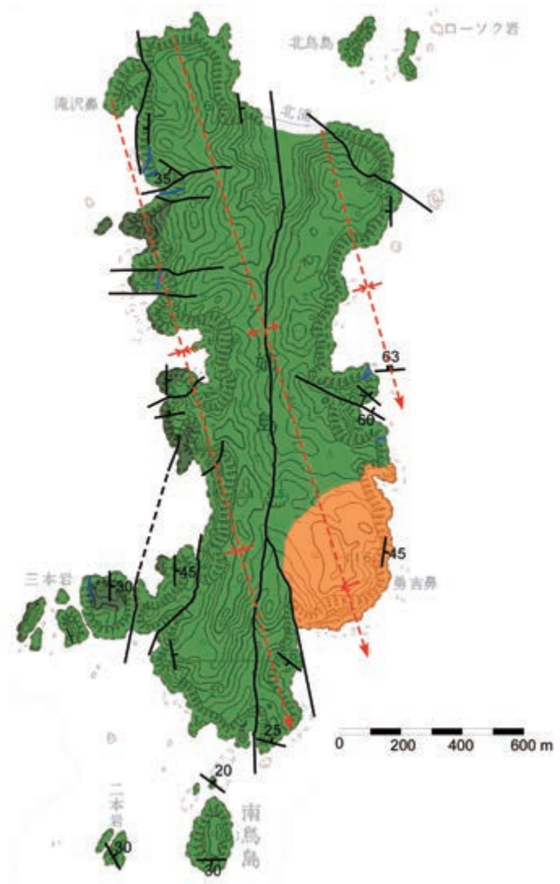
60 Strike and dip of bedding

Fault

(Revised from Kanayama et al., 2009)

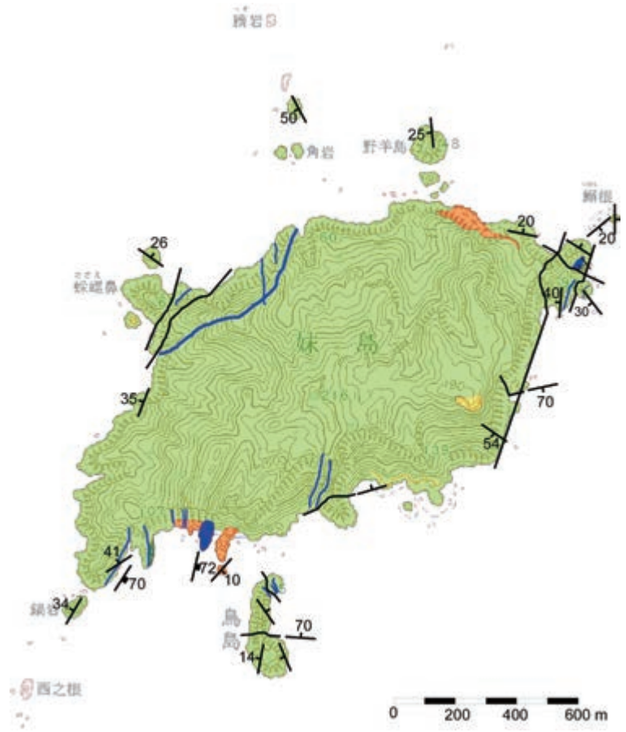
*2-3-6. Geological maps of Hahajima Island Group II*

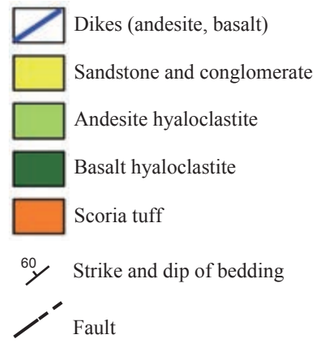
Anejima Is.




(Revised from Kanayama et al., 2009)

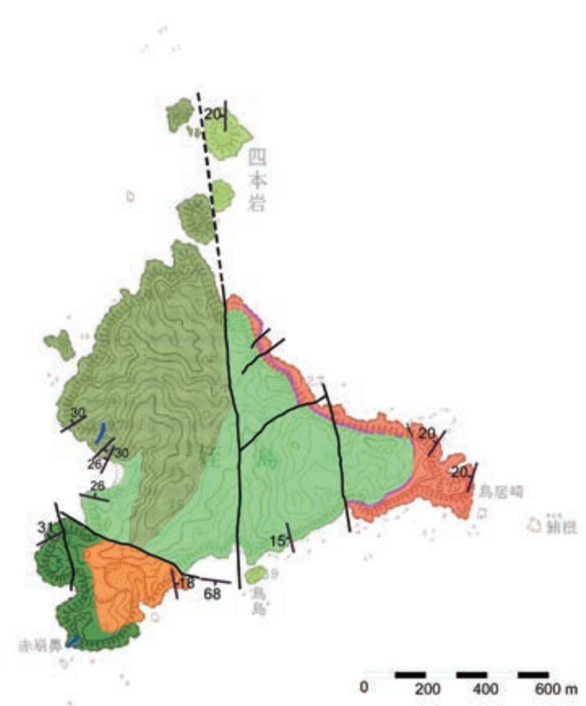
Imotojima Is.

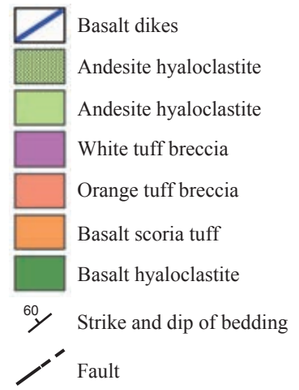



(Revised from Kanayama et al., 2009)

Meijima Is.




(Revised from Kanayama et al., 2009)

*2-3-7. Geological maps of Nishinoshima Is. and Kazan Island Group*

Nishinoshima Is.



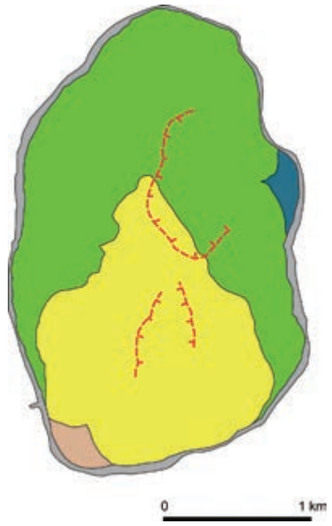

a Gravel, sand and mud

N2 Orthopyroxene-bearing clinopyroxene andesite lava and pyroclastics

N1 Orthopyroxene-clinopyroxene andesite lava and pyroclastics

(Revised from Umino and Nakano, 2006, AIST Permission No. 60635500-A-20091202-010)

Kita-iwoto Is.




Gravel beach

Younger talus

Older talus

Younger volcano

Older volvcano

Inferred crater rim

(Revised from Nakano and Furukawa, 2009)

Minami-iwoto Is.




Talus and bearh gravel

Younger volcano

Older volcano II

Older volcano I

(Revised from Fukuyama, 1983)

## Reference

(Titles of articles in Japanese papers are tentative translation)


- Geological maps of the Mukojima Island Group:

  Kanayama, K., S. Umino and O. Ishizuka. 2009. Arc magmatism at the incipient stage of formation of subduction zone: geochemistry of the Bonin Islands. Abstracts *Japan Geoscience Union Meeting 2009*, K214-P004.

- Geological maps of the Chichijima Island Group:

  Umino, S. and S. Nakano. 2006. *Geological Map of Japan 1:50,000, Chichijima Rettō*. Geological Survey of Japan, AIST.

- Geological map of Hahajima Island Group (Hahajima):

  Geological Society of Japan, Eds. 2006. *Chubu Region, Account of Regional Japanese Geology, 4,* Asakura Publishing Co. Ltd., Tokyo, 564p. (in Japanese).

- Geological maps of Hahajima Island Group (satellite islands in Hahajima):

  Kanayama K., S. Umino and O. Ishizuka. 2009. Arc magmatism at the incipient stage of formation of subduction zone: geochemistry of the Bonin Islands. Abstracts *Japan Geoscience Union Meeting 2009*, K214-P004.

- Geological map of Nishinoshima Is. :

  Umino, S. and S. Nakano. 2006. *Geological Map of Japan 1:50,000, Chichijima Rettō*. Geological Survey of Japan, AIST.

- Geological map of the Kazan Island Group (Kita-Iwoto Is.):

  Nakano, S. and R. Furukawa. 2009. Outline of geology of Kita-Iwo-To Volcano in Volcano Islands, Japan. *Bull. Geol. Surv. Japan*, 60 (7/8), 395-405 (in Japanese).

- Geological map of Kazan Island Group (Minami-Iwoto Is.):

  Fukuyama, H. 1983. Geology of Minami-Iwo Volcano, Izu-Bonin Islands, Japan. *Journal of Geography*, 92: 55-67 (in Japanese).

# Appendix 3

**Vegetation maps and Species list of Ogasawara Islands**

3-1 : Vegetation maps

3-2 : Species list

# *3-1. Vegetation maps*

## Legend

I Forest Vegetation

I.1 Natural forest / Semi-natural forest

I 1 1.1 Subtropical evergreen broadleaved forest

01 Machilio boninensisi-Ardisietum sieboldii, typical subass., typical variant

02 Machilio boninensisi-Ardisietum sieboldii, *Schima mertensiana* subass.

03 Machilus kobu-Schimetum mertensianae, *Psidium littorale* subass.

04 Machilus kobu-Schimetum mertensianae, *Geniostoma glabrum* subass, typical variant / *Freycinetia boninensis* variant

05 *Pisonia umbellifera* -*Trema orientalis* community

I 1 1.2 Subtropical rainforest

06 Pisonio-Elaeocarpetum photiniaefoliae

I 1 1.3 Cloud forest

07 Dendrocacalietum crepidifoliae

08 Boninio griseae-Elaeocarpetum pachycarpae

09 Machilio boninensisi-Ardisietum sieboldii, typical subass., *Fatsia oligocarpella* variant

10 *Machilus kobu* -*Diplazium virescens* var. *virescens* community

11 Cyathetum mertensianae / Cyathetum tuyamae

12 *Ficus boninsimae* community *etc.*

13 *Hydrangea macrophylla* f. *normalis* -*Eurya japonica* community

I 1 1.4 Sclerophyllous scrub

14 Distylio-Pouterietum dubiae

15 Wikstroemio-Pouterietum dubiae

16 Machilus kobu-Schimetum mertensianae, *Geniostoma glabrum* subass. , *Distylium lepidotum* variant

I 1 1.5 Coastal forest

17 *Hernandia nymphaeifolia* -*Terminalia catappa* community

18 *Livistonia chinensis* var. *boninensis* -*Pandanus boninensis* association

19 *Hibiscus tiliaceus* community

I 1 1.6 Coastal scrub

20 *Scaevola sericea* community

21 *Sophora tomentosa* community

I 1 1.7 Landslide forest

22 *Terminalia catappa* community

23 *Celtis boninensis*-*Sapindus boninensis* community

24 *Morus boninensis* community

I 1 1.8 Landslide scrub

*25 Pandanus boninensis* community

26 *Planchonella obovata* community

27 *Melia azedarach* community

I.2 Secondary forest

I 2 2.1 Native secondary forest


28 *Trema orientalis* community (includ. *Boehmeria boninensis* association)


29 Cyathetum mertensianae (secondary stand)


30 *Freycinetia boninensis* community

I 2 2.2 Alien secondary forest


31 *Bischoffia javanica* community


32 *Leucaena leucocephala* community


*33 Pinus lutchuensis* community


34 *Lantana camara* community

I.3 Planted forest

I 3 3.1 *Casuarina equisetifolia* planted forest


35 *Casuarina equisetifolia* forest (includ. secondary forest)

I 3 3.2 Evergreen broadleaved planted forest


36 Evergreen broadleaved planted forest

I 3 3.3 Bamboo forest


37 *Bambusa vulgaris* forest etc.

I.4 Alien liana community

I 4 4.1 Alien liana community


38 *Derris elliptica* community


39 *Thunbergia laurifolia* community

## II Grassland Vegetation

II.1 Natural grassland

II 1 1.1 Plant community in rocky desert (includ. Sclerophyllous dwarf-scrub)


40 Plant communities in rocky desert

II 1 1.2 Grassland on cliff and talus


41 *Nephrolepis cordifolia* community

II 1 1.3 Coastal cliff grassland


42 Miscanthetum condensati var. boninensis (includ. *Pennisetum sordidum* community, typical under units etc.)


43 *Crossostephium chinense* community (dwarf halh-shrubs)

II 1 1.4 Coastal sandy / gravelly beach grassland


44 *Ipomoea pes-caprea* community


45 *Vitex rotundifolia* community


46 *Sporobolus virginicus* community

II 1 1.5 Plant community on raised coral reef


47 *Limonium wrightii* community (includ. Lycidetum griseolae)


48 *Zoysia tenuifolia* community (natural grassland)


49 Myoporetum boninensis

II 1 1.6 Cloud grassland


50 *Miscanthus sinensis* -*Garnotia acutigluma* association

II 1 1.7 Pioneer annual herbaceous community


51 *Portulaca oleracea-Eleusine indica* community

II.2 Secondary grassland

II 2 2.1 Secondary grassland

52 *Nephrolepis cordifolia -Pteridium aquilinum* var. *latiusculum* community

53 *Histiopteris incisa* community

54 *Imperata cylindrica* var. *major* community (includ. *Paspalum conjugatum* comm.)

55 *Miscanthus condensatus* community (includ. *Saccharum officinalum* comm.)

56 *Arundo donax* community

57 *Agave americana* community / *Agave sisalana* community

II 2 2.2 Dwarf-bamboo community

58 *Arundinaria simonii* community / *Pseudosasa japonica* community etc.

II 2 2.3 Moist secondary grassland

59 *Cyperus alternifolius-Calonyction aculeatum* community

II 2 2.4 Secondary grassland in rocky area

60 *Bryophyllum pinnatum* community

61 *Stachytarpheta jamaicensis* community

II 2 2.5 Goat-grazed grassland

62 *Paspalum orbiculare-Paspalum dilaltatum* community (include. *Pennisetum sordidum* community, *Paspalum orbiculare* under units)

*63 Zoysia tenuifolia* community (secondary grassland)

64 *Centella asiatica* community

II 2 2.6 Weed community of the open area

65 Weed communities of the open area (*Bidens pilosa* var. *radiata* community etc.)

II 2 2.7 Field weed community

66 Field weed communities (*Amaranthus lividus* community etc.)

II.3 Artificial grassland

II 3 3.1 Artificial grassland

67 Artificial grassland

III Other land use classification etc.

68 Park etc. (Planted trees, lawn etc.)

69 Residence, factory etc.

70 Concrete pavement site

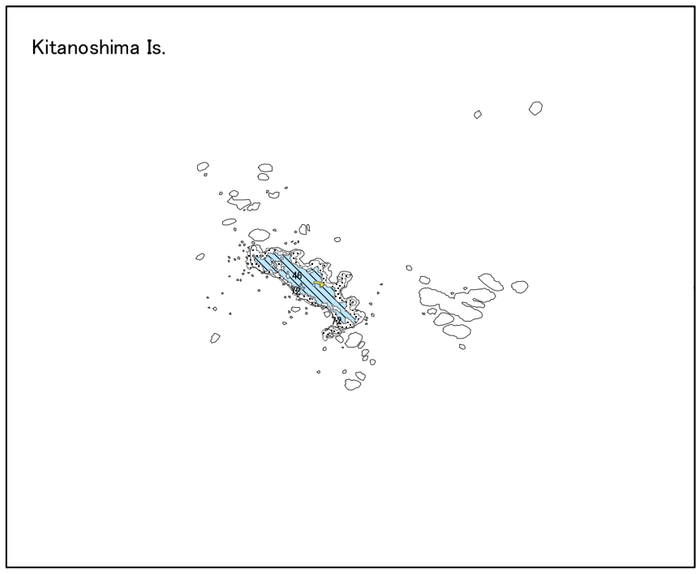
71 Artificial bareland

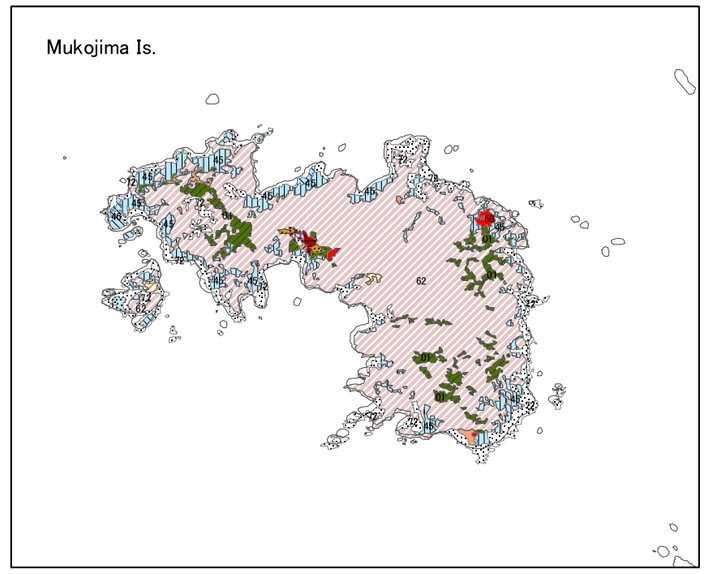
72 Natural bareland

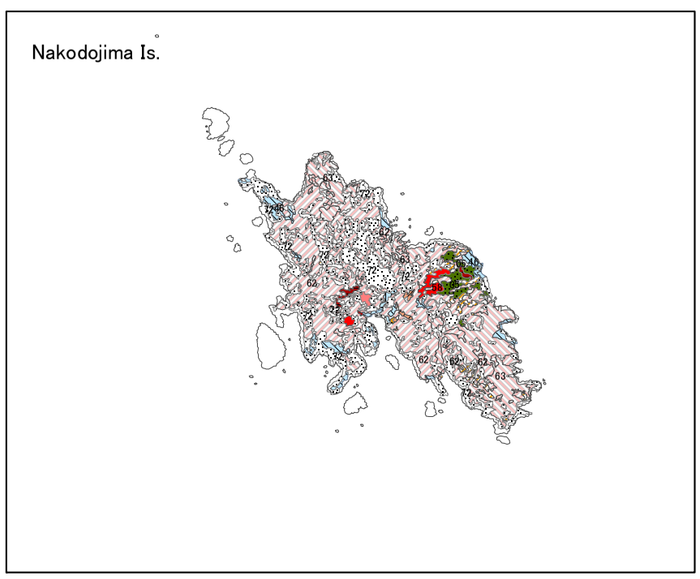
73 Open water

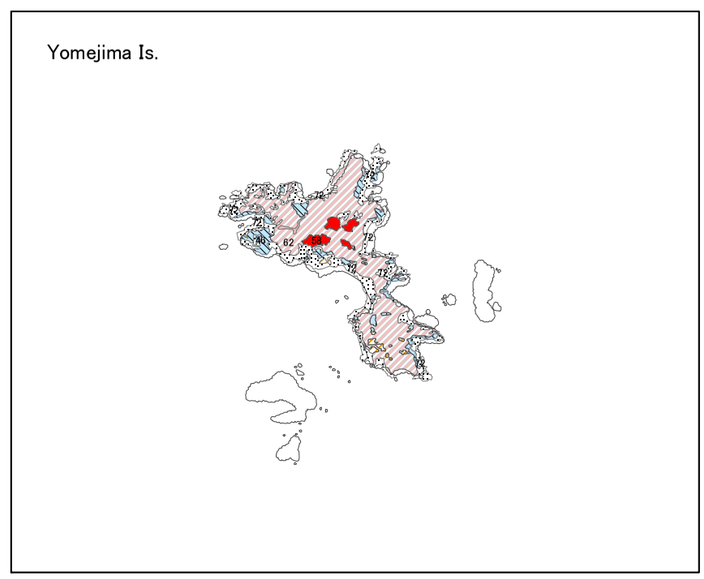
## *3-1-1. Vegetation map of Mukojima Island Group and some Islands surrounding Chichijima Island*

Mukojima Island Group

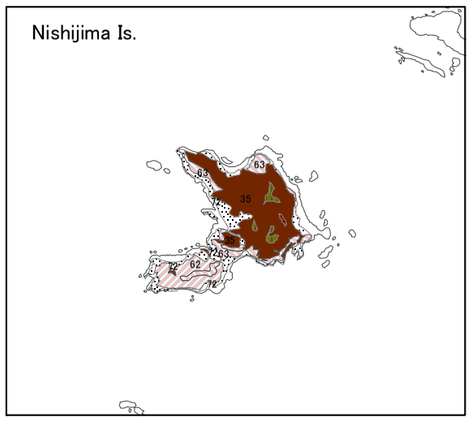


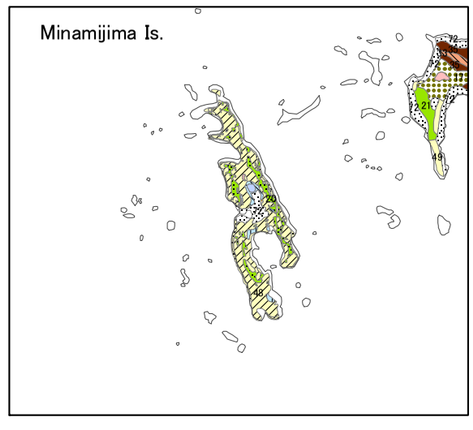



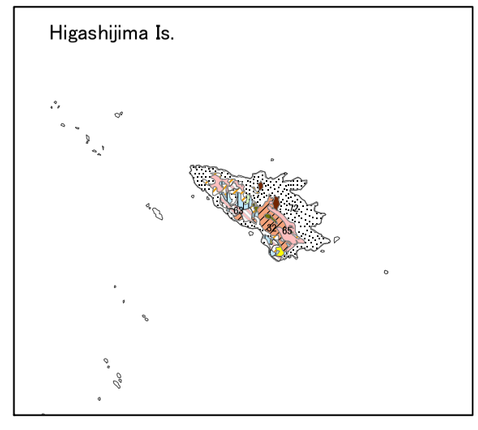




Satellite islands in Chichijima Island Group

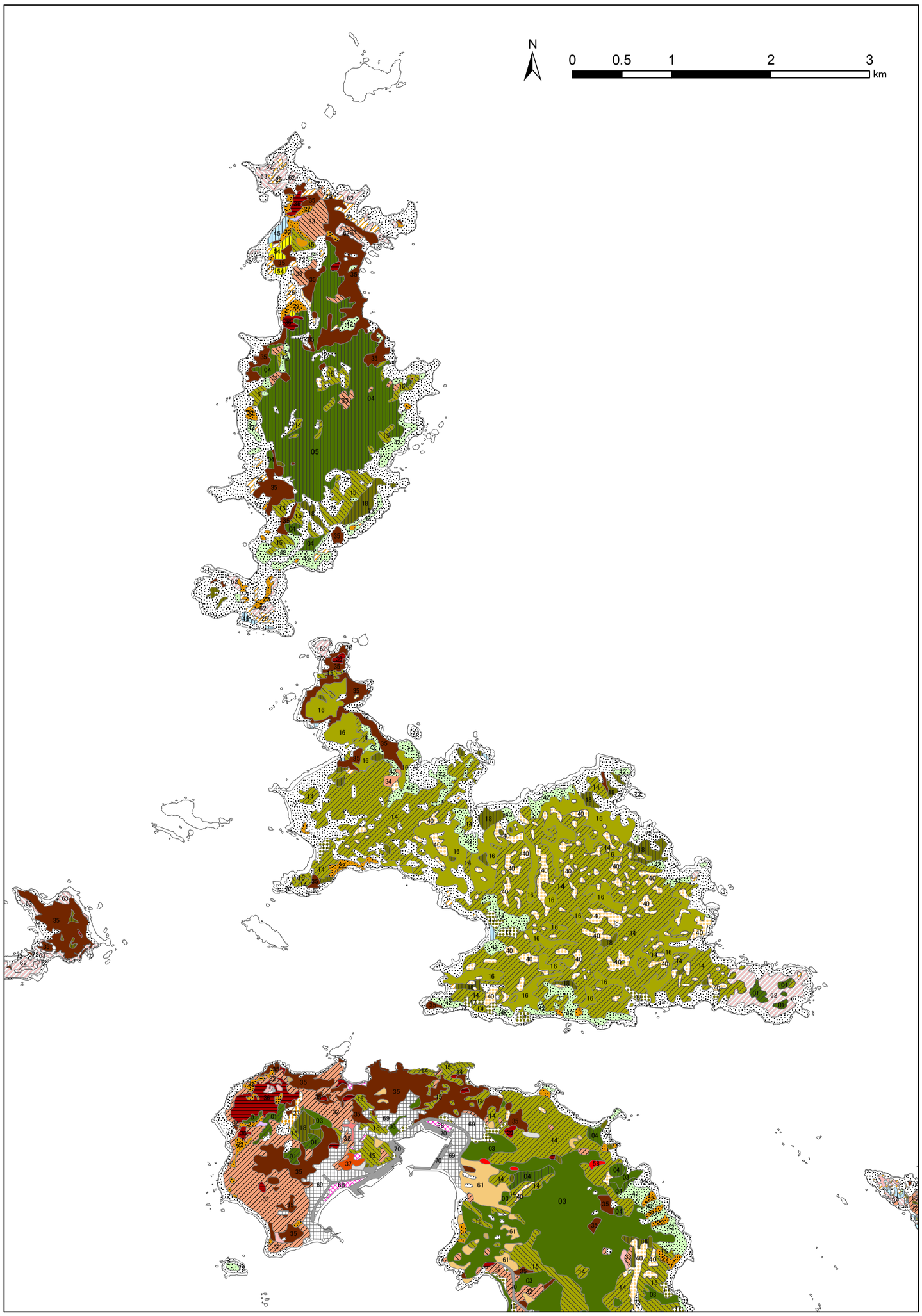


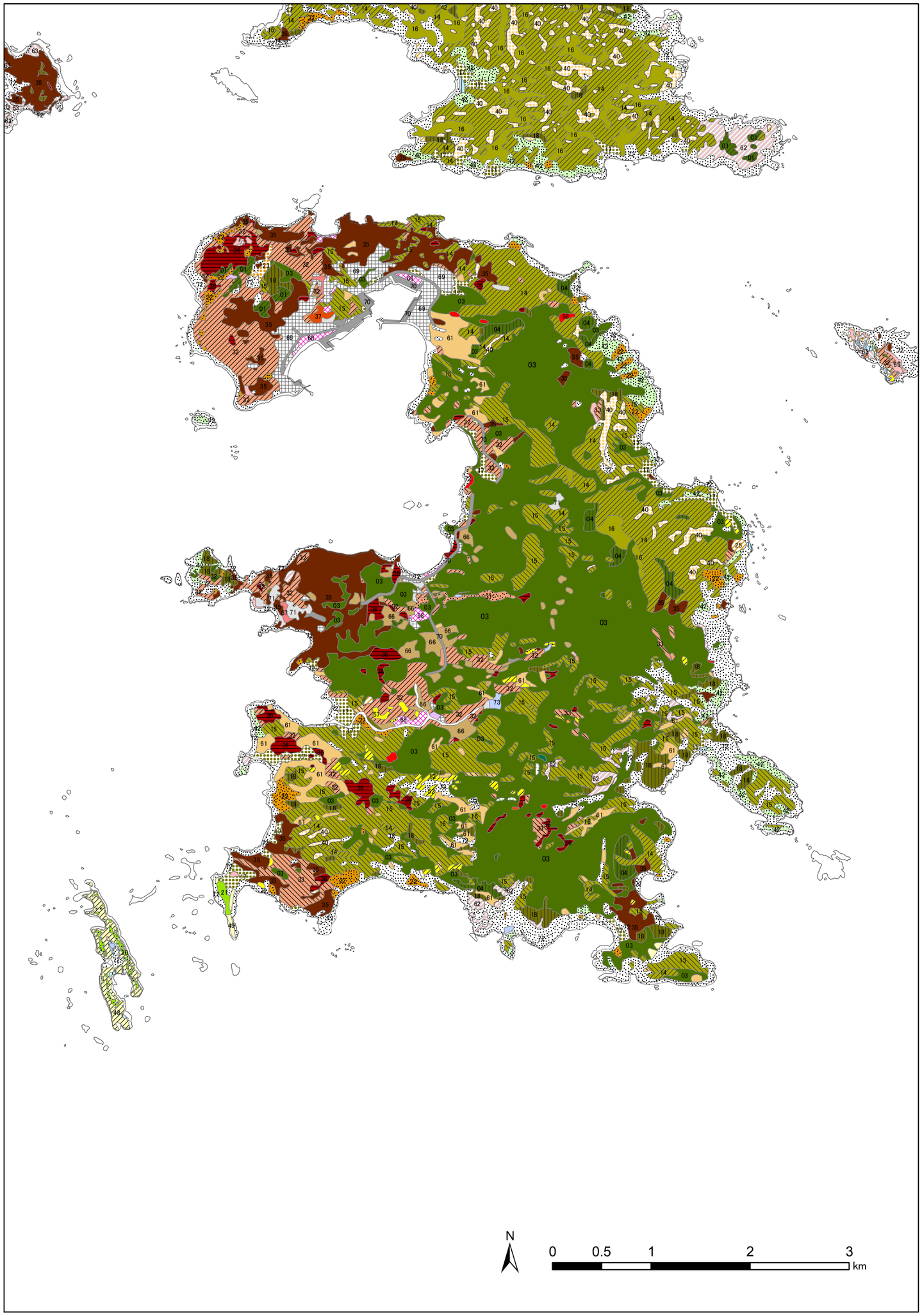





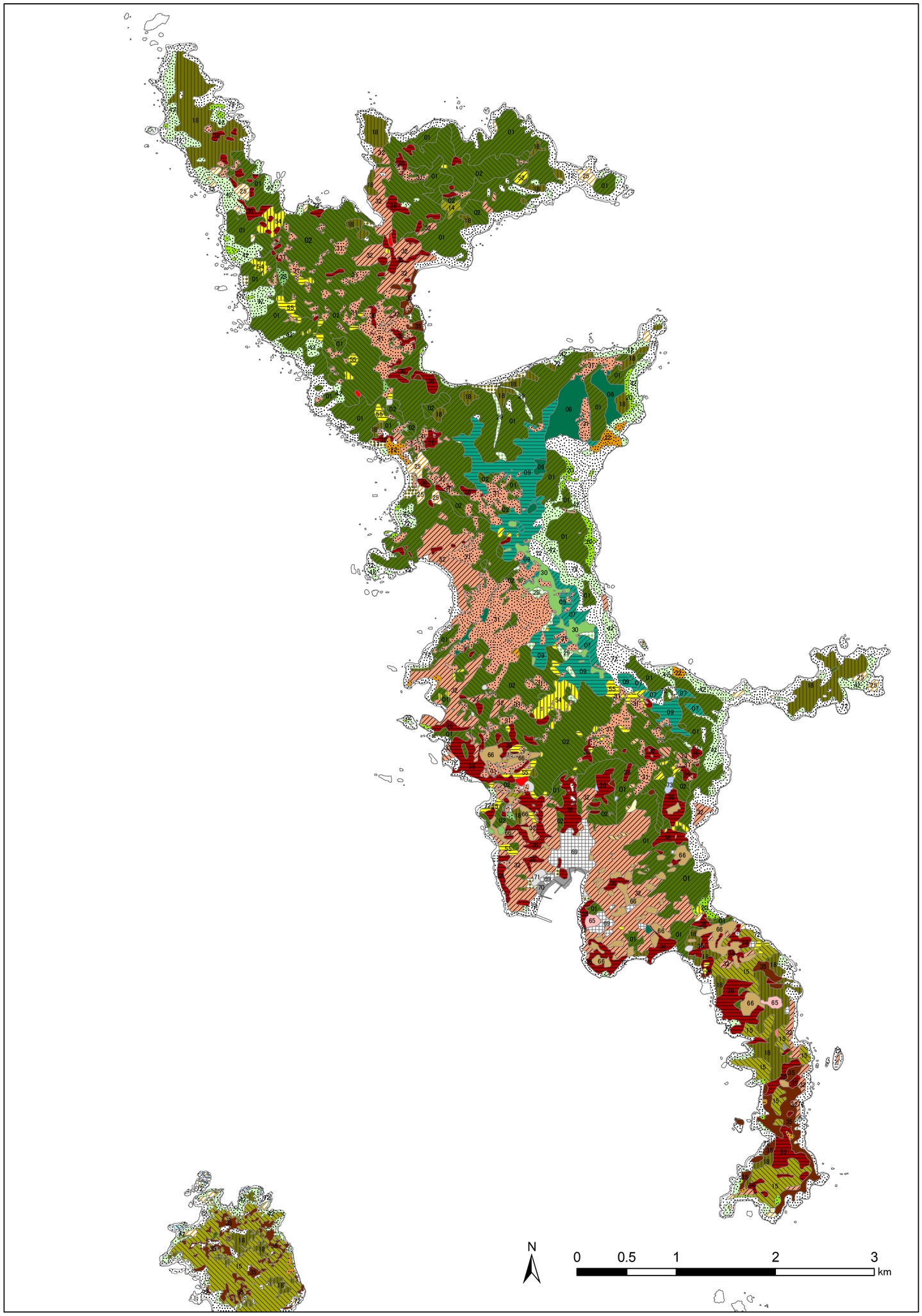

## *3-1-2. Vegetation map of Anijima Island and Ototojima Island*



### *3-1-3. Vegetation map of Chichijima Island*



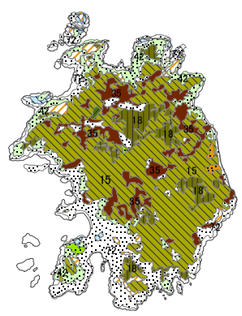
## *3-1-4. Vegetation map of Hahajima Island*



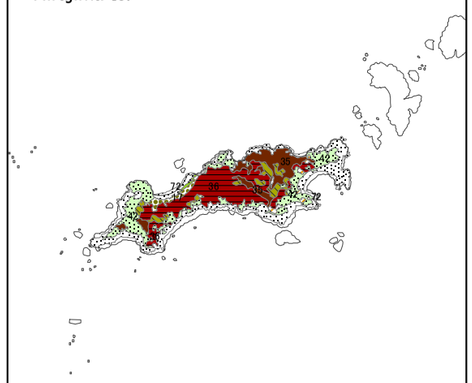
## *3-1-5. Vegetation map of some islands surrounding Hahajima Is., Kazan Island Group and Nishinoshima Is.*

Satellite islands in Hahajima Is. Group

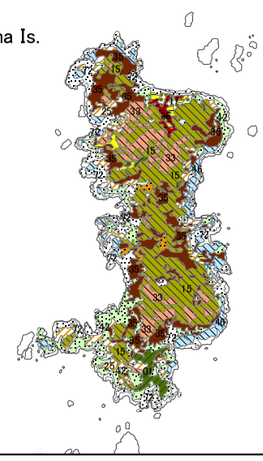
Mukohjima Is.



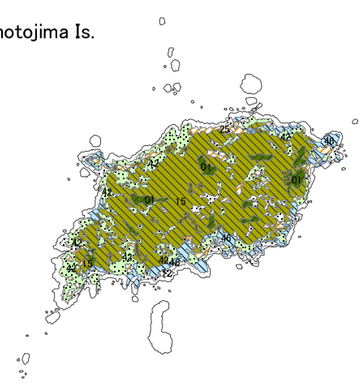
Hirajima Is.



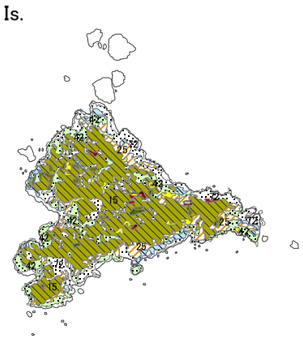
Anejima Is.



Imotojima Is.

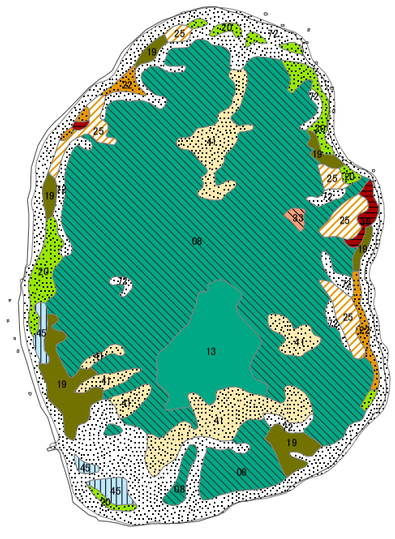


Meijima Is.

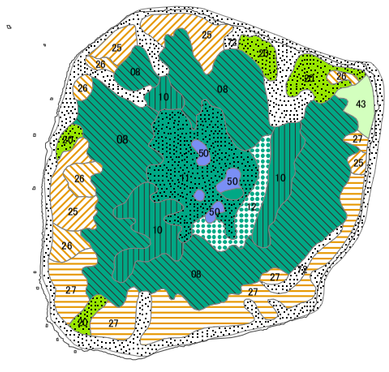


Kazan Island Group

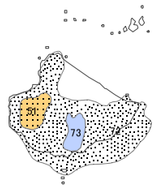
Kita-iwoto Is.



Minami-iwoto Is.



Nishinoshima Is.





# *3-2. Species list*

# *3-2-1. The Vascular Plants of Ogasawara islands*

*** Red List categories of IUCN, details are given on the last page.**

**** Red List Categories of Japanese Ministry of the Environment, details are given on the last page.**

Abbreviation of island names

Mk: Mukojima, Nk: Nakodojima, Ym: Yomejima, Kt: Kitanoshima, Ch: Chichijima, Ani: Anijima, Ot: Ototojima, Ns: Nishijima, Hg: Higashijima, Mn: Minamijima, Ha: Hahajima, Mkh: Mukohjima, Hr: Hirajima, Ane: Anejima, Im: Imotojima, Me: Meijima, Ki: Kita-iwoto, Mi: Minami-iwoto, Nsn: Nishinoshima, Or: Other, MIG: Mukojima Island Group, CIG: Chichijima Island Group, HIG: Hahajima Island Group, OOA: Other than Ogasawara Archipelago, Unidentified: Unidentified Islands.

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **PTERIDOPHYTA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PSILOTOPSIDA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PSILOTACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Psilotum nudum* | | NT | | | | ● | | | | ● | ● | ● | ● | | | ● | | ● | ● | | | ● | ● | ● | | ● | ● | ● | | ● | |
| **LYCOPSIDA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **LYCOPODIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lycopodium cernuum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Lycopodium hamiltonii* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| **SELAGINELLACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Selaginella boninensis* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | ● | ● | | ● | | | | | |
| *Selaginella tamariscina* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| **FILICES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **EUSPORANGIATAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **MARATTIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Angiopteris boninensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Marattia boninensis* | | VU | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| **OPHIOGLOSSACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ophioglossum parvifolium* | | EX | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Ophioglossum pendulum* | | EN | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ophioglossum petiolatum* | | | | | ● | ● | ● | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Ophioglossum thermale* var. *nipponicum* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| **OSMUNDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **OSMUNDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Osmunda banksiifolia* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **LEPTOSPORANGIATAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **SCHIZAEACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Schizaea digitata* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | | | ● | | ● | | | | | |
| **HYMENOPHYLLACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cephalomanes boninense* | | EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Cephalomanes obscurum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Crepidomanes acuto-obtusum* | | EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Crepidomanes birmanicum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | ● | |
| *Crepidomanes latealatum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Crepidomanes minutum* | | EN | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Crepidomanes radicans* var. *naseanum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Trichomanes tahitense* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| **CYATHEACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cyathea mertensiana* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | ● | ● | | ● | |
| *Cyathea ogurae* | | VU | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Cyathea spinulosa* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | ● | ● | | ● | |
| *Cyathea tuyamae* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **DENNSTAEDTIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Histiopteris incisa* | | | | | | ● | | | | ● | ● | | | | | | | ● | ● | | | | | | ● | | ● | | ● | |
| *Hypolepis alpina* | | | | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | ● | | ● | |
| *Hypolepis bamleriana* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Hypolepis punctata* | | | | | | | | | | | | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Microlepia speluncae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | ● | |
| *Microlepia strigosa* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | ● | | ● | | | | | |
| *Pteridium aquilinum* var. *latiusculum* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| **LINDSAEACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lindsaea repanda* | | VU | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | ● | | | ● | |
| *Lindsaea odorata* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | |
| *Sphenomeris biflora* | | | | | | ● | | | | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | | ● | ● | | ● | ● | ● | | ● | |
| *Sphenomeris chinensis* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | ● | | ● | | ● | ● | ● | | ● | |
| **DAVALLIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pachypleuria trifoliata* | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| **OLEANDRACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nephrolepis biserrata* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Nephrolepis cordifolia* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | ● | ● | | ● | |
| *Nephrolepis hirsutula* | | | | | | | | | | | ● | ● | ● | ● | | | | ● | ● | | | | | | ● | ● | ● | | ● | |
| **ADIANTACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Adiantum diaphanum* | | NT | | | | | | | | | | | | | | | | | ● | | | | | | ● | | ● | | ● | |
| *Adiantum ogasawarense* | | EN | ● | | | | | | | | | ● | | | | | | ● | ● | | | | | | ● | ● | | | ● | |
| *Coniogramme intermedia* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | ● | | ● | |
| *Onychium japonicum* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| **VITTARIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Vittaria elongata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Vittaria ensiformis* | | VU | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | ● | ● | | ● | |
| *Vittaria ogasawarensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | ● | | | ● | |
| *Vittaria zosterifolia* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | ● | | | ● | |
| **PTERIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Pteris boninensis* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | |
| *Pteris ensiformis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Pteris fauriei* | | | | | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | ● | ● | | ● | | | | |
| **ASPLENIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Asplenium australasicum* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Asplenium austrochinense* | | EX | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Asplenium laserpitiifolium* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Asplenium micantifrons* | | VU | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | ● | ● | | ● | |
| *Asplenium nidus* | | NT | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | ● | ● | | ● | |
| *Asplenium polyodon* | | VU | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Asplenium ritoense* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Asplenium tenerum* | | CR | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Asplenium trigonopterum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | ● | | | ● | ● | | | ● | |
| *Hymenasplenium cardiophyllum* | | CR | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Hymenasplenium excisum* | | EN | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Hymenasplenium hondoense* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Hymenasplenium murakami-hatanakae* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| **BLECHNACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Blechnum orientale* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Woodwardia orientalis* var. *formosana* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| **LOMARIOPSIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bolbitis quoyana* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Lomariopsis spectabilis* | | CR | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Lomariopteris boninensis* | | VU | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **DRYOPTERIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ctenitis lepigera* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Ctenitis microlepigera* | | CR | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cyrtomium falcatum* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | |
| *Dryopteris insularis* | | VU | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Dryopteris insularis* var. *chichisimensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Dryopteris varia* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | ● | | ● | |
| **THELYPTERIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Stegnogramma pozoi* subsp. *mollissima* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Thelypteris boninensis* | | EN | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | ● | | | ● | | | | | |
| *Thelypteris ogasawarensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Thelypteris parasitica* | | | | | ● | ● | ● | | | ● | ● | ● | ● | ● | | | | ● | ● | | ● | ● | ● | | | ● | ● | ● | | ● | |
| *Thelypteris torresiana* var. *torresiana* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| **WOODSIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cornopteris banajaoensis* | | CR | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Deparia bonincola* | | NT | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Deparia petersenii* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | ● | | ● | |
| *Diplazium chinense* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | ● | | | ● | |

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| *Diplazium longicarpum* | | EN | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Diplazium nipponicum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Diplazium subtripinnatum* | | CR | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Diplazium virescens* var. *conterminum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Diplazium virescens* var. *virescens* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | ● | | ● | |
| *Diplazium wichurae* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| **POLYPODIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Colysis pothifolia* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Lepisorus boninensis* | | NT | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Leptochilus decurrens* | | CR | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Loxogramme boninensis* | | VU | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Microsorum fortunei* | | VU | | | | | | | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Microsorum scolopendria* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Microsorum superficiale* | | VU | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **GRAMMITIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Grammitis tuyamae* | | CR | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| **GYMNOSPERMAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CYCADOPSIDA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CYCADACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cycas revoluta* | NT | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **CONIFEROPSIDA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PINACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pinus lutchuensis* | LR/lc | | | | ● | | | | | ● | ● | ● | ● | ● | | ● | | ● | ● | ● | ● | ● | ● | | | ● | ● | | | ● | |
| **TAXODIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cunninghamia lanceolata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **PODOCARPACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Podocarpus macrophyllus* | LR/lc | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **ARAUCARIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Araucaria cunninghamii* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CUPRESSACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Juniperus taxifolia* | DD | VU | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | | ● | | ● | ● | ● | | ● | | | | | |
| **ANGIOSPERMAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **DICOTYLEDONEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ARCHICHLAMYDEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CASUARINACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Casuarina equisetifolia* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | ● | | | | | |
| *Casuarina stricta* | | | | | | | | | | | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | | | | ● | ● | | | ● | |
| **MYRICACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Myrica rubra* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **FAGACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Castanea crenata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Castanopsis sieboldii* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Quercus acutissima* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **ULMACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Celtis boninensis* | | | ● | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | | | ● | | | ● | | | | |
| *Trema orientalis* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | ● | |
| **MORACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Broussonetia papyrifera* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Dorstenia contrajerva* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Ficus bengalensis* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Ficus boninsimae* | | | ● | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | ● | |
| *Ficus caulocarpa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Ficus elastica* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Ficus iidaiana* | | EN | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Ficus microcarpa* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | ● | | | | | ● | ● | | ● | |
| *Ficus nishimurae* | | EN | ● | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | ● | ● | | | ● | ● | | ● | |
| *Ficus pumila* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Ficus superba* var. *japonica* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Morus australis* | | | | | | | | | | | ● | | | | ● | | | ● | ● | | ● | ● | | ● | | ● | | | | |
| *Morus boninensis* | | EN | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| **URTICACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Boehmeria biloba* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Boehmeria boninensis* | | | ● | | | | | | | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | | | ● | ● | | ● | |
| *Boehmeria nivea* var. *nipononivea* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Boehmeria nivea* var. *nivea* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Oreocnide frutescens* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Procris boninensis* | | CR | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| **SANTALACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Santalum boninense* | | EN | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | ● | | | ● | | | | |
| **LORANTHACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Korthalsella japonica* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | | ● | | | ● | | | | |
| **POLYGONACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Antigonon leptopus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Persicaria hydropiper* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Rumex japonicus* | | | | | ● | ● | | ● | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| **PHYTOLACCACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Phytolacca americana* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Rivina humilis* | | | | | | | | | | | ● | ● | ● | | ● | | | ● | ● | ● | ● | | | | | ● | | | | |
| **NYCTAGINACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Boerhavia diffusa* | | | | | | | | ● | | ● | ● | | | | | ● | | ● | | | | | | | | | ● | ● | | ● | |
| *Bougainvillea spectabilis* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Mirabilis jalapa* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Pisonia umbellifera* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| **AIZOACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| *Sesuvium portulacastrum* | | | | | | | | ● | | ● | ● | | | | | ● | | ● | | | | | | | | | | | | |
| *Tetragonia tetragonoides* | | | | | ● | ● | | ● | | ● | ● | | ● | | ● | ● | | ● | ● | | ● | | ● | | | ● | | | | | |
| **PORTULACACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Portulaca oleracea* | | | | | ● | ● | ● | ● | | ● | ● | | ● | | ● | | | ● | ● | | | | ● | ● | | ● | ● | ● | | ● | |
| *Portulaca pilosa* | | | | | ● | ● | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Portulaca boninensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | |
| *Talinum paniculatum* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | ● | |
| **CARYOPHYLLACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cerastium fontanum* subsp. *vulgare* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Cerastium glomeratum* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Drymaria cordata* var. *pacifica* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Sagina japonica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Sagina maxima* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Stellaria aquatica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Stellaria media* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Stellaria uliginosa* var. *undulata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CHENOPODIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chenopodium album* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Chenopodium ambrosioides* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Chenopodium glaucum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **AMARANTHACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Achyranthes bidentata* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Achyranthes bidentata* var. *hachijoensis* | | | | | | | | | | | | | | | ● | | | ● | ● | | | | | | | ● | | | | | |
| *Achyranthes bidentata* var. *tomentosa* | | | | | ● | ● | | | | ● | | | | | ● | | | ● | | | | | | | | | | | | | |
| *Achyranthes obtusifolia* | | | | | ● | | | | | ● | ● | | ● | | ● | | | ● | ● | | | | ● | | | ● | ● | ● | | ● | |
| *Alternanthera sessilis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Amaranthus lividus* | | | | | | ● | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Amaranthus viridis* | | | | | | ● | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Gomphrena celosioides* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| **LAURACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cassytha filiformis* | | | | | ● | ● | | | | ● | ● | ● | | | ● | ● | | ● | ● | ● | ● | ● | | | | ● | ● | | | ● | |
| *Cinnamomum camphora* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cinnamomum pseudopedunculatum* | | | | ● | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | ● | ● | | ● | ● | | | ● | |
| *Machilus boninensis* | | | | ● | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | | | ● | | | | | |
| *Machilus japonicus* var. *kusanoi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Machilus kobu* | | | | ● | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | | | | ● | ● | ● | | ● | |
| *Machilus pseudokobu* | | EN | | ● | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | ● | | | | ● | ● | | | ● | |
| *Neolitsea boninensis* | | | | ● | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Neolitsea gilva* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Neolitsea sericea* var. *aurata* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| **HERNANDIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hernandia nymphaeifolia* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | ● | ● | | | | ● | ● | | | ● | |

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| **RANUNCULACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Clematis terniflora* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Clematis terniflora* var. *boninensis* | | VU | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ranunculus cantoniensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **CERATOPHYLLACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ceratophyllum demersum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **SAURURACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Houttuynia cordata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **PIPERACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Peperomia boninsimensis* | | VU | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Piper kadsura* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Piper postelsianum* | | CR | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **THEACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eurya japonica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | ● | | ● | |
| *Eurya japonica* subsp. *palauensis* | | EN | ● | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | ● | ● | | ● | |
| *Schima mertensiana* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| **GUTTIFERAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Calophyllum inophyllum* | LR/lc | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | |
| *Garcinia mangostana* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **PAPAVERACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Corydalis balansae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Corydalis heterocarpa* var. *brachystyla* | | | | | ● | ● | | ● | | ● | ● | | ● | | ● | | | ● | ● | | ● | ● | | | | ● | ● | | | ● | |
| **CRUCIFERAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Brassica* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Capsella bursa-pastoris* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Cardamine parviflora* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Coronopus didymus* | | | | | ● | ● | | | | ● | ● | | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Lepidium virginicum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Raphanus sativus* var. *hortensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Sisymbrium officinale* var. *leiocarpum* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **HAMAMELIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Distylium lepidotum* | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| **CRASSULACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Kalanchoe pinnata* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sedum uniflorum* subsp. *boninense* | | EN | ● | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| **SAXIFRAGACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hydrangea macrophylla* f. *normalis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | ● | | ● | |
| **PITTOSPORACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pittosporum boninense* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pittosporum boninense* var. *chichijimense* | | CR | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Pittosporum parvifolium* | | CR | ● | | ● | | | | | ● | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Pittosporum parvifolium* var. *beecheyi* | | VU | ● | | | | | | | | | | | | | | | | ● | ● | | ● | ● | ● | | ● | | | | | |

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| **ROSACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Amygdalus persica* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Osteomeles lanata* | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | ● | ● | | ● | | | | | |
| *Osteomeles schwerinae* | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | ● | ● | | ● | | | | | |
| *Photinia glabra* | | | | | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Photinia wrightiana* | | VU | ● | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| *Rhaphiolepis indica* var. *umbellata* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | |
| *Rubus nakaii* | | CR | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Rubus ribisoideus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Rubus tuyamae* | | | ● | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | | |
| *Rubus x* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **LEGUMINOSAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acacia confusa* | | | | | | | | | | | ● | | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Adenanthera pavonina* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Amorpha fruticosa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Caesalpinia bonduc* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | ● | ● | | ● | ● | ● | | ● | | ● | | ● | ● | ● | | ● | |
| *Caesalpinia minax* | | | | | | | | | | | ● | | | | | | | ● | | | | ● | | | | ● | | | | ● | |
| *Canavalia lineata* | | | | | ● | ● | | | | ● | ● | ● | ● | | | ● | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | |
| *Chamaecrista leschenaultiana* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Crotalaria pallida* var. *obovata* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | ● | |
| *Crotalaria trifoliastrum* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | ● | |
| *Derris elliptica* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Desmanthus virgatus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Desmodium heterocarpon* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Desmodium heterophyllum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Desmodium purpureum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Desmodium triflorum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Erythrina crista-galli* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Erythrina variegata* | | | | | ● | ● | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Erythrina x* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Indigofera pseudotinctoria* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Lespedeza cuneata* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Leucaena leucocephala* | | | | | ● | ● | | | | ● | ● | ● | ● | | ● | | | ● | ● | ● | ● | | ● | | | ● | | | | ● | |
| *Macroptilium lathyroides* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Medicago lupulina* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Medicago polymorpha* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Medicago polymorpha* var. *confinis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Melilotus indica* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mimosa pudica* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mucuna gigantea* | | NT | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | ● | | | | ● | | | | ● | |
| *Pachyrhizus erosus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Phaseolus lunatus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Pithecellobium dulce* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Pongamia pinnata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Pueraria lobata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Rhynchosia minima* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Senna occidentalis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | ● | |
| *Senna siamea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sesbania exaltata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | ● | |
| *Sophora tomentosa* | | EN | | | ● | ● | | | | ● | ● | | | | | | | ● | ● | | | ● | | | | ● | | | | | |
| *Trifolium repens* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Vigna marina* | | | | | ● | ● | | | | ● | ● | ● | | | | | | ● | ● | | ● | | | | | ● | ● | ● | | ● | |
| *Wisteria floribunda* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **OXALIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Oxalis corniculata* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Oxalis corniculata* var. *trichocaulon* | | | | | ● | ● | ● | ● | | ● | ● | ● | ● | | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | ● | |
| *Oxalis corymbosa* | | | | | ● | ● | | | | ● | ● | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | | ● | |
| *Oxalis dillenii* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **GERANIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Geranium carolinianum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| **EUPHORBIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acalypha godseffiana* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Acalypha wilkesiana'Heterophylla'* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Bischofia javanica* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | ● | | | | | ● | | | | |
| *Breynia nivosa* f. *roseopicta* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Breynia vitis-idaea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Chamaesyce hirta* | | | | | ● | ● | | | | ● | ● | ● | ● | | ● | | | ● | ● | ● | ● | | ● | ● | | ● | ● | | | ● | |
| *Chamaesyce hirta* var. *glaberrima* | | CR | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| *Chamaesyce hyssopifolia* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chamaesyce maculata* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Chamaesyce nutans* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Chamaesyce prostrata* | | | | | ● | ● | | | | ● | ● | ● | | ● | | ● | | ● | ● | | | | | | | ● | | | | |
| *Chamaesyce thymifolia* | | | | | | | | | | | ● | ● | | ● | ● | | | ● | | | | | | | | | | | ● | |
| *Claoxylon centinarium* | | CR | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Drypetes integerrima* | | VU | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | ● | ● | | ● | ● | | | ● | |
| *Euphorbia cyathophora* | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | ● | | | | ● | |
| *Manihot utilissima* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Phyllanthus amarus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Phyllanthus debilis* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Phyllanthus tenellus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Phyllanthus* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Ricinus communis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Sapium sebiferum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **RUTACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Boninia glabra* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Boninia grisea* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | ● |
| *Boninia grisea* var. *crassifolia* | | EN | ● | | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Citrus natsudaidai* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Citrus sinensis* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Citrus* sp. | | | | | ● | | | | | ● | | | ● | | | | | ● | | | | | | | | | ● | | | ● | |
| *Melicope nishimurae* | | VU | ● | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| *Murraya paniculata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Zanthoxylum ailanthoides* var. *boninshimae* | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | | ● | | ● | ● | | | ● | |
| *Zanthoxylum beecheyanum* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **MELIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Melia azedarach* var. *azedarach* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | |
| **ANACARDIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Mangifera indica* | DD | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Rhus succedanea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Schinus terebinthifolius* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **SAPINDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cardiospermum halicacabum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Dodonaea viscosa* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Koelreuteria henryi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Sapindus mukorossi* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | ● | | | ● | ● | | | ● | |
| **AQUIFOLIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ilex matanoana* | | EN | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ilex mertensii* | | NT | ● | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | | ● | | | | | |
| *Ilex mertensii* var. *beecheyi* | | EN | ● | | ● | | | | | ● | ● | | ● | | | | | ● | ● | ● | | ● | ● | | | ● | | | | | |
| *Ilex percoriacea* | | | ● | | | | | | | | ● | ● | | | | | | ● | | | | ● | ● | ● | | ● | | | | | |
| **CELASTRACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Euonymus boninensis* | | VU | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | ● | | | ● | | | | | |
| **BUXACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Buxus liukiuensis* | | VU | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| **VITACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cayratia japonica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **ELAEOCARPACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Elaeocarpus photiniaefolius* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Elaeocarpus sylvestris* var. *pachycarpus* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| **TILIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Triumfetta rhomboidea* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **MALVACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Abelmoschus moschatus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Abutilon indicum* | | | | | ● | ● | ● | | | ● | ● | | ● | | | | | ● | ● | | ● | | | ● | | ● | ● | ● | | ● | |
| *Abutilon indicum* subsp. *guineense* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | | | | ● | | ● | | ● | | ● | |

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| *Hibiscus glaber* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | | ● | | | | | |
| *Hibiscus mutabilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| *Hibiscus pacificus* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| *Hibiscus rosa-sinensis* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Hibiscus schizopetalus* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | ● | | | ● | |
| *Hibiscus tiliaceus* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | ● | | | ● | |
| *Malva rotundifolia* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Malvastrum coromandelianum* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Sida acuta* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Sida rhombifolia* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | | ● | | | | ● | ● | | | ● | |
| **STERCULIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Melochia compacta* var. *villosissima* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **THYMELAEACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Wikstroemia pseudoretusa* | | NT | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| **ELAEAGNACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Elaeagnus rotundata* | | | ● | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | | | ● | | | ● | | | | ● | |
| **VIOLACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Viola mandshurica* var. *triangularis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **STACHYURACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Stachyurus praecox* var. *macrocarpus* [1] | | CR | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Stachyurus praecox* var. *macrocarpus* [1] | | CR | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Stachyurus praecox* var. *matsuzakii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **CARICACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Carica papaya* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | ● | |
| **CUCURBITACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Trichosanthes ovigera* var. *boninensis* | | EN | ● | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| **LYTHRACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ammannia coccinea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Lagerstroemia indica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Lagerstroemia subcostata* | | NT | | | | | | | | | ● | | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| **MYRTACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Melaleuca leucadendron* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Meterosideros boninensis* | | EN | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Psidium guajava* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Psidium littorale* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Rhodomyrtus tomentosa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Syzygium buxifolium* | | | | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| *Syzygium cleyerifolium* | | VU | ● | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| *Syzygium jambos* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **PUNICACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Punica granatum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **LECYTHIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Barringtonia asiatica* | | CR | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **MELASTOMATACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Melastoma candidum* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Melastoma candidum* var. *alessandrense* | | VU | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Melastoma tetramerum* | | CR | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| *Melastoma tetramerum* var. *pentapetalum* | | EN | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| **COMBRETACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Terminalia catappa* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | ● | | | ● | ● | | | ● | |
| **ONAGRACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ludwigia hyssopifolia* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | |
| *Ludwigia octovalvis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Ludwigia octovalvis* subsp. *octovalvis* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Oenothera laciniata* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| **ARALIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Fatsia oligocarpella* | | VU | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | | ● | |
| *Polyscias fruticosa* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Tetrapanax papyriferus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| **UMBELLIFERAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Angelica japonica* var. *boninensis* | | VU | ● | | | | | ● | | ● | ● | | ● | | | | | ● | ● | | | ● | | | | ● | | | | |
| *Angelica keiskei* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Apium leptophyllum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Centella asiatica* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | ● | | | | |
| *Hydrocotyle maritima* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | |
| *Hydrocotyle sibthorpioides* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **SYMPETALAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ERICACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Rhododendron boninense* | | CR | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Vaccinium boninense* | | VU | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| **MYRSINACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ardisia sieboldii* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | | | | ● | | | | |
| *Maesa montana* var. *formosana* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Myrsine maximowiczii* [1] | | VU | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | ● |
| *Myrsine maximowiczii* [1] | | CR | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | ● | | | ● | | | | |
| **PRIMULACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anagallis arvensis* f. *arvensis* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | ● | |
| *Lysimachia japonica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Lysimachia mauritiana* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | ● | |
| *Lysimachia mauritiana* var. *rubida* | | | ● | | ● | ● | | ● | | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | ● | | | | |
| *Lysimachia* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| **PLUMBAGINACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Limonium wrightii* | | VU | | | ● | ● | ● | ● | | ● | ● | | | | | ● | | ● | | | | | | | | | | ● | | ● | |
| **SAPOTACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Planchonella boninensis* | | EN | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| *Planchonella obovata* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | ● |
| *Planchonella obovata* var. *dubia* | | VU | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | ● | | ● | | | | | |
| **EBENACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Diospyros ebenum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Diospyros egbert-walkeri* | | NT | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Diospyros kaki* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **SYMPLOCACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Symplocos boninensis* | | CR | ● | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Symplocos kawakamii* | | CR | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Symplocos pergracilis* | | EN | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| **OLEACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Jasminum hemsleyi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ligustrum micranthum* | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | ● |
| *Osmanthus insularis* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| **LOGANIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Geniostoma glabrum* | | VU | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | ● | ● | | ● | | | | | |
| **APOCYNACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Allamanda cathartica* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Carissa carandas* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Catharanthus roseus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Excavatia hexandra* | | NT | ● | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | | ● | |
| *Neisosperma nakaianum* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | | ● | | | | | ● |
| *Nerium indicum* | | | | | ● | ● | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Trachelospermum asiaticum* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | ● | ● | | ● | | | | | |
| **ASCLEPIADACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Asclepias curassavica* | | | | | | | | | | | ● | | | | ● | | | ● | | | | | ● | | | ● | | | | | |
| **RUBIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Coffea arabica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Galium spurium* var. *echinospermon* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Gardenia boninensis* | | VU | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| *Hedyotis corymbosa* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Hedyotis grayi* | | VU | ● | | ● | ● | ● | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | ● |
| *Hedyotis mexicana* | | VU | ● | | | ● | ● | ● | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| *Hedyotis pachyphylla* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| *Ixora chinensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Morinda citrifolia* | | | | | ● | | | | | ● | ● | | | | | ● | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | |
| *Morinda umbellata* subsp. *boninensis* | | | ● | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| *Morinda umbellata* subsp. *boninensis* var. *hahajimensis* | | EN | ● | | | ● | | | | ● | | | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| *Paederia scandens* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Paederia scandens* var. *maritima* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Psychotria boninensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | | ● | ● | | ● | | | | | |
| *Psychotria homalosperma* | | VU | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | ● |
| *Tarenna subsessilis* | | VU | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| **CONVOLVULACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Calystegia hederacea* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Evolvulus alsinoides* var. *decumbens* | | | | | | | | | | | | | | | | | | | ● | ● | | ● | ● | ● | | ● | | | | | |
| *Ipomoea alba* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ipomoea cairica* | | | | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | | |
| *Ipomoea imperati* | | | | | | | | | | | | | | | | | | | | | ● | | | | | ● | | | | ● | |
| *Ipomoea indica* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | ● | ● | | ● | |
| *Ipomoea littoralis* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Ipomoea mauritiana* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Ipomoea pes-caprae* | | | | | ● | ● | ● | ● | | ● | ● | ● | ● | | | ● | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | |
| *Ipomoea triloba* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Ipomoea violacea* | | | | | | | | | | | ● | | | | | ● | | ● | | | | | | | | | | | | | |
| *Merremia hederacea* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Stictocardia tiliifolia* | | | | | ● | ● | | | | ● | ● | ● | | | | | | ● | ● | | ● | | | | | ● | ● | ● | | ● | |
| **BORAGINACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Argusia argentea* | | | | | ● | | | | | ● | ● | | ● | | | ● | | ● | | | ● | ● | | | | ● | | | | | |
| *Bothriospermum zeylanicum* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Heliotropium procumbens* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **VERBENACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Callicarpa glabra* | | CR | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Callicarpa parvifolia* | | CR | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Callicarpa subpubescens* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | ● | ● | ● |
| *Clerodendron wallichii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Clerodendrum japonicum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Lantana camara* var. *aculeata* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Phyla nodiflora* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Stachytarpheta jamaicensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Stachytarpheta urticifolia* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Vitex rotundifolia* | | | | | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | |
| **LABIATAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ajuga boninsimae* | | CR | ● | | ● | ● | | | | ● | ● | | | | | | | ● | ● | | | | ● | | | ● | | | | | |
| *Lamium amplexicaule* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Leucas chinensis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Scutellaria longituba* | | VU | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| **SOLANACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cestrum nocturnum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Lycianthes biflora* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Lycianthes boninensis* | | EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Lycium sandwicense* | | | | | ● | ● | | ● | | ● | ● | | | | | ● | | ● | ● | | | | ● | | | ● | | | | | |

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| *Lycopersicon esculentum* var. *cerasiforme* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Nicotiana longiflora* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Nicotiana tabacum* | | | | | ● | ● | | | | ● | ● | | ● | | | ● | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Physalis angulata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Physalis peruviana* | | | | | ● | ● | | | | ● | | | | | | | | | ● | | | ● | | ● | | ● | ● | | | ● | |
| *Physalis pruinosa* | | | | | ● | ● | | | | ● | ● | | | | | | | ● | ● | | | ● | | ● | | ● | ● | | | ● | |
| *Solanum nigrum* | | | | | ● | ● | | | | ● | ● | ● | ● | | ● | ● | | ● | ● | | | ● | ● | ● | | ● | ● | ● | | ● | |
| *Solanum nodiflorum* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Solanum suffruticosum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Tubocapsicum boninense* | | | ● | | ● | | | | | ● | | | | | | | | | ● | | | | | | | ● | ● | | | ● | |
| **SCROPHULARIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lindernia antipoda* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Mazus pumilus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Mimulus moniliformis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Russelia equisetiformis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Veronica javanica* | | VU | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Veronica peregrina* var. *peregrina* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Veronica undulata* | | NT | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **ACANTHACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Thunbergia affinis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Thunbergia alata* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Thunbergia laurifolia* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **OROBANCHACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aeginetia indica* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | ● | | ● | | | ● | | | | | |
| *Orobanche boninsimae* | | EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **MYOPORACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Myoporum boninense* | | | ● | | ● | ● | | | | ● | ● | ● | ● | | | ● | | ● | | | | | | | | | | | | | |
| **PLANTAGINACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Plantago asiatica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Plantago virginica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CAPRIFOLIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sambucus chinensis* var. *formosana* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Viburnum japonicum* var. *boninsimense* | | EN | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | ● | | | ● | |
| **CAMPANULACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lobelia boninensis* | | EN | ● | | ● | ● | | ● | | ● | ● | | | | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | | | | | |
| *Wahlenbergia marginata* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | ● | ● | | ● | |
| **GOODENIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Scaevola taccada* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | |
| **COMPOSITAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Adenostemma lavenia* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Ageratum conyzoides* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | |
| *Ageratum houstonianum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |

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| *Artemisia indica* var. *maximowiczii* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Aster indicus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Aster subulatus* var. *obtusifolius* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Bidens pilosa* var. *minor* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | ● | |
| *Bidens pilosa* var. *radiata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cirsium boninense* | | VU | ● | | ● | ● | | ● | | ● | ● | ● | ● | ● | | ● | | ● | ● | | | | | | | ● | | | | | |
| *Cirsium toyoshimae* | | EX | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Conyza bonariensis* | | | | | ● | ● | | | | ● | ● | | ● | ● | ● | | | ● | ● | | ● | | ● | | | ● | | ● | | ● | |
| *Conyza canadensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Conyza canadensis* var. *pusilla* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Conyza sumatrensis* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | | ● | | ● | ● | | | ● | ● | ● | | ● | ● | ● | | ● | |
| *Coreopsis tinctoria* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Crassocephalum crepidioides* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Crepidiastrum ameristophyllum* | | EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | ● | ● | | ● | | | | | |
| *Crepidiastrum grandicollum* | | CR | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Crepidiastrum linguifolium* | | EN | ● | | | | | | | | ● | | | | | | | ● | ● | | ● | | ● | ● | | ● | | | | | |
| *Crossostephium chinense* | | VU | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| *Dendrocacalia crepidifolia* | | VU | ● | | ● | | | | | ● | | | | | | | | | ● | ● | | | ● | ● | | ● | | | | | |
| *Eclipta alba* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Eclipta thermalis* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | ● | | | | | ● | | | | ● | |
| *Elephantopus mollis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Emilia fosbergii* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| *Emilia sonchifolia* | | | | | | ● | | | | ● | ● | | ● | ● | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Erechtites hieracifolia* var. *cacalioides* | | | | | ● | ● | | | | ● | ● | | ● | ● | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Erechtites valerianifolia* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | ● | ● | | | | ● | ● | ● | | ● | |
| *Galinsoga quadriradiata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Glossocardia bidens* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| *Gnaphalium pensylvanicum* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Helianthus argophyllus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ixeris debilis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ixeris longirostra* | | VU | ● | | ● | | | | | ● | ● | | ● | | ● | ● | | ● | ● | ● | ● | | ● | | | ● | | | | | |
| *Ixeris stolonifera* | | | | | ● | | | | | ● | ● | | | | | | | ● | | ● | | | | | | ● | | | | | |
| *Lactuca indica* f. *indivisa* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Solidago altissima* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Soliva anthemifolia* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Sonchus asper* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sonchus oleraceus* | | | | | ● | ● | | ● | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | ● | | ● | ● | | ● | ● | ● | | ● | |
| *Spilanthes iabadicensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Synedrella nodiflora* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Taraxacum officinale* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Tridax procumbens* | | | | | | | | | | | ● | ● | ● | | ● | ● | | ● | ● | | | | | | | ● | | | | ● | |
| *Vernonia cinerea* | | | | | ● | ● | | | | ● | ● | ● | ● | | ● | | | ● | ● | ● | | | | | | ● | ● | | | ● | |

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| *Vernonia cinerea* var. *parviflora* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | | ● | ● | | | ● | ● | | | ● | |
| *Wedelia biflora* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Wedelia prostrata* | | | | | ● | ● | | | | ● | ● | ● | | | | ● | | ● | | | | | | | | | | | | | |
| *Wedelia trilobata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Youngia japonica* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | |
| **MONOCOTYLEDONEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **POTAMOGETONACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ruppia rostellata* | | NT | | | | | | | | | ● | ● | | | | ● | | ● | | | | | | | | | | | | | |
| **TRIURIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Andruris japonica* | | VU | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Sciaphila okabeana* | | VU | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Sciaphila tosaensis* | | VU | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | ● | | ● | | | | | |
| **LILIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Allium thunbergii* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Asparagus cochinchinensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Asparagus densiflorus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Asparagus schoberioides* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Asparagus setaceus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Dianella ensifolia* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| *Lilium longiflorum* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | ● | | | ● | |
| *Lilium x formolongo* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Smilax china* var. *yanagitani* | | | | | ● | | | | | ● | ● | ● | ● | | | ● | | ● | ● | ● | | ● | ● | | | ● | | | | | |
| **AGAVACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Agave americana* | | | | | ● | ● | | | | ● | ● | ● | ● | | ● | | | ● | ● | | | ● | | ● | | ● | ● | | | ● | |
| *Agave saisalana* | | | | | | | | | | | ● | | | | | | | ● | ● | | | ● | | | | ● | | | | ● | |
| *Dracaena fragrans* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Sansevieria nilotica* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sansevieria stackyi* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Yucca smalliana* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **AMARYLLIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Crinum asiaticum* var. *sinicum* | | | | | ● | ● | | | | ● | ● | | ● | | | ● | | ● | ● | | | ● | ● | ● | | ● | | | | | |
| *Hippeastrum rutilum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Hippeastrum x* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Hymenocallis littoralis* | | | | | ● | | | | | ● | | | ● | | | | | ● | | | | | | | | | | | | | |
| **DIOSCOREACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dioscorea alata* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Dioscorea bulbifera* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | ● | | | ● | ● | | | ● | |
| *Dioscorea bulbifera* f. *domestica* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Dioscorea japonica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **IRIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Crocosmia x* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **COMMELINACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Commelina benghalensis* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Murdannia angustifolia* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Rhoeo spathacea* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | ● | | | | ● | | ● | | | | | |
| *Tradescantia flumiensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **FLAGELLARIACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Flagellaria indica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **GRAMINEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aristida cumingiana* | | EN | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Arthraxon hispidus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Arundo donax* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Bambusa multiplex* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Bambusa multiplex* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Bambusa vulgaris* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Bambusoideae* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Bothriochloa bladhii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Bothriochloa ischaemum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Capillipedium parviflorum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | ● | | ● | |
| *Cenchrus echinatus* | | | | | ● | ● | | | | ● | ● | ● | ● | | ● | ● | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Chloris barbata* | | | | | ● | | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | | | | | ● | | | | ● | |
| *Chloris gayana* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Chloris radiata* | | | | | ● | ● | | | | ● | ● | ● | ● | | | ● | | ● | ● | ● | ● | | ● | ● | | ● | ● | | | ● | |
| *Chrysopogon aciculatus* | | | | | ● | ● | | | | ● | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Cymbopogon citratus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Cymbopogon tortilis* var. *goeringii* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| *Cynodon dactylon* | | | | | ● | ● | ● | ● | | ● | ● | ● | ● | | | ● | | ● | ● | | ● | | ● | | | ● | | | | ● | |
| *Cyrtococcum patens* | | | | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| *Dactyloctenium aegyptium* | | | | | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | ● | | | | ● | |
| *Dendrocalamus latiflorus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Dichanthium aristatum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Digitaria ciliaris* | | | | | ● | ● | ● | | | ● | ● | | ● | | | | | ● | ● | | ● | | | | | ● | ● | ● | | ● | |
| *Digitaria platycarpha* | | EN | ● | | ● | ● | | ● | | ● | ● | ● | ● | | ● | ● | | ● | ● | ● | | ● | | ● | | ● | ● | | | ● | |
| *Digitaria pluriens* | | | | | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | |
| *Digitaria radicosa* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Digitaria setigera* | | | | | | ● | | | | ● | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Digitaria violascens* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | ● | |
| *Echinochloa colona* | | | | | | | | | | | ● | | | ● | | | | ● | ● | | | ● | | | | ● | | | | | |
| *Echinochloa crus-galli* var. *crus-galli* | | | | | ● | ● | | ● | | ● | ● | | | | | | | ● | ● | | | | | ● | | ● | | | | ● | |
| *Echinochloa crus-galli* var. *formosensis* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Eleusine indica* | | | | | ● | ● | | ● | | ● | ● | | | | | | | ● | ● | | ● | | | ● | | ● | ● | ● | | ● | |
| *Enteropogon dolichostachyus* | | | | | ● | ● | | | | ● | ● | | | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Eragrostis bulbillifera* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | ● | | ● | |
| *Eragrostis curvula* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |

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| *Eragrostis minor* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eragrostis tenella* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | ● | |
| *Eriochloa procera* | | | | | | | | | | | ● | | | | | ● | | ● | ● | | | | | | | ● | | | | |
| *Garnotia acutigluma* | | VU | | | | | | | | | ● | | | | | | | ● | ● | ● | | | | | | ● | ● | ● | | ● | |
| *Imperata cylindrica* var. *koenigii* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | ● | | | | ● | | | | | |
| *Ischaemum ischaemoides* | | EN | ● | | | | | | | | ● | ● | | | | ● | | ● | | | | | | | | | | | | |
| *Leptochloa panicea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Lepturus repens* | | | | | | | | | | | ● | | | | | | | ● | | ● | | | | | | ● | ● | ● | | ● | |
| *Miscanthus boninensis* | | | ● | | ● | ● | ● | ● | | ● | ● | ● | ● | | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | |
| *Miscanthus condensatus* | | | | | | | | ● | | ● | ● | | | | | | | ● | ● | | | ● | ● | ● | | ● | | ● | | ● | |
| *Miscanthus sinensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | |
| *Oplismenus compositus* | | | | | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | |
| *Panicum maximum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Paspalidium distans* | | VU | ● | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Paspalum conjugatum* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | ● | |
| *Paspalum dilatatum* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Paspalum notatum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Paspalum scrobiculatum* var. *scrobiculatum* | | | | | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | | | | | | ● | ● | | | ● | |
| *Paspalum thunbergii* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Paspalum urvillei* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Pennisetum purpureum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Pennisetum sordidum* | | | | | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | | | ● | | | | ● | ● | | | ● | | | | | |
| *Phyllostachys aurea* | | | | | | ● | | | | ● | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Phyllostachys nigra* var. *henonis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Pleioblastus gramineus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Pleioblastus simonii* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Poa annua* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Pseudosasa japonica* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Rhynchelytrum repens* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Saccharum formosanum(Stapf)* var. *pollinioides* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Saccharum officinarum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Setaria barbata* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | | | | | ● | | | | ● | |
| *Setaria faberi* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Setaria glauca* | | | | | ● | ● | ● | | | ● | ● | | | | | | | ● | ● | | | | | ● | | ● | | | | ● | |
| *Setaria gracilis* | | | | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | | |
| *Setaria viridis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sorghum bicolor* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Sorghum halepense* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sorghum halepense* f. *muticum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sporobolus diander* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |

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| *Sporobolus virginicus* | | | | | ● | ● | ● | ● | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | ● | | ● | | | | | ● |
| *Stenotaphrum secundatum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Stenotaphrum subulatum* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Thuarea involuta* | | | | | ● | | | | | ● | ● | ● | ● | | | ● | | ● | ● | ● | ● | | | | ● | | | | ● | |
| *Vetiveria zizanioides* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | ● | |
| *Zoysia japonica* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Zoysia matrella* | | | | | ● | | | | | ● | | | | | | | | | ● | ● | | | | | ● | | | | | |
| *Zoysia pacifica* | | | | | ● | ● | ● | ● | | ● | ● | ● | ● | | | ● | | ● | ● | | | | | ● | | ● | | | ● | |
| **PALMAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Archontophoenix alexandrae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Areca catechu* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Arenga engleri* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Caryota urens* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Chrysalidocarpus lutescens* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Clinostigma savoryanum* | DD | VU | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | | | ● | | | | | |
| *Cocos nucifera* | | | | | | | | | | | ● | | | | | ● | | ● | ● | | ● | | | | ● | | | | ● | |
| *Howea belmoreana* | VU | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Livistona chinensis* var. *boninensis* | | | ● | | ● | ● | ● | | | ● | ● | ● | ● | | ● | | | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | |
| *Mascarena verschaffeltii* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Phoenix roebelenii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Rhapis excelsa* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Veitchia merrillii* | | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | |
| **ARACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Alocasia cucullata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Colocasia esculenta* var. *aquatilis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Rhaphidophora aurea* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Monstera deliciosa* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Typhonium blumei* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **LEMNACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lemna aequinoctialis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Lemna aoukikusa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Lemna* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **PANDANACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Freycinetia boninensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | ● | |
| *Pandanus boninensis* | | | ● | | ● | ● | ● | ● | | ● | ● | ● | ● | | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● |
| *Pandanus centrifugalis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Pandanus* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| **CYPERACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bulbostylis barbata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | ● | |
| *Bulbostylis densa* var. *capitata* | | VU | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | ● | |
| *Carex augustini* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Carex brunnea* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Carex hattoriana* | | | ● | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | ● | | | ● | | | | | |
| *Carex toyoshimae* | | VU | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Carex wahuensis* var. *robusta* | | | | | ● | ● | | ● | | ● | ● | ● | ● | ● | | ● | | ● | ● | ● | ● | ● | ● | | | ● | ● | | | ● | |
| *Cladium jamaicense* subsp. *chinense* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| *Cyperus alternifolius* subsp. *flabelliformis* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cyperus compressus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Cyperus cyperinus* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | ● | | | ● | ● | | | ● | |
| *Cyperus cyperoides* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | ● | | ● | | | ● | ● | ● | | ● | ● |
| *Cyperus difformis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Cyperus flavidus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Cyperus iria* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● | |
| *Cyperus javanicus* | | | | | ● | ● | | ● | | ● | ● | | ● | | | | | ● | ● | ● | | ● | | | | ● | ● | ● | | ● | |
| *Cyperus malaccensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Cyperus odoratus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cyperus pilosus* | | | | | | ● | | | | ● | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Cyperus polystachyos* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | ● | | | | | | ● | | ● | | ● | |
| *Cyperus rotundus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | ● | |
| *Fimbristylis cymosa* | | | | | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Fimbristylis dichotoma* var. *boninensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | |
| *Fimbristylis dichotoma* var. *floribunda* | | | | | | | | | | | ● | | | | | | | ● | | | | | | ● | | ● | | ● | | ● | |
| *Fimbristylis dichotoma* var. *tentsuki* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Fimbristylis littoralis* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Fimbristylis longispica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Fimbristylis longispica* var. *boninensis* | | VU | ● | | ● | ● | ● | | | ● | ● | ● | ● | | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | ● |
| *Fimbristylis longispica* var. *hahajimensis* | | EN | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Fimbristylis pacifica* | | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | |
| *Fimbristylis sieboldii* subsp. *anpinensis* | | | | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Gahnia aspera* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | | | | | |
| *Kyllinga brevifolius* var. *brevifolius* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Kyllinga brevifolius* var. *leiolepis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Kyllinga nemoralis* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | ● | | | | | | ● | | | | ● | |
| *Machaerina glomerata* | | | | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| *Machaerina rubiginosa* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Rhynchospora boninensis* | | EN | ● | | ● | | ● | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Rhynchospora chinensis* var. *curvoaristata* | | VU | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Rhynchospora rubra* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Rhynchospora rugosa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Schoenoplectus grossus* | | EN | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Schoenoplectus triqueter* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Schoenus brevifolius* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Scirpus ternatanus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Scleria levis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **MUSACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Musa x sapientum* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Ravenala madagascariensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Strelitzia reginae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **ZINGIBERACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Alpinia bilamellata* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Alpinia boninsimensis* | | VU | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Alpinia nakaiana* | | | ● | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | | ● | |
| *Alpinia zerumbet* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Hedychium coronarium* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **CANNACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Canna coccinea* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Canna indica* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **MARANTACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Maranta arundinacea* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| **ORCHIDACEAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bulbophyllum boninense* | | EN | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Calanthe hattorii* | | EN | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Calanthe hoshii* | | CR | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Calanthe triplicata* | | VU | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Corymborkis subdensa* | | EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Eulophia toyoshimae* | | EN | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Gastrodia boninensis* | | VU | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Goodyera augustinii* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Goodyera boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Goodyera procera* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | ● | | ● | |
| *Liparis hostifolia* | | CR | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Liparis nervosa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | ● | | | |
| *Luisia boninensis* | | EN | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Malaxis boninensis* | | CR | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Malaxis hahajimensis* | | EN | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Platanthera boninensis* | | EN | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Zeuxine boninensis* | | EX | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |

## Reference


(Note: English translations of titles in Japanese are tentative, unauthorized, and only for informative purposes)

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## Notes

1) These plants are treated as two species because they are considered to be differentiated into two separate species, though having the same scientific name.

# 3-2-2. The Mammals of Ogasawara Islands and its Coastal Area

*** Red List categories of IUCN, details are given on the last page.**

**** Red List Categories of Japanese Ministry of the Environment, details are given on the last page.**

Abbreviation of island names

Mk: Mukojima, Nk: Nakodojima, Ym: Yomejima, Kt: Kitanoshima, Ch: Chichijima, Ani: Anijima, Ot: Ototojima, Ns: Nishijima, Hg: Higashijima, Mn: Minamijima, Ha: Hahajima, Mkh: Mukohjima, Hr: Hirajima, Ane: Anejima, Im: Imotojima, Me: Meijima, Ki: Kita-iwoto, Mi: Minami-iwoto, Nsn: Nishinoshima, Or: Other, MIG: Mukojima Island Group, CIG: Chichijima Island Group, HIG: Hahajima Island Group, OOA: Other than Ogasawara Archipelago, Unidentified: Unidentified Islands.

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **CHIROPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PTEROPODIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pteropus pselaphon* | CR | CR | ● | ● | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | ● | ● | | ● | | |
| **CARNIVORA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **FELIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Felis catus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | | |
| **RODENTIA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **MURIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Rattus norvegicus* | | | | | | | | | | | | | | | | | | | ● | | ● | | | | | | | | | | |
| *Rattus rattus* | | | | | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | ● | |
| *Mus musculus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | | | | | | |
| **ARTIODACTYLA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **BOVIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Capra hircus* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| **CETACEA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **BALAENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eubalaena japonica* | EN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **BALAENOPTERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Balaenoptera musculus* | EN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Balaenoptera physalus* | EN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Balaenoptera borealis* | EN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Balaenoptera edeni* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Megaptera novaeangliae* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PHYSETERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Physeter macrocephalus* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **KOGIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Kogia breviceps* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ZIPHIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ziphius cavirostris* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **DELPHINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Orcinus orca* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Globicephala macrorhynchus* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudorca crassidens* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Feresa attenuata* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Peponocephala electra* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Steno bredanensis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Grampus griseus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Tursiops truncatus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Tursiops aduncus* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stenella attenuata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stenella longirostris* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stenella coeruleoalba* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Delphinus delphis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lagenodelphis hosei* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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(Note: English translations of titles in Japanese are tentative, unauthorized, and only for informative purposes)

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# 3-2-3. The Birds of the Ogasawara Islands and its Coastal Area

*** Red List categories of IUCN, details are given on the last page.**
**** Red List Categories of Japanese Ministry of the Environment, details are given on the last page.**

Abbreviation of island names
Mk: Mukojima, Nk: Nakodojima, Ym: Yomejima, Kt: Kitanoshima, Ch: Chichijima, Ani: Anijima, Ot: Ototojima, Ns: Nishijima, Hg: Higashijima, Mn: Minamijima, Ha: Hahajima, Mkh: Mukohjima, Hr: Hirajima, Ane: Anejima, Im: Imotojima, Me: Meijima, Ki: Kita-iwoto, Mi: Minami-iwoto, Nsn: Nishinoshima, Or: Other, MIG: Mukojima Island Group, CIG: Chichijima Island Group, HIG: Hahajima Island Group, OOA: Other than Ogasawara Archipelago, Unidentified: Unidentified Islands.

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **PODICIPEDIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PODICIPEDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tachybaptus ruficollis poggei* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Podiceps nigricollis nigricollis* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **PROCELLARIIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **DIOMEDEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Phoebastria albatrus* | VU | VU | | ● | ● | | ● | | | ● | | | | | | | | | | | | | | | | | ● | | | | |
| *Phoebastria immutabilis* | VU | EN | | | ● | | | | ● | ● | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Phoebastria nigripes* | EN | | | | ● | ● | ● | ● | ● | ● | | | | | | | | ● | | | | ● | ● | | ● | ● | | ● | | ● | |
| **PROCELLARIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pterodroma hypoleuca* | LC | DD | | | | | | ● | ● | ● | | | | | | | | ● | | | | | | | | ● | ● | ● | | ● | |
| *Bulweria bulwerii* | LC | | | | | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | | ● | ● | ● | | ● | ● | ● | |
| *Calonectris leucomelas* | LC | | | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | | |
| *Puffinus carneipes* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Puffinus pacificus* | LC | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| *Puffinus bulleri* | VU | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| *Puffinus griseus* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Puffinus tenuirostris* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Puffinus nativitatis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| ○ *Puffinus assimilis* | LC | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | | |
| *Puffinus lherminieri bannermani* | LC | DD | | | | | | | | | ● | | | | ● | ● | | ● | ● | | | | | | ● | | ● | ● | | ● | |
| **HYDROBATIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Oceanodroma leucorhoa leucorhoa* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Oceanodroma tristrami* | NT | VU | | | | | | ● | ● | ● | ● | | | | | | ● | ● | | | | | | ● | ● | ● | | ● | ● | | |
| *Oceanodroma matsudairae* | DD | EN | | | | | | | ● | ● | ● | | | | | | | ● | ● | ● | | ● | | | | ● | ● | ● | ● | ● | |
| **PELECANIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PHAETHONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Phaethon rubricauda melanorhynchos* | LC | EN | | | | | | | | | | | | | | | | ● | ● | | | | | | | ● | ● | ● | ● | ● | |
| *Phaethon lepturus dorotheae* | LC | | | | | | ● | | | ● | | | | | | | | | | | | | | | | | | | | | |
| **SULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sula dactylatra personata* | LC | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | |

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| *Sula sula rubripes* | LC | EN | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | ● | ● | |
| *Sula leucogaster plotus* | LC | | | | ● | ● | | ● | ● | ● | ● | ● | ● | | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| **PHALACROCORACIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Phalacrocorax carbo hanedae* | LC | | | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | |
| *Phalacrocorax capillatus* | LC | | | | | | | | | | ● | | | | | | | ● | ● | ● | ● | | | | | ● | | | | |
| **FREGATIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Fregata minor minor* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | ● | |
| *Fregata ariel ariel* | LC | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | ● | |
| **CICONIIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ARDEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ardea cinerea jouyi* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Ardea purpurea manilensis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Ardea alba alba* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Egretta intermedia intermedia* | LC | NT | | | | | | | | | ● | | | | | | | ● | ● | | | | ● | | | ● | | ● | | |
| *Egretta garzetta garzetta* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Ardeola bacchus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Bubulcus ibis coromandus* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Butorides striata amurensis* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Nycticorax nycticorax nycticorax* | LC | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Gorsachius goisagi* | EN | EN | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Ixobrychus sinensis* | LC | NT | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Ixobrychus eurhythmus* | LC | EN | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Ixobrychus cinnamomeus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| **THRESKIORNITHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Threskiornis melanocephalus* | NT | DD | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **ANSERIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ANATIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cygnus cygnus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Cygnus columbianus bewickii* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Anser fabalis rossicus* | LC | | | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | |
| *Anser fabalis serrirostris* | LC | VU | | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | | | | | | | | |
| *Anser albifrons frontalis* | LC | NT | | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Aix galericulata* | LC | DD | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Anas penelope* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Anas falcata* | NT | | | | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | |
| *Anas formosa* | VU | VU | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Anas crecca crecca* | LC | | | | ● | | | | | ● | ● | | | | | ● | | ● | ● | | | | | | | ● | | | | |
| *Anas platyrhynchos platyrhynchos* | LC | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Anas poecilorhyncha zonorhyncha* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Anas acuta* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | ClG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Anas querquedula* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Anas clypeata* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Aythya fuligula* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Aythya marila mariloides* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Mergus serrator* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **FALCONIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PANDIONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pandion haliaetus haliaetus* | LC | NT | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| **ACCIPITRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Haliaeetus albicilla* | LC | EN | | ● | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Circus spilonotus spilonotus* | LC | EN | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Circus cyaneus cyaneus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Accipiter gularis gularis* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Accipiter gentilis fujiyamae* | LC | NT | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Butastur indicus* | LC | VU | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Buteo buteo toyoshimai* | LC | EN | ● | ● | | | | | | | ● | ● | ● | | | ● | | ● | ● | | ● | | | ● | | ● | | | | | |
| **FALCONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Falco tinnunculus interstinctus* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Falco peregrinus japonensis* | LC | VU | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Falco peregrinus furuitii* | LC | CR | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| **GRUIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **RALLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ○ *Amaurornis phoenicurus* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Porzana pusilla pusilla* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Gallicrex cinerea* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Gallinula chloropus indica* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Fulica atra atra* | LC | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **CHARADRIIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **HAEMATOPODIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Haematopus ostralegus osculans* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **RECURVIROSTRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Himantopus himantopus* | LC | VU | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **GLAREOLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Glareola maldivarum* | LC | VU | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| **CHARADRIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Vanellus vanellus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Vanellus cinereus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Pluvialis fulva* | LC | | | | ● | ● | ● | | | ● | ● | | | | | | | ● | ● | | ● | | | ● | | ● | ● | | | ● | |
| *Pluvialis squatarola* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Charadrius hiaticula tundrae* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Charadrius placidus* | LC | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Charadrius dubius curonicus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | ● | ● | |
| *Charadrius alexandrinus alexandrinus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | ● | ● | |
| *Charadrius mongolus stegmanni* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | ● | | | ● | |
| *Charadrius leschenaultii leschenaultii* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **SCOLOPACIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Scolopax rusticola* | LC | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Gallinago solitaria japonica* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Gallinago stenura* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Gallinago megala* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Gallinago gallinago gallinago* | LC | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Limosa lapponica menzbieri* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Limosa lapponica baueri* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Numenius phaeopus variegatus* | LC | | | | | ● | | | | ● | ● | | | | | | | ● | ● | | ● | | | | | ● | ● | | | ● | |
| *Numenius madagascariensis* | LC | VU | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Xenus cinereus* | LC | | | | | | | | | | ● | | | | | ● | | ● | | | | | | | | | | | | |
| *Actitis hypoleucos* | LC | | | | | ● | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Tringa ochropus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Tringa brevipes* | LC | | | | | ● | | | | ● | ● | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | ● | |
| *Tringa incana* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | ● | | ● | ● | ● | | ● | |
| *Tringa nebularia* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Tringa flavipes* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Tringa stagnatilis* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Tringa glareola* | LC | | | | | | | | | | ● | | | | | ● | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Tringa totanus ussuriensis* | LC | VU | | | | | | | | | ● | | | | | ● | | ● | | | | | | | | | | | | |
| *Arenaria interpres* | LC | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | ● | |
| *Calidris ruficollis* | LC | | | | | | | | | | ● | | | | | ● | | ● | | | | | | | | | | | | |
| *Calidris subminuta* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Calidris melanotos* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Calidris acuminata* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Calidris ferruginea* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Calidris alpina sakhalina* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Calidris himantopus* | LC | | | | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | |
| *Philomachus pugnax* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **LARIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Larus crassirostris* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Larus canus kamtschatschensis* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | ● | | | ● | |
| *Larus hyperboreus pallidissimus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Larus vegae vegae* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | ● | | ● | ● | | ● | ● | |
| *Larus schistisagus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | ● | | | ● | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | ClG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Larus ridibundus* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **STERNIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anous stolidus pileatus* | LC | | | | | | | | ● | ● | | | | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | ● | |
| *Procelsterna cerulea saxatilis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | | |
| *Gygis alba candida* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Onychoprion fuscatus nubilosa* | LC | | | | | | ● | | | ● | ● | | | ● | ● | | | ● | ● | | | | | | | ● | | ● | ● | ● | | |
| *Onychoprion lunatus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Onychoprion anaethetus anaethetus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Sternula albifrons sinensis* | LC | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chlidonias leucopterus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Chlidonias hybrida javanicus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Sterna hirundo longipennis* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Thalasseus bergii cristatus* | LC | VU | | | ● | | | ● | | ● | ● | | | | | | | ● | | | | | | | | | | | ● | ● | |
| **STERCORARIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Stercorarius parasiticus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | |
| **COLUMBIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **COLUMBIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Columba janthina nitens* | NT | CR | ● | ● | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | | | ● | ● | ● | | ● | |
| *Streptopelia orientalis orientalis* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Treron sieboldii sieboldii* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CUCULIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CUCULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cuculus canorus subtelephonus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | ● | | | ● | |
| *Cuculus optatus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | ● | | | ● | |
| *Cuculus poliocephalus* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | ● | | | ● | |
| **STRIGIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **STRIGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ninox japonica japonica* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | ● | | | ● | |
| *Asio otus otus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Asio flammeus flammeus* | LC | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| **CAPRIMULGIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CAPRIMULGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Caprimulgus indicus jotaka* | LC | VU | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | ● | | | ● | |
| **APODIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **APODIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ○ *Apus pacificus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Apus nipalensis subfurcatus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CORACIIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ALCEDINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Alcedo atthis bengalensis* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | ClG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **CORACIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ○ *Eurystomus orientalis* | LC | EN | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **UPUPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Upupa epops saturata* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **PASSERIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ALAUDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Calandrella brachydactyla longipennis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| ○ *Alauda arvensis* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **HIRUNDINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Riparia riparia iijimae* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Hirundo rustica gutturalis* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | ● | ● | | ● | |
| *Delichon dasypus dasypus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **MOTACILLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anthus richardi sinensis* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Anthus cervinus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Anthus hodgsoni hodgsoni* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Anthus gustavi gustavi* | LC | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Anthus rubescens japonicus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Dendronanthus indicus* | LC | | | | | | | | | | | | | | | | | ● | | | | | | | | ● | | | ● | |
| *Motacilla alba lugens* | LC | | | | | | | | | | ● | | | | | ● | | ● | ● | | | | | | ● | ● | | | ● | |
| *Motacilla tschutschensis simillima* | LC | | | | | | | | | | | | | | | | | | ● | | | | | | ● | ● | | | ● | |
| *Motacilla cinerea cinerea* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | ● | | ● | ● | |
| **PYCNONOTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ixos amaurotis squamiceps* | LC | | ● | | ● | | ● | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | | ● | | ● | | | | |
| *Ixos amaurotis magnirostris* | LC | | ● | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| **BOMBYCILLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bombycilla garrulus centralasiae* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Bombycilla japonica* | NT | | | | | | | | | | ● | | | | | | | ● | | | | | | | | ● | | | ● | |
| **TURDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Monticola solitarius philippensis* | LC | | | | ● | ● | | | | ● | ● | ● | ● | | | ● | | ● | ● | ● | ● | | | | | ● | | ● | ● | ● | |
| *Zoothera dauma aurea* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Turdus pallidus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Turdus chrysolaus chrysolaus* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | ● | | | ● | |
| *Turdus naumanni eunomus* | LC | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | ● | | ● | ● | | | ● | |
| **SYLVIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Urosphena squameiceps* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Cettia diphone diphone* | LC | | ● | | ● | ● | ● | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | | ● | ● | | ● | ● | | ● | |
| *Acrocephalus orientalis* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **MUSCICAPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ficedula narcissina narcissina* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | ● | | | ● | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Cyanoptila cyanomelana cyanomelana* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Luscinia calliope* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Tarsiger cyanurus cyanurus* | LC | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Phoenicurus auroreus auroreus* | LC | | | | ● | ● | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Saxicola maurus stejnegeri* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **ZOSTEROPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Zosterops japonicus alani* | LC | | ● | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Zosterops japonicus (alani X stejnegeri)* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | ● | | | | | ● | | | | | |
| **MELIPHAGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Apalopteron familiare hahasima* | VU | EN | ● | ● | | | | | | | | | | | | | | | ● | ● | ● | ● | | | | ● | | | | | |
| **LANIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lanius bucephalus bucephalus* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| ○ *Lanius cristatus* | LC | EN | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| **STURNIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sturnia philippensis* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sturnus cineraceus* | LC | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| ○ *Sturnus vulgaris* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **FRINGILLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Fringilla montifringilla* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | ● | | | | | ● | ● | | | ● | |
| *Loxia curvirostra japonica* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Carduelis flammea flammea* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Carduelis spinus* | LC | | | | ● | | | | | ● | ● | | | | | | | ● | | | ● | | | | | ● | ● | | | ● | |
| *Carduelis sinica kittlitzi* | LC | EN | ● | | | | | | | | | ● | | | | | | ● | ● | ● | ● | | | | | ● | | ● | | ● | |
| *Coccothraustes coccothraustes japonicus* | LC | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Eophona migratoria migratoria* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Eophona personata personata* | LC | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **EMBERIZIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Emberiza rustica latifascia* | LC | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Emberiza aureola ornata* | VU | CR | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |

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(Note: English translations of titles in Japanese are tentative, unauthorized, and only for informative purposes)

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**Notes**

○: Subspecies name was omitted because it was not identified from the records.

Classification and scientific names are based on the following literature.

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# 3-2-4. The Reptiles of the Ogasawara Islands and its Coastal Area

*** Red List categories of IUCN, details are given on the last page.**
**** Red List Categories of Japanese Ministry of the Environment, details are given on the last page.**

Abbreviation of island names
Mk: Mukojima, Nk: Nakodojima, Ym: Yomejima, Kt: Kitanoshima, Ch: Chichijima, Ani: Anijima, Ot: Ototojima, Ns: Nishijima, Hg: Higashijima, Mn: Minamijima, Ha: Hahajima, Mkh: Mukohjima, Hr: Hirajima, Ane: Anejima, Im: Imotojima, Me: Meijima, Ki: Kita-iwoto, Mi: Minami-iwoto, Nsn: Nishinoshima, Or: Other, MIG: Mukojima Island Group, CIG: Chichijima Island Group, HIG: Hahajima Island Group, OOA: Other than Ogasawara Archipelago, Unidentified: Unidentified Islands.

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **SQUAMATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **GEKKONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Perochirus ateles* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Lepidodactylus lugbris* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |
| *Hemidactylus frenatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |
| **IGUANIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anolis carolinensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |
| **SCINCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cryptoblepharus nigropunctatus* [1] | | NT[2] | ● | | ● | ● | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | |
| **TESTUDINES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CHELONIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chelonia mydas* | EN | VU | | | ● | | ● | | | ● | ● | ● | ● | | ● | ● | | ● | ● | ● | ● | ● | | ● | ● | ● | | | | | ● |
| *Caretta caretta* | EN | EN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eretmochelys imbricata* | CR | EN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **DERMOCHELYIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dermochelys coriacea* | CR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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(Note: English translations of titles in Japanese are tentative, unauthorized, and only for informative purposes)

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**Notes**

1) Distribution records of *Cryptoblepharus nigropunctatu* s include information by personal communications with surveyors (Masanari Aoki, Takuma Hashimoto, Kazuto Kawakami, Akira Ozono, and Masaaki Takiguchi).

2) This species listed on MOE RL as *Cryptoblepharus boutonii nigropunctatus* based on the previous taxonomic classification.

# *3-2-5. The Aquatic animals (Fresh and Brackish water) of the Ogasawara Islands*

*** Red List categories of IUCN, details are given on the last page.**
**** Red List Categories of Japanese Ministry of the Environment, details are given on the last page.**

Abbreviation of island names
Mk: Mukojima, Nk: Nakodojima, Ym: Yomejima, Kt: Kitanoshima, Ch: Chichijima, Ani: Anijima, Ot: Ototojima, Ns: Nishijima, Hg: Higashijima, Mn: Minamijima, Ha: Hahajima, Mkh: Mukohjima, Hr: Hirajima, Ane: Anejima, Im: Imotojima, Me: Meijima, Ki: Kita-iwoto, Mi: Minami-iwoto, Nsn: Nishinoshima, Or: Other, MIG: Mukojima Island Group, CIG: Chichijima Island Group, HIG: Hahajima Island Group, OOA: Other than Ogasawara Archipelago, Unidentified: Unidentified Islands.

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **ANGUILLIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ANGUILLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anguilla marmorata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |
| *Anguilla japonica* | | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CLUPEIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CLUPEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Herklotsichthys quadrimaculatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |
| *Sardinella melanura* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | ● | ● | | |
| **ENGRAULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Thryssa baelama* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | | |
| *Thryssa hamiltoni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CYPRINIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CYPRINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cyprinus carpio* | DD | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |
| **COBITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Misgurnus anguillicaudatus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **AULOPIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **SYNODONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Saurida nebulosa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **MUGILIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **MUGILIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Crenimugil crenilabis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |
| *Mugil cephalus cephalus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |
| *Neomyxus leuciscus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CYPRINODONTIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **POECILIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gambusia affinis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |
| *Poecilia reticulata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | | |
| **PERCIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CARANGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Caranx ignobilis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Caranx papuensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Caranx sexfasciatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **LUTJANIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lutjanus fulvus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Lutjanus monostigma* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **GERREIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gerres baconensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **MULLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Mulloidichthys flavolineatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **CICHLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Oreochromis mossambicus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **KUHLIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Kuhlia boninensis* | | EN | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Kuhlia rupestris* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **POLYNEMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Polydactylus plebeius* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Polydactylus sexfilis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **BLENNIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Istiblennius* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **ELEOTRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eleotris acanthopoma* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Eleotris fusca* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **GOBIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Amblygobius nocturnus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Bathygobius cocosensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Oligolepis stomias* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Oxyurichthys visayanus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Rhinogobius* sp. BI | | CR | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Stenogobius* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sicyopterus japonicus* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sicyopterus lagocephalus* | | EN | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Stiphodon percnopterygionus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **PLEURONECTIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **BOTHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bothus pantherinus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Engyrosopon sp.* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **DECAPODA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ATYIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Paratya boninensis* | | CR+EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Atyoida pilipes* | | NT | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | ClG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Caridina multidentata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Caridina celebensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Caridina typus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **PALAEMONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Macrobrachium japonicum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Macrobrachium lar* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Palaemon ogasawaraensis* | | NT | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **ALPHEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Metabetaeus minutus* | | NT | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **PORTUNIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Scylla serrata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **GRAPSIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eriocheir ogasawaraensis* | | VU | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Helice leachi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Chiromantes dehaani* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ptychognathus glaber* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Varuna* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **OCYPODIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Uca crassipes* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **COENOBITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Birgus lafro* | DD | VU | | | | | | | | | ● | | | | | ● | | ● | | | | | | | | | ● | ● | | ● | |
| *Coenobita cavipes* | | | | | | | | | | ● | ● | ● | | | | | | ● | | | | | | ● | | ● | | | | | |
| *Coenobita perlatus* | | VU | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | ● | | ● | ● |
| *Coenobita purpureus* | | | | | | | | | | ● | ● | ● | | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | |
| *Coenobita rugosus* | | | | | | | | | | ● | | ● | | | | | | ● | | | ● | | | | | ● | | | | | |
| *Coenobita spinosus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |

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**Notes**

Distribution records of Decapoda include information by personal communication with the surveyor (Kiyoshi Satake).

# 3-2-6. The Marine Fishes of the Ogasawara's Coastal Area

*** Red List categories of IUCN, details are given on the last page.**

**** Red List Categories of Japanese Ministry of the Environment, details are given on the last page.**

Abbreviation of island names

Mk: Mukojima, Nk: Nakodojima, Ym: Yomejima, Kt: Kitanoshima, Ch: Chichijima, Ani: Anijima, Ot: Ototojima, Ns: Nishijima, Hg: Higashijima, Mn: Minamijima, Ha: Hahajima, Mkh: Mukohjima, Hr: Hirajima, Ane: Anejima, Im: Imotojima, Me: Meijima, Ki: Kita-iwoto, Mi: Minami-iwoto, Nsn: Nishinoshima, Or: Other, MIG: Mukojima Island Group, CIG: Chichijima Island Group, HIG: Hahajima Island Group, OOA: Other than Ogasawara Archipelago, Unidentified: Unidentified Islands.

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **HETERODONIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **HETERODONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Heterodontus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Heterodontus zebra* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CARCHARHINIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CARCHARHINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Carcharhinus albimarginatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Carcharhinus dussumieri* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Carcharhinus galapagensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Carcharhinus obscurus* | LR/nt | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Carcharhinus plumbeus* | LR/nt | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Galeocerdo cuvier* | LR/nt | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Rhizoprionodon acutus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sphyrna lewini* | LR/nt | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sphyrna zygaena* | LR/nt | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Triaenodon obesus* | LR/nt | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **LAMNIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ODONTASPIDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Carcharias taurus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PRISTIOPHORIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PRISTIOPHORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pristiophorus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **RAJIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **DASYATIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dasyatis akajei* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dasyatis bennetti* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dasyatis kuhlii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dasyatis ushiei* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnura japonica* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Taeniura meyeni* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MYLIOBATIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aetobatus narinari* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Manta birostris* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Mobula japanica* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Mobula thurstoni* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Myliobatis tobijei* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Rhinoptera javanica* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ALBULIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ALBULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Albula neoguinaica* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ANGUILLIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **MURAENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anarchias seychellensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Echidna nebulosa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnomuraena zebra* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax berndti* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax chilospilus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax chlorostigma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax elegans* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax fimbriatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax flavimarginatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax isingteena* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax kidako* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax margaritopho 1us* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax melatremus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax meleagris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax mieroszewskii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax richardsoni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax thyrsoideus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax undulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnothorax ypsilon* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Muraena pardalis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Rhinomuraena quaesita* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **OPHICHTHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ichthyapus vulturis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Myrichthys colubrinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Myrichthys maculosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ophichthus erabo* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pisodonophis cancrivorus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CONGRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Conger cinereus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Conger myriaster* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Heteroconger hassi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CLUPEIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ENGRAULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Thryssa baelama* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Thryssa hamiltoni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **CLUPEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Herklotsichthys quadrimaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sardinella melanura* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sardinella zunasi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SILURIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PLOTOSIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Plotosus lineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **AULOPIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **SYNODONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Saurida gracilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Saurida nebulosa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Synodus binotatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Synodus dermatogenys* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Synodus hoshinonis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Synodus jaculum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Synodus ulae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Synodus variegatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Synodus sp. 1* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Synodus sp. 2* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Trachinocephalus myops* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **OPHIDIIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CARAPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Encheliophis sagamianus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **OPHIDIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Brotula multibarbata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ophidion muraenolepis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **BYTHITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Brosmophyciops pautzkei* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dinematichthys sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **LOPHIIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ANTENNARIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Antennarius commersoni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Antennarius nummifer* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Antennarius striatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Histrio histrio* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MUGILIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **MUGILIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Crenimugil crenilabis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Mugil cephalus cephalus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ATHERINIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ATHERINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Atherinomorus lacunosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Atherion elymus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hypoatherina valenciennei* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **BELONIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **BELONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ablennes hians* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Platybelone argalus platyura* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Strongylura anastomella* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Tylosurus acus melanotus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Tylosurus crocodilus crocodilus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **HEMIRAMPHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hemiramphus lutkei* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hyporhamphus dussumieri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **BERYCIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **MONOCENTRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Monocentris japonica* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **HOLOCENTRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Myripristis amaena* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Myripristis berndti* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Myripristis botche* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Myripristis chryseres* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Myripristis greenfieldi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Myripristis hexagona* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Myripristis kuntee* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Myripristis vittata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Neoniphon aurolineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Neoniphon sammara* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ostichthys archiepiscopus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ostichthys japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectrypops lima* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pristilepis oligolepis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sargocentron caudimaculatum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sargocentron diadema* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sargocentron ittodai* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sargocentron melanospilos* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sargocentron microstoma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sargocentron punctatissimum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sargocentron spiniferum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sargocentron spinosissimum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sargocentron tiere* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **GASTEROSTEIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **SYNGNATHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acentronura tentaculata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Campichthys sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cosmocampus banneri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Doryrhamphus excisus excisus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Doryrhamphus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hippocampus histrix* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Syngnathus schlegeli* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Trachyrhamphus bicoarctatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **AULOSTOMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aulostomus chinensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **FISTULARIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Fistularia commersonii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fistularia petimba* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SCORPAENIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **DACTYLOPTERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dactyloptena orientalis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dactyloptena peterseni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SCORPAENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Apistus carinatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dendrochirus zebra* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ebosia bleekeri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Erosa erosa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Inimicus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Neosebastes entaxis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pontinus macrocephalus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pterois antennata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pterois volitans* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scorpaenodes littoralis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scorpaenodes varipinnis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scorpaenopsis brevifrons* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scorpaenopsis diabolus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scorpaenopsis oxycephala* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sebastapistes cyanostigma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sebastapistes galactacma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sebastapistes tinkhami* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Synanceia verrucosa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CARACANTHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Caracanthus maculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Caracanthus unipinna* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PLATYCEPHALIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eurycephalus otaitensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PERCIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **SERRANIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Aethaloperca rogaa* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Anyperodon leucogrammicus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Aulacocephalus temmincki* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Caprodon schlegelii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cephalopholis argus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cephalopholis igarashiensis* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cephalopholis miniata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cephalopholis sexmaculata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cephalopholis sonnerati* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cephalopholis spiloparaea* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cephalopholis urodeta* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromileptes altivelis* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus akaara* | EN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus areolatus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus awoara* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus bruneus* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus caeruleopunctatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus chlorostigma* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus cyanopodus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus epistictus* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus fasciatus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus hexagonatus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus lanceolatus* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus latifasciatus* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus macrospilos* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus maculatus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus melanostigma* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus merra* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus morrhua* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus octofasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus ongus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus poecilonotus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus polyphekadion* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus quoyanus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus retouti* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus rivulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus socialis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus stictus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus tauvina* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epinephelus trimaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Grammistes sexlineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Holanthias borbonius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Holanthias flagris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Holanthias unimaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Liopropoma japonicum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Liopropoma maculatum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Liopropoma mitratum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Liopropoma susumi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Liopropoma susumi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectranthias kamii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectranthias kelloggi azumanus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectranthias longimanus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pogonoperca punctata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudanthias caudalis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudanthias cooperi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudanthias pascalus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudanthias sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudanthias squamipinnis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudanthias taira* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudanthias ventralis ventralis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudogramma polyacanthum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sacura margaritacea* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Saloptia powelli* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Triso dermopterus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Variola louti* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ACROPOMATIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Doederleinia berycoides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PSEUDOCHROMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pseudochromis fuscus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudochromis marshallensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PLESIOPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acanthoplesiops hiatti* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plesiops coeruleolineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PRIACANTHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cookeolus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Heteropriacanthus cruentatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Priacanthus hamrur* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Priacanthus macracanthus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pristigenys niphonia* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **APOGONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Apogon bandanensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon caudicinctus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon cookii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon crassiceps* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Apogon cyanosoma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon doederleini* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon endekataenia* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon fukuii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon kallopterus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon lineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon nigrofasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon novemfasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Apogon semilineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Archamia dispilus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Archamia fucata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cheilodipterus macrodon* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cheilodipterus quinquelineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fowleria variegata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudamia rubra* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudamiops sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Siphamia majimai* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Siphamia versicolor* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Siphamia sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MALACANTHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Malacanthus brevirostris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ECHENEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Echeneis naucrates* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Phtheirichthys lineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Remorina albescens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **RACHYCENTRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Rachycentron canadum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Remora remora* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CARANGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Alectis ciliaris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Atropus atropos* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Carangoides ferdau* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Carangoides fulvoguttatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Carangoides orthogrammus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Carangoides plagiotaenia* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Caranx ignobilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Caranx lugubris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Caranx melampygus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Caranx papuensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Caranx sexfasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Decapterus kurroides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Decapterus macarellus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Decapterus maruadsi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Decapterus russelli* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Decapterus tabl* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Elagatis bipinnulata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Kaiwarinus equula* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parastromateus niger* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudocaranx dentex* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scomberoides lysan* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Selar crumenophthalmus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Seriola dumerili* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Seriola lalandi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Seriola quinqueradiata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Seriola rivoliana* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Trachinotus baillonii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Trachurus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Uraspis helvola* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **EMMELICHTHYIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Emmelichthys struhsakeri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Erythrocles schlegelii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Erythrocles scintillans* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **LUTJANIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aphareus furca* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Aphareus rutilans* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Aprion virescens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Etelis carbunculus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Etelis coruscans* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus bohar* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus fulviflamma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus fulvus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus gibbus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus kasmira* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus monostigma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus rivulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus rufolineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus russellii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus sebae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus stellatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lutjanus vaigiensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Macolor niger* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Paracaesio caerulea* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Paracaesio kusakarii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Paracaesio sordida* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Paracaesio xanthura* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pristipomoides argyrogrammicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pristipomoides auricilla* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pristipomoides filamentosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pristipomoides flavipinnis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pristipomoides sieboldii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pristipomoides zonatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Randallichthys filamentosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CAESIONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Caesio caerulaurea* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Caesio cuning* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Caesio lunaris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Caesio teres* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pterocaesio chrysozona* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pterocaesio marri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pterocaesio tile* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **LOBOTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lobotes surinamensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **GERREIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gerres acinaces* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gerres japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gerres lucidus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gerres oyena* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **HAEMULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Diagramma pictum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hapalogenys mucronatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectorhinchus chaetodonoides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectorhinchus cinctus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectorhinchus flavomaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectorhinchus lessonii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectorhinchus lineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectorhinchus picus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectorhinchus vittatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SPARIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acanthopagrus latus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dentex tumifrons* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **LETHRINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gnathodentex aureolineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnocranius euanus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnocranius griseus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnocranius sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lethrinus haematopterus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Lethrinus lentjan* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lethrinus miniatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lethrinus nebulosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lethrinus reticulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lethrinus rubrioperculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Monotaxis grandoculis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **NEMIPTERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nemipterus virgatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Neomyxus leuciscus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parascolopsis inermis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pentapodus nagasakiensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scolopsis lineata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **POLYNEMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Polydactylus plebeius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Polydactylus sexfilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MULLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Mulloidichthys flavolineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Mulloidichthys pflugeri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Mulloidichthys vanicolensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parupeneus barberinoides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parupeneus bifasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parupeneus chrysopleuron* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parupeneus ciliatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parupeneus cyclostomus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parupeneus heptacanthus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parupeneus indicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parupeneus multifasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parupeneus pleurostigma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parupeneus spilurus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Upeneus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Upeneus moluccensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PEMPHERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pempheris japonica* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pempheris schwenkii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pempheris sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CHAETODONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chaetodon argentatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon auriga* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon auripes* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon baronessa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon bennetti* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon citrinellus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Chaetodon daedalma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon ephippium* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon guentheri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon kleinii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon lineolatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon lunula* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon lunulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon melannotus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon mertensii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon modestus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon nippon* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon ornatissimus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon plebeius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon punctatofasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon quadrimaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon reticulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon speculum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon trifascialis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon ulietensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon unimaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodon vagabundus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coradion altivelis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coradion chrysozonus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Forcipiger flavissimus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Forcipiger longirostris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hemitaurichthys polylepis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hemitaurichthys thompsoni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Heniochus chrysostomus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Heniochus diphreutes* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Heniochus monoceros* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parachaetodon ocellatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **POMACANTHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Apolemichthys trimaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Centropyge bicolor* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Centropyge bispinosa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Centropyge ferrugata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Centropyge flavicauda* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Centropyge flavissimus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Centropyge heraldi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Centropyge interruptus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Centropyge shepardi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Centropyge tibicen* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Centropyge vrolikii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetodontoplus septentrionalis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Genicanthus melanospilos* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Genicanthus semifasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Genicanthus takeuchii* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Genicanthus watanabei* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pomacanthus annularis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pomacanthus imperator* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pomacanthus semicirculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pygoplites diacanthus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PENTACEROTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Evistias acutirostris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pentaceros japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudopentaceros wheeleri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **KYPHOSIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Girella mezina* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Girella punctata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Kyphosus bigibbus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Kyphosus cinerascens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Kyphosus vaigiensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Labracoglossa argentiventris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Microcanthus strigatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **TERAPONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pelates quadrilineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Terapon theraps* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **KUHLIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Kuhlia boninensis* | | EN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Kuhlia mugil* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Kuhlia rupestris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **OPLEGNATHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Oplegnathus fasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Oplegnathus punctatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CIRRHITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cirrhitichthys aprinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cirrhitichthys falco* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cirrhitichthys oxycephalus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cirrhitops hubbardi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cirrhitus pinnulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Neocirrhites armatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Oxycirrhites typus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Paracirrhites arcatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Paracirrhites forsteri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Paracirrhites hemistictus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CHEILODACTYLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Goniistius quadricornis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniistius zebra* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniistius zonatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **POMACENTRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Abudefduf bengalensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Abudefduf notatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Abudefduf sexfasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Abudefduf sordidus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Abudefduf vaigiensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Amphiprion clarkii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Amphiprion frenatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis acares* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis agilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis albomaculata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis alleni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis atripes* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis chrysura* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis flavomaculata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis margaritifer* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis notata notata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis ovatiformis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis vanderbilti* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chromis viridis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chrysiptera biocellata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chrysiptera starcki* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chrysiptera tricincta* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dascyllus aruanus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dascyllus reticulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dascyllus trimaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Neoglyphidodon melas* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Neoglyphidodon nigroris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectroglyphidodon dickii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectroglyphidodon imparipennis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectroglyphidodon johnstonianus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectroglyphidodon lacrymatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plectroglyphidodon leucozonus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pomacentrus chrysurus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pomacentrus coelestis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pomacentrus nagasakiensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stegastes altus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| **LABRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anampses caeruleopunctatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Anampses melanurus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Anampses meleagrides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Anampses twistii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bodianus axillaris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bodianus bilunulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bodianus loxozonus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bodianus mesothorax* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bodianus oxycephalus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bodianus perditio* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cheilinus oxycephalus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cheilinus trilobatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cheilio inermis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Choerodon anchorago* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Choerodon azurio* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cirrhilabrus lunatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coris aygula* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coris batuensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coris dorsomacula* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coris gaimard* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coris picta* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cymolutes torquatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gomphosus varius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Halichoeres hortulanus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Halichoeres margaritaceus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Halichoeres melanurus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Halichoeres melasmapomus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Halichoeres poecilopterus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Halichoeres sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hemigymnus fasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hemigymnus melapterus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hologymnosus annulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hologymnosus doliatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Labroides bicolor* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Labroides dimidiatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Labroides pectoralis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Labropsis manabei* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Labropsis xanthonota* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Macropharyngodon meleagris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Macropharyngodon negrosensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Novaculichthys taeniourus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Novaculops woodi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Oxycheilinus unifasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudocheilinus evanidus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudocheilinus hexataenia* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudocheilinus octotaenia* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudocheilinus tetrataenia* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudocheilinus sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudocoris aurantiofasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudocoris yamashiroi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudodax moluccanus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudojuloides atavai* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudojuloides cerasinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudolabrus eoethinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pteragogus aurigarius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Semicossyphus reticulatus* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stethojulis interrupta terina* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stethojulis maculata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Suezichthys arquatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Suezichthys gracilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Suezichthys soelae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Thalassoma amblycephalum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Thalassoma cupido* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Thalassoma hardwicke* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Thalassoma lunare* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Thalassoma lutescens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Thalassoma purpureum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Thalassoma quinquevittatum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Thalassoma trilobatum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xyrichtys dea* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xyrichtys pavo* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xyrichtys pentadactylus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xyrichtys sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SCARIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Calotomus carolinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Calotomus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chlorurus microrhinos* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chlorurus sordidus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptoscarus vaigiensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scarus altipinnis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scarus festivus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scarus forsteni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scarus frenatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Scarus ghobban* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scarus globiceps* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scarus niger* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scarus obishime* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scarus oviceps* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scarus rubroviolaceus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scarus schlegeli* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **AMMODYTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ammodytoides kimurai* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **URANOSCOPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Uranoscopus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PINGUIPEDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Parapercis millipunctata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parapercis sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **TRICHONOTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Trichonotus filamentosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Trichonotus setiger* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CREEDIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Limnichthys fasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Limnichthys nitidus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **TRIPTERYGIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Enneapterygius etheostomus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Enneapterygius miyakensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Enneapterygius tutuilae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Enneapterygius sp. 1* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Enneapterygius sp. 2* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Helcogramma hudsoni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Helcogramma obtusirostris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Helcogramma striata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Helcogramma sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Norfolkia brachylepis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Norfolkia thomasi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **BLENNIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Alticus saliens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Aspidontus dussumieri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Aspidontus taeniatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cirripectes castaneus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cirripectes imitator* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cirripectes polyzona* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cirripectes variolosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ecsenius lineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Enchelyurus kraussi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Entomacrodus caudofasciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Entomacrodus niuafoouensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Entomacrodus striatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Entomacrodus thalassinusthalassinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Exallias brevis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Glyptoparus delicatulus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Istiblennius edentulus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Mimoblennius atrocinctus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Petroscirtes breviceps* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plagiotremus rhinorhynchos* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plagiotremus tapeinosoma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Praealticus tanegashimae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stanulus talboti* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **GOBIESOCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lepadichthys frenatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CALLIONYMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Diplogrammus xenicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Minysynchiropus kiyoae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Paradiplogrammus corallinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **GOBIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Amblyeleotris ogasawarensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Amblyeleotris periophthalma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Amblyeleotris wheeleri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Amblygobius nocturnus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Amblygobius phalaena* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Asterropteryx semipunctata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bathygobius cocosensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bathygobius cotticeps* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bathygobius fuscus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bathygobius peterophilus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bryaninops amplus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Callogobius sclateri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eviota abax* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eviota albolineata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eviota epiphanes* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eviota prasina* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eviota prasites* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eviota smaragdus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eviota storthynx* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eviota sp. 1* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eviota sp. 2* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eviota sp. 3* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Eviota sp. 4* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fusigobius duospilus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fusigobius neophytus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fusigobius sp.3* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gnatholepis scapulostigma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gobiodon atrangulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gobiodon oculolineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gobiodon quinquestrigatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gobiodon sp. 4* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gobiopsis arenaria* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hetereleotris poecila* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Istigobius campbelli* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Istigobius ornatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Paragobiodon lacunicolus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Priolepis cincta* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Priolepis semidoliata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sueviota lachneri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Tomiyamichthys oni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Trimma okinawae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Valenciennea puellaris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Vanderhorstia ornatissima* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Vanderhorstia sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gobiidae sp.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MICRODESMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nemateleotris helfrichi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Nemateleotris magnifica* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ptereleotris evides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ptereleotris heteroptera* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ptereleotris zebra* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **EPHIPPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Platax teira* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SIGANIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Siganus argenteus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Siganus corallinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Siganus fuscescens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Siganus punctatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Siganus unimaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ZANCLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Zanclus cornutus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ACANTHURIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acanthurus bariene* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus blochii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Acanthurus dussumieri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus leucopareius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus lineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus mata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus nigricans* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus nigrofuscus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus olivaceus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus pyroferus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus thompsoni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus triostegus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthurus xanthopterus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ctenochaetus binotatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ctenochaetus striatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ctenochaetus strigosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Naso annulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Naso brevirostris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Naso hexacanthus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Naso lituratus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Naso maculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Naso unicornis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Naso vlamingii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Paracanthurus hepatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Prionurus scalprum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Zebrasoma flavescens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Zebrasoma scopas* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Zebrasoma veliferum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SPHYRAENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sphyraena barracuda* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sphyraena forsteri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sphyraena helleri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sphyraena japonica* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sphyraena qenie* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SCOMBRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acanthocybium solandri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Auxis rochei* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Auxis thazard* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Euthynnus affinis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnosarda unicolor* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sarda orientalis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scomber australasicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scomber japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| *Thunnus albacares* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PLEUROCECTIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PARALICHTHYIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pseudorhombus arsius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **BOTHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bothus mancus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bothus pantherinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Engyprosopon sp. 1* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Engyprosopon sp. 2* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SOLEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Liachirus melanospilus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **TETRAODONTIFORMES** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **BALISTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Balistapus undulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Balistoides conspicillum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Balistoides viridescens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Canthidermis maculata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Melichthys niger* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Melichthys vidua* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Odonus niger* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudobalistes flavimarginatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudobalistes fuscus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Rhinecanthus aculeatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Rhinecanthus rectangulus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Rhinecanthus verrucosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sufflamen bursa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sufflamen chrysopterum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sufflamen fraenatum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xanthichthys caeruleolineatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xanthichthys mento* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MONACANTHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aluterus monoceros* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Aluterus scriptus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cantherhines dumerilii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cantherhines pardalis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Oxymonacanthus longirostris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Paraluteres prionurus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Paramonacanthus matsuurai* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pervagor janthinosoma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pervagor melanocephalus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stephanolepis cirrhifer* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Thamnaconus modestoides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Thamnaconus tesselatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **OSTRACIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Kentrocapros aculeatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lactoria cornuta* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lactoria diaphana* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lactoria fornasini* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ostracion cubicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ostracion immaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ostracion meleagris meleagris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **TRIODONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Triodon macropterus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **DIODONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chilomycterus reticulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Diodon holocanthus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Diodon hystrix* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Diodon liturosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **TETRAODONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Arothron firmamentum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Arothron hispidus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Arothron meleagris* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Arothron nigropunctatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Arothron stellatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Canthigaster compressa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Canthigaster coronata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Canthigaster epilampra* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Canthigaster janthinoptera* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Canthigaster rivulata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Canthigaster valentini* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chelonodon patoca* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lagocephalus sceleratus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sphoeroides pachygaster* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Takifugu xanthopterus* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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# 3-2-7. The Hermaypic corals of the Ogasawara's Coastal Area

*** Red List categories of IUCN, details are given on the last page.**

Abbreviation of island names

Mk: Mukojima, Nk: Nakodojima, Ym: Yomejima, Kt: Kitanoshima, Ch: Chichijima, Ani: Anijima, Ot: Ototojima, Ns: Nishijima, Hg: Higashijima, Mn: Minamijima, Ha: Hahajima, Mkh: Mukohjima, Hr: Hirajima, Ane: Anejima, Im: Imotojima, Me: Meijima, Ki: Kita-iwoto, Mi: Minami-iwoto, Nsn: Nishinoshima, Or: Other, MIG: Mukojima Island Group, CIG: Chichijima Island Group, HIG: Hahajima Island Group, OOA: Other than Ogasawara Archipelago, Unidentified: Unidentified Islands.

| Scientific name | IUCN RL* | MOE RL | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **SCLERACTINIA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ASTROCOENIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Stylocoeniella armata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stylocoeniella guentheri* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **POCILLOPORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pocillopora damicornis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pocillopora elegans* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pocillopora eydouxi* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pocillopora meandrina* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pocillopora verrucosa* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pocillopora woodjonesi* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Seriatopora aculeata* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Seriatopora caliendrum* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Seriatopora hystrix* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Seriatopora stellata* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stylophora pistillata* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ACROPORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Montipora aequituberculata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora caliculata* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora efflorescens* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora foveolata* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora grisea* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora hoffmeisteri* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora informis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora monasteriata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora spongodes* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora tuberculosa* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora undata* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montipora verrucosa* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Anacropora puertogalerae* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Anacropora spinosa* | EN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora abrotanoides* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora aculeus* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora acuminata* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora aspera* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora bifurcata* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

| Scientific name | IUCN RL* | MOE RL | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Acropora caroliniana* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora cophodactyla* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora cuneata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora danai* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora digitifera* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora divaricata* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora florida* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora formosa* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora gemmifera* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora globiceps* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora grandis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora granulosa* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora listeri* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora microphthalma* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora millepora* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora monticulosa* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora multiacuta* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora nasuta* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora palifera* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora rambleri* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora robusta* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora samoensis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora subglabra* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora tenella* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora tenuis* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora teres* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora valida* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora vaughani* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora verweyi* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acropora willisae* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Astreopora gracilis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Astreopora listeri* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Astreopora myriophthalma* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Astreopora randalli* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Astreopora scabra* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PORITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Porites annae* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Porites australiensis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Porites cylindrica* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Porites densa* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Porites horizontalata* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Porites lichen* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

| Scientific name | IUCN RL* | MOE RL | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Porites lutea* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Porites murrayensis* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Porites napopora* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Porites nigrescens* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Porites rus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Porites vaughani* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stylaraea punctata* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniopora columna* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniopora djiboutiensis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniopora fruticosa* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniopora lobata* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniopora minor* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniopora somaliensis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniopora tenuidens* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Alveopora fenestrata* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Alveopora spongiosa* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SIDERASTREIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Psammocora contigua* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Psammocora digitata* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Psammocora haimeana* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Psammocora obtusangula* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Psammocora stellata* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Psammocora vaughani* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coscinaraea columna* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **AGARICIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pavona bipartita* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pavona cactus* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pavona clavus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pavona decussata* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pavona duerdeni* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pavona explanulata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pavona frondifera* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pavona maldivensis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pavona minuta* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pavona varians* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pavona venosa* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptoseris explanata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptoseris foliosa* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptoseris gardineri* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptoseris hawaiiensis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptoseris mycetoseroides* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptoseris papyracea* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

| Scientific name | IUCN RL* | MOE RL | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Leptoseris scabra* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptoseris solida* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gardineroseris planulata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coeloseris mayeri* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pachyseris rugosa* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **FUNGIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cycloseris costulata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cycloseris tenuis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cycloseris vaughani* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Diaseris fragilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cantharellus jebbi* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Heliofungia actiniformis* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fungia concinna* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fungia danai* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fungia fungites* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fungia horrida* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fungia paumotensis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fungia scutaria* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ctenactis echinata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Herpolitha limax* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Herpolitha weberi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Polyphyllia talpina* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Halomitra clavator* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Halomitra pileus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sandalolitha dentata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sandalolitha robusta* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Podabacia crustacea* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **OCULINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Galaxea astreata* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Galaxea fascicularis* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Galaxea horrescens* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Galaxea paucisepta* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acrhelia horrescens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PECTINIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Echinophyllia aspera* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Oxypora crassispinosa* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Oxypora glabra* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Mycedium elephantotus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Physophyllia ayleni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pectinia alcicornis* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pectinia paeonia* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MUSSIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Scolymia australis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthastrea amakusensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthastrea brevis* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthastrea echinata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthastrea hemprichii* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthastrea ishigakiensis* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthastrea regularis* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthastrea rotundoflora* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lobophyllia corymbosa* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lobophyllia hataii* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lobophyllia hemprichii* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lobophyllia robusta* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Symphyllia agaricia* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Symphyllia valenciennesii* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MERULINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Boninastrea boninensis* | DD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hydnophora exesa* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hydnophora grandis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hydnophora microconos* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hydnophora rigida* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Merulina ampliata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Merulina scabricula* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scapophyllia cylindrica* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **FAVIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Favia danae* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favia favus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favia maritima* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favia matthaii* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favia maxima* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favia pallida* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favia rotumana* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favia marshae* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favia truncatus* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Barabattoia amicorum* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Barabattoia laddi* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favites abdita* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favites flexuosa* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favites halicora* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favites pentagona* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Favites russelli* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniastrea aspera* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniastrea australiensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Goniastrea edwardsi* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniastrea palauensis* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniastrea pectinata* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Goniastrea retiformis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Platygyra daedalea* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Platygyra pini* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Platygyra ryukyuensis* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptoria irregularis* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptoria phrygia* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Oulophyllia crispa* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Oulophyllia levis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montastrea colemani* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montastrea curta* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montastrea magnistellata* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Montastrea valenciennesi* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plesiastrea versipora* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Diploastrea heliopora* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptastrea bottae* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptastrea purpurea* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Leptastrea transversa* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cyphastrea agassizi* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cyphastrea chalicidicum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cyphastrea microphthalma* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Cyphastrea serailia* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Echinopora lamellosa* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CARYOPHYLLIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Euphyllia ancora* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Euphyllia cristata* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Euphyllia glabrescens* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Euphyllia paraancora* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plerogyra eurysepta* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plerogyra simplex* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Plerogyra sinuosa* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Physogyra lichtensteini* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **DENDROPHYLLIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Turbinaria irregularis* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Turbinaria mesenterina* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Turbinaria reniformis* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Turbinaria stellulata* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **COENOTHECALIA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **HELIOPORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Heliopora coerulea* | VU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| **STOLONIFERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **TUBIPORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tubipora musica* | NT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MILLEPORINA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **MILLEPORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Millepora platyphylla* | LC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

## Reference

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# *3-2-8. The Insects of the Ogasawara Islands*

*** Red List categories of IUCN, details are given on the last page.**
**** Red List Categories of Japanese Ministry of the Environment, details are given on the last page.**

Abbreviation of island names
Mk: Mukojima, Nk: Nakodojima, Ym: Yomejima, Kt: Kitanoshima, Ch: Chichijima, Ani: Anijima, Ot: Ototojima, Ns: Nishijima, Hg: Higashijima, Mn: Minamijima, Ha: Hahajima, Mkh: Mukohjima, Hr: Hirajima, Ane: Anejima, Im: Imotojima, Me: Meijima, Ki: Kita-iwoto, Mi: Minami-iwoto, Nsn: Nishinoshima, Or: Other, MIG: Mukojima Island Group, CIG: Chichijima Island Group, HIG: Hahajima Island Group, OOA: Other than Ogasawara Archipelago, Unidentified: Unidentified Islands.

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| **COLLEMBOLA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PSEUDACHOURITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Brachystomella* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **HYPOGASTRURIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ceratophysella denticulata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **ONYCHIURIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Protaphorura* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **ISOTOMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Folsomides parvulus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Isotomiella minor* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | ● | | ● | |
| *Proisotoma minima* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Desoria sensibilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **ENTOMOBRYIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Heteromurus tenuicornis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Lepidosira* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **PARONELLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Salina affinis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **NEELIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Megalothorax minimus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **SMINTHURIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sphaeridia pumilus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **PROTURA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **EOSENTOMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eosentomon udagawai* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **ACERENTOMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Baculentulus tosanus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **DIPLURA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CAMPODEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lepidocampa weberi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **PARAJAPYGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Parajapyx* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **THYSANURA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **LEPISMATIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| *Acrotelsa collaris* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Ctenolepisma longicaudata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **NICOLETIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nipponatelura ?* sp. | | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | |
| **ODONATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **AGRIONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Boninagrion ezoin* | CR | VU | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | | | ● | | ● | | | | | |
| *Ischnura senegalensis* | | | | | ● | ● | ● | | | ● | ● | ● | ● | ● | | ● | | ● | ● | ● | | | ● | ● | | ● | | | | | |
| **LESTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Indolestes boninensis* | CR | CR+EN | ● | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | | | | |
| **LIBELLAGINIDAE (CHLOROCYPHIDAE AUCT.)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Rhinocypha ogasawarensis* | CR | CR+EN | ● | ● | | | | | | | ● | ● | ● | | | | | ● | ● | | | ● | | | | ● | | | | | |
| **AESCHNIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anaciaeschna jaspidea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Anax guttatus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Anax parthenope julius* | | | | | | | | | | | ● | | ● | | | ● | | ● | ● | | | | | | | ● | | | | | |
| **CORDULIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hemicordulia ogasawarensis* | EN | CR+EN | ● | ● | | | | | | | ● | ● | ● | | | | | ● | ● | | | ● | | | | ● | | | | | |
| **LIBELLULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Agrionoptera sanguinolenta sanguinolenta* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Boninthemis insularis* | CR | VU | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | | ● | | ● | ● | | | ● | |
| *Diplacodes bipunctatus* | | NT | | | ● | ● | ● | | | ● | ● | ● | ● | | | ● | | ● | ● | ● | | ● | | ● | | ● | | | | | |
| *Macrodiplax cora* | | | | | | | | | | | ● | | | | | | | ● | | ● | | | | | | ● | | | | | |
| *Pantala flavescens* | | | | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | | ● | | ● | | ● | | ● | |
| *Tramea transmarina euryale* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Tramea virginia* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **EMBIOPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **OLIGOTOMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Oligotoma japonica* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **BLATTARIA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PYCNOSCELIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pycnoscelis surinamensis* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | | ● | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| **BLATTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Periplaneta americana* | | | | | ● | ● | | | | ● | ● | ● | ● | | | ● | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Periplaneta australasiae* | | | | | ● | ● | ● | | | ● | ● | | ● | ● | | | | ● | ● | ● | | | | | | ● | ● | ● | | ● | |
| **BLATTELLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Blattella lituricollis* | | | | | | ● | | | | ● | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Onchostylus pallidiolus boninensis* | | | ● | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | ● | ● | | | ● | | | | | |
| *Onchostylus vilis* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | ● | | | ● | ● | | | | | | | ● | | | | | |
| *Supella longipalpa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | ● |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **MANTODEA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **MANTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tenodera aridifolia* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Orthodera burmeisteri* | | | | | | | | | | | ● | ● | ● | ● | | | | ● | | | | | | | | | | | | |
| **ISOPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **KALOTERMITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cryptotermes domesticus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Glyptotermes nakajimai* | | | | | | | | | | | ● | | | | | | | ● | ● | ● | | | | | | ● | | | | |
| **RHINOTERMITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Coptotermes formosanus* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | ● | ● | |
| *Reticulitermes speratus speratus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **ORTHOPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **GRYLLACRIDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Neanias boninensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| **GRYLLOTALPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gryllotalpa fossor* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **GRYLLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gryllodes sigillatus* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Teleogryllus boninensis* | | | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| *Velarifictorus politus* | | NT | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | |
| **TRIGONIDIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Caconemobius takarai* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Polionemobius mikado* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Trigonidium ogasawarense* | | | ● | | ● | ● | | | | ● | ● | | ● | ● | | ● | | ● | ● | | | | | | | ● | | | | |
| *Trigonidium pallipes* | | | | | ● | ● | ● | | | ● | ● | | ● | | | ● | | ● | ● | | | | | | | ● | | | | |
| **ENEOPTERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aphonoides rufescens* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Duolandrevus major* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| **MOGOPLISTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ectatoderus* sp. | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Ornebius longipennis longipennis* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Ornebius bimaculatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | ● | | ● | ● | | | ● | |
| *Ornebius kanetataki* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **MYRMECOPHILIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Myrmecophilus formosanus* | | | | | | | | | | | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | |
| **TETTIGONIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Conocephalus maculatus* | | | | | ● | ● | ● | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | |
| *Euconocephalus pallidus* | | | | | ● | ● | ● | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Hexacentrus fuscipes* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| **PHANEROPTERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Ducetia boninensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| **ACRIDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Locusta migratoria* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | |
| *Ogasawaracris gloriosus* | | DD | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Oxya ogasawarensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **DERMAPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ANISOLABIDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anisolabis maritima* | | | | | ● | ● | ● | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Euborellia annulipes* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| **SPONGIPHORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Labia curvicauda* | | | | | ● | ● | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| **PSOCOPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **LEPIDOPSOCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Echmepteryx lunulata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Echmepteryx madagascariensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **CAECILIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Caecilius novoguinensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **PERIPSOCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ectopsocus boharti* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Ectopsocus ornatoides* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Peripsocus pauliani* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PSEUDOCAECILIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pseudocaecilius criniger* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **PHILOTARSIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Haplophallus boninensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **PSOCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ptycta nigromaculata* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **MALLOPHAGA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **TRICHODECTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Felicola subrostratus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **THYSANOPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **THRIPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Echinothrips americanus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Elixothrips brevisetis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Heliothrips haemorrhoidalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Hercinothrips femoralis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Selenothrips rubrocinctus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Scirtothrips dorsalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Thrips hawaiiensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Thrips tabaci* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Thrips palmi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **PHLAEOTHRIPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Azaleothrips moundi* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Bactrothrips honoris* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Gynaikothrips ficorum* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | ● | ● | |
| *Haplothrips gowdeyi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Holothrips hasegawai* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Holothrips ogasawarensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Nesothrips lativentris* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Stephanothrips boninensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Stephanothrips formosanus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Stephanothrips metaleucus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Stephanothrips occidentalis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **HEMIPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CIXIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Oliarus boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Oliarus ogasawarensis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **DELPHACIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ugyops vittatus* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Stenocranus ogasawarensis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Epeurysa nawaii* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| *Hosunka hakonensis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Nycheuma cognatum* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Peregrinus maidis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sardia rostrata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Sogatella kolophon* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sogatella longifurcifera* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Toya propinqua* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Perkinsiella saccharicida* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **DERBRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tempora boninensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **DICTYOPHARIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dicyophora* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **TROPIDUCHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Kallitaxila auster auster* | | | ● | | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Kallitaxila auster murcia* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Kallitaxila boninensis* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Kallitaxila crini* | | | ● | | | | | | | | | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Kallitaxila suturalis* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mesepora boninensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Mesepora issiformis* | | | ● | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Mesepora ogasawarana* | | | ● | | | | | | | | ● | ● | ● | | | ● | | ● | ● | | | | | | | ● | | | | |
| **FLATIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Geisha distinctissima* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| *Mimophantia maritima* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| **RICANIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Euricania fascialis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Orosanga dido* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Orosanga laverna* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Orosanga triton* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Orosanga xantho* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Ricanoides flabellum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| **CICADIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Meimuna boninensis* | | | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | | | | | ● | | | | |
| **APHROPHORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aphrophora bizonalis* | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Aphrophora bicolor* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ikedana latipennis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| **MEMBRACIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gargara genistae* | | | | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | | | | | | | | | | | | |
| **DELTOCEPHALIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Coelidia insularis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coelidia nigrifrons* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Coelidia ogasawarensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Coelidia virescens* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Lodiana boninensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Thagria fuscovenosa* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Athysanus ogasawarensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Balclutha incisa* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Balclutha kuroiwae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Balclutha ogasawarensis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Balclutha rosea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Cicadulina bipunctella* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Doratulina grandis* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | | | | | |
| *Exitianus fusconervosus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Exitianus nanus* | | | | | | | | | | | ● | | ● | | | ● | | ● | | | | | | | | | | | | |
| *Irinula erythrocephala* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Batracomorphus ogasawarensis* | | | ● | | | | | | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Nirvana orientalis* | | | | | | | | | | | ● | ● | | | | | | | ● | | | | | | | ● | | | | |
| *Bhatia boninensis* | | | ● | | | | | | | | | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |

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| *Alebroides boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Empoasca boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Empoasca setsukoae* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Jacobiasca boninensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Tartessus ferrugineus proximus* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **APHALARIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Paurocephala albescens* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| **PSYLIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cacopsylla boninofatsiae* | | VU | ● | | | | | | | | ● | | | | | | | ● | ● | ● | | | | | ● | ● | | | ● | |
| *Cacopsylla insularis* | | | ● | | | | | | | | | ● | | | | | | ● | ● | ● | | | | | ● | | | | | |
| *Cacopsylla maculipennis* | | VU | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | ● | | | ● | |
| *Heteropsylla cubana* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Megatrioza swezeyi* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | | | | | | | | | | | | |
| **CARSIDARIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Mesohomotoma camphorae* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | ● | | | ● | |
| **TRIOZIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Leptynoptera sulfurea* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | | ● | | | | | ● | ● | | | ● | |
| **APHIDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aphis craccivora craccivora* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Aphis gossypii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lipaphis erysimi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Melanaphis bambusae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Myzus persicae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pentalonia nigronervosa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Rhopalosiphum maidis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Schizaphis* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Sitobion akebiae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Toxoptera aurantii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| **MARGARODIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Icerya aegyptiaca* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **PSEUDOCOCCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Allotrionymus boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Allotrionymus chichijimensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Allotrionymus multipori* | | | ● | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | |
| *Antonina crawii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Boninococcus miscanthi* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chaetococcus bambusae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chorizococcus ilu* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dysmicoccus boninsis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dysmicoccus brevipes* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Heliococcus myopori* | | | | | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | |
| *Neoripersia ogasawarensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Palmicultor palmarum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Phenacoccus madeirensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Planococcus citri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pseudococcus ogasawarensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| **COCCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ceroplastes floridensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ceroplastes hesperidum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coccus longulus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coccus moestus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Coccus viridis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eucalymnatus tessellatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parasaissetia nigra* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pulvinaria aurantii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pulvinaria psidii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Saissetia coffeae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● |
| *Saissetia oleae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ASTEROLECANIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Asterolecanium bambusae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Asterolecanium coronatum* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **DIASPIDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lopholeucaspis cockerelli* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Genaparlatoria pseudaspidiotus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Gymnaspis aechmeae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parlatoria cinerea* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Parlatoria pergandii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Parlatoria proteus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Odonaspis secreta* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Abgrallaspis cyanophylli* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Aonidiella aurantii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Aonidiella citrina* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Aspidiotus destructor* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chrysomphalus dictyospermi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chrysomphalus ficus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hemiberlesia cydniae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hemiberlesia lataniae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hemiberlesia rapax* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Melanaspis marlatti* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Acanthomytilus arii* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Andaspis hawaiiensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Howardia biclavis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Ischnaspis longirostris* | | | | | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | ● |
| *Lepidosaphes beckii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lepidosaphes ceodes* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lepidosaphes gloverii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lepidosaphes machili* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lepidosaphes ogasawarensis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lepidosaphes pallida* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lepidosaphes pini* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Lepidosaphes schimae* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Lepidosaphes tokionis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Aulacaspis rosae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● |
| *Fiorinia fioriniae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fiorinia japonica* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fiorinia pinicola* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Kuwanaspis howardi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pinnaspis aspidistrae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pinnaspis buxi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudaulacaspis cockerelli* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Pseudaulacaspis pentagona* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SCHIZOPTERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hypselosoma* sp. | | | ● | | | | | | | | | ● | ● | | | | | ● | ● | | | | | | ● | | | | | ● |
| **VELIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Microvelia douglasi* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | ● |
| *Microvelia* sp. | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Xiphovelia boninensis* | | VU | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | ● |
| **GERRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Halobates germanus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Halobates sericeus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● |
| *Limnogonus boninensis* | | NT | ● | ● | | | | | | | ● | ● | ● | ● | | | | ● | | | | | | | | | | | | |
| **SALDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Saldula boninana* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● |
| **GELASTOCORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nerthra macrothorax* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| **NOTONECTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anisops ogasawarensis* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | | | | | | | | | | | | ● |
| **MIRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Fulvius anthocoroides* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Pilophorus* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Sthenaridea piceonigra* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Sthenaridea rufescens* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Campylomma boharti* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Campylomma boninensis boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Campylomma chichijima* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Campylomma chinense* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Campylomma livida* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Moissonia punctata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Tytthus chinensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Nesidiocoris tenuis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Deraeocoris ryukyuensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Creontiades brevis* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Lygocorias boninensis* | | NT | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | ● | | ● | |
| *Prolygus bakeri* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Taylorilygus apicalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | ● | | ● | |
| *Trigonotylus tenuis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **NABIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nabis kinbergii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | ● |
| **ANTHOCORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bilia pilosa* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Kitocoris hahajima* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Kitocoris omura* | | NT | ● | | ● | | | | | ● | ● | | ● | | | | | ● | | | | | | | | | | | | |
| *Montandoniola moraguesi* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Orius strigicollis* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| **TINGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Omoplax desecta* | | | ● | | | | | | | | ● | ● | ● | ● | | | | ● | ● | | | | | | ● | | | | | |
| **REDUVIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Empicoris minutus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Empicoris rubromaculatus* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Empicoris tesselatoides* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | |
| *Empicoris toshinobui* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Gardena* sp. | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Ectrychotes andreae* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Haematoloecha rufescens* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| **ARADIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Brachyrhynchus membranaceus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Calisius* sp. | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Carventus* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Neuroctenus pacificus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Neuroctenus palauensis* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |

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| *Zimera micronesica* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **LYGAEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Botocudo* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Clerada apicicornis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Gastrodes grossipes japonicus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Geocoris proteus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Horridipamera nietneri* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Horridipamera inconspicua* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Metochus abbreviatus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Nysius caledoniae* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pachybrachius nigriceps* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Paromius gracilis* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Stigmatonotum geniculatum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **ALYDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Leptocorisa acuta* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Leptocorisa chinensis* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **COREIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cletus trigonus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **RHOPALIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Liorhyssus hyalinus* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| **CYDNIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Geotomus pygmaeus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Macroscytus japonensis* ? | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **PENTATOMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eysarcoris insularis* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Nezara vividula* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Plautia cyanoviridis* | | | ● | | ● | | ● | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| **NEUROPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **HEMEROBIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hemerobius* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Micromus timidus* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **CHRYSOPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chrysoperla furcifera* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Mallada alcestes* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mallada basalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mallada boninensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Plesiochrysa oceanica* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Plesiochrysa remota* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudomallada alcestes* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MYRMELEONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Distoleon bistrigatus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Distoleon boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Distoleon parvulus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **COLEOPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **CUPEDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tenomerga mucida* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CICINDELIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cicindela bonina* | | CR+EN | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| **CARABIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Paratachys sexgutatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Paratachys* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Tachyura boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Morion boninense* | | VU | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Colpodes boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Colpodes laetus* | | CR+EN | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | ● | | ● | |
| *Colpodes yamaguchii* | | CR+EN | ● | | | | | | | | | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Gnathaphanus licinoides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Stenolophus kusamai* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Stenolophus quinquepustulatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Badister* sp. 1 | | | ● | | | | | | | | ● | | | ● | | | | ● | | | | | | | | | | | | |
| *Badister* sp. 2 | | | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Badister* sp. 3 | | | ● | | | | | | | | | | | ● | | | | ● | | | | | | | | | | | | |
| *Chlaenius ikedai* | | CR+EN | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Chlaenius flaviguttatus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Perigona nigriceps* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Perigona plagiata* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Calleida lepida* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Dolichoctis striatus striatus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Dromius quadraticollis* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | |
| **DYTISCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Copelatus ogasawarensis* | | | ● | ● | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | | | ● | | | | | |
| *Cybister tripunctatus orientalis* | | CR+EN | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Rhantus pulverosus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● |
| **HYDROPHILIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Coelostoma stultum* | | | | | ● | | | | | ● | | | | | | | | | ● | | | | | | ● | | | | | |
| *Dactylosternum abdominale* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Enochrus japonicus* | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | | | | | | | | |
| *Enochrus simulans* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Regimbartia attenuata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **HISTERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Hypocaccus varians hatsune* | | | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Saprinus cyaneus auricollis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Carcinops pumilio* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Eulomalus* sp. | | | | | ● | | | | | ● | | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Platylomalus kusuii* | | | ● | | ● | | | | | ● | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Atholus depistor* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hololepta depressa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **PTILIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ptinella* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **STAPHYLINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Phloeonomus* sp. | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Articerodes kishimotoi* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Articerodes kurosawai* | | | ● | | | | | | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Erchomus minimus* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Paracilea insulicola* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Paracilea* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Aleochara parens* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Aleochara* sp. | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Sepedophilus* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Bryothinusa minuta* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Dictyon insulicola* | | | ● | | ● | | | | | ● | | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Falagria concinna* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Leptusa* ? sp. | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Myllaena japonica* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Oligota* sp. | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Gyrophaena cicatricola* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Zyras* sp. | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Scaphisoma perkinsi* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Scaphisoma tricolor* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Eleusis terminata* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Paralispinus exiguus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Nacaeus longulus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Neolosus* sp. | | | | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | | |
| *Thoracophorus certatus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Anotylus glaerosus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Carpelimus siamensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Carpelimus* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Oxytelus incisus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Oxytelus piceus* ? | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Stenus rugipennis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Astenus chloroticus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Astenus leptocerus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Lathrobium unicolor* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Lithocharis nigriceps* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Medon* ? sp. 1 | | | ● | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Medon* ? sp. 2 | | | ● | | | | | | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Medon* ? sp. 3 | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Procirrus lewisii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Rugilus ceylanensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Phacophallus parumpunctatus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Scopaeus viriliformis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | ● | | |
| *Stilicopsis setigera* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Leptacinus angustus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Sunius debilicornis* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Diochus* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Gabrius* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Gabronthus maritimus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Philonthus aeneipennis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Philonthus discoideus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Philonthus flavocinctus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Philonthus peliomerus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Philonthus quisquiliarius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Philonthus rectangulus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **SCYDMAENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cephennodes mizunoi* | | | ● | | | | | | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Euconnus* sp. | | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | |
| **LUCANIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aegus ogasawarensis ogasawarensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Aegus ogasawarensis chichijimaensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Figulus boninensis* | | | ● | | | ● | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | | | ● | | | | | |
| **SCARABAEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ataenius pacificus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Neotrichiorhyssemus esakii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Blitopertha orientalis* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Ohkubous ferrieri* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Protaetia fusca* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Protaetia orientalis submarumorea* | | | | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| **PTILODACTYLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ptilodactyla* sp. | | | | | | | | | | | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| **BUPRESTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Buprestis haemorrhoidalis japanensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● |
| *Chalcophora japonica japonica* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Chalcophora yunnana satzumae* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Chrysobothris boninensis boninensis* | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| *Chrysobothris boninensis suzukii* | | CR+EN | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Chrysochroa holstii* | | | ● | ● | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Kurosawaia yanoi* | | NT | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | ● | | ● | | ● | | | | | |
| *Tamamushia virida virida* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | ● | | | | ● | | | | | |
| *Tamamushia virida fujitai* | | CR+EN | ● | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | | |
| *Agrilus boninensis* | | DD | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | ● |
| *Agrilus suzukii* | | DD | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **ELATERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Agrypnus hypnicola* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Lacon boninensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | | ● | | | ● | | | | | |
| *Paracalais berus* | | | | | | | | | | | ● | | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Cryp talaus larvatus pini* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Tetrigus fujitai* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Tetrigus kusuii* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Haterumelater bifoveolatus* | | | | | | | | | | | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Megapenthes kusuii* | | | ● | | ● | | | | | ● | ● | | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Megapenthes makiharai* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ischiodontus langfordi* | | | ● | | ● | | | | | ● | ● | | ● | | | | | ● | ● | ● | | | | | | ● | | ● | | ● | |
| *Podeonius yamamotoi* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Silesis musculus musculus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Melanotus boninensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Neodiploconus boninensis* | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | ● | | | | | | ● | ● | | | ● | |
| *Cardiophorus pinguis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Platynychus adjutor adjutor* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Subprotelater hisamatsi* | | | ● | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| **EUCNEMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Euryptychus ishiharai* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Dromaeolus marginatus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Fornax hachijonis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Rhacopus* sp. | | | | | | | | | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **CANTHARIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Caccodes kanekoi* | | | ● | | | | | | | | ● | | | ● | | | | ● | ● | | | | | | | ● | | | | | |
| **NOSODENDRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nosodendron* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **DERMESTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Attagenus undulatus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |

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| *Dermestes ater* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | ● | |
| *Dermestes coarctatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dermestes maculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Orphinus fulvipes* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Thaumaglossa rufocapillata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Trogoderma ornatum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Evorinea iota* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **BOSTRYCHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lyctus brunneus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Heterobostrychus hamatipennis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Xylopsocus castanopterus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| **ANOBIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Falsogastrallus sauteri* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Nicobium hirtum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Oligomerus* ? sp. | | | | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | |
| *Megorama japonicola* | | | | | | | | | | | | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cryptoramorphus boninensis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Dorcatoma* sp. | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Hadrobregmus* ? sp. | | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | |
| **TROGOSSITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tenebroides mauritanicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CLERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tilloidea munin* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | | ● | | | | ● | | ● | | | | | |
| *Tilloidea notata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Necrobia rufipes* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **MELYRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Intybia niponica* | | | | | | | ● | | | ● | | | | | | | | | | | | | | | | | | | | |
| **NITIDULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Carpophilus cingulatoides* | | | | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | |
| *Carpophilus contegens* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Carpophilus dimidiatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Carpophilus marginellus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Carpophilus pilosellus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Urophorus humeralis* | | | | | ● | | | | | ● | ● | | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Haptoncurina motschulskii* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Haptoncus ocularis* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Haptoncus opacus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Epuraea fallax* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Stelidota alternata* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **RHIZOPHAGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Mimemodes japonus* | | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | |
| **PHALACRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Olibrus* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Stilbus polygramma* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | |
| **LAEMOPHLOEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cryptolestes* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nipponophloeus boninensis* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | ● | ● | ● | | ● | |
| *Notolaemus* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Pseudophloeus fuscicornis* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Xylolestes laevior* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| **SILVANIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ahasverus advena* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Cryptomorpha desjardinsi* | | | | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | ● | | | | | ● | ● | ● | | ● | |
| *Mananus concinnulus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | ● | ● | | | | | |
| *Psammoecus triguttatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Silvanoprus scuticollis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Silvanus* sp. | | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | |
| **CRYPTOPHAGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Curelius japonicus*? | | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | |
| **LANGURIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cryptophilus propinquus* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Toramus taprobanae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● |
| **EROTYLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Neothallis xanthosticta pilippinensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **CERYLONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cerylon* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Euxestus*? sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Thyroderus porcatus* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| **CORYLOPHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Arthrolips* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Parmulus* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sericoderus* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | ● | | ● | |
| *Lewisium* sp. | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | |
| **ENDOMYCHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Trochoideus desjardinsi* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| **MYCHOTHENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Idiophyes boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| **COCCINELLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cryptolaemus montrouzieri* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | |
| *Coccinella septempunctata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |

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| *Coelophora inaequaris* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Harmonia axyridis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Menochilus sexmaculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Nephus boninensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Oenopia scalaris* | | | | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | | | | |
| *Scymnus syoitii* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Scymnus nigrosuturalis* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Rodolia pumila* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Rodolia quadrimaculata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Telsimia nitida* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Epilachna vigintioctopunctata* | | | | | ● | | | | | ● | ● | ● | | ● | | | | ● | | | | | | | | | | | | |
| **LATHRIDIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cartodere*? sp. | | | | | | | | | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **COLYDIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ascetoderes popei* | | | ● | | ● | ● | | | | ● | | | ● | | | | | ● | ● | | | | ● | | | ● | | | | | |
| *Asprecodes ogasawarensis* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cicones angustissimus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Cicones boninus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Colobicus parilis* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Neotrichius cavatus* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Pabula bonina* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Penthelispa vilis* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **MYCETOPHAGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Litargus antennatus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Typhaea stercorea* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ceracis* sp. | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Cis* sp. | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Ennearthron* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Orthocis ornatus*? | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **MELANDRYIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Phloeotrya* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **MORDELLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ermischiella castanea* | | | | | ● | | | | | ● | ● | | ● | ● | | | | ● | ● | | | ● | | | | ● | | | | | |
| *Ermischiella chichijimana* | | DD | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ermischiella hahajimana* | | DD | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Ermischiella nigriceps* | | DD | ● | | | | | | | | ● | | | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Falsomordellistena formosana boninensis* | | DD | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Falsomordellistena pseudalpigena* | | CR+EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Falsomordellistena rosseoloides* | | VU | ● | | | | | | | | ● | | | ● | | | | ● | | | | | | | | | | | | | |

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| *Falsomordellistena watanabei* | | CR+EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Glipa asahinai* | | CR+EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Glipa kurosawai* | | CR+EN | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Glipa ogasawarensis* | | CR+EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Glipostenoda pseudexcisa* | | | ● | | | | | | | | ● | ● | ● | ● | | | | ● | ● | | | | ● | | | ● | | | | | |
| *Hoshihananomia katoi boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Hoshihananomia kusuii* | | CR+EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Hoshihananomia ochrothorax* | | VU | ● | | ● | | | | | ● | ● | ● | | | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Hoshihananomia trichopalpis* | | VU | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mordellina amamiensis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Tomoxia relicta* | | CR+EN | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Variimorda ihai boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Variimorda inomatai* | | CR+EN | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Variimorda* sp. | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **OEDEMERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eobia cinereipennis ogasawarensis* | | | ● | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Eobia matsumurai* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| **ANTHICIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anthelephila imperatrix* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sapintus minamiiwo* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | | ● | |
| *Sapintus oceanicus* | | | | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| **ADERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Mixaderus* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Pseudoloterus ogasawarensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pseudoloterus* ? sp. | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| **SALPINGIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ocholissa hiroyukii* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| **TENEBRIONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Caedius palauensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gonocephalum adpressiforme* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Gonocephalum pottsi* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Bradymerus kondoi* | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | ● | | | | ● | | | | | |
| *Platydema kulzerianum* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Platydema maruseuli* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Platydema subfascia subfascia* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Dioedus tokaranus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Alphitobius diaperinus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Alphitobius laevigatus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Palorus subdepressus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Uloma* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Menephilus atronitens* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Menephilus arciscelis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Schizomma kondoi* | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | | | ● | | | | | |
| *Tetragonomenes boninensis* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | ● | | | | | |
| **CERAMBYCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eurypoda boninensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Megopis sinica savoryi* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Psephactus scabripennis chichijimensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Psephactus scabripennis scabripennis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Arhopalus coreanus* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Cephalallus unicolor* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Allotraeus boninensis* | | VU | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Ceresium signaticolle* | | | ● | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | ● | ● | | | | | |
| *Ceresium simile simile* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Ceresium unicolor unicolor* | | | | | ● | | | | | ● | ● | | ● | ● | | | | ● | ● | | | | | | ● | ● | | | ● | |
| *Chlorophorus boninensis* | | VU | ● | | | | | | | | ● | ● | ● | ● | | ● | | ● | ● | ● | | | | ● | ● | | | | | |
| *Chlorophorus kobayashii* | | VU | ● | | | | | | | | ● | ● | ● | | ● | | | ● | ● | ● | | | | ● | ● | | | | | |
| *Chlorophorus kusamai* | | CR+EN | ● | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | |
| *Chlorophorus masatakai* | | | ● | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | |
| *Chlorophorus minamiiwo minamiiwo* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Chlorophorus minamiiwo kitaiwo* | | | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Chlorophorus muscosus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Perissus ogasawarensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Comusia testacea* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Stromatium longicorne* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Nortia kusuii* | | VU | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Curtomerus flavus* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Merionoeda tosawai* | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | | ● | ● | | | | | |
| *Pseudiphra bicolor bicolor* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Pseudiphra bicolor nigripennis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Xylotrechus ogasawarensis* | | VU | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Xylotrechus takakuwai* | | CR+EN | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Acalolepta boninensis* | | NT | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | ● | | | | | | | |
| *Anoplophora ogasawaraensis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Boninella anoplos* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Boninella degenerata* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | | | ● | | | | | |
| *Boninella hirsuta* | | | ● | | | ● | | | | ● | ● | | ● | | | | | ● | | | | | | | | | | | | |
| *Boninella igai* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | ● | | | | | ● | | | | | |
| *Boninella karubei* | | | ● | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | |
| *Boninella satoi* | | | ● | | | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |

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| *Boninoleips kitajimai* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Bonipogonius fujitai* | | CR+EN | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Coptops hirtiventris* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mutatocoptops rufa* | | | ● | | ● | | | | | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | | | ● | ● | | ● | | | | | |
| *Monochamus alternatus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Nobuosciades bioculata* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | ● | | | ● | ● | ● | | ● | |
| *Nobuosciades lanata* | | NT | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Olenecamptus fukutomii* | | | ● | | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Prosoplus bankii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pterolophia annulata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Pterolophia bigibbera* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pterolophia kusamai* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Rhodopina lewisii lewisii* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **CHRYSOMELIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Argopistes coccinelliformis* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | | ● | | | | | | ● | | | | | |
| *Chaetocnema ingenua* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Longitarsus bimaculatus* | | | | | | | | | | | | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Nonarthra cyanea* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Psylliodes brettinghami* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | ● | | ● | |
| *Callosobruchus chinensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **ANTHRIBIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Notioxenus nakanei* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Araecerus fasciculatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Araecerus varians* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | ● | | ● | | ● | | ● | ● | | | ● | |
| *Araeocerdes elongatus* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Xanthoderopygus ogasawarensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Choragus velutinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Euparius boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Basitropis seinoi* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | ● | | | | ● | | ● | | | | | |
| *Mauia subnotatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Dendropemon ohkurai* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Japanthribus kusuii* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | | ● | | | ● | | | | | |
| *Plintheria caliginosa* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cedus insignis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Litocerus striatifrons* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Litocerus tokarensis ogasawaranus* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Gibber ogasawarensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Phaulimia annulipes* | | | ● | | | | | | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Phaulimia minor* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **BRENTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Cylas formicarius* | | | | | ● | ● | | | | ● | ● | ● | | | | | | ● | | | | | | | | | | ● | | ● | |
| *Cyphagogus boninensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **NANOPHYIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nanophyes proles* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CURCULIONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Myosides seriehispidus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ogasawarazo mater* | | | ● | | | | | | | | | | | | | | | | ● | | | | ● | ● | | ● | | | | | |
| *Ogasawarazo rugosicephalus hahajimaensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Ogasawarazo rugosicephalus rugosicephalus* | | | ● | | ● | | | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| *Ogasawarazo* sp.1 | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Ogasawarazo* sp.2 | | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Ogasawarazo* sp.3 | | | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | | | | |
| *Ogasawarazo* sp.4 or subsp. of *rugosicephalus* | | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | |
| *Ogasawarazo* sp.5 | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Ogasawarazo lineatus* | | DD | ● | | ● | | | | | ● | ● | | ● | ● | | ● | | ● | ● | ● | | | | ● | | ● | | | | | |
| *Torishimazo* sp.1 | | | | | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Torishimazo* sp.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Satozo minamiiwoensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Niphades variegates* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Anthonomus bisignifer* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Buninus chichijimaensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Buninus hahajimaensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Buninus iriei* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Buninus niger* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Buninus seinoi* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Euscepes postfasciatus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Euthyrhinus kojimai* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Gasterocercus ogasawaranus* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Metempleurus nigritus* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Metempleurus ogasawarensis* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Microcryptorhynchus nipponicus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Microcryptorhynchus* sp.1 | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Microcryptorhynchus* sp.2 | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Microcryptorhynchus* sp.3 | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Parempleurus nigronotatus* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Parempleurus nigrovariegatus* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Shirahoshizo insidiosus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Shirahoshizo rufescens* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Simulatacalles simulator* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Watanabezo unguiculatus* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |

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| Gen. nov. near *Acalles.* sp. | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Colobodellus* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Parapries* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Catolethrobius* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Conarthrus ferrugineus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cossonus* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | ● | | | | ● | | | | | |
| *Dryotribus mimeticus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Dryotribus* sp. | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Himatium* sp. | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Isodryotribus* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Leptomimus* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Microtribus splendidus* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Oxydema fusiforme* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pachyops* sp. | | | | | | ● | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Pentarthrum* sp.1 | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Pentarthrum* sp.2 | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Proeces* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Rhinanisus* sp.1 | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Rhinanisus* sp.2 | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Stenoscelis gracilitarsis* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Stenoscelodes* sp.1 | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Stenoscelodes* sp.2 | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Stenotrupis* sp.1 | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Stenotrupis* sp.2 | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Stereoborus* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Toura* sp.1 | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Toura* sp.2 | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Tyttoxydema* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| Gen. nov. sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | ● | | ● | |
| **RHYNCHOPHORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dryophthorus kusuii* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Dryophthorus ogasawaraensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Cosmopolites sordidus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Rhabdoscelus obscurus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Diocalandra frumenti* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Polytus mellerborgi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Prodioctes* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Sitophilus zeamais* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **PLATYPODIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Platypus* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |

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| *Phylloplatypus pandani* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| **SCOLYTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cryphalus fulvus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Hypothenemus birmanus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hypothenemus eruditus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Coccotrypes dactyliperda* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Crytogenius* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Poecilips advena* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Xyleborus formicatus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Xyleborus glabratus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xyleborus perforans* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | ● | |
| *Xyleborus rubricollis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xyleborus saxeseni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xyleborus semiopacus*? | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Xyleborus similis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xyleborus validus* | | | | | | | | | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Xylosandrus brevis*? | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Xylosandrus compactus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Eidophelus imcomptus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Orthotomicus angulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Stephanoderes hivaoea* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **STREPSIPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ELENCHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Elenchus japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **STYLOPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pseudoxenos iwatai* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **HYMENOPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **ORUSSIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Orussus boninensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| **BRACONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Histeromerus orientalis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| **ICHNEUMONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Netelia latro latro* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Netelia orientalis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Netelia unicolor* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Enicospilus nocturnus* | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | | | | | | | | |
| *Enicospilus taiwanus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Triclistus aitkini* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Foenatopus cervinus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **EVANIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Evania appendigaster* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **AULACIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pristaulacus boninensis* | | | ● | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **GASTERUPTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gasteruption ogasawarensis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SCELIONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Macroteleia* sp. | | | | | | | ● | | | ● | | | | | | | | | | | | | | | | | | | | | |
| **CHALCIDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Brachymeria lasus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Antrocephalus dividens* | | | | | ● | ● | | | | ● | | | | ● | | | | ● | | | | | | | | | | | | | |
| *Dirhinus banksi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Hockeria yamamotoi* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Proconura yamamotoi* | | | ● | | | | | | | | | | | ● | | | | ● | | | | | | | | | | | | | |
| **AGAONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Blastophaga* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Eupristina verticillata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **PTEROMALIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Spalangia* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Pteromalus puparum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Trichomalopsis americanus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Systasis* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Solenura* sp. | | | ● | | | | | | | | | | ● | | | | | ● | | ● | | | | | | ● | | | | | |
| **EULOPHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tetrastichus boninensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CHRYSIDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chrysis boninensis* | | VU | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Chrysis nohirai* | | VU | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Chrysis lusca* | | | | | | | | | | | ● | | | ● | | | | ● | | | | | | | | | | | | | |
| **DRYINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gonatopus hagoromo* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **BETHYLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sclerodermus nipponicus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **MUTILLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Trogaspidia pustulata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **SCOLIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Scolia decorata ventralis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **FORMICIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Brachyponera chinensis* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cryptopone tengu* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Ectomomyrmex javanus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Hypoponera bondroiti* | | | | | | | | | | | ● | | ● | ● | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Hypoponera sauteri* | | | | | ● | | | | | ● | ● | ● | ● | ● | | ● | | ● | ● | | | | | | | ● | | | | | |
| *Ponera swezeyi* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Proceratium japonicum* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Trachymesopus pilosior* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Aphaenogaster edentula* | | | ● | | ● | | | | | ● | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Aphaenogaster osimensis* | | | | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | | ● | | | | | ● | | | | | |
| *Cardiocondyla nuda* | | | | | | | | | | | ● | ● | | | | ● | | ● | ● | ● | | | | | | ● | | ● | | ● | |
| *Cardiocondyla tsukuyomi* | | | | | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Cardiocondyla wroughtonii* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | ● | | | | | | ● | | ● | | ● | |
| *Leptothorax haira* | | | ● | | | | | | | | | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Leptothorax santra* | | | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Monomorium chinense* | | | | | ● | | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | | | | | ● | | | | | |
| *Monomorium destructor* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | ● | |
| *Monomorium floricola* | | | | | | | | | | | ● | ● | | | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Monomorium fossulatum* | | | | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| *Monomorium intrudens* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Monomorium pharaonis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Pheidole fervens* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pheidole indica* | | | | | | ● | | | | ● | ● | | ● | ● | | | | ● | ● | ● | ● | | | | | ● | | | | | |
| *Pheidole megacephala* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pheidole noda* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Pheidole parva* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pheidole pieli* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Pheidole susanowo* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Pheidole aff. rinae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Pheidologeton diversus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pristomyrmex pungens* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pyramica hexamera* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Trichoscapa membranifera* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Quadristruma emmae* | | | | | ● | | | | | ● | ● | ● | | ● | ● | | | ● | | | | | | | | | | | | | |
| *Strumigenys exilirhina* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Strumigenys solifontis* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Tetramorium bicarinatum* | | | | | ● | ● | | | | ● | ● | ● | ● | | | ● | | ● | ● | ● | ● | | | | | ● | | ● | | ● | |
| *Tetramorium lanuginosum* | | | | | | | | | | | ● | ● | ● | ● | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Tetramorium nipponense* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Tetramorium simillimum* | | | | | ● | | | | | ● | ● | | ● | ● | | | | ● | | | | | | | | | | | | | |
| *Tetramorium tonganum* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Vollenhovia sakishimana* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Leptanilla oceanica* | | VU | ● | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Iridomyrmex itoi* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | ● | | | | | ● | | | | |
| *Tapinoma melanocephalum* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | ● | | | | | ● | | | | |
| *Tapinoma* sp.2 | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Technomyrmex albipes* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| *Camponotus nipponicus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Camponotus ogasawarensis* | | | ● | | ● | | | | | ● | ● | ● | ● | ● | | ● | | ● | ● | | ● | | | | | ● | | | | |
| *Paratrechina amia* | | | | | ● | ● | | | | ● | ● | ● | ● | | | ● | | ● | ● | ● | ● | | | | | ● | | | | |
| *Paratrechina longicornis* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | ● | ● |
| *Paratrechina ogasawarensis* | | | ● | | | | | | | | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | |
| *Plagiolepis alluaudi* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| **POMPILIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dipogon ogasawarensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| **EUMENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anterhynchium flavomarginatum* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Delta pyriforme* | | | | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | | | | |
| *Euodynerus nipanicus nipanicus* | | | | | | | | | | | | ● | | | | | | ● | ● | | | | | | | ● | | | | ● |
| *Pararrhynchium oceanicum* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Stenodynerus frauenfeldi* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | ● |
| *Stenodynerus ogasawaraensis* | | VU | ● | | ● | | | | | ● | ● | ● | | ● | | | | ● | ● | | | | | | | ● | | | | |
| **SPHECIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chalybion bengalense* | | | | | ● | | | | | ● | ● | | | ● | | | | ● | | | | | | | | | | | | ● |
| *Chalybion japonicum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● |
| *Sceliphron caementarium* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | ● |
| *Isodontia boninensis* | | VU | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | ● |
| *Psenulus carinifrons iwatai* | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | ● | | | | |
| *Psenulus ogasawaranus* | | | ● | | | | | | | | ● | ● | | ● | | | | ● | ● | | | | | | | ● | | | | |
| *Liris aurulentus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Liris festinans japonicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Liris subtessellatus ogasawarae* | | | ● | | | | | | | | | | | ● | | | | ● | | | | | | | | | | | | ● |
| *Tachysphex nigricolor nigricolor* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pison argentatum hanedai* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Pison hahadzimaense* | | VU | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Pison oakleyi boninense* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Pison punctifrons* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | ● |
| *Pison tosawai* | | VU | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Psen boninensis* | | | ● | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | |
| *Trypoxylon chichidzimaense* | | VU | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Trypoxylon petiolatum* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Lestica rufigaster* | | VU | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Bembecinus anthracinus mukodzimaensis* | | | ● | | ● | | | | | ● | | | ● | | | | | ● | | | | | | | | | | | | ● |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Bembecinus anthracinus ogasawaraensis* | | | ● | | | | | | | | ● | ● | | ● | | | | ● | ● | | | | ● | ● | | ● | | | | ● |
| **COLLETIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hylaeus ikedai* | | | ● | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | | | ● | | ● | ● | | | ● | |
| *Hylaeus boninensis* | | CR+EN | ● | | | | | | | | ● | ● | | | | | | ● | ● | ● | | | | | | ● | | | | | |
| *Hylaeus incomitatus* | | CR+EN | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Hylaeus yasumatsui* | | CR+EN | ● | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| **MEGACHILIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lithurge ogasawarensis* | | VU | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Heriades fulvohispidus* | | | ● | | | | | | | | ● | ● | ● | ● | | | | ● | ● | | | | | ● | | ● | | | | | |
| *Megachile asahinai* | | | ● | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | ● | | | | ● | ● | ● | | ● | |
| **ANTHOPHORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ceratina boninensis* | | | ● | ● | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | ● | | ● | | ● | | ● | |
| *Xylocopa ogasawarensis* | | NT | ● | ● | | | | | | | ● | ● | ● | | | | | ● | ● | ● | | ● | ● | ● | | ● | | | | | |
| **APIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Apis mellifera* | | | | | | | | | | | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | | |
| **SIPHONAPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PULICIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ctenocephalides* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **DIPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **TIPULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Limonia boniniana* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Limonia boninensis* | | | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Limonia snyderi chichiensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Limonia snyderi snyderi* | | | ● | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Limonia unisetosa perelongata* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **PSYCHODIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Brunettia biformis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Psychoda allodapa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Psychodocha longiseta* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Psychodocha plaesia* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Tinearia alternata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Trichopsychoda boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **CULICIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aedes savorii* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Aedes togoi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Aedes albopictus* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Aedes wadai* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Culex boninensis* | | | ● | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Culex pipiens quinquefasciatus* | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Culex tritaeniorhynchus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |

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| *Culex halifaxii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Culex shinonagai* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **SIMULIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Simulium bonninense* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Simulium satakei* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **CERATOPOGONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Culicoides claggi* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Dasyhelea subperfida* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Atrichopogon snyderi* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Forcipomyia claggi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Forcipomyia edgari* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Forcipomyia penniornatus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CHIRONOMIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Macropelopia ogasasextdecima* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ablabesmyia moniliformis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Anatopynia boninensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Brillia ogasaquinta* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cricotopus ogasaseptimus* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Cricotopus ogasasextus* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Cricotopus quadrizonatus* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Eukiefferiella ogasaoctava* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Hahayusurika ogasaundecima* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Metriocnemus claggi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Metriocnemus ogasadecimus* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Paratrissocladius ogasaduodecimus* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Parametriocnemus claggi* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pseudosmitta ogasatridecima* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Smittia aterrima* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Smittia tuberculifera* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Chironomus claggi* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Dicrotendipes nervosus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Polypedilum nubifer* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Tanytarsus boninensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Tanytarsus ogasaquartus* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Tanytarsus ogasatertius* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Thienemanniella ogasaquardecima* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Thienemanniella ogasaquindecima* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **SCATOPSIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anapausis* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| **CECIDOMYIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Peromyia carinata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Peromyia muscorum* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Peromyia photophila* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **KEROPLATIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Neoplatyura digitata* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **MYCETOPHILIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Allodia* sp. | | | ● | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | | |
| *Clastobasis ridens* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Neoempheria vicina* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Epicypta boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Exechia snyderi* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Phronia boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **SCIARIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bradysia boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Bradysia snyderi* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **STRATIOMYIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hermetia illucens* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Aidomyia snyderi* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Artemita insularis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Tinda javana* | | | | | ● | | | | | ● | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Wallacea albiesta borealis* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | ● | | | ● | | | | | |
| **ACROCERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ogcodes trifasciata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **BOMBYLIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anthrax boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Exhyalanthrax ogasawarensis* | | | | | ● | | | | | ● | ● | | | | | | | ● | | ● | | | | ● | | ● | | | | | |
| **SCENOPINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Goniophyto boninensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **ASILIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Laphria ogasawaraensis* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | ● | | | ● | | | ● | ● | | | ● | |
| *Tolmerus* sp. | | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| **DOLICHOPODIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Conhopus* sp. 1 | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Conhopus* sp. 2 | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **PHORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Diplonevra peregrina* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Dohrniphora cornuta* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Megaselia setaria* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Megaselia spiracularis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Megaselia boninensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |

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| *Megaselia scalaris* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Megaselia tetricifrons* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Puliciphora wymani* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Beckerina* sp. | | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | |
| **PIPUNCULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dorilas* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **SYRPHIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Episyrphus balteatus* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Ischiodon scutellaris* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Allographa ianava* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Sphaerophoria ogasawarensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Allobaccha apicalis* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Melanostoma orientale* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Paragus tibialis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Eristalinus tenax* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Syritta suyderi* | | | ● | | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | ● | ● | | | ● | | | | | |
| *Syritta orientalis?* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Xylota boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | ● | | ● | |
| **MICROPEZIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Rainieria boninensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **TEPHRITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bactrocera dorsalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Parazeugodacus matsumurai* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Dioxyna sororcula* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Shunraia boninensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Spathulina acroleuca* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ensina sonchi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **OTITIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gen. sp. | | | | | | ● | | | | ● | | | | | | | | | | | | | | | | | | | | | |
| **SEPSIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sepsis albifacies* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **LAUXANIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Homoneura acrostichalis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Lauxania* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Luzonomyza bakeri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Trigonometops* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | ● | | | ● | |
| **AGROMYZIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Japanagromyza elaeagni* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Japanagromyza insularum* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | | | | | | | | | | | | | |
| *Liriomyza brassicae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |

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| *Liriomyza trifolii* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Melanagromyza boninensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Melanagromyza melallica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Melanagromyza sojae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Phytomyza horticola* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudonapomyza spicata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **MILICHIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gen. sp. | | | | | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | | |
| **CHLOROPIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cadrema ryukyuana* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Meijerella flavisetosa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Pseudogaurax boninensis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Chlorops leymi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **EPHYDRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ephydra japonica* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **DROSOPHILIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Leucophenga boninensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | ● |
| *Dettopsomyia nigrovittata* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | ● |
| *Drosophila apicohispida* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Drosophila novicia* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | ● |
| *Drosophila paiviae* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | ● |
| *Drosophila ananassae* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | ● |
| *Drosophila annulipes* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | ● |
| *Drosophila daruma* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Drosophila hydei* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | ● |
| *Drosophila immigrans* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | ● |
| *Drosophila kikkawai* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Drosophila melanogaster* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | ● |
| *Drosophila pectinifera* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | ● |
| *Drosophila pulchrella* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Drosophila simulans* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Drosophila suzukii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Mycodrosophila serrata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Nesiodrosophila ogasawarensis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scaptomyza hexasticha* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scaptomyza boninensis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scaptomyza elmoi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Scaptomyza pallida* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | ● |
| *Scaptomyza polygonia* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| **TETHINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Dasyrhicnoessa* sp. | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **SPHAEROCERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Leptocera nigra* | | | | | | | | | | | ● | ● | | ● | | | | ● | | | | | | | | | | | | |
| *Leptocera boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Spinilimosina rufifrons* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Spelobia bifrons* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Coproica hirtula* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **HIPPOBOSCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ornithoctona plicata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Ornithoica momiyamai* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| **ANTHOMYIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anthomyia illocata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Delia platura* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Fucellia apicalis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Fucellia boninensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **FANNIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Fannia canicularis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fannia leucosticta* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Fannia prisca* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| **MUSCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Haematobosca carabao* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Synthesiomyia nudiseta* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Hydrotaea chalcogaster* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Hydrotaea dentipes* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Musca domestica* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | | | | | | | | | | | | |
| *Musca hervei* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | |
| *Musca sorbens* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Stomoxys calcitrans* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Atherigona boninensis* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Atherigona excisa* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Atherigona orientalis* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Atherigona oryzae* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Atherigona reversura* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Atherigona varia* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Bdellolarynx carabao* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Brontaea ascendens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Brontaea nigrogrisea* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Graphomya maculata* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Limnophora boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Limnophora bracteola* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |

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| *Limnophora haha* | | | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Limnophora setibunda* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Limnophora umbra* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Lispe assimilis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Lispe bivittata* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Lispe boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Lispe haha* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Orchisia costata* | | | | | | | ● | | | ● | ● | ● | ● | | | | | ● | | | | | | | | | | | | |
| *Pygophora boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Gymnodia expansa* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Gymnodia marguerita* | | | ● | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | |
| **CALLIPHORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hemipyrellia ligurriens* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Lucilia snyderi* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | ● | | ● | |
| *Lucilia cuprina* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Lucilia sericata* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Chrysomya megacephala* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | ● | | ● | | ● | |
| *Stomorhina obsoleta* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | ● | ● | | ● | |
| **SARCOPHAGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cylindrothecum angustifrons* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Senotainia* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Goniophyto boninensis* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Boettcherisca peregrina* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Parasarcophaga misera* | | | | | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | ● | | ● | | ● | |
| *Phytosarcophaga gressitti* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **TACHINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bessa parallela* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Pseudogonia rufifrons* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Gymnochaeta viridis?* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Peribaea orbata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Pleooestrus leonidei* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| **TRICHOPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **HYDROPTILIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gen. sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| **GOERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Goera ogasawaraenis* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **LEPIDOPTERA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **TORTRICIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acleris enitescens* | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Adoxophyes* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |

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| *Homona* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Ancylis mandarinana* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Bactra hostilis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Bactra venosana* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Crocidosema plebejana* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Allobrachygonia angulicostana* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Cryptophlebia ombrodelta* | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Cydia* sp. | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Dudua aprobola* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Megaherpystis melanoneura* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Hedya iophaea* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Loboschiza koenigiana* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | ● | | ● | |
| *Metenthodenia ogasawaraensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Retinia cristata* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Rhodocosmaria occidentalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Temnolopha mosaica* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Lopharcha* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Trymalitis escharia* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| **TINEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Erechthias itoi* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Erechthias zebrina* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Opogona sacchari* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **LYONETIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bedellia somnulentella* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Lyonetia anthemopa* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| **GRACILLARIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acrocercops* sp.1 | | | ● | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Acrocercops* sp.2 | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Acrocercops* sp.3 | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Caloptilia elongata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Caloptilia theivora* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Caloptilia* sp.1 | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Caloptilia* sp.2 | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Caloptilia* sp.3 | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Conopomorphina* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Gibbovalva* sp.1 | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Gibbovalva* sp.2 | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Ketapangia leucochorda* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Macarostola* sp. | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Metriochroa fraxinella* | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |

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| *Metriochroa* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **PHYLLOCNISTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Phyllocnistis citrella* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Phyllocnistis* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **ACROLEPIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acrolepiopsis sapporensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **YPONOMEUTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Plutella xylostella* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Saridoscelis sphenias* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **CHOREUTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Choreutis fulminea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Choreutis* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **OECOPHORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gen. sp. | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| **COSMOPTERIGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cosmopterix* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **GELECHIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gen. sp. | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| **ZYGAENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Artona martini* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **LIMACODIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Belippa boninensis* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| **HYBLAEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hyblaea puera* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **THYRIDIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Banisia myrsusalis elaralis* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Banisia whalleyi* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| **PYRALIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ancylolomia japonica* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Calamotropha albistrigellus* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Crambus argyrophorus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Crambus boninellus* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Parapediasia teterrella* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Hellula undalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Musotima kumatai* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Agathodes ostentalis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Agrotera flavobasalis* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Hydriris ornatalis orientalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Bocchoris albipunctalis* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cnaphalocrocis medinalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |

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| *Cnaphalocrocis pilosa* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Cnaphalocrocis poeyalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cnaphalocrocis stereogona* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Diaphania indica* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Diasemia accalis* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Eurrhyparodes tricoloralis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Dysallacta negatalis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Glyphodes fenestratus* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Glyphodes pulverulentalis* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Omoides similis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Herpetogramma licarsisalis* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Herpetogramma submarginalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Maruca vitrata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Metasia bilineatella* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Nacoleia charesalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Nacoleia gressitti* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Nomophila noctuella* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Omiodes diemenalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pagyda citrinella* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Palpita munroei* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Palpita nigropunctalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Parotis ogasawarensis* | | | ● | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Spoladea recurvalis* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Aripana cribrata* | | | | | | | | | | | ● | | | | | ● | | ● | ● | | | | | | | ● | | | | | |
| *Erpis pacificalis pacificalis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Erpis pacificalis iwojimensis* | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Rehimena variegata* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Sufetula minuscula* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Talanga nympha* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Tatobotys albivenalis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Terastia subjectalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Trichophysetis cretacea* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Udea testacea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Galleria mellonella* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Lamoria* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Thalamorrhyncha cramboides* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Tirathaba mundella* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Endotricha pulverealis* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Orthopygia repetita* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pyralis manihotalis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |

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| *Cryptoblabes gnidiella* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Eucampgla estriatella* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Faveria leucophaeella* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Homoeosoma* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Indomyrlaea eugraphella* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Microthrix inconspicuella* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Plodia interpunctella* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **PTEROPHORIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sphenarches anisodactylus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **HESPERIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Badamia exclamationis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Parnara guttata guttata* | | | | | | ● | | | | ● | ● | | | | | | | ● | ● | | | ● | | | | ● | | | | |
| *Parnara ogasawarensis* | | VU | ● | | | | | | | | ● | | | | | | | ● | ● | ● | ● | ● | ● | ● | | ● | | | | |
| **PAPILIONIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Papilio xuthus* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| **PIERIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Catopsilia pomona* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Colias erate poliographus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Eurema hecabe* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Pieris rapae crucivora* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **LYCAENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Celastrina ogasawaraensis* | | CR+EN | ● | ● | | | | | | | ● | ● | ● | | | | | ● | ● | | | ● | | | | ● | | | | |
| *Lampides boeticus* | | | | | | | | | | | ● | ● | | | | | | ● | ● | ● | | ● | ● | ● | | ● | | ● | | ● | |
| *Narathura bazalus turbata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Petrelaea tombugensis* | | | | | ● | ● | | | | ● | ● | ● | ● | ● | | | | ● | ● | | | | | | | ● | | | | |
| *Zizula hylax* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| **LIBYTHEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Libythea celtis celtoides* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **DANAIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Danaus plexippus plexippus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Euploea eunice eunice* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Parantica sita niphonica* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| **NYMPHALIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Argyreus hyperbius hyperbius* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Cynthia cardui* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Hypolimnas anomala truentus* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Hypolimnas bolina* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Polygonia c-aureum c-aureum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Vanessa indica* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| **SATYRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| *Melanitis leda ismene* | | | | | ● | | | | | ● | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **GEOMETRIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Agathia ichnospora* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Thalassodes supracutipennis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pelagodes antiquadraria* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pelagodes ogasawarensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Anisodes* sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Perixera illepidaria* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Perixera niveopuncta* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Perixera obrinaria* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Scopula hypochra* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Traminda aventiaria* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Casuariclystis latifascia* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Collix ghosha ghosha* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Episteira nigrilinearia* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Eupithecia costalis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Gymnoscelis boninensis* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Gymnoscelis esakii* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Gymnoscelis melaninfra* | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Gymnoscelis montgomeryi* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Gymnoscelis tristrigosa* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Spiralsigna subpumilata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Orthonama obstipata* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Sauris hirudinata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ascotis selenaria cretacea* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Boninnadagara crinomorpha* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Macaria abydata* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Cleora ogasawarensis* | | | ● | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Pseudonadagara hepatica* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| **URANIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Warreniplema fumicosta islandica* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **SPHINGIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Agrius convolvuli* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Daphnis nerii* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Macroglossum heliophilus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Macroglossum poecilum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Macroglossum pyrrhosticta* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Theretra nessus* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| **ARCTIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hyphantria cunea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Utetheisa pulchelloides umata* | | | | | | | | | | | ● | | | | | ● | | ● | | | | | | | | | | | | |
| *Nyctemera adversata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **NOLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nola infralba* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **NOCTUIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Helicoverpa armigera* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Helicoverpa assulta* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Helicoverpa sugii* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Agrotis ipsilon* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Agrotis segetum* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Diarsia deparca* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Mythimna formosana* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mythimna loreyi* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mythimna polysticha* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mythimna separata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Dictyestra dissecta* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Tiracola plagiata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Callopistria aethiops* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Callopistria maillardi maillardi* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Callopistria reticulata* | | | | | | | | | | | ● | | ● | | | | | ● | | | | | | | | | | | | | |
| *Callopistria* sp. | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Chasmina candida* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | |
| *Chasmina takakuwai* | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Conidica illecta* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Conidica serva* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Athetis thoracica* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Spodoptera cilium* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Spodoptera exempta* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Spodoptera exigua* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Spodoptera litura* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Spodoptera mauritia* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Spodoptera pecten* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Spodoptera picta* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Penicillaria jocosatrix* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Stictoptera curcullioides* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Nanaguna breviuscula* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Maurilia iconica* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Amyna axis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | ● | | ● | |
| *Amyna natalis?* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Araeopteron* sp. | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| *Corgatha pygmaea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Eublemma cochylioides* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Honeyania ragusana* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Anadevidia peponis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Autographa gamma* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Autographa nigrisigna* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Chrysodeixis acuta* | | | | | | | | | | | | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Chrysodeixis eriosoma* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ctenoplusia agnata* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ctenoplusia albostriata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ctenoplusia ichinosei* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Trichoplusia ni* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Achaea janata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Achaea serva* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Arcte coerula* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● |
| *Avatha discolor* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Dysgonia illibata* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Grammodes geometrica* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Mocis undata* | | | | | | | | | | | ● | | | | | | | ● | ● | | ● | | | ● | | ● | | | | | |
| *Ophisma gravata* | | | | | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Ophiusa coronata* | | | | | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| *Ophiusa disjungens indiscriminata* | | | | | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Ophiusa tirhaca* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ophiusa triphaenoides* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Remigia frugalis* | | | | | | ● | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Anomis flava flava* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Anomis fulvida* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Anomis mesogona* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Daddala lucilla* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Ectogoniella* sp. | | | ● | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ericeia subcinerea* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Hypocala deflorata deflorata* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ischyja manlia* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Lacera noctilio* | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Lacera procellosa* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Luceria oculalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Oraesia excavata* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Polydesma boarmoides* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Schrankia costaestrigalis* | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Serrodes campana* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
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| *Speiredonia inocellata* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Sypnoides picta* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Hypena gonospilalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Hypena indicatalis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Hypena laceratalis* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Hypena masurialis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Hypena* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Hipoepa fractalis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Nodaria ogasawarensis* | | | ● | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | |
| *Simplicia niphona* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Simplicia caeneusalis* | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Simplicia* sp. | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Zanclognatha* sp. | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| Gen. sp. | | | ● | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |

## Reference


(Note: English translations of titles in Japanese are tentative, unauthorized, and only for informative purposes)

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**Note**

?: Indicating the genus or the species is not clearly identified.

# 3-2-9. The Land snails of the Ogasawara Islands

*** Red List categories of IUCN, details are given on the last page.**

**** Red List Categories of Japanese Ministry of the Environment, details are given on the last page.**

Abbreviation of island names

Mk: Mukojima, Nk: Nakodojima, Ym: Yomejima, Kt: Kitanoshima, Ch: Chichijima, Ani: Anijima, Ot: Ototojima, Ns: Nishijima, Hg: Higashijima, Mn: Minamijima, Ha: Hahajima, Mkh: Mukohjima, Hr: Hirajima, Ane: Anejima, Im: Imotojima, Me: Meijima, Ki: Kita-iwoto, Mi: Minami-iwoto, Nsn: Nishinoshima, Or: Other, MIG: Mukojima Island Group, CIG: Chichijima Island Group, HIG: Hahajima Island Group, OOA: Other than Ogasawara Archipelago, Unidentified: Unidentified Islands.

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| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **CYCLONERITIMORPHA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **HELICINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ogasawarana ogasawarana* | DD | VU | ● | ● | | | | | | | | | | | | | | | ● | | | | ● | ● | | ● | | | | | |
| *Ogasawarana arata* | DD | CR+EN | ● | ● | | ● | | | | ● | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Ogasawarana discrepans* | DD | CR+EN | ● | ● | | | | | | | ● | ● | ● | ● | ● | | | ● | | | | | | | | | | | | | |
| *Ogasawarana optima* | DD | CR+EN | ● | ● | | | | | | | ● | ● | ● | ● | | | | ● | | | | | | | | | | | | | |
| *Ogasawarana microtheca* | DD | VU | ● | ● | | | | | | | | | | | | | | | ● | | ● | ● | ● | ● | | ● | | | | | |
| *Ogasawarana nitida* | DD | CR+EN | ● | ● | | | | | | | | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Ogasawarana capsula* | DD | CR+EN | ● | ● | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | | |
| *Ogasawarana yoshiwarana* | CR | CR+EN | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Ogasawarana hirasei* | DD | EX | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Ogasawarana comes* | DD | CR+EN | ● | ● | | | | | | | | ● | | ● | | | | ● | | | | | | | | | | | | | |
| *Ogasawarana obtusa* | | | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Ogasawarana* sp.A | | | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Ogasawarana* sp.B | | | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Ogasawarana* sp.C | | | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| **HYPSOGASTROPODA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **TRUNCATELLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Truncatella guerinii* | DD | | | | | | | | | | ● | | | | | ● | | ● | ● | | | | | | | ● | | | | | |
| **ASSIMINEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Paludinella minima* | DD | VU | ● | ● | ● | | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| *Paludinella* sp.A | | | ● | ● | | | | | | | ● | | | | | ● | | ● | | | | | | | | | | | | | |
| *Paludinella devilis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Paludinella* sp.B | | | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Paludinella* sp.C | | | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Ditropisena* sp. A | | | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| *Ditropisena* sp. B | | | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| **PULMONATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **RATHOUSIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Granulilimax* sp. | | | | | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |

| Scientific name | IUCN RL* | MOE RL** | Endemic to Ogasawara | Natural Monument | Mukojima Island Group | | | | | | Chichijima Island Group | | | | | | | Hahajima Island Group | | | | | | | | Other than Ogasawara Archipelago | | | | Unidentified |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **ELLOBIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Carychium pessimum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **SUCCINEIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Boninosuccinea punctulispira* | VU | VU | ● | ● | | | | | | | | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Boninosuccinea ogasawarae* | VU | VU | ● | ● | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| **ACHATINELLIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Elasmias kitaiwojimanum* | VU | VU | | ● | | | | | | | | | | | | | | | ● | | | | | | ● | ● | | | ● | |
| *Elasmias* sp. | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Tornatellides tryoni* | | NT | ● | ● | ● | ● | | | | ● | ● | ● | ● | ● | | ● | | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | |
| *Tornatellides boeningi* | | VU | | ● | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Lamellidea biplicata* | VU | VU | | ● | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |
| *Lamellidea ogasawarana* | VU | VU | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | | ● | | ● | ● | ● | | ● | ● | ● | ● | | | | | |
| *Lamellidea nakadai* | EX | DD | ● | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Lamellidea monodonta* | EX | DD | ● | ● | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| *Lamellidea hataiana* | | DD | ● | ● | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Lamellidea* sp. | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **VERTIGINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ptychalaea dedecora* | VU | VU | | ● | ● | | | | | ● | ● | ● | | | | | | ● | ● | | | | ● | | ● | | | | | |
| *Ptychalaea tamagonari* | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Gastrocopta boninensis* | VU | NT | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | | ● | ● | ● | ● | | ● | | | | ● | | ● | | ● | |
| *Gastrocopta chichijimana* | EX | CR+EN | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | |
| *Vertigo* sp.A | | | ● | ● | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| *Vertigo* sp.B | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Vertigo* sp.C | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Vertigo shimochii* | | | | | | | | | | | ● | | | | | ● | | ● | | | | | | | | | | | | |
| **ENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Boninena ogasawarae* | EN | CR+EN | ● | ● | | | | | | | | ● | | | | | | ● | ● | ● | | | ● | | ● | | | | | |
| *Boninena callistoderma* | EN | CR+EN | ● | ● | | | | | | | ● | ● | | | | | | ● | ● | ● | | ● | ● | | ● | | | | | |
| *Boninena hiraseana hiraseana* | EN | CR+EN | ● | ● | | ● | | | | ● | | | | | | | | | | | | | | | | | | | | |
| *Boninena hiraseana chichijimana* | EN | CR+EN | ● | ● | | | | | | | ● | ● | ● | | | | | ● | | | | | ● | | ● | | | | | |
| **SUBULINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Allopeas kyotoensis* | | | | | | ● | | | | ● | | ● | ● | | | | | ● | ● | | | | | | ● | | | | | |
| *Allopeas pyrgula* | | | | | ● | ● | | | | ● | | ● | | | | | | ● | ● | | | | | | ● | | | | | |
| *Allopeas javanicum* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Allopeas gracilis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **SPIRAXIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Euglandina rosea* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| **ACHATINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Achatina fulica* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | ● | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | ClG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **FERUSSACIIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ferussaciidae gen sp. | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | ● | | ● | ● | | ● | | | | |
| **STREPTAXIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Indoennea bicolor* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | ● | | | ● | |
| **PUNCTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Punctum* sp. | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| **GASTRODONTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Zonitoides arboreus* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| **EUCONULIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hirasea chichijimana* | EN | CR+EN | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Hirasea operculina* | EN | CR+EN | ● | ● | | | | | | | ● | ● | | ● | | | | ● | | | | | | | | | | | | | |
| *Hirasea insignis* | EN | CR+EN | ● | ● | ● | | | | | ● | | | | | | | | | | | | | | | | | | | | | |
| *Hirasea diplomphalus diplomphalus* | EN | CR+EN | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Hirasea diplomphalus latispira* | EN | EX | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Hirasea acutissima* | EN | CR+EN | ● | ● | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | | |
| *Hirasea acuta* | | CR+EN | ● | ● | | | | | | | | | | | | | | | | | ● | | ● | ● | ● | | | | | | |
| *Hirasea* sp.A | | | ● | ● | | ● | | | | ● | | | | | | | | | | | | | | | | | | | | | |
| *Hirasea* sp.B | | | ● | ● | | | | | | | | | | | ● | | | ● | | | | | | | | | | | | | |
| *Liardetia boninensis* | VU | NT | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | ● | ● | ● | | | ● | | | ● | ● | | | ● | |
| *Parakaliella harimensis* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Parakaliella nahaensis* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Discoconulus sinapidium* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |
| *Discoconulus* sp.A | | | ● | ● | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | | |
| *Discoconulus* sp.B | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | |
| *Hacrochlamys lineolatus* | EN | CR+EN | ● | ● | | | | | | | | ● | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| *Lamprocystis hahajimana* | EN | VU | ● | ● | | | | | | | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | |
| *Lamprocystis kitaiwojimana* | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | |
| *Ovachlamys fulgens* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| Euconulidae gen sp.A | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | |
| Euconulidae gen sp.B | | | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | |
| *Sitalina* sp. | | | | | | | | | | | ● | | ● | | | | | ● | ● | | | | | | | ● | | | | | |
| **ARIOPHANTIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Vitrinula chaunax* | EX | CR+EN | ● | ● | | | | | | | | | | | | | | | ● | | | | ● | | | ● | | | | | |
| **PHILOMYCIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Meghimatium bilineatum* | | | | | | | | | | | ● | ● | | | | | | ● | ● | | | | | | | ● | | | | | |
| *Meghimatium fruhstorferi* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | | |
| **VITRINIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hawaiia minuscula* | | | | | ● | | | | | ● | ● | | | | | | | ● | ● | | | | | | | ● | | ● | | ● | |
| **CAMAENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Coniglobus mercatorius* | | | | | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mk | Nk | Ym | Kt | Or | MIG | Ch | Ani | Ot | Ns | Hg | Mn | Or | CIG | Ha | Mkh | Hr | Ane | Im | Me | Or | HIG | Ki | Mi | Nsn | OOA | |
| **BRADYBAENIDAE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bradybaena similaris* | | | | | | | | | | | ● | ● | ● | | | | | ● | ● | | | | | | | ● | | | | |
| *Acusta despecta* | | | | | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Mandarina mandarina* | DD | VU | ● | ● | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| *Mandarina chichijimana* | DD | CR+EN | ● | ● | | | | | | | ● | | | | | | | ● | | | | | | | | | | | | |
| *Mandarina anijimana* | DD | VU | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | |
| *Mandarina tomiyamai* | | | ● | ● | | | | | | | | ● | | | | | | ● | | | | | | | | | | | | |
| *Mandarina hirasei* | DD | CR+EN | ● | ● | | | | | | | ● | | | | | | | ● | ● | | | | | | | ● | | | | |
| *Mandarina suenoae* | DD | CR+EN | ● | ● | | | | | | | ● | ● | | | | | | ● | | | | | | | | | | | | |
| *Mandarina trifasciata* | | CR+EN | ● | ● | | ● | | | | ● | | | | | | | | | | | | | | | | | | | | |
| *Mandarina aureola* | DD | VU | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Mandarina polita* | DD | VU | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Mandarina ponderosa* | DD | CR+EN | ● | ● | | | | | | | | | | | | | | | ● | ● | | ● | | | | ● | | | | |
| *Mandarina conus* | | | ● | ● | | | | | | | | | | | | | | | | | | ● | ● | ● | | ● | | | | |
| *Mandarina hahajimana* | DD | CR+EN | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Mandarina kaguya* | | | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Mandarina hayatoi* | | | ● | ● | | | | | | | | | | | | | | | | ● | | ● | ● | ● | | ● | | | | |
| *Mandarina exoptata* | DD | CR+EN | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Mandarina* sp.A | | | ● | ● | | | | | | | | ● | ● | | | | | ● | | | | | | | | | | | | |
| *Mandarina* sp.B | | | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Mandarina* sp.C | | | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | |
| *Mandarina* sp.D | | | ● | ● | | ● | | | | ● | | | | | | | | | | | | | | | | | | | | |

## Reference


(Note: English translations of titles in Japanese are tentative, unauthorized, and only for informative purposes)

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# *The Categories*

* Categories of IUCN Red List

| | |
|---|---|
| EX | EXTINCT: A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its histori |
| EW | EXTINCT IN THE WILD: A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys |
| CR | CRITICALLY ENDANGERED: A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the |
| EN | ENDANGERED: A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild. |
| VU | VULNERABLE: A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild. |
| NT | NEAR THREATENED: A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in t |
| LR(1994 category) | LOWER RISK: A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories: |
| LR/cd | Conservation Dependent. Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened catego |
| LR/nt | Near Threatened. Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable. |
| LR/lc | Least Concern. Taxa which do not qualify for Conservation Dependent or Near Threatened. |

** Categories of Red List published by Ministry of the Environment, Government of Japan.

| | |
|---|---|
| EX | Extinct: A taxon is considered extinct in Japan. |
| EW | Extinct in the wild: A taxon known only to survive in cultivation or in captivity. |
| CR | Threatened IA: Critically Endangered. A taxon is facing an extremely high risk of extinction in the wild immediate future. |
| EN | Threatened IB: Endangered. A taxon is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future. |
| VU | Threatened II: Vulnerable. A taxon believed likely to move into the upper rank in near future if the casual factors continue operating. |
| NT | Near threatened: A taxon which are close to qualifying for vulnerable. |

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# Appendix 4*

***** These documents are tentative translations for the appendices of the nomination of the Ogasawara Islands.

**Legal instruments of protection applying to the nominated property**

4-1 : Nature Conservation Law (Extract)
4-2 : Natural Parks Law (Extract)
4-3 : Law on the Administration and Management of National Forests (Extract)
4-4 : National Forests Administration and Management Bylaw (Extract)
4-5 : Protected forest setting rule
4-6 : Summary of the Wildlife Protection and Appropriate Hunting Law
4-7 : Summary of the Law for Conservation of Endangered Species of Wild Fauna and Flora
4-8 : Invasive Alien Species Act
4-9 : Law for the Protection of Cultural Property (Extract)

# *4-1. Nature Conservation Law (Extract)*

Law No. 85 of June 22, 1972
Amended by Law No. 73 of 1973, No. 87 of 1978, No. 58 of 1987, No. 26 of 1990, No. 79 of 1991, No. 75 of 1992, No. 92 of 1993, No. 87, No. 102, No. 160 of 1999, No. 88 of 2002, No.84 of 2004, and No.33 of 2005.

## Contents of the Law


**Chapter I** **General Provisions (Article 1~Article 11)**

**Chapter II** Basic Policies of Nature Conservation and Nature Conservation Council (Article 12~Article 13)

**Chapter III** Wilderness Areas.
Section 1 Designation, Etc. (Article 14~Article 16)
Section 2 Conservation (Article 17~ Article 21)

**Chapter IV** **Nature Conservation Areas.**
Section 1 Designation, Etc. (Article 22~Article 24)
Section 2 Conservation (Article 25~ Article 30)
Section 3 Miscellaneous Provisions (Article 31~Article 35)

**Chapter V** **Miscellaneous Provisions (Article 36~Article 44)**

**Chapter VI** Prefectural Nature Conservation Areas and Prefectural Nature Conservation Councils (Article 45~Article 51)

**Chapter VII** Supplementary Provisions (Article 52)

**Chapter VIII** Penal Provisions (Article 53~Article 58)


**Additional reference**
Basic Policies for Nature Conservation

## *Chapter I General Provisions*

(Purpose)

**Article 1**

This Law aims at setting forth the basic concept of conservation of the natural environment and other basic matters relating to the conservation of the natural environment, and, together with the Natural Parks Law (Law No. 161 of 1957) and other laws aiming at conservation of the natural environment, to provide comprehensive promotion of the proper conservation of the natural environment and thereby to contribute to ensuring the healthful and cultural life of the people, both now and in the future.

(Responsibility of the State etc.)

**Article 2**

The State, local public bodies, businesses and citizens of the State shall make efforts for proper conservation of the natural environment in their respective positions in accordance with the basic principle of environmental conservation prescribed in Articles 3 to 5 of the Basic Environmental Law (Law No. 91 of 1993).

(Respect for Property Rights and Adjustment With Other Public Interests)

**Article 3**

In administering conservation of the natural environment, ownership and other property rights of the persons concerned shall be respected, and adjustment with such public interests as conservation shall also be taken into consideration.

(Execution of Basic Survey)

**Article 4**

The State shall endeavor to conduct at five-year intervals basic surveys concerning topography, geology, and fauna and flora as necessary for the planning of measures to be taken for conservation of the natural environment.

(Considerations in Executing Regional Development, Etc.)

**Article 5**

In making and carrying out plans for regional development,and other measures which are deemed to have an effect upon the natural environment, the State shall consider the proper conservation of the natural environment.

## *Chapter II Basic Policies for Nature Conservation*

(Basic Policies for Nature Conservation)

**Article 12**

The State shall determine the basic policies for the planning of nature conservation (hereinafter referred to as the "basic policies for nature conservation").

2. The matters described in the following items shall be provided for in the basic policies for nature conservation.
   (1) Basic policy on conservation of the natural environment.
   (2) Designation of Wilderness Areas and Nature Conservation Areas and other fundamental matters concerning the planning related to conservation of the natural environment within the areas concerned.
   (3) Standards for the designation of Prefectural Nature Conservation Areas and other fundamental matters relating to standards for the planning related to conservation of the natural environment within the areas concerned.
   (4) In addition to the matters provided for in the preceding three items, basic policy on adjustment of the areas referred to in the preceding two items with the areas designated under the Natural Parks Law and other laws aiming at conservation of the natural environment and other significant matters on conservation of the natural environment.

3. The Minister of the Environment shall propose the basic policies for nature conservation and shall ask the Cabinet for its decision.

4. In drafting a proposal for the basic policies for nature conservation, the Minister of the Environment shall seek in advance the opinion of the Central Environmental Council (hereinafter referred to as “Council”).

5. When the Cabinet has made its decision in accordance with Paragraph 3, the Minister of the Environment shall give prompt public notice of the basic policies for nature conservation.

6. The preceding three Paragraphs shall apply correspondingly to any revision of the basic policies for nature conservation.

## *Chapter III Wilderness Areas*

### Section 1 Designation, Etc.

(Designation)

**Article 14**

From among the zones of land upon which the natural environment has maintained an

ecological stability without being influenced by human activities, are of a size exceeding that prescribed in the Cabinet Order, and are owned by the State or local public bodies (excluding those protection forests designated in accordance with the provisions of paragraph 1 of Article 25or paragraph 1 and 2 of Article 25-2 of the Forest Law (Law No. 249 of 1951), the Minister of the Environment may designate those areas where conservation of the natural environment is especially needed as Wilderness Areas.

2. The Minister of the Environment, when he/she intends to make the designation of the Wilderness Area, shall seek in advance the opinion of the governor of the prefecture concerned and the Council.

3. The Minister of the Environment, when he/she intends to make the designation of the Wilderness Area, shall obtain the prior consent of the head of the administrative agency having control over the land if it is owned by the State or of the local public body concerned if it is owned by a local public body.

4. The Minister of the Environment, when he/she intends to make the designation of the Wilderness Area, shall give public notice to this effect and the area to be designated in official gazette.

5. The designation of the Wilderness Area shall come into force on the public notice under the preceding paragraph.

6. The provisions of paragraph 2, paragraph 4, and the preceding paragraph shall apply correspondingly to revocation of designation of the Wilderness Area or alteration of its boundary, and the provisions of paragraph 3 to expansion of the zone of the Wilderness Area.

(Determination of Conservation Plan relating to Wilderness Area)

**Article 15**

The conservation plan relating to the Wilderness Area (hereinafter meaning the Plan concerning the regulations or facilities for conservation of the natural environment with the Wilderness Area) shall be determined by the Minister of the Environment after hearing the opinions of the governor of the prefecture concerned and the Council.

2. Should the Minister of the Environment determine the conservation plan relating to the Wilderness Area, he shall give public notice of its general outline.

3. The provisions of preceding two paragraphs shall apply correspondingly to revocation or alteration of the conservation plan relating to a Wilderness Area.

(Execution of Conservation Work relating to Wilderness Area)

**Article 16**

The State shall execute the conservation work relating to the Wilderness Area (hereinafter meaning the work to be executed on the basis of the conservation plan relating to the Wilderness Area and the facilities for conservation of the natural environment within the area concerned as prescribed by Cabinet Order).

2. Local public bodies may execute part of the conservation work relating to the Wilderness Area after consulting with the Minister of the Environment and obtaining consent therefrom.

## Section 2 Conservation

(Restriction of Activities)

**Article 17**

The activities mentioned in the following items shall not be carried out within the Wilderness Area. However, this provision shall not apply to cases where the Minister of the Environment has specifically granted a permission for scientific research or otherwise for the public good, or where the activity is carried out as an emergency measure to cope with an extraordinary situation.

(1) Constructing, reconstructing, or expanding buildings or other structures.
(2) Making housing lots, clearing land, or otherwise changing the feature of the land.
(3) Mining minerals or extracting soil and stones.
(4) Reclaiming the surface of water or reclaiming by drainage.
(5) Causing increase or decrease in the water-level or quantity of water of rivers, lakes, marshes, swamps and wetlands etc.
(6) Felling or damaging trees and bamboos.
(7) Collecting or damaging plants other than trees and bamboos or collecting fallen leaves or fallen branches.
(8) Planting trees and bamboos.
(9) Capturing, killing or wounding animals, or collecting or damaging their eggs.
(10) Pasturing livestock.
(11) Setting or making fire.
(12) Accumulating or storing things in the open air.
(13) Using horses, vehicles or power-driven vessels, or landing aircrafts.
(14) Any activity other than those mentioned in the preceding items which may affect the conservation of the natural environment within the Wilderness Area is prescribed by the Cabinet Order.

2. Such conditions as necessary for conservation of the natural environment within the Wilderness Area may be attached to the permission referred to in the preceding paragraph.

3. One, who has committed activity mentioned in any item of paragraph 1 as an emergency measure to cope with an extraordinary situation within the Wilderness Area shall so notify the Minister of the Environment within 14 days from the date of commission of the activity.

4. One, who has already started the activity mentioned in any of the items of paragraph 1 within an area at the time of the designation of the Wilderness Area or which is included within the expanded zone of such Wilderness Area may continue said activity notwithstanding the provisions of said paragraph for three months from the date of the designation or the expansion of the gone (in case he applies for the permit referred to in said paragraph within such period, until said permit is granted or denied).

5. The provisions of paragraph 1 and paragraph 3 shall not apply to the activities mentioned in the following items.
   (1) Any activity to be performed in executing the conservation work relating to the Wilderness Area.
   (2) Any activity of ordinary management or simple activity as prescribed by the environmental ministerial ordinance and not likely to interfere with conservation of the natural environment within the Wilderness Area.

(Order of Suspension, Etc)

**Article 18**

The Minister of the Environment, when deemed necessary for conservation of the natural environment within the Wilderness Area, shall enjoin the person who has violated an item of paragraph 1 of the preceding Article or who has acted in violation of the conditions attached to the permission granted in accordance with paragraph 2 of the same Article from said activity, order said person to restore the area to its original state within a reasonable period to be prescribed or, when it is difficult to restore the area to its original state, order the person to take such other necessary measures.

2. The Minister of the Environment may appoint a nature protection supervisor from among his officials in accordance with the provisions of the Cabinet Order and may delegate a part of his authority under the preceding paragraph to said supervisor.

3. The official of the preceding paragraph shall carry identification papers and present such to the persons concerned.

(Restricted Entry Zone)

**Article 19**

The Minister of the Environment, when deemed especially necessary for conservation of

the natural environment within the Wilderness Area, may designate Restricted Entry Zone within the zone of said area based upon the conservation plan relating to the Wilderness Area.

2. The provisions of Article 14 paragraph 3 shall apply correspondingly to the designation of Restricted Entry Zone and its expansion, and the provisions of paragraph 4 and paragraph 5 of the same Article to the designation of Restricted Entry Zones, revocation of such designation, and alteration of designation.

3. No person shall enter a Restricted Entry Zone. However, this shall not apply to the cases mentioned in the following items.
   (1) When he/she enters to carry out an activity for which a permission has been granted under paragraph 1 of Article 17 (including an activity discussed under the provision of the second sentence of Paragraph 1 of Article 21).
   (2) When he/she enters to take an emergency measures to cope with an extraordinary situation.
   (3) When he/she enters to execute the conservation work relating to the Wilderness Area,
   (4) When he/she enters to perform an ordinary management or simple activity as prescribed in the environmental ministerial ordinance and not likely to interfere with conservation of the natural environment within the Wilderness Area.
   (5) In addition to the activities listed in the preceding items, when the Minister of the Environment has granted a special permission for unavoidable cause.

(Report)

**Article 20**

The Minister of the Environment, when deemed necessary for conservation of the natural environment within the Wilderness Area, may require the person to whom the permission has been granted under paragraph 1 of Article 17 to submit a report on the condition of execution and on other necessary matters.

(Special Case for the State, Etc.)

**Article 21**

With respect to activities to be carried out by State agencies or local public bodies, such shall not be required to obtain the permission under paragraph 1 of Article 17 or item 5, paragraph 3 of Article 19. In this case, agencies concerned or local public bodies shall consult in advance with the Minister of the Environment and obtain consent therefrom before carrying out said activity.

2. When State agencies or local public bodies have carried out an activity for which notification is required under paragraph 3 of Article 17, such notification shall be

made to the Minister of the Environment under the provision of said paragraph.

## *Chapter V Miscellaneous Provisions*

(Expenses Necessary for Execution of Conservation Work)

**Article 36**

Expenses necessary for execution of the conservation work (herein-after meaning the conservation work relating to the Wilderness Areas and to the Nature Conservation Areas) shall be borne by the person executing said conservation work.

(Charge to Person Creating Cause)

**Article 37**

Should execution of the conservation work become necessary due to other construction work or other acts, the State or local public bodies may require the person bearing the expenses for said construction work or activities to bear in whole or in part the expenses for the conservation work to such extent as he/she causes its need.

(Charge to Beneficiary)

**Article 38**

Should any person benefit from execution of the conservation work, the State or local public bodies may require said person to bear in part the expenses for the execution of the conservation work to such extent as he/she benefits.

(Method of Collecting Charges, Etc.)

**Article 39**

The method of collection of the charges referred to in the preceding two Articles and other necessary matters relating to the charges shall be provided for by the Cabinet Order or regulations.

(Forced Collection of Charges)

**Article 40**

Should any person fail to pay the charge imposed under Article 37 or Article 38, the Minister of the Environment or the head of the local public body concerned shall send a demand note to said person designating the period for payment.

2. In the case of the preceding paragraph, the Minister of the Environment may in accordance with the provisions of the environmental ministerial ordinance, or the head of the local public body concerned may in accordance with the provisions of its regulations, collect arrears. However, the amount of arrears must be set so as not to exceed the amount of the charge multiplied by 0.145 per annum.

3. Should a person who has received a demand note under paragraph 1 fail to pay the charge due by the time limit set, the Minister of the Environment or the head of the local public body concerned may collect the charge and its arrears referred to in the preceding two paragraphs by forced collection as for the national tax if said charge would become a part of the State's income or by forced collection as for the local tax if said charge would become a part of the local public body's income. In such case, the priority of lien for the charge and arrears shall be next after the national tax and the local tax.

4. Arrears shall be given preference to the charge.

(State Subsidy)

**Article 41**

The State may assist prefectures in charge of execution of the conservation work with respect to part of the expenses required for their execution within the budgetary limits in accordance with the provisions of the Cabinet Order.

(Exemption from Application)

**Article 42**

The provisions of Article 36 to Article 41 shall not apply to the conservation work for which special provision is made for the expenses required for its execution in another law.

(Consultation)

**Article 43**

The Minister of the Environment, when he/she intends to designate or expand the Wilderness Area, Nature Conservation Area, Restricted Entry Zone, Special Zone, Wild Animal and Plant Protection Zone, or Special Marine Zone; or intends to determine or alter a conservation plan relating to the Wilderness Area or the Nature Conservation Area; or intends to propose formulation of the environmental ministerial ordinance in paragraph 6 of Article 25 or paragraph 5 of Article 27, shall consult with the heads of the related administrative agencies.

2. The State agency other than the Ministry of the Environment, when it intends to execute the conservation work, shall consult with the Minister of the Environment.

(Delegation of Authority)

**Article 44**

The authority of the Minister of the Environment as prescribed in this Law may be delegated to the Director of the Regional Environment Office according to the environmental ministerial ordinance.

## *Chapter VII Supplementary Provisions*

(Consideration for Local Government Bonds)

**Article 52**

In making an issue of local government bonds within the framework of its regulations in order to procure the necessary operating expenses for conservation of the natural environment, the state shall give due consideration to its and prefecture's financial condition.

## *Chapter VIII Penal Provisions*

**Article 53**

One, who falls under any of the following items shall be sentenced to imprisonment not to exceed one year or to a fine not to exceed five hundred thousand yen (¥500,000).

(1) One, who has violated paragraph 1 of Article 17.
(2) One, who has disobeyed an order issued under Paragraph 1 and 2 of Article 18 (including the application of where these provisions accordingly under Article 30).

**Article 54**

One, who falls under any of the following items shall be sentenced to imprisonment not to exceed six months or to a fine not to exceed three hundred thousand yen (¥300,000).

(1) One, who has acted in violation of the condition attached to the permit under paragraph 2 of Article 17 (including the application of this paragraph accordingly under paragraph 5 of Article 25, paragraph 4 of Article 26, and paragraph 4 of Article 27).
(2) One, who has violated paragraph 3 of Article 19, paragraph 4 of Article 25, paragraph 3 of Article 26, or paragraph 3 of Article 27.

**Article 55**

One, who has violated the handling in accordance with paragraph 2 of Article 28 shall be sentenced to a fine not to exceed three hundred thousand yen (¥300,000).

**Article 56**

One, who falls under any of the following items shall be sentenced to a fine not to exceed two hundred thousand yen (¥200,000).

(1) One, who has failed to submit a report as required under Article 20 or paragraph 1 of Article 29 or who has submitted a false report.
(2) One, who has failed to give notification under paragraph 1 of Article 28 or who has given false notification.
(3) One, who has violated the provision of paragraph 4of Article 28.
(4) One, who has refused, hindered, or avoided the actual inspection or actual survey

under paragraph 1 of Article 29.

(5) One, who has, in violation of paragraph 5 of Article 31, refused or hindered the entry and other acts conducted under paragraph 1 of said Article.

**Article 57**

Should the representative of a juridical person, or the agent, employee, or other worker of a juridical or natural person commit a violation of Article 53 to Article 56 with respect to the business of such juridical or natural person, in addition to the punishment of the actual offender, said juridical or natural person shall also be subject to the relevant fine.

**Article 58**

The regulations enacted under paragraph 1 of Article 46 or Article 47 may provide that a person who has violated said regulations shall be subject to penal provisions appropriate to the offense to the extent that such shall not exceed the penal framework prescribed in Article 53 to Article 57.

***Additional Reference***

# *Basic Policies for Nature Conservation (Extract)*

## *Part 1. Basic Concept for Nature Conservation*

In a general sense of the word, nature not only forms the natural environment that is necessary for human life, but is also the source of life itself, bestowing infinite good on man. That is,

1. nature provides resources necessary for human economic activities and
2. is in itself an essential element of human life.

In our country, in particular, man, his works of art, and nature form an organic unity. This has been our unique cultural tradition.

In view of the role played by nature in our lives, it may be rightly said that we must first appreciate the value of nature and make, the spirit of protection and conservation of nature, a part of our daily lives. From this standpoint, we are required to adopt a more well-rounded way of thinking, based on ecology, which highlights the equilibrium that exists among the various components of nature. We must cope with the problems concerning the conservation of the natural environment based on the view that, principally, no human activity should be allowed to disturb the delicate balance that

exists among elements such as sunlight, the atmosphere, water, earth, and living beings.

In reality, however, destruction of the natural environment is already advancing at a relentless pace, and its enormous scope and complexity gives rise to serious problems all over our country. The situation is even more problematic because it is often accompanied by a conflict of interests to the extent of social injustice. As a result, any adequate measures, that need to be taken against the process of destruction, become increasingly complicated.

This leads us to conclude that we are required to develop stringent, comprehensive policies covering all aspects of the social and economic system in a manner that permits us to impose, where deemed necessary, severe controls on human activities. To be more precise, we must realize that natural resources are limited, and gravely reflect on economic activities based on mass production, mass consumption and mass disposal. We must give due importance to the non-monetary value of nature, which has often been overshadowed by the preference for economic efficiency. Furthermore, we must endeavor to create a rich environment by introducing adequate control and providing guidance through proper land planning which emphasizes the conservation of the natural environment.

Needless to say, the policy for conservation of the natural environment, with nature protection as its primary concern, will occupy an important part of a comprehensive policy which is to be developed from the aforementioned fundamental idea. Its task will consist of keeping human activities in check, from the viewpoint of nature conservation in the manner required by specific regional circumstances. Therefore, in carrying out the policy, we must scientifically evaluate and quantitatively as well as qualitatively specify the proper extent of the conservation measures needed to be taken both in the country as a whole and in different regions. It must, however, be realized that the establishment of such measures will inevitably involve problems such as the restriction of human activities or distribution of limited resources. It must also be kept in mind that given our present extent of scientific knowledge, we are still far from solving the mystery of nature in its entirety.

Under these circumstances, it might be suggested that a more positive and far-sighted approach is required to cope with nature conservation, so as to prevent a basis for trouble in the future. In other words, we must not only protect nature which is not destroyed but also take active measures to restore and re-build the natural environment for the common good. For this, the invaluable natural heritage, rich in flora and fauna, wild animals, land with unique topographical features, and the like, must be conserved in an ample area with a view to preventing any further conceivable damage. The industries of agriculture, forestry, and fishery which permit a rational utilization of solar energy, in keeping with

their roles in conservation of the natural environment, must be acknowledged and their development must be on an eco-friendly basis. In urban areas, the natural environment must be conserved to ensure healthy human life. Moreover, the nature conservation policy must not simply remain a domestic policy, but must activate vigorous, world-wide cooperation for the protection of endangered wild animals and plants, as well as for marine pollution control.

Based on the aforementioned principles, the fundamental directions of the actual policy for nature conservation can be laid down as follows:

1. The Nature Conservation Law and associated legal institutions of various kinds are to be employed in a comprehensive manner permitting the systematic conservation of nature in its diversity.
   (1) Conservation work is to be strictly executed for areas with pristine natural environment untouched by human activities, places of scenic beauty, natural objects of academic or cultural value, and the like. They must be preserved for posterity as part of our national heritage, as they either contain a rich variety of living species or provide man with knowledge of the subtle mechanism of nature.
   (2) Areas playing an important role in maintaining the balance of nature, those with outstanding scenery, habitats of wild animals, and sites fit for outdoor recreation are of vital value to man in relation to nature. They are to be given proper protection, or restored and re-built where deemed necessary.
   (3) The importance of agriculture, forestry, and fishery for nature conservation is to be duly assessed and efforts are to be made for their proper development, since they are indispensable not only as suppliers of resources but also from the viewpoint of maintaining the balance of nature such as land conservation, watershed protection, and atmospheric purification.
   (4) Wooded land, grass-growing plots, watersides and the like in urban areas, are not only useful for purifying the atmosphere, tempering meteorological phenomena, preventing ruthless urbanization, environmental pollution or disasters, but also have a major influence on the spiritual development of inhabitants within those areas. Therefore, vigorous efforts must be made to protect, promote, or restore such zones that are deemed essential for a sound infrastructure and environment in cities.

2. Natural areas to be conserved must be properly administered in accordance with their specific characteristics. For this purpose, we must, while endeavoring to formulate the relevant administrative system, encourage purchases of privately-owned land when deemed necessary.

3. When a large-scale development project of any kind that is potentially destructive to

the natural environment is to be implemented, the concerned policy-makers must carry out surveys prior to, the execution. These surveys range from forecasts of the extent of impact resulting from the project on the natural environment to comparative studies on alternative projects. The results of such surveys must be reflected in the project and the work is to be carried out after obtaining the consent of the local residents. Measures for nature conservation must be taken where deemed necessary, even after the development work.

4. Much is yet to be known about the mechanism of nature. We must actively encourage studies on human activities in relation to nature, material cycle, and techniques to ensure the conservation of the ecosystem. For this purpose, we must endeavor to establish a research system, build an information network, and train technicians who are capable of converting the work of researchers into concrete measures.
   Moreover, we must carry out scientific surveys in various fields ranging from flora and fauna, wild animals, topography, and geology to the invisible mechanism of nature, which is often neglected, in order to precisely grasp the actual condition of the natural environment in our country.

5. To ensure sufficient conservation of the natural environment, it is essential for every single individual in our country to appreciate and promote the spirit of conservation and preservation of nature. For this purpose, environmental education must be vigorously promoted in schools, as well as in communities, in order to deepen people’s understanding to eventually cultivate in them, love and a sense of morality with respect to nature.

6. One of the major purposes of nature conservation is to respond to our people’s longing for nature. Outdoor recreation that ensures man's contact with nature is assuming increasing importance in the daily lives of people. There is already a growing demand for this kind of recreation.

   On the other hand, such activities are also threatening to destroy nature in areas where they are excessively concentrated. Therefore, policies encouraging outdoor recreation must be readjusted in a manner so as to ensure the proper conservation of the natural environment.

The aforementioned program for conservation of the natural environment shall be vigorously developed through coordination with local governments and on the basis of cooperation and understanding of the people. For this, we must courageously face the task of regulating a land development act, laying greater stress on the public nature of land, and the like. At the same time, in executing such a program, it is necessary to adopt a comprehensive point of view, adjusting it, on one hand, with land conservation, and on

the other, with public interests. It is also necessary to ensure that, a just distribution of burden to stabilize the existence of local residents, promote welfare, and safeguard property rights and the like. Proper conservation of the natural environment will not be realized unless social justice is attained, both in the benefit and burden involved in the act of exploitation and conservation of nature.

## *Part 2. Fundamental Items Concerning Nature Conservation Area and the Like*

Three kinds of conservation areas designated under Nature Conservation Law — Wilderness Area, Nature Conservation Area and Prefectural Nature Conservation Area — must systematically be selected on a nationwide scale and conserved properly in accordance with the basic policy on conservation of natural environment, as specified in the following fundamental guidelines and policies

### 1. Guidelines for designation of Wilderness Area

In our country, where land development planning has been pursued to the utmost degree, areas uninfluenced by human activities have come to assume extremely high value from the viewpoint of conservation of the natural environment. The significance of such areas to scholars is immeasurable, as they are sources of important scientific information.

From among subtropical rain forests, warm temperate laurel forests, temperate deciduous broad-leaved forests, and sub-arctic coniferous forests in our country, those areas that have retained a typical primeval state of nature and that meet the following conditions are designated as Wilderness Areas.

(1) Forests, marshland, grassland, and the like which are at climax phase or close to it, and in which the biome of wild plants and animals has retained its primeval state without being influenced by human activities.
(2) Areas that are of a sufficient size and form to maintain a dynamic ecosystem.
(3) Areas, in connection with (2), in which the natural environment has been preserved to a large extent.

### 2. Conservation Policies for Wilderness Area

In light of the guidelines for the designation of an area as a Wilderness Area, the basic principle of conservation policies must lie in ensuring the natural transition of the areas concerned.

(1) For the purpose of maintaining areas with the climax phase or the state of primeval, any artificial change within the boundary of the areas is, in principle, forbidden. External influences of various kinds are to be prevented as much as possible.
(2) When deemed necessary to conserve certain flora or fauna which are either

endangered species or unique to the areas concerned, and which are easily affected by human activities, Restricted Entry zones are to be established for their protection.

(3) When the areas concerned are damaged by natural disasters, they must be restored, in principle, by virtue of the natural process of transition, and not through any artificial method.

(4) The nature in the areas concerned is to be observed, surveyed and studied. Moreover, the minimum conservation work necessary, is to be executed under strict administration.

**3. Guidelines for Designation of Nature Conservation Area**

Forests dominated by exceptional natural forests; seashores, lakes and marshes, damp fields and rivers, habitats of wild animals and plants, and the like where the natural environment, including fauna and flora within said zones, is maintained in an excellent condition and which are of a definite size are to be designated as Nature Conservation Areas. However, in so doing, various natural and social conditions, such as stabilization of existence of local residents in areas designated for agriculture, forestry, fishery, promotion of welfare, long-term maintenance of natural resources, and the like must be taken into consideration.

Designation must take place without delay, particularly in the following cases:

(1) Areas whose natural environment is prone to the influence of human activities and are difficult to restore once destroyed

(2) Areas whose natural environment is unique, particular or rare

(3) Areas that are feared to be influenced by developmental activities in the vicinity that are in progress or threatening to make rapid progress, and whose well-conserved state of nature is subject to damage.

**4. Conservation Policy for Nature Conservation Area**

Proper conservation measures in accordance with the actual state of the natural environment are to be taken in order to maintain the specific natural environment of Nature Conservation Areas.

(1) In the areas concerned, zones that are important structural components of the ecosystem of the said areas and require particular promotional measures for the maintenance of the system, or which are particularly necessary for the conservation of a certain natural environment, or which are an essential part of the areas to be conserved, are to be protected through designation as a Special Zone or Special Marine Zone, to the extent deemed necessary.

(2) When deemed necessary, to conserve certain wild flora and fauna within the said special zones, which are home to rare or particular species, such areas are designated as Wild Animal and Plant Protection Zones.

(3) Ordinary Zones are to be conserved in a manner sufficiently permitting its functioning as buffer zone.
(4) When damage is incurred through natural disasters and the like within the said area, restoration and similar work must be implemented from the standpoint of disaster control and in the light of the result of ecological surveys.
(5) Within the said area, necessary conservation work is to be executed under proper administration.
(6) Adjustment with land conservation and other public interests, stabilization of means of existence of local residents such as agriculture, forestry, fishery and the like, and promotion of welfare are to be taken into consideration.

**5. Guidelines for Designation of Prefectural Nature Conservation Area**

Zones where the natural environment is equivalent to that in the Nature Conservation Area may be designated as Prefectural Nature Conservation Area in the following manner:

(1) The said zones are to be designated in accordance with the guidelines for the designation of Nature Conservation Areas, and to the extent necessary for conserving the organism to be protected.
(2) Urban areas where an excellent natural environment is maintained may be the objects of designation provided that adjustment with city planning is attained.
(3) As with the case of the procedure of designating an area as a Nature Conservation Area, opinions of residents within the areas concerned as well as of interested parties must be sought, as designation may involve restriction and the like of private rights.

**6. Guidelines for Conservation Policies for Prefectural Nature Conservation Areas**

For the maintenance of the definite natural environment, which is the focus of the conservation act within the said Prefectural Nature Conservation Area, proper conservation policies, fit for the actual condition of nature, are to be adopted and positive restoration works are to be planned where deemed necessary.

(1) Special Zone, Wild Animal and Plant Protection Zone, and Ordinary Zone are designated as in the case of Nature Conservation Area.
(2) When damage is incurred to the natural environment within the said Prefectural Nature Conservation Area, prompt measures are to be taken for restoration or plantation in accordance with the characteristics of the natural environment and the state of damage incurred.
(3) When said area is of a small size, special attention is to be paid to the treatment of the boundary zone in contact with other areas. If necessary, it is to be provided with green belts and the like for protection.
(4) Necessary conservation work is to be executed under proper administration within the said area.

(5) Adjustment with land conservation and other public interests, stabilization of means of existence of local residents such as agriculture, forestry, fishery, and the like, and promotion of welfare are to be taken into consideration.

## 7. Adjustment between Nature Conservation Area and the like and Areas under the Natural Parks Law and other Laws Aiming at Conservation of the Natural Environment

In order to promote proper conservation of the natural environment in a comprehensive manner, not only are three kinds of areas designated under the Nature Conservation Law but various kinds of areas are also to be designated under the Natural Parks Law and other laws aiming at conservation of the natural environment. Designation and conservation of such areas are to be promoted positively. An adjustment between Nature Conservation Areas and other areas is to be made according to the following principles:

(1) Zones already included in the areas referred to in the Natural Parks Law and other laws aiming at conservation of the natural environment may be designated as Wilderness Areas by virtue of the importance of the natural environment within the said zones, and after a sufficient study on their utility and the like as Natural Parks, it is deemed necessary to conserve them strictly.

(2) Only zones not included in Natural Parks may be designated as Nature Conservation Areas and Prefectural Nature Conservation Areas. However, zones having an excellent natural environment within Prefectural Natural Parks may be transferred, after sufficient discussion with the prefecture concerned, to Nature Conservation Areas in light of the particular characteristics of the nature within said zones and the natural and social conditions of the surroundings.

(3) In areas allocated for city planning, zones allocated for streets are not to be designated as Nature Conservation Areas and Prefectural Nature Conservation Areas. With respect to other zones, adjustments are to be made so that they will not overlap with Green Conservation Areas established for the purpose of forming a proper city environment.

# *4-2. Natural Parks Law (Extract)*

Law No. 161 of June 1, 1957
Amended by Law No. 140 and No. 161 of 1962, No. 13, No. 61 and No. 140 of 1970, No. 88 of 1971, No. 52 and No. 85 of 1972, No. 73 of 1973, No. 87 of 1978, No. 26 of 1990, No. 92 of 1993, No. 87 and No. 160 of 1999, and No. 1 and No. 29 of 2002

## Contents of the Law


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## *Chapter I General Provisions*

(Purpose)
**Article 1**
This Law shall aim at the protection of the places of natural scenic beauty and also, through the promoted utilization thereof, at the contribution to the health, recreation and culture of the people.

(Definitions)
**Article 2**
In this Law, the terms mentioned in the following items shall be understood respectively as laid down in the items concerned:

(1) Natural Parks shall mean National Parks, Quasi-national Parks and Prefectural Natural Parks.
(2) National Parks shall mean the places of greatest natural scenic beauty [including natural scenic beauty of sea areas (hereinafter the same except Chapter 2, Section 4 and Article 61)], representing the model scenic beauties of our country, designated by the Minister of the Environment in accordance with the provision of paragraph 1 of Article 5.
(3) Quasi-national Parks shall mean the places of great natural scenic beauty next to the National Parks, designated by the Minister of the Environment in accordance with the provision of paragraph 2 of Article 5.
(4) Prefectural Natural Parks shall mean the places of great natural scenic beauty designated by the prefectures in accordance with the provision of Article 59.
(5) Park Plans shall mean the planning concerning the regulation or facilities for the protection or utilization of the National Parks or Quasi-national Parks.
(6) Park Works shall mean the works executed on the basis of the Park Plan pertaining to the facilities, prescribed by the Cabinet Order, for the protection or utilization of National Parks or Quasi-national Parks.

(Responsibility of the State etc.)

**Article 3**

In accordance with the basic intent of environmental conservation prescribed in Articles 3 to 5 of the Basic Environmental Law (Law No. 91 of 1993), the State, local public bodies, park workers and visitors of the natural parks shall make effort respectively to protect the natural scenic beauty and promote appropriate utilization.

2. In light of the fact that the protection of fauna and flora in the natural parks is significant for conserving the scenic beauty of the natural parks, the State and local public bodies shall take measures for conserving the scenic beauty of the natural parks with the aim to ensure the diversity in the ecosystem and creature in the natural parks.

(Respect for Property Rights and Adjustment with Public Interests)

**Article 4**

At the time of the application of this Law, in addition to the provision of Article 3 of the Nature Conservation Law, the proprietary rights, mining rights and other property rights shall be respected and also the adjustment between the land development and other public interests shall be taken into consideration.

## *Chapter II National Parks and Quasi-National Parks*

### Section 1 Designation

(Designation)

**Article 5**

The National Parks shall be designated, with specification of their boundaries, by the Minister of the Environment after seeking the opinions of the prefectures concerned and the Central Environmental Council (hereinafter referred to as "Council").

2. The Quasi-national Parks shall be designated, with specification of their boundaries, by the Minister of the Environment, upon request of the prefecture concerned, after seeking the opinions of the Council.

3. In the case of the designation of the National Park or Quasi-national Park by the Minister of the Environment, the fact and the area thereof shall be announced in the official gazette.

4. The designation of the National Park or Quasi-national Park shall take effect on the public announcement under the preceding paragraph.

(Dissolution of Designation and Alteration of Area)

**Article 6**

The Minister of the Environment, when he intends to dissolve the designation of the National Park or alter the area thereof, shal1 seek the opinions of the prefectures concerned and the Council.

2. The Minister of the Environment, when he intends to dissolve the designation of the Quasi-national Park or alter the area thereof, shall seek the opinions of the prefecture concerned and the Council; provided that the expansion of its area shall be based upon request of the prefecture concerned.

3. The provisions of paragraphs 3 and 4 of the preceding article shall be applied correspondingly to the dissolution of the designation of the National Park or Quasi-national Park and the alternation of the area thereof.

### Section 2 Natural Park Plan and Natural Park Work

(Decision upon Natural Park Plan and Natural Park Work)

**Article 7**

The Park Plan concerning the National Park shall be decided upon by the Minister of the

Environment after seeking the opinions of the prefecture concerned and the Council.

2. The Park Work concerning the National Park shall be decided upon by the Minister of the Environment after seeking the opinions of the Council.

3. The Park Plan concerning the Quasi-national Park shall he decided upon by the Minister of the Environment upon request of the prefecture concerned after seeking the opinions of the Council.

4. The Park Work concerning the Quasi-national Park shall be decided upon by the governors of the prefectures concerned.

5. The Minister of the Environment, when he has decided upon the Park Plan or Park Work, shall announce the outline of the fact.

6. The governor of the prefecture concerned, when he has decided upon the Park Work, shall announce the outline of the fact.

(Discontinuance and Alteration of Park Plan and Park Work)

**Article 8**

The Minister of the Environment, when he intends to discontinue or alter the Park Plan concerning the National Park, shall seek the opinions of the prefecture concerned and the Council.

2. The Minister of the Environment, when he intends to discontinue or alter the Park Work concerning the National Park, shall seek the opinions of the Council.

3. The Minister of the Environment, when he intends to discontinue or alter the Park Plan concerning the Quasi-national Park, shall seek the opinion of the prefecture concerned and the Council; provided that the additional Park Plan shall be based upon request of the prefecture.

4. The provision of paragraph 5 of the preceding article shall be applied correspondingly to the discontinuance or alteration of the Park Plan or Park Work by the Minister of the Environment, and the provision of paragraph 6 of the preceding article shall be applied correspondingly to the discontinuance or alteration of the Park Work by the governor of the prefecture concerned.

(Execution of Park Work of National Park)

**Article 9**

The Park Work concerning the National Park shall be executed by the State.

2. Local public bodies and other bodies prescribed by the Cabinet Order (hereinafter referred to as 'the public bodies") may execute a part of the Park Work concerning the National Park after consulting with the Minister of the Environment and obtaining his consent therefrom.

3. Those other than the State and public bodies may execute a part of the Park Work concerning the National Park upon obtaining authorized concession from the Minister of the Environment.

(Execution of Park Work of Quasi-national Park)

**Article 10**

The Park Work concerning the Quasi-national Park shall be executed by the prefecture; provided that the State shall not be precluded from executing the works concerning roads or any other works as provided for by the Road Law, (Law No. 180 of 1952) or any other laws.

2. The public bodies other than the prefectures may execute a part of the Park Work concerning the Quasi-national Park after consulting with the governor of the prefecture concerned and obtaining consent therefrom.

3. Those other than the State and public bodies may execute a part of the Park Work concerning the Quasi-national Park upon obtaining authorized concession from the governor of the prefecture.

(Procedure of Consultation Etc.)

**Article 11**

As to the consultation under paragraph 2 of Article 9 and paragraph 2 of the preceding article, the procedure of authorization under paragraph 3 of Article 9 and paragraph 3 of the preceding article, and the execution of the Park Work with the consent or authorized concession under paragraph 2 of Article 9 and paragraph 2 of the preceding article, necessary matters shall be prescribed by the Cabinet Order.

(Maintenance of Cleanliness)

**Article 12**

The State and local public bodies shall, when deemed necessary, cooperate with the personnel responsible for the administration of the roads, picnic grounds, camping grounds, ski slopes, swimming areas, and other public use sites located in National and Quasi-national Parks in the maintenance of the cleanliness of such facilities.

## Section 3 Protection and Utilization

(Special Zone)

### Article 13

The Minister of the Environment, in regard to the National Park and the governor of the prefecture concerned, in regard to the Quasi-national Park, may, for the purpose of preserving scenic beauty of the Park concerned, designate the Special Zone within its boundary (excluding sea areas) in accordance with the Park Plan.

2. The provisions of paragraphs 3 and 4 of Article 5 shall be applied correspondingly to the designation of the Special Zone and dissolution of its designation, and to the alteration of its boundary. In this case, the "Minister of the Environment" mentioned in paragraph 3 of the same article shall read as the "Minister of the Environment and the governor of the prefecture concerned," and "official gazette" in the same paragraph shall read as "official gazette or prefectural official report", respectively.

3. Within the Special Zone (with the exception of the Special Protection Zone; hereinafter the same in this article), the activities coming under any of the following items shall not be carried out without the permission of the Minister of the Environment in case of the National Park and that of the governor of the prefecture in case of the Quasi-national Park; provided that the activity, that has already been under way at the time of the designation of the Special Zone concerned or the expansion of its boundary, (except the work mentioned in item 5 below), or the activity mentioned in item 5, that has already been under way at the time of the designation of the lakes, marshes or swamps prescribed in the same item, or the activity mentioned in item 7, that has already been under way at the time of the designation of the materials prescribed in the same item, or the activity carried out as the emergency measure in case of disaster shall be excepted from this provision.
   (1) Constructing, reconstructing or extending structures.
   (2) Felling trees and bamboos.
   (3) Mining minerals or extracting soil and stones.
   (4) Causing increase or decrease of the water-level or quantity of water of rivers, lakes, marshes, swamps and wetlands etc.
   (5) Discharging polluted or waste water through the sewage disposal facilities into the lakes, marshes or swamps and wetlands designated by the Minister of the Environment or within a distance of one kilometer from there discharging the same through the sewage disposal facilities into the water running into the designated lakes marshes or swamps and wetlands etc.
   (6) Putting up or setting up advertisements or those similar to them, or showing of advertisements or those similar to them on the structures and the like.
   (7) Accumulating or storing soil and stones or other materials designated by the

Minister of the Environment in the open air.

(8) Reclaiming the surface of water or reclaiming by drainage.

(9) Clearing land or changing the feature of land.

(10) Collecting or damaging alpine plants or other plants designated by the Minister of the Environment.

(11) Capturing or killing or wounding animals in mountains, or animals designated by the Minister of the Environment (hereinafter, the "Designated Animals" in this item), or collecting or damaging eggs of the Designated Animals.

(12)Altering the colors of roofs, surface of walls, fences and walls, bridges, steel towers, water-pipes or those similar to them.

(13) Entering into wetlands or similar areas designated by the Minister of the Environment during the period designated according to such areas.

(14) Using horses, vehicles or power-driven vessels, or landing of airplanes in areas designated by the Minister of the Environment other than roads, plazas, paddies, fields, pastures or housing lots.

(15) Any activity other than those mentioned in the preceding items which may affect the scenic beauty of the Special Zone and is prescribed by the Cabinet Order.

4. Neither the Minister of the Environment nor the governor of the prefecture concerned shall grant the permission prescribed in the preceding paragraph if any activity mentioned in the items of the preceding paragraph fails to comply with the standards prescribed by the environmental ministerial ordinance.

5. When the governor of the prefecture concerned intends to grant the permission prescribed in paragraph 3 of this article for the Quasi-national Park, if the activity concerning the permission falls under an activity prescribed in the environmental ministerial ordinance in view of its impact on the scenic beauty of the Quasi-national Park concerned and other circumstances, he shall consult with the Minister of the Environment and obtain consent therefrom.

6. One, who has already started the activity mentioned in any of the items of paragraph 3 (except the activity mentioned in item 5 of the same paragraph) within the Special Zone at the time of the designation of the Special Protection Zone concerned or the expansion thereof, or the activity mentioned in item 5 of the same paragraph within the Special Zone at the time of the designation of the lakes, marshes or moist grasslands prescribed in the same item, or the activity mentioned in item 7 of the same paragraph at the time of the designation of the materials prescribed in the same item, shall notify the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park to that effect within three months counting from the day of such designation or expansion of the boundary.

7. One, who has already started the activity mentioned in any of the items of paragraph 3 within the Special Zone as the necessary emergency measure for the exceptional disaster, shall notify the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park to that effect within 14 days counting from the day of the activity carried out.

8. One, who intends to plant trees and bamboos or pasture livestock within the Special Zone, shall previously notify the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park to that effect.

9. To the activities mentioned in any of the following items, the provisions of paragraph 3 and the preceding 3 paragraphs shall not be applied:
   (1) Activity carried out as the execution of the Park Works.
   (2) Activity carried out within the Scenic Landscape Preservation Area, which is to be prescribed in paragraph 1 of article 31 based on the Scenic Landscape Preservation Agreement executed under item 1 of the same paragraph, in accordance with the matters mentioned in item 2 or 3 of the same paragraph.
   (3) Ordinary administrative activity, simple activity or other activities prescribed by the environmental ministerial ordinance.

(Special Protection Zone)

**Article 14**

The Minister of the Environment, in regard to the National Park and the governor of the prefecture concerned, in regard to the Quasi-national Park, when specially necessary for the preservation of the landscapes of the Park, may designate the Special Protection Zone within the Special Zone in accordance with the Park Plan.

2. The provisions of paragraphs 3 and 4 of Article 5 shall be applied accordingly to the designation of the Special Protection Zone and dissolution of the designation thereof, and to the alteration of the boundary thereof. In this case, the "Minister of the Environment" mentioned in paragraph 3 of the same article shall read as the "Minister of the Environment or the governor of the prefecture concerned", and "official gazette" in the same paragraph shall read as "official gazette or prefectural official report", respectively.

3. Within the Special Protection Zone the following activities shall not be carried out without the permission of the Minister of the Environment in the case of the National Park and without that of the governor of the prefecture concerned in the case of the Quasi-national Park; provided that the activity, that has already been under way at the time of the designation of the Special Protection Zone concerned or the expansion of

its boundary, (except the activity mentioned in item 5 or paragraph 3 of the preceding article), or the activity mentioned in item 5, that has already been under way at the time of the designation of the lakes, marshes or swamps and wetlands prescribed in the same item, or the activity carried out as the emergency measure in case of disaster shall be excepted from this provision.

(1) Any Activity mentioned in the items 1 to 6, 8, 9, 12 and 13 of paragraph 3 of the preceding article.
(2) Damaging trees and bamboos.
(3) Planting trees and bamboos.
(4) Pasturing livestock.
(5) Accumulating or storing things in the open air.
(6) Setting fire or making fire.
(7) Collecting or damaging plants other than trees and bamboos, or collecting fallen leaves or fallen branches.
(8) Capturing, killing or wounding animals, or collecting or damaging their eggs.
(9) Using horses, vehicles or power-driven vessels, or landing airplanes in areas other than roads or plazas.
(10) Any activity other than those mentioned in the preceding items which may affect the landscapes of the Special Protection Zone and is prescribed by the Cabinet Order.

4. Neither the Minister of the Environment nor the governor of the prefecture concerned shall grant the permission prescribed in the preceding paragraph if any activity mentioned in the items of the preceding paragraph fails to comply with the standards prescribed by the environmental ministerial ordinance.

5. When the governor of the prefecture concerned intends to grant the permission prescribed in paragraph 3 of this article for the Quasi-national Park, if the activity concerning the permission falls under an activity prescribed in the environmental ministerial ordinance in view of its impact on the landscape of the Quasi-national Park concerned and other circumstances, he shall consult with the Minister of the Environment and obtain consent therefrom.

6. One, who has already started the activity mentioned in any of the items of paragraph 3 (except the activity mentioned in item 5 of the same paragraph) within the Special Protection Zone at the time of the designation of the Special Protection Zone concerned or the expansion thereof, or the activity mentioned in item 5 of the same paragraph within the Special Protection Zone at the time of the designation of the lakes, marshes or swamps and wetlands prescribed in the same item, or the work mentioned in item 7 of the same paragraph at the time of the designation of the materials prescribed in the same item, shall notify the Minister of the Environment in

the case of the National Park, or the governor of the prefecture concerned in the case of the Quasi-national Park to that effect within three months counting from the day of such designation or expansion of the boundary.

7. One, who has carried out the activity mentioned in any of the items of paragraph 3 within the Special Protection Zone as the necessary emergency measure for the exceptional disaster, shall notify the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park to that effect within 14 days counting from the day of the same work carried out.

8. To the activities mentioned in the following items, the provisions of paragraph 3 and the preceding two paragraphs shall not be applied:
   (1) Activity carried out as the execution of the Park Works.
   (2) Activity carried out within the Scenic Landscape Preservation Area, which is to be prescribed in paragraph 1 of Article 31 based on the Landscape Preservation Agreement executed under paragraph 1 of the same article, in accordance with the matters mentioned in item 2 or 3 of the same paragraph.
   (3) Ordinary administrative activity, simple activity or other activities prescribed by the environmental ministerial ordinance.

(Regulated Utilization Area)

**Article 15**

The Minister of the Environment, in regard to the National Park, and the governor of the prefecture concerned, in regard to the Quasi-national Park, when specially necessary for the preservation of the scenic beauty or landscape of the Park concerned and proper use thereof, may designate the Regulated Utilization Area within the Special Zone in accordance with the Park Plan.

2. The provisions of paragraphs 3 and 4 of Article 5 shall be applied correspondingly to the designation of the Regulated Utilization Area and dissolution of the designation thereof, and to the alteration of the boundary thereof. In this case, the "Minister of the Environment" mentioned in paragraph 3 of the same article shall read as the "Minister of the Environment and the governor of the prefecture concerned", and "official gazette" in the same paragraph shall read as "official gazette or prefectural official report", respectively.

3. No one shall enter the Regulated Utilization Area within a period designated by the Minister of the Environment without the approval prescribed in paragraph 1 of the following article except the entries mentioned in the following items:
   (1) Entry in order to carry out the activity with the permission of paragraph 3 of Article

13 or paragraph 3 of the preceding article (including the activity concerning the consultation prescribed in the latter part of paragraph 1 of Article 56), or the activity notified as prescribed in paragraph 6 or 8 of Article 13 or paragraph 6 of the preceding article (including the activity concerning the notice prescribed in paragraph 3 of Article 56).

(2) Entry in order to carry out the necessary emergency measure in case of disaster.

(3) Entry in order to execute the Park Work.

(4) Entry in order to carry out the activity within the Scenic Landscape Preservation Area, which is prescribed in paragraph 1 of Article 31 based on the Scenic Landscape Preservation agreement executed under paragraph 1 of the same article, in accordance with the matters mentioned in item 2 or 3 of the same paragraph.

(5) Entry in order to carry out ordinary administrative work, simple activity or other activities that are prescribed by the environmental ministerial ordinance.

(6) Any other entry than those mentioned in each item above that is acknowledged as inevitable and approved by the Minister of the Environment or the governor of the prefecture concerned.

(Approval of Entry)

**Article 16**

The user of the National Park or Quasi-national Park, when attempting to enter the Regulated Utilization Area within the period prescribed in paragraph 3 of the preceding article, shall obtain the approval from the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park with respect to the compliance with the requirements of the following items:

(1) Entry in order to use the National Park or Quasi-national Park.

(2) Compliance with the standards prescribed by the environmental ministerial ordinance that requires the entry not to affect the preservation of the scenic beauty or landscape and proper use of the Park concerned.

2. The user who intends to obtain the approval of the preceding paragraph shall, as prescribed in the environmental ministerial ordinance, apply for the approval to the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park.

3. The Minister of the Environment or the governor of the prefecture concerned shall grant the approval of paragraph 1 when he acknowledges that the entry for which the approval is applied as prescribed in paragraph 1 complies with the requirements of each item of the same paragraph.

4. The Minister of the Environment or the governor of the prefecture concerned shall

issue an entry approval certificate as prescribed in the environmental ministerial ordinance upon granting the authorization under paragraph 1.

5. If one who has been granted the authorization of paragraph 1 has lost or destructed the entry approval certificate under the preceding paragraph, the one may, as prescribed in the environmental ministerial ordinance, apply for reissuance of the certificate concerned to the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park.

6. When entering the Regulated Utilization Area concerned, one who has been granted the approval of paragraph 1 shall carry the entry approval certificate prescribed in paragraph 4.

(Designated Approval Institution)

**Article 17**

The Minister of the Environment and the governor of the prefecture concerned may cause their nominee (the "Designated Approval Institution") to perform all or part of their affairs prescribed in the preceding article (the "Approval-related Affairs") with respect to National Park in the case of the Minister of the Environment or Quasi-national Park in the case of the governor of the prefecture concerned.

2. Designation of the Approval Institution (hereinafter referred to as "Designation" up to Article 21) shall be made upon application by one who intends to perform the approval-related affairs.

3. No one who falls under any of the following items shall be given the Designation:
   (1) Minor, ward who is of age, or quasi-incompetent person.
   (2) One, who is bankrupt and unable to recover legal status.
   (3) One ,who has been sentenced to a punishment not lighter than imprisonment, or has undergone the execution of the punishment sentenced under this Law or the Nature Conservation Law or ceased to undergo such execution during the latest two years.
   (4) One whose Designation has been cancelled under paragraph 2 or 3 of Article 21 during the latest two years.
   (5) Legal entity any director of which falls under any of the preceding items.

4. In the event of the Designation, the Minister of the Environment or the governor of the prefecture concerned shall not perform the designated Approval-related Affairs concerning the Regulated Utilization Area.

5. In the event of the Designation, the Minister of the Environment or the governor of

the prefecture concerned shall announce the Designation in the official gazette or prefectural official report, respectively.

6. With respect to application of the preceding article in the event of the Approval by the Designated Approval Institution, "from the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park" in paragraph 1 of the same article, "to the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park" in paragraphs 2 and 5 of the same article, and "the Minister of the Environment or the governor of the prefecture concerned" in paragraphs 3 and 4 of the same article shall read as the "Designated Approval Institution."

(Standards for Designation)

**Article 18**

The Minister of the Environment or the governor of the prefecture concerned shall not make the Designation unless there are no other Designated Approval Institutions for the Regulated Utilization Area concerning the application in paragraph 2 of the preceding article and the application concerned complies with the following standards:

(1) The plan for implementing the approval-related affairs shall be appropriate for accurate implementation thereof with respect to the matters concerning personnel, method of implementing the affairs concerned, etc.
(2) The applicant shall be provided with the accounting and technical bases that are enough to accurately practice the plan for implementing the approval-related affairs under the preceding paragraph.
(3) When the applicant is engaged in business other than the approval-related affairs, there shall not be any possibility that the engagement in such business affects the fair implementation of the approval-related affairs.
(4) The applicant shall be provided with the standards for fair and accurate implementation of the approval-related affairs other than those prescribed in the foregoing three items.

(Matters to be Observed by Designated Authorization Institution)

**Article 19**

The Designated Approval Institution shall prescribe the rules for implementing the approval-related affairs before starting the affairs in accordance with the environmental ministerial ordinance concerned and obtain approval for such rules including amendments thereto from the Minister of the Environment or the governor of the prefecture concerned.

2. The Designated Approval Institution shall formulate a business plan and an income

and expenditure budget for each fiscal year before the beginning of the fiscal year concerned (immediately after the Designation, for the fiscal year to which the date of Designation belongs), and obtain approval for such plan and budget including amendments thereto from the Minister of the Environment or the governor of the prefecture concerned.

3. The Designated Approval Institution shall formulate an annual report and statements of account of the fiscal year concerned within three months after the end of each fiscal year, and submit them to the Minister of the Environment or the governor of the prefecture concerned.

4. The Designated Approval Institution shall not suspend or discontinue all or part of the approval-related affairs concerned without the permission of the Minister of the Environment or the governor of the prefecture concerned.

5. When the Designated Approval Institution suspends all or part of the approval-related affairs with the permission of the preceding paragraph, or is unable to implement all or part of the Affairs concerned due to a natural disaster or any other event, the Minister of the Environment or the governor of the prefecture concerned, when deemed necessary, shall implement all or part of the approval-related affairs concerned.

6. When the Minister of the Environment or the governor of the prefecture concerned implements all or part of the approval-related affairs under the preceding paragraph, or when the Designated Approval Institution discontinues all or part of the approval-related affairs concerned with the permission of paragraph 4, or when the Minister of the Environment or the governor of the prefecture concerned cancels the Designation under paragraph 2 or 3 of Article 21, necessary matters including transfer of the approval-related affairs shall be prescribed by the environmental ministerial ordinance.

(Duty of Confidentiality Etc.)

**Article 20**

The Designated Approval Institution (directors when the Institution is a legal entity), its personnel and the former Designated Approval Institution shall not leak out the confidential information that has come to their knowledge in the course of implementing the approval-related affairs, or shall not use such information for their personal benefits.

2. The Designated Approval Institution and its personnel who engage in the approval-related affairs shall be deemed as the personnel who engage in official duties under law with respect to application of the Criminal Law (Law No. 45 of 1907) and

other penal regulations.

(Order of supervision concerning Designated Approval Institution)

**Article 21**

The Minister of the Environment or the governor of the prefecture concerned may issue orders necessary for supervision to the Designated Approval Institution concerning the approval-related affairs to the extent required for enforcement of the provisions from Articles 16 to 23.

2. The Minister of the Environment or the governor of the prefecture concerned shall cancel the Designation if the Designated Approval Institution falls under any of the items (except item 4) of paragraph 3 of Article 17.

3. The Minister of the Environment or the governor of the prefecture concerned may cancel the Designation if the Designated Approval Institution infringes upon the provision of Article 19, implements the approval-related affairs not under paragraph 1 of the same article, violates the order issued under paragraph 1, or is otherwise considered unable to implement the approval-related affairs properly and accurately.

4. The provision of paragraph 5 of Article 17 shall be applied correspondingly to the cancellation of the Designation under the preceding two paragraphs.

(Collection of Reports and Spot Inspection)

**Article 22**

The Minister of the Environment or the governor of the prefecture concerned may, to the extent required for enforcement of the provisions from Articles 16 to 23, ask the Designated Approval Institution to report on the approval-related affairs concerned, or cause their officials to enter the offices of the Designated Approval Institution to inspect relevant articles such as accounting books and documents or have the interested party ask relevant questions.

2. The personnel provided for in the preceding paragraph shall carry the identification papers and present them upon request.

3. The powers under paragraph 1 shall not be understood as those approved of for criminal investigations.

(Charges)

**Article 23**

One, who intends to obtain the approval under paragraph 1 of Article 16 or receive reissuance of the entry approval certificate to National Parks under paragraph 5 of the

same article shall pay to the State (the Designated Approval Institution when it performs the approval-related affairs) the charge prescribed in the Cabinet Order in consideration of actual expenses.

2. When the prefecture concerned collects the charge for the approval based on the provision of Article 227 of the Local Autonomy Law (Law No. 67 of 1947) under paragraph 1 of Article 16 or reissuance of the entry approval certificate under paragraph 5 of the same article, it may cause one who intends to receive the approval or reissuance of the entry approval certificate by the Designated Approval Institution under Article 17 to pay the charge concerned to the Designated Approval Institution concerned in accordance with the municipal bylaw.

3. Charges paid to the Designated Approval Institution under the preceding two paragraphs shall belong to the income of the Institution concerned.

(Marine Park Areas)

**Article 24**

The Minister of the Environment, in regard to the National Park, and the governor of the prefecture concerned, in regard to the Quasi-national Park, may, for the purpose of preserving the marine landscape of the Park concerned, designate Marine Park Areas within its boundary in accordance with the Park Plan.

2. The provisions of paragraphs 3 and 4 of Article 5 shall apply correspondingly to the designation of such Marine Park Areas, the dissolution of such designation, and any changes in the boundaries of such areas. In this case, the "Minister of the Environment" stated in paragraph 3 of the same article shall read as "the Minister of the Environment or the governor of the prefecture concerned", and "official gazette" in the same paragraph shall read as "official gazette or prefectural official report", respectively.

3. Within the Marine Park Areas, the activities coming under any of the following items shall not be carried out without the permission of the Minister of the Environment in the case of National Parks and the permission of the Minister of the Environment in case of the National Park and that of the governor of the prefecture in case of the Quasi-national Parks; provided that the activity, that has already under way at the time of the designation of the Marine Park Area concerned or the expansion of its boundary, or the activity carried out as the emergency measure in case of disaster, or the activities mentioned in item 1, 4 and 5 shall be excepted from this provision which are necessary for fishery operations such as setting up of fishing gear.
   (1) Activities mentioned in the items 1, 3 and 6 of paragraph 3 of Article 13.
   (2) Capturing, killing or wounding, gathering, or damaging tropical fish, coral,

seaweed, or plants and animal life similar to them that has been designated for each National or Quasi-national Park by the Minister of the Environment with the consent of the Minister of the Agriculture and Forestry.

(3) Reclaiming the surface of the sea or reclaiming by drainage.
(4) Changing the feature of the seabed.
(5) Mooring.
(6) Discharging polluted or waste water through the sewage disposal facilities.

4. Neither the Minister of the Environment nor the governor of the prefecture concerned shall grant the permission prescribed in the preceding paragraph if any activity mentioned in items of the preceding paragraph fails to comply with the standards prescribed by the environmental ministerial ordinance.

5. When the governor of the prefecture concerned intends to grant the permission prescribed in paragraph 3 of this article for the Quasi-national Park, if the activity concerning the permission falls under an activity prescribed in the environmental ministerial ordinance in view of its impact on marine landscape of the Quasi-national Park concerned and other circumstances, he shall consult the Minister of the Environment and obtain consent therefrom.

6. One, who has already started the activity mentioned in any of the items of paragraph 3 within the Marine Park Areas at the time of the designation of the Marine Park Area or the expansion thereof, shall notify the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park to that effect within three months counting from the day of such designation or expansion of the boundary.

7. One, who has undertaken any of the activities mentioned in any of the items of paragraph 3 as the necessary emergency measures for exceptional disaster within the Marine Park Area shall notify the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park to that effect within 14 days counting from the day of the activity carried out.

8. To the activities mentioned in any of the following items, the provisions of paragraph 3 and the preceding two paragraphs shall not apply be applied.
(1) Activity carried out as the execution of Park Works.
(2) Ordinary administrative activity and simple activity or other, that are prescribed by the environmental ministerial ordinance.

(Conditions)

**Article 25**

To the permissions under paragraph 3 of Article 13, paragraph 3 of Article 14, item 6, paragraph 3 of Article 15 and paragraph 3 of the preceding article, conditions may be attached within the limits necessary for the protection of the scenic beauty or spectacular sight of the National Park or Quasi-national Park.

(Ordinary Zone)

**Article 26**

One, who intends to undertake the activities coming under any of the following items within National or Quasi-national Parks other than Special Zones. or Marine Park Areas (hereinafter referred to as "Ordinary Zone") shall notify the Minister of the Environment in the case of National Parks or the governor of the prefecture concerned in the case of Quasi-national Parks of the matters prescribed by the environmental ministerial ordinance such as activity type, place, implementation method and scheduled date of commencement; provided that the activities mentioned in items 1, 3, 5 and 7 which are necessary for fishery operations such as setting up fishing gear shall be excepted from this provision.

(1) Constructing, reconstructing or extending structures, whose scales are beyond the standards prescribed by the environmental ministerial ordinance (including reconstructing or extending in the case that the scale thereof is to be beyond the standards prescribed by the environmental ministerial ordinance after the completion of the reconstruction or extension concerned).
(2) Causing increase or decrease of the water-levels or quantities of the rivers, lakes, marshes, swamps and wetlands within the Special Zone.
(3) Putting up or setting up advertisements or those similar to them, or showing advertisements or those similar to them on the structures and the like.
(4) Reclaiming the surface of the sea or reclaiming by drainage.
(5) Mining minerals or extracting soil and stones within one kilometer of the Marine Park Area.
(6) Changing the feature of the land.
(7) Changing the feature of the seabed within one kilometer of the Marine Park Area.

2. The Minister of the Environment, in regard to the National Park and the governor of the prefecture, in regard to the Quasi-national Parks, may, for the purpose of preserving landscape of the Park concerned give orders, to the one who intends to undertake or has undertaken the activity mentioned in any of the items of the preceding paragraph in the Ordinary Zone, to prohibit or restrict such activity or to take necessary measure, within the limits necessary for the protection of the landscapes thereof.

3. One, who has made the notification under paragraph 1, the act under the preceding paragraph may be taken exclusively within 30 days counting from the day of the notification made.

4. The Minister of the Environment or the governor of the prefecture, when, with the notification made under paragraph 1, the on-the-spot survey is required or when there is any other rational reason against the measure under paragraph 2 to be made within the period of time under the preceding paragraph, may prolong the period of time under the preceding paragraph during the period of existence of such reason. In this case, one, who has made the notification under paragraph 1, shall be notified of the fact and reason why the period of time is prolonged.

5. One, who has made the notification under paragraph 1, shall not start activity notified of unless a period of 30 days passes after the date of such notification.

6. The Minister of the Environment, in regard to the National Parks and the governor of the prefecture concerned, in regard to the Quasi-national Parks, may reduce the period of the preceding paragraph if such reduction is deemed to cause no hindrance to the protection of landscape of such Parks.

7. To the activities mentioned in any of the following items, the provisions of paragraphs 1 and 2 shall not be applied.
   (1) Activity carried out for the execution of the Park Works.
   (2) Activity carried out within the Scenic Landscape Preservation Area, which is prescribed in paragraph 1 of Article 31 based on the Scenic Landscape Preservation Agreement executed under paragraph 1 of the same article, in accordance with the matters mentioned in item 2 or 3 of the same paragraph.
   (3) Ordinary administrative activity, simple activity or other activities prescribed by the environmental ministerial ordinance.
   (4) Works which have already started at the time of the designation of National Parks, Quasi-national Parks or Marine Park Areas or the expansion of the boundaries thereof.
   (5) Works carried out as the emergency measures necessary for exceptional disasters.

(Order of Suspension Etc.)

**Article 27**

The Minister of the Environment, in regard to the National Parks and the governor of the prefecture concerned, in regard to the Quasi-national Parks, when deemed necessary for the protection of the respective parks concerned, may give an order to suspend the work concerned to one who has violated the provisions to the permissions under paragraph 3 of Article, paragraph 3 of Article 14, paragraph 3 of Article 15, paragraph 3 of Article 24,

or Article 25, or who has violated the measure under paragraph 2 of the preceding article, or give an order to restore to the original state within a reasonable period or, if such restoration is remarkably difficult, to take necessary measures as the substitute therefor, to the one or another who has succeeded to the rights of the land, buildings, other structures, from the one, both to the extent necessary for the protection concerned.

2. Upon attempting to issue an order to restore to the original state or take necessary measure as the substitute therefor (hereinafter referred to as "restoration to the original state, etc."), if it is impossible due to the absence of negligence to clarify the one to which an order of the restoration to the original state, etc. the Minister of the Environment or the governor of the prefecture concerned may carry out or cause another who is ordered or entrusted thereby to carry out the restoration to the original state, etc. at the expense of the one concerned. In this case, the Minister of the Environment or the governor of the prefecture concerned shall in advance announce publicly to the effect that the restoration to the original state, etc. shall be carried out within a reasonable period and that if such restoration etc. is not carried out within such a period, the Minister of the Environment or the governor of the prefecture concerned or the one who is ordered or entrusted thereby shall carry out the restoration to the original state, etc.

3. The personnel attempting to carry out the restoration to the original state, etc. under the preceding paragraph shall carry the identification papers and present them upon request.

(Collection of Reports and Spot Inspection)

**Article 28**

The Minister of the Environment, in regard to the National Park, or the governor of the prefecture concerned, in regard to the Quasi-national Park, when deemed necessary for the protection of the Park concerned, may ask the report on the actual conditions of the work under way and other necessary matters from one who has been given the permission under the provision of paragraph 3 of Article 13, paragraph 3 of Article 14, item 6, paragraph 3 of Article 15, or paragraph 3 of Article 24, or one whose work has been restricted or ordered to take necessary measures under paragraph 2 of Article 26.

2. The Minister of the Environment, in regard to the National Park or the governor of the prefecture concerned, in regard to the Quasi-national Park, when deemed necessary for the measure taken in accordance with the provision of paragraph 3 of Article 13, paragraph 3 of Article 14, item 6, paragraph 3 of Article 15, paragraph 3 of Article 24, paragraph 1 of Article 26, may have their officials, within the limits necessary therefor, enter the lands or buildings within the boundary of the Park concerned , or inspect the practical state of the activity which is mentioned in any of

the items paragraph 3 of Article 13, paragraph 3 of Article 14, item 6, paragraph 3 of Article 15 , paragraph 3 of Article 24, paragraph 1 of Article 26, or investigate the effects of these activities upon the landscapes.

3. The personnel provided for in the preceding paragraph shall carry the identification papers and present them upon request.

4. The powers under paragraphs 1 and 2 shall not be understood as those approved of for criminal investigations.

(Facility Complex)

**Article 29**

Minister of the Environment, in regard to the National Park and the governor of the prefecture concerned, in regard to Quasi-national Park, may, for the purpose of consolidating in groups the facilities for the utilization of the Park, the former or designate the Facility Complex within its boundary in accordance with the Park Plan.

2. The provisions of paragraphs 3 and 4 of Article 5 shall be applied correspondingly to the designation and dissolution of the Facility Complex and to the alteration of its boundary. In this case, the "Minister of the Environment" mentioned in paragraph 3 of the same article shall read as the "Minister of the Environment or the governor of the prefecture concerned", and "official gazette" in the same paragraph shall read as "official gazette or prefectural official report", respectively.

(Regulation for Utilization)

**Article 30**

Within the Special Zone, Marine Park Areas or Facility Complex of the National and Quasi-national Parks, no one shall perform the activities mentioned in the following items:

(1) Dumping refuse and other filth or waste or leaving them as they are in such manners as give remarkably unpleasant feelings to those utilizing the National Park or Quasi-national Park concerned.

(2) Letting remarkably offensive odors exhale, rending out disturbing noises with loud speakers, radios, etc., occupying waywardly observation points, pavilions, etc., touting in such manners as cause one to feel sickening, or else causing annoyance remarkably to those utilizing the National Park or Quasi-national Park concerned.

2. The competent personnel of the State or of the prefecture, when anyone is found performing the activity mentioned in item 2 of the preceding article within the Special Zone or Facility Complex, may give instructions to stop the act.
3. The personnel provided for in the preceding paragraph shall carry identification

papers and present them upon request.

## Section 4　Scenic Landscape Preservation Agreement

(Conclusion of the Scenic Landscape Preservation Agreement, Etc.)

**Article 31**

The Minister of the Environment or local public bodies or the park management organization that is designated under paragraph 1 of Article 37 and performs the activity concerning management of the place of natural scenic beauty under the Scenic Landscape Preservation Agreement out of the activities mentioned in item 1 of Article 38 may, when deemed necessary to protect the place of natural scenic landscape within the National or Quasi-national Park, manage the place of natural scenic landscape within the boundary of the land concerned by executing an agreement providing for the following matters (the "Scenic Landscape Preservation Agreement") with the owner of land or trees and bamboos (referred to the "owner of land, etc." together with the following one) within the boundary (excluding sea areas) of the Park concerned or the one who owns the right to use and earn profits from such land or trees and bamboos (except when such right is clearly established for temporary facilities or other temporary use).

(1) Area to be covered by the Scenic Landscape Preservation Agreement (the "Scenic Landscape Preservation Area").
(2) Matters concerning methods for managing the place of natural scenic landscape within the Scenic Landscape Preservation Area.
(3) Matters concerning development of the facilities concerned when improvement is necessary for the facilities required with respect to the protection of the place of natural scenic landscape within the Scenic Landscape Preservation Area.
(4) Effective period of the Scenic Landscape Preservation Agreement.
(5) Measures to be taken in the event of breach of the Scenic landscape preservation agreement.

2. The Scenic Landscape Preservation Agreement requires consent of all the owners of land, etc. within the Scenic Landscape Preservation Area.

3. Contents of the Scenic Landscape Preservation Agreement shall comply with the following standards:

(1) The Agreement shall be effective and appropriate for protection of the place of natural scenic landscape.
(2) The Agreement shall not unreasonably restrict the use of the land and trees and bamboos concerned.
(3) Matters mentioned in each item of paragraph 1 comply with the standards prescribed by the environmental ministerial ordinance.

4. When a local public body intends to execute the Scenic Landscape Preservation Agreement, it shall previously consult with the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park, and obtain consent therefrom, except when the prefecture intends to execute the Scenic Landscape Preservation Agreement on the land within its boundary with respect to the Quasi-national Park.

5. When the Park Management Organization mentioned in paragraph 1 intends to execute the Scenic Landscape Preservation Agreement, it shall previously obtain approval from the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park.

(Public Inspection of Scenic Landscape Preservation Agreement Etc.)

**Article 32**

Upon attempting to execute the Scenic Landscape Preservation Agreement, or upon approving the application of Landscape Preservation Agreement under paragraph 5 of the preceding article, the Minister of the Environment, the local public body, or the governor of the prefecture concerned, shall publicly announce to that effect as prescribed in the environmental ministerial ordinance and provide the Scenic Landscape Preservation Agreement concerned for public inspection of the interest party for two weeks counting from the date of the announcement concerned.

2. In the event of public announcement under the preceding paragraph, those concerned may submit written opinions about the Scenic Landscape Preservation Agreement to the Minister of the Environment, the local public body, or the governor of the prefecture concerned by the date of expiration of the inspection period under the preceding paragraph.

(Approval of Scenic Landscape Preservation Agreement)

**Article 33**

The Minister of the Environment or the governor of the prefecture concerned shall grant the approval of the Scenic Landscape Preservation Agreement when the application made for the Agreement concerned under paragraph 5 of Article 31 falls under all the following items:

(1) Application procedures are not in breach of relevant laws.
(2) Contents of the Scenic Landscape Preservation Agreement comply with the standards mentioned in each item of paragraph 3 of Article 31.

(Official Announcement of Scenic Landscape Preservation Agreement Etc.)

**Article 34**

In the event of execution of the Scenic Landscape Preservation Agreement or approval

under the preceding article, the Minister of the Environment, the local public body, or the governor of the prefecture concerned, as prescribed by the environmental ministerial ordinance, shall publicly announce such event, provide a copy of the Scenic Landscape Preservation Agreement concerned for public inspection, and expressly indicate the Scenic Landscape Preservation Area within its boundary.

(Alteration to Scenic landscape preservation agreement)

**Article 35**

The provisions of paragraphs 2 to 5 of Article 31and preceding three articles shall be applied correspondingly to alterations to the matters prescribed in the Scenic Landscape Preservation Agreement.

(Effect of Scenic Landscape Preservation Agreement)

**Article 36**

The Scenic Landscape Preservation Agreement that has been publicly announced under Article 34 (including the cases when being correspondingly applied under the preceding article) shall remain in force for the one who becomes the owner of land etc. within the boundary of the Scenic Landscape Preservation Area concerned after such public announcement.

## Section 5 Park Management Organization

(Designation)

**Article 37**

The Minister of the Environment, in regard to the National Park and the governor of the prefecture concerned, in regard to the Quasi-national Park, respectively, may designate, as the Park Management Organization, a legal incorporated association or foundation established for protection and proper use of the place of natural scenic landscape within the National or Quasi-national Park, or a nonprofit organization under paragraph 2 of Article 2 of the Law to Promote Specified Nonprofit Activities (Law No. 7 of 1998), or other legal entity prescribed in the environmental ministerial ordinance, each of which is acknowledged as capable of performing properly and certainly the operations mentioned in the items of the following article.

2. In the event of designation under the preceding paragraph, the Minister of the Environment and the governor of the prefecture concerned shall announce the name and address of the Park Management Organization concerned and location of its offices in the official gazette or prefectural official report, respectively.

3. Upon attempting to change the name, address or location of the office, the Park Management Organization shall previously notify, to that effect, the Minister of the

Environment in the case of the National Park or the governor of the prefecture concerned in the case of Quasi-national Park.

4. In the event of notification under the preceding paragraph, the Minister of the Environment or the governor of the prefecture concerned shall announce the matters concerning the notification in the official gazette or prefectural official report, respectively.

(Operations)

**Article 38**

The Park Management Organization shall perform the following operations:

(1) Management of the places of natural scenic beauty and other activities that contribute to preservation of natural scenic beauty under the Scenic Landscape Preservation Agreement.
(2) Maintenance and management of the facilities within the National or Quasi-national Park including repairs.
(3) Collection and presentation of information or materials concerning the protection of the National or Quasi-national Park and promotion of their proper use.
(4) Offer of appropriate advice and guidance concerning the protection of the National or Quasi-national Park and promotion of their proper use.
(5) Study and research concerning the protection of the National or Quasi-national Park and promotion of their proper use.
(6) Operations incidental to the aforementioned operations.

(Cooperation)

**Article 39**

The Park Management Organization shall perform the operations mentioned in item 1 of the preceding article in close cooperation with the Minister of the Environment and local public body concerned.

(Order for Improvement)

**Article 40**

When improvement in the management of the operation by the Park Management Organization is considered necessary, the Minister of the Environment or the governor of the prefecture concerned may order the Organization concerned to take measures necessary for such improvement.

(Cancellation of Designation Etc.)

**Article 41**

If the Park Management Organization violates the order under the preceding article, the Minister of the Environment or the governor of the prefecture concerned may cancel the

designation of the Organization.

2. In the event of cancellation of the designation under the preceding paragraph, the Minister of the Environment or the governor of the prefecture concerned shall announce the event in the official gazette or prefectural official report, respectively.

(Presentation of Information Etc.)

**Article 42**

The State and local public bodies shall provide the Park Management Organizations with information, guidance and advice necessary for them to perform their operations.

## Section 6 Expenses

(Expenses Necessary for Execution of Park Work)

**Article 43**

The expenses necessary for the execution of the Park Work shall be borne by the one who executes the Park Work concerned.

(Subsidy from State)

**Article 44**

The State may subsidize, within the limits of budgetary appropriation, part of the expenses necessary for the execution of the Park Work for the prefecture that executes the Park Work concerned, in accordance with that which is prescribed by the Cabinet Order.

(Charge to Local Public Body)

**Article 45**

In case that the State executes the Park Work concerning the National Park, when the execution of the Park Work concerned gives any special benefit to any local public body, the State may charge a part of the expenses necessary for the same execution to the same local public body within the limits of the benefits it receives.

2. In case that the State intends to charge a part of the expenses necessary for the execution of the Park Work to the local public body in accordance with the provision of the preceding article, the State shall seek the opinion of the local public body concerned.

(Charge to Beneficiary)

**Article 46**

The State or the local public body, in case that there is any one who receives special benefit through the execution of the Park Work, may charge a part of the expenses

necessary for the execution of the Park Work concerned to the same one within the limits of the benefits he receives.

(Charge to Causes)

**Article 47**

The State or the local public body, in case that the execution of the Park Work is made necessary by any other construction or another's activity, may charge all or a part of the expenses concerned, within the limits of the necessity for the execution of the Park Work, to one who bears the expenses of the construction or the activity which has made such a cause.

(Method of Collection of Shares, etc.)

**Article 48**

The method of the collection of the shares in accordance with the provisions of the preceding three articles and other necessary matters concerning the shares shall be prescribed by the Cabinet Order.

(Exception from Application)

**Article 49**

The provisions of this section shall not be applied to the works concerning the roads under the Road Law and other works that are provided for otherwise, in other Laws, concerning the expenses necessary for the execution thereof.

## Section 7 Miscellaneous Provisions

(On-the-spot Survey)

**Article 50**

If a spot survey is necessary, the Minister of the Environment, with respect to the designation of National or Quasi-national Park, decision on the Park Plan, execution of the Park Work, or decision on the Park Work on the National Park, and the governor of the prefecture concerned, with respect to designation of the Quasi-national Park or application for expansion of its area, decision on the Park Plan, application for additional Work, decision on the Park Work or execution of the Park Work, and the State organs other than the Minister of the Environment, with respect to execution of the Park Work, may respectively have their competent personnel enter the lands of others, set up land marks, survey the lands, fell or remove the trees and bamboos, or hedges or fences, etc. which pose an impediment, provided that, in case that any provision concerning the on-the-spot survey is found in the Road Law or other laws, its provision shall be preferentially obeyed.

2. The State organs or the governor of the prefecture, when they intend to have their

competent personnel perform the activities in accordance with the provision of the preceding article, shall previously notify the fact to the owner (when the address of the owner is unknown, the occupant thereof; hereinafter, the same) and occupant of the same land and the owner of the trees and bamboos or the hedges, fences, etc., and thus give them the opportunity for presenting their written opinions.

3. The personnel under paragraph 1 shall not enter the housing lot or the land enclosed with hedges, fences, etc., before sunrise and after sunset.

4. The personnel under paragraph 1 shall carry the identification papers and present them upon request.

5. The owner or occupant of the land or the owner of trees and bamboos or hedges or fences shall not deny or interfere with the entry or setting up of the land marks or other activities under paragraph 1, without any good reasons.

(Arbitration of Environmental Dispute Coordination Committee)

**Article 51**

One, who has been dealt with the measure by the Minister of the Environment or the governor of the prefecture under the provision of paragraph 3 of Article 13, paragraph 3 of Article 14, paragraph 3 of Article 24, or paragraph 2 of Article 26 has any complaint against it, may apply for the arbitration to the Environmental Dispute Coordination Committee, when the reason of his complaint is upon the coordination with mining, quarring or gravel industries. In this case, the person can not make complaint in accordance with the Administration Complaint Examination Law (Law No. 160 of 1962).

2. Article 18 of the Administration Complaint Examination Law shall apply correspondingly, in case of the disposition of the preceding article, the disposition authority instructs erroneously that the person can claim re-examination or complaint.

(Loss Compensation)

**Article 52**

The State, in regard to the National Park and the governor of the prefecture, in regard to the Quasi-national Park, shall compensate for the loss that may occur under ordinary circumstances to one who suffers the loss due to inability to obtain the permission under paragraph 3 of Article 13, paragraph 3 of Article 14, or paragraph 3 of Article 24, or due to the conditions attached to the permission under Article 25, or due to the disposition under paragraph 2 of Article 26.

2. One, who intends to claim the compensation in accordance with the preceding article,

shall claim it to the Minister of the Environment, in regard to the State and the governor of the prefecture concerned, in regard to the prefecture.

3. The Minister of the Environment or the governor of the prefecture concerned, when he has received the claim in accordance with the provision of the preceding article, shall decide upon the sum of the compensation and notify it to the claimant concerned.

4. The State or the prefecture concerned shall compensate for the loss that may occur under ordinary circumstances to one who suffers the loss due to an activity of the competent personnel under paragraph 1of Article 50.

5. The provisions of paragraphs 2 and 3 shall be applied correspondingly to the compensation of the loss under the provision of the preceding article in this case, the "Minister of the Environment" in paragraphs 2 and 3 shall read as the "competent minister who administers the affairs concerning the spot survey prescribed in paragraph 1 of Article 50 ".

(Institution of Appeal)

**Article 53**

One, who is dissatisfied with the decision under the provision of paragraph 8 of the preceding article (including the case of the corresponding application under paragraph 5 of the same article) may claim the increase of the sum of the compensation by the appeal within six months counting from the day of the notification received concerned.

2. In the complaint of the preceding paragraph, the State or the Prefectural Government shall be the defendant.

(Compulsory Collection of Shares)

**Article 54**

In case that any one, who does not pay the share to be paid to the State in accordance with the provisions of this Law, is found, the Minister of the Environment shall press him for the payment of it with the time-limit of its payment by the demand note.

2. In the preceding case, the Minister of the Environment may impose the arrears as provided for by the environmental ministerial ordinance provided that the arrears shall be decided upon within the limits of the amount calculated at the rate of 14.5% per annum.

3. In case that the one, who has received the demand, does not pay the sum to be paid by the appointed time-limit, the Minister of the Environment may impose the share and

the arrears provided for by the preceding two articles. In this case, the order of the share and arrears in the right of priority shall be next to those of the national tax and the local taxes.

4. The arrears shall be prior to the share.

(Consultation)

**Article 55**

The Minister of the Environment shall consult with the heads of the interested administrative organs when attempting to carry out the designation of the National Park or Quasi-national Park, expansion of the boundary thereof, decision upon or alteration of the Park Plan, or designation of the Special Zone, Special Protection Zone, Regulated Utilization Area or Marine Park Area, or expansion of the boundary thereof.

2. The governor of the prefecture concerned shall consult with the heads of the interested administrative organs when attempting to carry out the designation of the Special Zone, Special Protection Zone, Regulated Utilization Zone or Marine Park Zone within the Quasi-national Park or expansion of the boundary thereof.

3. The State organs other than the Minister of the Environment, when they intend to execute the Park Work concerning the National Park in accordance with the provision of paragraph 1of Article 9, shall consult with the Minister of the Environment.

4. The State organs, when they intend to execute the Park Work concerning the Quasi-national Park in accordance with the provision of the proviso to paragraph 1 of Article 10, shall consult with the Minister of the Environment.

(Special Cases with State)

**Article 56**

As to the activity carried out by the State organs, the permission in accordance with the provision of paragraph 3 of Article 13, or paragraph 3 of Article 14, item 6, paragraph 3 of Article 15 or paragraph 3 of Article 24 shall not need to be obtained. In this case, the State organ concerned, when it intends to carry out the same activity, shall previously consult with the Minister of the Environment in the case of the National Park, or with the governor of the prefecture in the case of the Quasi-national Park.

2. In the event of the consultation concerning the Quasi-national Park under the preceding paragraph, the governor of the prefecture concerned, if the activity concerning the consultation falls under any of the activities prescribed by the environmental ministerial ordinance in view of its impact on the spectacular sights of the Quasi-national Park concerned and other circumstances, the governor shall

consult with the Minister of the Environment and obtain consent therefrom.

3. The State organization, when it has carried out or intends to carry out the activity requiring to be notified in accordance with the provisions of paragraphs 6 to 8 of Article 13, paragraphs 6 and 7 of Article 14, paragraphs 6 and 7 of Article 24, or paragraph 1 of Article 26 shall notify the Minister of the Environment in the case of the National Park or the governor of the prefecture concerned in the case of the Quasi-national Park to that effect following the examples of notification in accordance with these provisions.

4. The Minister of the Environment or the governor of the prefecture, when deemed necessary for the protection of the landscapes of the park concerned on the receipt of the notification following the examples of reporting in accordance with the provision of paragraph 1 of Article 26, may seek conference with the State organ concerned on the measure to be taken for the protection of the landscapes.

(Delegation of Authority)
Article 56-2
The authority of the Minister of the Environment as prescribed in this Law may be delegated to the Director of the Regional Environment Office according to the environmental ministerial ordinance.

(Classification of Affairs)
**Article 57**
Affairs to be dealt with by the prefecture concerned under paragraph 3 of Article 5, which is being correspondingly applied in paragraphs 1 and 2 of Article 13, paragraph 3 of Article 5, which is being correspondingly applied in paragraphs 1 and 2 of Article 14, paragraph 3 of Article 5, which is being correspondingly applied in paragraphs 1 and 2 of Article 24, and paragraph 2 of Article 55 (excluding the provision concerning the Regulated Utilization Area) shall be deemed as the "Item 1 Legally Entrusted Affairs" prescribed in item 1, paragraph 9of Article 2 of the Local Autonomy Law.

(Relationship with Wilderness Area)
**Article 58**
The Wilderness Area designated under paragraph 1of Article 14 of the Nature Conservation Law shall be excluded from the area of the National or Quasi-national Park.

## *Chapter IV Penal Provisions*

**Article 69**

Any one, who has violated the order under the provision of paragraph 1 of Article 27, shall be punished with a penal servitude of not more than one year or a fine of not more than 1,000,000 yen.

**Article 70**

Any one, who comes under any of the following items, shall be punished with a penal servitude of not more than six months or a fine of not more than 500,000 yen:

(1) One, who has violated the provision of paragraph 3 of Article 13, paragraph 3 of Article 14, paragraph 3 of Article 15 or paragraph 3 of Article 24
(2) One, who has been authorized under paragraph 1 of Article 16 by falsification or other illegal means
(3) One, who has violated the conditions attached to the permission in accordance with the provision of Article 25.

**Article 71**

Any one, who has violated the provision of paragraph 1of Article 20, shall be punished with a penal servitude of not more than six months or a fine of not more than 500,000 yen.

**Article 72**

Any one, who has violated the measure taken under the provision of paragraph 2 of Article 26 or Article 40, shall be punished with a fine of not more than 500,000 yen.

**Article 73**

Any one, who comes under any of the following items, shall be punished with a fine of not more than 300,000 yen:

(1) One, who has been given reissuance of the entry approval certificate under paragraph 5 of Article 16 by falsification or other illegal means.
(2) One, who has discontinued all the approval-related affairs without the permission under paragraph 4 of Article 19.
(3) One, who has failed to report as prescribed in paragraph 1 of Article 22, or reported falsely, or refused, obstructed or evaded the spot inspection under the same paragraph, or made no statement or false statement in response to questions.
(4) One, who has failed to make the notification under the provision of paragraph 1 of Article 26 or has made false notification.
(5) One, who has violated the provision of paragraph 5 of Article 26.
(6) One, who has failed to make the reporting under paragraph 1 of Article 28 or has made false reporting.

(7) One, who has denied, prevented or evaded the entering inspection or entering survey under the provision of paragraph 2 of Article 28.
(8) One, who has performed, without permission, the activities mentioned in item 1, paragraph 1 of Article 30 within the Special Zone, Marine Park Area or Facility Complex of the National Park or Quasi-national Park.
(9) One, who has performed, without permission, the activities mentioned in item 2, paragraph 1 of the same article without obedience to the direction of the competent personnel under the provision of paragraph 2 of Article 30 within the Special Zone, Marine Park Area or Facility Complex of the National Park or Quasi-national Park.
(10) One, who has denied or prevented the entry or setting up of land marks or other activities under the provision of paragraph 1 of the same article, violating the provision of paragraph 5 of Article 50.

**Article 74**

When the representative of the juridical person or the juridical person, or the proxy of the individual, employee or other service worker has committed the offences under Article 69, Article 70, Article 72 or the preceding article in connection with the business of the some juridical person or individual, the same juridical person or individual, too, shall be punished respectively with the fines under the same articles, besides the punishment on the actual offender.

**Article 75**

Any one, who has entered without carrying the entry approval certificate, which violated the provision of paragraph 6 of Article 16, shall be punished with a fine of not more than 100,000 yen.

**Article 76**

Prefectural ordinance based upon the provision of Article 60, Article 62 or Article 63 may include the provision laid down for the punishments inflected on the actual offender, respectively within the limits of not exceeding the extents of the punishments prescribed in any of the preceding articles, according to the modes of the same offences.

## *Extract from the Supplementary Provisions*

(Date of Enforcement)

1. This Law shall come into force on October 1, 1957.

(Abolition of the National Parks Law)

2. The National Parks Act (Law No. 36 of 1931) shall be abolished.

(Affairs Dealt with by Prefectures)

9. Part of the affairs that belong to the authority of the Minister of the Environment as prescribed in this Law may be performed by the governors of the prefectures prescribed by the Cabinet Order for the time being as prescribed in the Cabinet Order.

10. When attempting to draft the Cabinet Order to prescribe the prefectures under the preceding paragraph, the Minister of the Environment shall draft it upon application by the governor of the prefecture concerned.

(Interest-free Loan by the State, etc.)

11. For the Park Work for which the State may subsidize the expense under Article 44, the State, for the time being, may provide interest-free loans to the prefecture concerned in the amount for which the State may provide within the budgetary limit as subsidy under Article 44 with respect to the funds to be used as expense for the matters mentioned in item 2, paragraph 1 of Article 2 of the Law concerning Special Measures for Promoting Improvement of Social Infrastructure Using Proceeds from Sales of the Stock of Nippon Telegraph and Telephone Corporation (Law No. 86 of 1987).

12. The repayment period of the loans provided by the State under the preceding paragraph shall be prescribed by the Cabinet Order not exceeding five years (including a grace period not exceeding two years).

13. In addition to the preceding paragraph, matters necessary for redemption such as method and acceleration of the due date under paragraph 11 of the Supplementary Provisions shall be prescribed by the Cabinet Order.

14. When the loan is extended to a prefecture under paragraph 11 of the Supplementary Provisions, the State shall subsidize the Park Work concerning the loan extended in the amount equivalent to the amount of said loan in accordance with Article 44. This subsidy shall be implemented by delivering the amount equivalent to the total redemption of the loan concerned at the time of redemption thereof.

15. When redemption of the interest-free loan extended to a prefecture under paragraph 11 of the Supplementary Provisions is accelerated to a date prior to the due date prescribed in paragraphs 12 and 13 of the Supplementary Provisions (except when such redemption is prescribed by the Cabinet Order), with respect to application of the provision of the preceding paragraph, the redemption concerned shall be deemed to have been made at the due date for the redemption.

## *Extract of the Supplementary Provisions (Law No. 29 dated April 24, 2002)*

(Date of Enforcement)

**Article 1**

This Law shall come into force on the date prescribed by the Cabinet Order not exceeding one year from the date of promulgation.

(Examination)

**Article 2**

The Government, when five years have passed since the enforcement of this Law, shall consider the state of enforcement of the National Parks Law, which is revised by this Law, (hereinafter, the "New Law" in this article), and when considered necessary, shall examine the provisions of the New Law and take necessary measures based on results of such examination.

# *4-3. Law on the Administration and Management of National Forests (Extract)*

(Law No. 246 of June 23, 1951)
Last amended by Law No. 160 of December 22, 1999

## Contents of the Law


**Chapter I** General Provisions (Articles 1 to 3)

**Chapter I-2** Administration and Management Plan (Articles 4 to 6-4)

**Chapter I-3** Consignment of Research (Articles 6-5 to 6-16)

**Chapter II** Lending, Using and Selling (Articles 7 to 8-4)

**Chapter III** Long-Term Profit-Sharing Afforestation (Articles 9 to 17)

**Chapter IV** Middle-Term Profit-Sharing Silviculture (Articles 17-2 to 17-6)

**Chapter V** National Forests Permitted to be (Jointly) Used by Local Dwellers (Articles 18 to 24)

**Chapter VI** Miscellaneous Provisions (Article 25)

**Chapter VII** Penal Provisions (Articles 26 and 27)

Supplementary Provisions

## *Chapter I General Provisions*

(Purpose of this Law)

**Article 1**

The purpose of this Law shall be to ensure the appropriate and efficient administration and management of national forests by clarifying administration and management plans and providing matters related to lending, selling, etc. with respect to national forests.

(2) The special rules for the acquisition, maintenance, conservation, utilization and disposal of national forests under the National Property Law (Law No. 73 of 1948) shall be as provided in this Law unless otherwise provided by other Law.

(Definition)

**Article 2**

"National forests" in this Law means that listed in the following:

(1) state-owned forests and range land which the state provides or has decided to provide for forest management and which are thus properties for company use as in Article 3(2)(iv) of the National Property Law; and

(2) state-owned forests and range land which are not provided for forest management any more on the basis of consideration for national welfare and thus are ordinary properties as in Article 3(3) of the National Property Law (excluding those of which jurisdiction was transferred to another ministry, agency, etc. as provided in Article 4(2) of the said Law and those of which affiliation was transferred to another department or bureau as provided in Article 4(3) of the said Law).

(Objectives of Administration and Management of National Forests)

**Article 3**

The objectives of administration and management of national forests shall be to maintain and improve land conservation function and other public-interest functions of national forests, and to supply forest products in a sustainable and planned way, as well as to use national forests to contribute to the development of industry and the improvement of the welfare of residents in the relevant region.

## *Chapter I-2 Administration and Management Plan*

(Basic Plan for Administration and Management)

**Article 4**

The Minister of Agriculture, Forestry and Fisheries must establish a basic plan for administration and management of national forests every five years as prescribed by Cabinet Order, while considering 10 years as one term (hereinafter referred to as the "Basic Plan for Administration and Management").

(2) The following matters shall be provided in the Basic Plan for Administration and Management:
   (i) basic policy for the administration and management of national forests;
   (ii) basic matters related to the maintenance and conservation of national forests;
   (iii) basic matters related to the supply of forest products from national forests;
   (iv) basic matters related to the utilization of national forests;
   (v) matters related to the system to implement operations for the administration and management of national forests or the prospects of long-term income and expenditure, and other matters related to the management of operations; and
   (vi) other matters necessary for the administration and management of national forests.

(3) The Basic Plan for Administration and Management must be consistent with the National Forests Plan, which was established in accordance with the provisions of Article 4(1) of the Forest Law (Law No. 249 of 1951), and other plans for forest maintenance in accordance with the provisions of other laws.

(Public Inspection of Draft Basic Plan for Administration and Management, etc.)

**Article 5**

The Minister of Agriculture, Forestry and Fisheries, when intending to establish or alter the Basic Plan for Administration and Management, must publicly announce such as prescribed by the Ministry of Agriculture, Forestry and Fisheries Ordinance in advance and provide a draft of the relevant Basic Plan for Administration and Management for public inspection for 30 days from the date of the relevant announcement.

(2) When the Minister of Agriculture, Forestry and Fisheries has made an announcement in accordance with the provisions of the preceding paragraph, those who have comments on the draft Basic Plan for Administration and Management provided for public inspection may give the comments to the Minister by reasoned documents before the date of the expiration of the public inspection period as in the preceding paragraph.

(3) After the expiration of the public inspection period as in Paragraph (1), the Minister of Agriculture, Forestry and Fisheries must ask for the opinions of the Forestry Policy Council by attaching the summary of comments about the relevant draft Basic Plan for Administration and Management which were made in accordance

with the provisions of the preceding paragraph.

(4) If the Minister of Agriculture, Forestry and Fisheries has established or altered the Basic Plan for Administration and Management, he/she must announce such without delay. In doing so, the Minister must also announce the summary of comments made in accordance with the provisions of Paragraph (2) and the results of considerations of the relevant comments.

(Regional Administration and Management Plan)

**Article 6**

The Director of the Regional Forest Office must establish a plan for the administration and management of national forests (hereinafter referred to as the "Regional Administration and Management Plan") every five years in line with the Basic Plan for Administration and Management, for each forest planning area as in Article 7-2(1) of the Forest Law with respect to national forests under his/her administration and management that is related to the relevant forest planning area, while setting the start of the period of the forest plan for the relevant forest planning area as the start of the period of the relevant plan and considering five years as one term.

(2) The following matters shall be provided in the Regional Administration and Management Plan:
   (i) basic matters related to the administration and management of national forests covered by the plan;
   (ii) matters related to patrol, the extermination of forest diseases and pests or the prevention of their infestation, and other matters related to the maintenance and conservation of national forests;
   (iii) matters related to the establishment of stable business relations for timber, and other matters related to the supply of forest products;
   (iv) matters related to the development of industry or the improvement of the welfare of residents in the region, and other matters related to the utilization of national forests;
   (v) basic policy for the maintenance of areas provided for public health use and forests within the relevant areas as well as facilities provided for public health use; and
   (vi) other matters necessary for the administration and management of national forests.

(3) The Regional Administration and Management Plan must be consistent with the forest plan established in accordance with the provisions of Article 7-2(1) of the Forest Law.

(4) The provisions of the preceding article shall apply mutatis mutandis to the establishment and alteration of the Regional Administration and Management Plan. In such case, "Minister of Agriculture, Forestry and Fisheries" in the said article shall read "Director of the Regional Forest Office," and "Forestry Policy Council" in Paragraph (3) of the said article shall read "related prefectural governor, related

municipal governor, and those who have academic backgrounds for matters mentioned in the items of Paragraph (2) of the following article."

# *4-4. National Forests Administration and Management Bylaw (Extract)*

## *Chapter 1 General Provisions*

**Article 1 (Principle)**

With respect to the administration and management of national forests, these rules shall apply in addition to the provisions of laws and orders and other governmental instructions.

**Article 2 (Division of National Forests into Blocks)**

1. The division of National Forests shall be classified in compartments and subcompartments.
2. A block shall be established, in principle, by dividing forests in need of preservation (which means national forests as set forth in Article 2, paragraph 1, of the Law on Administration and management of National Forests (Law No. 246, 1951: hereafter called the "LAW": the same shall apply hereafter)) for each forest planning area (which means the forest planning area as set forth in Article 5, paragraph 1, of the Forest Law (Law No. 249, 1951: the same shall apply hereafter)) for purposes of making clear the location of national forests and of contributing to the convenience of the execution of business, and subcompartments shall be established by dividing the block in question if parts exist in a block for which the state of the forest is different from the rest, or for which the handling relating to the administration and management is different or otherwise.

**Article 3 (Functional Categories of National Forests)**

1. Within national forests, the forests needing preservation shall be classified into such categories as listed in any one of the following subparagraphs in terms of a function that is primarily to be demonstrated among various functions held by it:
   (1) Forests for water land conservation
   (2) Forests for symbiosis between forests and people
   (3) Forests for cyclic use of resources.
2. "Forests for water and land conservation " are national forests for which the function of mountain disaster prevention or of water conservation is primarily to be demonstrated from the viewpoint of generating a national land infrastructure that can resist disaster and of ensuring the stable supply of excellent quality water.
3. " Forests for human and native" are national forests for which the function of the living environment conservation or of health and culture is primarily to be demonstrated from the viewpoint of conserving the diversity of living creatures, based on the importance of forests as an ecosystem, or of exploring the co-existence

of forest and mankind through communication with the forest.

4. "Forests for cyclic use of resources" are national forests, other than the forest for water and land conservation and the forest for human and native, in which industrial activity such as lumber production shall be carried out from the viewpoint of supplying in a stable and efficient manner forestry products such as lumber that are a material necessary for the national living and having a small impact on environment, while paying due consideration to the demonstration of the function of public benefit.

## *Chapter 2 Regional Administration and Management plan*

**Article 4 (Detailed Items of Planned Matters)**

Details of items to be set forth in the Regional administration and management plan under Article 6, paragraph 1, of the Law shall be as follows:

(1) Basic matters concerning the administration and management of national forests
a. Basic policy for the administration of national forests
b. Matters concerning the administration corresponding to functional categories
   (i) Guideline for administration and management of forests for water and land conservation, or other matters concerning conservation forest for water and soil
   (ii) Guideline for administration and management of forests for symbiosis between forests and people, or other matters concerning co-existence forest for forest and mankind
   (iii) Guideline for administration and management of forests for cyclic use of resources, or other matters concerning resource recycling utilization forest
c. Matters that are necessary for promoting watershed control system
d. Matters concerning the execution of major management
   (i) Total cutting volume
   (ii) Total regeneration volume
   (iii) Total tending volume
   (iv) Total volume of opening and improvement of forest road
e. Other necessary matters

(2) Matters concerning maintenance and preservation of national forests
a. Matters concerning patrol
b. Matters concerning expelling or preventing infestation of harmful insects in forest
c. Matters concerning forests for which special protection is necessary
d. Other necessary matters

(3) Matters concerning supply of forestry products
a. Matters concerning the establishment of a stable transaction relationship for lumber
b. Other necessary matters

(4) Matters concerning utilization of national forests
a. Policy of promoting utilization of national forests
b. Detailed method of utilization of national forests
c. Other necessary matters

(5) Basic policy concerning areas that are offered for the purpose of public health and concerning the maintenance of forest and of facilities that are offered for the purpose of public health in the area in question
a. Area that is offered for the purpose of public health
b. Basic policy concerning the maintenance of facilities in the area that is offered for the purpose of public health
c. Basic policy concerning the maintenance of forests in the area

(6) Matters concerning the maintenance of forests by national participation
a. Matters concerning national participation forests
b. Matters concerning profit sharing forests
c. Other necessary matters

(7) Other matters that are necessary for the administration and management of national forests
a. Matters concerning the development, guidance and dissemination of technology for the forestry industry
b. Matters concerning regional development
c. Other necessary matters

**Article 5 (Details of Plan)**

1. Matters concerning the administration and management corresponding to the functional category under "b," subparagraph 1, of the preceding Article shall be specified based on the following concept:

(1) Forests for water and land conservation shall be specified by dividing them into 2 categories: the "Land Conservation Type," for which the mountain disaster prevention function, including principally the prevention of erosion or landslide, is primarily to be demonstrated, and the "Water Conservation Type" for which the function of conserving water, including principally the alleviation of drought and flood, is primarily to be demonstrated.

(2) Forests for symbiosis between forests and people shall be specified by dividing them into 2 categories: the "Nature Conservation Type" for which the function of preserving the natural environment, including principally the maintenance of the old growth forestry ecosystem, is to be demonstrated, and the "Forest Space Utilization Type," for which the function of preserving the living environment, such as exploring the possibility of the co-existence of forest and mankind by way of communication with forests, and the health and culture function are primarily to be

demonstrated.

2. The total cutting volume set forth in (i), d, subparagraph 1, of the preceding Article shall be specified for cases of final cutting and of thinning by giving due consideration to the following concept that is consistent with the cutting of standing tree volume set forth in the forest planning area of national forests by areas under paragraph 1, Article 7-2, of the Forest Law (hereafter called the "Forest Planning"):

(1) With respect to the Nature Conservation Type of forest for symbiosis between forests and people, cutting shall not be carried out except for cutting that is necessary according to the characteristic feature of a subject for which protection is to be considered.

(2) With respect to the Land conservation Type of forests for water and land conservation and the Forest Space Utilization Type of forests for symbiosis between forests and people, cutting shall be carried out to the extent necessary to maintain the respective functions that are primarily to be demonstrated.

(3) With respect to the Water Conservation Type of forests for water and land conservation, the maximum cutting area for the final cutting shall be specified, making it a r ule to maintain and enhance the function of conserving water for respective management groups, and the cutting area shall not exceed the maximum cutting area. O n such occasions, management groups shall be established by totaling the areas of forest to be treated, relating similarly to management.

(4) With respect to the forests for cyclic use of resources, the standard cutting volume shall be determined for respective production groups and for final cutting or thinning by setting an upper limit at the lumber growth volume in the resource recycling utilization forest during the planning period in the regional management plan and by giving due consideration to the trend of the supply and demand of lumber in the region, making it a principle not to cause trouble to the continuation of crops and to ensure the stable supply of various species of woods, and the total cutting volume shall be approximately equal to such standard cutting volume. O n such occasion, the working class shall be established by totalling the forests for which the production target of lumber is equal and in which businesses shall be treated in a similar manner.

3. The purpose of matters concerning the utilization of national forests under subparagraph 4 of the preceding Article shall be described, making it a r ule to ensure the development of industry and the enhancement of welfare of residents and so on in the region based on the principle under Article 3, paragraphs 1 and 2, of the Law for Utilization of National Forests (Law No. 108, 1971).

4. The basic policy under subparagraph 5 of the preceding Article concerning areas that are offered for the purpose of public health and concerning the maintenance of forests and of facilities that are offered for the purpose of public health in the area in question shall be determined in the following manner:

(1) Areas under "a" that are offered for the purpose of public health shall be the national forests that are included in the forests for symbiosis between forests and people and are classified into the Forest Space Utilization Type and shall specify the scope of area that has a predetermined level of unity that is capable of demonstrating highly the function of health and culture held by the forest from the viewpoint of natural and social conditions and for which the utilization for public health is to be promoted by carrying out the maintenance of facilities and forest that are of substantial size and offered for the purpose of the public health.

(2) The basic policy under "b" concerning the maintenance of facilities in the area that is offered for the purpose of public health shall describe the major pattern of use for public health that is to be promoted in the area in question and the maintenance of major facilities that are necessary for such pattern of use and are offered for the purpose of public health, based on natural and social conditions of the national forests in the area in question.

In addition, such basic policy shall describe the harmonization with public benefit functions other than the function of public health held by national forests and other matters for which due consideration is to be given with regard to the maintenance of facilities that are offered for the purpose of public health, based on the natural and social conditions of the national forests in the area in question.

(3) The basic policy under "c" concerning the maintenance of forests in the area shall describe the basic policy concerning the maintenance of forests that is necessary to ensure the promotion of the function of public health held by the national forests in the area in question and the harmonization with public benefit functions other than the function of public health held by national forests in accordance with the guidelines of administration and management and according to the maintenance of facilities in the area that is offered for the purpose of public health.

5. The forest of national participation under "a," subparagraph 6, of the preceding Article shall be selected from among the national forests that are classified as the Forest Space Utilization Type included in the co-existence forests for forests and mankind, and for which it is considered appropriate to promote the use for voluntary forest maintenance by people.

**Article 6 (Procedure for Approval and Change of Plan)**

1. When a Director of a regional forest office intends to specify a regional administration and management plan, the Director shall hear the opinion of the manager of the district forest office that is stationed in the forest area in question.
2. The preparation of the regional administration and management plan shall be made by preparing a written plan.
3. The public notice pursuant to Article 5, paragraph 1, of the Law that is amended to read and applies mutatis mutandis in Article 6, paragraph 4, of the Law shall be

given at the regional forest office or at the district forest office having the forest planning area covered by the forest planning area in question, in whole or in part, as its area of jurisdiction, and the public inspection under said paragraph of said Article shall be made at the regional forest office or district forest office having the forest planning area covered by the forest plan in question, in whole or in part, as its area of jurisdiction by making available a draft of such plan to the public inspection.

4. An opinion submitted pursuant to Article 5, paragraph 3, of the Law that is amended to read and applies mutatis mutandis in Article 6, paragraph 4, of the Law shall be properly handled by establishing an opinion settlement commission, etc., in the regional forest office.
5. A hearing of opinions from governors of concerned prefectures and heads of concerned cities, towns and villages pursuant to Article 5, paragraph 3, of the Law that is amended to read and applies mutatis mutandis in Article 6, paragraph 4, of the Law shall be conducted by using a written instrument by showing them the draft plan, summary of opinion and draft processing plan of such opinion.
6. When an opinion is heard from persons having an academic career in such matters as are listed in Article 6, paragraph 2, pursuant to Article 5, paragraph 3, of the Law that is amended to read and applies mutatis mutandis in Article 6, paragraph 4, of the Law, such opinion shall be heard from more than one person.
7. The public announcement of the regional administration and management plan, summary of opinion from the general public and the result of processing of such opinion shall be made at the regional forest office or at the district forest office having the forest planning area covered by the forest planning area in question, in whole or in part, as its area of jurisdiction by making available the written plan and document that indicates the summary of opinion and the result of processing of such opinion to the public inspection. On such occasion, the period of public announcement shall be the planning period of the plan in question.
8. A Director of a regional forest office may change the regional management plan if the Director deems it necessary to do so by reason of change in the present situation of the national forests or the economic situation and so on.
9. Provisions of paragraphs 1 through 6 inclusive shall apply mutatis mutandis to the procedure in case of change set forth in the preceding paragraph. On such occasion, "written plan" under paragraph 5 shall be amended to read as "a section relating to the change of the written plan."

**Article 7 (Report of Plan, etc.)**

When a Director of a regional forest office specifies or changes a regional administration and management plan, the Director shall report to the Director General of the Forestry Agency without delay and shall give notice to concerned managers of the district forest office.

## *Chapter 3 Plan to Offer for the Purpose of Public Health*

(snip)

## *Chapter 4 National Forests Operation Plan*

**Article 12 (Details of Plan, etc.)**

1. A Director of a regional forest office shall, in line with a forest planning and a regional administration and management plan, specify an national forests operation plan (hereafter called the "Implementation Plan") that has the same planning period as the regional management plan relating to a forest planning area in respect of preservation of the needed forest relating to the area in question for respective forest planning areas.

2. The Implementation Plan shall specify the following matters:

(1) Name and area of a compartment of national forests
(2) Functional category set forth in Article 3 and district by type set forth in Article 5, paragraph 1
(3) Name and area of the management group or working class, cutting age or circulation period, maximum cutting area or standard cutting volume, cutting method and cutting volume for each cutting place, as well as regeneration method and regeneration volume for each regeneration place
(4) Matters concerning maintenance of forest roads
(5) Matters concerning soil saving
(6) Name and area of protected forest and green corridor
(7) Name and area of recreation forest
(8) Other necessary matters

**Article 13 (Details of Plan)**

1. The name and area of a compartment of national forests under paragraph 2, subparagraph 1, of the preceding Article, as well as the functional category set forth in subparagraph 2 of said paragraph and specified in Article 3 and areas by type set forth in Article 5, paragraph 1, shall be indicated in the drawings of the National Forests Operation Plan.
2. The cutting method and cutting volume for each cutting place, as well as the regeneration method and regeneration volume for each regeneration place under paragraph 2, subparagraph 3, of the preceding Article shall be specified in accordance with the respective items under Article 5, paragraph 2, and taking into account selected functions other than that to be demonstrated primarily, efficient utilization of forest roads or other network of roads, wind hazard, forest fire, prevention of damage by insects and local situations and with the predetermined

cutting order being imagined and indicated in the cutting and planting plan.

3. The forest reserve under paragraph 2, subparagraph 6, of the preceding Article shall select such national forests as is included in the Nature Conservation Type of the forests for symbiosis between forests and people set forth in Article 5, paragraph 1, subparagraph 2, and for which it is considered appropriate to carry out control, taking into account the inhabitation of animals and plants and the situation of their growth and requests of the region, for the purpose of contributing specifically to the maintenance of the natural environment consisting of the ecosystem of virgin forest, protection of animals and plants, conservation of genetic resources, and development of operation and management technology and so on.
4. Green corridors under paragraph 2, subparagraph 6, of the preceding Article shall select such national forests for which it is considered appropriate to carry out control, taking into account the distribution of wild animals and plants, the establishment situation of forest reserve and requests of the region, for the purpose of securing a migration pathway for wild animals and plants and of contributing to the expansion and mutual exchange of place of inhabitation and habitat.
5. Recreation forests under paragraph 2, subparagraph 7, of the preceding Article shall select such national forests as are included in the Forest Space Utilization Type of the forests for symbiosis between forests and people set forth in Article 5, paragraph 1, subparagraph 2, and for which it is considered appropriate to maintain the facility and forest offered for health, cultural and educational utilization by people in a specifically active manner, taking into account the natural landscape, present situation and future prospect of utilization of the forest on health, cultural and educational grounds and requests of the region.

(Omitted below)

# *4-5. Protected forest setting rule*

## *1. Purpose*

As people's sense of value has become diversified, people's demand for forest has also progressed to the high level and diversified. Demand of people to forest has increased, in the form of contact with nature, for the utilization of forest as the place of fostering of sentiment, and for the preservation of forest as natural environment of high quality. Especially, for national forests which possess a large areas of primitive virgin forests having beautiful scenery and suitable for living of various fauna and flora, demand for preservation of forests has recently increased.

To cope with this situation, adjusting management of national forests operation, making effort for the preservation of primeval natural forests in national forests as valuable natural environment, classification system of protected forest will be reexamined, responding to the diversified demand for national forests. This rule is to stipulate the idea and procedure of setting, policy of management, and various consideration for forest reserve.

## *2. Classification of protected forest*

From the point of purpose, forest reserves are classified into Forest Ecosystem Reserve, Forest Bio-genetic Resources Preservation Forest, Forest Tree Genetic Resources Preservation Forest, Plant Community Protected Forest, Specific Animal Habitat Protected Forest, Specific Topography Protected Forest, and Hometown Forest.

## *3. Forest Ecosystem Reserve*

**1) Purpose**

The setting purpose of Forest Ecosystem Reserve district is preservation of natural environment consisting of forest ecosystem, preservation of fauna and flora, preservation of genetic resources, development of forest operation and management technique, and contribution to scientific research, by preservation of primeval natural forests.

**2) Setting Criteria**

The director of Regional Forest Office is to decide a place which fits to one of the clauses written below, as Forest Ecosystem Reserve.

(1) Primeval natural forest representing main forest zone of Japan, having area of more than 1,000 ha as a rule.

(2) Rare primeval natural forest which has speciality only found in the area. The area should be over 500 ha as a rule.

**3) Classification of zone**

Forest Ecosystem Reserve is classified into preservation zone and conservation and utilization zone.

(1) The purpose of preservation zone is to strictly maintain forest ecosystem

(2) The purpose of conservation and utilization zone is to play a role of buffer not to give influence from outside environmental change to the zone.

**4) Setting procedure**

(1) The director of Regional Forest Office is to prepare setting plan of Forest Ecosystem Reserve (hereafter, it is called as setting plan), which has following items, after collection of information and necessary survey of the predetermined place.
   a. Location and area of Forest Ecosystem Reserve
   b Location and area of preservation zone and conservation and utilization zone
   c. Kind of animals and plants to be preserved in the Forest Ecosystem Reserve
   d. Articles on management of Forest Ecosystem Reserve
   e. Articles on utilization of Forest Ecosystem Reserve
   f. Other considerations

(2) In the case of setting of Forest Ecosystem Reserve, the director of regional forest office is to organize Forest Ecosystem Reserve setting committee (hereafter, called as committee), taking into consideration on the below written clause, and hear public opinions for the setting plan.
   a. Committee should be organized for each forest managing office as a rule
   b. In case of setting Forest Ecosystem Reserve over the managing area of more than two Regional Forest Offices, concerned forest managing offices (hereafter, called as concerned offices), is to set a chance of discussion, to promote better understanding among committee members of the concerned committees, to have unified management over the concerned districts.
   c. The committee is to be constituted by persons who have academic knowledge on forestry, ecology, genetics, etc., learned persons, directors of the concerned local communities. The selection of learned persons should be carried out reflecting a wide point of view.
   d. The committee is allowed to set a small committee to have technical discussion, if necessity occurred.

(3) The director of Regional Forest Office ask opinions of the concerned administrate offices, if necessity occurred.

(4) After hearing opinions of the committee on the setting plan, and making adjustment over the concerned offices, the director of forest management office is to set Forest Ecosystem Reserve forest, adjusting national forests operation plan and giving enough consideration to the content of setting plan.

**5) Principles of management**

(1) Forests in preservation zone is to leave to natural turnover without human action as a rule. However, the following actions are excluded.
   a. Monitoring (continuous observation・recording of long-term change), actions related to utilization of genetic resources, scientific research, etc. and other actions which is recognized as necessary from the point of view of public benefit.
   b. Emergency countermeasure against accidental disaster written below.
   (a) Extinction of forest fire, etc.
   (b) Rehabilitation of large-scale forest land erosion, land slide, etc.
   c. Setting of signpost.
   d. Other actions necessary by the regulations.

(2) Conservation and utilization zone consists of natural forests of the quality similar to reservation district as a rule, and no forest operation for wood production is not allowed. However, multi-storied forests are allowed, in case of artificial forest operation.

(3) Conservation and utilization zone are utilized for educational purpose and places for forest recreation without accompanied with a large-scale development, according to natural conditions. Construction of necessary roads and facilities are allowed in a condition not against the setting idea of conservation and utilization zone.

(4) In the forests adjacent to conservation and utilization zone, in order to avoid drastic environmental change of Forest Ecosystem Reserve, clear cutting is no allowed. Virgin forest rearing operations or naturally regenerating forest operations are carried out.

**6) Change of registration of district**

(1) The director of Regional Forest Office can change or cancel the concerned Forest Ecosystem Reserve, when maintenance of the already designated Forest Ecosystem Reserve is judged to be difficult due to public interest or other unavoidable causes.

(2) Change or cancellation of Forest Ecosystem Reserve shall be processed due to the procedures written in the clauses 4). (2) to 4). (4).

**7) Others**

(1) Demarcation of Forest Ecosystem Reserve is decided by the geographical lines, as a rule.

(2) Conservation and utilization zone are to be set to include surrounding area of preservation zone referring to the geographical lines, as a rule. However, in case from the condition of forests, and site factors, no influence is expected from outside to the concerned district without encircling all the surrounding of the preservation zone, this regulation is not applied.

## *4. Forest Bio-genetic Resources Preservation Forests*

1) Biological genetic resources preservation forests (Class 2 preservation forest), set by

the regulations "On the preservation of biological resources of forest ecosystem" (The notification of the Director of Forestry Agency 61 Rinyagyou-No.70 formulated October 20 1986) is pertinent to Forest Bio-genetic Resources Preservation Forests.

2) Setting procedure and managing policy of Forest Bio-genetic Resources Preservation Forests are to be carried out by the regulations issued by the Director of Forest Agency.
3) In case Forest Bio-genetic Resources Preservation Forests are included in Forest Ecosystem Reserve, Forest Bio-genetic Resources Preservation Forests are treated as one part of Forest Ecosystem Reserve managed as a whole.

## *5. Forest Tree Genetic Resources Preservation Forests*

1) Forest Tree Genetic Resources Preservation Forests is pertinent to biological genetic resources preservation forests (Class 1 preservation forest), set by the regulations of the Director of Forestry Agency.
2) Setting procedure, managing policy, etc. are carried out by the regulations of the Director of Forestry Agency.

## *6. Plant Community Protected Forests*

**1) Purpose**

Setting purpose of Plant Community Protected Forest is to preserve plant habitats which need to be preserved as representative of nature of Japan or specific locality, and forests of historical or scientific value, in addition to contribute the development of managing techniques and scientific research.

**2) Setting criteria**

The director of Regional Forest Office designates districts which need special preservation, fit for the criteria written below and exist outside forest reserve defined by in No. 3 to No. 5 Clause, as Plant Community Protected Forest.

(1) Districts where plant community which are becoming rare are found.
(2) Districts where plant community which are rather common are found, but the districts exist on the boundary of geographical distribution.
(3) Districts where plant community which live on a special topographical conditions such as marshlands, alpine district, etc. are found.
(4) Districts where giant trees or unique trees which have been handed down as historically significant, or scientifically valuable are found.
(5) Other districts where plant community or trees which need protection are found.

**3) Setting procedure**

(1) In order to set plant community protected forest, the director of Regional Forest

Office conducts collection of information and necessary survey on the plant habitat. If necessity arises, the director of forestry management office asks opinions of the related organizations, such as, the Forestry and Forest Products Research Institute, Forest Tree Breeding Center, etc. and sets Plant Community Protected Forest, defining the below written items.

a. Site and area of Plant Community Protected Forest.
b. Items on preservation and management of Plant Community Protected Forest.

(2) The Director of Regional Forest Office complies ledger according to the attached form 1, and keeps in working order, when he sets Plant Community Protected Forest.

**4) Managing policy**

(1) According to the condition of plant community, Plant Community Protected Forest is managed as follows.

a. Plant community which is in the stage of climax vegetation is to be left to natural succession without artificial treatment, as a rule.
b. Plant community which is in the intermediate stage of succession is to receive necessary forestry operations necessary to keep the present situation.

(2) The following actions to be carried out, notwithstanding (1).

a. Monitoring, scientific research, etc. which are necessary from the issue of public interest.
b. The following action which is to be carried out as countermeasures for emergency disasters.
(a) Extinction of mountain fire, etc.
(b) Rehabilitation of large-scale forest land erosion, land slide, etc.
c. Signpost setting.
d. Small scale roads and facilities for educational purpose.
e. Other actions necessary by the regulations.

**5) Change of registration of district**

(1) The director of Regional Forest Office can change or cancel the concerned district, when maintenance of the already designated Plant Community Protected Forest is judged to be difficult due to public interest or other unavoidable causes.

(2) Change or cancellation of Plant Community Protected Forest is to be processed due to the procedures written in 3).

**6) Others**

(1) The director of Regional Forest Office is to carry out appropriate forestry operations to the forests adjacent to Plant Community Protected Forest, to protect influence from outside.

(2) To make clear the demarcation of protected forest, signs of boundary are to be set.

## *7. Specific Animal Habitat Protected Forest*

**1) Purpose**

Specific Animal Habitat Protected Forest is to protect breeding places and living places of specific animals, in addition to contribute to the scientific research.

**2) Setting criteria**

The director of Regional Forest Office is to designate the district, which is especially necessary for the protection of breeding and living of specific animals, as Specific Animal Habitat Protected Forest. T hese districts are outside of protected forests formulated by the regulations from No. 3 to No. 6, and fit for the following criteria.

a. Breeding site or habitat of animals which are becoming rare.
b. Breeding site or habitat of animals which are not found in other places and live in a group.
c. Breeding site or habitat of animals for which protection is necessary.

**3) Setting procedure**

(1) In order to set Specific Animal Habitat Protected Forest, the director of Regional Forest Office conducts collection of information and necessary survey on the animal habitat. If necessity arises, the director of regional forest office asks opinions of the related organizations, such as, Forestry and Forest Products Research Institute, etc. and sets Specific Animal Habitat Protected Forest, defining the below written items.
   a. Site and area of Specific Animal Habitat Protected Forest.
   b. Items on preservation and management of Specific Animal Habitat Protected Forest.

(2) The director of Regional Forest Office complies a ledger according to the attached form 1, and keeps in working order, when he sets Specific Animal Habitat Protected Forest.

**4) Managing policy**

To preserve Specific Animal Habitat Protected Forest, preservation and management are to be carried out, giving appropriate consideration to ecological features of animals which breed and live there. For this purpose, necessary forest managing operations and actions written in 6. 4). (2) are to be carried out.

**5) Change of registration of district**

(1) The director of Regional Forest Office can change or cancel the concerned district, when maintenance of the already designated Specific Animal Habitat Protected Forest is judged to be difficult due to public interest or other unavoidable causes.

(2) Change or cancellation of specific animal habitat protected forest is to be processed due to the procedures written in 3).

**6) Others**

(1) The director of Regional Forest Office is to carry out appropriate forestry operations

to the forests adjacent to Specific Animal Habitat Protected Forest, to protect influence from outside.

(2) To make clear the demarcation of forest reserve, signs of boundary are to be set.

## *8. Specific Topography Protected Forest*

**1) Purpose**

Specific Topography Protected Forest is to preserve particular geographical features and geological features, in addition, to contribute to the scientific research.

**2) Setting criteria**

The director of Regional Forest Office is to designate the district, which is especially necessary for the preservation of geographic feature as Specific Topography Protected Forest. These districts are to be outside of protected forest formulated by the regulations from No. 3 to No. 7.

**3) Setting procedure**

(1) In order to set Specific Topography Protected Forest, the director of Regional Forest office conducts collection of information and necessary survey on the geographic features and geological features. If necessity arises, the director of Regional Forest Office asks opinions of the related organizations, such as, Forestry and Forest Products Research Institute, Forest Tree Breeding Center, etc. and sets specific geographic feature preservation forest reserve, defining the below written items.

a. Site and area of Specific Topography Protected forest.
b. Items on preservation and management of Specific Topography Protected forest.

(2) The director of Regional Forest Office complies a ledger according to the attached form 1, and keeps in working order, when he sets Specific Topography Protected forest.

**4) Management policy**

For Specific Topographic Protected Forest, forestry operation is not to be carried out, however, actions written in 6. 4). (2) are to be conducted.

**5) Change of registration of district**

(1) The director of Regional Forest Office can change or cancel the concerned district, when maintenance of the already designated Specific Topographic Protected Forest is judged to be difficult due to public interest or other unavoidable causes.

(2) Change or cancellation of Specific Topography Protected Forest is to be proceeded due to the procedures written in 3).

**6) Others**

(1) The director of Regional Forest Office is to carry out appropriate forestry operations to the forests adjacent to Specific Topography Protected Forest, to protect influence from outside.

(2) To make clear the demarcation of forest reserve, signs of boundary are to be set.

## *9. Hometown forest*

**1) Purpose**

Hometown forest is to preserve forests for the preservation of the present features of which local people have strong demand as symbol for the locality, and to contribute the local development.

**2) Setting criteria**

The director of Regional Forest Office is to designate the district, which is fit for the following conditions.

a. The adjustment with local industry such as forestry business, agricultural activities, etc. was already performed.
b. The agreement on preservation of hometown forest mentioned in 3). (2) was already concluded and setting of the folk forest does not cause any trouble for the management of national forests.

**3) Setting procedure**

(1) For the setting of Hometown Forest, the headman of the community is to apply to the director of Regional Forest Office through the District Forest Office of the locality, clearly describing the site and area of the Hometown Forest and the reason of setting.
(2) The director of Regional Forest Office who received the application is to conclude agreement with the head of the community who applied the setting according to the attached form 2.
(3) The director of Regional Forest Office is to comply a ledger according to the attached form 1, and keep in working order.

**4) The term of agreement**

The upper limit of the term of agreement is to be 30 years as a rule, however, renovation of the term is possible.

**5) Management policy**

(1) The fundamental management of Hometown Forest is to leave to the natural succession, and necessary operation to keep the present conditions is principally to be carried out. These operations are to be carried out on the plan agreed between the director of regional forest office and the headman of the local community.
(2) In the plan, the following items are to be decided.
   a. Site and area of Hometown Forest.
   b. Items on the preservation and management of Hometown Forest.
   c. Items on the utilization of Hometown Forest.
   d. Other items taken into consideration.
(3) The headman of the local community is to set and manage the facilities decided in

the above plan, with the permission of loan and utilization from the director of regional forest office.

**6) Change of district of hometown forest**

The director of Regional Forest Office can change or cancel of the Hometown Forest, when some difficulty due to public interest occurred, after taking discussion with the headman of the community.

**7) Others**

(1) Appropriate management operations are to be carried out on the surrounding forests, taking into consideration the purpose of setting.
(2) To make clear the demarcation of hometown forest, signs of boundary are to be set due to the present situation of the forest.

## *10. Items need to consider*

1) In accordance to the formulation of this notification, the already set protected forests are reorganized into the protected forest or Recreation Forests.
2) National forests are to set actively protected forests even in the Wilderness Area and areas already designated by Law for the Protection of Cultural Properties, in a condition they fit for protected forests, and carry out appropriate preservation and management operation, after setting clear role by national forests.
3) The director of Regional Forest Office is to give names to each forest reserve.
4) The director of Regional Forest Office is to make the director of District Forest Office known to the setting purpose, managing policy, etc. of protected forest. Furthermore, the director of Regional Forest Office is to be always aware of the situation of protected forest, and give guidance to the director of local District Forest Office to carry out appropriate preservation and operation.

# *4-6. Summary of the Wildlife Protection and Appropriate Hunting Law*

## *I. General provisions*

**1. Purpose**

The purpose of this law is to protect wildlife and rationalize hunting by:

1. implementing projects to protect wildlife;
2. preventing and controlling damage caused by wildlife to ecosystems, agriculture, forestry, fisheries and other human activities;
3. preventing hazards caused by the use of hunting equipment.

These contribute to conservation of biodiversity, and development of the agriculture, forestry, fishery and other human activities. (Article 1)

**2. Definitions**

In this law, the term "wildlife" is defined as wild animals that are classified as either birds or mammals.

(Article 2)

## *II. Wildlife protection project plans*

1. The national government shall establish the Basic Guidelines for the Implementation of Wildlife Management Project.
2. The prefectures shall establish plans to promote Wildlife Protection Projects according to the basic guideline.
3. Prefectures may establish Specified Wildlife Management Plans to control local populations of specific wildlife species, such as deer and wild boar, which have been rapidly increasing their population, or bear in specific regions of western Japan, which have small populations.

(Articles 3 through 7)

## *III. Regulations on the capture of wildlife*

1. With the following exceptions, the capture or collection of wildlife or bird eggs is prohibited.

(1) If a person has permission from the Minister of the Environment or a prefectural

governor for the special purpose.

(2) If a hunter with hunting license captures game animals according to the hunting rules and regulations.

(3) If a person captures moles or mice for preventing damage to agriculture and forestry.

2. The Minister of the Environment or a prefectural governor may establish hunting rules and regulations to protect wildlife, and may designate the Designated Way of Hunting Prohibited Area in which using specified hunting methods causing serious adverse effects on wildlife is prohibited.

3. In principle, a person who has captured birds and mammals must not leave the carcass scraps of them in the place in which he or she has captured them.

(Articles 8 through 18)

## *IV. Restrictions on the rearing and selling of wildlife*

1. A person who wishes to raise wild birds and mammals must complete registration procedures at the prefecture.
2. Without the permission of the prefectural governor, selling Copper Pheasant which would cause serious adverse effects on its population is prohibited.
3. Unless the governmental agency proves that the capture of birds and mammals has been done legally, the export of them is prohibited.
4. Unless foreign government agencies prove that the capture of birds and mammals has been done legally, the import of them is prohibited.
5. Raising, transferring, receiving, or selling birds and mammals that have been captured or imported illegally are prohibited.

(Articles 19 through 27)

## *V. Wildlife protection areas*

1. If deemed necessary for protecting wildlife, after considering the type of wildlife and its current status, National Wildlife Protection Areas are designated by the Minister of the Environment, and prefectural Wildlife Protection Areas are designated by the governor of the prefecture.
2. Where more strict regulation is needed, the Minister of the Environment or a prefectural governor may designate, within the wildlife protection areas, certain areas as special protection areas in which such activities as constructing structures, reclamation and felling trees require permission of the Minister of the Environment or a prefectural governor.
3. If deemed necessary for protecting wildlife, the Minister of the Environment or prefectural governor may implement conservation programs in Wildlife Protection

Areas.

(Articles 28 through 33)

## *VI. Temporary game preserve areas*

If the game has drastically decreased and a prefectural governor deems necessary to increase the game, a prefectural governor may designate an area as a temporary game preserve area.

(Article 34)

## *VII. Hazard prevention*

1. If there is an area in which the prefectural governor deems necessary to prohibit or restrict hunting with guns or other equipment for hunting in order to prevent from hazards, he or she may designate a Certain Hunting Equipment Prohibited Area.
2. Dangerous hunting methods, such as using explosives, dangerous drugs or poisons, are prohibited for the capture of wildlife, without permission from the Minister of the Environment.
3. Hunting with guns is prohibited before sunrise and after sunset.
4. Hunting with guns is prohibited in communities where there are housing concentrations, recreation grounds, stations and other places where many people gather. It is also forbidden to hunt while pointing a gun in a direction in which a bullet could potentially reach livestock, buildings, trains, cars, boats, ships and other vehicles.

(Articles 35 through 38)

## *VIII. Hunting licenses*

1. A person wishing to hunt must obtain a hunting license.
2. Hunting licenses are divided into the following categories: license for nets, license for trap, first grade game shooting license, and second grade game shooting license.
3. A person wishing to hunt using legal hunting with nets must obtain a license for nets.
4. A person wishing to hunt using legal hunting with traps or snares must obtain a license for traps.
5. A person wishing to hunt through hunting methods employing bullet-loaded guns must obtain a first grade game shooting license.
6. A person wishing to hunt through hunting methods employing air guns must obtain a second grade game shooting license.
7. Hunting licenses are granted to a person who has passed the hunting license

examination overseen by prefectural governors.

8. Hunting licenses are valid until September 14 of the year that is three years after the day a person has taken the relevant hunting license examination.

(Articles 39 through 54)

## *IX. Hunter registration*

1. A person wishing to hunt must register with the governor of the prefecture in which he or she wishes to hunt and pay a hunting tax.
2. Hunter registration is valid from October 15 of the year until April 15 of the following year. In Hokkaido, however, it is valid from September 15 of the year until April 15 of the following year. The hunting season is, in principle, from November 15 to February 15 of the following year. In Hokkaido, however, it is from October 1 to January 31 of the following year.
3. Hunter registration is valid only for the license class and the location for which a person is registered.

(Articles 55 through 67)

## *X. Game areas*

1. A person who, in order to maintain viable populations of game animals and ensure safe hunting, wishes to release game animals, limit hunter numbers, or otherwise manage hunting activities in specific areas, must establish sets of rules and obtain permission from the prefectural governor for the management of hunting.
2. Hunting in a hunting area is prohibited unless approval of the party that established such hunting area is obtained.

(Articles 68 through 74)

## *XI. Miscellaneous provisions*

1. The Minister of the Environment or a prefectural governor can, to the extent necessary for the enforcement of this law, request necessary reports from persons who have permission to capture wildlife. In addition, they each may order personnel under their respective authority to enter land or other places as necessary in wildlife protection areas, or to perform surveys or tests.

2. Personnel involved in enforcing the protection of wildlife or the rationalization of hunting may be authorized to exercise the necessary authority. In addition, wildlife protection staff shall be assigned to the prefectures.

3. When populations of wildlife have decreased drastically or other situations in which the Minister of the Environment deems the protection of wildlife a necessity, he or she may issue necessary directives to prefectural governors.

4. The stipulations in this law do not apply in cases involving species such as brown rat, black rat and house mouse that pose a serious threat to ensuring public health, or in cases of species protected and managed by other laws or regulations.

(Article 75 through Article 82)

## *XII. Necessary stipulations shall be established regarding penalties*

(Articles 83 through 89)

# *4-7. Summary of the Law for Conservation of Endangered Species of Wild Fauna and Flora*

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## *1. Substance*

**(A) Objective**

Recognizing that species of wild fauna and flora are important components of ecosystems, as well as having essential value for humanity, the Law for the Conservation of Endangered Species of Wild Fauna and Flora (LCES) aims to ensure the conservation of endangered species of wild fauna and flora, and to contribute to the conservation of natural surroundings for present and future generations.

**(B) Responsibility**

(1) The Government should take integrated measures to conserve endangered species (including subspecies and varieties) of wild fauna and flora according to their status.
(2) In accordance with natural, social and other conditions, local governments should take measures to conserve endangered species of wild fauna and flora.
(3) The public should cooperate with the Government and their local governments, and make attempts to contribute to the conservation of endangered species of wild fauna and flora.

**(C) Definition**

(1) "Endangered" means that there is a t hreat of extinction. In other words, the population of a s pecies has decreased, or is decreasing, to the level at which its survival is at risk, or the habitat of a s pecies has degraded or decreased or is degrading or decreasing.
(2) "Endangered Species" refers to all species in danger of extinction. They are divided into four categories; "National Endangered Species", "Designated National Endangered Species", "International Endangered species" and "Temporarily Designated Species."
(3) "National Endangered Species" means endangered species known to exist in Japan. They are designated by the Government. Migratory species would also be so designated if it is considered to be in danger of extinction in Japan.
(4) "Designated National Endangered Species" means species whose population in the wild is in danger of extinction, even though the commercially domesticated or cultivated population is ample. This type of species may be in danger of extinction due to illegal overexploitation because of their commercial value.
(5) "International Endangered Species" means species that are listed in CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) Appendix 1 or endangered species reported under Japan's bilateral conventions with the U.S., and Australia and agreement with Russia. A lthough these conventions and agreements request the contracting parties to regulate only the international trade of these species, transferring within Japan should also be regulated so as to ensure the enforcement of the conventions and agreements.
(6) "Temporarily Designated Endangered Species" means species that are designated by

the Minister of the Environment.

If a new species, or a species thought to be extinct, is found, the Minister of the Environment will designate the species as "Temporarily Designated Endangered Species". The duration of the designation is limited to three years.

**(D) The National Guidelines for Conservation of Endangered Species**

The Government must adopt "The National Guidelines for the Conservation of Endangered Species". These guidelines include the fundamental concept and basic approaches for protection of organisms, protection and rehabilitation of natural habitats, maintenance of viable population, and other items necessary for the conservation of Endangered Species.

## *2. Treatment of Organisms and Their Parts*

**(A) Responsibility of Those Who Possess Organisms and Their Parts**

Those who possess organisms of Endangered Species including eggs, seeds, live and processed intact organisms, parts and processed parts (specified by cabinet order, hereafter "organisms and others") should treat them in an appropriate manner. The Minister of the Environment may advise or guide them in the handling of organisms and others for the conservation of Endangered Species.

**(B) Prohibition on Acquisition, Transfer and Trading of Endangered Species**

(1) Hunting, gathering, killing or damaging (hereafter "acquisition") of live Endangered Species except International Endangered Species is prohibited unless the Minister of the Environment permits the acquisition for the purpose of research, investigation, instruction or rehabilitation. Acquisition of live organisms without permission is allowed in case of emergency, or if it is necessary for their protection.

(2) Transfer of organisms and others of Endangered Species either on a commercial or non-commercial basis, is prohibited. The exception is allowed in such cases as, 1) when the Minister of the Environment permits transfer for the purpose of research, investigation, instruction or rehabilitation, 2) when organisms and others of Designated National Endangered Species are transferred, 3) when Designated Specific Parts which are parts of International Endangered Species and their processed parts, (used in making products in Japan) are transferred, 4) when live organisms of National Endangered Species which are "taken" without permission in case of emergency or for their protection, and their parts and processed parts are transferred, or 5) when organisms and others of registered International Endangered Species and specific materials with prior-registration are transferred.

(3) International trading of organisms and others of National Endangered Species (except those of Designated National Endangered Species) is prohibited either on a commercial as well as non-commercial basis except if conditions adopted by the Government have been fulfilled. The Minister of the Environment will permit

international trading so long as it does not threaten the survival of the Endangered Species.

**(C) Registration of Organisms and Their Parts of International Endangered Species**

(1) To ensure the enforcement of CITES, those who intend to transfer an International Endangered Species in Japan must first register the organisms and others. Transfer of a r egistered International Endangered Species, either on a co mmercial or non-commercial basis, must be made with the registration certificate corresponding to the said organism and others. Registration can be made, if (a) the organisms of the International Endangered Species have been domesticated or cultivated or (b) obtained before CITES measures were enforced. Without registration, transfer is allowed only if the Minister of the Environment permits it as mentioned in 2.(2) above.

(2) Those who transfer large quantities of items can do prior-registration. This system is introduced because the number of registrations is expected to increase after introduction of the new regulation on parts of species. Those who have made prior-registration shall submit a report on transfer of the items to the Minister of the Environment.

**(D) Registration of Businesses**

**(D-l) Businesses which deal in Designated National Endangered Species.**

(1) Designated National Endangered Species are in danger of extinction because of their commercial value. For that reason, businesses which deal in Designated National Endangered Species must ensure that they will not deal in Designated National Endangered Species taken illegally.

(2) Businesses which deal in Designated National Endangered Species, whether they are retail businesses or wholesale businesses, must be registered. If they do not deal in Designated National Endangered Species in an appropriate manner, the Minister of the Environment must order the business to improve their business practices, or order suspension of the business for three months.

**(D-2) Businesses which deal in Designated Specific Parts of International Endangered Species.**

(1) Transfer of Designated Specific Parts is exempted from prohibition as mentions (B)(2), but in order to ensure that illegal transfer does not take place, businesses which deal in Designated Specific Parts must be registered.

(2) Those who do business under the above mentioned registration shall make a report on their business activities and keep that report. If they do not deal in Designated Specific Parts in an appropriate manner, the Minister of the Environment and related ministers must order the business to improve their business practices, or order suspension of the business for three months.

(3) Those businesses that have registered may issue certification cards which show the legality of the parts they are handling, if:

a) they transfer Designated Specific Parts that are the portions of the original which was registered; o r
b) they transfer Designated Specific Parts that are the portions of Designated Specific Parts received with a cer tification card. The Designated Specific Parts for which a certification card is issued shall be transferred with the certification card.

**(E) Certification that product was made of legally obtained materials**

(1) Those who engaged in producing the final product of specific materials eligible for certification may put on the product a mark which shows as such, if:
a) they have received a c ertification card with the Designated Specific Parts they have used in making the final product card. or
b) they have received specific materials that have been registered.

The mark is issued by the Minister of the Environment and related ministers or designated public organization.

## *3. Habitat Conservation*

**(A) Types of Conservation Areas**

(1) For the purposes of ensuring the conservation of National Endangered Species, their natural habitats are designated by the Minister of the Environment as "Natural Habitat Conservation Areas".
(2) One type of Natural Habitat Conservation Area is the "Conservation Area". In this area, a) construction, b) modification of land, c) mining, d) reclamation, e) changing of the water level, f) tree felling and other habitat modifications are prohibited without the permission of the Minister of the Environment. If it is necessary and appropriate, the Minister may designate "Protection Areas" and " Strict Protection Areas" in Conservation Areas. In a protection area, in addition to the prohibited actions listed above, introduction of alien species and the taking of any other species are also prohibited without prior permission. In a "Strict Protection Area", the Director-General prohibits entrance to the area without prior permission.
(3) Another type of Habitat Conservation Area is a "Monitoring Area", which functions as a buffer zone. In this area, actions from a) to e) listed in (2) above are regulated. Those who intend to engage in these actions in the area must first give notice to the Minister of the Environment. If the Minister finds that the action may affect the conservation of the National Endangered Species, he/she will order the party in question to take necessary and appropriate measures or to stop the action.

**(B) Designation Procedure**

Before designation, the Minister of the Environment must hold a public hearing.

## *4. Programs for Rehabilitation of National Habitatsand Maintenance of a Viable Population*

**(A) Strategy for Promotion**

Since the stable survival of Endangered Species may not be achieved by the protection of each organism or its natural habitat alone, the Government may promote the rehabilitation of natural habitats and the maintenance of viable populations of National Endangered Species. The Ministry of the Environment will establish a program promoting the rehabilitation of natural habitats and maintenance of viable populations in cooperation with other Ministries and Agencies. The program may be implemented by the Ministry of the Environment or other Ministries or Agencies if appropriate.

**(B) Cooperation with Local Governments and NGOs (Non-Governmental Organizations)**

When local governments or NGOs wish to participate in the program, they can be given approval by the Ministry of the Environment if their program is in accord with the program of the Government. With such approval, they may take organisms of the National Endangered Species, or conduct actions normally prohibited in the Habitat Reservation Area without prior permission.

# *4-8. Invasive Alien Species Act*

(Law No. 78 (June 2, 2004))

## Contents

**Chapter 1** **General Provisions (Article 1 to Article 3)**

**Chapter 2** **Regulations on Handling Invasive Alien Species(Article 4 to Article 10)**

**Chapter 3** **Mitigation of Invasive Alien Species (Article 11 to Article 20)**

**Chapter 4** **Uncategorized Alien Species (Article 21 to Article 24)**

**Chapter 5** **Miscellaneous Provisions (Article 25 to Article 31)**

**Chapter 6** **Penal Provisions (Article 32 to Article 36)**

Supplementary Provisions

## *Chapter 1 General Provisions*

(Purpose)

**Article 1**

This Law shall have the purpose of preventing Adverse Effects on Ecosystems caused by Invasive Alien Species (IAS) through regulating raising, planting, storing, carrying (hereinafter "Raising"), importing, or other handling of invasive alien species and through taking measures such as the mitigation of IAS by the national government and other entities, with the aim to help stabilize and improve national life through contributions to conservation of biodiversity, human safety and sound development of agriculture, forestry and fisheries.

(Definition)

**Article 2**

In this Law, "Invasive Alien Species" or "IAS" shall mean individuals (including eggs, seeds and others stipulated by the Cabinet Ordinance; limited to living ones) and their organs (limited to those which require measures such as regulations on Raising for preventing Adverse Effects on Ecosystems to be taken under this Law and which are stipulated by the Cabinet Ordinance (limited to living ones)) that are stipulated by the Cabinet Ordinance to exist outside their original habitats as a result of introduction from

overseas into our country (hereinafter “Alien Species”) and that are recognized or feared to cause Adverse Effects on Ecosystems because of their different properties from organisms having original habitats in Japan (hereinafter “Indigenous Species”).

2. In this Law “Adverse Effects on Ecosystems” shall mean adverse effects on ecosystems, human safety, or agriculture, forestry and fisheries.
3. When the competent ministers make a plan in enacting, amending or abolishing the ordinance of Paragraph 1, the ministers must consult academic experts on properties of living organisms about the draft plan.

(Basic Policy for Preventing Adverse Effects on Ecosystems Caused by Invasive Alien Species)

**Article 3**

The competent ministers shall prepare a draft of a basic policy for preventing Adverse Effects on Ecosystems caused by IAS upon consultation with the Central Environment Council and ask for a Cabinet decision on it.

2. The basic policy in the preceding paragraph (hereinafter “The Basic Policy”) shall stipulate the following matters:
   i) The basic framework about the prevention of Adverse Effects on Ecosystems caused by IAS;
   ii) Principles concerning the selection of IAS;
   iii) Principles the handling of IAS;
   iv) Principles concerning the mitigation of IAS by the national government and other entities; and
   v) In addition to those mentioned in the preceding subparagraphs, important matters concerning the prevention of Adverse Effects on Ecosystems caused by IAS.
3. The competent ministers must, when the Cabinet decision on The Basic Policy stipulated under Paragraph 1 is made, announce it officially without delay.
4. The provisions of Paragraph 1 and the preceding paragraph shall be applied mutatis mutandis to a change of The Basic Policy.

## *Chapter 2 Regulations on Handling Invasive Alien Species*

(Prohibition of Raising)

**Article 4**

No approval shall be issued to Raising IAS otherwise than in accordance with the following cases:

i) When permission in Paragraph 1 of the next Article is obtained and Raising in connection with that permission is performed; or
ii) In the case of capture and other treatment for mitigation under the provisions of Chapter 3, or when there is an unavoidable reason stipulated in the Ministerial

Ordinance.

(Permission for Raising)

**Article 5**

A person who wishes to perform Raising of IAS for the purpose of scientific research or any other purposes stipulated by the Ministerial Ordinance must obtain permission from the competent ministers.

2. A person who wishes to obtain permission in the preceding paragraph must submit an application for permission to the competent ministers as stipulated in the Ministerial Ordinance.
3. The competent ministers must not grant permission in Paragraph 1 in case there is a reason that falls under any of the following subparagraphs with respect to the Raising for which the application in the preceding paragraph is submitted:
   i) The purpose of the Raising does not conform with one stipulated in Paragraph 1; or
   ii) A person who is to perform Raising is recognized not to handle IAS properly because the person does not have a facility for the Raising which meets standards stipulated by the Ministerial Ordinance in accordance with the properties of IAS (hereinafter "Special Raising Facility") or for some other reasons.
4. In the case of granting permission in Paragraph 1, the competent ministers may attach conditions to the permission when they are recognized to be necessary for preventing Adverse Effects on Ecosystems caused by IAS, within the limits of the necessity.
5. A permittee in Paragraph 1 must, when performing the permitted Raising, inspect the Special Raising Facility for the permitted IAS periodically, make it clear that the permission is granted for the IAS, and use other methods stipulated in the Ministerial Ordinance.

(Order for Measures to Permittees for Raising)

**Article 6**

When a permittee in Paragraph 1 of the preceding Article violates the provisions of Paragraph 5 of the same Article or does not meet conditions imposed under the provisions of Paragraph 4 of the same Article, the competent ministers may order to correct the methods of Raising the IAS or to take other necessary measures if they are recognized to be necessary for preventing Adverse Effects on Ecosystems caused by the IAS.

2. The competent ministers may cancel the permission in Paragraph 1 of the preceding Article in case the permittee violates the provisions of this Law or ordinances based on this Law, or disobeys proceedings imposed by this Law, resulting in the IAS being recognized as having or being likely to have Adverse Effects on Ecosystems.

(Prohibition of Import)

**Article 7**
IAS must not be imported. This does not apply, however, to the case where a permittee under Paragraph 1 of Article 5 imports IAS in connection with that permission.

(Prohibition of Transfers)

**Article 8**
Any actions relating transfers (hereinafter "Transfers") of IAS are not allowed. Nevertheless, this does not apply to the case where persons, who perform or intend to perform Raising of IAS in conformity with the provisions of Article 4, Subparagraph 1, shall conduct Transfers of the IAS between them, or to the cases stipulated by the Ministerial Ordinance.

(Prohibition of Releasing, Planting, or Sowing)

**Article 9**
IAS regarding Raising, import, or Transfers must not be released, planted, or sowed outside the Special Raising Facility for the IAS.

(Collection of Reports and On-site Inspection)

**Article 10**
Within the limits required for the enforcement of this Law, the competent ministers may request a permittee under Paragraph 1 of Article 5 to submit reports on conditions of handling IAS and on other necessary matters, or may authorize staff members to enter facilities for the Raising of IAS, to inspect IAS, documents, and other properties, or to question relevant persons.

2. The staff members in the preceding paragraph must carry their identification papers and present them to relevant persons.
3. The authority under the provisions of Paragraph 1 shall not be construed as being permitted for the purpose of criminal investigation.

## *Chapter 3 Mitigation of Invasive Alien Species*

(Mitigation by the National Government)

**Article 11**
In case Adverse Effects on Ecosystems by IAS occur or are likely to occur, and if a need arises for preventing occurrence of the adverse effects, the competent ministers and heads of the pertinent administrative organs of the national government (hereinafter "the National Government") shall conduct mitigation under the provisions of this Chapter.

2. To perform mitigation under the provisions of the preceding paragraph, the National Government must, in accordance with the Ministerial Ordinance, stipulate the matters mentioned below and announce them officially in consultation with the prefectures

concerned.

i) The type of IAS to be subjected to the mitigation;

ii) An area and a period for which the mitigation is performed; and

iii)Details of the mitigation such as capture, collection, or killing (herein after "Capture") of the IAS and other pertinent matters; and

iv)In addition to those mentioned in the preceding subparagraphs, matters stipulated in the Ministerial Ordinance.

(Exception from the Wildlife Protection and Hunting Law)

**Article 12**

To the Capture of IAS subjected to mitigation performed by the National Government under the provisions of Paragraph 1 of the preceding Article, the provisions of the Wildlife Protection and Hunting Law (Law No. 88 (2002)) shall not be applied.

(Entry into Land and other measures)

**Article 13**

Within the limits required for mitigation under the provisions of Article 11, Paragraph 1, the National Government may authorize its staff members to enter other persons' lands or water surfaces, to conduct Capture of IAS, or to cut down trees and bamboos which interfere with Capture of the IAS.

2. In the case of authorizing the staff members to act under provisions of the preceding paragraph, the National Government, in advance, must notify occupants of the lands or the water surfaces, or owners of the trees and bamboos about the acts, and give an opportunity to express their opinions.
3. The staff members in Paragraph 1 must carry their identification papers and present them to relevant persons.

(Compensation of Loss)

**Article 14**

To a person who suffers a loss as a result of an act under the provisions of Paragraph 1 of the preceding Article, the government shall compensate for a loss that is to incur normally.

2. A person who wishes to be given compensation under the provisions of the preceding paragraph needs to request it from the National Government.
3. The National Government must, when a request under the provisions of the preceding paragraph is received, decide the amount of compensation and notify it to the claimant.

(Filing of a Suit)

**Article 15**

A person who is dissatisfied with a decision made under the provisions of Paragraph 3 of the preceding Article may demand an increase of the amount to be given in compensation within six months from the date of the receipt of the notice.

2. With regard to the complaint under the preceding paragraph, the government shall be the defendant.

(Liability of a Causer)

**Article 16**

In case the need to carry out mitigation under the provisions of Paragraph 1 of Article 11 arises and there is a person who has performed an act causing it, the government may make the person bear the whole or part of expenses within the limits necessary to carry out the mitigation.

(Methods of Collecting Expenses Imposed)

**Article 17**

When intending to make a person bear expenses under the provisions of the preceding Article, the National Government must fix the amount of expenses intended to make the person bear (hereinafter "Expenses Imposed" in this Article) and the deadline for their payment, and order the payment, as stipulated by the Ministerial Ordinance.

2. If there is a person who does not pay Expenses Imposed by the deadline under the preceding paragraph, the National Government must urge the person to pay by designating a new deadline in a reminder, as stipulated in the Ministerial Ordinance.
3. When the payment is urged under the provisions of the preceding paragraph, the National Government may collect arrearages in an amount calculated by multiplying the Expenses Imposed by a rate of 14.5% or less per annum for the number of days from the date following the deadline for payment in Paragraph 1 to the date of completion of the payment of the Expenses Imposed or to the date preceding the attachment of property for collecting the Expenses Imposed, as stipulated by the Ministerial Ordinance.
4. When a person who is urged to pay under the provisions of Paragraph 2 does not pay the Expenses Imposed and the arrearages of the Expenses Imposed stipulated by the preceding paragraph (hereinafter "Arrearages" in this Article) by a deadline designated by a reminder in Paragraph 2, the National Government may collect the Expenses Imposed and the Arrearages in accordance with cases of disposition for failure to pay national taxes. In this case, the order of the preferential right on the Expenses Imposed and the Arrearages shall come next to national taxes and local taxes.
5. The Arrearages shall come prior to the Expenses Imposed.

(Mitigation by Others than the National Government)

**Article 18**

On mitigation of IAS which is intended by a local public entity and conforms with matters announced officially under the provisions of Paragraph 2 of Article 11, the local pubic entity may obtain confirmation to that effect from the competent ministers, as stipulated in the Ministerial Ordinance.

2. A person other than the government and local public entities may obtain the competent ministers' acknowledgement, as stipulated by the Ministerial Ordinance, on the mitigation of IAS planned by the person to the effect that the person is capable of performing it properly and reliably and that the mitigation conforms with matters announced officially under the provisions of Paragraph 2 of Article 11.
3. When the competent ministers give confirmation under Paragraph 1 or acknowledgement under the preceding paragraph, that fact must be announced officially as stipulated in the Ministerial Ordinance. The same applies to cases where these confirmation and acknowledgement are cancelled under the provisions of Paragraph 2 or 3 of Article 20.
4. The provisions of Article 12 shall be applied mutatis mutandis to mitigation which is performed by a local public entity under the confirmation in Paragraph 1 and mitigation which is performed by a person other than the government and local public entities under the acknowledgement in Paragraph 2, and the provisions of Article 13 to the preceding Article shall be applied mutatis mutandis to local public entities taking charge of affairs related to the mitigation under the confirmation in Paragraph 1.

**Article 19**

The competent ministers may request a person who obtains the acknowledgement in Paragraph 2 of the preceding Article and performs mitigation to submit reports on how the mitigation is performed and on other necessary matters.

**Article 20**

When a person who obtains the confirmation under Article 18, Paragraph 1 or the acknowledgement in Paragraph 2 of the same Article suspends the mitigation or becomes unable to perform the mitigation in conformity with matters announced officially under the provisions of Article 11, Paragraph 2, the person must notify the effect to the competent ministers.

2. When notified under the provisions of the preceding paragraph, the competent ministers shall cancel the case's confirmation under Paragraph 1 of Article 18 or its acknowledgement under Paragraph 2 of the same Article.
3. When it is recognized that mitigation on which acknowledgement under Paragraph 2 of Article 18 is given is not performed in conformity with matters announced

officially under the provisions of Article 11, Paragraph 2, or that a person, who performs the mitigation, becomes unable to carry out the mitigation properly and reliably, omits submitting reports stipulated in the preceding Article, or submits a false report, the competent ministers may cancel the acknowledgement.

## *Chapter 4 Uncategorized Alien Species*

(Notification of Import)

**Article 21**

As stipulated in the Ministerial Ordinance, a person who intends to import uncategorized alien species (which mean Alien Species stipulated in the Ministerial Ordinance as being suspected to have likelihood of causing Adverse Effects on Ecosystems due to properties different from those of Indigenous Species (limited to living ones). Hereinafter the same definition applies.) must previously notify the competent ministers of the type of the uncategorized alien species (or "UAS") and other matters stipulated in the Ministerial Ordinance.

(Judgment)

**Article 22**

When a notification stipulated under the preceding Article is received, the competent ministers must judge whether or not the UAS in the notification has the likelihood of causing Adverse Effects on Ecosystems due to its properties different from those of Indigenous Species, and inform the result to the person who has submitted the notification within six months from the date of the receipt of the notice.

(Restrictions on Import)

**Article 23**

A person who intends to import UAS must not import the UAS before receiving the information under the preceding Article to the effect that the UAS is free from the likelihood of causing Adverse Effects on Ecosystems due to its properties different from those of Indigenous Species.

(Uncategorized Alien Species relevant to Exporters Abroad)

**Article 24**

A person who wishes to export UAS to Japan is able to previously notify, as stipulated in the Ministerial Ordinance, the competent ministers of the type of the UAS and other matters stipulated in the Ministerial Ordinance.

2. The provisions of Article 22 shall apply mutatis mutandis to the notification stipulated in the preceding paragraph.

## *Chapter 5 Miscellaneous Provisions*

(Attachment of a Certificate for Import)

**Article 25**

Other organisms (limited to living ones) than those stipulated in the Ministerial Ordinance as being easily confirmable that they do not fall under the category of IAS nor UAS must not be imported unless certificates issued by foreign government agencies proving the types of the organisms or stipulated in the Ministerial Ordinance are attached to the organisms.

2. An organism requiring the attachment of a certificate in the preceding paragraph must not be imported through any other place than a port or an airport stipulated in the Ministerial Ordinance.

(Personnel Engaging in Control)

**Article 26**

The competent ministers may authorize those of staff members who meet requirements stipulated by the Cabinet Ordinance to exercise a part of authorities stipulated in Paragraph 1 of Article 6 or Paragraph 1 or Article 10.

2. Staff members who exercise the part of authorities of the competent ministers under the provisions of the preceding paragraph (in the next paragraph, "Controllers for IAS' Adverse Effects Prevention") must carry their identification papers and present them to relevant persons when such authorities are to be exercised.
3. In addition to those stipulated in the preceding two paragraphs, matters necessary in relation to the Controllers for IAS' Adverse Effects Prevention shall be stipulated by the Cabinet Ordinance.

(Measures for Amplification of Scientific Knowledge)

**Article 27**

For the sake of amplification of scientific knowledge about Adverse Effects on Ecosystems caused by Alien Species and the prevention thereof, the government must endeavor to collect, arrange and analyze information, promote study, and take other necessary measures relevant to the knowledge.

(Promotion of Public Understanding)

**Article 28**

About mitigating IAS and other matters involved with Alien Species, the government must endeavor to deepen public understanding through measures such as educational activities and public relation activities.

(The Competent Ministers and the Ministerial Ordinance)

**Article 29**

The competent minister in this Act shall be the Minister of the Environment. Nevertheless, for matters related to the prevention of adverse effects on agriculture, forestry and fisheries, the Minister of the Environment and the Minister of Agriculture, Forestry and Fisheries shall be the competent ministers.

2. The Ministerial Ordinance in this Act shall be an order issued by the competent ministers.

(Interim Measures)

**Article 30**

In case an order is established, amended or abolished under the provisions of this Act, needed interim measures (including interim measures on penal provisions) may be stipulated by the order to the degree judged reasonably necessary for the establishment, amendment or abolition thereof.

(Delegation to the Ministerial Ordinance)

**Article 31**

Besides those stipulated in this Act, procedures for the implementation of this Act and other matters necessary for the enforcement of this Act shall be stipulated by the Ministerial Ordinance.

## *Chapter 6 Penal Provisions*

**Article 32**

A person who falls under any of the following subparagraphs shall be punished by imprisonment for any period not exceeding three years or a fine not exceeding three million yen, or a combination of these two.

i) A person who has performed Raising of IAS with the aim to sell or distribute in violation of the provisions of Article 4;

ii) A person who has obtained permission in Paragraph 1 of Article 5 by a deception or other unlawful means;

iii) A person who has disobeyed an order under the provisions of Article 6, Paragraph 1;

iv) A person who has violated the provisions of Article 7 or Article 9; or

v) A person who has sold or distributed IAS in violation of the provisions of Article 8.

**Article 33**

A person who falls under any of the following subparagraphs shall be punished by imprisonment for any period not exceeding one year or a fine not exceeding one million

yen, or a combination of these two.

i) A person who has violated the provisions of Article 4 or Article 8 (excluding those who fall under Subparagraph 1 or Subparagraph 5 of the preceding Article);
ii) A person who has performed Raising of IAS against conditions attached under the provisions of Article 5, Paragraph 4; or
iii) A person who has violated the provisions of Article 23.

**Article 34**

A person who has violated the provisions of Paragraph 1 or Paragraph 2 of Article 25 shall be punished by a fine not exceeding five hundred thousand yen.

**Article 35**

A person shall be punished by a fine not exceeding three hundred thousand yen who has not submitted reports or has submitted a false report under the provisions of Paragraph 1 of Article 10; or who has refused, disturbed or evaded an on-site inspection under the provisions of the same paragraph, or has not given a statement or has given a false statement in reply to a question asked at the on-site inspection.

**Article 36**

In case a representative of a corporation, or an agent, an employee or other operative of a corporation or a person commits an offense in Article 32 to the preceding Article in connection with the work of the corporation or the person, besides punishing the actual offender, the corporation is punished by a fine stipulated in an appropriate one of the following subparagraphs and the person is punished by a fine set forth in the main text of each appropriate Article.

i) Article 32: Punishment by a fine not exceeding one hundred million yen
ii) Article 33: Punishment by a fine not exceeding fifty million yen
iii) Article 34 or Article 35: Punishment by a fine set forth in the main text of each appropriate Article

## *Supplementary Provisions*

(Date of Enforcement)

**Article 1**

This Act shall be enforced from a date stipulated by the Cabinet Ordinance within the limits not exceeding one year from the date of promulgation. Nevertheless, the provisions of the next Article, Article 3 and Article 5 of Supplementary Provisions shall be enforced from the date of promulgation.

(Interim Measures)

**Article 2**

Even before the enforcement of this Act, the competent ministers may prepare a basic policy for preventing Adverse Effects on Ecosystems caused by IAS in accordance with cases in the provisions of Paragraph 1 and Paragraph 2 of Article 3 and ask for a Cabinet decision.

2. When the Cabinet decides on the basic policy in the preceding paragraph, the competent ministers must announce it officially without delay.
3. The basic policy set forth under the provisions of Paragraph 1 shall be taken as The Basic Policy stipulated under the provisions of Paragraph 1 and Paragraph 2 of Article 3 on the date of enforcement of this Act.

(Delegation to the Cabinet Ordinance)

**Article 3**

Besides those stipulated in the preceding Article, necessary interim measures concerning the enforcement of this Act shall be stipulated by the Cabinet Ordinance.

(Review)

**Article 4**

The government shall, after five years lapse from the enforcement of this Act, conduct a review concerning the state of enforcement of this Act and, when it is deemed necessary, shall devise requisite measures based on the results thereof.

(Partial Amendment of the Basic Environment Law)

**Article 5**

Part of the Basic Environment Law (Law No. 91 (1993)) shall be amended as follows:
Article 41, Paragraph 2, Subparagraph 3 shall be amended as follows:

iii) To deal with matters caused to pertain to their authorities by the Natural Park Law (Law No. 161 (1957)), the Farmland Soil Pollution Control Law (Law No. 139 (1970)), the Natural Environment Conservation Law (Law No. 85 (1972)), the Protection and Keeping of Animals Law (Law No. 105 (1973)), the Special Measures Law for Conservation of Seto-Inland Sea Environment (Law No. 110 (1973)), the Law concerning Compensation for Pollution Damage to Health (Law No. 111 (1973)), the Law for the Conservation of Endangered Species of Wild Fauna and Flora (Law No. 75 (1992)), the Special Measures Law on Dioxins (Law No. 105 (1999)), the Basic Law for Recycling-oriented Society Promotion (Law No. 110 (2000)), the Law concerning Recycling of Used Motor Cars (Law No. 87 (2002)), the Wildlife Protection and Hunting Law (Law No. 88 ( 2002)) and the Invasive Alien Species Act (Law No. (2004)).

## *Reasons for Introducing This Bill*

In order to prevent adverse effects on ecosystems, human safety, or agriculture, forestry and fisheries caused by Invasive Alien Species, raising, planting, storing or carrying, importing and other handling of IAS are prohibited with the exception of specified cases. At the same time, the mitigation of IAS by the government and other entities is promoted. Besides, it is necessary to restrict the import of Uncategorized Alien Species and to take other requisite measures. These are reasons for introducing this bill.

# *4-9. Law for the Protection of Cultural Property (Extract)*

Promulgated on May 30,1950
Law No.214
AGENCY FOR CULTURAL AFFAIRS GOVERNMENT OF JAPAN

## Contents of the Law


**Chapter I** General Rules (Article 1 to Article 4)

**Chapter VII** Historic Sites, Places of Scenic Beauty and Natural Monuments (Article 109 to Article 133)

**Chapter XI** Consultation with the Council for Cultural Affairs (Article 153)

**Chapter XIII** Penal Rules (Article 193 to Article 203)

## *Chapter I General Rules (Article 1 to Article 4)*

(Purpose of the Present Law)

**Article 1**

The purpose of the present law is to preserve and utilize cultural property objects so that the cultural quality of the nation can be enhanced, thereby contributing to the evolution of world culture.

(Definition of Cultural Property)

**Article 2**

"An object of cultural property" in the present law shall be as follows:

(1) Buildings, pictures, sculptures, applied crafts, calligraphic works, classical books, ancient documents, and other tangible cultural products that are of significant historical or artistic value to Japan (including lands and other objects which are combined with these objects to create such value): archaeological and other historical resources of significant scientific value (hereinafter referred to as "Tangible Cultural Property");

(2) Drama, music, applied art, and other intangible cultural products that are of a significant historical or artistic value to Japan (hereinafter referred to as "Intangible Cultural Property");

(3) (i)Manners and customs related to food, clothing and housing, to occupations, to religious faiths, and to annual festivals, etc.: (ii) folk performing arts: (iii) folk skills: (iv)clothes, utensils, houses and other objects used therefor, which are indispensable to the understanding of changes in the mode of life of Japan (hereinafter referred to as "Folk Cultural Property");

(4) (i) Shell mounds, tumuli, sites of fortified capitals, sites of forts, sites of castles, monument houses and other sites, which are of significant historical or scientific value to Japan: (ii) gardens, bridges, gorges, sea-shores, mountains, and other places of scenic beauty, which are of significant artistic or aesthetic value to Japan: (iii) animals (including their habitats, breeding areas and trails), plants (including their self-seeded areas), and geological features and minerals (including the areas where peculiar natural phenomena are recognizable), which are of significant scientific value to Japan (hereinafter referred to as "Monuments");

(5) Landscapes that have been created by people's lives or occupations in their community as well as by the climate prevailing in such community, and which are indispensable to the understanding of the mode of life or occupation of Japan (hereinafter referred to as "Cultural Landscapes");

(6) Groups of traditional buildings of a high value, which form a cer tain historic configuration in combination with their environments (hereinafter referred to as a "Group of Traditional Buildings");

2. The term "an object of 'Important Cultural Property'" prescribed in the provisions of the present law (except for the provisions of Articles 27 to 29 inclusive, Article 37, Article 55 pa ragraph 1 I tem (4), Article 153 paragraph 1 I tem (1), Article 165, Article 171, and additional rules' Article 3) shall include 'National Treasure'.
3. The term "Historic Sites, Places of Scenic Beauty and Natural Monuments" prescribed in the provisions of the present law (except for the provisions of Article 109, Article 110, Article 112, Article 122, Article 131 paragraph 1 Items (4), Article 153 paragraph 1 I tems (7) and (8), Article 165, and Article 171) shall include 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments'.

(Duty of the Government and Local Governments)

**Article 3**

The Government and local governments shall, recognizing that cultural property is indispensable to the correct understanding of the history and culture of Japan and that it forms a foundation for cultural development in the future, sincerely endeavor to achieve the purpose of the present law so that the preservation thereof may be properly secured.

(Attitude of People and Owners)

**Article 4**

The general people shall faithfully cooperate with such measures taken by the Government and local governments to achieve the purpose of the present law.

2. An owner of cultural property and other persons concerned therewith, being conscious that cultural property is a valuable national asset, shall preserve it with good care for the public and endeavor to promote its cultural utilization, such as by opening it to public viewing.
3. The Government and local governments shall respect the ownership and other property rights of the persons concerned in the enforcement of the present law.

## *Chapter VII Historic Sites, Places of Scenic Beauty and Natural Monuments*

(Designation)

**Article 109**

The Minister of Education, Culture, Sports, Science and Technology may designate an important one among monuments as 'Historic Site', 'Place of Scenic Beauty' or 'Natural Monument' (hereinafter collectively referred to as "Historic Sites, Places of Scenic Beauty and Natural Monuments").

2. The Minister of Education, Culture, Sports, Science and Technology may designate particularly important ones among 'Historic Sites, Places of Scenic Beauty or Natural Monuments' designated under the provisions of the preceding paragraph, as 'Special Historic Site', 'Special Place of Scenic Beauty', or 'Special Natural Monument' (hereinafter collectively referred to as "Special Historic Sites, Places of Scenic Beauty and Natural Monuments").
3. The designation under the preceding two paragraphs shall be announced in the Official Gazette, and an owner and an occupant by title of such 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments' or such 'Historic Sites, Places of Scenic Beauty and Natural Monuments' shall be informed thereof.
4. Where there are too many addressees to be individually informed under the provisions of the preceding paragraph, the Minister of Education, Culture, Sports, Science and Technology may, instead of informing them as prescribed in the same paragraph, put up a notice of matters to be informed on a notice board in an office or any other similar facility in a city (including special wards; hereinafter the same applies), town, or village where such 'Special Historic Sites, Places of Scenic Beauty or Natural Monuments' or such 'Historic Sites, Places of Scenic Beauty and Natural Monuments' are located. In this case the information document prescribed in the preceding paragraph shall be deemed to have reached those addressees after two weeks have passed since the day on which the notice was first exhibited.
5. Designation under the provisions of paragraph 1 or paragraph 2 shall come into effect as from the day of announcement in the Official Gazette under the provisions of paragraph 3. However, for an owner or an occupant by title of 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments' or of 'Historic Sites, Places of Scenic Beauty and Natural Monuments', it shall come into effect as from the time when the information document under the provisions of paragraph 3 has reached him or when it is deemed to have reached him under the provisions of the preceding paragraph.
6. Where the Minister of Education, Culture, Sports, Science and Technology designates a historic site, a place of scenic beauty or a natural monument, he shall consult the Minister of the Environment if such monuments to be designated possess a high value for the protection of the natural environment.

(Interim Designation)

**Article 110**

Prior to designation under the provisions of the preceding Article, paragraph 1, if a board of education within To-Do-Fu-Ken (prefectures) recognizes an imminent necessity, it may make an interim designation of 'Historic Sites, Places of Scenic Beauty and Natural Monuments'.

2. Where the board of education within To-Do-Fu-Ken (prefectures) has made an interim designation under the provisions of the preceding paragraph, it shall report the fact to

the Minister of Education, Culture, Sports, Science and Technology without delay.

3. The provisions of the preceding Article, paragraphs 3 to 5 inclusive, shall apply *mutatis mutandis* to an interim designation under the provisions of paragraph 1.

(Respect for Ownership, etc. and Coordination with Other Public Interests)

**Article 111**

In making a designation under the provisions of Article 109, paragraph 1 or paragraph 2, or an interim designation under the provisions of the preceding Article, paragraph 1, the Minister of Education, Culture, Sports, Science and Technology or a board of education within To-Do-Fu-Ken (prefectures) shall, in particular, respect ownership, mining rights and other property rights of the parties concerned, and at the same time pay due attention to coordination with land development and other public interests.

2. Where the Minister of Education, Culture, Sports, Science and Technology deems it necessary, he may express his opinions to the Minister of the Environment on the protection and maintenance of natural environment that relates to Places of Scenic Beauty or Natural Monuments. Where the Commissioner for the Cultural Affairs expresses his opinion in that case, he shall do so through the Minister of Education, Culture, Sports, Science and Technology.
3. Where the Minister of the Environment deems it necessary, he may express his opinions on the preservation or utilization of Places of Scenic Beauty or Natural Monuments of a high value from the viewpoint of the protection of the natural environment to the Minister of Education, Culture, Sports, Science and Technology, or to the Commissioner for Cultural Affairs through the Minister of Education, Culture, Sports, Science and Technology.

(Annulment of Designation)

**Article 112**

Where 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments', or 'Historic Sites, Places of Scenic Beauty and Natural Monuments' have lost there value as such, or where there is any other special reason, the Minister of Education, Culture, Sports, Science and Technology or a board of education within To-Do-Fu-Ken (prefectures) may annul the designation or interim designation thereof.

2. Where designation under the provisions of Article 109, paragraph 1, has been done for 'Historic Sites, Places of Scenic Beauty and Natural Monuments' for which an interim designation had been done under the provisions of Article 110, paragraph 1, or where no designation under the same provision has been done within two years as from the day when such an interim designation had been done, such an interim designation shall become null and void.
3. Where the Minister of Education, Culture, Sports, Science and Technology deems it inappropriate, he may annual any interim designation under the provisions of Article

110, paragraph 1.

4. The provisions of Article 109, paragraphs 3 to 5 inclusive, shall apply *mutatis mutandis* to the annulment of designation or interim designation under the provisions of paragraph 1 or of the preceding paragraph.

(Management and Restoration by a Managerial Body)

**Article 113**

Where an owner of 'Historic Sites, Places of Scenic Beauty, and Natural Monuments' does not exist or is not traceable, or where it is apparently recognizable that the management by its responsible manager appointed by an owner or under the provisions of Article 109, paragraph 2, is extremely difficult or inappropriate, the Commissioner for Cultural Affairs may appoint an appropriate local government or any other juridical person and charge it with the management and restoration necessary for the preservation of the said 'Historic Sites, Places of Scenic Beauty and Natural Monuments' (including the management and restoration of such facilities, equipment and other objects under the ownership or management of the owner of the said 'Historic Sites, Places of Scenic Beauty and Natural Monuments', as are necessary for the preservation thereof)

2. In order to make an appointment under the provisions of the preceding paragraph, the Commissioner for Cultural Affairs shall obtain the consent of a local government or any other juridical person to be appointed in advance.
3. The appointment under the provisions of paragraph 1 shall be announced in the Official Gazette, and an owner and an occupant by title of the said 'Historic Sites, Places of Scenic Beauty and Natural Monuments' as well as a local government or other juridical person to be appointed shall be informed thereof.
4. The provisions of Article 109, paragraphs 4 and 5, shall apply *mutatis mutandis* to appointment under the provisions of paragraph 1.

**Article 114**

Where the reasons prescribed in the preceding Article, paragraph 1, have become obsolete or where there is any other special reason, the Commissioner for Cultural Affairs may annul the appointment of a managerial body.

2. The provisions of the preceding Article, paragraph 3, and Article 109, paragraphs 4 and 5, shall apply *mutatis mutandis* to annulment under the provisions of the preceding paragraph.

**Article 115**

A local government and any other juridical person appointed under the provisions of Article 113, paragraph 1 (hereinafter referred to as "a managerial body" in the present Chapter and Chapter XII) shall set up signs, explanation boards, boundary indicators, fences and other facilities necessary for the management of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' according to the standards set by a M EXT

ordinance.

2. Where there has been any change in the name, block number, category or acreage of land within the designated area of 'Historic Sites, Places of Scenic Beauty and Natural Monuments', a managerial body shall notify the Commissioner for Cultural Affairs to that effect in accordance with the stipulations of a MEXT ordinance.
3. Where a managerial body implements restoration, it shall hear opinions of an owner (except where the owner is not traceable) and an occupant by title of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' in advance on the method and time of restoration.
4. An owner or an occupant of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' shall not refuse, impede, or evade the management, restoration, or measures necessary for such management or restoration implemented by a managerial body without justifiable reasons.

**Article 116**

A managerial body shall bear the expenses required for the management and restoration implemented by itself, unless otherwise prescribed by the present law.

2. Notwithstanding the provisions of the preceding paragraph, an owner may bear part of the expenses required for the management or restoration upon agreement between a managerial body and an owner, within the limit of profits that the latter enjoys as a result of management or restoration implemented by the former.
3. A managerial body may collect admission fees from visitors to 'Historic Sites, Places of Scenic Beauty and Natural Monuments' during its term of management.

**Article 117**

A managerial body shall compensate a person who has suffered loss caused by the manager or restoration it implemented, for ordinary damages incidental thereto.

2. The amount of indemnity under the preceding paragraph shall be determined by a managerial body (or if a managerial body is a local government, the board of education within such a local government).
3. The provisions of Article 41, paragraph 3, shall apply *mutatis mutandis* to the amount of indemnity under the provisions of the preceding paragraph.
4. A managerial body shall be a defendant in a lawsuit under the provisions of Article 41, paragraph 3, when applied *mutatis mutandis* in the preceding paragraph.

**Article 118**

The provisions of Article 30, Article 31, paragraph 1, and Article 33 shall apply *mutatis mutndis* to the management implemented by a managerial body; the provisions of Articles 35 and 47 to the management and restoration implemented by a managerial body; the provisions of Article 56, paragraph 3, to cases where a managerial body has been appointed, or where such appointment has been annulled.

(Management and Restoration by an Owner)

**Article 119**

Except where a managerial body has been appointed, the owner of ' Historic Sites, Places of Scenic Beauty and Natural Monuments' shall be responsible for the management and restoration thereof.

2. An owner in charge of the management of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' under the provisions of the preceding paragraph may appoint an appropriate person to be responsible on his behalf for the management of the said 'Historic Sites, Places of Scenic Beauty and Natural Monuments' in specific circumstances (hereinafter referred to as "a responsible manager" in the present Chapter and Chapter XII). The provisions of Article 31, paragraph 3 shall apply *mutatis mutandis* in this case.

**Article 120**

The provisions of Article 30, Article 31, paragraph 1, Article 32, Article 33 and Article 115, paragraphs 1 and 2 (paragraph 2 is not applicable if a managerial body has been appointed) shall apply *mutatis mutandis* to management by an owner; the provisions of Article 35 and 47 to management and restoration by an owner; the provisions of Article 56, paragraph 1, to the succession to rights and obligations upon a change in ownership; the provisions of Article 30, Article 31, paragraph 1, Article 32, paragraph 3, Article 33, Article 47, paragraph 4 and Article 115, paragraph 2 to management by a responsible manager.

(Order or Advice on Management)

**Article 121**

Where the Commissioner for Cultural Affairs concludes that 'Historic Sites, Places of Scenic Beauty and Natural Monuments' is in danger of destruction, damage, decay or theft because of inappropriate management, he may (i) order a managerial body, an owner or a responsible manager thereof to improve its management methods, to install facilities for preservation and to take any other measure necessary for proper management thereof, or (ii) often them appropriate advice.

2. The provisions of Article 36, paragraphs 2 and 3, shall apply *mutatis mutandis* to cases under the preceding paragraph.

(Order or Advice on Restoration)

**Article 122**

Where 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments' is damaged or in a state of decay and the Commissioner for Cultural Affairs deems it necessary for its preservation, he may give any necessary order or advice on its

restoration to a managerial body or owner thereof.

2. Where 'Historic Sites, Places of Scenic Beauty and Natural Monuments' other than 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments' is damaged or in a state of decay and the Commissioner for Cultural Affairs deems it necessary for its preservation, he may give necessary advice on its restoration to a managerial body or to an owner thereof.
3. The provisions of Article 37, paragraphs 3 and 4, shall apply *mutatis mutandis* to cases under the preceding two paragraphs.

(Implementation of Restoration, etc. of Special Historic Sites, Places of Scenic Beauty or Natural Monuments by the Commissioner for Cultural Affairs)

**Article 123**

The Commissioner for Cultural Affairs may himself implement the restoration of 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments' or take measures to prevent its destruction, damage, decay or theft, in either of the following cases:

(1) where a managerial body, an owner or a responsible manager does not observe the orders given under the provisions of the preceding two Articles;
(2) where 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments' is damaged or in a state of decay, or in danger of destruction, damage, decay or theft, and where The Commissioner for Cultural Affairs deems it inappropriate to have a managerial body, an owner or a responsible manager thereof restore or take measures to prevent its destruction, damage, decay or theft.

2. The provisions of Article 38, paragraph 2, and Articles 39 to 41 inclusive, shall apply *mutatis mutants* to the cases under preceding paragraph.

(Reimbursement for Alienation of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' for Which a Subsidy, etc. Has Been Granted)

**Article 124**

The provisions of Article 42 shall apply *mutatis mutandis* to 'Historic Sites, Places of Scenic Beauty and Natural Monuments' for which a subsidy has been granted by the State for restoration or measures to prevent its destruction, damage, decay or theft under the provisions of Article 35, paragraph 1 when applied *mutatis mutants* in Article 118 and Article 120, or for which all or part of the expenses were owed under the provisions of Article 36, paragraph 2, when applied *mutatis mutants* by Article 121, paragraph 2, under Article 37, paragraph 3, when applied *mutatis mutants* in Article 122, paragraph 3, or under Article 40, paragraph 1, when applied *mutatis mutants* in the preceding Article, paragraph 2.

(Restriction upon Alteration of the Status Quo and Order of Restitutio in Integrum)

**Article 125**

Where any person intends to take action to alter the status quo of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' or any action that affects its preservation, he must obtain the permission of the Commissioner for Cultural Affairs. However, the present provision does not apply where such act of altering the status quo is merely a measure for maintaining the *status quo* of an entity or an emergency measure necessary for the prevention of extraordinary disasters; or where the influence of any act that may affect its preservation is insignificant.

2. The extent of a measure to maintain the status quo provided for in the proviso to the preceding paragraph shall be stipulated by the MEXT ordinance.
3. The provisions of Article 43, paragraph 3 s hall apply *mutatis mutandis* to the delivery of permission prescribed in paragraph 1, while that of Article 43, paragraph 4, shall apply to a person who has obtained such permission under paragraph 1.
4. The provisions of Article 111, paragraph 1, shall apply *mutatis mutandis* to final actions under the provisions of paragraph 1.
5. The State shall compensate a person who has suffered loss caused by the fact that he failed to obtain permission under paragraph 1 or that the permission was subject to conditions under Article 43, paragraph 3, when applied *mutatis mutandis* in paragraph 3, for ordinary damages incidental thereto.
6. The provisions of Article 41, paragraphs 2 to 4 i nclusive, shall apply *mutatis mutandis* to cases under the preceding paragraph.
7. Where any person has done anything to alter the status quo or to affect the preservation of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' without obtaining permission under the provisions of paragraph 1 or without observing the conditions of permission under Article 43, paragraph 3, when applied *mutatis mutandis* in paragraph 3, the Commissioner for Cultural Affairs may order him to restore it to its original state. In this case the Commissioner for Cultural Affairs may give necessary instructions for such recovery.

(Informing the Administrative Agency Concerned)

**Article 126**

Regarding an act for which a permission should be obtained under the provisions of the preceding Article, paragraph 1, and the conduct subject to other permission, authorization, or any other final action, depending on a cabinet order under the provisions of other laws or orders, the administrative agency with competence for a final action under such other laws or orders, or a person to whom such competence has been entrusted, shall inform the Commissioner for Cultural Affairs (or a board of education within To- Do- Fu-Ken (prefectures) or a city if Article 184, paragraph 1, provides that a b oard of education within To-Do-Fu-Ken (prefectures) or a city shall exercise competence for permission under the provisions of the preceding Article, paragraph 1) to that effect in accordance with what the cabinet order prescribed where it takes such a final action.

(Notification of Restoration)

**Article 127**

Where 'Historic Sites, Places of Scenic Beauty and Natural Monuments' is to be restored, its managerial body or owner shall notify the Commissioner for Cultural Affairs thereof at least thirty days prior to the commencement date of such restoration, in accordance with the stipulations of a MEXT ordinance. However, the present provision does not apply to cases where permission is to be obtained under the provisions of Article 125, paragraph 1 and to other cases stipulated by a MEXT ordinance.

2. Where the Commissioner for Cultural Affairs deems it necessary for the protection of 'Historic Sites, Places of Scenic Beauty and Natural Monuments', he may give technical guidance and advice on the restoration of the 'Historic Sites, Places of Scenic Beauty and Natural Monument' for which notification is filed under the preceding paragraph.

(Integrity of Surroundings)

**Article 128**

Where the Commissioner for Cultural Affairs deems it necessary for the preservation of 'Historic Sites, Places of Scenic Beauty and Natural Monuments', he may restrict or prohibit certain acts within a delimitated area or order the installation of any necessary facilities in such area.

2. The State shall compensate a person who has suffered loss caused by the final action under the preceding paragraph, for ordinary damages incidental thereto.
3. The provisions of Article 125, paragraph 7 shall apply *mutatis mutandis* to a person who has contravened the restriction or prohibitions under paragraph 1, while the provisions of Article 4l, paragraphs 2 to 4 inclusive, shall apply to cases under the preceding paragraph.

(Subsidy for a Managerial Body to Buy)

**Article 129**

Where a local government or other juridical person that is a managerial body deems it necessary to buy the land, buildings or other fixtures to the land involved in the designation as 'Historic Sites, Places of Scenic Beauty and Natural Monuments' for the preservation of a designated entity that is under its management, the State may grant a subsidy to cover part of the expenses required to buy the same.

2. The provisions of Article 35, paragraphs 2 and 3, and Article 42 shall apply *mutatis mutandis* to cases under the preceding paragraph.

(Investigation for Preservation)

**Article 130**

Where the Commissioner for Cultural Affairs deems it necessary, he may ask a managerial body, an owner or a responsible manager to file a report (i) on the status quo of 'Historic Sites, Places of Scenic Beauty and Natural Monuments', or (ii) on the conditions of its management, of its restoration, or of the integrity of its surroundings.

**Article 131**

In any of the following cases, when the Commissioner for Cultural Affairs is still unable to confirm the condition of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' notwithstanding the report filed under the preceding Article, and where there appears to be no alternative way for the confirmation thereof, he may appoint a person who is in charge of the investigation and have him enter upon the land where the 'Historic Sites, Places of Scenic Beauty and Natural Monuments' is located or its adjoining area, investigate on the spot the status quo or the conditions of its management, of its restoration, or of the integrity of its surroundings, excavate the land, remove obstacles, or take any other measures necessary for such investigation. However, he shall not oblige him to take such measures as may result in considerable damage to the owner or the occupant or any other parties with an interested such land:

(1) where application has been filed for approval of alteration of the status quo or of any action to affect the preservation of 'Historic Sites, Places of Scenic Beauty and Natural Monuments';
(2) where 'Historic Sites, Places of Scenic Beauty and Natural Monuments' is damaged in a state of decay;
(3) where 'Historic Sites, Places of Scenic Beauty and Natural Monuments' is in danger of destruction, damage, decay or theft;
(4) where special circumstances necessitate re-investigating of the value of 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments' or of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' as such.

2. The State shall compensate a person who has suffered loss caused by the investigation or measures under the provisions of the preceding paragraph, for ordinary damages incidental thereto.
3. The provisions of Article 55, paragraph 2, shall apply *mutatis mutandis* to cases of entering upon the land for investigation under the provisions of paragraph 1, and those of Article 41, paragraphs 2 to 4 inclusive, to cases under the preceding paragraph.

(Registered Monuments)

**Article 132**

From among monuments (expect those designated by a local government under the provisions of Article 182, paragraph 2) other than 'Historic Sites, Places of Scenic Beauty or Natural

Monuments' (including those of interim designation by a board of education within To-Do-Fu-Ken (prefectures) under the provisions of Article 110, paragraph 1), the Minister of Education, Cultural, Sports, Science and Technology may, in view of the value as cultural property, register in the Cultural, Sports, Science and Technology may, in view of the value as cultural property, register in the Cultural Property Registry those monuments for which it is especially necessary to take preservation and utilization measures.

2. Article 57, paragraph 2 to 3 inclusive, Article 109, paragraph 3 to 5 inclusive, and Article 111, paragraph 1, shall apply *mutatis mutandis* to registration under the preceding paragraph.

**Article 133**

The provisions of Article 59, paragraph 1 to 5 inclusive, Article 64, Article 68, Article 111, paragraph 2 and paragraph 3, and Article 113 to Article 120 inclusive, shall apply *mutatis mutandis* to monuments registered under the provisions of the preceding paragraph (hereinafter referred to as "registered monuments").

In these cases, "in cases where … has been designated as Important Cultural Property under the provisions of Article 27, paragraph 1" described in Article 59, paragraph 1, shall be read as "where … has been designated as Historical Sites, Places of Scenic Beauty or Natural Monuments under the provisions of Article 109, paragraph 1(including an interim designation by a board of education within To-Do-Fu-Ken (prefectures) under the provisions of Article 110, paragraph 1)";

"an owner … shall be informed thereof "described in the same Article, paragraph 4 shall be read as "an owner and an occupant by title … shall be informed thereof. However, in cases where there are too many addressees to be individually informed, the Minister of Education, Culture, Sports, Science and Technology may, instead of thus informing them, put up a notice of matters to be informed on a notice board in an office or any other similar facility in a city, town, or village where such registered monument is located. In this case the information shall be deemed to have reached those addressees when two weeks have passed since the day when the notice was first exhibited" ;

"the provisions of the preceding Article, paragraph 2 shall apply *mutatis mutandis* to the annulment of registration" described in the same Article, paragraph 5, shall be read as "annulments shall come into effect as from the day of its announcement in the Official Gazette under the provisions of the preceding paragraph. However, it shall come into effect for an owner or an occupant by title of the said Registered Monument as form the time when the information under the provisions of the preceding paragraph has reached or is deemed to have reached them" ;

"where it is apparently recognizable that … is inappropriate" described in Article 113, paragraph 1, shall be read as "where the local government concerned reports to the effect that it is apparent

that … is inappropriate, the Commissioner for Cultural shall hear the opinion of the local government concerned";

"Article 30 and Article 31, paragraph 1" described in Article 118 and Article 120" shall be read as "Article 31, paragraph 1," and "shall apply *mutatis mutandis* to" shall be read as "shall apply *mutatis mutandis* to … In this case, 'under … as well as those MEXT ordinances and instructions of the Commissioner for Cultural Affairs as issued thereunder' described in Article 31, paragraph 1, shall be read as 'under … as well as those MEXT ordinances as issued thereunder'";

"the provisions of Articles 35 and 47 to … ; the provisions of Article 56, paragraph 3, to cases where a managerial body has been appointed or where such appointment has been annulled." described in Article 118 shall be read as "Article 47, paragraph 4";

"the provisions of Article 35 and 47 to … ; the provisions of Article 56, paragraph 1, to the succession to rights and obligations upon a change in ownership" described in Article 120,shall be read as "Article 47, paragraph 4."

## *Chapter XI Consultation with the Council for Cultural Affairs*

**Article 153**

The Minister of Education, Culture, Sports, Science and Technology shall consult the Council for Cultural Affairs about the following matters in advance:

(1) designation as 'National Treasure' or 'Important Cultural Property', and annulment of such designation;
(2) registration of an object of 'Registered Tangible Cultural Property', and annulment of such registration (except annulment of registration under the provisions of Article 59, paragraph 1 or 2);
(3) designation of a element as 'Important Intangible Cultural Property, and annulment of such designation;
(4) recognition of bearer or a bearing body of an element of 'Important Intangible Cultural Property', and annulment of such recognition;
(5) designation of an object as 'Important Tangible Folk Cultural Property' or an element as 'Important Intangible Folk Cultural Property', and annulment of such designation;
(6) registration of an object of Registered 'Tangible Folk Cultural Property', and annulment of such registration (except annulment of registration under the provisions of Article 59, paragraph 1 or 2, when applied *mutatis mutandis* in Article 90, paragraph 3);
(7) designation of 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments', or 'Historic Sites, Places of Scenic Beauty and Natural Monuments', and annulment of such designation;
(8) interim designation of an entity as 'Historic Sites, Places of Scenic Beauty and Natural Monuments' and annulment of such an interim designation;

(9) registration of a r egistered monument, and annulment of that registration (except annulment of registration under the provisions of Article 59, paragraph 1 or 2, when applied *mutatis mutandis* in Article 133);
(10) selection of 'Important Cultural Landscape', and annulment of such selection;
(11) selection of an 'Important Preserved District for a Group of Traditional Buildings', and annulment of such selection.
(12) selection of a preservation technique, and annulment of such selection;
(13) recognition of a bearer or preserving body of a preservation technique, and annulment of such recognition.

2. The Commissioner for Cultural Affairs shall consult the Council for Cultural Affairs about the following matters in advance:
(1) orders on the management of an object of 'Important Cultural Property' or the repairs of 'National Treasure';
(2) repairs of 'National Treasure' or taking measures to prevent its destruction, damage or theft, by the Commissioner for Cultural Affairs;
(3) permission for the alteration of the status quo of or for any action that affects the preservation of an object of 'Important Cultural Property';
(4) orders on the restriction, prohibition or necessary facilities for the integrity of the surroundings of an object of 'Important Cultural Property';
(5) buying of an object of 'Important Cultural Property' by the State;
(6) choosing from among elements of 'Intangible Cultural Property' other than 'Important Intangible Cultural Property', the record of which the Commissioner for Cultural Affairs shall produce or subsidize;
(7) orders on the management of an object of 'Important Tangible Folk Cultural Property';
(8) buying an object of 'Important Tangible Folk Cultural Property';
(9) choosing from among elements of 'Intangible Folk Cultural Property' other than 'Important Intangible Folk Cultural Property', the record of which the Commissioner for Cultural Affairs shall produce or subsidize;
(10) extension of the terms of orders on the suspension or prohibition of such action as to alter the status quo of remains;
(11) implementation of excavation by the Commissioner for Cultural Affairs in order to investigate Treasure Trove;
(12) orders on the management of 'Historic Sites, Places of Scenic Beauty and Natural Monuments', or on restoration of 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments';
(13) implementation by the Commissioner for Cultural Affairs of the restoration or measures to prevent destruction, damage, decay or theft of 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments';
(14) permission for the alteration of the status quo of or for any action that affects the preservation of 'Historic Sites, Places of Scenic Beauty and Natural Monuments';
(15) orders on the restriction, prohibition or necessary facilities for the integrity of the

surroundings of 'Historic Sites, Places of Scenic Beauty and Natural Monuments';

(16) orders on the *restitution in integrum* where permission for alteration of the status quo of or for any act that affects the preservation of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' is not obtained or conditions of such permission are not observed, or where a restriction or prohibition for the integrity of surroundings of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' is violated;

(17) orders on the maintenance of 'Important Cultural Landscape';

(18) proposals for the establishment, revision or annulment of a cabinet order under Article 184, paragraph 1 (limited to matters related to the administrative tasks listed in the same Article, paragraph 2, Item(2)).

## *Chapter XIII Penal Rules*

**Article 193**

Any person who has, in contravention of the provisions of Article 44, exported an object of 'Important Cultural Property' without obtaining permission from the Commissioner for Cultural Affairs shall be subject to imprisonment with or without labor for a term not exceeding five years or to a fine not exceeding one million yen.

**Article 194**

Any person who has, in contravention of the provisions of Article 82, exported an object of 'Important Tangible Folk Cultural Property' without obtaining permission from the Commissioner for Cultural Affairs shall be subject to imprisonment with or without labor for a term not exceeding three years or to a fine not exceeding five hundred thousand yen.

**Article 195**

Any person who has damaged, discarded or concealed an object of 'Important Cultural Property' shall be subject to imprisonment with or without labor for a term not exceeding five years or to a fine not exceeding three hundred thousand yen.

2. Where the person prescribed in the preceding paragraph happens to be the owner of the said object of 'Important Cultural Property', he shall be subject to imprisonment with or without labor for a term not exceeding two years or to a fine not exceeding two hundred thousand yen, or a minor fine.

**Article 196**

Any person who has altered the status quo of 'Historic Sites, Places of Scenic Beauty and Natural Monuments', or committed an action that affects its preservation and has then destroyed, damaged or caused it to deteriorate shall be subject to imprisonment with or without labor for a term not exceeding five years or to a fine not exceeding three hundred thousand yen.

2. Where the person prescribed in the preceding paragraph happens to be the owner of the said entity of 'Historic Sites, Places of Scenic Beauty and Natural Monuments', he shall be subject to imprisonment with or without labor for a term not exceeding two years or to a fine not exceeding two hundred thousand yen, or a minor fine.

**Article 197**

Any person who falls under either of the following Items shall be subject to a fine not exceeding two hundred thousand yen:

(1) any person who has, in contravention of the provisions of Article 43 or Article 125, altered the status quo of or committed an act that affects the preservation of an object of 'Important Cultural Property' or 'Historic Sites, Places of Scenic Beauty and Natural Monuments' without obtaining permission or without complying with the conditions of such permission; has failed to comply with an order on the suspension of any act to alter the status quo or to affect the preservation thereof;

(2) any person who has, in contravention of the provisions of Article 96, paragraph 2, failed to comply with an order on the suspension or prohibition of any act resulting in the alteration of the status quo.

**Article 198**

Any person who falls under either of the following Items shall be subject to a find not exceeding ten thousand yen;

(1) any person who has, in contravention of the provisions of Article 32 *bis*, paragraph 5 applied *mutatis mutandis* in Article 39, paragraph 3 ( including cases where this paragraph applied *mutatis mutandis* in Article 186, paragraph 2), refused or interfered with implementing repairs or taking measures to prevent destruction, damage or theft of 'National Treasure';

(2) any person who has, in contravention of the provisions of Article 32 *bis*, paragraph 5 applied *mutatis mutandis* in Article 39, paragraph 3, which is applied *mutatis mutandis* in Article 98, paragraph 3 (including cases where this paragraph is applied *mutatis mutandis* in Article 186, paragraph 2), refused or interfered with the implementation of an excavation;

(3) any person who has, in contravention of the provisions of Article 32 *bis*, paragraph 5 applied *mutatis mutandis* in Article 39, paragraph 3, which is applied *mutatis mutandis* in Article 123, paragraph 2 (including cases where this paragraph is applied *mutatis mutandis* in Article 186, paragraph 2), refused or interfered with implementing restoration or taking measures to prevent the destruction, damage, decay or theft of 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments'.

**Article 199**

Where a representative of a juridical person, or an proxy, a servant or any other employee of a juridical or natural person has committed any of the offenses prescribed in Article 193 to the preceding Articles inclusive, regarding the services or property management of the juridical or natural person, such an offender shall be punished while the juridical or

natural person shall be fined.

**Article 200**

Where a person in charge of the implementation of the management, repairs or restoration of an object of 'Important Cultural Property', an object of 'Important Tangible Folk Cultural Property' or 'Historic Sites, Places of Scenic Beauty and Natural Monuments' prescribed in Article 39, paragraph 1 (including cases where this paragraph is applied *mutatis mutandis* in Article 47, paragraph 3 (including cases where the latter is applied *mutatis mutandis* in Article 83), Article 123, paragraph 2, Article 186, paragraph 2 or Article 187, paragraph 2), Article 49 (including cases where this paragraph is applied *mutatis mutandis* in Article 85) or Article 185, paragraph 2, has resulted in the destruction, damage or deterioration of an object of 'Important Cultural Property', an object of 'Important Tangible Folk Cultural Property' or 'Historic Sites, Places of Scenic Beauty and Natural Monuments' through negligence or serious dereliction of duty, he shall be subject to a minor fine not exceeding three hundred thousand yen.

**Article 201**

Any person who falls under either of the following Items shall be subject to a fine not exceeding three hundred thousand yen:

(1) any person who has failed to comply with, without justifiable reason, an order of the Commissioner for Cultural Affairs on the repairs of 'National Treasure' or on the management of an object of 'Important Cultural Property' or 'Important Tangible Folk Cultural Property' prescribed in Article 36, paragraph 1 (including cases where this paragraph is applied *mutatis mutandis* in Article 83 and Article 172, paragraph 5) or Article 37, paragraph 1;

(2) any person who has failed to comply with, without justifiable reason, an order of the Commissioner for Cultural Affairs on the restoration of 'Special Historic Sites, Places of Scenic Beauty and Natural Monuments' or on the management of 'Historic Sites, Places of Scenic Beauty and Natural Monuments' prescribed in Article 121, paragraph 1 (including cases where this paragraph is applied mutatis mutandis in Article 172, paragraph 5) or Article 122, paragraph 1;

(3) any person who has failed to comply with, without justifiable reason, an order of the Commissioner for Cultural Affairs on taking such measures as related to a recommendation regarding the management of an Important Landscape as prescribed in Article 137, paragraph 2.

**Article 202**

Any person who falls under either of the following Items shall be subject to a fine not exceeding one hundred thousand yen:

(1) any person who has failed to comply with, without justifiable reasons, an order on the restriction, prohibitions or facilities prescribed in Article 45, paragraph 1;

(2) any person who, in contravention of the provisions of Article 46 ( including cases where this Article is applied *mutatis mutandis* in Article 83), failed to make an offer to the Commissioner for Cultural Affairs regarding a sale to the State; transferred an

object of 'Important Cultural Property' or 'Important Tangible Folk Cultural Property' to any other party than the State within the period prescribed in Article 46, paragraph 5 (including cases where this paragraph is applied *mutatis mutandis* in Article 83) after making such offer; has made a false statement on an offer of sales under the provisions of Article 46, paragraph 1 (including cases where this paragraph applies *mutatis mutandis* under Article 83);

(3) any person who has, in contravention of the provisions of Article 48, paragraph 4 (including cases where this paragraph is applied *mutatis mutandis* in Article 51, paragraph 3 (including cases where the latter paragraph is applied *mutatis mutandis* under Article 85) and Article 85), failed to display or open to public viewing, or has, in contravention of the provisions of Article 51, paragraph 5 (including cases where this paragraph is applied *mutatis mutandis* in Article 51 bis (including cases where this Article is applied *mutatis mutandis* in Article 85) , Article 84 paragraph 2 and Article 85), failed to obey the order for suspension or discontinuance of such public viewing;

(4) any person who has, in contravention of the provisions of Article 53, paragraphs 1, 3, or 4, opened an object of 'Important Cultural Property' to public viewing, without obtaining permission or failing to comply with the conditions of such permission, or failed to comply with an order on the suspension of public viewing;

(5) any person who has, in contravention of the provisions of Article 54 (including cases where this Article is applied *mutatis mutandis* in Article 86 and Article 172, paragraph 5), Article 55, Article 68 ( including cases where the latter Article is applied *mutatis mutandis* in Article 90, paragraph 3 and Article 133) or Article 130 (including cases where this Article is applied *mutatis mutandis* in Article 172, paragraph 5), Article 131 or Article 140, failed to submit a report or submitted a false report, or has refused, interfered with or evaded a responsible officials' on-site investigation or the implementation of measures necessary for such investigation;

(6) any person who has, in contravention of the provisions of Article 92, paragraph 2, failed to comply with an order the prohibition, suspension or discontinuance of an excavation;

(7) any person who has, without justifiable reason, failed to comply with an order on the restriction, prohibitions or facilities prescribed in Article 128, paragraph 1.

**Article 203**

Any person who falls under either of the following Items shall be subject to a fine not exceeding fifty thousand yen:

(1) Any person who has, in contravention of the provisions of Article 28, paragraph 5, Article 29, paragraph 4 ( including cases where this paragraph is applied *mutatis mutandis* in Article 79, paragraph 2), Article 56, paragraph 2 (including cases where this paragraph is applied *mutatis mutandis* in Article 86), Article 59, paragraph 6 or Article 69 (including cases where these paragraphs are applied *mutatis mutandis* in Article 90, paragraph 3) failed to return a certificate of designation as 'Important Cultural Property' or 'Important Tangible Folk Cultural Property' or a certificate of

registration of an object of Registered 'Tangible Folk Cultural Property' to the Minister of Education, Culture, Sports, Science and Technology or to a new owner of the said object;

(2) any person who has, in contravention of the provisions of Article 31, paragraph 3 (including cases where this paragraph is applied *mutatis mutandis* in Article 60, paragraph 4 ( including cases where this paragraph is applied *mutatis mutandis* in Article 90, paragraph 3 ), Article 80, Article 119, paragraph 2 (including cases where this paragraph is applied *mutatis mutandis* in Article 133 ), Article 32 (including cases where this Article is applied *mutatis mutandis* in Article 60, paragraph 4 (including cases where this is applied *mutatis mutandis* in Article 90, paragraph 3), Article 80 and Article 120 (including cases where this is applied *mutatis mutandis* in Article 133)), Article 33 (including cases where this Article is applied *mutatis mutandis* in Article 80, Article 118 and Article 120 (including cases where these provisions are applied *mutatis mutandis* in Article 133) Article 172, paragraph 5), Article 34 (including cases where this Article is applied *mutatis mutandis* in Article 80 and Article 172, paragraph 5), Article 43 bis, paragraph 1, Article 61 and Article 62 (including cases where these Articles are applied *mutatis mutandis* in Article 90, paragraph 3), Article 64, paragraph 1 (including cases where this paragraph is applied *mutatis mutandis* in Article 90, paragraph 3 and Article 133), Article 65, paragraph 1 ( including cases where this paragraph is applied *mutatis mutandis* in Article 90, paragraph 3), Article 73, Article 81, paragraph 1, Article 84, paragraph 1 except for the proviso, Article 92, paragraph 1, Article 96, paragraph 1, Article 115, paragraph 2 ( including cases where this paragraph is applied *mutatis mutandis* in Article 120, Article 133 a nd Article 172, paragraph 5), Article 127, paragraph 1, Article 136, or Article 139, paragraph 1, failed to submit a report or a false report;

(3) any person who has, in contravention of the provisions of Article 32 bis, paragraph 5 (including cases where this paragraph is applied mutatis mutandis in Article 83), Article 115, paragraph 4, Article 63, paragraph 2 (including cases where these paragraphs are applied mutatis mutandis in Article 90, paragraph 3) and Article 80), or Article 115, paragraph 4 (including cases where this paragraph is applied mutatis mutandis in Article 133), refused, interfered with or evaded the implementation of management, repairs or restoration, or measures necessary for these actions.

# Appendix 5*

***** These documents are tentative translations for the appendices of the nomination of the Ogasawara Islands.

**Plans of protection applying to the nominated property**

5-1 : Conservation plan for Minami-iwoto Wilderness Area

5-2 : Park Plan for Ogasawara National Park (Extract)

5-3 : The Third Regional Administration and Management Plan (The Izu Islands Forest Planning Area)

5-4 : Conservation Management Plan for the Ogasawara Islands Forest Ecosystem Reserve

5-5 : Conservation Program defined by the law

5-6 : Ogasawara Archipelago National Wildlife Protection Area

5-7 : Nishinoshima National Wildlife Protection Area

5-8: Kita-iwoto National Wildlife Protection Area

5-9: Guidelines for Environment-conscious Public Works in the Ogasawara Islands and Handbook for Construction Work in the Ogasawara Islands

5-10: The Guidelines for Public Facilities, which give due consideration to the scenery of Ogasawara (Chichijima and Hahajima) and Recommended tree species list

5-11: Guidelines for Ecotourism and Agreement on appropriate use rules

5-12: Ogasawara Islands Promotion and Development Plan (2009-2013)

# *5-1. Conservation Plan for Minami-iwoto Wilderness Area*

May 17, 1975

## *Environment Agency*

### 1. Reason for designation

The Minami-iwoto Wilderness Area is located about 60 kilometers south of Iwoto Island. It is shaped like a cone, and precipitous slope leads directly from the sea up to a 918 meter tall hill, forming the highest summit in the Ogasawara Islands. Vegetation on the island has oceanic characteristics and it forms a transition zone from the tropics to the subtropics. On the hillsides, there are short and small trees. While the area near the summit is narrow, there is a moss forest that has developed in a cloud belt, in addition to different kinds of woody ferns. For geographical reasons, southern and northern-derived plants both grow together, though few in number. There are also a considerable number of endemic species. As for wild animals, many seabirds inhabit the island, which serves as a breeding ground. In this manner, Minami-iwoto exhibits the fauna and flora which are typical of small oceanic islands, and it is of great scientific value. It is one of the few areas in the Ogasawara Islands that have been absolutely unaffected by human activity, and an archetype of tropical/subtropical islands in Japan.

### 2. Conservation Area

**Establishment of the conservation area**

Because of the unique mix of fauna and flora and the fact that the island is uninhabited and unaffected by human activity, the entirety of Minami-iwoto was established as a wilderness area.

A. Area: 367 ha
B. Relevant municipality: Ogasawara Village, Tokyo
C. Ownership of land: National Forest; Ogasawara subsection, Unit 38

### 3. Conservation Plan

**1) Features of the natural environment to be conserved**

**A. Vegetation**

The vegetation on the island forms a transition zone from the tropics to the subtropics, but because of the conical topography of the island marked by extremely steep slopes, the island lacks laurel forests. On the hillsides, there are short and small trees. Because of the effects of the wind, the area around the summit is covered with dwarf scrub. Above 800 meters from sea level, most part of the hill are

covered by a cloud belt and a moss forest occurs. Examples of woody plants include *Trema orientalis*, *Ficus boninsimae*, *Boehmeria boninensis*, *Machilus kobu*, *Eurya japonica* subsp. *palauensis*, and *Melastoma tetramerum*. *Excavatia hexandra*, *Elaeocarpus sylvestris* var. *pachycarpus*, and *Hedyotis pachyphylla* are endemic to the Kazan Island Group (Kita-iwoto, Iwoto, and Minami-iwoto Islands). *Hydrangea macrophylla f. normalis*, which grows from southern Kanto region to the Izu Islands, is present on Minami-iwoto but not on any of the other islands of Ogasawara. It is thought that Minami-iwoto is the southern limit of its habitat because temperature in the elevated area is low. As for herbaceous plants, the island is home to different types of ferns, as well as *Goodyera augustinii* and *Carex augustini*, which are thought to be endemic, and others. *H. pachyphylla* and *Ex. hexandra* come from the Mariana Islands, while *El. sylvestris* var. *pachycarpus* derives from Central China. The presence of these species as well as *Hy. macrophylla f. normalis* shows how northern and southern plants coexist on the island.

**B. Wild animals**

The most distinctive feature of the island's fauna is the presence of seabirds. *Phaethon rubricauda*, the Bonin petrel (*Pterodroma hypoleuca*), the wedge-tailed shearwater (*Puffinus pacificus*), the black-footed albatross (*Phoebastria nigripes*), and the brown booby (*Sula leucogaster*) have been confirmed breeding on Minami-iwoto. The Kazan Island Group is the only place in Japan on which *Pha. rubricauda* has been confirmed breeding. Because of geographical conditions and the fact that there is no interference by humans, Minami-iwoto is a more favorable environment for seabirds as a breeding ground than Chichijima Island, Hahajima Island, and other places in the Ogasawara Islands.

**C. Topography and geology**

The Kazan Island Group, which comprises Kita-iwoto, Iwoto, and Minami-iwoto, has been in the process of forming ever since the end of the Pleistocene. They are newer than the rest of the Ogasawara Islands, which are made up mainly of Paleogene volcanic rocks. The stratovolcano that composes Minami-iwoto is the highest summit in the Ogasawara Islands, with an elevation of 918 meters above sea level. The summit consists of a single pointed peak with no clearly visible vent. The rock of the volcano is pyroxene andesite lava and agglomerates, with columnar jointing and flow structures. White stripes that appear to be dikes of quartz-andecite run the layers vertically. It is thought that numerous cracks occurred after the stratovolcano was formed and lava subsequently penetrated those cracks. Nearly the entire circumference of Minami-iwoto consists of sea cliffs from 100 to 200 meters high.

**2) Basic matters concerning the conservation of the natural environment**

(1) Strict conservation of the entire Minami-iwoto as a wilderness area

(2) Plan to install signs for purposes of conservation

### 3) Plan for designating the area

**Wilderness Area**

| Name | Location | Areas | Total areas (ha) | Ownership (ha) | Remarks |
|---|---|---|---|---|---|
| Minami-iwoto Wilderness Area | Ogasawara Village, Tokyo | National Forest, Ogasawra subsection, Unit 38, in OgasawaraVillage, Tokyo | 367 | National Forest 367 (100%) | All the forest units on the island |

**Summary of zones**

| Category | Restricted Entry Zone | | | Other zones | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| Ownership | National | Public | Private | National | Public | Private | National | Public | Private |
| Area size(ha) by ownership | 0 | 0 | 0 | 367 | 0 | 0 | 367 | 0 | 0 |
| Area size by zone(ha) | 0 | | | 367 | | | 367 | | |
| Ratio of each zone(%) | 0 | | | 100 | | | 100 | | |

### 4) Plan for conservation facilities

**Signs**

| No. | Facilities | Type of Facilities | Location | Type of Installation | Remarks |
|---|---|---|---|---|---|
| 1 | | Signs | OgasawaraVillage,Tokyo（Minami-iwoto） | New installation | |

# *5-2. Park Plan for Ogasawara National Park ( Excerpt)*

## *1. Basic Guidelines*

The “Ogasawara Islands” is a term that collectively refers to a group of islands located in the northwest Pacific about 1,000 km south of the Japanese archipelago. Extending about 400 km from north to south, they are made up of the Ogasawara Archipelago, itself composed of the Chichijima, Hahajima, and Mukojima Island Groups, the Iwo Island Group (also known as the Kazan Island Group) and isolated islands in the area. All of the islands are oceanic islands that since their formation have never been joined with a continent. For this reason, the islands are home to unique ecosystems with many endemic species that have evolved in distinct ways. The natural scenery has characteristics unique to subtropical oceanic islands, with well-developed sea cliffs, towering reefs, narrow straits, island-studded seas, and other dynamic island scenery rich in variety. The seascapes, which are full of coral communities, tropical fish, green turtles (*Chelonia mydas*), and cetaceans, are also a major feature of the islands.

In 1968 the Ogasawara Islands were returned to Japan by the United States, and on October 16, 1972, most of the Ogasawara Islands were designated as the Ogasawara National Park. On May 17, 1975, Minami-iwoto Island was removed from the park and became the Minami-iwoto Wilderness Area. Although plans for conservation facilities were added on August 15, 2002 and on August 1, 2006, overall revisions has not been made to the park plan.

At present, stronger conservation and management measures are thought to be needed for listing as a natural World Heritage property. At the same time, there are still issues that are attributed to alien species such as feral goats, *Bischofia* (*Bischofia javanica*), green anole (*Anolis carolinensis*), from a natural environment conservation perspective. It is necessary to implement measures designed to restore the natural environments that have been devastated by these species, and to promote conservation of endangered endemic species that have been affected by them. In addition, use of the national park is diversifying with the promotion of ecotourism.

Given these circumstances, in order to properly protect the unique ecosystems fauna, flora, and natural scenery of this park, and at the same time actively promote utilization of these features of the park, overall revisions (review) shall be conducted according to the guidelines below.

***

**(1)Regulatory plan**

A. On Chichijima and Hahajima Islands, Special Protection Zone and Special Zone will be applied more stringently in accordance with the degree of necessity to protect the vegetation and habitats of rare endemic species of wild fauna and flora composing the ecosystems that make the Ogasawara Islands distinctive of oceanic islands.

B. All islands other than Chichijima and Hahajima shall be designated as Special Protection Areas, as they have ecosystems that make the Ogasawara Islands especially distinctive of oceanic islands and possess habitats for fauna and flora endemic to Ogasawara.

C. For areas in which the natural qualities befitting a national park are on the decline, proper changes will be made, which may include relaxing the application of Special Zone, etc.

D. A part of marine areas in which there are coral communities shall be newly designated as a Marine Park Zone.

**(2) Facility plan**

For utilization facilities for which plans have been established, the overall implementation status will be checked, and those facilities which are deemed either unnecessary for park use or unlikely to be constructed shall be cancelled. On the other hand, facilities which will be necessary for park use or nature conservation shall be added.

## *2. Regulatory plan*

**(1) Protective regulations plan**

**(A) Special Protection Zones**

The following areas shall be designated as Special Protection Zones.

(Table 5: List of Special Protection Zones)

| Name | Overview of the area | Area (ha) |
|---|---|---|
| Mukojima Island Group | The Mukojima Island Group comprises Mukojima, Nakodojima, Yomejima Islands, etc. It has land snails and insects that are well-preserved. Speciation has progressed differently from the Chichijima Island Group, and examples of such speciation are valuable from a scientific standpoint. In addition, this island group is important as a breeding ground for sea birds, etc. | 542 |

| Name | Overview of the area | Area (ha) |
|---|---|---|
| Northern part of the Chichijima Island Group Ototojima, Anijima, Nishijima Islands, etc. | The islands in the northern part of the Chichijima Island Group not only offer the beautiful scenery of island-studded waters, but are also rich in ecosystems, fauna and flora in their original, natural state, hence they are important for the conservation of biodiversity.<br><br>Geologically, Anijima is made up mainly of boninite. In terms of vegetation, sclerophyllous scrub forest (Distylio-Pouterietum dubiae), which is one of the distinguishing features of Ogasawara, is particularly well conserved on Anijima. Both of these features are important from a scientific standpoint. *Calanthe hattorii*, *Bulbophyllum boninense*, *Meterosideros boninensis*, *Crepidiastrum grandicollum*, *Eurya japonica* subsp. *palauensis*, and other endangered plant species endemic to Ogasawara grow on the island. Anijima is also very important as a habitat for a variety of animals endemic to Ogasawara. For example, it is the only known habitat for *Cicindela bonina*, and it is home to a wide variety of land snails such as *Mandarina chichijimana*.<br><br>Ototojima is covered by highly primitive forests. It is one of the only places where *Morus boninensis* grows in its pure form, genetically unadulterated by hybridization. It is also one of the richest places in the Chichijima Island Group in terms of insect fauna, and all five species of dragonfly endemic to Ogasawara occur on this island.<br><br>Nishijima still has many land snails and insects whose populations on Chichijima have decreased, making the island very important from a conservation standpoint. | 1,398 |

| Name | Overview of the area | Area (ha) |
|---|---|---|
| Chichijima | The northern part of Chichijima is made up mainly of boninite, making this area important from a geological standpoint.<br><br>The central part of the island, extending from Asahidaira to Higashidaira, is scientifically important as the sclerophyllous scrub forest (Distylio-Pouterietum dubiae) is particularly well preserved within the area of Chichiijma. *Calanthe hattorii*, *Bulbophyllum boninense*, *Meterosideros boninensis*, *Crepidiastrum grandicollum*, *Eurya japonica* subsp. *palauensis*, and other endangered plant species endemic to Ogasawara grow in this area. It is also important as a habitat for a variety of animals endemic to Ogasawara, such as *Columba janthina nitens*. Furthermore, the central part is also made up mainly of boninite, making this area geologically important.<br><br>On the southern part of the island, vegetation is mostly made up of secondary forest of *Schima mertensiana*, but cloud belts form in this area making it one of the wettest places on Chichijima, and is important as a habitat for many endemic fauna and flora, including *Rhinocypha ogasawarensis*, *Boninthemis insularis*, *Meimuna boninensis*, *Columba janthina nitens*, *Buteo buteo toyoshimai*, *Mandarina* species, *Calanthe hattorii*, and *Malaxis boninensis*. Also notable are seashore landscapes, such as Chihiroiwa Rock and other sea cliffs, Tatsumizaki and Toriyama. Kinshizawa is the only place on Chichijima where pyrite is found.<br><br>Minamijima Island and its surrounding area have a submerged karst landform on limestone formed during the Tertiary period, and the beach contiguous with it makes for a seashore landscape. It is also important as a breeding ground for sea birds.<br><br>Higashijima Island is important as a habitat for rare plants and as a breeding ground for sea birds. | 839 |
| Hahajima Nishidai and Koshinzuka | The peninsula at Nishidai is surrounded by sea cliffs, forming a majestic seashore landscape. The vegetation on top of the cliffs is made up of natural forests unique to Hahajima, which are inhabited by *Columba janthina nitens* and other animals, making it an important area for biodiversity. | 258 |

| Name | Overview of the area | Area (ha) |
|---|---|---|
| Hahajima Higashidai | The peninsula at Higashidai is surrounded by sea cliffs. The seashore landscapes and forests together offer beautiful scenery. At the tip of this area is a huge marine cave. Most of the natural forests on top of the cliffs are unique to Hahajima, and they are also inhabited by *Columba janthina nitens* and other animals, making it an important area for biodiversity. | 168 |
| HahajimaSekimon, Chibusayama, and the hill area | The hill and the area to the east of it are the most pristine areas on Hahajima.<br><br>The entire Sekimon locality is an old karst plain that formed in the Tertiary period. The vegetation consists of a well-developed subtropical rainforest that includes trees such as *Pisonia umbellifera*. This area is known for many endangered plants and animals that only live in this spot, such as *Claoxylon centinarium*, and *Procris boninensis*. For this reason it is the most important area on Hahajima. in terms of conserving biodiversity.<br><br>The area from Sakaigadake and Chibusayama and the ridge that extends to the south is a hill area representative of Hahajima. Since cloud belts form here, rich forests have developed. Natural forests unique to Hahajima cover most of this area. On the ridge is a grassland of the endemic *Freycinetia boninensis*, as well as *Dendrocacalia crepidifolia* community. In this community, species of Asteraceae are known to have become woody, which is a phenomenon often seen on oceanic islands. There are also habitats of five species of land snail, including arboreal species. The area is important as a habitat for various plants and animals endemic to Ogasawara. | 483 |
| Hahajima Nishikaigan | On Hahajima's Nishikaigan is where a small peninsula, reefs and a bay all intricately connect, and together with the forest on top of the cliffs they make up a shoreline landscape that Hahajima is well-known for. | 16 |
| Hahajima Miyukinohama Beach | A gently sloping shoreline formation that faces the coral reef of the Marine Park Zone can be seen in this area. Nummulites, which are large foraminifera fossils, are also found here and these are important from scientific standpoint. | 5 |

| Name | Overview of the area | Area (ha) |
|---|---|---|
| Southern part of the Hahajima Island Group Mukohjima, Anejima, Imotojima, Meijima, and Hirajima Islands | The islands that dot the southern part of the Hahajima Island Group are home to sclerophyllous scrub forest unique to Hahajima. There are well-preserved rare endemic species of plants, insects, and land snails, and is a breeding ground for the threatened *Carduelis sinica kittlitzi*. The islands also have breeding grounds for the black-footed albatross (*Phoebastria nigripes*) and other sea birds. It is an important area for biodiversity conservation. | 584 |
| Nishinoshima Island | Nishinoshima is the peak of a submarine volcano that is still very active. In fact, many people still remember the eruption which resulted in a formation of the Nishinoshima-shinto Island. This island is significant from a volcanological perspective, and important as a breeding ground for many sea birds, including the common tern (*Sterna hirundo*). | 30 |
| Kita-iwoto Island | Kita-iwoto shares many of the well-preserved, rich natural features in common with Minami-iwoto Island. It formed in a different formation process from the Ogasawara Archipelago. The fauna and flora also followed a different process of speciation. These features make the island scientifically valuable. | 558 |
| | Total | 4,934 |

**(B) Class I Special Zones**

The following areas shall be designated as Class I Special Zones.

(Table 7: List of Class I Special Zones)

| Name | Overview of the area | Area (ha) |
|---|---|---|
| Chichijima Eboshi-iwa | Eboshi-iwa is an islet off the northernmost point of Chichijima. Its outcrops of boninite make this islet important from a geological perspective. | 3 |
| Chichijima Byobudani, Asahiyama, and Yoakeyama | From the summit of Asahiyama to its foot, there are steep escarpments with oddly-shaped rocks, waterfalls and other notable features. In addition, it is the area with the second largest amount of well-preserved sclerophyllous scrub forest (Distylio-Pouterietum dubiae on Chichijima next to Higashidaira. The shoreline in the southern part of this area is adjacent to Sakaiura, which is a scenic spot. On the shore there is a sandy beach and a seaside forest of *Hernandia nymphaeifolia* and *Calophyllum inophyllum*. | 216 |
| Chichijima Otaki and the Higashikaigan | This area is one part of the eastern coast. It has forests of *Schima mertensiana* of the kind unique to Ogasawara, which are in relatively good condition. This area is also important as a habitat for various rare species of flora and fauna endemic to Ogasawara. | 19 |
| Chichijima Shigureyama | In addition to secondary forests of *Schima mertensiana*, there is sclerophyllous scrub forest (Distylio-Pouterietum dubiae and Wikstroemio-Pouterietum dubiae.<br><br>The latter occurs on Chichijima after disruption by human activity, but the communities in this area are one of the few typical examples that developed naturally. This area is also important as a habitat for various endemic species of fauna and flora. | 52 |
| Chichijima Kominato, Takayama, and Minamifukurozawa | The Kominato shore area in the north of the island is located at the mouth of the Yatsuse River, Ogasawara's only river. The area forms a distinctive riparian environment that nurtures *Hibiscus tiliaceus* community, as well as *Eriocheir ogasawaraensis*, and others. The largest sandy beach on Chichijima is located here, where there is also a developed seaside forest. Throughout the Takayama and Tsuitateyama area there live endemic land snails whose populations are decreasing on Chichijima. These areas, in addition to Minamifukurozawa, are home to many rare species of insects. Such features make these areas important for the conservation of biodiversity. | 205 |

| Name | Overview of the area | Area (ha) |
|---|---|---|
| Hahajima<br>Nagahama Beach | This area is part of the steep escarpment and hill area of Hahajima's western coast. The vegetation includes natural forests that are unique to Hahajima. They consist of Machilio boninensisi-Ardisietum sieboldii, subass. of *Schima mertensiana*, which is important from a conservation standpoint, as well as *Ardisia sieboldii* forests (Machilio boninensisi-Ardisietum sieboldii, typical subass., typical variant), which is common on Hahajima. It forms a contiguous region together with Hahajima's rocky coast formation and the primitive Sekimon locality and serves as a corridor for endemic species linking Sekimon and Nishidai. It is inhabited by many species of rare insects endemic to Ogasawara. As a habitat for fauna and flora endemic to Ogasawara, it is one of the most important areas. | 167 |
| Hahajima<br>Igumadani | Facing Iguma Bay, Igumadani offers a dynamic view of sea cliffs. Most of the vegetation consists of *Ardisia sieboldii* forest. There is alien species intrusion in part of a collapse, but the area is important as a habitat for rare insects. | 21 |
| Hahajima<br>Shin-yuhigaoka | This area is a part of a forest that begins in Hahajima's hill area. It is mostly covered by natural forest of Machilio boninensisi-Ardisietum sieboldii, subass. of *Schima mertensiana*. It is home to many species of rare insects endemic to the Ogasawara Islands. As a habitat for fauna and flora endemic to Ogasawara, it is one of the most important areas. | 26 |
| Hahajima<br>Funamidai and Komoridani | This is a hilly area in the center of Hahajima . It is mostly covered by natural forest of Machilio boninensisi-Ardisietum sieboldii, subass. of *Schima mertensiana*.<br><br>This natural forest, which is contiguous with Hahajima's hill area, is in good condition, and is an important habitat for animals endemic to Ogasawara. | 35 |
| Hahajima<br>Okimura Village and Okiko Port | Sea cliffs running north to south in the Okiko Port offer an excellent view of a seashore landscape. This north-south seashore landscape blends together with Chibusayama and other features to form an attractive scenic view. | 15 |

| Name | Overview of the area | Area (ha) |
|---|---|---|
| Hahajima Funakiyama and Minamizaki | This area has sea cliffs, a small bay, and a beach that together create seashore scenery. The inland area is covered by natural forests of Liyistonia chinensis var. boninensis-Pandanus boninensis and Wikstroemio-Pouterietum dubiae, both of which are unique to Hahajima. There also are communities of casaurinas.<br><br>Evidence of impact by humans can be seen in some places. Although most of Hahajima is moist, this area is dry, which has led to the creation of a unique ecosystem here. Land snails in this area are diverse. It is an important habitat for animals endemic to Ogasawara. | 190 |
| | Total | 949 |

**(C) Class II Special Zone**

The following areas shall be designated as Class II Special Zones.

(Table 8: Summary of Class II Special Zones)

| Name of prefecture | Areas | Area (ha) |
|---|---|---|
| Tokyo | Within Ogasawara Village:<br>National Forest Division, Ogasawara General Office Unit 13, 16, 19-23, and 27-29<br><br>Ogasawara Village:<br>Otaki, Oneyama, the Kita-fukurozawa River, Kuwanokiyama, Shigureyama, Nishimachi, Funamiyama, Mikazukiyama, the Minami-fukurozawa River, Miyanohama, and Miyanohamamichi areas on Chichijima.<br>Igumadani, Otani, Nagahama Beach, Nishiura, Higashidai, Funakiyama, and Motochi areas on Hahajima.<br><br>All waterfronts, islets, and reefs that are adjacent to the areas listed above. | 534 |
| Total | | 534 |

**(D) Class III Special Zone**

The following areas shall be designated as Class III Special Zones.

(Table 10: Summary of Class III Special Zones)

| Name of prefecture | Areas | Area (ha) |
|---|---|---|
| Tokyo | Within Ogasawara Village:<br>National Forest Division, Ogasawara General Office Unit 13, 14, 18, 19, and 24<br><br>Ogasawara Village:<br>Asahiyama, Kuwanokiyama, and Sakaiura areas on Chichijima.<br>Koshinzuka area on Hahajima.<br><br>All waterfronts, islets, and reefs that are adjacent to the areas listed above. | 194 |
| Total | | 194 |

B. Marine Park Zones

The following areas shall be designated as Marine Park Zones.

(Table 12: List of Marine Park Zones)

| No. | Name | Overview of the area | Area (ha) |
|---|---|---|---|
| 1 | Hyotan Island | Comprises the marine areas off Hyotan, Nekoiwa, and Meganejima Islands. There are coral communities, and it not only serves as a good environment for rare marine life, it also offers an excellent underwater seascape. | 24.0 |
| 2 | Hitomaru Island | Comprises the marine areas off Hitomarujima and Anijima Islands, as well as Sujiiwa Cape There are coral communities, and it not only serves as a good environment for rare marine life, it also offers an excellent underwater seascape. | 16.7 |
| 3 | Anijima | Comprises the marine areas off Anijima's Cabbage Beach and Mansaku Shore. There are coral communities, and it not only serves as a good environment for rare marine life, it also offers an excellent underwater seascape. | 26.9 |
| 4 | Chichijima Miyanohama and Tsurihama Beach | Comprises the marine areas off Chichijima's Miyanohama, Jumonji, and Tsurihama Beach. There are coral communities, and it not only serves as a good environment for rare marine life, it also offers an excellent underwater seascape. | 38.9 |

| No. | Name | Overview of the area | Area (ha) |
|---|---|---|---|
| 5 | Chichijima Seihyo Shore | Comprises the marine areas around the entrance to Chichijima's Futami Bay. There is Ogasawara's (and thought to be Japan's) largest single community of branching corals , and therefore is home to a very rare community. | 2.9 |
| 6 | Chichijima Tatsumi Bay (Naka Shore) | Comprises the marine areas off the Naka Shore off Chichijima's Tatsumi Bay. These waters have the highest rate of coverage by coral communities in Chichijima. The coral *Galaxea fascicularis* is dominant, and the area has a diverse range of species. | 2.0 |
| 7 | Chichijima Tatsumi Bay (Kujirazaki) | Comprises the marine areas off Kujirazaki at Chichijima's Tatsumi Bay. These waters have one of the highest rates of coverage by coral communities in Chichijima, and the area has a diverse range of species. | 6.1 |
| 8 | Chichijima Tatsumi Bay (Nishikaigan) | Comprises the marine areas off the Nishikaigan off Chichijima's Tatsumi Bay. It has a high rate of coverage by coral communities. There is a lot of soft coral, and the area has a diverse range of species. | 6.3 |
| 9 | Minamijima | Comprises the marine areas off Chichijima's Minamizaki and Minamijima. The area consists of a submerged karst landform and offers an excellent underwater seascape. (Former name: Ogasawara Marine Park Zone No. 5). | 245.3 |
| 10 | Hahajima Yashihama Beach | Comprises the marine areas off Hahajima's Yashihama, Kirihama, and Sekimonzaki. This area is one of the few spots in Ogasawara where communities of tabulate corals are found. | 85.2 |
| 11 | Hahajima Wintro | Comprises the marine areas off the southern side Hahajima's Higashiko. This area is one of the few spots in Ogasawara table corals are found. | 157.1 |
| 12 | Hahajima Miyukinohama Beach | Comprises the marine areas off Hahajima's Miyukinohama Beach. There are coral communities, and it not only serves as a good environment for rare marine life, it also offers an excellent underwater seascape. | 41.3 |
| 13 | Mukohjima Island Higashikaigan | Comprises the waters off Mukohjima's Higashikaigan. In this area can see coral communities of *Pavona* duerdeni. | 47.5 |
| 14 | Hirajima | Comprises the marine areas off Hirajima's Kitakaigan. There are coral communities, and it not only serves as a good environment for rare marine life, it also offers an excellent underwater seascape. | 79.2 |
| | | Total | 779.5 |

C. Ordinary Zones

Ordinary Zones shall consist of the following areas.

（Table 13: Table of ordinary zones）

| **Name of prefecture** | **Areas** | **Area (ha)** |
|---|---|---|
| Tokyo | Within Ogasawara Village:<br>National Forest Division, Ogasawara General Office, Unit 23 and 24<br><br>Ogasawara Village:<br>Koshinzuka, Koromodate, and Higashidai areas on Hirajima. | 18 |
| Water surfaces adjacent to land areas of the park | | |
| Total | | 18 |

D. Breakdown of area (dimensions)

(A) Area by zone type and by ownership status

(Table 12: Summary of area by zone type and by ownership status)

| **Region category** | | **Special Zone** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Land type category** | | **Special Protection Zone** | | | **Class I** | | | **Class II** | | |
| Ownership status | | National | Public | Private | National | Public | Private | National | Public | Private |
| Total | Area by ownership status | 4,123 | 156 | 655 | 795 | 76 | 78 | 346 | 35 | 153 |
| | Area by Land type category (Ratio) | | | 4,934 (74.4) | | | 949 (14.3) | | | 534 (8.1) |
| | Area by region category (Ratio) | | | | | | | | | |
| | Area by region (Ratio) | | | 4,934 (74.4) | | | | | | |

(Units: ha for area; % for ratio)

| **Special Zone** | | | **Ordinary Zone (land)** | | | **Total (land)** | | | **Marine Park Zone** |
|---|---|---|---|---|---|---|---|---|---|
| **Class III** | | | | | | | | | |
| National | Public | Private | National | Public | Private | National | Public | Private | |
| 137 | 15 | 42 | 3 | 9 | 6 | 5,404 | 291 | 934 | |
| | | 194 (2.9) | | | | | | | |
| | | 1,677 (25.3) | | | | | | | |
| | | 1,677 (25.3) | | | 18 (0.3) | | | 6,629 (100.0) | 14 zones 779.6 |

## *3. Facility plan*

### (1) Conservation facility plan

Conservation facilities shall be as follows.

(Table 14: Conservation facilities)

| No. | Type | Location | Construction policy |
|---|---|---|---|
| 1 | Nature restoration facility | Ogasawara Village, Tokyo (Mukojima Island Group) | To construct facilities for conserving and restoring the natural environment of Mukojima., the islands in its group, and the surrounding marine areas (vegetation restoration after the removal of feral goats, improvements to breeding grounds of sea birds, environment improvements for breeding of insects, etc.). |
| 2 | Nature restoration facility | Ogasawara Village, Tokyo (Chichijima Island Group) | To mitigate the impact of invasive alien species such as the green anole, feral goats, the black rat, casaurinas, *Bischofia*, etc. by removing them and constructing facilities such as fences to prevent their intrusion in order to conserve and rehabilitate degraded endemic ecosystems on Chichijima, Anijima, Otojima, other islands belonging to the group, and the surrounding marine areas. |
| 3 | Nature restoration facility | Ogasawara Village, Tokyo (Hahajima Island Group) | To mitigate the impact of invasive alien species such as the green anole, the black rat, feral goats, *Bischofia*, etc. by constructing facilities such as fences to prevent their intrusion in order to conserve and rehabilitate degraded endemic ecosystems on Hahajima, other islands belonging to the group, and the surrounding marine areas. |
| 4 | Nature restoration facility | Ogasawara Village, Tokyo (Nishinoshima) | To construct facilities for conserving and restoring the natural environment of Nishinoshima and surrounding areas (environment improvements for breeding of sea birds, etc.). |
| 5 | Nature restoration facility | Ogasawara Village, Tokyo (Kazan Island Group) | To construct facilities for conserving and restoring the natural environment of Kita-iwoto and the surrounding marine areas (environment improvements for breeding of *Columba janthina nitens*, the Bonin flying fox [*Pteropus pselaphon*], etc.). |

## (2) Utilization facility plan

### A. Individual facilities

Individual facilities shall be as follows.

(Table 15: Individual facilities)

| No. | Type | Location | Construction policy |
|---|---|---|---|
| 1 | Recreation area | Chichijima, Ogasawara Village, Tokyo (Miyanohama) | To create a recreation area for resting, bathing, and snorkeling. |
| 2 | Recreation area | Chichijima, Ogasawara Village, Tokyo (Mikazukiyama) | To create a recreation area for look out from the weather station and for getting information about natural features. |
| 3 | Lodging | Chichijima, Ogasawara Village, Tokyo (Okumura) | To construct a small lodging facility to be used as center from which to look out upon Futami Port, and from which to get to trails and recreation areas within walking distance (as the scale of the park expands, the facility may be expanded depending on the circumstances). |
| 4 | Recreation area | Chichijima, Ogasawara Village, Tokyo (Asahiyama) | To create a recreation area for getting information about natural features. |
| 5 | Recreation area | Chichijima, Ogasawara Village, Tokyo (Sakaiura) | To create a recreation area for resting and snorkeling. |
| 6 | Recreation area | Chichijima, Ogasawara Village, Tokyo (Hatsuneura) | To create a recreation area for resting and getting information about natural features. |
| 7 | Recreation area | Chichijima, Ogasawara Village, Tokyo (Chuosan) | To create a recreation area for taking in the view from Chuosan and getting information about natural features. |
| 8 | Recreation area | Chichijima, Ogasawara Village, Tokyo (Kopepe) | To create a recreation area for taking breaks (as it is the starting/ending point of trails), resting, bathing, snorkeling and getting information about natural features. |
| 9 | Recreation area | Chichijima, Ogasawara Village, Tokyo (Kominato) | To create a recreation area for resting, taking walks, bathing, and snorkeling. |
| 10 | Recreation area | Chichijima, Ogasawara Village, Tokyo (Chichijima Minamizaki) | To create a recreation area for resting and getting information about natural features. |
| 11 | Recreation area | Hahajima, Ogasawara Village, Tokyo (Kitamura) | To create a recreation area for taking breaks (as it is the starting/ending point of trails), resting, resting, bathing, and snorkeling. |

| No. | Type | Location | Construction policy |
|---|---|---|---|
| 12 | Recreation area | Hahajima, Ogasawara Village, Tokyo (Koshinzuka) | To create a recreation area for taking in the view of the Higashiko/Sekimon area and exploring nature. |
| 13 | Recreation area | Hahajima, Ogasawara Village, Tokyo (Tamagawa Dam) | To create a recreation area and paths for exploring nature around the waterfall area of Funakiyama. |
| 14 | Recreation area | Hahajima, Ogasawara Village, Tokyo (Funakiyama) | To create a recreation area for taking walks, resting, and taking in the view. |
| 15 | Recreation area | Hahajima, Ogasawara Village, Tokyo (Samegasaki) | To create a recreation area for taking walks and taking in the view. |
| 16 | Recreation area | Hahajima, Ogasawara Village, Tokyo (Miyukinohama Beach) | To create a recreation area for resting, snorkeling, and getting information about natural features. |
| 17 | Recreation area | Hahajima, Ogasawara Village, Tokyo (Hahajima Minamizaki) | To create a recreation area for resting, getting information about natural features of the Minamizaki waterfront area, and snorkeling. |

**B. Routes**

(A) Roads

Roads shall be as follows.

(Table 16: Routes [roads])

| No. | Route name | Origin and terminal | Major places passed | Construction policy |
|---|---|---|---|---|
| 1 | Miyanohama Road | Origin — Chichijima, Ogasawara Village, Tokyo (Miyanohama Road, National Park boundary) Terminal — Chichijima, Ogasawara Village, Tokyo (Miyanohama) | | To construct a road to the Miyanohama Recreation Area. |

| No. | Route name | Origin and terminal | Major places passed | Construction policy |
|---|---|---|---|---|
| 2 | Mikazukiyama Road | Origin — Chichijima, Ogasawara Village, Tokyo (Oneyama, National Park boundary)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Nishimachi) | | To construct a road to the Mikazukiyama Recreation Area. |
| 3 | Chichijima Beltway | Origin — Chichijima, Ogasawara Village, Tokyo (Byobudani, National Park boundary)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Sakaiura, National Park boundary)<br>Origin — Chichijima, Ogasawara Village, Tokyo (Okumura, National Park boundary)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Nagatani, National Park boundary)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Shigureyama) | Sakaiura<br>Yoakeyama<br>Kuwanokiyama | To construct a road leading to various visitor sites on Chichijima. |
| 4 | Kominato Road | Origin — Chichijima, Ogasawara Village, Tokyo (Kitafukurozawa, National Park boundary)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Kominato) | | To construct a road to the Kominato Recreation Area. |
| 5 | Hahajima North Road | Origin — Hahajima, Ogasawara Village, Tokyo (Komoridani, National Park boundary)<br>Terminal — Hahajima, Ogasawara Village, Tokyo (Kitamura) | | To construct a road leading to various visitor sites in the north of Hahajima. |

| No. | Route name | Origin and terminal | Major places passed | Construction policy |
|---|---|---|---|---|
| 6 | Hahajima South Road | Origin — Hahajima, Ogasawara Village, Tokyo (Minamizaki, National Park boundary)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Minamizaki) | | To construct a road leading to the Minamizaki area. |

(B)Trails

Trails shall be as follows

(Table 17: Routes [trails])

| No. | Route name | Origin and terminal | Major places passed | Construction policy |
|---|---|---|---|---|
| 1 | Mikazukiyama Trail | Origin — Chichijima, Ogasawara Village, Tokyo (Mikazukiyama, end of the road)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Miyanohama-michi National Park boundary) | Mikazukiyama | To build a scenic trail from Mikazuki yama to Miyanohama. |
| 2 | Denshinyama Trail | Origin — Chichijima, Ogasawara Village, Tokyo (Miyanohama)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Asahiyama, road junction) | Denshinyama Tsurihama Beach | To build a scenic trail that starts at Miyanohama, passes Denshinyama, and leads to the observation deck at Nagasaki. |
| 3 | Asahiyama Trail | Origin — Chichijima, Ogasawara Village, Tokyo (Asahiyama, fork in the road)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Asahiyama)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Nyutosan) | | To build a trail up Asahiyama. |

| No. | Route name | Origin and terminal | Major places passed | Construction policy |
|---|---|---|---|---|
| 4 | Hatsuneura Trail | Origin — Chichijima, Ogasawara Village, Tokyo (Kuwanokiyama, fork in the road)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Hatsuneura) | | To build a scenic trail to Hatsuneura. |
| 5 | Ogiura Trail | Origin — Chichijima, Ogasawara Village, Tokyo (Ogiura, National Park boundary)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Fukiwariyama, road junction) | Fukiwariyama | To build a scenic trail from Ogiura to Fukiwariyama |
| 6 | Chichijima Shore Trail | Origin — Chichijima, Ogasawara Village, Tokyo (Kopepe)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (John Beach)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Southern foot of Takayama)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Southern foot of Takayama, trail junction) | Kominato Nakayama Pass Takayama | To build a scenic trail that starts at Kopepe Beach, goes over the Nakayama Pass and past Takayama, and leads to John Beach. |
| 7 | Tsutsujiyama Southern Foot Trail | Origin — Chichijima, Ogasawara Village, Tokyo (Kitafukurozawa, National Park boundary)<br>Terminal — Chichijima, Ogasawara Village, Tokyo (Tatsumidani) | Tokoyo Falls | To build a trail that goes up to Tatsumidani via Tokoyo Falls. |
| 8 | Nishidai Trail | Origin — Hahajima, Ogasawara Village, Tokyo (Kitako, fork in the road)<br>Terminal — Hahajima, Ogasawara Village, Tokyo (Inuizaki) | Osawa Coast | To build a scenic trail that goes from Kitamura to Osawa Coast, and continues on to Nishidai. |

| No. | Route name | Origin and terminal | Major places passed | Construction policy |
|---|---|---|---|---|
| 9 | Higashiyama Trail | Origin — Hahajima, Ogasawara Village, Tokyo (Higashiko, fork in the road)<br>Terminal — Hahajima, Ogasawara Village, Tokyo (Kitamura, road junction)<br>Terminal — Hahajima, Ogasawara Village, Tokyo (Gagyukaku) | Higashiyama | To build a scenic trail that goes up Higashiyama from Kitamura, then returns to Kitamura, and continues further to Gagyukaku. |
| 10 | Sekimon Trail | Origin — Hahajima, Ogasawara Village, Tokyo (Igumadani, fork in the road)<br>Terminal — Hahajima, Ogasawara Village, Tokyo (Sekimon)<br>Terminal — Hahajima, Ogasawara Village, Tokyo (Sekimon, trail junction) | Sakaigatake | To build a trail for trekking to Sekimon. |
| 11 | Hahajima Ridge Trail | Origin — Hahajima, Ogasawara Village, Tokyo (Motochi, National Park boundary)<br>Terminal — Hahajima, Ogasawara Village, Tokyo (Sakaigatake, trail junction)<br>Terminal — Hahajima, Ogasawara Village, Tokyo (Motochi, National Park boundary) | Chibusayama | To build a trail that circles Chibusayama and travels along the ridge from Chibusayama to Sakaigatake |
| 12 | Minamizaki Trail | Origin — Hahajima, Ogasawara Village, Tokyo (Motochi, National Park boundary)<br>Terminal — Hahajima, Ogasawara Village, Tokyo (Kofuji) | Miyukinohama Beach<br>Minamizaki | To build a scenic trail that goes to various shores from Okiko Port to Minamizaki and then on to Kofuji. |

**C. Transport facilities**

Transport facilities shall be as follows.

(Table 18: Transport facilities)

| No. | Type | Location | Construction policy |
|---|---|---|---|
| 1 | Mooring facilities | Anijima, Ogasawara Village, Tokyo (Anijima Seto) | To install simple mooring buoys in the Marine Park Zone in order to protect coral and underwater topographical features. |
| 2 | Mooring facilities | Chichijima, Ogasawara Village, Tokyo (Miyanohama) | To installssimple mooring buoys in the Marine Park Zone in order to protect coral and underwater topographical features. |
| 3 | Mooring facilities | Chichijima, Ogasawara Village, Tokyo (Hatsuneura) | To installssimple mooring buoys in the Marine Park Zone in order to protect coral and underwater topographical features. |
| 4 | Mooring facilities | Chichijima, Ogasawara Village, Tokyo (Kominato) | To installssimple mooring buoys in the Marine Park Zone in order to protect coral and underwater topographical features. |
| 5 | Mooring facilities | Chichijima, Ogasawara Village, Tokyo (Tatsumi Bay) | To installssimple mooring buoys in the Marine Park Zone in order to protect coral and underwater topographical features. |
| 6 | Mooring facilities | Minamijima, Ogasawara Village, Tokyo (Minamijima) | To installssimple mooring facilities to protect limestone formations on the shores and seabed, and to ensure the safety of visitors landing on the island. |
| 7 | Mooring facilities | Hahajima, Ogasawara Village, Tokyo (Higashiko) | To installssimple mooring buoys in the Marine Park Zone in order to protect coral and underwater topographical features. |
| 8 | Mooring facilities | Hahajima, Ogasawara Village, Tokyo (Wentro) | To installssimple mooring buoys in the Marine Park Zone in order to protect coral and underwater topographical features. |
| 9 | Mooring facilities | Hahajima, Ogasawara Village, Tokyo (Miyukinohama Beach) | To installssimple mooring buoys in the Marine Park Zone in order to protect coral and underwater topographical features. |
| 10 | Mooring facilities | Mukohjima, Ogasawara Village, Tokyo (Mukohjima) | To installssimple mooring buoys in the Marine Park Zone in order to protect coral and underwater topographical features. |
| 11 | Mooring facilities | Hirajima, Ogasawara Village, Tokyo (Hirajima) | To installs simple mooring buoys in the Marine Park Zone in order to protect coral and underwater topographical features. |

# *4. Notes*

## (1) Designated plants and animals

### A. Special Zones

(A) Designated plants

Plants to be protected from collection or damage in the Special Zones are as follows.

（Table 19: Designated plants）

| Family name | Species name |
|---|---|
| Psilotaceae | *Psilotum nudum* |
| Lycopodiaceae | *Lycopodium cernuum* |
| | *Lycopodium hamiltonii* |
| Selaginellaceae | *Selaginella boninensis* |
| | *Selaginella tamariscina* |
| Ophioglossaceae | *Ophioglossum pendulum* |
| Marattiaceae | *Angiopteris boninensis* |
| | *Marattia tuyamae* |
| | *Marattia boninensis* |
| | *Schizaea digitata* |
| Hymenophyllaceae | *Cephalomanes boninense* |
| | *Crepidomanes acuto-obtusum* |
| | *Crepidomanes minutum* |
| | *Trichomanes tahitense* |
| Pteridaceae | *Adiantum ogasawarense* |
| | *Pteris boninensis* |
| Davalliaceae | *Pachypleuria trifoliata* |
| | *Nephrolepis hirsutula* |
| Cyatheaceae | *Cyathea mertensiana* |
| | *Cyathea ogurae* |
| | *Cyathea spinulosa* |
| Dryopteridaceae | *Bolbitis quoyana* |
| | *Ctenitis lepigera* |
| | *Ctenitis microlepigera* |
| | *Diplazium longicarpum* |
| | *Deparia bonincola* |
| | *Dryopteris insularis* |
| | *Lomariopteris boninensis* |
| | *Thelypteris boninensis* |
| | *Thelypteris ogasawarensis* |

| Family name | Species name |
|---|---|
| Aspleniaceae | *Hymenasplenium excisum* |
| | *Hymenasplenium cardiophyllum* |
| | *Asplenium micantifrons* |
| | *Asplenium nidus* |
| | *Asplenium polyodon* |
| Polypodiaceae | *Grammitis tuyamae* |
| | *Loxogramme boninensis* |
| | *Microsorum fortunei* |
| | *Microsorum superficiale* |
| | *Microsorum scolopendria* |
| | *Lepisorus boninensis* |
| | *Loxogramme boninensis* |
| Urticaceae | *Boehmeria boninensis* |
| | *Procris boninensis* |
| Santalaceae | *Santalum boninense* |
| Portulacaceae | *Portulaca boninensis* |
| Piperaceae | *Peperomia boninsimensis* |
| | *Piper postelsianum* |
| Crassulaceae | *Sedum uniflorum* subsp. *boninense* |
| Pittosporaceae | *Pittosporum parvifolium* var. *beecheyi* |
| | *Pittosporum boninense* |
| | *Pittosporum boninense* var. *chichijimense* |
| | *Pittosporum parvifolium* |
| Rosaceae | *Osteomeles schwerinae* |
| | *Osteomeles lanata* |
| | *Photinia wrightiana* |
| Euphorbiaceae | *Claoxylon centinarium* |
| | *Drypetes integerrima* |
| Rutaceae | *Melicope nishimurae* |
| | *Zanthoxylum ailanthoides* var. *boninshimae* |
| | *Zanthoxylum beecheyanum* |
| Celastraceae | *Euonymus boninensis* |
| Thymelaeaceae | *Wikstroemia pseudoretusa* |
| Elaeagnaceae | *Elaeagnus rotundata* |
| Stachyuraceae | *Stachyurus praecox* var. *macrocarpus* |
| Myrtaceae | *Meterosideros boninensis* |
| | *Syzygium cleyerifolium* |
| Melastomataceae | *Melastoma tetramerum* |
| Araliaceae | *Fatsia oligocarpella* |
| Ericaceae | *Rhododendron boninense* |

| Family name | Species name |
|---|---|
| Myrsinaceae | *Myrsine maximowiczii* |
| Primulaceae | *Lysimachia mauritiana* var. *rubida* |
| Sapotaceae | *Planchonella boninensis* |
| | *Planchonella obovata* var. *dubia* |
| Symplocaceae | *Symplocos boninensis* |
| | *Symplocos kawakamii* |
| | *Symplocos pergracilis* |
| Apocynaceae | *Neisosperma nakaianum* |
| Rubiaceae | *Gardenia boninensis* |
| | *Hedyotis grayi* |
| | *Hedyotis mexicana* |
| | *Hedyotis pachyphylla* |
| | *Morinda umbellata* subsp. *boninensis* |
| | *Psychotria boninensis* |
| | *Psychotria homalosperma* |
| | *Tarenna subsessilis* |
| Convolvulaceae | *Evolvulus alsinoides* |
| Boraginaceae | *Argusia argentea* |
| Verbenaceae | *Callicarpa glabra* |
| | *Callicarpa parvifolia* |
| | *Callicarpa subpubescens* |
| Labiatae | *Ajuga boninsimae* |
| | *Scutellaria longituba* |
| Solanaceae | *Lycianthes boninensis* |
| | *Lycium sandwicense* |
| | *Tubocapsicum boninense* |
| Orobanchaceae | *Orobanche boninsimae* |
| Myoporaceae | *Myoporum boninense* |
| Campanulaceae | *Lobelia boninensis* |
| Compositae | *Cirsium boninense* |
| | *Cirsium toyoshimae* |
| | *Crepidiastrum ameristophyllum* |
| | *Crepidiastrum grandicollum* |
| | *Crepidiastrum linguifolium* |
| | *Dendrocacalia crepidifolia* |
| | *Ixeris longirostra* |
| Triuridaceae | *Sciaphila tosaensis* |
| | *Sciaphila okabeana* |
| Palmae | *Clinostigma savoryanum* |

| **Family name** | **Species name** |
|---|---|
| Cyperaceae | *Carex toyoshimae* |
| | *Fimbristylis longispica* var. *boninensis* |
| | *Fimbristylis longispica* var. *hahajimensis* |
| | *Machaerina glomerata* |
| | *Machaerina rubiginosa* |
| | *Rhynchospora boninensis* |
| | *Rhynchospora chinensis* var. *curvoaristata* |
| Zingiberaceae | *Alpinia boninsimensis* |
| Orchidaceae | *Calanthe triplicata* |
| | *Calanthe hattorii* |
| | *Bulbophyllum boninense* |
| | *Corymborkis subdensa* |
| | *Eulophia toyoshimae* |
| | *Gastrodia boninensis* |
| | *Goodyera augustinii* |
| | *Goodyera procera* |
| | *Liparis hostifolia* |
| | *Luisia boninensis* |
| | *Malaxis boninensis* |
| | *Platanthera boninensis* |
| | *Zeuxine boninensis* |
| | *Goodyera boninensis* |
| The added species are listed below | |
| Lindsaeaceae | *Lindsaea repanda* |
| Woodsiaceae | *Diplazium subtripinnatum* |
| Polypodiaceae | *Leptochilus decurrens* |
| Cupressaceae | *Juniperus taxifolia* |
| Moraceae | *Ficus boninsimae* |
| | *Ficus iidaiana* |
| | *Ficus nishimurae* |
| | *Morus boninensis* |
| Lauraceae | *Machilus pseudokobu* |
| Ranunculaceae | *Clematis terniflora* var. *boninensis* |
| Theaceae | *Eurya japonica* subsp. *palauensis* |
| Rosaceae | *Rubus nakaii* |
| Euphorbiaceae | *Chamaesyce hirta* var. *glaberrima* |
| Rutaceae | *Boninia glabra* |
| | *Boninia grisea* var. *crassifolia* |
| Aquifoliaceae | *Ilex mertensii* var. *beecheyi* |
| | *Ilex matanoana* |

| Family name | Species name |
|---|---|
| Elaeocarpaceae | *Elaeocarpus photiniaefolius* |
| Cucurbitaceae | *Trichosanthes ovigera* var. *boninensis* |
| Melastomataceae | *Melastoma tetramerum* var. *pentapetalum* |
| Umbelliferae | *Angelica japonica* var. *boninensis* |
| Ericaceae | *Vaccinium boninense* |
| Loganiaceae | *Geniostoma glabrum* |
| Rubiaceae | *Morinda umbellata* subsp. *boninensis* var. *hahajimensis* |
| Caprifoliaceae | *Viburnum japonicum* var. *boninsimense* |
| Gramineae | *Aristida cumingiana* |
| | *Digitaria platycarpha* |
| | *Ischaemum ischaemoides* |
| | *Paspalidium distans* |
| Orchidaceae | *Calanthe hoshii* |
| | *Malaxis hahajimensis* |

(B) Designated animals

Animals to be protected from capture, harm, killing, collection or damage in the Special Zones are as follows.

（Table 20: Designated animals）

| Family name | Speices name |
|---|---|
| Lestidae | *Indolestes boninensis* |
| Corduliidae | *Hemicordulia ogasawarensis* |

**B. Marine Park Zones**

Plants and animals to be protected from capture, harm, killing, collection or damage in the Marine Park Zones are as follows.

（Table 21: Animals and plants to be protected from capture）

| |
|---|
| Fistulariidae, Syngnathidae, Aulostomidae, Holocentridae, Mullidae, Apogonidae, *Pseudanthias squamipinnis*, *Grammistes sexlineatus*, *Pseudanthias taira*, Pomacentridae, Labridae (excluding *Semicossyphus reticulates* and *Choerodon azurio*), Scaridae, Microcanthidae, Chaetodontidae, Zanclidae, Balistidae, *Acanthurus lineatus*, *Acanthurus mata*, *Acanthurus olivaceus*, *Naso lituratus*, *Paracanthurus hepatus*, *Zebrasoma scopas*, *Zebrasoma veliferum*, *Paraluteres prionurus*, Aracanidae, Ostraciidae, Tetraodontidae, *Diodon holocanthus*, Scorpaenidae, Antennariidae, Cirrhitidae, Blenniidae, |

Eleotridae, Gobiidae, Ophichthidae, Muraenidae, *Millepora platyphylla*, *Tubipora musica*, *Xenia hicksoni*, *Melithaea flabellifera*, *Nephtheida*e, *Alcyoniidae*, *Acanthogorgiidae*, *Pocillop*oridae, Acroporidae, Agariciidae, Siderastreidae, Pectiniidae, Fungiidae, Poritidae, Faviidae, Merulinidae, Mussidae, Oculinidae, Caryophylliidae, Dendrophylliidae, *Stenopus hispidus*, *Hexabranchus lacera*, *Tridacna maxima*, *Lambis lambis*, *Lambis chiragra*, *Cypraea mauritiana*, *Cellana mazatlandica*, *Charonia tritonis*, *Saccostrea mordax*, *Octopus*, *Asteropsis carinifera*, *Linckia laevigata*, *Coscinasterias acutispina*, *Eucidaris metularia*, *Phyllacanthus imperialis*, *Diadema setosum*, *Echinometra mathaei*, *Colobocentrotus mertensii*, *Echinometra oblonga*, *Toxopneustes pileolus*, *Echinostrephus molaris*, *Heterocentrotus mammillatus*, *Holothuria*, Bryopsidaceae, *Dictyota*, *Dictyopteris*, *Padina minor*, *Tricleocarpa cylindrica*, *Ganonema farinosa*, *Ahnfeltiopsis concinna*, *Pterocladia densa*, *Laurencia yamadana*

Maps of Ogasawara National Park and the Park Plan are attached at the end of this document.

# *5-3. The Third Regional Administration and Management Plan (The Izu Islands Forest Planning Area)*

## *1. Basic Matters Related to the Administration and Management of National Forests*

**(1) Basic Policy on Administration of National Forests**

This plan was developed for 6,929 hectares of national forests which constitute 17 % of the whole Izu Islands forest planning area.

This planning area is composed of the Izu Islands and the Ogasawara Islands. The Izu Islands are volcanic islands that belong to the Fuji volcanic belt. The Ogasawara Islands are roughly divided into the Mukojima Island Group, Chichijima Island Group, Hahajima Island Group, and Iwo Island Group, all of which are non-volcanic islands except for the Iwo Island Group.

(snip)

As national forests in the Ogasawara Islands have rich forest ecosystems and endemic species, they will be designated as a forest ecosystem reserve except for the forests in Iwoto Is. and Minami-torishima Is.. The national forests in this area are also designated as Ogasawara National Park.

Thus, the national forests covered in this plan will be classified as a functional type "forest for human and nature coexistence" in a manner consistent with forest categories that are broken by public-forest functions under the regional plan for national forests.
The functional types are described in (2).

The national forests in this planning area are roughly divided into the Izu Islands located in the warm-temperate zone and the Ogasawara Islands in the subtropical zone.
The priorities in administration and management in each area are as follows:

(snip)

b) The Ogasawara Islands (1 to 39 forest compartments)

The Ogasawara Islands consist of 30-odd islands of various sizes that are roughly

divided into the Mukojima Island Group, Chichijima Island Group, Hahajima Island Group, and Iwo Island Group from north to south. National forests, most of which are designated as Ogasawara National Park, make up about 60 % of the total area of the Ogasawara Islands. Because the Ogasawara Islands are oceanic islands that have never been connected to continents in the past, there are forests with unique island ecosystems. Therefore, they will be administered as a forests for nature conservation type of the "forest for human and nature coexistence."

The national forests in Iwoto Is. and Minami-torishima Is. will be managed as sites for aviation station facilities and sites for communication facilities.

## (2) Matters Related to the Administration and Management Corresponding to Functional Types

(snip)

### a. Policies on Administration and Management and Other Matters Concerning "Forest for Human and Nature Coexistence"

Policies on the administration and management of "forests for human and nature coexistence" are described in the "Policies on forest administration and management."(Appendix)

"Forest for human and nature coexistence" is further divided into two categories of "nature maintenance type" and "forest space utilization type."

(a) Forests for nature conservation

Forests will be administered in principle by leaving them to their spontaneous transition, and in consideration of conservation of habitats and growing environments of wildlife. As for existing walking trails, guidance for appropriate utilization will be provided so as not to adversely affect the surrounding vegetation. At the same time, the trails will be repaired as necessary.

Forests that are consisting of primitive forest ecosystems, necessary for contributing to inhabitation and growth of wildlife with academic values, or necessary for preserving genetic resources are designated as protected forests.

(snip)

## *2. Matters Related to the Maintenance and Preservation of National Forests*

### (1) Matters Related to Patrol

**a. Forest Conservation Patrol for Forest Fire Prevention, etc.**

In the national forests of this planning area, many people enter forests throughout the year. Therefore, in order to conserve and manage rich natural environments that are common possessions of the nation, forest conservation patrol for preventing forest fires and illegal waste dumping will be strengthened in cooperation and collaboration with local residents, local authorities, volunteers, etc. At the same time, forest conservation and management including protection of precious wild plants and animals should be promoted by providing people who enter the forests with information and education on the importance of forest conservation.

(snip)

**c. Public Enlightenment on Manners of Entering Forest**

As the number of people entering national forests has been increasing year by year, there is concern about throwing of garbage and trampling of vegetation. Therefore, manners of entering forest will be widely disseminated in order to foster the sense to conserve nature such as taking garbage back home, in collaboration with local authorities, tourist associations, and volunteer groups for nature conservation, etc.

(snip)

### (3) Matters Related to the Forests that Requires Special Protection.

a) Protected forest

Protected forests are selected as national forests that are considered appropriate to be managed with a focus on contribution to maintenance of natural environments with primitive forest ecosystems, wildlife protection, genetic resource preservation, and development of the forestry operation and management technologies, in consideration of the inhabitation and growth conditions of wildlife and requests from local communities. Protected forests are divided into the following types according to the purposes of their designation: forest ecosystem reserve; forest for preserving genetic resources of forest organisms; forest for preserving genetic resources of forest trees; protected forest for plant communities; protected forest for habitats of specific animals; protected forest for specific geography; and hometown forests.

Many protected forests such as "Forest Ecosystem Reserve in the East Coast of Hahajima Is. in the Ogasawara Islands" have been designated in the national forest land of the Ogasawara Islands in order to protect precious forest ecosystems, etc. Furthermore, as will be appreciated from the fact that this area was selected as a candidate site of World Natural Heritage, there are growing calls for protection of

the forests that have globally precious endemic species of animals and plants.

Considering the above situation and aiming at integrally preserving unique ecosystems of the Ogasawara Islands, the existing protected forests will be reorganized and integrally designated as "Ogasawara Islands Forest Ecosystem Reserve" that includes most of national forests, so as to protect the forests more appropriately.

For the protection of precious endemic species of the Ogasawara Islands, taking countermeasures against alien species such as Bischofia (*Bischofia javanica*) and Casuarina (*Casuarina eguisetifolia*) has become an urgent issue. Thus, appropriate measures should also be taken in the national forests.
Conservation and management of protected forests will be conducted appropriately in maintaining coordination with academic experts, various organizations, related agencies, and local residents concerned.

| Type | Number of sites | Area (ha) |
|---|---|---|
| Forest ecosystem reserve | 1 | 5,580 |
| Total | 1 | 5,580 |

(snip)

**(4) Other Necessary Matters**

Forest ecosystems in the Ogasawara Islands will be used appropriately from a standpoint of forest ecosystem conservation, by gaining understanding and cooperation of related organizations, local residents, volunteers, NPOs, etc.

## *3. Matters Related to the Supply of Forest Products*

(snip)

**(2) Other Necessary Matters**

Though a very small amount of the main product is being supplied in this planning area, in the Ogasawara Islands there are needs for side products such as leaves of *Livistona chinensis* that are used as thatch for park facilities and other public facilities, leaves of *Pandanus boninensis* used for local crafts, and raw stones of Iwo Island to be quarried. These products will be continuously supplied so as to promote the regional development.

Utilization of harvested alien species such as Bischofia and Casuarina will also be examined.

(snip)

## *5. Matters Related to the Forest Maintenance through Public Participation*

**(1) Matters Related to the Forest Maintenance through Public Participation**

Countermeasures against an alien species, Bischofia , by volunteers have been taken in a part of the national forests in Hahajima Island in the Ogasawara Islands. In the future, comprehensive measures will be examined, including the forest maintenance in the whole Ogasawara Islands through public participation.

(snip)

# *(Appendix)*

# *Excerption from Policies on Forest Administration and Management (Izu Islands forest planning area)*

## *Section 2. Policy on Forest Administration and Management by Functional Types*

### II. Forests for Human and Nature Coexistence

#### 1. Forests for nature conservation

**a. Basic Concepts of Administration and management and Goals of Maintenance**

Aiming at creating forests with good natural environments and those suitable for the habitats of wildlife with academic values, the forests for nature conservation will be managed in order to maintain and from environments to be conserved, depending on the characteristics of forest ecosystems and wildlife that should be conserved.

**b. Methods of Forestry Operations**

Methods of forestry operations will be based on III. "Forestry Operations in Natural Regeneration Forests" of Section 3.( Section 3 is omitted)

**c. Cutting, Regeneration, and Tending of Forests**

Cutting, regeneration, and tending of forests will be conducted based on the following principle depending on the types of protected forests, with the exception of actions that are considered necessary for public-interest reasons including academic research, fire fighting in the forest, actions required for restoration after disasters such as large-scale collapse of forest land and landslides, and other actions pursuant to the provisions of laws and regulations.

(a) Forest Ecosystem Reserve

In principle, forest ecosystem reserves shall be untouched by humans.

Each forest ecosystem reserve should be treated according to the purpose of its designation.

-- Some lines omitted –

**d. Development and Maintenance of Facilities**

(a) Facilities, such as road networks necessary for the management for conserving the

natural environment, will be developed and maintained as necessary by giving due consideration so as not to aggravate the environment to be conserved.

(b) In the forests situated around the primitive natural forests that shall be preserved by leaving them to their spontaneous transition, facilities such as erosion control facilities for maintaining the forest function of conserving land will be developed and maintained as necessary.

(c) Signs will be established in protected forests as necessary.

**e. Conservation and Management**

(a) During forest patrol, special efforts should be made to grasp the inhabitation and growth conditions of precious wildlife and the surrounding environments.

(b) With respect to protected forests, continuous observation of long-term changes, patrol for preventing forest fires, spread of knowledge and education on the natural environment conservation, etc. will be conducted in cooperation with citizen volunteers as necessary.

**f. Others**

In the forests with legal restrictions such as protection forests, forestry operations shall be conducted appropriately within the limits of designated forestry operation requirements.

# *5-4. Conservation Management Plan for the Ogasawara Islands Forest Ecosystem Reserve*

## *Introduction*

Many wild ecosystems and precious wildlife habitats still remain in national forests. These precious forests are designated as ‘forest reserves' and managed in accordance with the changes in the natural environment and also in accordance with the intention for the designation, and as necessary, vegetation restoration measures are implemented or protective fences are installed in order to appropriately conserve and manage the precious natural environment.

The Ogasawara Islands have unique ecosystems established on their very small oceanic islands, but at the same time, degradation of particular ecosystems caused by an increase of alien species has been a serious issue and also, a decrease of vegetation due partly to its overuse has been an issue of concern.

For this reason, in March 2006, the Kanto Regional Forest Office established the Ogasawara Islands Forest Ecosystem Reserve Designation Committee, and based on the committee’s input, in April 2007, most of the national forests on the Ogasawara Islands were designated as forest ecosystem reserves. The Designation Committee also suggested establishment of a p ermanent committee focusing on conservation and management of these reserves, and in response to this, in May 2007, the Review Committee for Conservation Management of the Ogasawara Islands Forest Ecosystem Reserve was established.

Meanwhile, the Ogasawara Islands were listed on the tentative world heritage list in January 2007, and it is now necessary to address the issues that must be solved in order to have the Islands officially listed.

The natural environment of these Islands has been degrading due to human activities and the current important task is to implement a scientifically-based, systematic nature restoration program. Also, adjustment of the balance between conservation and use of the natural environment requires a consensus of those involved.

Under these circumstances, the conservation management plan was established as a comprehensive guideline for systematic implementation of nature conservation activities based on the inputs from the Review Committee, and this paper describes how national forest conservation and management should be carried out while taking the characteristics of the Ogasawara Islands into account.

(snip)

## *2. Basic Rules on Forest Ecosystem Conservation and Management*

The Ogasawara Islands forest ecosystem reserves have been designated, as a part of national forest conservation and management activities, for the purpose of bequeathing their unique forest ecosystems. These designated reserves are divided into 'Preservation Zones' and 'Conservation and Utilization Zones.' In Preservation Zones, forest will be untouched except for operations essential for conservation and rehabilitation. Conservation and Utilization Zones will be the buffer for Preservation Zones. The total area of Preservation Zones is 5,319 hectares and the total area of Conservation and Utilization Zones is 261 hectares.

### (1) Preservation Zones

Taking into account the size of forest ecosystems including typical biological communities and a range of endemic as well as rare species, the following areas have been selected as Preservation Zones for the purpose of achieving maintenance, restoration, and appropriate conservation of pristine forest ecosystems:

- Already designated forest reserves including the Ogasawara Hahajima Is. east coast forest ecosystem reserves
- Major and minor islands (areas unaffected by humans as they are uninhabited islands) excluding Chichijima Is. and Hahajima Is.
- Areas with strong influence on ecosystems (for land snails, important vegetation, and so on) unique to the Ogasawara Islands
- Priority areas for extermination of alien species and restoration of wild forest ecosystems.

#### 1)Forest Management

In Preservation Zones, forest will be left naturally to the forces of nature unless particular science-based operations are approved as being essential for conservation and restoration of biodiversity of endemic species and forest ecosystems. Note, however, the following actions can be taken notwithstanding the description above:

a. Actions that are approved as being necessary for academic, research, or public welfare reasons, such as monitoring and use of biological genetic resources

b. Other actions

(a) The following actions that are carried out as emergency measures:
Combating wildfires and implementation of restoration measures after disasters such as large-scale forest collapse and mudslides

(b) Installation of signs

(c) Maintenance and repair work for already-installed walkways

(d) Collection of leaves of *Livistona chinensis* and *Pandanus Boninensis* within the extent that it is necessary for regional development, it does not hinder their growth, and it has no adverse effects on their ecosystems

(e) Other actions that conform to relevant laws and ordinances

**2)Forest Use**

When entering Preservation Zones, individuals must use already-installed walkways, and also, as necessary, they must request those who have a certain level of knowledge about forest ecosystem conservation (guides with extensive knowledge about the natural environment, for example) to accompany them. Entry to Preservation Zones will also be restricted as necessary.

**(2) Conservation and Utilization Zones**

As areas to prevent any impact of external environmental changes from affecting the forest ecosystems in Preservation Zones, the following areas are designated as Conservation and Utilization Zones while taking into account how adjacent areas, such as Farms and Villages, are managed in association with human life, how these areas are used, and how park plans are managed in these areas.

- Areas that are now in use and that need to be used in the future
- Forests of a depth of 50 m or more from adjacent Farms or Villages

**1)Forest Management**

To serve as buffers for Preservation Zones, Conservation and Utilization Zones shall be managed in the same way as Preservation Zones for the purpose of achieving conservation and restoration of forest ecosystems that are essentially the same as those of Preservation Zones. Note, however, the following actions can be taken notwithstanding the description above:

a. The same forest management procedures as applied to Preservation Zones
b. Environmental education activities inside a forest that are approved as necessary
c. Other actions

(a) Conservation works and other ancillary works that are necessary for national land conservation
(b) Logging and removal of damaged trees

**2)Forest Use**

a. Forests in Conservation and Utilization Zones can be used in the same way as forests in Preservation Zones can be used.
b. In accordance with the natural conditions, forests in Conservation and Utilization Zones can be used as forest education or recreation sites within the extent that forests in Preservation Zones are not affected.

   For this reason, roads or buildings that are necessary can be installed or established only within the extent that they will not affect the function of Conservation and Utilization Zones.

### (3) Other Areas

In forests that are externally adjacent to forest ecosystem reserves, the natural environment including native wild animal species must be conserved while bearing in mind the size of forest ecosystems in these forests.

### (4) Approach to Forest Conservation and Management and Important Note for each Island

Based on the approach to forest management and forest use as described in (1) through (3) above, the long-term goal is to let each island have its own unique ecosystem. To achieve the goal, plans that are customized in accordance with the characteristics of each island must be monitored and relevant organizations must cooperate with each other.

#### 1)Mukojima Island Group

a. Yomejima Is. and Nakodojima Is.

Both islands have many steep slopes. Grassland covers most of these islands due to vegetation damage caused by feral goats *(Capra hircus)*, and also, soil flows into the ocean to affect the condition of the surrounding water. Currently, however, feral goats have been exterminated and native tree species are now gradually growing back. Therefore, for the time being, extended damage by alien species such as Leucaena *(Leucaena leucocephala)*, woody bamboo, and shrubby bamboo must be prevented and removed as necessary, and at the same time, measures to prevent soil from flowing into the ocean must be implemented.

b. Mukojima Is.

The grassland mainly in the northwestern part of the island and on Torishima Is., the island adjacent to Mukojima Is., is an important breeding site for albatrosses. Therefore, extended damage by alien species such as Leucaena, woody bamboo, and shrubby bamboo must be prevented and removed, and at the same time, measures to prevent overuse of this area must be implemented.

c. Other minor islands

Leave them untouched and see whether the forests can recover naturally.

#### 2)Chichijima Island Group

a. Otoutojima Is.

There is a large vegetation of *Schima mertensiana* at the center of the island, where forests are now recovering to become natural forests. In this area, it is necessary to eliminate Casuarina *(Casuarina equisetufolium)* that hinders forest recovery to eliminate alien species such as *Morus australis* that interfere with genes by mating with *Morus boninensis*, and to restore forest consist of endemic species.

At the same time, it is necessary to implement measures to prevent soil from flowing into the ocean in places where soil runoff may occur.

Also, it is necessary to promote establishment of measures to restore habitats for endemic species such as dragonflies and land snails.

b. Anijima Is.

Anijima Is. has the largest dry scrub forest among the Ogasawara Islands. Rare endemic plants such as *Crepidiastrum grandicollum*, *Callicarpa nishimurae*, and *Calanthe hattorii*, and also, many rare insects such as *Hemicordulia ogasawarensis* and *Cicindela bonina* live in that forest. Also, the forest is high on the priority list for eliminating alien species; therefore, prompt implementation of elimination of alien species such as feral goats and Casuarina must be promoted.

c. Chichijima Is.

The natural environment of Chichijima Is. is strongly affected by alien species and also is disturbed by interaction with humans. Also, national forests on the island have been used too much, resulting in a decrease in vegetation as well as in an increase in worn paths.

In particular, the dry scrub forest in the Higashidaira area is a habitat for particularly rare plants among endemic species and is therefore high on the priory list for eliminating alien species. It is thus necessary to first identify priority areas and then to continue to eliminate alien species. Restoration of pristine ecosystems must be planned while taking into account the possibility of freeding some of the endemic species.

In addition, it is necessary to implement measures to limit walkways that can be used, plan to eliminate feral cat and rats in order to restore the breeding and growing environment for an endemic subspecies of Japanese wood-pigeon *(Columba janthina niten)*, and to promote elimination of green Anoles *(Anolis carolinensis)* that is seriously affecting inhabitation of insects.

d. Minamijima Is.

Changes in the environment will be monitored. Since the island is quite often accessed and used by people, it is necessary to implement measures to prevent overuse of the island, and also, as needed, it is necessary to restore the vegetation and at the same time eliminate alien plants such as *Cenchrus echinatus Linnaeus.*

Minamijima Is. is also a breeding site for marine birds; therefore, alien species such as rats must be eliminated.

e. Nishijima Is.

In order to restore the vegetation on the island that has become a grassland, alien species such as Casuarina and Leucaena must be eliminated.

f. Higashijima Is.

Conservation of Higashijima Is. as a vegetation site for an endemic species called *Lobelia boninensis* is necessary. Higashijima Is. is also a breeding site for

*Puffinus pacificus* and *Bulweria bulwerii*; therefore, it is necessary to eliminate rats that are alien species as well as their predators.

g. Other Minor Islands
Leave the forest untouched and whether the forests can recover naturally.

**3)Hahajima Island Group**

a. Hahajima Is.
The natural environment of Hahajima Is. is strongly affected by alien species and also is disturbed by interaction with humans.
*Morus boninensis*, the wood-pigeon, *Apalopteron familiare hahasima*, and *Celastrina ogasawaraensis* live in the north central part of Hahajima Is., and this is an area high on the priority list for alien species elimination. Since expansion of invasion by Bischofia *(Bischofia javanica)* has been significant in this area, it is necessary to eliminate it in order to conserve the pristine wet tall-tree forest and the native vegetation such as the *Ardisia sieboldii* and *Machilus Pseudokobu* vegetation. At the same time, feral cat and rats must be eliminated in order to conserve habitats of the wood-pigeon and *Apalopteron familiare hahasima*.
In the northern part of the island, Casuarina has invaded the *Planchonella obovata* and *Wikstroemia pseudoretusa* vegetation and also the *Livistona chinensis* and *Pandanus Boninensis* vegetation. In addition, Casuarina has been expanding its distribution causing a decrease in endemic plants. Therefore, it is necessary to restore the native vegetation by eliminating Casuarina, and at the same time, feral cat must also be eliminated in order to conserve *Apalopteron familiare hahasima* and marine bird habitats. Furthermore, elimination of green Anoles, which is seriously damaging insect habitats, must also be promoted.

b. Mukoujima Is., Hirajima Is., Anejima Is., Imotojima Is., and Meijima Is.
The *Planchonella obovata* and *Wikstroemia pseudoretusa* vegetation on the islands other than Imotojima Is. and Meijima Is. has been invaded by Casuarina , causing a reduction in habitats of endemic species. Therefore, elimination of Casuarina needs to be planned. Also, conservation and restoration of pristine island vegetation such as dry scrub forests need to be planned by assisting restoration of vegetation of endemic species as necessary.

c. Other Minor Islands
Leave the forest untouched and recover naturally.

**4)Kazan Island Group and Individual Islands**

Leave the forest untouched and recover naturally.

## *3. Current Issues*

The following issues must be dealt with for the time being, and at the same time, in order to determine whether or not various types of actions have adverse effects on ecosystems that are supposed to be protected, it is necessary to monitor the management operations and also to assess and examine the monitoring results to appropriately proceed with the conservation and management program ("adaptive management").

### (1) Areas that Require Immediate Action

For the areas listed below, it is necessary to promptly establish detailed ecosystem restoration plans by cooperating with relevant organizations and to preferentially carry out the plans in these areas.

#### 1)Chichijima Is. [Eastern Part]

On Chichijima Is., the area from Mt. Asahi to Higashidaira has the second largest dry scrub forest after Anijima Is., and more endemic species are found in this area than any other parts on the island. Also, this is an important area as it serves as a breeding site for the wood-pigeon.

Meanwhile, invasion by Casuarina has been observed in this area, but it is still at an early stage; therefore, prompt implementation of appropriate measures is expected to be highly effective. A lso, some parts of the forest are invaded by Bischofia, interfering with endemic ecosystems including trees that serve as feed for the wood-pigeon. Expansion of the invaded area has thus currently been a concern.

#### 2)Anijima Is.

Anijima Is. has the largest dry scrub forest among the Ogasawara Islands, and this forest has not been disturbed much by humans.

Feral goats eat or trample endemic species, and also, there has been invasion by Casuarina and *Pinus luchuensis*, and these are causing concerns about expansion of the impact on endemic ecosystems. However, it is expected that the precious dry scrub forest can be efficiently conserved if appropriate measures such as extermination of Casuarina are promptly implemented.

#### 3)Hahajima Is. (Central Northern Part)

Hahajima Is. has wet tall-tree forests that are more pristine than the forests on other islands. M any large-diameter trees such as *Morus boninensis, Elaeocarpus photiniaefolius,* and *Pisonia umbellifera* grow in these forests, and also, *Callicarpa subpubescens* and *Machilus pseudokobu* grow to be used by *Celastrina ogasawaraensis* when they breed during the winter. Also, Hahajima Is. has many rare herbaceous species that grow only in the Sekimon district such as *Procris boninensis*. F urthermore, this area is an important breeding site for the wood-pigeon.

However, Bischofia has been expanding its habitat and having adverse effects on ecosystems consisting of endemic species. If this is left unaddressed, rare species may become extinct.

## (2) Measures against alien Species

In order to protect of ecosystems that are unique to the Ogasawara Islands, it is necessary to eliminate of adverse effects caused by alien species that endanger the existence of habitats of native species. Therefore, implementation of appropriate measures through cooperation with relevant organizations is necessary.

Also, elimination of alien plant species must be carried out on the premise that the vegetation of native species will be restore by natural regeneration. Note, however, *Elaeocarpus photiniaefolius*, *Morus boninensis*, *Melia azedarach*, and *Pisonia umbellifera* are expected to be used as plants that feed rare species because the population of the abovementioned plants has already dramatically decreased to the point where they cannot be restored naturally or because genes of some plants may be contaminated by other subspecies imported to the island. For these species, therefore, it is necessary to establish a technique to grow them, and to prodact their seedlings, fully considering whether target locations actually require plantation of these plants. When doing so, it is necessary to make sure that genes of these plants are not disturbed or that alien species do not invade the plantation areas.

### 1)Plant Species

Planted vegetation is often found in areas that used to be agricultural lands or villages before the world war Ⅱ. Forests on gentle slopes or on hillsides where soil was deep were increasingly made into agricultural lands before the war, and Calophyllum inophyllum forests that were planted as windbreak forests for these agricultural lands and also Ficus microcarpa forests that were planted around villages still exist. In the former agricultural lands that hae been left unattended, there are forests that consist of alien species such as Pinus luchuensis, Casuarina , and Leucaena expanded by natural regeneration. As ar esult, Bischofia has spread its habitat over almost all of Hahajima Is.. Also, not as much as Hahajima Is., however, Bischofia has also spread on Chichijima Is. over wet plant communities having deep soil since it was planted in some parts of the islands and served as the mother tree.

Bischofia and Casuarina in particular have expanded their habitats, and it is believed that they have serious adverse effects on ecosystems since they invade endemic vegetation. Therefore, prompt implementation of appropriate measures is necessary.

a. Bischofia

Bischofia is the most widely spread invasive alien plant on the Ogasawara Islands, and it is growing on Chichijima Is., Hahajima Is, and Ototojima Is.

The area of invasion by Bischofia is quite large and the frequency of invasion is not always the same, and thus implementation of a unified measure is difficult. It is therefore necessary to set priorities for Bischofia extermination, starting from areas with low invasion frequency, and to exterminate it using the currently used effective means such as girdling, felling, use of shading sheets, and poisoning.
It may be possible to exterminate all Bischofia trees at once in areas with a relatively low invasion frequency. In areas with a high invasion frequency, however, extermination of Bischofia will be a long and gradual process because conservation of understory vegetation, prevention of drying of the understory vegetation, and growing of native species are required at the same time.

b. Casuarina

Casuarina is highly resistant to dryness and salt, and is therefore able to grow in places with poor soil quality such as mountain ridges, rocky areas, and cliffs. Because Casuarina grows fast and also its fallen leaves fully cover the forest floor, it sometimes forms a pure forest with poor understory vegetation.
It may also invade bare lands or forests with no canopy, like forest damaged by wind, suppress other species while taking advantage of its own resistance to dryness and a high initial growth speed, and finally form pure vegetation.
Felling is one possible way to exterminate Casuarina since its sprouting ability is lower than Bischofia, but it is necessary to select a test site for testing extermination methods as well as forest regeneration methods and then adopt the most effective extermination method. Note, however, early extermination should be carried out in places where invasion of Casuarina may cause serious damage.

c. Leucaena

Due to its poor shade tolerance, Leucaena cannot invade healthy forests like Bischofia, but because it has high dryness and salt resistance and also is a nitrogen-fixing plant, it quickly invades and grows aggressively in disturbed places like former developed lands and collapsed lands. Note that it can grow well on barrens.
It is necessary to continue observation of this species because it expands its habitat slowly and there is a predator called *Heteropsyra cubana*. In places where invasion of *Leucaena leucocephala* may cause serious damage, however, early extermination before expansion is necessary.

d. Others

Other alien plant species that may expand their habitats are *Pinus luchuensis*, Psidium *(Psidium littorale),* woody bamboo, and shrubby bamboo.
These plants must be continuously observed, and at the same time, appropriate measures must be implemented as necessary. Note that *Pinus luchuensis* needs to be exterminated when exterminating Casuarina.

**2)Animal Species**

Examples of mammalian species that were introduced to the Ogasawara Islands and became wild over time are feral goats, feral pigs, feral cat, and rats. Damage by feral goats is especially extensive, and feral goats feeding on rare plant species, destruction of vegetation, and soil erosion have been the current issues. Damage is serious in the Chichijima Island Group and Mukojima Island Group, but recently, there was an attempt to eliminate feral goats on Mukojima Is., Nakodojia Is., Yomejima Is., and Nishijima Is.. As a result, they have either been completely eliminated or only a few of them still remain.

a. Feral Goats

Plant damage caused by feral goats can be divided into two types: direct damage and indirect damage. D irect damage refers to damage done by feeding and stepping on plants. Indirect damage refers to degradation of habitats of endemic plant and animal species caused by destruction of vegetation due to feral goats feeding on it, land becoming barren, and soil erosion. A lso, soil runoff has adverse effects not only on forest ecosystems but also on marine ecosystems. Therefore, adverse effects on ecosystems of various islands in the Ogasawara Islands have been a concern, and therefore, prompt implementation of appropriate measures is necessary.

On Chichijima Is., since it takes a long time to eradicate feral goats, rare plant and animal species that are subject to feeding damage will be target species to be protected for the time being, and implementation of necessary conservation measures such as protective fences and nets will be promoted.

b. Feral cat and rats

Recently, there are problems concerning adverse effects of cats, which have become wild over time, and rats on breeding of the wood-pigeon and marine birds, and relevant organizations and NPOs are now cooperating with each other to eliminate or collect feral cat from breeding sites. Establishment of measures to completely eliminate them must be promoted.

c. Reptiles and Amphibians

As for reptiles, green Anoles originating from North America lives across both Chichijima Is. and Hahajima Is.. A conflict of existence between green Anoles and *Cryptoblepharus boutonii nigropunctatus* has been a concern, and at the same time, there has been a report of expansion of green Anoles habitat and a r apid decrease as well as extinction of endemic insects. A s for amphibians, Bufo marinus lives both on Chichijima Is. and Hahajima Is., feeding on land insects, arthropods such as shellfish, and land snails.

Establishment of necessary measures must be promoted in order to prevent additional invasion of reptiles and amphibians to other minor islands.

## (3) Notes on Forest Use

National forests of the Ogasawara Islands are used for a wide variety of purposes such as recreation, environmental education, commercial activities, and research activities. In order to implement measures to reduce the impact of forest use on endemic ecosystems and also to stop further degradation of endemic ecosystems and restore them, it is necessary to make necessary arrangements on forest use and protection through cooperation with relevant organizations.

### 1)Walkways for General Use

Walkways for general use must be public roads or other leased roads.

### 2)Passages other than Designated Walkways

a. In Preservation Zones

Entry to areas other than the walkways designated in 1)above (except for seashores) must be limited to designated passages that meet the following conditions:

- Passages must NOT apply to any of the following:

(a) Located in places that may have adverse effects on rare animal or plant species
(b) Located near nests of the wood-pigeon (only applies during the breeding season)
(c) Located near nests of an endemic subspecies of Common Buzzard (Buteo buteo toyoshimai)(only applies during the breeding season)
(d) Located in areas where the land may collapse

- When there are multiple routes to the destination, select one that has the smallest impact on the ecosystem.

b. In Conservation and Utilization Zones

Entry to areas other than the walkways designated in 1) above is permitted.

### 3)Application for Entry

A forest entry permit must be obtained prior to entry to areas other than the walkways designated in 1) above (except for seashores) (routes designated in Conservation and Utilization Zones are excluded).

To enter Preservation Zones, it is necessary to request accompaniment by those who have a certain level of knowledge about forest ecosystem conservation (guides with extensive knowledge about the natural environment, for example).

Criteria for the forest entry permit depend on the purpose and mode of entry, and as necessary, activity reports must be submitted.

### 4)Dissemination of Rules on Forest Use

The rules on forest use must be disseminated by, for example, distributing brochures.

Through cooperation among relevant organizations, a training program must be provided for guides who accompany those who enter forests.

**(4) Miscellaneous**

Use of forests as testing sites for example is permitted for the following purposes:

1) **Academic research and monitoring survey**
2) **Establishment of facilities necessary for implementing measures against alien species (fences to protect plants from feeding damage by feral goats, for example)**
3) **Installation of passages to private lands that exist inside national forests**

## *4. Promotion Systems*

**(1) Review Committee**

The Review Committee for Conservation Management of the Ogasawara Islands Forest Ecosystem Reserve, established within the Kanto Regional Forest Office, will be in charge of review of selection of Ogasawara Islands forest ecosystem reserves and also execution and review of the Ogasawara Islands forest ecosystem reserve conservation and management plan.

**(2) Monitoring Survey and Regular Inspection**

In order to protect forest ecosystems, it is necessary to cooperate with relevant organizations and systematically carry out required monitoring surveys. The survey plan and result must be studied at the Review Committee such that appropriate conservation and management can be carried out.

Also, through cooperation with the relevant organizations, regular inspection of government-designated rare plants and animals and also a the wood-pigeon habitat survey must be carried out.

**(3) Establishment of an Information Infrastructure**

Each forest ecosystem reserve on each island of the Ogasawara Islands is in a different natural environment, under different social conditions, and has a different historical background. Therefore, in order to implement effective as well as efficient measures, it is important to set science-based priorities for places to be conserved and to strategically as well as systematically implement conservation and management measures while making full use of monitoring survey results. Therefore, through cooperation with relevant organizations, it is necessary to accumulate past and known scientific findings, visualize them spatially as well as chronologically, and establish a system that can contribute to planning of effective conservation and management operations.

**(4) Information Distribution and Education**

In order to collect and manage information, publish it as necessary, and raise awareness

and educate the public, it is necessary to cooperate with relevant organizations to install signboards and signs, publish public relations papers, and exhibit materials showing examples of measures taken against alien species.

**(5) Cooperation with Volunteer Organizations**

Strengthening of the collaborative relationship with NPOs and continued provision of opportunities for volunteers to exterminate alien plants and to plant native species are necessary.

**(6) Alignment with the World Heritage Conservation and Management Plan**

Currently, a conservation and management plan is under development for the Ogasawara Islands as a world heritage. Therefore, necessary measures to conserve and manage the forest as a Natural world heritage shall be promoted through cooperation with relevant oganizations, align with the conservation management plan for the Ogasawara Islands forest Ecosystem Reseve.

# 5-5. Conservation Program defined by the law

## 5-5-1. Conservation Program for Piper postelsianum

Ministry of Agriculture, Forestry and Fisheries
Ministry of the Environment

## I. Purpose of the program

*Piper postelsianum* is a perennial herb of the family Piperaceae that is currently only seen on Hahajima in the Ogasawara Islands. There are many aspects of the biology and ecology of this species that are not fully understood, but what is known is that now there is only a very small population left. Reasons for this decline include changes to the environment caused by land collapse and other natural disasters, the decreased amount of sunshine caused by shading by other species, and feeding damage by the black rat (*Rattus rattus*) and East African land snail (*Achatina fulica*).

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species in known habitats, maintaining and improving habitats, preventing illegal digging, and initiating artificial breeding programs as necessary, thereby maintaining populations of this species and expanding its scope.

## II. Program area

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## III. Program details

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, the program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil , individuals, and other materials that might be carrying them.

## 1. Ascertaining population and other data

In order to carry out the program properly and effectively, the following studies will be conducted as necessary.

### (1) Ascertaining population/distribution data

Surveys will be conducted to ascertain current population size and its changes, flowering data, fruition and seeding data, and information on pests and diseases in its populations in currently known habitats. These aspects will be monitored regularly for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

### (2) Ascertaining habitat environments and other data

Surveys will be conducted in and around habitat areas, to understand changes in the growing environment which is believed to play important role in stable growth of the species, including climate, vegetation, geography, topography, illumination.
Those changes will be monitored regularly.
With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

### (3)Identifying biological/ecological features that will contribute to the preservation of this species

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

### (4) Identifying factors affecting the maintenance of populations and monitoring their effects

Damage caused by vegetation and poor sunlight conditions due to shading, feeding damage by the black rat and East African land snail and other elements that may affect the maintenance of populations will be identified, and the effects of these factors will be monitored.

## 2. Maintaining and improving environments in the species' habitats

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary to maintain and improve environments conducive to the growth and propagation of this species.
will then be taken

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impacting other wildlife living or growing in the areas or ecosystems thereof. In case any adverse impact is expected, changes in the condition of the species and to the surrounding environment shall be monitored.

## 3. Artificial reproduction

The following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

### (1) Artificial pollination

On top of the fact that this species is extremely few in number, it is dioecious, making it difficult to bear fruit in its natural habitats. For this reason, after carefully studying the necessity of doing so, reproduction through artificial pollination in habitats may be carried out in a complementary manner. Taking into account the possibility of artificial pollination leading to vulnerable individuals, the plan shall proceed systematically in a manner that continually incorporates updated information on the state of the species.

### (2) Artificial reproduction

For this species, the only established method of artificial reproduction is with plant cuttings, and it is necessary to develop techniques for artificial reproduction from seeds. In order to prepare for the possibility of extinction of individuals in the wild from potential degradation of its habitat in the future, artificial reproduction will be systematically implemented after carefully studying the necessity of doing so.

Steps will be taken during artificial reproduction to ensure that the individuals produced are suited to reintroduction into the wild. For example, methods will be studied for lessening the occurrence of mutations, crosses with related species, pests and diseases. Some of these methods are: growing seedlings from seeds, establishing control protocols for detecting and preventing the occurrence of pests and diseases, and naturalization in the areas around the species' habitat.

### (3) Reintroduction

The basic ideal for the propagation of this species will be the maintenance and expansion of wild populations in their natural state. However, after carefully studying the necessity of doing so, individuals that were reproduced *ex situ* shall be reintroduced as a complementary measure. Areas for reintroduction shall be chosen from among places offering an ideal environment for this species, including areas that were once habitats, with steps taken to preserve the habitat as necessary, such as preventing damage by black rats and other pests and by managing trees that block

sunlight to the species. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes.

When reintroducing individuals produced *ex situ*, due care will be taken with regard to genetic disruption caused by reintroduced plants, the occurrence of pests and diseases, and potential threats to the survival of wild populations and other organisms. Studies will be conducted to develop sound reintroduction methods, such as reintroduction in areas other than its current habitat, so that the program may be halted or revised in the event that any of the problems above arise.

Careful attention will be given to the matter of preserving area ecosystems and other wild flora and fauna that grow or live there when reintroducing the species. At the same time, the proper steps will be taken to prevent the accidental introduction of new alien species together with reintroduced individuals, soil or other materials.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

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**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-2. Conservation Program for Pittosporum parvifolium*

Ministry of Agriculture, Forestry and Fisheries
Ministry of the Environment

## *I. Purpose of the program*

*Pittosporum parvifolium* is a woody plant in the family Pittosporaceae that only grows on Chichijima in the Ogasawara Islands. There are many aspects of the biology and ecology of this plant that are not fully understood. At present there are very few surviving individuals, thought to have been diminished through changes to its habitat via natural disasters such as typhoons as well as feeding damage by black rats.

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species in known habitats, maintaining and improving habitats, preventing illegal digging, and initiating artificial breeding programs as necessary, thereby maintaining populations of this species and expanding its scope.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, the program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil, individuals and other materials that might be carrying them.

### 1. Ascertaining population and other data

In order to carry out the program properly and effectively, the following studies will be conducted as necessary.

**(1) Ascertaining population/distribution data**

Surveys will be conducted to ascertain current population size and its changes, flowering data, fruition and seeding data, and information on pests and diseases in its populations in currently known habitats. These aspects will be monitored regularly for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Ascertaining habitat environments and other data**

Surveys will be conducted in and around habitat areas, to understand changes in the growing environment which is believed to play important role in stable growth of the species, including climate, vegetation, geography, topography, illumination.

Those changes will be monitored regularly.

With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3) Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Habitat changes caused by natural disasters such as typhoons, reductions in pollinating insects, feeding damage by black rats, and other factors that may affect the maintenance of populations will be identified, and the effects of these factors will be monitored.

**2. Maintaining and improving environments in the species' habitats**

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary to maintain and improve environments conducive to the growth and propagation of this species including preventing feeding damage by black rats (e.g. covering its fruit with bags), exterminating pests and diseases.

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impacting other wildlife living or growing in the areas or ecosystems thereof. In case any adverse impact is expected, changes in the condition of the species and to the surrounding environment shall be monitored.

**3. Artificial reproduction**

The following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

**(1) Artificial pollination**

On top of the fact that this species is extremely few in number, it is dioecious, making it difficult to bear fruit in its natural habitats. For this reason, after carefully studying the necessity of doing so, reproduction through artificial pollination in habitats may be carried out in a complementary manner. Taking into account the possibility of artificial pollination leading to vulnerable individuals, the plan shall proceed systematically in a manner that continually incorporates updated information on the state of the species.

**(2) Artificial reproduction**

Artificial reproduction techniques via growth from seeds have been established for this species, but it is difficult to obtain seeds *en masse*, so reproduction techniques using cutting and grafting must be established. In order to prepare for the possibility of extinction of individuals in the wild from potential degradation of its habitat in the future, artificial reproduction will be systematically implemented after carefully studying the necessity of doing so.

Steps will be taken during artificial reproduction to ensure that the individuals produced are suited to reintroduction into the wild. For example, methods will be studied for lessening the occurrence of mutations, crosses with related species, pests and diseases. Some of these methods are: growing seedlings from seeds, establishing control protocols for detecting and preventing the occurrence of pests and diseases, and naturalization in the areas around the species' habitat.

**(3) Reintroduction**

The basic ideal for the propagation of this species will be the maintenance and expansion of wild populations in their natural state. However, after carefully studying the necessity of doing so, individuals that were reproduced *ex situ* shall be reintroduced as a complementary measure. Areas for reintroduction shall be chosen from among places offering an ideal environment for this species, including areas that were once habitats, with steps taken to preserve the habitat as necessary, such as preventing damage by black rats and other pests. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes.

When reintroducing individuals produced *ex situ*, due care will be taken with regard to genetic disruption caused by reintroduced plants, the occurrence of pests and diseases, as they are potential threats to the survival of wild populations and other organisms. Studies will be conducted to develop sound reintroduction methods, such as reintroduction in areas other than its current habitat, so that the program may be halted or revised in the event that any of the problems above arise.

Careful attention will be given to the matter of preserving area ecosystems and other wild flora and fauna that grow or live there when reintroducing the species. At the same time, the proper steps will be taken to prevent the accidental introduction of new alien species together with reintroduced individuals, soil or other materials.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-3. Conservation Program for Melastoma tetramerum*

Ministry of Agriculture, Forestry and Fisheries Ministry of the Environment

## *I. Purpose of the program*

*Melastoma tetramerum* is a woody plant in the family Melastomataceae that only grows on Chichijima in the Ogasawara Islands. There are many aspects of the biology and ecology of this plant that are not fully understood, but in addition to the fact that there are very few environments suited to its growth, changes to its habitat caused by drops in annual rainfall, surrounding trees preventing sufficient sunlight from reaching it and other factors have caused population numbers to decline, and at present there are very few surviving individuals.

The objective of the program is to realize stable existence of this species in a natural state,

which will be achieved by ascertaining data on the population/distribution of this species in known habitats, maintaining and improving habitats, preventing illegal digging, and initiating artificial breeding programs as necessary, thereby maintaining populations of this species and expanding its scope.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, the program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil, individuals, and other materials that might be carrying them.

**1. Ascertaining population and other data**

In order to carry out the program properly and effectively, the following studies will be conducted as necessary.

**(1) Ascertaining population/distribution data**

Surveys will be conducted to ascertain current population size and its changes, flowering data, fruition and seeding data, and information on pests and diseases in its populations in currently known habitats. These aspects will be monitored regularly for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Ascertaining habitat environments and other data**

Surveys will be conducted in and around habitat areas, to understand changes in the growing environment which is believed to play important role in stable growth of the species, including climate, vegetation, geography, topography, illumination.

Those changes will be monitored regularly.

With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3) Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Habitat changes caused by lower levels of annual rainfall, reductions in pollinating insects, competition with other species for sunlight, and other factors that may affect the maintenance of populations will be identified, and the effects of these factors will be monitored.

**2. Maintaining and improving environments in the species' habitats**

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary to maintain and improve environments conducive to the growth and propagation of this species including management of other trees that block sunlight from this species..

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impacting other wildlife living or growing in the areas or ecosystems thereof. After implementation, changes in the condition of the species and to the surrounding environment shall be regularly monitored.

**3. Artificial reproduction**

The following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

**(1) Artificial reproduction**

Artificial reproduction techniques, including cutting and growth of seedlings from seeds, have been established for this species. In order to prepare for the possibility of extinction of individuals in the wild from potential degradation of its habitat in the future, artificial reproduction will be systematically implemented after carefully studying the necessity of doing so.

Steps will be taken during artificial reproduction to ensure that the individuals produced are suited to reintroduction into the wild. For example, methods will be

studied for lessening the occurrence of mutations, crosses with related species, pests and diseases. Some of these methods are: growing seedlings from seeds, establishing control protocols for detecting and preventing the occurrence of pests and diseases, and naturalization in the areas around the species' habitat.

**(2) Reintroduction**

The basic ideal for the propagation of this species will be the maintenance and expansion of wild populations in their natural state. However, after carefully studying the necessity of doing so, individuals that were reproduced *ex situ* shall be reintroduced as a complementary measure. Areas for reintroduction shall be chosen from among places offering an ideal environment for this species, including areas that were once habitats, with steps taken to preserve the habitat as necessary, such as managing trees that block sunlight to the species. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes.

When reintroducing individuals produced *ex situ*, due care will be taken with regard to genetic disruption caused by reintroduced plants, the occurrence of pests and diseases, as they are potential threats to the survival of wild populations and other organisms. Studies will be conducted to develop sound reintroduction methods, such as reintroduction in areas other than its current habitat, so that the program may be halted or revised in the event that any of the problems above arise.

Careful attention will be given to the matter of preserving area ecosystems and other wild flora and fauna that grow or live there when reintroducing the species. At the same time, the proper steps will be taken to prevent the accidental introduction of new alien species together with reintroduced individuals, soil or other materials.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-4. Conservation Program for Rhododendron boninense*

Ministry of Agriculture, Forestry and Fisheries
Ministry of the Environment

## *I. Purpose of the program*

*Rhododendron boninense* is a woody plant in the family Ericaceae that only grows on Chichijima in the Ogasawara Islands. There are many aspects of the biology and ecology of this plant that are not fully understood. Illegal digging, collecting flowers and branches, damage by feral goats, and other factors have all but wiped out the species. At present there is only one known specimen growing in its natural habitat.

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species in known habitats, maintaining and improving habitats, preventing illegal digging, and initiating artificial breeding programs as necessary, thereby maintaining populations of this species and expanding its scope.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, the program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil , individuals, and other materials that might be carrying them.

## 1. Ascertaining population and other data

In order to carry out the program properly and effectively, the following studies will be conducted as necessary.

**(1) Ascertaining population/distribution data**

Surveys will be conducted to ascertain the flowering data, fruition and seeding data, and information on pests and diseases in populations of this species in currently known habitats. These aspects will be monitored regularly for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Ascertaining habitat environments and other data**

Surveys will be conducted in and around habitat areas, to understand changes in the growing environment which is believed to play important role in stable growth of the species, including climate, vegetation, geography, topography, illumination.
Those changes will be monitored regularly.

With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3) Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Reductions and changes in pollinating insects, damage to individuals caused by feral goats scratching their horns and feeding on it, competition with different species for sunlight, the occurrence of pestilent insects , and other factors that may affect the maintenance of populations will be identified, and the effects of these factors will be monitored.

## 2. Maintaining and improving environments in the species' habitats

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary to maintain and improve environments conducive to the growth and propagation of this species.

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impacting other wildlife living or growing in the areas or ecosystems thereof. In case any adverse impact is expected, changes in the condition of the species and to the surrounding environment shall be monitored.

## 3. Artificial reproduction

The following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

### (1) Artificial reproduction

Artificial reproduction techniques using laterite that include symbiotic fungus have been established. In order to prepare for the possibility of extinction of individuals in the wild from potential degradation of its habitat in the future, artificial reproduction will be systematically implemented after carefully studying the necessity of doing so.

Steps will be taken during artificial reproduction to ensure that the individuals produced are suited to reintroduction into the wild. For example, methods will be studied for lessening the occurrence of mutations, crosses with related species, pests and diseases. Some of these methods are: growing seedlings from seeds, establishing control protocols for detecting and preventing the occurrence of pests and diseases, and naturalization in the areas around the species' habitat.

### (2) Reintroduction

The basic ideal for the propagation of this species will be the maintenance and expansion of wild populations in their natural state. However, after carefully studying the necessity of doing so, individuals that were reproduced *ex situ* shall be reintroduced as a complementary measure. Areas for reintroduction shall be chosen from among places offering an ideal environment for this species, including areas that were once habitats, with steps taken to preserve the habitat as necessary, such as extermination of pestilent insects, constructing fences to prevent intrusion by feral goats. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes.

When reintroducing individuals produced *ex situ*, due care will be taken with regard to genetic disruption caused by reintroduced plants, the occurrence of pests and diseases, as they are potential threats to the survival of wild populations and other organisms. Studies will be conducted to develop sound introduction methods, such as reintroduction in areas other than its current habitat, so that the program may be halted or revised in the event that any of the problems above arise.

Careful attention will be given to the matter of preserving area ecosystems and other wild flora and fauna that grow or live there when reintroducing the species. At the same time, the proper steps will be taken to prevent the accidental introduction of new alien species together with reintroduced individuals, soil or other materials.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging, collecting of flowers and branches, and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-5. Conservation Program for Callicarpa parvifolia*

Ministry of Agriculture, Forestry and Fisheries
Ministry of the Environment

## *I. Purpose of the program*

*Callicarpa parvifolia* is a woody plant in the family Verbenaceae that only grows on Chichijima and Anijima in the Ogasawara Islands. There are many aspects of the biology and ecology of this plant that are not fully understood, but current population levels are extremely low, thought to have been diminished through changes to its habitat via natural disasters such as typhoons as well as feeding damage by feral goats and black rats.

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species

in known habitats, maintaining and improving habitats, preventing illegal digging, and initiating artificial breeding programs as necessary, thereby maintaining populations of this species and expanding its scope.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, the program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil, individuals and other materials that might be carrying them.

### 1. Ascertaining population and other data

In order to carry out the program properly and effectively, the following studies will be conducted as necessary.

**(1) Ascertaining population/distribution data**

Surveys will be conducted to ascertain current population size and its changes, flowering data, fruition and seeding data, and information on pests and diseases in its populations in currently known habitats. These aspects will be monitored regularly for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Ascertaining habitat environments and other data**

Surveys will be conducted in and around habitat areas, to understand changes in the growing environment which is believed to play important role in stable growth of the species, including climate, vegetation, geography, topography, illumination.

Those changes will be monitored regularly.

With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3) Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Habitat changes caused by natural disasters such as typhoons, reductions or changes in pollinating insects, feeding damage by feral goats or black rats, and other factors that may affect the maintenance of populations will be identified, and the effects of these factors will be monitored.

**2. Maintaining and improving environments in the species' habitats**

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary to maintain and improve environments conducive to the growth and propagation of this species, including construction of fences to prevent intrusion by feral goats, black rats, and other pests.

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impacting other wildlife living or growing in the areas or ecosystems thereof. After implementation, changes in the condition of the species and to the surrounding environment shall be monitored.

**3. Artificial reproduction**

The following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

**(1) Artificial pollination**

On top of the fact that this species is extremely few in number, it is dioecious, making it difficult to bear fruit in its natural habitats. For this reason, after carefully studying the necessity of doing so, reproduction through artificial pollination in habitats may be carried out in a complementary manner. Taking into account the possibility of artificial pollination leading to vulnerable individuals, the plan shall proceed systematically in a manner that continually incorporates updated information on the state of the species.

**(2) Artificial reproduction**

For this species, the only established method of artificial reproduction is with plant cuttings, and it is necessary to develop techniques for artificial reproduction from seeds. In order to prepare for the possibility of extinction of individuals in the wild from potential degradation of its habitat in the future, artificial reproduction will be systematically implemented after carefully studying the necessity of doing so.

Steps will be taken during artificial reproduction to ensure that the individuals produced are suited to reintroduction into the wild. For example, methods will be studied for lessening the occurrence of mutations, crosses with related species, pests and diseases. Some of these methods are: growing seedlings from seeds, establishing control protocols for detecting and preventing the occurrence of pests and diseases, and naturalization in the areas around the species' habitat.

**(3) Reintroduction**

The basic ideal for the propagation of this species will be the maintenance and expansion of wild populations in their natural state. However, after carefully studying the necessity of doing so, individuals that were reproduced *ex situ* shall be reintroduced as a complementary measure. Areas for reintroduction shall be chosen from among places offering an ideal environment for this species, including areas that were once habitats, with steps taken to preserve the habitat as necessary, such as preventing damage by feral goats, black rats and other pests. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes.

When reintroducing individuals produced *ex situ*, due care will be taken with regard to genetic disruption caused by reintroduced plants, the occurrence of pests and diseases, as they are potential threats to the survival of wild populations and other organisms. Studies will be conducted to develop sound reintroduction methods, such as reintroduction in areas other than its current habitat, so that the program may be halted or revised in the event that any of the problems above arise.

Careful attention will be given to the matter of preserving area ecosystems and other wild flora and fauna that grow or live there when reintroducing the species. At the same time, the proper steps will be taken to prevent the accidental introduction of new alien species together with reintroduced individuals, soil or other materials.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-6. Conservation Program for Calanthe hattorii*

Ministry of Agriculture, Forestry and Fisheries
Ministry of the Environment

## *I. Purpose of the program*

*Calanthe hattorii* is a perennial herb in the family Orchidaceae that only grows on Chichijima and Anijima in the Ogasawara Islands. There are many aspects of the biology and ecology of this plant that are not fully understood. On top of the fact that suitable habitats for this species have dramatically declined, illegal digging, changes to its habitat caused by drops in annual rainfall, feeding damage by feral goats and the East African land snail (*Achatina fulica*), etc. At present surviving population figures are extremely small.

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species in known habitats, maintaining and improving habitats, preventing illegal digging, and initiating artificial breeding programs as necessary, thereby maintaining populations of this species and expanding its scope.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, this program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil, individuals, and other materials that might be carrying them.

### 1. Ascertaining population and other data

In order to carry out the program properly and effectively, the following studies will be conducted as necessary.

**(1) Ascertaining population/distribution data**

Surveys will be conducted to ascertain current population size and its changes, flowering data, fruition and seeding data, and information on pests and diseases in its populations in currently known habitats. These aspects will be monitored regularly for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Ascertaining habitat environments and other data**

Surveys will be conducted in and around habitat areas, to understand changes in the growing environment which is believed to play important role in stable growth of the species, including climate, vegetation, geography, topography, illumination.
Those changes will be monitored regularly.
With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3) Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Habitat changes caused by lower levels of annual rainfall, reductions and changes in pollinating insects, damage by feral goats and the East African land snail, and other factors that may affect the maintenance of populations will be identified, and the effects of these factors will be monitored.

**2. Maintaining and improving environments in the species' habitats**

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary to maintain and improve environments conducive to the growth and propagation of this species.

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impacting other wildlife living or growing in the areas or ecosystems thereof. In case any adverse impact is expected, changes in the condition of the species and to the surrounding environment shall be monitored.

**3. Artificial reproduction**

The following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

**(1) Artificial pollination**

After carefully studying the necessity of doing so, reproduction through artificial pollination in habitats may be carried out in a complementary manner. Taking into account the possibility of artificial pollination leading to vulnerable individuals, the plan shall proceed systematically in a manner that continually incorporates updated information on the state of the species.

**(2) Sowing seeds in the species' habitats**

In order to complement the natural reproduction of the species, seeds will be dispersed artificially over the areas from which the seeds originated. Due attention is given to not genetically disturbing wild populations, which means that the seeds dispersed are those that had a reasonable chance of being dispersed in the habitat area under natural conditions.

**(3) Artificial reproduction**

Processes for the sterile culturing of this species using back bulbs and immature seeds

have been established. In order to prepare for the possibility of extinction of individuals in the wild from potential degradation of its habitat in the future, artificial reproduction will be systematically implemented after carefully studying the necessity of doing so.

Steps will be taken during artificial reproduction to ensure that the individuals produced are suited to reintroduction into the wild. For example, methods will be studied for lessening the occurrence of mutations, crosses with related species, pests and diseases. Some of these methods are: growing seedlings from seeds, establishing control protocols for detecting and preventing the occurrence of pests and diseases, and naturalization in the areas around the species' habitat.

**(4) Reintroduction**

The basic ideal for the propagation of this species will be the maintenance and expansion of wild populations in their natural state. However, after carefully studying the necessity of doing so, individuals that were reproduced *ex situ* shall be reintroduced as a complementary measure. Areas for reintroduction shall be chosen from among places offering an ideal environment for this species, including areas that were once habitats, with steps taken to preserve the habitat as necessary, such as preventing damage by feral goats, the East African land snail and other pests. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes.

When reintroducing individuals produced *ex situ*, due care will be taken with regard to genetic disruption caused by reintroduced plants, the occurrence of pests and diseases, as they are potential threats to the survival of wild populations and other organisms. Studies will be conducted to develop sound introduction methods, such as reintroduction in areas other than its current habitat, so that the program may be halted or revised in the event that any of the problems above arise.

Careful attention will be given to the matter of preserving area ecosystems and other wild flora and fauna that grow or live there when reintroducing the species. At the same time, the proper steps will be taken to prevent the accidental introduction of new alien species together with reintroduced individuals, soil or other materials.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-7. Conservation Program for Calanthe hoshii*

Ministry of Agriculture, Forestry and Fisheries
Ministry of the Environment

## *I. Purpose of the program*

*Calanthe hoshii* is a perennial herb in the family Orchidaceae that only grows on Hahajima in the Ogasawara Islands. There are many aspects of the biology and ecology of this plant that are not fully understood, but on top of the fact that populations have declined since its discovery, illegal digging, changes to its habitat via collapses of land tracts, etc. have resulted in further loss of population numbers. At present there are very few surviving specimens.

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species in known habitats, maintaining and improving habitats, preventing illegal digging, and initiating artificial breeding programs as necessary, thereby maintaining populations of this species and expanding its scope.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past

habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, this program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil, individuals, and other materials that might be carrying them.

### 1. Ascertaining population and other data

In order to carry out the program properly and effectively, the following studies will be conducted as necessary.

**(1) Ascertaining population/distribution data**

Surveys will be conducted to ascertain current population size and its changes, flowering data, fruition and seeding data, and information on pests and diseases in its populations in currently known habitats. These aspects will be monitored regularly for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Ascertaining habitat environments and other data**

Surveys will be conducted in and around habitat areas, to understand changes in the growing environment which is believed to play important role in stable growth of the species, including climate, vegetation, geography, topography. Those changes will be monitored regularly.

With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3) Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Habitat changes caused by natural disasters such as collapses of land tracts, reductions and changes in pollinating insects, and other factors that may affect the maintenance of

populations will be identified, and the effects of these factors will be monitored.

**2. Maintaining and improving environments in the species' habitats**

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary to maintain and improve environments conducive to the growth and propagation of this species.

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impact other wildlife living or growing in the areas or ecosystems thereof. In case any adverse impact is expected, changes in the condition of the species and to the surrounding environment shall be monitored.

**3. Artificial reproduction**

The following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

**(1) Artificial pollination**

After carefully studying the necessity of doing so, reproduction through artificial pollination in habitats may be carried out in a complementary manner. Taking into account the possibility of artificial pollination leading to vulnerable individuals, the plan shall proceed systematically in a manner that continually incorporates updated information on the state of the species.

**(2) Sowing seeds in the species' habitats**

In order to complement the natural reproduction of the species, seeds will be dispersed artificially over the areas from which the seeds originated. Due attention is given to not genetically disturbing wild populations, which means that the seeds dispersed are those that had a reasonable chance of being dispersed in the habitat area under natural conditions.

**(3) Artificial reproduction**

Processes for the sterile culturing of this species using back bulbs and immature seeds have been established. In order to prepare for the possibility of extinction of individuals in the wild from potential degradation of its habitat in the future, artificial reproduction will be systematically implemented after carefully studying the necessity of doing so.

Steps will be taken during artificial reproduction to ensure that the individuals produced are suited to reintroduction into the wild. For example, methods will be studied for lessening the occurrence of mutations, crosses with related species, pests and diseases. Some of these methods are: growing seedlings from seeds, establishing control protocols for detecting and preventing the occurrence of pests and diseases, and naturalization in the areas around the species' habitat.

**(4) Reintroduction**

The basic ideal for the propagation of this species will be the maintenance and expansion of wild populations in their natural state. However, after carefully studying the necessity of doing so, individuals that were reproduced *ex situ* shall be reintroduced as a complementary measure. Areas for reintroduction shall be chosen from among places offering an ideal environment for this species, including areas that were once habitats, with steps taken to preserve the habitat as necessary, such as preventing damage by the East African land snail (*Achatina fulica*) and other pests and by managing trees that block sunlight to the species. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes.

When reintroducing individuals produced *ex situ*, due care will be taken with regard to genetic disruption caused by reintroduced plants, the occurrence of pests and diseases, and potential threats to the survival of wild populations and other organisms. Studies will be conducted to develop sound reintroduction methods, such as reintroduction in areas other than its current habitat, so that the program may be halted or revised in the event that any of the problems above arise.

Careful attention will be given to the matter of preserving area ecosystems and other wild flora and fauna that grow or live there when reintroducing the species. At the same time, the proper steps will be taken to prevent the accidental introduction of new alien species together with reintroduced individuals, soil or other materials.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken.

The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-8. Conservation Program for Malaxis boninensis*

Ministry of Agriculture, Forestry and Fisheries
Ministry of the Environment

## *I. Purpose of the program*

*Calanthe hoshii* is a perennial herb in the family Orchidaceae that only grows on Hahajima in the Ogasawara Islands. There are many aspects of the biology and ecology of this plant that are not fully understood.On top of the fact that its populations were already limited in number at the time of its discovery, the number has further decreased due to illegal digging, changes to the habitat caused by drops in annual rainfall, root exposure by the topsoil erosion, etc.. At present there are extremely few surviving specimens.

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species in known habitats, maintaining and improving habitats, preventing illegal digging, and initiating artificial breeding programs as necessary, thereby maintaining populations of this species and expanding its scope.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, this program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil, individuals, and other materials that might be carrying them.

### 1. Ascertaining population and other data

In order to carry out the program properly and effectively, the following studies will be conducted as necessary.

**(1) Ascertaining population/distribution data**

Surveys will be conducted to ascertain current population size and its changes, flowering data, fruition and seeding data, and information on pests and diseases in its populations in currently known habitats. These aspects will be monitored regularly for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Ascertaining habitat environments and other data**

Surveys will be conducted in and around habitat areas, to understand changes in the growing environment which is believed to play important role in stable growth of the species, including climate, vegetation, geography, topography, illumination.
Those changes will be monitored regularly.
With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3) Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Habitat changes caused by lower levels of annual rainfall, reductions and changes in pollinating insects, trampling by feral goats, and other factors that may affect the maintenance of populations will be identified, and the effects of these factors will be monitored.

**2. Maintaining and improving environments in the species' habitats**

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary maintain and improve environments conducive to the growth and propagation of this species including construction of fences to prevent intrusion by feral goats.

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impact other wildlife living or growing in the areas or ecosystems thereof. In case any adverse impact is expected, changes in the condition of the species and to the surrounding environment shall be regularly monitored.

**3. Artificial reproduction**

The following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

**(1) Artificial pollination**

After carefully studying the necessity of doing so, reproduction through artificial pollination in habitats may be carried out in a complementary manner. Taking into account the possibility of artificial pollination leading to vulnerable individuals, the plan shall proceed systematically in a manner that continually incorporates updated information on the state of the species.

**(2) Sowing seeds in the species' habitats**

In order to complement the natural reproduction of the species, seeds will be dispersed artificially over the areas from which the seeds originated. Due attention is given to not genetically disturbing wild populations, which means that the seeds dispersed are those that had a reasonable chance of being dispersed in the habitat area under natural conditions.

**(3) Artificial reproduction**

Processes for the sterile culturing of this species using back bulbs and immature seeds have been established, but it is difficult to obtain seedling *en masse*, so reproduction techniques growing from seeds must be established. In order to prepare for the possibility of extinction of individuals in the wild from potential degradation of its habitat in the future, artificial reproduction will be systematically implemented after carefully studying the necessity of doing so.

Steps will be taken during artificial reproduction to ensure that the individuals produced are suited to reintroduction into the wild. For example, methods will be studied for lessening the occurrence of mutations, crosses with related species, pests and diseases. Some of these methods are: growing seedlings from matured seeds, establishing control protocols for detecting and preventing the occurrence of pests and diseases, and naturalization in the areas around the species' habitat.

**(4) Reintroduction**

The basic ideal for the propagation of this species will be the maintenance and expansion of wild populations in their natural state. However, after carefully studying the necessity of doing so, individuals that were reproduced *ex situ* shall be reintroduced as a complementary measure. Areas for reintroduction shall be chosen from among places offering an ideal environment for this species, including areas that were once habitats, with steps taken to preserve the habitat as necessary. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes.

When reintroducing individuals produced *ex situ*, due care will be taken with regard to genetic disruption caused by reintroduced plants, the occurrence of pests and diseases, and potential threats to the survival of wild populations and other organisms. Studies will be conducted to develop sound reintroduction methods, such as reintroduction in areas other than its current habitat, so that the program may be halted or revised in the event that any of the problems above arise.

Careful attention will be given to the matter of preserving area ecosystems and other wild flora and fauna that grow or live there when reintroducing the species. At the same time, the proper steps will be taken to prevent the accidental introduction of new alien species together with reintroduced individuals, soil or other materials.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-9. Conservation Program for Hymenasplenium cardiophyllum*

Ministry of Agriculture, Forestry and Fisheries
Ministry of Land, Infrastructure, Transport and Tourism
Ministry of the Environment

## *I. Purpose of the program*

*Hymenasplenium cardiophyllum* belongs to the Aspleniaceae family of ferns. In Japan, it only grows on Hahajima in the Ogasawara Islands and Kitadaitojima of the Daito Islands. There are many aspects of the biology and ecology of this plant that are not fully understood. At present populations are extremely small, thought to have been diminished through changes to its habitat via natural disasters such as typhoons and collapses of land tracts as well as damage by the East African land snail (*Achatina fulica*).

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species in known habitats, maintaining and improving habitats necessary for its survival based upon the results of such data, and initiating artificial breeding program as necessary.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) and the Daitō Islands (Okinawa Prefecture) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands and Daito Islands possess unique small island ecosystems, this program will be implemented with

due attention given to not introducing species alien to the particular island, pests and diseases, or soil and other materials that might be carrying them.

**1. Ascertaining population and other data**

In order to carry out the program properly and effectively, the following studies will be conducted as necessary. If changes are seen that merit concern, steps contributing to the preservation of this species such as additional studies to identify the causes will then be taken..

**(1) Population/distribution surveys and monitoring**

Surveys will be conducted in known habitats to ascertain current population size and its changes, and information on pests and diseases in its populations, and other information. These aspects will be monitored regularly for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Habitat surveys and monitoring**

Surveys will be conducted to understand changes in the climate, vegetation, geography, topography, illumination, etc. in and around habitat areas, and those changes will be monitored regularly.

With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3) Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Habitat changes caused by natural disasters such as typhoons and collapses of land tracts, damage by the East African land snail, and other factors that may affect the maintenance of populations will be identified, and the effects of these factors will be monitored.

**2. Maintaining and improving environments in the species' habitats**

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described

in III.1 above, steps will be taken as necessary to maintain and improve the habitat conducive to the growth of this species including preventing damage by the East African land snail.
In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impact other wildlife living or growing in the areas or ecosystems thereof. After implementation, changes in the condition of the species and to the surrounding environment shall be regularly monitored.

In addition, efforts will be made to ensure the conditions necessary for the survival of this species whenever utilizing or developing land in its habitats.

## 3. Artificial reproduction

The basic ideal for the preservation of this species is to take the steps described in III.2 above *in situ*, i.e. in the species' natural habitats. However, because the current figures of this species are at critically low levels, the following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

**(1) Sowing spores in the species' habitats**

In order to complement the natural reproduction of the species, spores will be dispersed artificially over the areas from which the spores originated. Due attention is given to not genetically disturbing wild populations, which means that the spores dispersed are those that had a reasonable chance of being dispersed in the habitat area under natural conditions.

**(2) Reproducing artificially**

Taking into account that *in situ* preservation may prove difficult due to the rapid degradation of the conditions of the species, systematic artificial breeding of individuals shall be implemented.

In such a scenario, it is expected to return individuals preserved *ex situ* to the wild to a maximum extent. For this reason, efforts shall be made to establish artificial breeding techniques which preserve qualities in the species that would make return to the wild possible. At the same time, biological and ecological findings will be collected while in cultivation.

**(3) Return to the wild.**

Cultivated individuals via *ex situ* breeding as described in III.3 (2) will be returned to the wild.

Areas for return to the wild will be chosen from among areas within the species' ideal environment (including areas that were once habitats), with steps taken to preserve the environment as necessary, including steps to prevent damage by the East African land snail.

Due care will be taken with regard to adverse effect of return to the wild on populations of the same species and ecosystems in the area, such as genetic diversity disruption, communication of pests and diseases infected during the cultivation. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes. In the event that any problems arises,
the program shall either be immediately halted or reviewed, and the sound methods of returning the species to the wild shall be studied again.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-10. Conservation Program for Symplocos kawakamii*

Ministry of Agriculture, Forestry and Fisheries
Ministry of Land, Infrastructure, Transport and Tourism

Ministry of the Environment

# *I. Purpose of the program*

*Symplocos kawakamii* is a woody plant in the family Symplocaceae that only grows on Chichijima in the Ogasawara Islands. There are many aspects of the biology and ecology of this plant that are not fully understood, but death during unusually dry periods, damage by feral goats and other factors are thought to have led to their population decline. At present surviving population figures are extremely small.

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species in known habitats, maintaining and improving habitats necessary for its survival based upon the results of such data, and initiating artificial breeding program as necessary.

# *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

# *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, this program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil and other materials that might be carrying them.

## 1. Ascertaining population and other data

In order to carry out the program properly and effectively, the following studies will be conducted as necessary. If changes are seen that merit concern, steps contributing to the preservation of this species such as additional studies to identify the causes will then be taken.

### (1) Ascertaining population/distribution data

Surveys will be conducted in known habitats to ascertain current population and its changes, flowering data, fruition and seeding data, and information on pests and diseases in its populations. These aspects will be monitored regularly for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Ascertaining habitat environments and other data**

Surveys will be conducted to understand changes in the climate, vegetation, geography, topography, illumination, etc. in and around habitat areas, and those changes will be monitored regularly.

With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3)Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Damage to individuals caused by feral goats feeding on it, and other factors that may affect the maintenance of populations will be identified, and the effects of these will be monitored.

**2. Maintaining and improving environments in the species' habitats**

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary to maintain and improve environments conducive to the growth of this species including construction of fences to prevent intrusion by feral goats.

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impacting other wildlife living or growing in the areas or ecosystems thereof. After implementation, changes in the condition of the species and to the surrounding environment shall be regularly monitored.

Furthermore, efforts will be made to ensure the environmental conditions necessary for the survival of this species whenever utilizing or developing land in its habitats.

**3. Artificial reproduction**

The basic ideal for the preservation of this species is to take the steps described in III.2 above, but the current population of this species is at a critically low level. The following measures will then be implemented after carefully studying their necessity based on the

suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

**(1) Artificial pollination**

On top of the fact that this species is extremely few in number, only one seed is produced per fruit. In order to bolster the success rate of reproduction, plants will be artificially pollinated in their natural habitats as a complementary measure. Taking into account the possibility of artificial pollination leading to vulnerable individuals, , the plan shall proceed systematically in a manner that continually incorporates updated information on the state of the species.

**(2) Sowing seeds in the species' habitats**

In order to complement the natural reproduction of the species, seeds will be dispersed artificially over the areas from which the seeds originated. Due attention is given to not genetically disturbing wild populations, which means that the seeds dispersed are those that had a reasonable chance of being dispersed in the habitat area under natural conditions.

**(3) Reproducing artificially**

Taking into account that *in situ* preservation may prove difficult due to the rapid degradation of the conditions of the species, systematic artificial breeding of individuals shall be implemented.

In such a scenario, it is expected to return individuals preserved *ex situ* to the wild to a maximum extent. For this reason, efforts shall be made to establish artificial breeding techniques which preserve qualities in the species that would make return to the wild possible. At the same time, biological and ecological findings will be collected while in cultivation.

**(4) Return to the wild.**

Cultivated individuals via *ex situ* breeding as described in III.3(3) will be returned to the wild.

Areas for return to the wild will be chosen from among areas within the species' ideal environment (including areas that were once habitats), with steps taken to preserve the environment as necessary, including steps to prevent damage by feral goats.

Due care will be taken with regard to adverse effect of return to the wild on populations of the same species and ecosystems in the area, such as genetic diversity disruption, communication of pests and diseases infected during the cultivation. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes. In the event that any problems

arises, the program shall either be immediately halted or reviewed, and the sound methods of returning the species to the wild shall be studied again.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging, collecting of the flowers and branches, and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-11. Conservation Program for Ajuga boninsimae*

Ministry of Agriculture, Forestry and Fisheries
Ministry of Land, Infrastructure, Transport and Tourism
Ministry of the Environment

## *I. Purpose of the program*

*Ajuga boninsimae* is a perennial herb in the family Lamiaceae that only grows on Chichijima, Hahajima, and Imotojima in the Ogasawara Islands. There are many aspects of the biology and ecology of this plant that are not fully understood, but current population levels are extremely low, thought to have been diminished through changes to its habitat via natural disasters such as typhoons and collapses of land tracts, feeding damage by feral goats, and decimation caused by the invasion of alien plant species.

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species

in known habitats, maintaining and improving habitats necessary for its survival based upon the results of such data, and initiating artificial breeding program as necessary.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, this program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil and other materials that might be carrying them.

**1. Ascertaining population and other data**

In order to carry out the program properly and effectively, the following studies will be conducted as necessary. If changes are seen that merit concern, steps contributing to the preservation of this species such as additional studies to identify the causes will then be taken.

**(1) Ascertaining population/distribution data**

Surveys will be conducted in known habitats to ascertain current population size and itschanges, flowering data, fruition and seeding data, and information on pests and diseases in its populations. These aspects will be monitored for changes and trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Ascertaining habitat environments and other data**

Surveys will be conducted to understand changes in the climate, vegetation, geography, topography, illumination, etc. in and around habitat areas, and those changes will be monitored regularly.

With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3) Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological

features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Damage to individuals caused by feral goats feeding on it, by invasion of alien plant and other factors that may affect the maintenance of populations will be identified, and the effects of these will be monitored.

**2. Maintaining and improving environments in the species' habitats**

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary to construct fences to maintain and improve environments conducive to the growth of this species including construction of fences to prevent intrusion by feral goats and alien plant control.

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impacting other wildlife living or growing in the areas or ecosystems thereof. After implementation, changes in the condition of the species and to the surrounding environment shall be regularly monitored.

Furthermore, efforts will be made to ensure the environmental conditions necessary for the survival of this species whenever utilizing or developing land in its habitats.

**3. Artificial reproduction**

The basic ideal for the preservation of this species is to take the steps described in III.2 above, but the current population of this species is at a critically low level. The following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

**(1) Sowing seeds in the species' habitats**

In order to complement the natural reproduction of the species, seeds will be dispersed artificially over the areas from which the seeds originated. Due attention is given to not genetically disturbing wild populations, which means that the seeds dispersed are those that had a reasonable chance of being dispersed in the habitat area under natural conditions.

**(2) Reproducing artificially**

Taking into account that *in situ* preservation may prove difficult due to the rapid degradation of the conditions of the species, systematic artificial breeding of

individuals shall be implemented.

In such a scenario, it is expected to return individuals preserved *ex situ* to the wild to a maximum extent. For this reason, efforts shall be made to establish artificial breeding techniques which preserve qualities in the species that would make return to the wild possible. At the same time, biological and ecological findings will be collected while in cultivation.

**(3) Return to the wild.**

Cultivated individuals via *ex situ* breeding as described in III.3 (2) will be returned to the wild.

Areas for return to the wild will be chosen from among areas within the species' ideal habitat (including areas that were once habitats), with steps taken to preserve the environment as necessary, including steps to prevent damage by feral goats, and alien plants control.

Due care will be taken with regard to adverse effect of return to the wild on populations of the same species and ecosystems in the area, such as genetic diversity disruption, communication of pests and diseases infected during the cultivation. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes. In the event that any problems arises, the program shall either be immediately halted or reviewed, and the sound methods of returning the species to the wild shall be studied again.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging, collecting of the flower and branch, and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the

national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-12. Conservation Program for Crepidiastrum grandicollum*

Ministry of Agriculture, Forestry and Fisheries
Ministry of Land, Infrastructure, Transport and Tourism
Ministry of the Environment

## *I. Purpose of the program*

*Crepidiastrum grandicollum* is a perennial herb in the family Compositae that only grows on Anijima and Chichijima in the Ogasawara Islands. There are many aspects of the biology and ecology of this plant that are not fully understood, but current population levels are extremely low, thought to have been diminished through changes to its habitat via feeding damage by feral goats, and decimation caused by the invasion of alien plant species.

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining data on the population/distribution of this species in known habitats, maintaining and improving habitats necessary for its survival based upon the results of such data, and to initiate artificial breeding program as necessary.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

The program will be implemented so as not to adversely affect this species or its habitat by trampling, etc. Furthermore, considering the fact that the Ogasawara Islands possess unique small island ecosystems, the program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil and other materials that might be carrying them.

**1. Ascertaining population and other data**

In order to carry out the program properly and effectively, the following studies will be

conducted as necessary. If changes are seen that merit concern, steps contributing to the preservation of this species such as additional studies to identify the causes will then be taken.

**(1) Ascertaining population/distribution data**

Surveys will be conducted in known habitats to ascertain current population size and its changes, flowering data, fruition and seeding data, and information on pests and diseases in its populations. These aspects will be monitored for changes or trends. In addition, attempts will be made to discover heretofore unknown habitats.

**(2) Ascertaining habitat environments and other data**

Surveys will be conducted to understand changes in the climate, vegetation, geography, topography, illumination, etc. in and around habitat areas, and those changes will be monitored regularly.

With the aid of existing data and other materials, environment-related changes from past to present, e.g. changes in vegetation in habitats and surrounding environs, will be identified.

**(3) Identifying biological/ecological features that will contribute to the preservation of this species**

Reproductive patterns of the species in its natural state, the production and survival of spores, the genetic diversity within population groups, and other biological/ecological features that will contribute to the preservation of this species will be identified.

**(4) Identifying factors affecting the maintenance of populations and monitoring their effects**

Damage to individuals caused by feral goats feeding on it, by invasion of alien plant and other factors that may affect the maintenance of populations will be identified, and the effects of these will be monitored.

**2. Maintaining and improving environments in the species' habitats**

Based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above, steps will be taken as necessary to maintain and improve environments conducive to the growth of this species including construction of fences to prevent intrusion by feral goats and alien plant control. .

In implementing the steps to maintain and improve the species' habitats, careful attention will be paid to not adversely impacting other wildlife living or growing in the areas or

ecosystems thereof. After implementation, changes in the condition of the species and to the surrounding environment shall be regularly monitored.

Furthermore, efforts will be made to ensure the environmental conditions necessary for the survival of this species whenever utilizing or developing land in its habitats.

## 3. Artificial reproduction

The basic ideal for the preservation of this species is to take the steps described in III.2 above, but the current population of this species is at a critically low level. The following measures will then be implemented after carefully studying their necessity based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, taking into due consideration the findings of the studies described in III.1 above.

### (1) Artificial pollination

It has been confirmed that wild individuals of this species have a low germination rate. In order to bolster the success rate of reproduction, plants will be artificially pollinated in their natural habitats as a complementary measure. Taking into account the possibility of artificial pollination leading to vulnerable individuals, the plan shall proceed systematically in a manner that continually incorporates updated information on the state of the species.

### (2) Sowing seeds in the species' habitats

In order to complement the natural reproduction of the species, seeds will be dispersed artificially over the areas from which the seeds originated. Due attention is given to not genetically disturbing wild populations, which means that the seeds dispersed are those that had a reasonable chance of being dispersed in the habitat area under natural conditions.

### (3) Reproducing artificially

Taking into account that *in situ* preservation may prove difficult due to the rapid degradation of the conditions of the species, systematic artificial breeding of individuals shall be implemented.

In such a scenario, it is expected to return individuals preserved *ex situ* to the wild to a maximum extent. For this reason, efforts shall be made to establish artificial breeding techniques which preserve qualities in the species that would make return to the wild possible. At the same time, biological and ecological findings will be collected while in cultivation.

**(4) Reintroduction into the wild.**

Cultivated individuals via *ex situ* breeding as described in III.3 (3) will be returned into the wild.

Areas for return to the wild will be chosen from among areas within the species' ideal habitat (including areas that were once habitats), with steps taken to preserve the environment as necessary, including steps to prevent damage by feral goats, and alien plants control.

Due care will be taken with regard to adverse effect of return to the wild on populations of the same species and ecosystems in the area, such as genetic diversity disruption, communication of pests and diseases infected during the cultivation. Individuals will be managed after reintroduction. The habitats and surrounding areas will also be regularly monitored to check for changes. In the event that any problems arises,

, the program shall either be immediately halted or reviewed, and the sound methods of returning the species to the wild shall be studied again.

**4. Preventing illegal digging in the habitats**

In order to prevent illegal digging and inadvertent entry into habitat areas, habitats and their environs will be monitored.

**5. Promoting awareness**

In order to make the program effective, understanding on the part of relevant local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-13. Conservation Program for the Short-tailed Albatross (Phoebastria albatrus)*

Ministry of Education, Culture, Sports, Science and Technology
Ministry of Agriculture, Forestry and Fisheries
Ministry of the Environment

## *I. Purpose of the program*

The short-tailed albatross (*Phoebastria albatrus*) once bred in massive numbers on the Izu Islands, the Ogasawara Islands, and small islands to the west of the latter, but over-hunting caused numbers to decline to the point where it was once thought to be extinct. In the 1920s however, this species was rediscovered on Torishima of the Izu Islands. The population was estimated at around 600 individuals in1993, when Program for Protection and Breeding were formulated in order to save this species on the basis of the Law for the Conservation of Endangered Species of Wild Flora and Fauna (Law No. 75, 1992)., As a result of the program, the population of this species is steadily recovering, with numbers currently estimated at around 2150 individuals. In addition, short-tailed albatrosses have succeeded in establishing a new breeding ground in Hatsunezaki, which is located at the northwestern tip of Torishima.

Breeding of this species has been confirmed only on Torishima and on the Senkaku Islands, the majority of which breed in on the steep slopes of Tsubamezaki, at the southern tip of Torishima. Torishima, however, is home to an active volcano, so there is a constant threat of an eruption that could wipe out the breeding ground.

The objective of the program is to realize stable existence of this species in a natural state, which will be achieved by ascertaining population/distribution and other data on this species, maintaining and improving its breeding grounds as necessary, and building new breeding grounds on islands without active volcanoes, thereby dispersing breeding grounds of this species and expanding their scope.

## *II. Program area*

Torishima (Tokyo) and the Ogasawara Archipelago

## *III. Program details*

**1. Ascertaining population and other data**

In order to carry out the program properly and effectively, surveys will be conducted on

the distribution and home range of the species. At the same time, breeding results and breeding environments will be regularly monitored. Individuals will be identified to the extent possible by marking fledglings with tags.

## 2. Maintaining and improving breeding environments

### (1) Maintaining and improving the breeding environment at Tsubamezaki

The breeding ground at Tsubamezaki is a steep slope. This environment is inherently unstable due to the danger of landslides. For this reason, if deemed necessary from the results of the monitoring described in III.1 above, maintenance and improvement work will be done, such as putting structures in place, planting native plants in strategic locations, etc., to prevent soil from flowing into the breeding area.

### (2) Maintaining and improving the breeding environment at Hatsunezaki

For the breeding ground at Hatsunezaki, if deemed necessary from the results of the monitoring described in III.1 above, the breeding environment will be maintained and improved by placing in the area life-sized decoys of the bird and audio equipment that emits its calls.

### (3) Creating new breeding grounds in the Ogasawara Archipelago

There is an active volcano on Torishima, and there is a constant threat of an eruption that could destroy the breeding ground. For this reason, new breeding colonies will be created through the reintroduction of individuals to islands with no active volcanoes in the Ogasawara Archipelago, where this species once bred and still migrates to. In this manner, the breeding grounds of this species can be dispersed and expanded in scope. Considering the fact that the Ogasawara Archipelago is home to unique small islands ecosystems, this program will be implemented in a way that minimizes the impact to the ecosystems there. In particular, attention will be given to not introducing species alien to the particular island, pests and diseases, or albatross individuals, soil, and other materials that might be carrying them.

## 3. Promoting awareness

In order to make this program effective, understanding on the part of the parties carrying out the different aspects of the program, relevant government agencies, local governments, and the people including community residents and tourists, is crucial. For this reason, awareness-raising activities of the condition of this species, the need for protecting it, and the progress of the program will be undertaken, so that understanding and cooperation in protecting the species will be promoted. In addition, relevant parties will be asked to be wary of the impact of inadvertent entry into areas surrounding breeding grounds and how to mitigate or eliminate factors such as accidental capture that put pressures on the survival of this species.

**4. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

Furthermore, due attention will be paid to partnerships with conservation efforts carried out under the framework of international cooperation.

## *5-5-14. Conservation Program for Columba janthina nitens*

Ministry of Education, Culture, Sports, Science and Technology
Ministry of Agriculture, Forestry and Fisheries
Ministry of the Environment

## *I. Purpose of the program*

*Columba janthina nitens*, which belongs to the *Columba* genus of the Columbidae family, is regarded as one subspecies of the Japanese wood pigeon (*Columba janthina*) found in areas in and south of Honshu to the islands in the south of the Korean Peninsula. This subspecies is found only in the Ogasawara Islands, which consist of the Ogasawara Archipelago and the Volcano Islands (Kita-iwoto Iwoto, and Minami-iwoto). At present its numbers in the wild are estimated at around 40 at most, and it is believed to be in serious danger of extinction in the near future. Among the pressures threatening the survival of this subspecies are: predation by house cats that have reverted to wild states (hereunder “feral cats”), competition over food resources with rats and other animals, the decline of trees whose fruit or seeds the bird feeds upon, due to the overgrowth of bishop wood (*Bischofia javanica*) and typhoons.

The objective of the program is realizing stable existence of this subspecies in a natural sate, which will be achieved by ascertaining population/distribution and other data on this subspecies, mitigating or eliminating factors exerting pressure on its survival, maintaining and improving its breeding grounds, establishing *ex situ* breeding techniques in preparation for the rapid decrease in the numbers of wild individuals, and studying appropriate methods of reintroducing individuals bred in captivity.

## *II. Program area*

The Ogasawara Islands (Tokyo) as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

### 1. Ascertaining population and other data

**(1) Population/distribution surveys and monitoring**

Surveys will be conducted to ascertain such information as areas of populations and population density. These aspects are monitored regularly for changes or trends. In addition, efforts will be made through population and other surveys in the Volcano Islands to gather information on populations there.

**(2) Understanding the biology and ecology of the subspecies**

There are many aspects of the basic biology and ecology of this subspecies that are not fully understood. In an effort to ascertain information on the basic biology, ecology, and population dynamics of this subspecies, i.e. information necessary for program implementation, studies will be conducted of its diet, feeding habits, the movement and home range of individuals, the distribution of populations, and its behavior during mating and non-mating seasons.

In addition, fundamental information shall be gathered for the conservation of this subspecies through genetic comparisons, such as whether there is interaction between the populations in the Ogasawara Archipelago and those in the Volcano Islands.

**(3) Determining environments ideal for the subspecies**

Based on the results of the studies and surveys described in (1) and (2) above and in view of the importance of maintaining populations, suitable environments and important habitats for the subspecies shall be identified, and efforts shall be made to understand the relationship between this subspecies and the ecosystems around it.

### 2. Maintaining and improving environments in the subspecies' habitats

For the sake of stable survival of this subspecies in a natural state, it is necessary to keep the overall ecosystem of this subspecies' habitats, including the forests that supply it with food in the form of seeds and fruit, in good condition. Based on the findings of the studies described in III.1 above, effective methods will be studied for curbing the degradation of its habitats and the decline of its population, and the following measures will be taken to maintain and improve environments ideal for its survival.

In addition, efforts will be made to ensure the conditions necessary for the survival of this subspecies whenever utilizing or developing land in its habitats.

**(1) Mitigating the impact of alien species and rehabilitating native forest flora**

Feral cats, rats, and other alien species pose a serious threat to the survival of this

subspecies through predation and competition over food resources. For this reason, invasion by such subspecies into its habitats and the impact thereof will be monitored, and they will be controlled or removed from its habitats and surrounding areas. In addition, efforts shall be made to prevent intrusions of feral cats or other animals into the subspecies' habitats by such means as proper management of domestic animals.

Furthermore, steps will be taken to rehabilitate native forest flora that provides a rich source of food to this subspecies. Specifically, alien tree species that threaten the growth of trees which bear seeds and fruit on which this subspecies feeds will be removed, and the seedlings of native tree species will be transplanted instead.

**(2) Preserving and monitoring important habitats**

Steps will be taken to preserve habitats important to this subspecies, including areas in which trees grow that bear seeds and fruit on which it feeds, areas where nesting has been confirmed. Other measures, such as building watering spots where needed, will also be taken as necessary.

Furthermore, to prevent adverse effects on the species caused by people entering important habitats for the purpose of bird-watching, photography, etc., steps will be taken including formulating a set of rules for observing this subspecies in the wild, habitat monitoring, and posting signs indicating pertinent rules.

**3. *Ex situ* breeding and reintroducing individuals**

Considering the fact that there is an extremely limited number of this subspecies living in the wild, *ex situ* breeding techniques will be established. Individuals will be bred and reared with continual improvement of the facilities and systems necessary for breeding. Biological and ecological findings will be collected during *ex situ* breeding, and due attention will be given to both genealogical storage and the maintenance of a certain population size while in captivity.

If it is deemed impossible to achieve objective of the program through steps described in III.2 above, the possibility of reintroducing individuals whose numbers have been increased via *ex situ* breeding into the wild will be considered. To prepare for this possibility, due care will be taken to the potential danger of changes in behavior patterns caused by *ex situ* breeding or communication of pathogens from reintroduced individuals to wild populations, which could adversely affect the maintenance of wild populations. Because of this danger, sound rearing techniques from ecological and veterinary perspectives will be established. Methods of reintroduction will also be studied from these perspectives.

**4. Promoting awareness**

In order to make the program effective, understanding on the part of the parties carrying out the different aspects of the program, relevant government agencies, local governments, and the people including community residents and tourists, is crucial. For this reason, awareness-raising activities of the condition of this subspecies, the need for protecting it, the necessity of preventing damage by invasive alien species, and the progress of the program will be undertaken, so that understanding and cooperation in protecting the subspecies will be promoted.

Gaining cooperation of persons with expertise in the biology and ecology of this subspecies, groups participating in activities to protect this subspecies, and other related parties, efforts will be made to facilitate the development of voluntary conservation activities by community residents through such steps as fostering a deeper understanding of the subspecies.

**5. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this subspecies, in order for the program to proceed effectively.

## *5-5-15. Conservation Program for Indolestes boninensis*

Ministry of Agriculture, Forestry and Fisheries
Ministry of Land, Infrastructure, Transport and Tourism
Ministry of the Environment

## *I. Purpose of the program*

*Indolestes boninensis* is a species of dragonfly belonging to Lestidae family. In the past, its presence has been confirmed on Ototojima and Chichijima of the Ogasawara Islands, but now it can only be confirmed on Ototojima, and even there only around a few marshy ponds and gently flowing watersheds.

It is thought that a number of factors have contributed to the devastating decline in the numbers of individuals of this species, of which there are currently very few left. Such proposed factors include changes to the water environment caused by unusually dry periods and typhoons, changes to native vegetation due to invasions by alien plant species such as bishop wood (*Bischofia javanica*), casuarinas species and others, and

predation by the green anole (*Anolis carolinensis*) and the cane toad (*Bufo marinus*) on Chichijima and by feral pigs and the American bullfrog (*Rana catesbeiana*) on Ototojima.

The objective of the program is to realize stable survival of this species in a natural state, which will be achieved by ascertaining population/distribution and other data on this species, monitoring it, and using that information to maintain and improve environments necessary for this species' survival.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats)

## *III. Program details*

Considering the fact that the Ogasawara Islands are home to unique small island ecosystems, this program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil and other materials that might be carrying them.

**1. Ascertaining population and other data**

In order to carry out the program properly and effectively, the following studies will be conducted as necessary. If changes are seen that merit concern, steps contributing to the preservation of this species such as additional studies to identify the causes will then be taken.

**(1) Population/distribution surveys and monitoring**

In the current habitats area in Ototojima, surveys will be conducted to ascertain such data as areas of populations and population density of this species. These aspects are monitored regularly for changes or trends. Since there is the possibility of rediscovery, areas in which this species is known to have inhabited in the past will also be surveyed to try to confirm its presence. At the same time, surveys and research will be conducted in order to understand the biological characteristics of this species, including its lifecycle, reproductive patterns in its natural state.

**(2) Habitat surveys and monitoring**

Surveys will be conducted to understand changes in the vegetation, topography, climate, etc. in and around habitat areas, and those changes will be monitored

regularly.

**(3) Identifying factors affecting the maintenance of populations and monitoring their effects**

Changes to the water environment caused by unusually dry periods and typhoons, changes to native vegetation due to invasions by alien plant species such as bishop wood, casuarinas species and others, and predation by feral pigs and the American bullfrog, and other factors that may affect the maintenance of populations will be identified, and the effects of these will be monitored.

## 2. Maintaining and improving environments in the species' habitats

To ensure the stable survival of this species in a natural state, it is necessary to keep the overall ecosystem of this species' habitats, including the water environment, especially the marshy ponds and gently flowing watersheds that serve as its preferred environments, in good condition. Steps to achieve this will be studied based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above. The following measures will then be taken as necessary to maintain and improve environments ideal for its survival.

In addition, efforts will be made to ensure the conditions necessary for the survival of this species whenever utilizing or developing land in its habitats.

**(1) Mitigating the impact of alien species**

Efforts will be made to try to completely rid Ototojima of feral pigs and the American bullfrog in order to eliminate their impact. Because the green anole and the cane toad are thought to be largely responsible for the near local extinction of this species on Chichijima, steps will be taken to keep these species from invading Ototojima. At the same time, steps will be taken to control or remove the green anole and cane toad on Chichijima in order to rehabilitate environments suited to the survival of this species.

In order to prevent the further decline in ideal environments caused by changes to native vegetation due to invasions by alien plant species such as bishop wood, casuarina species and others on Ototojima, these alien species will be controlled or removed. Special efforts will be made to rid the island of bishop wood completely.

**(2) Securing breeding environments**

In order to lessen the impact of changes to the water environment caused by unusually dry periods and typhoons, artificial ponds will be created, thereby securing breeding environments for this species. Effective methods for implementing this plan will be studied after sufficiently considering the ecological characteristics identified through

the studies described in III.1 above.

**(3) Patrolling the habitats**

Habitats and surrounding areas will be patrolled in order to preserve the environment of the species.

**3. Preventing illegal capture**

To prevent the illegal capture of this species, its habitats will be monitored, and awareness-raising activities that target ferry passengers, informing them of the consequences of illegal capture, will be conducted. Furthermore, information will be gathered as to the illegal transfer, etc. of individuals of the species.

**4. Promoting awareness**

In order to make the program effective, understanding on the part of local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species as well as to facilitate the development of voluntary conservation activities of the community.

Particularly, awareness raising activities will be conducted targeting relevant parties (interested community residents, researchers, sea kayaking and tour guide vessel business operators, and those who use their services) who may travel to Ototojima, with a particular focus on informing them of how to prevent the invasion of Ototojima by the green anole and cane toad.

**5. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-16. Conservation Program for Rhinocypha ogasawarensis*

Ministry of Education, Culture, Sports, Science and Technology
Ministry of Agriculture, Forestry and Fisheries
Ministry of Land, Infrastructure, Transport and Tourism
Ministry of the Environment

## *I. Purpose of the program*

*Rhinocypha ogasawarensis* is a species of dragonfly in the Chlorocyphidae family. In the past, its presence has been confirmed in the Ogasawara Islands on Ototojima, Anijima, Chichijima, Hahajima, and Anejima., but at present it can only be found in a few mountain streams and brooks on Ototojima, Anijima, and Hahajima.

It is thought that a number of factors have contributed to the devastating decline in the numbers of individuals of this species, of which there are currently very few left. Such proposed factors include changes to the water environment caused by unusually dry periods and typhoons, changes to native vegetation due to invasions by alien plant species such as bishop wood (*Bischofia javanica*), casuarinas species and others, and predation by the green anole (*Anolis carolinensis*) and the cane toad (*Bufo marinus*) on Chichijima, Hahajima and by feral pigs and the American bullfrog (*Rana catesbeiana*) on Ototojima.

The objective of the program is to realize stable survival of this species in a natural state, which will be achieved by ascertaining population/distribution and other data on this species, monitoring it, and using that information to maintain and improve environments necessary for this species' survival.

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats)

## *III. Program details*

Considering the fact that the Ogasawara Islands are home to unique small island ecosystems, the program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil and other materials that might be carrying them.

**1. Ascertaining population and other data**

In order to carry out the program properly and effectively, the following studies will be conducted as necessary. If changes are seen that merit concern, steps contributing to the preservation of this species such as additional studies to identify the causes will then be taken.

**(1) Population/distribution surveys and monitoring**

In the current habitats area in Ototojima, Anijima, Hahajima, surveys will be conducted to ascertain such data as areas of populations and population density of this species. These aspects are monitored regularly for changes or trends. Since there is the possibility of rediscovery, areas in which this species is known to have inhabited in the past will also be surveyed to try to confirm its presence. At the same time, surveys and research will be conducted in order to understand the biological characteristics of this species, including its lifecycle, reproductive patterns, etc. in its natural state.

**(2) Habitat surveys and monitoring**

Surveys will be conducted to understand changes in the vegetation, topography, climate, etc. in and around habitat areas, and those changes will be monitored regularly.

**(3) Identifying factors affecting the maintenance of populations and monitoring their effects**

Predation by the green anole and American bullfrog, changes to native vegetation due to invasions by alien plant species such as bishop wood, casuarinas species and others, and other factors that may affect the maintenance of populations will be identified, and the effects of these will be monitored.

**2. Maintaining and improving environments in the species' habitats**

To ensure the stable survival of this species in a natural state, it is necessary to keep the overall ecosystem of this species' habitats, including the lotic environment, especially mountain streams and brooks that serve as its preferred environments, in good condition. Steps to achieve this will be studied based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above. The following measures will then be taken as necessary to maintain and improve environments ideal for its survival.

In addition, efforts will be made to ensure the conditions necessary for the survival of this species whenever utilizing or developing land in its habitats.

**(1) Mitigating the impact of alien species**

Efforts will be made to try to completely rid Ototojima of feral pigs and the American bullfrog in order to eliminate their impact.

Because the green anole and the cane toad are thought to be largely responsible for the near local extinction of this species on Chichijima, measures will be taken to control or remove these species in Hahajima, and steps will be taken to keep these species from invading Ototojima, Anijima. At the same time, steps will be taken to control or remove the green anole and cane toad on Chichijima in order to rehabilitate

environments suited to the survival of this species.

In order to prevent the further decline in ideal environments caused by changes to native vegetation due to invasions by alien plant species such as bishop wood, casuarina species and others on Ototojima, Anijima, and Hahajima, these alien species will be controlled or removed. Special efforts will be made to rid Ototojima of bishop wood completely.

**(2) Patrolling the habitats**

Habitats and surrounding areas will be patrolled in order to preserve the environment of the species.

**3. Preventing illegal capture**

To prevent the illegal capture of this species, its habitats will be monitored, and awareness-raising activities that target ferry passengers, informing them of the consequences of illegal capture, will be conducted. Furthermore, information will be gathered as to the illegal transfer, etc. of individuals of the species.

**4. Promoting awareness**

In order to make this program effective, understanding on the part of local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities will be undertaken of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

Awareness-raising activities will be conducted targeting relevant parties (interested community residents, researchers, sea kayaking and tour guide vessel business operators, and those who use their services) who may travel to Ototojima, Anijima, with a particular focus on informing them of how to prevent the invasion of Ototojima, Anijima by the green anole and cane toad.

**5. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-17. Conservation Program for Hemicordulia ogasawarensis*

Ministry of Education, Culture, Sports, Science and Technology
Ministry of Agriculture, Forestry and Fisheries
Ministry of Land, Infrastructure, Transport and Tourism
Ministry of the Environment

## *I. Purpose of the program*

*Hemicordulia ogasawarensis* is a species of dragonfly in the family Corduliidae. In the past, its presence has been confirmed in the Ogasawara Islands on Ototojima, Anijima, Chichijima, Hahajima, and Anejima., but at present it can only be found on Ototojima and Anijima, and even there only around a few marshy ponds and gently flowing watersheds.

It is thought that a number of factors have contributed to the devastating decline in the numbers of individuals of this species, of which there are currently very few left. Such proposed factors include changes to the water environment caused by unusually dry periods and typhoons, changes to native vegetation due to invasions by alien plant species such as bishop wood (*Bischofia javanica*), casuarinas species and others, and predation by the green anole (*Anolis carolinensis*) and the cane toad (*Bufo marinus*) on Chichijima, Hahajima and by feral pigs and the American bullfrog (*Rana catesbeiana*) on Ototojima.

The objective of the program is the stable survival of this species in a natural state, which will be achieved by ascertaining population/distribution and other data on this species, monitoring it, and using that information to maintain and improve environments necessary for this species' survival.

## *II. Program area*

The natural habitats of this species in the Ogasawara Islands (Tokyo) (including past habitats)

## *III. Program details*

Considering the fact that the Ogasawara Islands are home to unique small island ecosystems, this program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil and other

materials that might be carrying them.

## 1. Ascertaining population and other data

In order to carry out the program properly and effectively, the following studies will be conducted as necessary. If changes are seen that merit concern, steps contributing to the preservation of this species such as additional studies to identify the causes will then be taken.

**(1) Population/distribution surveys and monitoring**

In the current habitats area in Ototojima, Anijima, surveys will be conducted to ascertain such data as areas of populations and population density of this species. These aspects are monitored regularly for changes or trends. Since there is the possibility of rediscovery, areas in which this species is known to have inhabited in the past will also be surveyed to try to confirm its presence. At the same time, surveys and research will be conducted in order to understand the biological characteristics of this species, including its lifecycle, reproductive patterns in its natural state.

**(2) Habitat surveys and monitoring**

Surveys will be conducted to understand changes in the vegetation, topography, climate, etc. in and around habitat areas, and those changes will be monitored regularly.

**(3) Identifying factors affecting the maintenance of populations and monitoring their effects**

Changes to the water environment caused by unusually dry periods and typhoons, changes to native vegetation due to invasions by alien plant species such as bishop wood, casuarinas species and others, and predation by feral pigs and the American bullfrog, and other factors that may affect the maintenance of populations will be identified, and the effects of these will be monitored.

## 2. Maintaining and improving environments in the species' habitats

To ensure the stable survival of this species in a natural state, it is necessary to keep the overall ecosystem of this species' habitats, including the water environment, especially the marshy ponds and gently flowing watersheds that serve as its preferred environments, in good condition. Steps to achieve this will be studied based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above. The following measures will then be taken as necessary to maintain and improve environments ideal for its survival.

In addition, efforts will be made to ensure the conditions necessary for the survival of

this species whenever utilizing or developing land in its habitats.

**(1) Mitigating the impact of alien species**

Efforts will be made to try to completely rid Ototojima of feral pigs and the American bullfrog in order to eliminate their impact.

Because the green anole and the cane toad are thought to be largely responsible for the near local extinction of this species on Chichijima and Hahajima, steps will be taken to keep these species from invading Ototojima, Anijima. At the same time, steps will be taken to control or remove the green anole and cane toad on Chichijima, Hahajima in order to rehabilitate environments suited to the survival of this species.

In order to prevent the further decline in ideal environments caused by changes to native vegetation due to invasions by alien plant species such as bishop wood, casuarina species and others on Ototojima and Anijima, these alien species will be controlled or removed. Special efforts will be made to rid these islands of bishop wood completely.

**(2) Securing breeding environments**

In order to lessen the impact of changes to the water environment caused by unusually dry periods and typhoons, artificial ponds will be created, thereby securing breeding environments for this species. Effective methods for implementing this plan will be studied after sufficiently considering the ecological characteristics identified through the studies described in III.1 above.

**(3) Patrolling the habitats**

Habitats and surrounding areas will be patrolled in order to preserve the environment of the species.

**3. Preventing illegal capture**

To prevent the illegal capture of this species, its habitats will be monitored, and awareness-raising activities that target ferry passengers, informing them of the consequences of illegal capture, will be conducted. Furthermore, information will be gathered as to the illegal transfer, etc. of individuals of the species.

**4. Promoting awareness**

In order to make this program effective, understanding on the part of local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of need for protecting this species and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well

as to facilitate the development of voluntary conservation activities of the community.

Particularly, awareness-raising activities will be conducted targeting relevant parties (interested community residents, researchers, sea kayaking and tour guide vessel business operators, and those who use their services) who may travel to Ototojima and Anijima with a particular focus on informing them of how to prevent the invasion of Ototojima and Anijima by the green anole and cane toad.

**5. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-18. Conservation Program for Cicindela bonina*

Ministry of Agriculture, Forestry and Fisheries
Ministry of Land, Infrastructure, Transport and Tourism
Ministry of the Environment

## *I. Purpose of the program*

*Cicindela bonina* is a species of beetle in the Cicindelidae (tiger beetle) family. Its presence in the Ogasawara Islands was once confirmed on Anijima and Chichijima., but now it is found only in a few places on Anijima.

This species inhabits the stable bare land environments that are found on relatively dry plateaus, but the decrease in bare land due to invasion by alien plants species such as casuarina species, the Luchu pine (*Pinus luchuensis*), lantana and other species, collection by enthusiasts, and in the case of Chichijima predation by the green anole and the cane toad (*Bufo marinus*), are thought to have caused its numbers to dwindle.

The objective of this program is to realize a stable survival of this species in a natural state, which will be achieved by ascertaining population/distribution and other data on this species, monitoring it, and using that information to maintain and improve environments necessary for this species' survival, as well as initiating artificial breeding program as necessary..

## *II. Program area*

The natural habitat of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

Considering the fact that the Ogasawara Islands are home to unique small island ecosystems, this program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil and other materials that might be carrying them.

**1. Ascertaining population and other data**

In order to carry out the program properly and effectively, the following studies will be conducted as necessary. If changes are seen that merit concern, steps to contributing to the preservation of this species such as additional studies to identify the causes will then be taken.

**(1) Population/distribution surveys and monitoring**

In the current habitats area in Anijima, surveys will be conducted to ascertain such data as areas of populations and population density of this species. These aspects are monitored regularly for changes or trends. Since there is the possibility of rediscovery, areas in which this species is known to have inhabited in the past will also be surveyed to try to confirm its presence. At the same time, surveys and research will be conducted in order to understand the biological characteristics of this species, including its lifecycle, reproductive patterns in its natural state.

**(2) Habitat surveys and monitoring**

Surveys will be conducted to understand changes in the vegetation, topography, climate, etc. in and around habitat areas, and those changes will be monitored regularly.

**(3) Identifying factors affecting the maintenance of populations and monitoring their effects**

Predation by the green anole, changes to native vegetation due to invasions by alien plant species such as casuarinas species, the Luchu pine and others, and other factors that may affect the maintenance of populations will be identified, and the effects of these will be monitored.

## 2. Maintaining and improving environments in the species' habitats

To ensure the stable survival of this species in a natural state, it is necessary to keep the overall ecosystem of this species' habitats in good condition. This includes the stable bare land environments found sporadically among xeric scrub on plateaus, which serves as its preferred environments. Steps to achieve this will be studied based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above. The following measures will then be taken as necessary to maintain and improve environments ideal for its survival.

In addition, efforts will be made to ensure the conditions necessary for the survival of this species whenever utilizing or developing land in its habitats.

### (1) Mitigating the impact of alien species

In order to prevent the further decline in ideal environments caused by changes to native vegetation due to invasions by alien plant species such as casuarina species and others on Anijima, these alien species will be controlled or removed.

In addition, because the green anole and the cane toad are thought to be largely responsible for the local extinction of this species on Chichijima, steps will be taken to keep these species from invading Anijima.

### (2) Patrolling the habitats

Habitats and surrounding areas will be patrolled in order to preserve the environment of the species.

## 3. Rearing and artificial breeding in captivity

The basic ideal for the preservation of this species is to take the steps described in III.2 above *in situ*, i.e. in the species' natural habitats. However, taking into account that *in situ* preservation may prove difficult due to the rapid degradation of the conditions of the species or other factors, rearing in captivity and artificial breeding shall be implemented, after carefully studying the necessity of doing so and based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, in order to establish techniques for rearing and artificially breeding of this species *ex situ*.

In such a scenario, it is expected to return individuals preserved *ex situ* to the wild to a maximum extent. For this reason, efforts shall be made to establish techniques for rearing and artificial breeding which preserve qualities in the species that would make return to the wild possible. At the same time, biological and ecological findings will be collected while in captivity. If it is deemed impossible to achieve objective of the program through steps described in III.2 above, the possibility of returning individuals whose numbers have been increased via *ex situ* breeding to the wild will be considered.

**4. Preventing illegal capture**

To prevent the illegal capture of this species, its habitats will be monitored, and awareness-raising activities that target ferry passengers, informing them of the consequences of illegal capture, will be conducted. Furthermore, information will be gathered as to the illegal transfer, etc. of individuals of the species.

**5. Promoting awareness**

In order to make this program effective, understanding on the part of local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities will be undertaken of the need for protecting this species, and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

Particularly, awareness-raising activities will be conducted targeting relevant parties (interested community residents, researchers, sea kayaking and tour guide vessel business operators, and those who use their services) who may travel to Anijima, with a particular focus on informing them of how to prevent the invasion of Anijima by the green anole and cane toad.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

## *5-5-19. Conservation Program for the Lycaenid Butterfly (Celastrina ogasawaraensis)*

Ministry of Education, Culture, Sports, Science and Technology
Ministry of Agriculture, Forestry and Fisheries
Ministry of Land, Infrastructure, Transport and Tourism
Ministry of the Environment

## *I. Purpose of the program*

The lycaenid butterfly (*Celastrina ogasawaraensis*) is a species of butterfly in the family

Lycaenidae. In 1978 its presence in the Ogasawara Islands was confirmed on Ototojima, Anijima, Chichijima, Hahajima, and Anejima., but it has since become locally extinct in almost all of these areas. At present it can only be found in a few areas on Hahajima.
It is thought that a number of factors have contributed to the devastating decline in the numbers of individuals of this species, of which there are currently very few left. Such proposed factors include predation by the green anole, the reduction of *Machilus* species, *Callicarpa subpubescens*, and other trees it feeds on due to invasion of alien plant species such as bishop wood (*Bischofia javanica*), the Chinese mulberry (*Morus australis*), etc., and capture by enthusiasts.

The objective of this program is realizing the stable survival of this species in a natural state, which will be achieved by ascertaining population/ distribution and other data on this species, monitoring it, and using that information to maintain and improve the environments necessary for this species' survival.

## *II. Program area*

The natural habitats of this species in the Ogasawara Islands (Tokyo) (including past habitats), as well as *ex situ* breeding areas described in III.3 below.

## *III. Program details*

Because the current numbers of this species are at critically low levels, disruptions to natural conditions, e.g. by typhoons, could have devastating consequences for its survival. In order to carry out the program properly and effectively, the details of the program shall be reviewed flexibly in order to accommodate such changes.

Considering the fact that the Ogasawara Islands are home to unique small island ecosystems, the program will be implemented with due attention given to not introducing species alien to the particular island, pests and diseases, or soil and other materials that might be carrying them.

### 1. Ascertaining population and other data

In order to carry out the program properly and effectively, the following studies will be conducted as necessary. If changes are seen that merit concern, steps to contributing to the preservation of this species such as additional studies to identify the causes will then be taken.

**(1) Population/distribution surveys and monitoring**

In the current habitats area in Hahajima, surveys will be conducted to ascertain such data as areas of populations and population density of this species. These aspects will be monitored regularly for changes or trends. Since there is the possibility of rediscovery, areas in which this species is known to have inhabited in the past will also be surveyed to try to confirm its presence.

At the same time, surveys and research will be conducted in order to understand the biological characteristics of this species, including its lifecycle, reproductive patterns, etc. in its natural state.

**(2) Habitat surveys and monitoring**

Surveys will be conducted to understand changes in the vegetation, topography, climate, etc. in and around habitat areas, and those changes will be monitored regularly.

In addition, the growth and flowering of *Machilus* species, *Callicarpa subpubescens*, and other trees that are essential food sources for the larvae of this species will be studied.

**(3) Identifying factors affecting the maintenance of populations and monitoring their effects**

Predation by the green anole, changes to native vegetation due to invasions by alien plant species such as bishop wood, Morus species and others, and other factors that may affect the maintenance of populations will be identified, and the effects of these will be monitored.

**2. Maintaining and improving environments in the species' habitats**

To ensure the stable survival of this species in a natural state, it is necessary to keep the overall ecosystem, including these species' preferred habitats, in good condition. Machilus species and *Callicarpa subpubescens* in particular are vital to the growth of the larvae of this species as food source, making their preservation especially important. Steps to achieve this will be studied based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species and with due consideration to the findings of the studies described in III.1 above. The following measures will then be taken as necessary to maintain and improve environments ideal for its survival.

In addition, efforts will be made to ensure the conditions necessary for the survival of this species whenever utilizing or developing land in its habitats.

**(1) Rehabilitating native forest flora**

Bishop wood, Morus species, and other alien species crowding out Machilus species

and *Callicarpa subpubescens* shall be controlled or removed, as the latter are sources of food for the larvae of this species. *C. subpubescens* will also be planted. Planting will be implemented taking into account the flowering season, and planted trees will be properly managed thereby not disrupting the genetic diversity of wild populations of this tree species.

**(2) Eliminating the impact of the green anole**

Predation by the green anole poses a serious threat to the survival of this species. The extent of invasion by the green anole into this species' habitat and its impact will be monitored. Furthermore, measures that fully take into account the ecological characteristics of this species will be implemented in order to control or remove the green anole, using fences that prevent intrusion and sticky traps to capture.

**(3) Patrolling the habitats**

Habitats and surrounding areas will be patrolled in order to preserve the environment of the species.

**3. Rearing and artificial breeding in captivity**

The basic ideal for the preservation of this species is to take the steps described in III.2 above *in situ*, i.e. in the species' natural habitats. However, taking into account that *in situ* preservation may prove difficult due to the rapid degradation of the conditions of the species or other factors, rearing in captivity and artificial breeding shall be implemented, after carefully studying the necessity of doing so and based on the suggestions of persons with expertise on the biology, ecology and other aspects of this species, in order to establish techniques for rearing and artificially breeding of this species *ex situ*.

In such a scenario, it is expected to return individuals preserved *ex situ* to the wild to a maximum extent. For this reason, efforts shall be made to establish techniques for rearing and artificial breeding which preserve qualities in the species that would make return to the wild possible. At the same time, biological and ecological findings will be collected while in captivity. If it is deemed impossible to achieve objective of the program through steps described in III.2 above, the possibility of returning individuals whose numbers have been increased via *ex situ* breeding to the wild will be considered.

If it is deemed impossible to achieve objectives through steps described in III.2 above, the possibility of returning individuals whose numbers have been increased via *ex situ* breeding to the wild will be considered.

**4. Preventing illegal capture**

To prevent the illegal capture of this species, its habitats will be monitored, and awareness-raising activities that target ferry passengers, informing them of the consequences of illegal capture, will be conducted. Furthermore, information will be

gathered as to the illegal transfer, etc. of individuals of the species.

**5. Promoting awareness**

In order to make this program effective, understanding on the part of local governments, the parties carrying out the different aspects of the program, and the people including community residents, is crucial. For this reason, awareness-raising activities of the need for protecting this species and the progress of the program will be undertaken. The activities are expected to promote consideration and cooperation in protecting the species, as well as to facilitate the development of voluntary conservation activities of the community.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise on the biology, ecology or other aspects of this species, as well as groups and community residents participating in activities to protect this species, in order for the program to proceed effectively.

# *5-6. Ogasawara Archipelago National Wildlife* Protection Area*

* In this section, the term "wildlife" is defined as wild animals that are classified as either birds or mammals.

## *5-6-1. Ogasawara Archipelago National Wildlife Protection Area*

**1. Summary of the National Wildlife Protection Area**

**(1) Name of the National Wildlife Protection Area**

Ogasawara Archipelago National Wildlife Protection Area

(Name to be changed from the former Ogasawara Islands National Wildlife Protection Area in 2009)

**(2) Area(s) comprising the National Wildlife Protection Area**

As shown in the figure 5-3 in the nomination

**(3) Duration as a National Wildlife Protection Area**

From November 1, 2009 to October 31, 2019 (10 years)

**(4) Designation category for the National Wildlife Protection Area**

Habitat for endangered wildlife

**(5) Purpose for designation as a National Wildlife Protection Area**

All of the islands comprising the Ogasawara Archipelago are oceanic islands that have been uplifted from the sea. They are separated by great distances from any landmass and have never been part of a continent, so wildlife endemic to the archipelago has evolved in unique ways. In addition, the archipelago is an important breeding ground for seabirds that inhabit the subtropical ocean.

Nine species of terrestrial birds breed on the archipelago. These include Bonin honeyeater (*Apalopteron familiare*, a globally rare species which is endemic to the archipelago and also a Special Natural Monument), *Buteo buteo toyoshimai*, *Columba janthina nitens*, and *Carduelis sinica kittlitzi*. Another nine species of seabirds currently also breed on the archipelago, including the black-footed albatross (*Phoebastria nigripes*), the Laysan albatross (*P. immutabilis*), the brown booby (*Sula leucogaster*), the Tristram's storm-petrel (*Oceanodroma tristrami*), and the wedge-tailed shearwater (*Puffinus pacificus*). The archipelago also serves as a stopover for migrating waterbirds such as shorebirds and ducks.

The only endemic mammal to the area is the Bonin flying fox (*Pteropus pselaphon*).

There are about 130 individuals, most of which are found on Chichijima Island.

As outlined above, the area is important as a habitat and breeding ground for endangered species endemic to Ogasawara Islands. In order to protect wildlife living in the relevant area, the Wildlife Protection Area pursuant to Article 28.1 of the Wildlife Protection and Appropriate Hunting Law (Law No. 88 of 2002) shall be revised, and the designated area shall be expanded to include previously undesignated areas of Chichijima and Hahajima Islands as well as marine areas within one kilometer of the breeding grounds of seabirds.

## 2. Guidelines concerning protection in the National Wildlife Protection Area

**Conservation management policies**

1) Conduct surveys to ascertain and monitor the current status of wildlife within the area. In addition, cooperate with relevant national government agencies, relevant local governments, local NPOs, residents, etc. to conserve each island's ecosystem, and take necessary conservation measures to eradicate alien plants, remove feral cats that could possibly prey on wildlife or otherwise prevent their incursion into habitats important to native and endemic wildlife, remove feral goats, rats, etc.
2) Conduct activities such as patrols and education in cooperation with relevant national government agencies, relevant local governments, local NPOs, residents, etc. in order to prevent adverse impacts to the wildlife and their habitats by the uncontrolled entry of people into colony roosting areas and breeding grounds, and discarding rubbish, etc.
3) Utilize the area for observing nature, studying the environment, etc. to the extent that such activities do not affect the wildlife.

## 3. The land (by land-use) and water surface area incorporated into the National Wildlife Protection Area

Total area: 20,058 ha

Breakdown:

A. Breakdown according to land-use type:

Forest: 6,921 ha

Agricultural land: 35 ha

Water surface: 13,002 ha (extending one kilometer off each breeding grounds of seabirds)

Other: 100 ha

## *5-6-2. Ogasawara Archipelago National Wildlife Protection Area, Special Protection Area*

**1. Summary of the Special Protection Area**

**(1) Name of the Special Protection Area**

Ogasawara Archipelago Special Protection Area

**(2) Area(s) comprising the Special Protection Area**

As shown in the figure 5-3 in the nomination

**(3) Duration as a Special Protection Area**

From November 1, 2009 to October 31, 2019 (10 years)

**(4) Designation category for the Special Protection Area**

Habitat for endangered wildlife

**(5) Purpose for designation as a Special Protection Area**

Of the terrestrial birds breeding on the archipelago, *Buteo buteo toyoshimai*, *Columba janthina nitens*, and *Carduelis sinica kittlitzi* are known to have small populations. These species are included in the Threatened I category (Critically Endangered & Endangered) on the Japanese Ministry of the Environment's Red List, and there are serious concerns over their extinction. Furthermore, Bonin honeyeater (*Apalopteron familiare*, a globally rare species which is endemic to the archipelago, and also a Special Natural Monument), breeds in the archipelago. In addition, the area is the breeding ground for endangered seabirds including the Laysan albatross (*Phoebastria immutabilis*), the Tristrams's storm-petrel (*Oceanodroma tristrami*), as well as colonies of black-footed albatross (*P. nigripes*), the brown booby (*Sula leucogaster*), and the wedge-tailed shearwater (*Puffinus pacificus*).

As for mammals, the area is a habitat of the Bonin flying fox (*Pteropus pselaphon*), which is included in the Threatened IA category (Critically Endangered) on the Japanese Ministry of the Environment's Red List, and there are serious concerns over its extinction. Every winter nearly all individuals gather in the Ogiura district of Chichijima Island and roost in a colony. Hence in order to ensure the stable existence of this species, it is critical that the colony roosting area is protected.

For areas particularly important as habitats and/or breeding grounds for endangered species, the Special Protection Area will continue to be designated pursuant to Article 29.1 of the Wildlife Protection and Appropriate Hunting Law (Law No. 88 of 2002). Furthermore, the colony roosting area for the Bonin flying fox and its surrounding areas were designated as the Special Protection Area to protect wildlife living in the relevant area.

## 2. Guidelines concerning protection in the Special Protection Area

**Conservation management policies**

1) Conduct surveys to ascertain and monitor the current status of wildlife within the area. In addition, cooperate with relevant national government agencies, relevant local governments, local NPOs, residents, etc. to conserve each island's ecosystem, and take necessary conservation measures to eradicate alien plants, remove feral cats that could possibly prey on wildlife or otherwise prevent their incursion into habitats important to native and endemic wildlife, remove feral goats, rats, etc.
2) Conduct activities such as patrols and education in cooperation with relevant national government agencies, relevant local governments, local NPOs, residents, etc. in order to prevent adverse impacts to the wildlife and their habitats by the uncontrolled entry of people into colony roosting areas and breeding grounds of wildlife, and discarding rubbish, etc.
3) The areas serving as roosting site in winter for the Bonin flying fox and its surrounding areas shall be properly protected by cooperating with relevant local governments to coordinate with landowners, parties involved with agriculture and tourism, etc. for coexistence with their activities.
4) Utilize the area for observing nature, studying the environment, etc. to the extent that such activities do not affect the wildlife.

## 3. The land (by land-use) and water surface area of the Special Protection Area

Total area: 1,345 ha

Breakdown:

A. Breakdown according to land- use type:

Forest: 1,341 ha
Agricultural land: 4 ha
Water surface: - ha
Other: - ha

## *5-6-3. Ogasawara Archipelago National Wildlife Protection Area, Designated Special Protection Area*

**1. Summary of the Designated Special Protection Area**

**(1) Name of the National Wildlife Protection Area, Designated Special Protection Area**

Ogasawara Archipelago National Wildlife Protection Area, Designated Special Protection Area

**(2) Area(s) established comprising the National Wildlife Protection Area**

Protection area for habitats of endangered wildlife

**(3) Area(s) comprising the National Wildlife Protection Area, Designated Special Protection Area**

As shown in the figure 5-3 in the nomination and the attached figure

**(4) Reasons for designation**

The Bonin flying fox (*Pteropus pselaphon*, hereinafter "flying fox") is the only endemic mammal on the Ogasawara Archipelago. It has been designated a Natural Monument. At present, the species lives only in the Ogasawara Archipelago and on the Kazan Island Group. Not much is known about the ecology/biology of this species and there are no certain figures as to the total speices population. The reliable data obtained from Chichijima Island indicates that there are only about 130 individuals living on that island. The species is included in the Threatened IA category (Critically Endangered) on the Japanese Ministry of the Environment's Red List, and there are serious concerns over its extinction.

It has become clear that within the Designated Special Protection Area nearly all flying foxes which live on Chichijima roost in a colony in winter. The colony is formed in a very specific place every year, and there are no other roosting sites identified on Chichijima. At present, the relevant area is critical for maintaining a stable population of flying foxes, and conserving this area is essential for protecting the species.

The colony roosting area is easily accessible via local roads. In recent years, the areas used by flying foxes have decreased due to housing development in adjacent areas. In addition, the colony roosting site has been moved, fragmented as a result of human activities such as incursion of tourists trying to observe the flying fox, and land development activities in the neighboring areas. Hence there are serious concerns that these human activities are threatening the stable subsistence of the species and adversely impacting their reproductive activities.

For these reasons, the colony roosting site and surrounding areas shall be designated as

a Special Protection Area of the National Wildlife Protection Area. Further, to protect the flying fox from human influence, the colony roosting site shall be designated as a Designated Special Protection Area and stringent protective measures shall be taken.

**2. The land (by land-use) and water surface area incorporated into the National Wildlife Protection Area, Designated Special Protection Area**

Total area: 3 ha

Breakdown:

A. Breakdown according to land- use type:

Forest: 3 ha

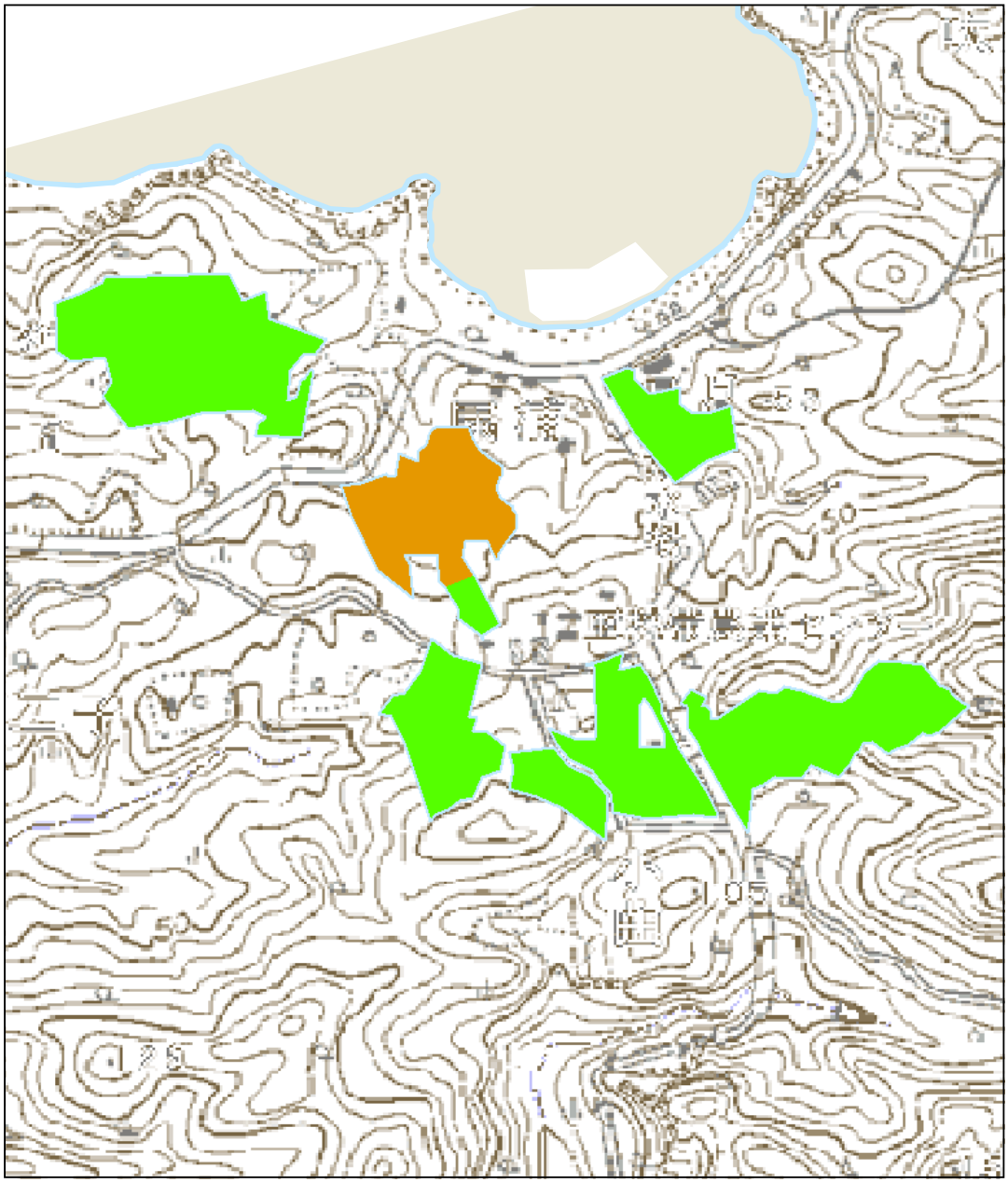
Agricultural land: - ha

Other: - ha

**3. Duration as a National Wildlife Protection Area, Designated Special Protection Area**

From December 1 to June 30 every year from November 1, 2009 to October 31, 2019

Ogasawara Archipelago Wildlife Protection Area
Detail map around Ogiura in Chichijima Is.



# *5-7. Nishinoshima National Wildlife* Protection Area*

* In this section, the term "wildlife" is defined as wild animals that are classified as either birds or mammals.

## *5-7-1. Nishinoshima National Wildlife Protection Area*

**1. Summary of the National Wildlife Protection Area**

**(1) Name of the National Wildlife Protection Area**

Nishinoshima National Wildlife Protection Area

**(2) Area(s) comprising the National Wildlife Protection Area**

Areas in Nishinoshima Island, Ogasawara Village, Tokyo

**(3) Duration as a National Wildlife Protection Area**

From August 1, 2008 to October 31, 2027 (19 years and three months)

**(4) Designation category for the National Wildlife Protection Area**

Protection area for colony breeding areas

**(5) Purpose for designation as a National Wildlife Protection Area**

Nishinoshima is a small oceanic island that extends roughly 0.6 km from north to south and about 0.7 km from east to west. The island is flat, with its highest point reaching only 25 meters above sea level. The island is a combination of new and old lava plateaus connected by gravelly lowland areas formed of accumulated volcanic deposits.

There are communities of herbaceous plants on the older and lower parts of the island, but no vegetation has been confirmed on the new plateau formed as a result of the 1973 volcanic eruption.

The unique characteristics of the island are also reflected in its fauna. The island is a colony breeding ground for many seabirds. They include: the species in the Threatened IB category (Endangered) on the Japanese Ministry of the Environment's Red List such as red-tailed tropicbird (*Phaethon rubricauda*); species in the Threatened II category (Vulnerable) such as masked booby (*Sula dactylatra*), the great crested tern (*Thalasseus bergii*), the Tristram's storm-petrel (*Oceanodroma tristrami*); and other species such as the brown booby (*S. leucogaster*), the wedge-tailed shearwater (*Puffinus pacificus*), and the sooty tern (*Onychoprion fuscatus*).

As outlined above, the area is considered important to colony breeding for seabirds, hence pursuant to Article 28.1 of the Wildlife Protection and Appropriate Hunting Law (Law No. 88 of 2002), the area shall be designated a Wildlife Protection Area as a measure to protect seabirds that breed in colonies.

**2. Guidelines concerning protection in the National Wildlife Protection Area**

**Conservation management policies**

1) Because the area is an uninhabited island, the focus shall be on conserving the current environment of the colony breeding grounds. Furthermore, efforts shall be made for rapid and appropriate responses to environmental changes by gathering information on environment-altering factors (marine rubbish, invasive alien species, etc.) that could potentially affect the seabirds.

2) Cooperate with relevant local governments, relevant organizations, residents, etc. to properly maintain the habitats and breeding environments of seabirds.

**3. The land (by land-use) and water surface area incorporated into the National Wildlife Protection Area**

Total area: 29 ha

Breakdown:

A. Breakdown according to land- use type:

Forest: - ha
Agricultural land: - ha
Water: 1 ha
Other: 28 ha

## *5-7-2. Nishinoshima National Wildlife Protection Area, Special Protection Area*

**1. Summary of the Special Protection Area**

**(1) Name of the Special Protection Area**

Nishinoshima Special Protection Area

**(2) Area(s) comprising the Special Protection Area**

The entirety of the Nishinoshima National Wildlife Protection Area

**(3) Duration as a Special Protection Area**

From August 1, 2008 to October 31, 2027 (19 years and three months)

**(4) Designation category for the Special Protection Area**

Protection area for colony breeding grounds

**(5) Purpose for designation as a Special Protection Area**

Nishinoshima has been confirmed as a colony breeding ground for many seabirds. They include: the species in the Threatened IB category (Endangered) on the Japanese Ministry of the Environment's Red List such as red-tailed tropicbird (*Phaethon rubricauda*); species in the Threatened II category (Vulnerable) such as masked booby (*Sula dactylatra*), the great crested tern (*Thalasseus bergii*), the Ttistram's storm-petrel (*Oceanodroma tristrami*); and other species such as the brown booby (*S. leucogaster*), the wedge-tailed shearwater (*Puffinus pacificus*), and the sooty tern (*Onychoprion fuscatus*).

As outlined above, all of the Nishinoshima Wildlife Protection Area is considered important to colony breeding for seabirds, hence pursuant to Article 29.1 of the Wildlife Protection and Appropriate Hunting Law (Law No. 88 of 2002), the relevant area shall be designated a Wildlife Special Protection Area in order to protect the breeding grounds and the birds that breed within said area.

## 2. Guidelines concerning protection in the Special Protection Area

**(1) Conservation management policies**

1) Because the area is an uninhabited island, the focus shall be on conserving the current environment of the colony breeding grounds. Furthermore, efforts shall be made for rapid and appropriate responses to environmental changes by gathering information on the environment-altering factors (marine rubbish, invasive alien species, etc.) that could potentially affect the seabirds.
2) Cooperate with relevant local governments, relevant organizations, residents, etc. to maintain the habitats and breeding environments of seabirds.

## 3. The land (by land-use) and water surface area incorporated into the Special Protection Area

Total area: 29 ha

Breakdown:

A. Breakdown according to land- use type:

Forest: - ha
Agricultural land: - ha
Water: 1 ha
Other: 28 ha

# 5-8. Kita-iwoto National Wildlife* Protection Area

* In this section, the term "wildlife" is defined as wild animals that are classified as either birds or mammals.

## 5-8-1. Kita-iwoto National Wildlife Protection Area

### 1. Summary of the National Wildlife Protection Area

**(1) Name of the National Wildlife Protection Area**

Kita-iwoto National Wildlife Protection Area

**(2) Area(s) comprising the National Wildlife Protection Area**

Areas in Kita-iwoto Island, Ogasawara Village, Tokyo, and marine areas within 300 meters of Kita-iwoto

**(3) Duration as a National Wildlife Protection Area**

From November 1, 2009 to October 31, 2029 (20 years)

**(4) Designation category for the National Wildlife Protection Area**

Protection area for colony breeding grounds

**(5) Purpose for designation as a National Wildlife Protection Area**

Kita-iwoto is an oceanic island shaped like an oval, extending 3.3 kilometers from north to south, 2.1 kilometers from east to west, and with a circumference of 8.0 kilometers. It is a volcanic island surrounded by coastal cliffs and pebble beaches. The highest point on the island has an elevation of 792 meters. The hillsides have a significant topography of erosional deep valleys with exposed rock on steep slopes.

The vegetation from the shore to the hillsides on the island is dominated by herbaceous plants and broad-leaved evergreen shrubs, reflecting the volcanic geology and subtropical ocean climate.

The unique characteristics of the island are also reflected in its fauna. The island serves as a habitat and colony breeding ground for many seabirds. They include: the species in the Threatened IB category (Endangered) on the Japanese Ministry of the Environment's Red List such as red-tailed tropicbird (*Phaethon rubricauda*), red-footed booby (*Sula sula*), Matsudaira's storm-petrel (*Oceanodroma matsudairae*); and other speies such as the brown booby (*S. leucogaster*), the white-tailed tropicbird (*P. lepturus*), the bridled tern (*Sterna lunata*), and the black noddy (*Anous stolidus*. Furthermore, endangered arboreal birds have been confirmed living on the island. They include: the species in the Threatened IA category (Critically Endangered) such as *Columba janthina nitens*; the species in the Threatened IB category such as *Carduelis sinica kittlitzi*; and the species in the Threatened II category (Vulnerable)

such as dollarbird (*Eurystomus orientalis*). As for mammals, Bonin flying fox (*Pteropus pselaphon*), which is included in Threatened IA category (Critically Endangered), has likewise been confirmed living on the island.

As outlined above, the area is considered important to colony breeding for seabirds and is also a habitat for endangered species, hence pursuant to Article 28.1 of the Wildlife Protection and Proper Hunting Law (Law No. 88 of 2002), the area shall be designated a Wildlife Protection Area as a measure to protect seabirds that breed in colonies and other endangered species inhabiting the area.

**2. Guidelines concerning protection in the National Wildlife Protection Area**

**Conservation management policies**

1) Because the area is an uninhabited island, the focus shall be on conserving the current environment of the colony breeding grounds.
2) Cooperate with relevant local governments, relevant organizations, residents, etc. to properly maintain the habitats and breeding environments of seabirds, etc.

**3. The land (by land-use) and water surface area incorporated into the National Wildlife Protection Area**

Total area: 860 ha

Breakdown:

A. Breakdown according to land-use type:
   Forest: 557 ha
   Agricultural land: - ha
   Water surface: 303 ha (extending 300 meters off the island)
   Other: - ha

## *5-8-2. Kita-iwoto National Wildlife Protection Area,Special Protection Area*

**1. Summary of the Special Protection Area**

**(1) Name of the Special Protection Area**

Kita-iwoto Special Protection Area

**(2) Area(s) comprising the Special Protection Area**

Areas ine Kita-iwoto Island, Ogasawara Village, Tokyo

**(3) Duration as a Special Protection Area**

From November 1, 2009 to October 31, 2029 (20 years)

**(4) Designation Category for the Special Protection Area**

Protection area for colony breeding grounds

**(5) Purpose for designation as a Special Protection Area**

The island serves as a colony breeding ground for many seabirds. They include: the species in the Threatened IB category (Endangered) on the Japanese Ministry of the Environment's Red List such as red-tailed tropicbird (*Phaethon rubricauda*), red-footed booby (*Sula sula*), Matsudaira's storm-petrel (*Oceanodroma matsudairae*); and other speies such as the brown booby (*S. leucogaster*), the white-tailed tropicbird (*P. lepturus*), the bridled tern (*Sterna lunata*), and the black noddy (*Anous stolidus*. Furthermore, endangered arboreal birds have been confirmed living on the island. They include: the species in the Threatened IA category (Critically Endangered) such as *Columba janthina nitens*; the species in the Threatened IB category such as *Carduelis sinica kittlitzi*; and the species in the Threatened II category (Vulnerable) such as dollarbird (*Eurystomus orientalis*). As for mammals, Bonin flying fox (*Pteropus pselaphon*), which is included in Threatened IA category (Critically Endangered), has likewise been confirmed living on the island.

As outlined above, all of the Kita-iwoto is considered important to colony breeding for seabirds and is also a habitat for endangered species of wildlife, hence pursuant to Article 29.1 of the Wildlife Protection and Appropriate Hunting Law (Law No. 88 of 2002), the entirety of the island shall be designated a Special Protection Area in order to protect seabirds that breed in colonies, other endangered species inhabiting the area, their breeding grounds, and habitats.

## 2. Guidelines concerning protection in the Special Protection Area

**Conservation management policies**

1) Because the area is an uninhabited island, the focus shall be on conserving the current environment of the colony breeding grounds.
2) Cooperate with relevant local governments, relevant organizations, residents, etc. to properly maintain the habitats and breeding environments of seabirds, etc.

## 3. The land (by land-use) and water surface area incorporated into the Special Protection Area

Total area: 557 ha

Breakdown:

A. Breakdown according to land-use type:

Forest: 557 ha
Agricultural land: - ha
Water: - ha
Other: - ha

# *5-9. Guidelines for Environment-conscious Public Works in the Ogasawara Islands and Handbook for Construction Work in the Ogasawara Islands*

## *Guidelines for Environment-conscious Public Works in the Ogasawara Islands*

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# *I. General matters*

## 1. Purpose and background

The Ogasawara Islands are home to unique natural environments that have developed out of the natural conditions peculiar to oceanic island arcs isolated from other landmasses. These natural environments must be preserved as a common heritage of humankind.

That said, many public works projects have been carried out in order to ensure the livelihoods of people living in and around these areas, and these projects have had no small impact on natural environments.

In May of 2003, the Ogasawara Islands were domestically chosen for candidacy for designation as a natural World Heritage Site. For this reason, public works projects must be carried out with greater considerations to natural environments of the Ogasawara islands than ever before.

Given this necessity, these Guidelines outline matters to which consideration must be given when implementing public works projects in the Ogasawara Islands in order to minimize their impact on natural environments, scenery, etc.

## 2. Basic principle

The basic principle of these Guidelines is to minimize the impact on the natural environments, scenery, etc. of the Ogasawara Islands, which constitute a common heritage of humankind, when implementing public works projects.

## 3. Basic Policies

Public works projects in the Ogasawara Islands shall consist of a bare minimum of construction, done with consideration to Ogasawara's natural environments, scenery, etc., and shall be implemented according to the following policies:

(1) In order to ensure the preservation of natural ecosystems endemic to the Ogasawara Islands, care shall be taken to prevent the introduction of alien species and to preserve native species.
(2) Proper measures shall be taken to avoid or minimize the effects of public works projects on nature and to repair or restore nature affected by such projects in order to mitigate the burden on the environment.
(3) Consideration shall be given to securing places where people can come into contact

with nature.

(4) All persons involved in public works projects shall have an understanding of the purport of these Guidelines.

(5) For other matters not covered in these Guidelines, consideration shall be given to the environment according to the relevant laws, regulations, ordinances, and other guidelines.

## 4. Applicable scope of the Guidelines

Public works projects that fall under the scope of these Guidelines are building and similar construction projects in the Ogasawara Islands that have been ordered by the Tokyo Metropolitan Government and in which attention should be given to natural environments, scenery, etc. However, these Guidelines do not apply to emergency construction, etc. that is needed to manage public facilities, although in such projects as well consideration shall be given to natural environments, scenery, etc., to the extent possible.

Due attention shall also be given to environmental concerns regarding existing public facilities. For example, proper repairs shall be done on them so as to keep natural environments, scenery, etc. in good condition.

For new development projects, such as those involving new roads, harbors, fishing ports, and airports, studies of their necessity and the impact they may have on Ogasawara's environments and scenery shall be conducted separately at their respective basic planning phases. These Guidelines, however, shall be applied to the planning and design phases of *implementation*.

## 5. Environmental factors to be considered

The specific factors pertinent to natural environments, scenery, etc. that shall be considered when implementing public works projects are as follows:

| Perspectives for consideration | Environmental factors to be given consideration |
|---|---|
| Biodiversity | Wild plants, wild animals, and ecosystems |
| Natural factors not listed above | Air, odor, noise and vibrations, soil, foundation integrity, topography and geology, water and bottom sediment quality, water circulation, groundwater, ocean waves, tidal currents, and others |
| Healthy human contact with nature | Scenery, townscapes, places for people to come into contact with nature, and sites of historical or cultural value |
| Mitigating the burden on the environment | Waste disposal, recycling, use of natural sources of energy, steps to address global warming, etc. |

### 6. Applying environmental considerations

Project operators shall ensure that considerations are given to environments in public works projects as stipulated in these Guidelines.

When undertaking public works projects, project operators shall conduct inspections of environmental considerations at the "implementation planning and design", "construction", and "maintenance" phases, and shall submit the results of those inspections to an auditing body. The auditing body shall examine the results of the inspections done internally by the project operator and, if necessary, request that the project operator make changes.

Furthermore, project operators shall publicly disclose the results of the examinations by auditing bodies.

## *II. Guidelines for Environment-conscious Public Works*

### 1. Matters involving planning and design phases

#### 1.1. Creating implementation plans

| |
|---|
| When drafting implementation plans, considerations shall be given to natural environments, scenery, etc. pursuant to the Basic Policies outlined in these Guidelines. |

When drafting implementation plans for public works projects carried out in the Ogasawara Islands, considerations shall be given to natural environments, scenery, etc. pursuant to the Basic Policies outlined in Section I.3 of these Guidelines.

#### 1.2. Conducting environmental surveys

| |
|---|
| Steps shall be taken to better understand the current condition of natural environments, scenery, etc. in the Ogasawara Islands, and the potential impact of public works projects on such natural environments, scenery, etc. shall be studied. |

When planning and designing the implementation of public works projects, the potential impact of public works projects on the Ogasawara Islands' natural environments, scenery, etc. shall be studied.

#### 1.3. Basic concepts for implementation planning and design

| |
|---|
| The locations, scales, and functions of facilities shall be studied comprehensively with a view to the impact they will have on natural environments, scenery, etc. |

When planning and designing the implementation of public works projects, comprehensive decisions shall be made with due consideration to the impact they will have on the Ogasawara Islands' unique natural environments, scenery, etc. The locations, scales, and functions of public facilities shall be thought out so that they are best-suited to the natural environments and scenery around them.

Furthermore, although the ideal is to preserve natural environments to the extent possible, in situations where a certain degree of impact on natural wildlife is unavoidable, the rehabilitation of alternative habitats and other such measures to preserve ecosystems shall be actively pursued.

### 1.4. Considerations involving structures

| |
|---|
| Structures, materials, and designs that are compatible with the natural environment and scenery shall be used. |

Structures such as roads, rivers, parks, harbors, and residential buildings have a major impact on the natural environment. In addition, these structures play an important role in defining townscapes. For these reasons, due attention shall be paid to making structures, materials, and designs as compatible as possible with the natural environments and scenery unique to Ogasawara.

### 1.5. Applying considerations to existing structures

| |
|---|
| These Guidelines shall also be applied to existing structures so as to keep natural environments, scenery, etc. in good condition. |

Roads, retaining walls, revetments, breakwaters, agricultural infrastructure, various public facilities, etc. shall be upgraded as necessary to keep natural environments, scenery, etc. in good condition.

### 1.6. Measures against alien species

| |
|---|
| Care will be taken in selecting materials that do not adversely affect the natural ecosystems unique to the Ogasawara Islands. |

Ogasawara is home to many endemic species and vulnerable ecosystems, making it necessary to prevent invasion by alien species. Proper steps shall be taken when selecting materials so as to prevent invasion by alien species.

## 2. Matters involving construction phases

### 2.1. Applying considerations to construction plans

| |
|---|
| When drafting construction plans, considerations shall be given to natural environments, scenery, etc. pursuant to the Basic Policies outlined in these Guidelines. |

Construction plans shall be drafted in a manner that takes into consideration the preservation of the Ogasawara Islands' natural environments and area scenery. Furthermore, construction orders shall be placed and schedules shall be set in ways that are sensitive to the natural environment.

### 2.2. Duties of contractors

Contractors shall give due attention to issues of concern regarding natural environments, scenery, etc. during the implementation planning and design phases, and shall not unnecessarily alter the topography or scenery within the construction area. Contractors shall also be aware of and consider the impact on natural environments of noise, vibrations and muddied waters caused by construction.

Contractors must fully understand the public works project orders they have accepted and work to minimize the impact construction has on the surrounding natural environments, scenery, etc. If differences arise in the conditions at construction sites, proper responses shall be taken based on the matters for consideration identified at the implementation planning and design phases.
In addition, construction shall be carried out in an environmentally friendly manner, including the use of low-noise, low-vibration, and low-carbon emitting construction machinery. Furthermore, attention shall be given to color schemes for safety fixtures/facilities in order to maintain harmony with the environs.

### 2.3. Natural environment awareness seminars

Contractors involved with public works must attend seminars held by the Ogasawara Islands Branch Office, Tokyo Metropolitan Government addressing natural environment considerations.

Contractors shall educate their field employees on natural environmental considerations based on seminar content in a manner that is in line with these Guidelines.

### 2.4. Duties of supervisors

Supervisors shall supervise and oversee construction to ensure that it is carried out with due consideration to the Ogasawara Islands' natural environments, scenery, etc., and report on measures to do so to an auditing body.

Supervisors shall fully ensure that contractors at construction sites strictly observe the environmental matters outlined in these Guidelines and in construction plans.
They shall also conduct inspections to make sure that proper considerations are being given to environments and report the results of those inspections to an auditing body.

### 2.5. Checking construction materials

When bringing building materials into an island from outside or otherwise transporting construction materials/equipment, supervisors and contractors shall stringently inspect those materials to prevent the accidental introduction, transport, or spread of alien species.

In order to prevent invasion by alien species, the place of origin and conditions of storage

of materials to be used are to be researched. Inspections shall be carried out when transporting them to see if proper measures to keep out alien species have been taken.
Sufficient preventive steps targeting alien species shall be taken when transporting building materials and construction materials/equipment to an island, within an island, or across different islands.

## 3. Matters involving maintenance phases

### 3.1. Maintenance duties

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|---|
| Maintenance duties shall be carried out with considerations given to natural environments, scenery, etc. pursuant to the Basic Policies outlined in these Guidelines. |

Maintenance work shall likewise entail environmental considerations to the extent possible. Specifically, the stipulations in "1.4. Considerations involving structures" and "1.6. Measures against alien species", which concern implementation planning and design phases, and the stipulations in "2.1. Applying considerations to construction plans" *through* "2.5. Checking construction materials", which concern construction phases, shall be observed.

### 3.2. Restoration of natural environments

| |
|---|
| Efforts shall be made to restore natural environments, including the prompt dismantling of facilities (structures) which no longer serve their intended functions. |

After structures which no longer serve their purpose, such as land upon which now-defunct roads run, have been removed, efforts shall be made to restore natural environments and scenery to their original condition.

## 4. Construction recycling

### 4.1. Promoting construction recycling

| |
|---|
| In order to minimize the environmental impact caused by the disposal of construction waste (byproducts), efforts shall be made to curb the amount of waste generated and to recycle (reuse and reclaim) the waste that is generated. |

Construction waste shall be handled appropriately according to the relevant laws, regulations and ordinances such as the Construction Waste Recycling Law, the Waste Disposal and Public Cleansing Law, and the Tokyo Metropolitan Government Plan for Promoting the Recycling of Construction Waste.
Efforts shall be made towards reducing the amount of waste generated by the extended use (i.e. extending the longevity) of structures and by curbing waste from construction and similar activities. Efforts shall also be made towards recycling (reusing and reclaiming) by: using reusable materials such as concrete blocks within a construction

area, coordinating with other construction sites so such materials can be reused, and treating waste at reclamation facilities.
The treatment of dredged soil shall be considered after gaining a better understanding of the waters it comes from.

### 4.2. Coordination among multiple construction sites/projects

| |
|---|
| Efforts shall be made to exchange information relevant to the use of materials across multiple construction sites and to coordinate their use among them in order to promote construction recycling. |

Regarding the reuse of construction "waste" within a construction site, across multiple construction sites, or processing it at reclamation facilities, information shall be exchanged between them through a coordination committee set up per island, which shall coordinate the use of reusable materials.
If such byproducts cannot be reused within one island, their use shall be coordinated with other destinations, including other islands, as part of a commitment to promote construction recycling.

## 5. Matters involving auditing

### 5.1. Establishing auditing bodies

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|---|
| Auditing bodies shall be established in order to examine the internal inspections of project operators. |

In order to examine the internal inspections of considerations of natural environments, scenery, etc. on the part of project operators, auditing bodies shall be established by the Director-General of the Ogasawara Islands Branch Office.

### 5.2. Examinations by auditing bodies

| |
|---|
| In the "implementation planning and design", "construction", and "maintenance" phases, project operators shall complete a checklist pursuant to these Guidelines and conduct internal inspections using that checklist, the results of which are to be examined by an auditing body. |

Project operators shall fill out on a checklist form prepared by the Bureau of General Affairs (Ogasawara Islands Branch Office, Tokyo Metropolitan Government) necessary items such as those that concern matters that must be taken into consideration, and conduct internal inspections based on this checklist to determine whether proper consideration has been given to environmental and similar concerns. An auditing body shall then examine the results of those inspections.

### 5.3. Requests for revisions

If the auditing body determines that there are outstanding issues based on the examinations mentioned above, it may request that project operators make revisions.

Auditing bodies shall evaluate checklists completed at the implementation planning and design phases to determine whether these Guidelines are being adhered to. If there are outstanding issues, the auditing body may request that revisions be made to implementation plans and/or designs. In construction phases, the auditing body shall confirm that construction is being undertaken with consideration to natural environments, scenery, etc.

If there are outstanding issues, the auditing body will request that the project operator make the necessary changes.

Project operators shall reexamine issues brought up in the request for revisions by the auditing body.

### 5.4. Public disclosure

Project operators shall publicly disclose the results of the examinations by auditing bodies.

Project operators shall publicly disclose the checklists and other materials that have been examined by auditing bodies.

Supplementary matters

These Guidelines go into effect on August 1, 2004.

# *Handbook for Construction Work in the Ogasawara Islands*

This handbook contains things that one needs to know when doing construction work in the Ogasawara Islands, which possess invaluable natural features.
In order to properly implement Guidelines for Environmental Considerations, people should be familiar with the contents of this handbook before doing any construction work.

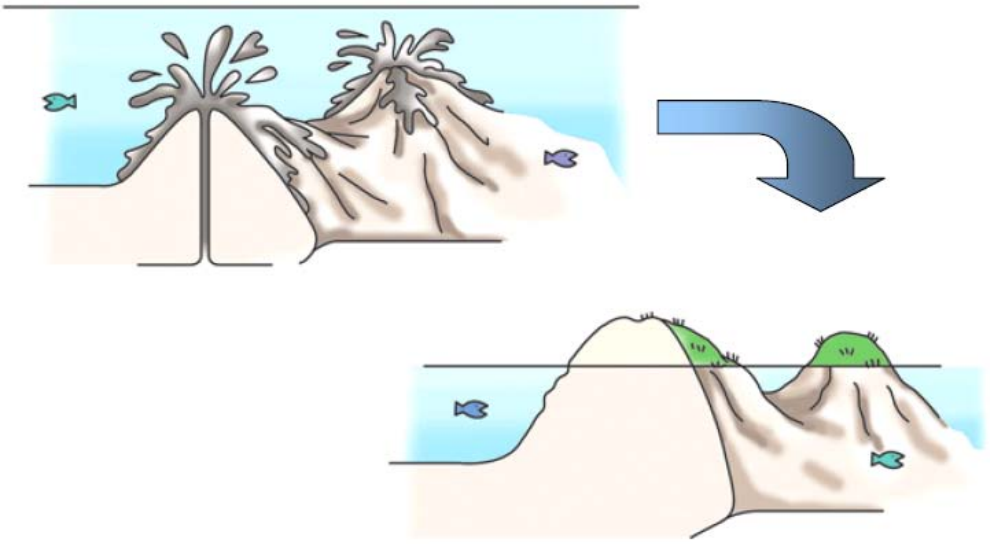
Ogasawara Islands Branch Office, Tokyo Metropolitan Government

**What kind of place is Ogasawara?**

The following is an overview of Ogasawara, a place with many unique natural features.

**A history of the Chichijima, Hahajima, and Mukojima Island Groups**

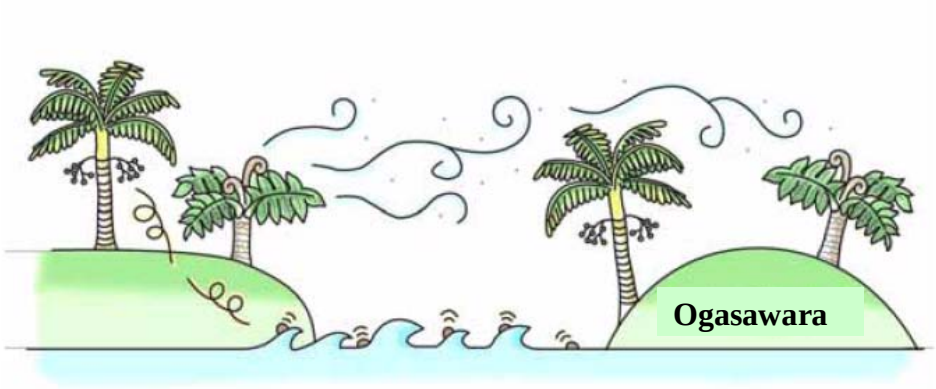
The Chichijima, Hahajima, and Mukojima Island Groups formed about 48 and 44 million years ago due to submarine volcanoes and uplift that subsequently occurred.



The Ogasawara Islands are all oceanic islands, and as such they have never been joined to a continent.

**Nature in Ogasawara**

The plants and animals native to the Ogasawara Islands are the descendents of those that survived after being carried by happenstance by ocean currents, wind, and birds.




The plants and animals that arrived in Ogasawara evolved in unique ways over an extremely long period of time.

**What kinds of endemic species are there in Ogasawara?**

The wildlife that took diversionary paths of evolution in Ogasawara consists of species that can only be found in Ogasawara.

These are referred to as the islands' "endemic species".



*Melastoma tetramerum*



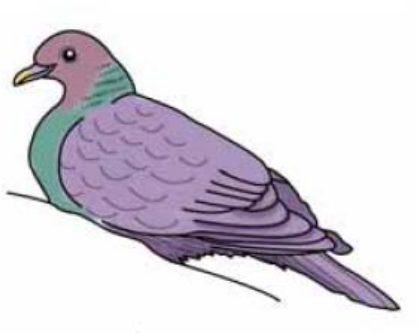
*Morus boninensis*



*Rhododendron boninense*



*Pteropus pselaphon* (Bonin flying fox)



*Columba janthina nitens*



*Boninthemis insularis*



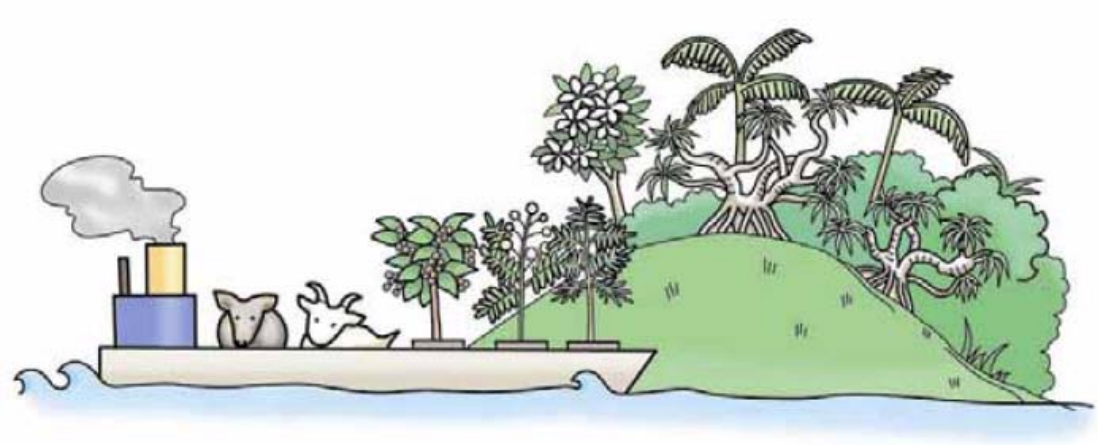
*Mandarina* snails

Many endemic species live in Ogasawara. In fact, about 40% of all plant species are endemic, as are about 90% of all snail species. Among Ogasawara's endemic species are Natural Monuments and highly endangered species.

Once a species becomes extinct, it is lost forever.

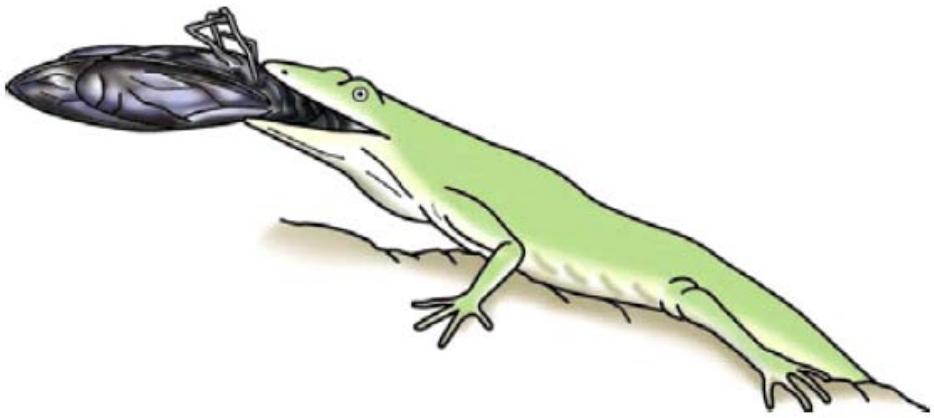
**What are alien species?**

Once people began to live in Ogasawara, they brought with them new plants and animals. These are referred to as “alien species”.



**The natural environment of Ogasawara is very delicate**

Life in Ogasawara is a matter of a very delicate balance, which is common of oceanic islands.



A green anole (alien species) preying on *Meimuna boninensis* (an endemic species of cicada).

Species endemic to the Ogasawara Islands have never had to compete with outside species. The very uniqueness of Ogasawara’s natural environment makes it highly vulnerable to human activity and alien species.

**Let's work to preserve nature**

Even the smallest acts can go a long way towards preserving Ogasawara's precious natural environment.

**Protect endemic species**

- Do your best to protect endemic species of wildlife living in construction areas.
  Find out if the work can be done without cutting down trees.
  Find out if they can be transplanted.



- Check for the presence of endemic species in the construction area, and report any to a supervisor.



**Keep alien species from getting in and getting out**

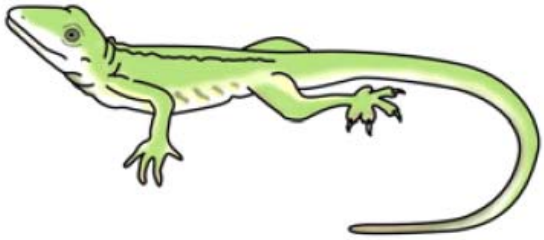
The natural environment of Ogasawara is highly susceptible to the effects of alien species.

- Make sure that nothing unintentional is stuck to work clothes, the soles of footwear, or on construction materials and equipment transported from the main Japanese islands or across islands in Ogasawara. If there is extraneous matter, dispose of it.





- Make sure that nothing unintentional is attached to cargo from the main Japanese islands or across islands in Ogasawara. If there is extraneous matter, dispose of it.



Green anole



New Guinea flatworm



Lead tree



Southern sandbur



Formosan subterranean termite

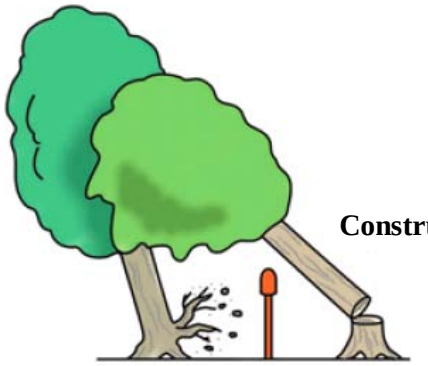
**Take care of trees, grasses, and flowers**

- Minimize the cutting of trees involved in construction work.

Cutting down trees has a major negative impact on the environment, so try to minimize it.



When felling trees or lifting up fallen ones, try not to damage the surrounding trees, grasses, or flowers.

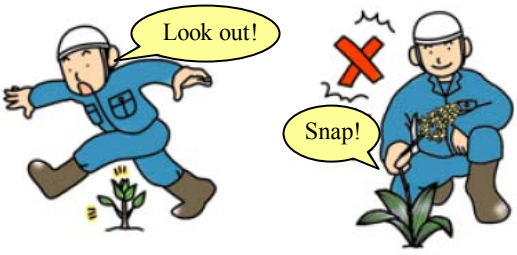



Take care not to harm surrounding trees.

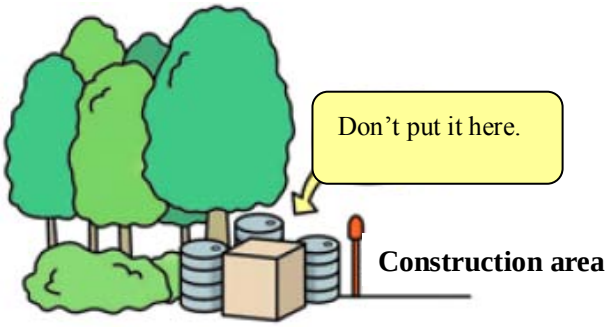


●Don't enter areas that are not part of the construction area.
Try not to step on grasses, flowers, or seedlings outside of the construction area.

Try not to break trees, grasses, or flowers.




Do not set down things outside of the construction area.



**Take care of soil and water**

- Protect the topsoil

  Try not to trample unnecessarily on plants around the construction site. Try not to damage the topsoil.

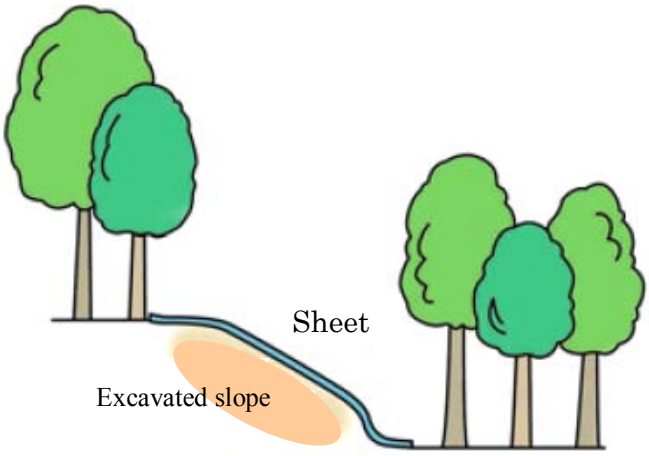


- Transport dirt and rocks from construction work to a predetermined place. Don’t discard it outside of the predetermined places.




- Keep dirt and rocks at construction sites from sliding into surrounding areas.

  Cover slopes that have been dug into with sheets.



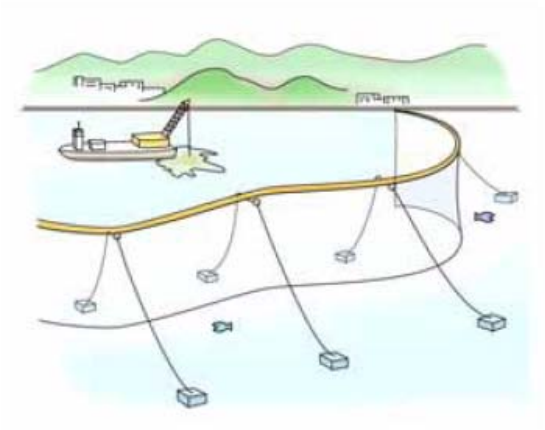
**Protect the ocean**

- Keep the ocean clean

Take the initiative in retrieving trash floating on the sea surface.



Use silt protectors to keep other areas from being muddied unnecessarily.



- Conduct ample surveys of the seabed before any construction.



**Protect wildlife**

- Do what you can to protect birds, the flying fox, blue turtles, and other wildlife

Make sure there are no breeding grounds or nests present, and report any to a supervisor.



Turn off lights at night when they are not necessary.



- Take precautions to protect terrestrial hermit crabs, insects and fish

  Streams and puddles are important habitats for hermit crabs, fish, and aquatic insects. Make sure that water veins are not cut off and that dirt and rocks do not flow into water.





Make sure that miscellaneous wastewater, water used to wash concrete, waste oil, etc. do not get into rivers. Dispose of them instead at predetermined locations.

**Other things to watch out for**

- Keep construction sites clean

Make sure the colors and shapes of temporary buildings and material storage piles don't stand out.

Use colors and shapes that don't stand out.



Keep materials and equipment clean and organized. Try to guard them with fences or covers.

For fences and covers, choose colors that don't stand out.

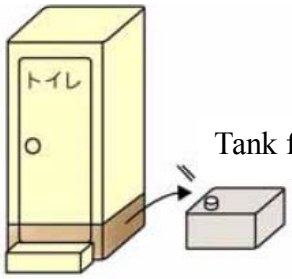
Take home all trash.



Spray water to keep the level of dust down.



Relieve yourself only in designated places. Make sure that such places have storage tanks which can be transported out and dispose of later, rather than letting it run off.




Tank for transport



Smoke only in designated areas, and discard cigarette butts in designated places.

The starting of fires is strictly prohibited.



Try to travel together in the same vehicle.



# *5-10. The Guidelines for Public Facilities, which give due consideration to the scenery of Ogasawara (Chichijima and Hahajima) and Recommeded tree species list*

## *1. The Guidelines*

**1) Background and purpose**

The Ogasawara Islands constitute a group of islands scattered across the Pacific about 1,000 kilometers south of Tokyo. None of these oceanic islands has ever been connected with a continent, a fact which makes the islands a cornucopia of rare and endemic species of flora and fauna that have evolved along unique lines of speciation. In order to preserve and protect the natural environments of Ogasawara as assets important for the common heritage of humankind, the Japanese government, the Tokyo Metropolitan government, and Ogasawara Village are striving to have Ogasawara listed as a natural World Heritage Site.

After the compulsory evacuation of Ogasawara islanders to the main Japanese islands during the Second World War and the years of post-war rule by American forces, the islands were returned to Japan in 1968. Since then, many projects have been undertaken to restore lifeline and industrial infrastructures as part of reconstruction and restoration efforts in order to consistently raise the standard of living on the part of islanders. While construction projects in the past have focused on maintaining the unique character of villages in the islands as well as harmony with the natural features and environments unique to the Ogasawara Islands, one cannot deny that some of the efforts in this direction have been insufficient, and as a result one can see sporadic examples of buildings and such which are clearly dissonant with their environs.

Expectations are high for increasing numbers of tourists seeking out the attractive natural features of Ogasawara, driven by the potential for listing as a natural World Heritage Site, improvements in terms of transportation amenities like access to highways, and well thought out strategies in place to promote tourism. In order to properly address the scenic issues posed by these developments, it is necessary to develop a set of “Ogasawara Rules”.

Most of the “central” areas of Ogasawara Village are taken up by public facilities like roads, parks, schools, and housing in Ogasawara. These public facilities act not only as the crux of activity for islanders and visitors alike, they provide attractive townscapes, which make the lives of residents more comfortable and fulfilling, and constitute high-quality social capital that preserves the character of Ogasawara Village overall. For these reasons, it is crucial that these townscapes are allowed to fulfill these scenic roles, and to this purpose they must be maintained and managed in a manner that contributes to

the positive aesthetic qualities of the village, with the proviso that functionality and safety are given priority.
The Guidelines for Public Facilities (hereunder "Guidelines"), which give due consideration to the scenery of Ogasawara (Chichijima and Hahajima), shall serve as guidelines for the proper considerations to be given to scenery by the Tokyo Metropolitan and Ogasawara Village governments, in addition to other public/public-interest enterprises (hereunder "public works project operators") by, for example, the national government, power companies and communications providers.

**2) What constitutes applicable facilities**

Applicable facilities are those that result from civil engineering projects involving public/public-interest facilities undertaken by the national government, the Tokyo Metropolitan Government, Ogasawara Village, or public works project operators that involve facilities which have an impact on the land- or townscapes of Ogasawara. The construction or repair of such facilities shall be undertaken according to the principles of the Guidelines. Namely, the following facilities apply:

**(1) Urban infrastructure**

A. Paths
- i. Roads and footpaths
- ii. Path-lining trees
- iii. Retaining walls
- iv. Bridges

B. Rivers
- i. Revetments

C. Tunnels
- i. Tunnel mouths

D. Harbor facilities
- i. Revetments and berths

E. Parks
- i. Open spaces
- ii. Overlooks and rest spots
- iii. Park paths

F. Structures
- i. Installations
- ii. Retaining walls forming residential land

**(2) Other facilities**

A. Safety fixtures (fences, guardrails, and lighting equipment)
B. Signs
C. Parking spaces for motor vehicles and bicycles

**(3) Buildings**

**3) The hierarchical status of the Guidelines and their application**

The Guidelines were developed through a collaborative effort between the Tokyo Metropolitan Government and Ogasawara Village in a manner reflecting the degree of impact on the scenery of Chichijima and Hahajima caused by the construction of public/public-interest facilities.

Ordinarily, when planning, constructing, maintaining or managing public/public-interest facilities under the respective authorities, they are constructed according to standards outlined by those authorities, but these Guidelines are intended to summarize matters that need to be addressed voluntarily in order to create, maintain, and preserve the scenery on both of these islands in a manner befitting listing as a natural World Heritage Site.

Specifically, these Guidelines are intended to reflect various design standards and existing plans, such as the Tokyo Cityscape Ordinance, the Tokyo Cityscape Plan, the Public Works Cityscaping Guidelines, the Road Construction Design Standards, and the Technical Standards (and Commentary) of Port and Harbor Facilities in Japan, so that construction designs are congruent with the unique characteristics and natural conditions of Ogasawara.

Using its status as a domestically designated candidate for listing as a natural World Heritage Site as the impetus to take the initiative on the construction of public facilities within its territory, Ogasawara Village has prepared a set of guidelines titled the "Guidelines for Environmental Considerations for Public Works Projects in the Ogasawara Islands" (hereunder the "Guidelines for Environmental Considerations") which outline matters which must be considered in the implementation planning, design, construction, and maintenance phases of public works projects ordered by the Tokyo Metropolitan Government. These guidelines are designed to mitigate the impact of public works projects on the natural environments, scenery, etc. of the Ogasawara Islands. The guidelines here are to be applied to the city/townscape aspects of the Guidelines for Environmental Considerations.

At the same time, there are areas that fall within Ogasawara National Park according to the Natural Parks Law for which standards relating to scenery have already been established, including the standards for development permits (Enforcement Regulation No. 11 of the same) and the Ogasawara National Park Management Plan. For this reason, in the event that administrative orders deriving authority in such standards or plans are issued, those orders shall be followed. Also note that these Guidelines apply for more detailed matters such as standards for color schemes.

In December of 2005, Ogasawara Village released its "Ogasawara Townscape Guidelines" for privately-owned buildings. The principles behind this set of guidelines are gradually gaining a foothold. Furthermore, joint efforts by the private and public sectors are underway to integrate the Guidelines presented here (which mainly concern public facilities) and village guidelines in order to create attractive townscapes.

The area around Futami Harbor in Ogasawara's Chichijima has been designated a Special

Scenic Zone through the Tokyo Cityscape Plan. Both public and private facilities are encouraged to pursue this designation awarded according to the Cityscape Formation Standards. Considering the importance of public facilities, the Guidelines aim to offer principles not covered by the Cityscape Formation Standards and encourage the creation of attractive townscapes.
These Guidelines shall be tentatively effective until the 2013 fiscal year, at which point they are scheduled for review. That said, the primary operative duration for these Guidelines is until fiscal 2011, when the Ogasawara is expected to be listed as a natural World Heritage Site. If and when that happens, the results of these Guidelines will be examined and revisions will be applied as necessary.

## *2. Basic policies of the Guidelines*

In its "Ogasawara Area Development Guidelines (May 2007)", the Tokyo Metropolitan Government stresses its commitment to preserving the unique natural environments of Ogasawara, but it also recognizes the important of maintaining and creating scenic townscapes and landscapes. Its basic landscape policies are designed to: A. Preserve the unique natural environments of Ogasawara, B. Preserve and pass on the history and cultural resources of Ogasawara, C. Create scenery that is in harmony with natural environments, and D. Create scenery that is conducive to regional economic prosperity.
In these guidelines, key landscapes shall include but not be limited to the following: the waterfront at Futami Harbor, which is the gateway to Ogasawara Village and the first thing visitors see from the ferry when they visit Chichijima; the scenic overlooks from the Ōkamiyama and Mikazukiyama observation decks, the view from the prefectural road, along which are located the Village Office, a church, the Ogasawara Fisheries Center, and other important tourist destinations; the waterfront at and around Oki Harbor that visitors view from the ferry when visiting Hahajima; and scenic overlook from the Shōkensaki observation deck. In order to preserve these landscapes, the following basic policies shall be implemented.

**Basic Policy I: Developing scenic landscapes in harmony with natural environments**

- The natural environments of Ogasawara are extremely rare and valuable, to the extent that they efforts are underway to have them collectively listed as a natural World Heritage Site. The sights and views that these natural environments enchant the hearts and minds of the people who visit the islands.
- Any plans or efforts to develop landscapes must first and foremost place primary importance on the preservation and protection of natural scenery.
- Landscape development must not harm natural environments or scenery, but rather improve the level of integration and harmony with natural environments.

**Consideration 1: "Facilities should be suited to the climate of Ogasawara"**

Facilities must be strong enough to withstand the unique climate of Ogasawara. Some common climatic issues experienced are excessive sunlight (ultraviolet rays), squall-like heavy rains, the strong winds of typhoons, salt from the ocean carried by the wind, and humidity, all of which can compromise the integrity of buildings and other facilities. Hence, they must be designed so that they can robustly and flexibly weather these harsh conditions.

**Consideration 2: "Facilities must take into consideration the habitats of wildlife"**

It is important to mitigate the impact on the habitats of Ogasawara's rare flora and fauna. Facilities should be constructed in an environmentally-friendly manner so as to minimize the impact on Ogasawara's rare wildlife habitats. This means the use of materials and construction methods that do not burden the natural environment. Structures themselves should be strong enough to withstand the effects of the Formosan subterranean termite and other flora and fauna in the islands that can damage buildings and other structures.

**Basic Policy II: Developing landscapes appropriate to the scenery**

- When giving consideration to the scenery of Ogasawara, it is important to focus on the blending of nature and townscapes. Factors such as townscapes with the sea or mountains in the background, the view of townscapes from the sea or mountains, and towns as centers of tourism should be matters of attention.
- Sites with views that define people's impressions of Ogasawara and scenic sites where many people gather should be identified, and in order to maximize the views that those scenic sites offer, it is important to develop them and improve upon them in an effective manner.

**Consideration 3: "Integration with natural scenic backdrops"**

It is important to consider the locations, shapes, and color schemes of buildings and other facilities so that they do not stand out and draw attention away from the Ogasawara's natural scenic backdrops, including the ocean, sandy beaches, and the green mountain ridges in the background.

**Consideration 4: "Preserve 'coziness' in architectural design"**

Facing the sea and flanked by mountains, people in Ogasawara have had to take advantage of a limited amount of inhabitable space, resulting in a cozy feel to buildings. Many of these buildings and houses are small, but rather than feeling overly cramped, there is an 'open' feel to them.

Structures should be built in a way that mimics these traditional orientations and uses of space.

**Basic Policy III: Creating landscapes that contribute to the economic prosperity of Ogasawara**

- For people who make their living in the sightseeing industry (tour guiding, diving, fishing, etc.), lodging industry, and souvenir industry, the impact of scenery affected by the construction of public facilities is large.
- In order to properly develop the scenery in Ogasawara, it is important to develop landscapes that in effect contribute to economic prosperity, instead of just "prettying up" things in a superficial manner.

**Consideration 5: "Creating comfortable spaces"**

Massive civil engineering-related structures, such as piles of concrete blocks for retaining walls may leave oppressive, rigid, and inorganic impressions. Furthermore, the site of different materials indiscriminately combined on retaining walls or pavement surfaces does not fit with Ogasawara's image.

Spaces should be designed with sufficient attention given to the mental impressions they leave people with. They should engender overall feelings of calmness and comfort.

**Consideration 6: "Creating spaces that make tourists feel welcome"**

Scenery should be developed in a manner that generates a sense of hospitality and shows pride, so that people who visit the islands for sightseeing purposes feel welcome, moved, and relaxed.

Especially in areas associated with marine leisure, hiking, nature tours, and other areas linked to tourism in Ogasawara, it is important design spaces and create landscapes that befit their respective fields.

We want visitors to enjoy their time spent in Ogasawara as much as possible, and achieving that objective also means providing ample shade and comfortable resting places and cultivating a "slow-paced" atmosphere.

**Basic Policy IV: Creating landscapes that convey the feeling that time passes more slowly in Ogasawara**

- The list of unique aspects of Ogasawara and its history is seemingly endless: its rare natural environments, the subtropical climate, a history of occupation by American forces, retrocession to Japan, the introduction of Western culture, and the fact that it is 1,000 km away from the main islands of Japan, just to name a few.
- The atmosphere and mood that these aspects have cultivated is unique to Ogasawara; this mood makes the passage of time seem slower in a way that is peculiar to Ogasawara.
- It is particularly important to try to create landscapes that blend in with nature in a way that continues to convey that unique feeling that time passes more slowly in Ogasawara.

**Consideration 7: "Cultivating 'Ogasawaranness'"**

What we may call "Ogasawaranness", which is what visitors look for and residents embody, can be thought of as a cultural dimension that has developed independently on the islands over many generations. Recently, however, scenery that invokes that distinctive feel is gradually giving way to modernity, making the pursuit and preservation of this Ogasawaranness a pressing concern.

When designing public facilities, one should try to create designs that are modest and reserved. The cost of pursuing such aesthetic qualities will offset in the end.

**Consideration 8: "Establishing original designs suited to the climate, environment, and culture"**

Attempts should be made to create designs best suited to Ogasawara's unique climate and natural environments, with one goal being the creation of an "Ogasawara style" in design and form.

It is important to strike a balance between maintaining traditional island lifestyles with lifestyles of convenience, which are marked by the flexible integration of ever-advancing technologies.

Attention should be paid to issues such as how to use new materials and technologies rationally and how to conceal fixtures from view. It is necessary to develop a new "Ogasawara style" so that "Ogasawaranness" is not lost in the process of development.

## 4. *Recommended tree species list*

### Recommended tree species list

- This is a list of tree species that are either already being grown in Ogasawara or are expected to be grown in the future. Compiled with input from experts, this list represents a broad selection of species believed not to be harmful to Ogasawara's unique ecosystems. It was put together in part to increase the range of choices that can be made for aesthetic/scenic reasons.
- This list represents assessments based on information available at the present time. Additions and deletions will be made as necessary when and if circumstances change, circumstances which may include future scientific findings or as the "Ogasawara Islands World Natural Heritage Candidate Site Management Plan" is developed.
- Only species grown on the islands may be used.

| Priority | Common name (if available) | Family | Native habitat | Garden species | Widespread species | Endemic species | Tree species type | | | Uses | | | | Areas where use is permitted | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Tall | Medium | Short | To line streets | In parks | As hedges | Along rivers | Special Landscape Area | Areas other than those listed to the left (including Hahajima) | |
| 1 (*1) | Traveller's Tree | Arecaceae | Madagascar | X | | | X | | | X | X | | X | X | X | Permitted because they are not invasive |
| | Natal Plum | Apocynaceae | South Africa | X | | | | | X | | X | X | X | X | X | |
| | Taiwan Cherry | Rosacea | Taiwan, China | X | | | X | | | X | X | | | X | X | |
| | Saipan Lemon (Kikuchi Lemon) | Citrus | Northern India | X | | | | X | | X | X | | X | X | X | |
| | Croton | Euphorbiaceae | Malay Peninsula | X | | | | X | | | X | X | | X | X | |
| | Golden Shower Tree | Fabaceae | India | X | | | X | | | X | X | | X | X | X | |
| | Coconut Palm (*4) | Arecaceae | Tropical Asia | X | | | X | | | X | X | | X | X | X | |
| | *Phyllanthus flexuosus* | Euphorbiaceae | South Sea Islands | X | | | | X | | | X | X | | X | X | |
| | Starfruit | Oxalidaceae | Tropical Asia | X | | | X | | | X | X | X | X | X | X | |
| | Triangle Palm | Arecaceae | Madagascar | X | | | X | | | X | X | | X | X | X | |
| | *Ixora chinensis* | Rubiaceae | Southern China | X | | | | X | | | X | X | X | X | X | |
| | Strelitzia (Bird of Paradise Flower) | Strelitziaceae | South Africa | X | | | | | X | | X | X | X | X | X | |
| | Tiger's Claw (*4) | Fabaceae | India | X | | | X | | | X | X | | X | X | X | |
| | Bottle Palm | Arecaceae | Mauritius, Mascarene Islands | X | | | X | | | X | X | | X | X | X | |
| | Spindle Palm | Arecaceae | Rodrigues Island | X | | | X | | | X | X | | X | X | X | |
| | Ponytail Palm | Agavaceae | Mexico | X | | | | X | | X | X | | X | X | X | |
| | Song of India | Agavaceae | Malaysia | X | | | | X | | | X | | X | X | X | |
| | Hibiscus | Malvaceae | India, Hawaii, Southern China | X | | | | X | | X | X | X | X | X | X | |
| | Guiana Chestnut | Bombacaceae | Mexico | X | | | X | | | | X | | X | X | X | |
| | Banana Tree | Musaceae | Tropical Asia | X | | | | X | | | X | | X | X | X | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bougainvilleae (*4) | Nyctaginaceae | South America | X | | | | X | | | X | X | X | X | X | |
| | Temple Tree | Apocynaceae | Mexico | X | | | X | | | | X | | X | X | X | |
| | Royal Poinciana (*4) | Fabaceae | Madagascar | X | | | X | | | X | X | | X | X | X | |
| | *Polyscias filicifolia* | Araliaceae | New Caledonia | X | | | | X | | | X | X | X | X | X | |
| | Manila Palm | Arecaceae | Philippines | X | | | X | | | X | X | | X | X | X | |
| | Mango Tree | Anacardiaceae | India | X | | | X | | | X | X | | X | X | X | |
| | Lychee | Sapindaceae | China | X | | | X | | | X | X | | X | X | X | |
| 2 (*2) | Yellow Necklace Pod | Fabaceae | Ogasawara (Southeast Asia) | | X | | | X | | | X | X | | X | | If native species of local pedigree (*3) are used, their use is permitted in Special Landscape Areas (upon verification of their local pedigree). |
| | Chinese Fan Palm | Arecaceae | Variety endemic to Ogasawara | | | X | X | | | X | X | | | X | | |
| | Beach Naupaka | Goodeniaceae | Ogasawara (Australia) | | X | | | | X | | X | | | X | | |
| | Seaside Morning Glory | Convolvulaceae | Ogasawara (Southeast Asia) | | X | | | | X | | | | | X | | |
| | Arrack Tree | Arecaceae | Ogasawara | | | X | X | | | X | X | | | X | | |
| | Chinaberry | Meliaceae | Ogasawara (Eastern India) | | X | | X | | | X | X | X | | X | | |
| | Grand Crinum Lily | Amaryllidaceae | Ogasawara (Southeast Asia) | | X | | | | X | | X | X | | X | | |
| | Pandanus boninensis (*4) | Pandanaceae | Ogasawara | | | X | | X | | X | X | | | X | | |
| | *Calophyllum inophyllum* (*4) | Clusiaceae | Ogasawara (Pacific islands) | | X | | X | | | X | X | | | X | | |
| | Mago | Hernandiaceae | Ogasawara (West Indies) | | X | | X | | | X | X | | | X | | |
| | *Vitex rotundifolia* | Malvaceae | Ogasawara (Southeast Asia) | | X | | | | X | | X | X | | X | | |
| | Bengal Almond Tree | Combretaceae | Ogasawara (Pacific islands and elsewhere) | | X | | X | | | X | X | | | X | | |
| | October Bush | Boraginaceae | Ogasawara (Southeast Asia) | | X | | | | X | | X | | | X | | |
| | Indian Mulberry | Rubiaceae | Ogasawara (Pacific islands) | | X | | X | | | | X | X | | X | | |
| | Beach Hibiscus | Malvaceae | Ogasawara (Okinawa) | | X | | X | | | | X | | | X | | |
| | *Photinia wrightiana* | Rosacea | Ogasawara (East Asia) | | X | | | X | | | X | X | | X | | |
| | *Hedyotis leptopetala* | Rubiaceae | Ogasawara | | | X | | | X | | X | | | X | | |
| | *Rhaphiolepis wrightiana* | Rosacea | Ogasawara (East Asia) | | X | | | | X | | X | X | | X | | |
| | *Osmanthus insularis* | Oleaceae | Ogasawara (East Asia) | | X | | X | | | X | X | X | | X | | |
| | *Wikstroemia pseudoretusa* | Thymelaeaceae | Ogasawara | | | X | | | X | | X | X | | X | | |
| | *Vaccinium boninense* | Ericaceae | Ogasawara | | | X | | | X | | X | X | | X | | |
| | *Schima wallichii* | Theaceae | Ogasawara | | | X | X | | | X | X | | | X | | |

*1:

・In order to prevent invasion by the Formosan subterranean termite, New Guinea flatworm, and other invasive species in the soil which prey upon endemic land snails designated as Natural Monuments, it is forbidden to introduce plants from outside Hahajima with their soil. Furthermore, the introduction of trees used for reforestation from Chichijima to Hahajima is forbidden under the “Ordinance to prevent infestation in Hahajima by the Formosan subterranean termite and other species” (Ogasawara Village, 1998).

*2:

・These are forbidden in the mountainous regions of Special Landscape Areas due to the high level of danger of genetic interbreeding caused by the dispersal of seeds associated with the lack of proper management.

・Native habitats indicated in parentheses indicate native species.

*3:

・Native species of local pedigree here refer to seedlings harvested from wild communities within the same island (or those cultivated through cutting thereof). Even if an individual is grown on Chichijima, unless its origins can be confirmed, its local pedigree cannot be verified, so it shall not be used. (For example, *Livistona* species, which are grown on Chichijima, are likely to have originated elsewhere, so they cannot be said to have a local pedigree).

*4:

・These are species listed in the Ogasawara Townscape Guidelines and the Tokyo Cityscape Plan (Ogasawara Special Landscape Areas) as particularly representative of Ogasawara.

# *5-11. Guidelines for Ecotourism and Agreement on appropriate use rules*

## *5-11-1. Guidelines for the Protection and the Appropriate Use of Nature on the Islands of Tokyo*

Bureau of Environment, Natural Environment Division, Planning Section Decree No.288 (2002), finalized by the governor, July 1, 2002

(Purpose)

**Article 1.**

The purpose of the guidelines is to set forth the necessary things in order to develop frameworks where people can enjoy rich natural environment and to protect and promote appropriate use of the environment in the island regions that have rare specimens of nature which should be passed on to future generations.

(Designation of Nature Conservation Promotion Area)

**Article 2.**

The governor may designate a Nature Conservation Promotion Area if the area satisfies the following and is recognized that a balance must be kept between conservation and use because it includes rich natural environment that should be passed down to future generations.

(1)Areas which satisfy any of the following conditions from A to C:

A. Habitats, breeding grounds, and migration destinations of rare animals or plants that are important to maintain diverse wildlife and ecosystems;

B. Geologically or topographically important areas;

C. Areas of outstanding scenery.

(2) Areas that are vulnerable to human activity, such as excessive entry.

2. In designating the areas described in the previous paragraph, the governor shall conduct monitoring surveys of wildlife (hereunder refers to as “monitoring surveys”) if necessary and clarify guidelines for the preservation of nature and proper use in the relevant area.

3. When the governor intends to designate a Nature Conservation Promotion Area, he or she shall consult with the mayors of municipalities which include the Nature Conservation Promotion Area (hereunder refers to as “relevant municipalities”) as well as the owners of land to be designated as a Nature Conservation Promotion Area (hereunder refers to as “landowners”).

4. After designating a Nature Conservation Promotion Area, the governor shall report it and notify the mayor of a Nature Conservation Area as well as the landowners.

5. The stipulations in Paragraph 2 apply to the revocation of designation of a Nature Conservation Promotion Area as well as to changes made to the designated area.

(Formation of an agreement)

**Article 3.**

Once the governor has designated a Nature Conservation Promotion Area, he or she shall enter into an agreement (hereunder refers to as "the Agreement") with the mayors of the relevant municipalities on appropriate use of that Nature Conservation Promotion Area regarding the following matters:

(1) Sharing of roles between the Tokyo Metropolitan Government and the relevant municipalities
(2) Necessary matters from the following concerning appropriate use of a Nature Conservation Promotion Area (hereunder refers to as "the Proper Use Rules"):
  A. Available areas or routes for visitors;
  B. Available terms and times for visitors;
  C. The maximum number of visitors (defined as people who use the Nature Conservation Promotion Area);
  D. The maximum number of people who can be accompained by one Tokyo Nature Guide as stipulated in Article 5, Paragraph 1;
  E. Other matters necessary for proper use.
(3) Other matters necessary for the conservation of nature and appropriate use of a Nature Conservation Promotion Area

(The conducting of monitoring surveys)

**Article 4.**

In order to promote the protection of nature in and proper use of a Nature Conservation Promotion Area, the governor shall conduct monitoring surveys.

2. If, based on the results of monitoring surveys, the governor deems it necessary to do, he or she shall deliberate with the mayor of the relevant municipality and reexamine the Proper Use Rules.

(Tokyo Nature Guide certification)

**Article 5.**

In order to promote the protection of nature and proper use of a Nature Conservation Promotion Area, the governor shall train and certify Tokyo Nature Guides.

2. Tokyo Nature Guides shall be certified by the governor if the persons have completed the required seminars sponsored by him or her maintain an address in the relevant area and are 18 years of age or older.

3. The governor shall decide upon the methods for training and certifying Tokyo Nature Guides in a manner prescribed elsewhere after deliberating with the mayors of relevant municipalities.

(The roles of Tokyo Nature Guides)

**Article 6.**

Tokyo Nature Guides shall assume the following roles:

(1) To teach visitors so as to deepen their knowledge of nature;
(2) To instruct visitors on use rules, according as these Guidelines;
(3) To cooperate in monitoring surveys of Nature Conservation Promotion Area.

(Accompanying of Tokyo Nature Guides)

**Article 7.**

Except for the circumstances of the following, persons wishing to enter a Nature Conservation Promotion Area shall be accompanied by a Tokyo Nature Guide.

(1) When a landowner enters the area for the reasons daily life;
(2) When it is necessary to enter the area in order to take emergency measures in times of disaster;
(3) When members of the national government or local public authorities must enter for management activities;
(4) If the governor deems it particularly necessary for the reasons that do not fall under above three Items

(Instruction on the use of Nature Conservation Promotion Area)

**Article 8.**

The governor shall, in cooperation with the mayor of the relevant municipality, issue necessary instructions or warnings to visitors concerning the use of a Nature Conservation Promotion Area.

(Responsibilities)

**Article 9.**

In implementing these Guidelines, the Tokyo Metropolitan Government shall, in cooperation with the relevant municipalities, work to promote comprehensive and systematic strategies for the conservation of nature and appropriate(wise) use.

Miscellaneous provisions

These Guidelines enter into effect as of July 1, 2002, with the exception of Article 4, Article 7, and Article 8, which enter into effect as of April 1, 2003.

## *5-11-2. Agreement on Appropriate Use of the Nature Conservation Promotion Area in the Ogasawara Islands*

Pursuant to the provisions of Article 3 of the Guidelines for the Protection and the Appropriate Use of Nature on the Islands of Tokyo (Environment Agency, Nature Conservation Bureau, Planning Division Decree No. 288 (2002), finalized by the governor, July 1, 2002; hereunder the “Guidelines”), an agreement with the following terms and conditions shall hereby be formed between the Tokyo Metropolitan

Government (hereinafter the “First Party”) and Ogasawara Village (hereinafter the “Second Party”).

(Purpose)
**Article 1.**
The purpose of this Agreement is for the First Party and the Second Party to cooperate pursuant to the Guidelines in order to promote the appropriate use of Nature Conservation Promotion Area in the Ogasawara Islands.

(Target Areas for the Promotion of Environmental Conservation)
**Article 2.**
This agreement applies The Nature Conservation Promotion Area to the following areas, which are outlined in Figure 1 and Figure 2 attached separately.

(1) Minamijima;
(2) The entire Sekimon area of Hahajima.

(Sharing of roles between the First Party and the Second Party)
**Article 3.**
The sharing of roles between the First Party and the Second Party, as well as the Rules for Appropriate Use, shall be decided upon deliberation between the First Party and the Second Party.

(Rules for Appropriate Use)
**Article 4.**
The Rules for Appropriate Use shall be decided by October 1, 2002 and go into effect on April 1, 2003.

(Deliberations)
**Article 5.**
In order to promote the protection and proper use of Nature Conservation Promotion Area, the First Party and the Second Party shall deliberate if necessary based on the status of implementation thereof.

IN WITNESS WHEREOF, the parties hereto hereby execute this Agreement in duplicate by placing their signatures thereon and each party shall retain one (1) executed original thereof.

July 9, 2002

2-8-1 Nishishinjuku, Shinjuku-ku, Tokyo
First Party Tokyo Metropolitan Government
Representative: Shintaro Ishihara, Governor of Tokyo
[Signature]

Nishimachi, Chichijima, Ogasawara Village, Tokyo

Second Party Ogasawara Village
Representative: Shoichi Miyazawa,
Mayor of Ogasawara Village
[Signature]



Agreement being signed by Governor Ishihara and former Mayor Miyazawa

## *5-11-3. Agreement Regarding Rules for Appropriate Use*

Pursuant to the provisions of Article 3 and Article 5 of the Agreement on Appropriate Use of the Nature Conservation Promotion Area in the Ogasawara Islands (concluded July 9, 2002), an agreement with the following terms and conditions shall hereby be entered into between the Tokyo Metropolitan Government (hereinafter the "First Party") and Ogasawara Village (hereinafter the "Second Party").

(Rules for Appropriate Use)

**Article 1.**

Rules for Appropriate Use are as indicated in the appended table.

2. The First Party and the Second Party shall cooperate in issuing instructions or warnings to visitors to a Nature Conservation Promotion Area concerning adherence to the Rules for Appropriate Use.

3. Based on the results of monitoring surveys carried out by the First Party, the First Party and the Second Party may deliberate and make changes to the Rules for Appropriate Use.

(The roles of the First Party)

**Article 2.**

The First Party shall carry out the following duties:

(1) To educate Tokyo residents and tourists on the meaning of designation as a Nature Conservation Promotion Area;
(2) To train and certify Tokyo Nature Guides;
(3) To conduct monitoring surveys; and
(4) To support the implementation of the Rules for Appropriate Use.

(The roles of the Second Party)

**Article 3.**

The Second Party shall carry out the following duties:

(1) To educate village residents and tourists on the Proper Use Rules;
(2) To develop schemes to facilitate the application of the Rules for Appropriate Use;
(3) To coordinate relevant local organizations and promote the Rules for Appropriate Use;
(4) To monitor the application of the Rules for Appropriate Use via reports by Tokyo Nature Guides, etc.; and
(5) To submit reports to the First Party concerning use (including use by village residents) of Nature Conservation Promotion Area.

(Deliberations)

**Article 4.**

Any question that arises over the interpretation of this Agreement or any matter not addressed herein shall be decided upon deliberations between the First Party and the Second Party.

IN WITNESS WHEREOF, the parties hereto hereby execute this Agreement in duplicate by placing their signatures and seals thereon and each party shall retain one (1) executed original thereof.

September 30, 2002

2-8-1 Nishishinjuku, Shinjuku-ku, Tokyo
First Party: Tokyo Metropolitan Government
Representative: Shintaro Ishihara, Governor of Tokyo

Nishimachi, Chichijima, Ogasawara Village, Tokyo
Second Party: Ogasawara Village
Representative: Shoichi Miyazawa,
Mayor of Ogasawara Village

Appended table

Rules for Appropriate Use

## I. Common rules

1. Instructions of Tokyo Nature Guides must be followed.
2. Tokyo Nature Guides shall wear armbands, etc. that identify themselves.
3. Do not enter an area not part of a designated route.
4. Leave plants, animals, pieces of wood, rocks, and other items that exist in nature as they were.
5. Do not bring in any alien species of plants, animals, seeds, insects, etc.
6. Do not feed any animals.
7. Do not frighten or provoke any animals.
8. Do not leave any graffiti on rocks or anywhere else.
9. Do not litter. Take all garbage back with you. Do not discard any items into the ocean.

## II. Individual rules

| Name | Minamijima | Entire Sekimon area of Hahajima |
|---|---|---|
| Visitor routes | As shown in Figure 1 attached. Visitors are forbidden from deviating from the designated visitor routes. | As shown in Figure 2 attached. Visitors are forbidden from deviating from the designated visitor routes. |
| Maximum amount of visitation time | 2 hours | No limit set |
| Maximum number of visitors per day | 100 (15 persons per island entry) | 50 (5 persons per one visit) |
| Restrictions | Period of 3 months per year during which access to the island is forbidden (This period shall,for the time being, be from November to the end of January of the following year, with the exception of 8 days permitted around the New Year's holiday. Specific schedules shall be determined every fiscal year). | Entry into the stalactite caves is forbidden. |
| The maximum number of people who can be accompanied by one Nature Guide | 15 | 5 |

# *5-12. Ogasawara Islands Promotion and Development Plan (2009—2013)*

***November 2009***

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# *I. Basic concepts for the Ogasawara Islands Promotion and Development Plan*

## 1. Features of the Ogasawara Islands

### 1.1. Geographical and natural features

The Ogasawara Islands constitute of 30 odd islands scattered across the Pacific about 1,000 kilometers south of Tokyo, the largest of which belong to the Chichijima and Hahajima island groups. Geographically noteworthy islands among the Ogasawara Islands include Okinotorishima, which is the southernmost island in Japan, and Minami-torishima, which is the easternmost.

The Ogasawara Islands are spread out across massive stretches of ocean. In fact, they make up about 30 percent of Japan's Exclusive Economic Zone. As outlined in the Basic Plan on Ocean Policy (approved by the Cabinet on March 18, 2008) pursuant to the Basic Act on Ocean Policy (Act No. 33 of 2007), the islands serve critical roles in terms of national security and economic development, roles which encompass the security of maritime travel and the development/use of fishery, mineral, and other marine resources.

The Ogasawara Islands lie in the subtropics. The islands have maritime climate, with relatively little change in year-round temperatures, but they are also frequently visited by typhoons.

None of these oceanic islands has ever been connected with a continent, a fact which has fostered the conditions for the evolution of rare and endemic species of flora and fauna as well as ecosystems unique to small island ecosystems. These conditions are also responsible for the unique geological and topographical formations seen on the islands, making them a cornucopia of incomparable natural features.

The majority of the region has been designated as national park. The area offers a soothing opportunity for visitors from Tokyo and countless other places to experience the beauty of nature up close.

### 1.2. Historical and sociological features

Whaling and trade vessels from the West began to use the Ogasawara Islands as ports in the 19$^{th}$ century, a point which marked the beginning of settlements by Westerners and Hawaiians. The subsequent interaction with other islands of the Pacific resulted in a distinctive fusion of these varied cultures, elements of which can still be seen today in Nanyō-odori ("South Pacific Dancing"), folk songs, etc.

In 1944, while World War II was still raging, almost all of the islanders were forced through compulsory evacuation to return to the main islands of Japan. For the next quarter of a century, until the islands were retroceded to Japan in 1968, they were unpopulated. Because of this unique chapter in their history, there are numerous sites on the islands that still bear the marks of war.

## 2. Achievements and issues

### 2.1. Achievements

In order to rebuild the communities on the islands, urgent infrastructure repair and construction projects were deemed necessary. Guided by a comprehensive plan, drastic improvement of infrastructure has been carried out by special measures including raising the amount of aid provided.

As a result, infrastructural systems necessary for basic living, such as housing, running water, etc. were provided, roads, harbors, and other structures were built for transportation, and farmland, fishing ports, and other elements critical for commerce and industry were created. The push to build or rebuild the infrastructure necessary for people to live on the islands produced suitable results.

The fact that people live on the islands and are engaged in a wide range of socioeconomic activities not only raises awareness of the islands as territories owed by Japan among people in Japan and the world at large, it also contributes a significant portion to Japan's national security and its overall Exclusive Economic Zone.

### 2.2. Issues

2.2.a. The stagnation of industry

In the fishery and agriculture industries, there are specialty products such as swordfish and passion fruit that the islands are well-known for, but in spite of that, the distance from Ogasawara to the main islands of Japan, the disadvantages the come with smaller-scale operations, and a growing lack of people available to inherit businesses and other such factors have meant that the infrastructure put in place to foster these industries is not necessarily being utilized to its fullest. The number of employees engaged in such businesses account for less than 10 percent of the total for all industries. In contrast, those engaged in construction and public service combined account for about 40 percent of the workforce.

As for tourism industry, about half of all tourists come in the four months of March, July, August, and December, so one issue to address is how to get more visitors in the off-seasons.

Although the numbers of tourists are rising perceptibly, there are still things that need to be improved before full advantage can be taken of tourism. These include providing more tour options to reflect the diversity of tourists and their interests, having options available for times of rain, and more suitable accommodations.

2.2.b. Effects on the natural environment

The introduction of alien species caused by the creation of farmland and the planting of trees since the first settlements on the Ogasawara Islands in the 19$^{th}$ century, together with unregulated visitation to Minamijima Island in more recent years, have affected the ecosystems of endemic species and disturbed rare and precious natural environments. To address these issues, the Tokyo

Ecotourism, which aims to strike a balance between the protection and utilization of nature, has been put in place on Minamijima and in the entire Sekimon area of Hahajima, thereby promoting the proper use and preservation of the natural environment.

The protection of rare and endangered species of flora and fauna from alien invasive species is one issue that must be addressed further in order for the islands to be listed as a Natural World Heritage Site.

2.2.c. Access between Ogasawara and the main Japanese islands

As the Ogasawara Islands are remote islands, it takes 26 hours one-way to or from the main islands of Japan, and the ferry service is only offered once a week.Improving access to and from the main islands has been a pressing issue, not just for the stability of the livelihoods of islanders, but for promoting industry as well.

2.2.d. Improving living conditions

In order to improve the availability of medical care on these remote oceanic islands in preparation for the projected increase in visitation, and to prepare for an ever aging population, solutions must be found in the realms of medical care, public health, and welfare.

Furthermore, measures must be taken to deal with the aging facilities that have been present since around the time the islands were retroceded, and plans/structures must be put in place to protect against major tsunamis that may be generated in the anticipated Tōnankai and Nankai Earthquakes.

Also, to make sure that people on the islands have access to the same information that the rest of the country does, terrestrial television broadcasting facilities must be digitized. Broadband communications lines must also be established. These steps are necessary to mitigate the problems posed by the remoteness of the islands.

## 3. Future direction

### 3.1. The basic philosophy for promotion and development

The natural environments with which Ogasawara is blessed are its richest community resources in terms of tourism. In order to utilize those resources in a sustained manner, mechanisms and strategies for protecting those natural environments must be developed and implemented. Any and all projects undertaken should likewise be done so with proper consideration given to the natural environment.

Particular priority should be given to working at natural conservation in a well-coordinated and integrated way, and to pushing forth efforts to have the Ogasawara Islands listed as a Natural World Heritage Site, so as to increase and convey the appeal of Ogasawara to people throughout the world.

At the same time, steps must be taken to develop and promote new tourism-related

projects aimed at cultivating new groups of potential tourists so as to raise the level of appeal of the islands as a tourist destination and increase the number of visitors.
In order to achieve these goals, the present plan shall set forth as its basic philosophy the goal of self-sustaining development that strikes the proper balance between environmental conservation and promotion of industry based on the principles of a sustainable, recycle-based society that minimizes the burden placed on the environment.
The effectiveness of this Promotion and Development Plan will be measured by setting goals for promotion and development strategies and projects and then evaluating how far they have gone towards achieving those goals.

### 3.2. The direction that promotion and development strategies should take

3.2.a. Establishing conditions for fixed residency that achieves peaceful coexistence with nature

Some of the measures that need to be taken in order to establish better conditions for fixed residency and ensure the security of Ogasawara residents are as follows.
As the population ages, systems of medical care, public health and welfare must each be improved, the most pressing of which is the system of medical care. Decrepit facilities that were constructed not long after retrocession must be repaired or rebuilt. Moreover, strategies must be implemented to protect against major tsunamis that may be generated in the anticipated Tōnankai and Nankai Earthquakes.
As for the access to and from Japan's main islands, in order to stabilize the livelihoods of Ogasawara residents, serious and detailed consideration should be given to an air service that is sufficiently harmonious with the environment.
Strategies and industries which would contribute to more convenient lifestyles and to the better quality of medical care and welfare, such as better telecommunications capabilities, shall be promoted and activated.
In constructing or establishing these facilities or capabilities, care shall be given to the creation of a sustainable, recycle-based society as well as peaceful coexistence with the natural environments the islands are blessed with.

3.2.b. The active and sustained utilization of community resources

The climate, location, and history of the Ogasawara Islands mean they have unique resources that can be utilized in different ways. These include: rare species of flora and fauna, many of which are endemic, having speciated in unique ways; a distinctive culture that has Western as well as South Pacific island influences; and exploitable marine resources, including potential fishery and mineral resources. These resources that are unique to the islands shall be actively utilized in manner that is sustainable and that revitalizes the community.
As the unique natural environments in particular are valuable to all mankind, special efforts shall be made to have the Ogasawara Islands listed as a Natural

World Heritage Site, so as to both ensure the protection of those environments and raise awareness of Ogasawara among people throughout the world.
Furthermore, the geographical and natural features of the islands shall be put to use to facilitate interaction with other areas and to encourage more scientific inquiry, thereby furthering the development of the community.
In addition, in the future, ways in which clean and natural sources of energy available in the area ―such as potential for rich solar power― can be actively utilized to raise the level of energy self-sufficiency shall be studied.

3.2.c. Utilizing local ideas and creativity

In order for the Ogasawara Islands to achieve self-sustaining development, it is absolutely necessary that community residents are encouraged to participate more and that the initiative is taken by local residents and groups in developing their community.
For that reason, the government, community residents, business owners, relevant industry groups, NPOs, and others must cooperate, coordinate their efforts, and exercise creativity in coming up with ways to promote and develop the community.
Human resources responsible for active community development shall also be put into training.

3.2.d. Promoting comprehensive strategies that integrate soft and hard aspects

Because projects designed to build or rebuild the infrastructure have yielded a suitable measure of success, in the future it is necessary to effect a shift towards mixes of industries whose self-sustaining development is possible, a shift which shall be achieved by cultivating tourist and information industries in a way that utilizes community resources unique to the Ogasawara Islands.
In addition, in order to maximize the utility of the existing infrastructure, measures will be developed that integrate both hard and soft strategies, strategies which are community-led and that make use of natural environments and other community resources.

(a) Promoting island industries with ecotourism as the core industry

By facilitating the development and distribution of locally-produced goods and cultivating a system that encourages both production and consumption locally, cooperation among entities in the agricultural, fishery, and tourism industries shall be reinforced, and steps shall be taken to diversify the tourism industry.
Ecotourism utilizing the national environment shall be promoted as the core industry of the islands.

(b) Promoting new tourism in a way that cultivates diverse groups of potential tourists

More options shall be developed for tourists with the goal of year-round visitors with diverse interests. This shall of course be done with due

consideration to natural environments.
In order to increase the total number of visitors, more committed attempts shall be made to attract groups on educational trips, senior citizens, and tourists from overseas (inbound), and more alternatives shall be explored for options during times of rain.

(c) Creating townscapes that blends in with the natural environment
Development shall proceed in an orderly fashion, in a way that maintains the distinctiveness of Ogasawara and that is in harmony with the rich and precious natural environment, so that it will become even more attractive as a tourist destination. In order to create new townscapes that are harmonious with natural surroundings and to preserve existing quality scenery, special steps shall be taken such as the elimination of utility poles. At the same time, regulations and direction provided for by the Landscape Act (Act No. 110 of 2004), landscape-related ordinances passed by the Tokyo Metropolitan Government, and the guidelines of public facilities in Ogasawara (Chichijima and Hahajima) that relate to landscapes shall be employed to promote the creation of attractive townscapes that blend in with their natural surroundings.

## 4. Duration of plan

The plan covers the five-year period from 2009 to 2013.

## 5. Target population

The expected population, including short-term residents, as of the end of the 2013 fiscal year is about 3,000 persons, with a projected maximum increase in visitation of about 2,000 persons.

## 6. Strategy and project goal-setting and evaluation

The following goals shall be set in order to examine the strategy of the Promotion and Development Plan and to ensure the timely implementation of projects therein.
Interim evaluations shall also be conducted, the results of which will be applied to the implementation of strategies and projects.

| Index | Baseline | | Target (FY2013) |
|---|---|---|---|
| Agricultural production | 2004–2007 (average) | ¥101,808,000 | ¥120,000,000 |
| Annual fish catch | 1998–2007 (average) | 505t | 510t |

| | | | |
|---|---|---|---|
| Annual visitors | 2004–2008 (average) | 21,236 | 26,500 |
| Visitors on educational trips | 2005–2008 (average) | 7 visits/300 | 11 visits/550 |
| Cruise ship visits | 2004–2008 (average) | 6 ships/2,440 | 7 ships/3,000 |

Note: "Annual visitors" includes visitors from tourist vessels not arriving on the regular ferry service.

### 7. Guidelines for individual islands

Various individual promotion and development projects shall be implemented for Chichijima and Hahajima. Assessments of environmental impact shall be performed as necessary when implementing these projects, and care shall be taken to ensure harmony with the surrounding natural environments and landscapes.

Strategies for promoting the islands individually shall be studied. For example, as the gateway to Ogasawara, Chichijima's convenience for tourists might be stressed, while for Hahajima, rich natural features might be emphasized.

Given that Iwoto and Kita-iwoto are not conducive to living by ordinary residents, measures falling under the category of group relocation projects to Chichijima and Hahajima will continue.

As for other islands, necessary surveys will be undertaken to study ways of balancing the use and protection of their natural environments, and appropriate steps will be taken pursuant to the Natural Parks Law and other laws.

## *II. Ogasawara Islands Promotion and Development Projects Plan*

Plans in different fields related to the promotion and development of the Ogasawara Islands are as follows.

When implementing individual plans, advantage shall be taken of aid mechanisms from the national government. Projects operators shall cooperate and coordinate their respective projects, and shall work to implement them in the most efficient and effective manner possible regarding both soft and hard aspects.

### 1. Issues involving land use

Plans involving land use shall comply with the following categories arranged according to use. Other regional categories and areas shall be as shown in the table below. Land use plans for Chichijima and Hahajima shall be more or less as shown in the figure below.

In order to ensure the proper use of land in accordance with land use plans, cooperation shall be sought with the relevant bodies, and special lease rights, regulations/guidances on land use, etc. shall be studied.

Note that in order to promote dealings in land, cadastral surveys shall be encouraged with the goal of the effective use of land resources.

### 1.1. Populated areas

On Chichijima, "populated areas" refer to the Ōmura, Kiyose, and Okumura areas, part of Ōgiura and the surrounding areas.

On Hahajima, "populated areas" refers to the Okimura area, part of Shizukazawa and surrounding areas.

### 1.2. Farming areas

On Chichijima, "farming areas" refer to the Sakaiura, Fukiagedani, Ōgiura, Susaki, Futago, Komagari, Nagatani, Kita-fukurozawa, and Shigureyama areas. On Hahajima, this refers to the Kōmoridani, Funamidai, Shizukazawa, Ōtani, Mt. Funaki, Hyōgidaira, Nakanotaira, and Minamizaki areas.

### 1.3. Nature preserves

"Nature preserves" refers to areas in the Ogasawara Islands whose natural beauty must be protected, areas with scientifically valuable flora, fauna, geographical features, etc. for which preservation is necessary, and forested areas that must be preserved and managed.

### 1.4. Other areas

"Other areas" here refers to those areas not outlined above that may be utilized for a variety of uses.

Table of the area of land used

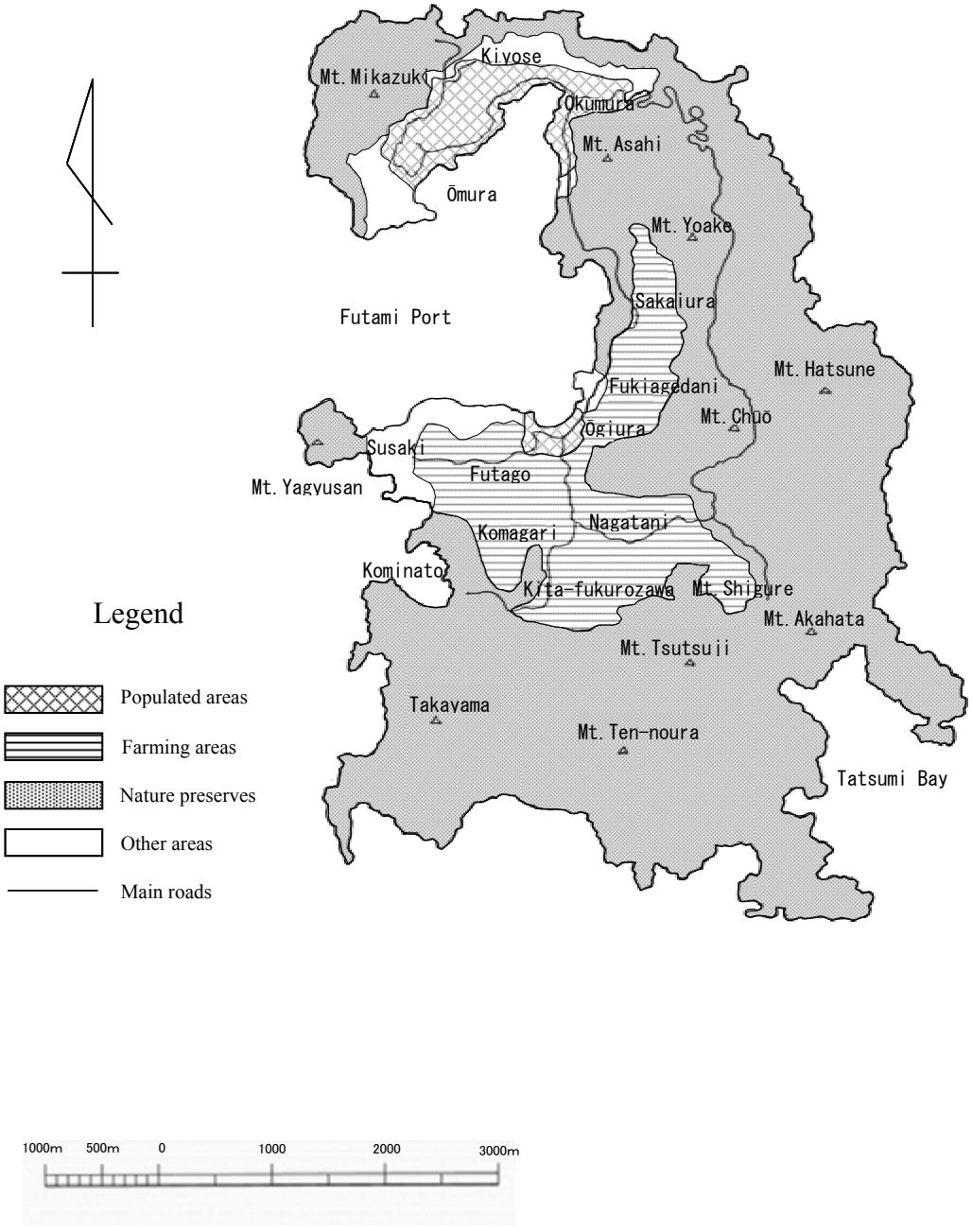
(Unit: square kilometers)

| Island / Category | Chichijima | Hahajima | Other islands | Total |
|---|---|---|---|---|
| Populated areas | 1.39 | 0.22 | – | 1.61 |
| Farming areas | 3.21 | 2.69 | – | 5.90 |
| Nature preserves | 17.91 | 16.82 | 37.66 | 72.39 |
| Other areas | 1.29 | 0.48 | 22.74 | 24.51 |
| Total | 23.80 | 20.21 | 60.40 | 104.41 |

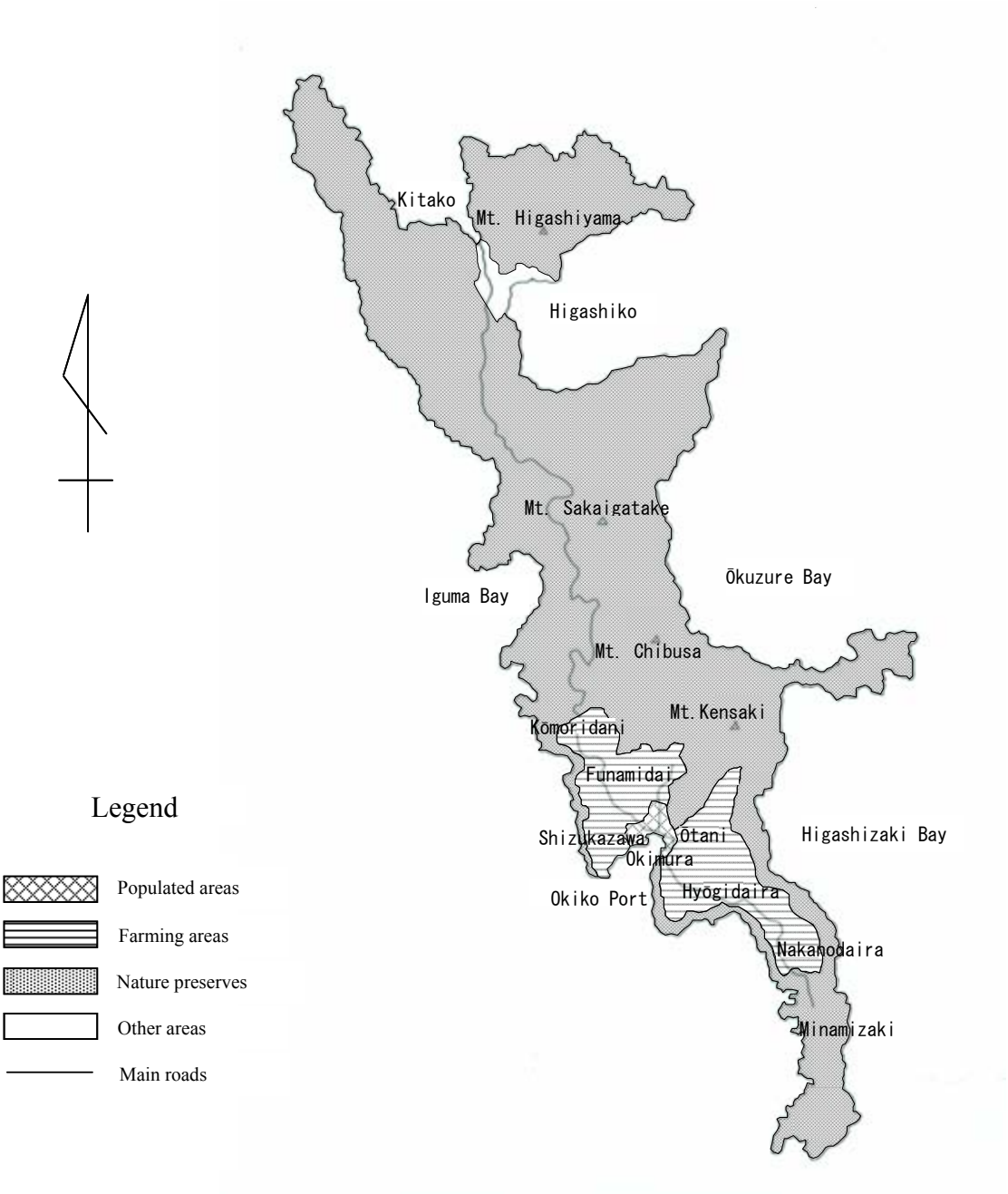
Note 1: The calculated areas of Chichijima and Hahajima do not include satellite islands.

Note 2: The figures for "Other areas" of "Other islands" consist of the total areas of Iwoto, Okinotorishima, and Minami-torishima.

Land use plan map for Chichijima



Land use plan map for Hahajima



## 2. Issues involving improvement of roads, ports, other transportation facilities and communications facilities

### 2.1. Transportation facilities

2.1.a. Ports

As the Ogasawara Islands are looking to be listed as a Natural World Heritage Site, construction around the ports has been carried out with great attention to providing a view befitting Ogasawara.

In order to ensure that there are no disruptions to shipping in the event of tsunamis generated in the anticipated Tōnankai and Nankai Earthquakes, quays have been improved in and around Chichijima's Futami Port, which is the only way to get to and from the main islands of Japan.

In order to improve safety and convenience in the port, the separation of shipping lines for passengers and supplies shall be considered. Landing docks and other facilities shall be constructed to improve mooring capabilities in Oki Port on Hahajima, and breakwaters shall be constructed in the port to improve convenience and safety.

2.1.b. Air services

In order to improve access to and from Japan's main islands, which is the most important issue that Ogasawara Village faces, serious and detailed consideration shall be given to the future opening of an air service that is sufficiently harmonious with the natural environment.

PI* activities sponsored by the Ogasawara Air Route Committee, which is a committee jointly established by the Tokyo Metropolitan Government and Ogasawara Village to study the issue, shall aim to build a healthy consensus among the interested parties and at the same time make relevant information available to the general public.

The Tokyo Metropolitan Government shall conduct comprehensive studies and surveys of issues such as the impact an air route would have on the environment, cost effectiveness, the economic feasibility of running such a service, safety, updataed technological trends, etc. and apply the results of those studies to PI activities.

Note: "PI", or public involvement, denotes the establishment of forums and other means by which residents can voice their opinions from the policy proposal and public works design/planning phases. Views expressed in such debates are then reflected in policies and project plans.

2.1.c. Roads

Projects to improve prefectural roads, including rationalizing road paths and constructing adjacent sidewalks, and to prevent land- and rockslides will continue. In addition to the goal of improving the safety and comfort of pedestrians and

vehicle passengers, such projects will improve access to tourist sites, thereby contributing to the promotion of tourism.

In an effort to improve convenience and congruence with the natural environs, prefectural roads near Futami Port, the gateway to Ogasawara, are being revamped in an attempt to get rid of utility poles and make the sidewalks accessible to the elderly and others with special needs. The goal of this redevelopment is to create attractive townscapes and structures that exude a sense of harmony with their environs and with the natural features unique to Ogasawara.

In order to provide safer roads, routes on village roads that pass through populated areas shall be repaired and improved, and at the same time disaster prevention steps shall be taken based on inspections of tracts of road vulnerable to damage during disasters.

The farm roads in and around the Ōgiura and Shizukazawa areas shall be converted to village roads or repaired as necessary after studying the importance of their utility in terms of overall promotion and development.

2.1.d. Ferry services

Ways to improve the Tokyo-Chichijima and Chichijima-Hahajima ferry routes shall be studied with a view to improving the convenience and safety of passengers and promoting industry.

**2.2. Telecommunications systems**

Projects shall be undertaken to improve the levels of convenience and to promote industry by proceeding with community intranet construction projects entailing the laying of submarine fiber-optic cables and providing broadband accessibility using the islands' fiber-optic cable networks.

Studies shall be conducted on how to improve medical services and how best to utilize education/culture-related and meteorological data once the submarine fiber-optic cables have been laid.

Together with the laying of submarine fiber-optic cables, steps will be taken to effect the smooth transition to digital terrestrial television broadcasts by utilizing the islands' fiber-optic cable networks. During this transition phase, temporary measures such as the use of satellite broadcasts shall be employed to prevent an accompanying loss in signal reception, and improvements shall concurrently be made to the islands' fiber-optic cable networks.

## 3. Promotion and development issues regarding industries such as agriculture, forestry, fisheries, and commerce utilizing local features

Steps will be taken to improve coordination between agents in the agriculture, fishery, commercial, and tourism industries, the aims of which are to promote intra-island distribution systems conductive to local production and consumption and expand sales

avenues to consumers in Japan's main islands, as well as to establish and promote the "Ogasawara brand". An additional aim is to promote environmentally-friendly industries that offer the added value of nature conservation in the provision of products or services. Efforts at lowering the costs involved with shipping supplies to the islands will continue.

### 3.1. Agriculture

In addition to improving farm roads and agricultural waterworks and other agricultural facilities, metal-framed greenhouses, produce processing facilities, and other shared-use facilities shall be constructed. Furthermore, energy shall be put into fostering and/or strengthening agricultural cooperatives.

Work shall be done towards improving and spreading testing and research functions and agricultural technologies for the purpose of improving productivity and providing more stable business environments. In addition, steps shall be taken to provide assistance for finding human resources to carry on farming operations and training them.

Steps shall be taken to eliminate disease-carrying and otherwise harmful pests, feral goats, and other predators in order to protect agricultural products. Concurrently, steps shall be extended to improve soil fertility and land capacity.

Furthermore, mechanisms shall be put in place to mediate between owners and operators of farmland and to facilitate the market "fluidity" of farmland, thereby ensuring a sufficient availability thereof.

### 3.2. Fisheries

Existing breakwaters shall be strengthened in fishing ports to protect against major tsunamis that may be generated in the anticipated Tōnankai and Nankai Earthquakes. Furthermore, new breakwaters shall be newly built in order to guarantee a level of seismic quiescence in the ports and ensure the safety of fishing vessels moored in port.

To improve overall systems of delivery of aquatic products, efforts shall be directed towards fostering and/or strengthening fishery cooperatives.

Work shall be done towards improving and spreading testing and research functions and fishery technologies such as fry production of new and potentially useful fish, for the purpose of improving productivity and providing more stable business environments. In addition, steps shall be taken to provide assistance for finding human resources to carry on fishery operations and training them.

### 3.3. Commerce

In addition to encouraging larger production scales and higher standards of quality for locally-produced products, steps shall be put forward to further develop and sell local agricultural and marine products with the aim of establishing and promoting the "Ogasawara brand".

Efforts shall also be directed towards fostering and/or strengthening the functions of chambers of commerce.

Methods of fostering lively commercial districts shall be studied in conjunction with

techniques for creating attractive townscapes.

## 4. Issues related to the construction of residential and other living accommodations, sanitation and other welfare facilities, other rural and city facilities and ensuring quality development medical treatment

### 4.1. Residential and other living environments

4.1.a. Residential accommodations

With the goal of improving residential housing and creating accommodations that are environmentally-friendly, steps shall be taken to rebuild the decrepit housing structures in Ogasawara.

In order to prevent and/or mitigate the damage done to housing by termites, steps shall be taken based on the “How to live without termites” plan, which seeks to eliminate termites from populated areas through extermination and steps to prevent reintroduction. At the same time, better extermination methods shall be explored.

4.1.b. Simple running water systems

Because water purification plants on both Chichijima and Hahajima are aging, a program of systematic repair and reconstruction shall be instituted. In repairing or reconstructing these facilities, water purification methods shall be reviewed in a comprehensive manner, taking into account the quality of the water produced as well as issues such as the maintenance and management.

On Chichijima, the Ōgiura Water purification Plant is to be rebuilt on higher ground in anticipation of the major tsunamis that may be generated in the future Tōnankai and Nankai Earthquakes.

To further stabilize the supply of potable water, while securing the water sources, renovations and functional expansion shall be seen at aging facilities.

4.1.c. Sewage treatment

Systematic upgrades and similar improvements shall proceed for aging electrical equipment and machinery in the community plant construction zones, functional improvements shall be made to sewage treatment facilities, and steps shall be taken to decrease sludge outputs, all of which shall mitigate the burden on the environment.

Proper maintenance shall be taken in other areas, including the encouragement of water purification tank installation.

Furthermore, by integrating the management of both of these areas, sewage can be processed properly, which contributes to the clean development of livable spaces through public sanitation as well as the prevention of the effects of water pollution on the natural environment stemming from the public water supply.

4.1.d. Waste treatment

Waste treatment facilities shall be repaired and/or upgraded according to their useful life spans. Attempts shall be made to maintain the functions and extend the life spans of existing decrepit facilities.

More importantly, broad concerted efforts will be made with authorities on the main Japanese islands to reduce the amount of waste and recycle it into reusable resources. In spite of the inherit disadvantages owing to remoteness, the objective is to realize a sustainable, recycle-based society through such cooperation.

**4.2. Securing public health and welfare facilities and guaranteeing medical care**

The current plan seeks to strengthen collaboration among the public health, welfare, and medical service fields, study the creation of service mechanisms that would support the needs of residents of these very remote islands, and recalibrate the social infrastructure so that it can cope with a low birth rate and aging society.

4.2.a. Social welfare

In conjunction with the rebuilding of the health clinic on Chichijima, integrated projects are underway to build nursing homes for the elderly and to build other facilities that embody a stronger bond between the fields of medical care and welfare.

Attempts at improving management structures are underway in order to provide welfare services of consistent quality.

A center for home nursing services for the elderly shall be built on Hahajima.

Furthermore, the Second Phase Next-Generation Training Assistance Action Plan is being currently formulated. This plan seeks to provide services to all households with children.

4.2.b. Medical care

In addition to acquiring diagnostic and other medical equipment to raise the general level of medical care provided, the plan seeks to improve the administration systems for doctors and nurses, thereby making the most of the fact that it is the only hospital in the Ogasawara Islands area.

In addition, steps shall be taken to ensure the improvement and/or maintenance of emergency medical services, including the transport of emergency patients.

On the island of Chichijima, the decrepit Chichijima Clinic is being rebuilt with a view towards expanded medical services to meet the medical needs of village residents as well as new medical services such as home visits.

In conjunction with the rebuilding of the Chichijima Clinic, a new medical and welfare complex is scheduled to begin offering services in 2010, so in addition to facilitating the coordination among medical care, welfare and public health services, necessary housing shall be built to accommodate nurses and other medical staff.

### 4.3. Construction and development in towns and populated rural communities

Utilizing the Metropolitan Government's regulations and suggestions concerning landscapes in accordance with the Landscape Act (Act No. 110 of 2004), in addition to creating attractive landscapes befitting a nominated Natural World Heritage Site, the plan provides for urban development that takes into account scenery, including the elimination of utility poles and the creation of sidewalks in the populated communities as well as the improvement of public parks.

Sets of rules for the outdoor advertizing shall also be formulated, and other steps shall be taken to enhance the appeal of the property for tourists and to facilitate the creation of townscapes that blend in with the natural surroundings.

The development of new housing lots in populated areas shall be considered as demand dictates.

## 5. Issues concerning the preservation of natural environments and the prevention of pollution

### 5.1. The preservation of natural environments

5.1.a. Preserving rare species endemic to Ogasawara

Resources shall be put into protecting and cultivating species of flora and fauna endemic to the Ogasawara Islands in order to protect its unique oceanic island ecosystems, as none of these oceanic islands has ever been connected with a continent.

Programs shall also be carried out that are designed to protect and/or increase the populations of critically endangered species.

5.1.b. Countermeasures for invasive alien species

Cooperation and coordination shall be sought among residents, NPOs, relevant bodies, etc. based on management plans for countermeasures against invasive alien species for the purpose of preserving the unique and precious natural environments of the Ogasawara Islands.

Special studies shall be undertaken for areas that are critical for the protection of natural features, and measures shall be implemented to guarantee the protection of such natural features. These steps shall be part of a larger effort to have the Ogasawara Islands listed as a Natural World Heritage Site for the greater purpose of preserving the islands' natural features for future generations.

By enforcing visitor regulations and etiquette rules after Ogasawara is listed as a Natural World Heritage Site, this plan aims to preserve the islands' natural environments, and at the same time build facilities that enhance the islands' value as a heritage site. To that end, the feasibility of a general managing body shall also be studied.

5.1.c. The preservation of natural landscapes and the restoration of vegetation

In order to protect and/or restore the splendid natural scenery of the Ogasawara Islands and the globally precious natural environments therein, this plan calls for the acquisition of sites of scenic beauty as well as steps to restore native vegetation.

5.1.d. Balancing the protection and utilization of natural resources

In order to strike a balance between the protection and utilization of natural resources, the role of visitor centers and other quality facilities that provide pertinent information is invaluable for raising awareness of protection issues. Ensuring visitation according to set rules, the training of nature guides, projects to monitor natural environments will be the critical functions of such centers.

In addition, nature preserve officials shall provide information and raise awareness of visitor etiquette on the part of islanders and tourists alike, which is just one example of the environmental support mechanisms to be provided for nature guides.

5.1.e. Striving for a low-carbon emitting community

Steps shall be taken to achieve energy self-sufficiency within the islands, including the exploration of solar power possibilities and studies of other natural and green energy resources.

The islands shall do their part in mitigating the effects of global warming by promoting the use of energy-efficient equipment in public facilities.

Before implementing the various projects in this plan, consideration shall be given to environmental policies relating to landscape plans and public work projects, and if necessary said projects shall be subject to environmental impact assessments and other considerations to ensure that they do not adversely affect the surrounding natural environments or scenery.

### 5.2. Pollution prevention

In addition to prior investigations of the effects on the natural environment conducted early in the planning stages before each project, this plan seeks to prevent the pollution of the quality of public sources of water as one of the natural environment conservation efforts.

Furthermore, the plan aims to further lessen the amount of waste generated in the islands, to promote the separation and recycling of any waste generated, and to otherwise contribute to the creation of a recycle-based society that minimizes the burden placed on the environment.

## 6. Issues related to the construction of facilities pertaining to disaster prevention and national security

Given that Ogasawara is frequently struck by typhoons, it is necessary to balance the

conservation of rare natural features and scenery with concerns of disaster prevention and national security, of which the primary concerns involve methods of preventing mud- and landslides, improving systems to get out accurate disaster information quickly, and ways to improve the safety of structures in the islands, all in order to ensure the safety of residents and visitors alike.

In preparation for tsunamis generated in the anticipated Tōnankai and Nankai Earthquakes, quays have been improved in and around Futami Port, the relocation of the Ōgiura water purification plant to an elevated location has been considered, and studies have been conducted on the construction of evacuation roads. Continual improvement will be made on these evacuation measures and more comprehensive tsunami contingencies shall be implemented.

## 7. Issues related to the promotion of education and culture

### 7.1. Education

The local community shall coordinate with the relevant authorities to promote education involving the study of unique traditional culture, history, and natural environments and instilling the values of world peace. Such educational programs shall serve as a vehicle for international understanding based on the principles of internationalization.

Improved programs for social education shall be implemented through the effective utilization of island facilities, including schools on the islands.

The subject of the rebuilding of the elementary and junior high schools on Chichijima, which have suffered the effects of age, shall be given serious study.

### 7.2. Promoting culture

In addition to protecting and preserving cultural and cultural assets, measures shall be implemented to preserve and utilize the relics of war.

Furthermore, the possibilities of utilizing the Ogasawara Islands as a center for the study and research of marine resources shall be explored in collaboration with the relevant bodies.

## 8. Issues related to the development of tourism

### 8.1. Cultivating diverse groups of potential tourists and developing new tourism options

Steps shall be taken to cultivate diverse groups of potential tourists ―primarily junior high and high school field trip students and mid-and-old-aged people―and to attract tourists in the off-seasons, using strategic target-consumer strategies.

Taking advantage of its status as a Natural World Heritage Site candidate, multi-faceted ecotourism shall be promoted in Ogasawara through cooperative campaigns with travel agencies that offer tours featuring historical and cultural

elements such as noteworthy wartime relics, all the while seeking to promote tourism and preserve rare natural features that must be passed down to future generations. In the same spirit, travel options shall be developed so as to offer hands-on experiences of Ogasawara blessed with the natural features, yet in a manner that preserves their integrity.

### 8.2. Improving conditions for tourists

In addition to encouraging operators of hotels and other accommodations to improve their facilities and features, this plan aims to raise the overall level of service and hospitality.

Aside from improving inter-island transportation methods, the plan aims to improve conditions conducive to overseas tourists (inbound).

In addition to making improvements to tourist facilities such as recreation areas and trekking paths, the value of the Ogasawara Islands as a nominated Natural World Heritage Site as well as information regarding its history and culture shall be made more available. Furthermore, in order to improve visitor service during times of rain or rough seas, improvements shall be made to visitor centers.

In addition, to further promote collaboration among businesses in agriculture and tourism, the possibility of displaying species of plants endemic to Ogasawara in hands-on tourist facilities or the Ogasawara Subtropical Agriculture Center shall be studied.

### 8.3. Increased collaboration among tourism and other industries

Efforts shall be made towards strengthening collaborations between the tourism industry and the agricultural, fishery, and commerce industries with the aim of establishing intra-island distribution systems conducive to local production and consumption and the development of products firmly identified with the “Ogasawara brand”.

### 8.4. Creating townscapes befitting Ogasawara

Landscape plans and ordinances passed by the Tokyo Metropolitan Government, shall be utilized to preserve existing landscapes that capture the feel of nature-blessed Ogasawara and blend in with their natural surroundings, and to promote the creation of attractive townscapes.

Furthermore, in order to promote the development of Ogasawara in a way that better appeals to tourists, the plan calls for attractive landscaping that includes the planting of trees along roads, etc.

### 8.5. Disseminating tourist information

Steps shall be taken to increase awareness and improve the reputation of the Ogasawara Islands as a tourist destination. These steps shall entail the events and the effective use of a variety of media, including the internet, television, magazines, etc., the aim of which is to disseminate information that increases and conveys the appeal

of Ogasawara, which is a candidate for listing as a Natural World Heritage Site, to people throughout the world.

### 8.6. Improving the convenience and comfort of ferry services

Attempts shall be made to cooperate with the relevant agencies to improve the quality of services, shorten travel times, and to improve the convenience and comfort for travelers overall.

## 9. Issues related to the promotion of interaction with other regions in Japan and abroad

Programs shall be developed through which people visiting the Ogasawara Islands are able during their stay and experiences to deepen their knowledge of the natural features, culture, and history of the islands, and also interact with local island residents.
In addition to studying different public facilities as potential forums for interaction, the potential for domestic and international interaction through sister city relationships, participation in symposiums and other venues shall be explored.
Furthermore, in addition to studies of how to attract groups to hotels and such, the plan calls for promoting the islands as a unique place of interaction for children from outside the islands on educational trips and activities to experience the natural features and culture distinctive of Ogasawara.
Future possibilities for the islands as primary sources of scientific research and inquiry in the fields of marine resources and rare wildlife shall also be explored.

## 10. Issues related to the training of people to human resources to contribute to the promotion and development of the Ogasawara Islands

In order for the Ogasawara Islands to achieve the kind of self-sustaining, locally-driven development fueled by its own local resources, such as the islands' unique natural environments, the region must commit itself to using local ideas and creativity for promoting the islands, and human resources responsible for such promotion must be trained.
In order to do so, it is necessary to locally train and improve the quality of the nature guides at the heart of ecotourism, an industry which seeks to strike a balance between the protection of nature and tourism promotion. In addition, seminars made possible through cooperation among educational and research institutions within the islands, lectures given by islanders on a voluntary basis, workshops, etc. shall be promoted.
Ways in which public facilities within the islands can serve as centers for spreading information or training personnel shall likewise be studied.

## 11. Issues related to securing the cooperation of business owners, residents, NPOs,

## and other parties involved in the promotion and development of the Ogasawara Islands

A diverse range of parties, including local governments, citizens, business owners, NPOs, and others cooperate and collaborate in the promotion and development process. Utilizing the strengths of each, this plan shall promote the further participation of community residents and encourage community-driven initiative.
To achieve this, human resources with the potential to contribute to the promotion and development of the region shall be trained, and an atmosphere in which those responsible can cooperate and coordinate shall be cultivated.

## 12. Issues related to helping former islanders return and helping them promote and develop the Ogasawara Islands

### 12.1. Assisting the return of former islanders who wish to return

The plan mandates continuing to create a climate in which former islanders can return if the wish to.
Given that Iwoto and Kita-iwoto are not conducive to living by ordinary residents, measures falling under the category of group relocation projects to Chichijima and Hahajima will continue.

### 12.2. Issues deserving mention regarding the promotion and development of the Ogasawara Islands

12.2.a. Financial policies

Special financial measures shall be adopted so that the financial systems necessary to provide the funds smoothly for residents to live normally and prosper in business may be improved.

12.2.b. Surveys

The surveys necessary for the evaluation of goals related to the implementation or progress of plans shall be conducted as necessary.

# Appendix 6

**Additional information**

6-1: Official topographic maps (provided separately)

6-2: List of photographs and other audiovisual material
Photo CD and DVD

6-3: Maps of Ogasawara National Park and the Park Plan

# 6-2. List of photographs and other audiovisual material

| No | Format | Caption | Date | Photographer | Copyright owner (if different than | Contact detail of copyright owner | Non exclusive cession of rights |
|---|---|---|---|---|---|---|---|
| 1 | jpg | *Mandarina suenoae* | 2008 | Hideaki Mori | | JWRC[1)] | yes |
| 2 | jpg | *Pandanus boninensis* | 2004 | Naomi Nakagawa | | same as above | yes |
| 3 | jpg | Elaeocarpus photiniaefolius | 2006 | Hideyuki Chiba | | same as above | yes |
| 4 | jpg | Chichijima Island Group | 2009 | Hideo Maruoka | | same as above | yes |
| 5 | jpg | Mukojima Island Group | 2008 | Masaaki Takiguchi | | same as above | yes |
| 6 | jpg | Boninites-series rocks in | 2007 | Hideo Maruoka | | same as above | yes |
| 7 | jpg | Minami-iwoto | 2005 | Ryuji Nakayama | MOE[2)] | MOE | yes |
| 8 | jpg | Sclerophyllous scrub | 2007 | Hideyuki Chiba | | JWRC | yes |
| 9 | jpg | *Morus boninensis* | 2007 | Hideyuki Chiba | | same as above | yes |
| 10 | jpg | Subtropical rain forest | 2006 | Mitsuhiko Toda | | same as above | yes |
| 11 | jpg | *Schima mertensiana* | 2006 | Mitsuhiko Toda | | same as above | yes |
| 12 | jpg | *Juniperus taxifolia* | 2009 | Keita Fukasawa | | same as above | yes |
| 13 | jpg | *Symplocos pergracilis* | 2006 | Hideyuki Chiba | | same as above | yes |
| 14 | jpg | *Callicarpa parvifolia* | 2006 | Eri Nakajima | | same as above | yes |
| 15 | jpg | *Callicarpa subpubescens* | 2008 | Hideaki Mori | | same as above | yes |
| 16 | jpg | *Columba janthina nitens* | 2007 | Hideyuki Chiba | | same as above | yes |
| 17 | jpg | Green turtle which returns to the sea after laying eggs | 2009 | Hiroo Takahashi | | same as above | yes |
| 18 | jpg | *Cryptoblepharus nigropunctatus* | 2009 | Hideaki Mori | | same as above | yes |
| 19 | jpg | *Stenomelania boninensis* | 2009 | Hitoshi Imai | | same as above | yes |
| 20 | jpg | Hermatypic corals | 2009 | Yuji Takafuji | | same as above | yes |
| 21 | jpg | *Boninthemis insularis* | 2008 | Hideaki Mori | | same as above | yes |
| 22 | jpg | *Indolestes boninensis* | 2007 | Yuji Takafuji | | same as above | yes |
| 23 | jpg | *Chlorophorus kobayashii* | 2009 | Hideaki Mori | | same as above | yes |
| 24 | jpg | *Boninosuccinea ogasawarae* | 2008 | Hideaki Mori | | same as above | yes |
| 25 | jpg | *Hirasea operculina* | 2009 | Hideaki Mori | | same as above | yes |
| 26 | jpg | *Mandarina ponderosa* | 2009 | Hideaki Mori | | same as above | yes |
| 27 | jpg | *Boninena hiraseana chichijimana* | 2006 | Hideaki Mori | | same as above | yes |
| 28 | jpg | *Ogasawarana discrepans* | 2009 | Hideaki Mori | | same as above | yes |
| 29 | jpg | Semifossil of *Mandarina* | 2008 | Hideaki Mori | | same as above | yes |
| 30 | jpg | *Ligia yamanishii* | 2009 | Masaaki Takiguchi | | same as above | yes |
| 31 | jpg | *Ligia boninensis* | 2009 | Hideaki Mori | | same as above | yes |
| 32 | jpg | Historic battle site | 2008 | Yuji Takafuji | | same as above | yes |
| 33 | jpg | *Phoebastria nigripes* | 2007 | Tomomi Anzai | | same as above | yes |
| 34 | jpg | *Figulus boninensis* | 2008 | Toshio Kishimoto | | same as above | yes |
| 35 | jpg | Sclerophyllous scrub | 2005 | Hideo Maruoka | | same as above | yes |
| 36 | jpg | *Claoxylon centinarium* | 2006 | Hideyuki Chiba | | same as above | yes |
| 37 | jpg | *Phoebastria immutabilis* | 2009 | Masaaki Takiguchi | | same as above | yes |
| 38 | jpg | *Apalopteron familiare* | 2009 | Hideaki Mori | | same as above | yes |
| 39 | jpg | *Rhinocypha ogasawarensis* | 2008 | Hideaki Mori | | same as above | yes |
| 40 | jpg | Ten-nohana | 2009 | Yukihiro Haisa | MOE | MOE | yes |
| 41 | jpg | Chichijima and Minamijima | 2007 | Takahiro Okano | MOE | same as above | yes |
| 42 | jpg | The Ogasawara Visitor Center | 2009 | Masaaki Takiguchi | | JWRC | yes |
| 43 | jpg | *Chelonia mydas* | 2009 | Yuji Takafuji | | same as above | yes |
| 44 | jpg | *Ogasawarazo lineatus* | 2008 | Hideaki Mori | | same as above | yes |
| 45 | jpg | Kita-iwoto | 2007 | Takahiro Okano | MOE | MOE | yes |
| 1 | DVD | Explanatory image data on the Ogasawara Natural World Heritage Nominated Property | 2009 | Ogasawara Islands Natural World Heritage Nominated Property<br>Regional Liaison Committee Secretariat<br>Scientific Council Secretariat | | 3) | no |

1) Japan Wildlife Research Center
2) Ministry of the Environment
3) Kanto Regional Environment Office, MOE / Kanto Regional Forest Office, Forestry Agency / Tokyo Metropolitan Government / Ogasawara Village

*Délégation permanente du Japon auprès de l'UNESCO*
*100, avenue de Suffren, 75015 Paris*

15 November 2010

390/10

Subject: Additional Information on the on the Nomination of "Ogasawara Islands"

Dear Mr Bandarin,

With reference to Mr Badman's letter dated 14 September 2010, I have the honour to transmit to you, enclosed herewith, three copies of additional information document on the nomination of "Ogasawara Islands" as requested.

Yours sincerely,

Isao Kiso
Ambassador Extraordinary and Plenipotentiary
Permanent Delegate of Japan to UNESCO

Mr Francesco Bandarin
Assistant Director-General for Culture
UNESCO

Cc: Mr Tim Badman
Head of the World Heritage Programme
IUCN

Supplementary Information for

# IUCN Evaluation of the “Ogasawara Islands” (Japan)

Government of Japan

November 2010

Responding to the request for supplementary information from IUCN, management authorities of the nominated property, i.e., the Ministry of the Environment, the Forestry Agency, the Agency for Cultural Affairs, the Tokyo Metropolitan Government and Ogasawara Village, have jointly compiled the following information. In the process, we consulted the local stakeholders and consensus was formed among the members of the Regional Liaison Committee. Advice from the members of the Scientific Committee was also incorporated.

We also would like to take this opportunity to report some progresses made in conservation management of the nominated property after the evaluation mission.

**Request 1. Marine components of the boundary of the nominated property**
**Supplementary Information 1**

Marine Park Zones of the Ogasawara National Park were mainly designated according to the area of coral distribution, except for the area surrounding Minamijima, which was designated from the viewpoint of specific geomorphological and geological features. The coral distribution areas are not recognized as attributes of outstanding universal value proposed in the nomination document. However, for snorkeling or diving, Marine Park Zones and neighboring coastal parts of the nominated property are sometimes used in an integrated manner.

For this reason, the Government of Japan deems that adopting the recommendations from IUCN and incorporating the Marine Park Zones into the nominated property would be meaningful from the viewpoint of improving management effectiveness, including such benefits as promoting awareness raising on the part of the visitors and enhancing the integrity of island ecosystem by maintaining the continuity of marine and terrestrial ecosystems.

Based on this view, we would like to change the boundary of the nominated property to include all the Marine Park Zones adjacent to the terrestrial part of the nominated property.

Please find attached a revised map of the nominated property, which was agreed upon by the relevant organizations and stakeholders at the Regional Liaison Committee (Figs.1-1 through 1-5). The revised nominated area is shown in Table 1.

**Request 2: Buffer Zone**
**Supplementary Information 2**

We have confirmed that, in effect, Ogasawara National Park serves as a functional buffer zone for the nominated property in line with the provisions in the Operational Guidelines. The regulations restricting development in Ogasawara National Park are explained in the table on page 162 of the nomination document. The marine area belongs to Ordinary Zone while the terrestrial area belongs

to Special Zone.

Furthermore, the area outside of the nominated property in the “World Heritage Management Area” explained on pages 14 and 21 of the nomination document, i.e., the area outside the nominated property encompassed by the outer boundary of Ogasawara National Park, also, in effect, serves as a functional buffer zone for the nominated property in line with the provisions in the Operational Guidelines based on the following regulations:

- As for the neighboring areas of the nominated property on Chichijima and Hahajima Islands, which are outside Ogasawara National Park, the national forests are designated as a Forest Ecosystem Reserve and subject to the regulations explained on page 163 of the nomination document. Also, almost all of the terrestrial areas not included in the National Park are designated as part of the Ogasawara Archipelago National Wildlife Protection Area and subject to the regulations on actions in the table on page 164 of the nomination document.

- In addition to the regulations explained above, overdevelopment is prevented on Chichijima and Hahajima Islands in accordance with land use classifications, such as residential areas, agricultural areas, nature protection areas and so on, based on the Ogasawara Islands Promotion and Development Plan shown in Appendix 5-12 of the nomination document. Furthermore, the areas outside Ogasawara National Park also have some regulations restricting development. For example, in accordance with the Ordinance of the Tokyo Metropolitan Government, it is necessary to acquire a permit from the governor of the Tokyo Metropolitan Government when someone intends to develop lands containing natural areas of a certain size (Annex 1).

**Request 3. Extent of alien invasive species**
**Supplementary Information 3**

As shown in the table below, the mapping exercise of invasive alien species by analysis of aerial photos and ground survey has been completed for the Chichijima Island Group and Hahajima Island. The resulting distribution maps are annexed.

| The area of the map | Invasive alien plant species | Map number in Annex. |
|---|---|---|
| Chichijima, Higashijima, Nishijiima, Minamijima. | All of the following species:<br>Casuarina,<br>Bischofia,<br>Lantana,<br>Okinawa pine,<br>Leucaena. | Fig. 2-1<br>Fig. 2-2<br>Fig. 2-3<br>Fig. 2-4<br>Fig. 2-5<br>Fig. 2-6 |
| Anijima, Ototojima, Magojima | All of the following species:<br>Casuarina,<br>Lantana,<br>Okinawa pine, | Fig. 3-1<br>Fig. 3-2<br>Fig. 3-3<br>Fig. 3-4 |
| Hahajima | All of the following species:<br>Casuarina,<br>Bischofia,<br>Okinawa pine,<br>Leucaena. | Fig. 4-1<br>Fig. 4-2<br>Fig. 4-3<br>Fig. 4-4<br>Fig. 4-5 |

The relevant management authorities have been working together to control these invasive alien plants.

On Ototojima and Hirajima Islands, eradication of mature trees of Bischofia has already succeeded. Control operations for Bischofia using herbicide injections have been conducted starting with priority areas, i.e. northern part and the Sekimon area of Hahajima. This work is shared by the Forestry Agency and the Ministry of the Environment. The progress in Bischofia eradication is shown in Figure 5. As for Casuarina and Okinawa pines, eradication in the delimited area is progressing in the eastern part of Chichijima, Anijima, Ototojima and so on. As a result of these efforts, some visible outcomes can be observed. For example, the breeding site of *Rhinocypha ogasawarensis*, an endemic dragonfly, is recovering because the shading effects of Bischofia over streams were removed.

On the other hand, some invasive alien plants now play a role in providing ecosystem services together with native plants, and it has been pointed out that there are potential negative impacts on the ecosystem if rushed and careless countermeasures are undertaken. Based on the scientific advice from the Scientific Council, we will conduct control programs against invasive alien plants carefully and strategically according to the management plan and conservation action plan in a manner that reflects interspecies relationships for each island.

**Supplementary Information 4 (Progress since the evaluation mission)**

Based on the Law for the Conservation of Endangered Species of Wild Fauna and Flora, the conservation program for the Bonin flying fox (Annex 2) has been formulated by the Ministry of Education, Culture, Sports, Science and Technology, the Ministry of Agriculture, Forestry and Fisheries, the Ministry of Land, Infrastructure, Transport and Tourism and the Ministry of the Environment on November 11, 2010. The Bonin flying fox is the only native terrestrial mammal in the nominated property and is endemic to the islands. Based on this program, these ministries will work in coordinated manner on ecological surveys and measures, which include steps for the conservation of the habitats of this species.

Table 1　Latitude / longitude and area of islands in the nominated property

| Name of Archipelago / island group | Name of island | Coordinates for the center point of the main island | | Area (ha) |
|---|---|---|---|---|
| | | Latitude | Longitude | |
| Ogasawara Archipelago | | | | |
| Mukojima Island Group | Kitanoshima and peripheral reefs | N27°43′06″ | E142°05′59″ | 34 |
| | Mukojima and peripheral reefs | N27°40′52″ | E142°08′20″ | 285 |
| | Nakodojima and peripheral reefs | N27°37′40″ | E142°10′42″ | 147 |
| | Yomejima and peripheral reefs | N27°29′47″ | E142°12′38″ | 77 |
| Subtotal | | N27°36′26″ | E142°09′18″ | 543 |
| Chichijima Island Group | Ototojima and peripheral reefs | N27°09′59″ | E142°11′27″ | 536 |
| | Anijima and peripheral reefs | N27°07′21″ | E142°12′35″ | 812 |
| | Some parts of Chichijima and peripheral reefs | N27°04′12″ | E142°12′33″ | 1,410 |
| | Nishijima and peripheral reefs | N27°07′02″ | E142°10′00″ | 51 |
| | Higashijima and peripheral reefs | N27°05′36″ | E142°14′42″ | 26 |
| | Minamijima and peripheral reefs | N27°02′18″ | E142°10′30″ | 33 |
| | Marine area | | | 1,171 |
| Subtotal | | N27°06′08″ | E142°12′21″ | 4,039 |
| Hahajima Island Group | Some parts of Hahajima and peripheral reefs | N26°40′01″ | E142°09′20″ | 1,419 |
| | Mukohjima and peripheral reefs | N26°36′11″ | E142°07′47″ | 144 |
| | Hirajima and peripheral reefs | N26°35′07″ | E142°09′18″ | 64 |
| | Meijima and peripheral reefs | N26°34′10″ | E142°13′54″ | 94 |
| | Anejima and peripheral reefs | N26°33′15″ | E142°09′23″ | 153 |
| | Imotojima and peripheral reefs | N26°33′33″ | E142°12′35″ | 131 |
| | Marine area | | | 410 |
| Subtotal | | N26°36′38″ | E142°10′50″ | 2,415 |
| Total | | N27°08′10″ | E142°10′21″ | 6,997 |
| Kazan Island Group | Kita-iwoto and peripheral reefs | N25°25′60″ | E141°16′56″ | 557 |
| | Minami-iwoto | N24°14′06″ | E141°27′45″ | 355 |
| Total | | N24°50′03″ | E141°22′21″ | 912 |
| | Nishinoshima and peripheral reefs | N27°14′48″ | E140°52′33″ | 30 |
| Whole the Ogasawara Islands | | | | 7,939 |

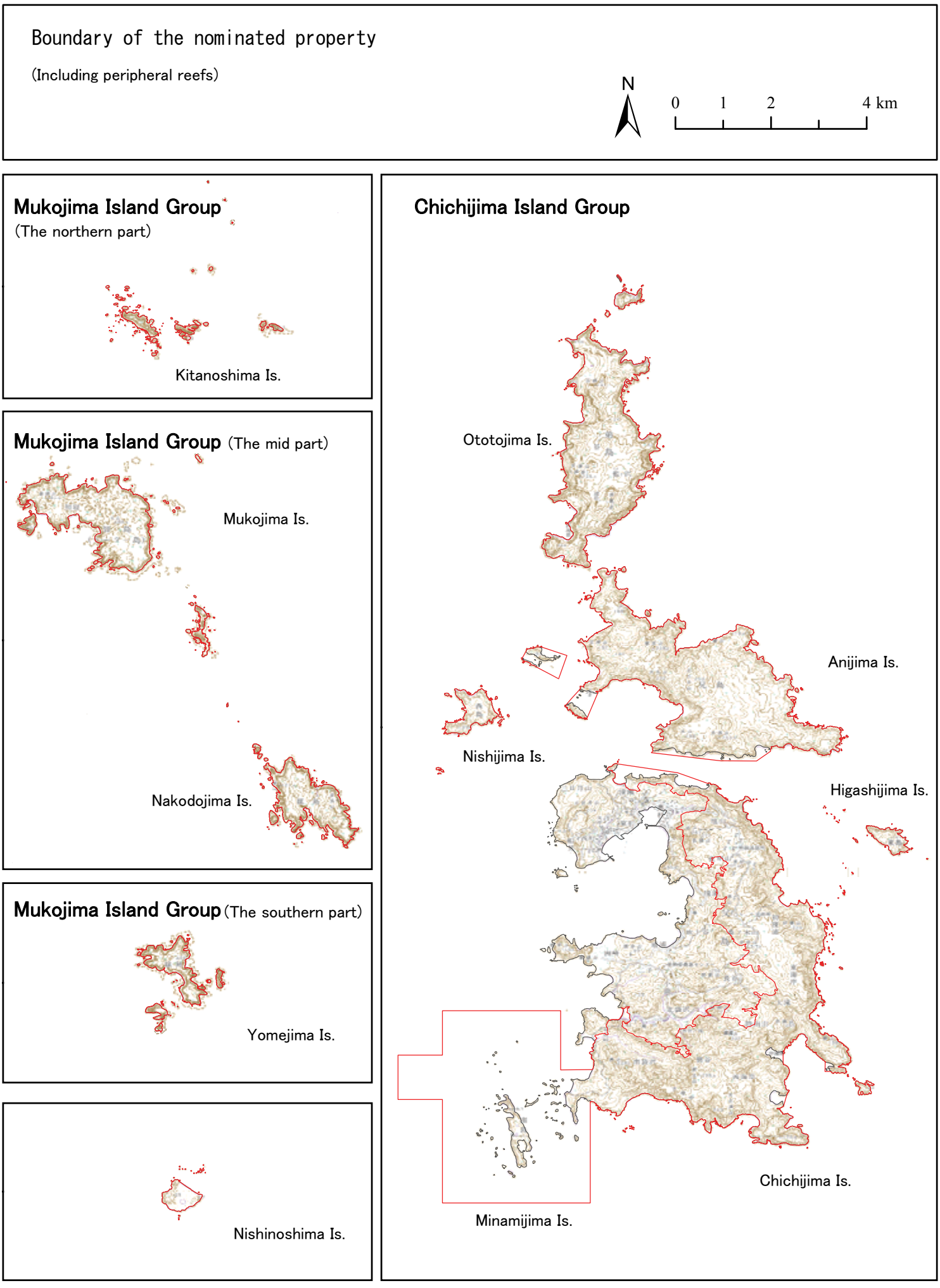



Fig. 1-1 Boundary of the nominated property
(Mukojima, Chichijima Island Groups and Nishinoshima)
*(Source: 'Yokosuka' Geographic Information (1/25,000) of Geographical Survey Institute)*

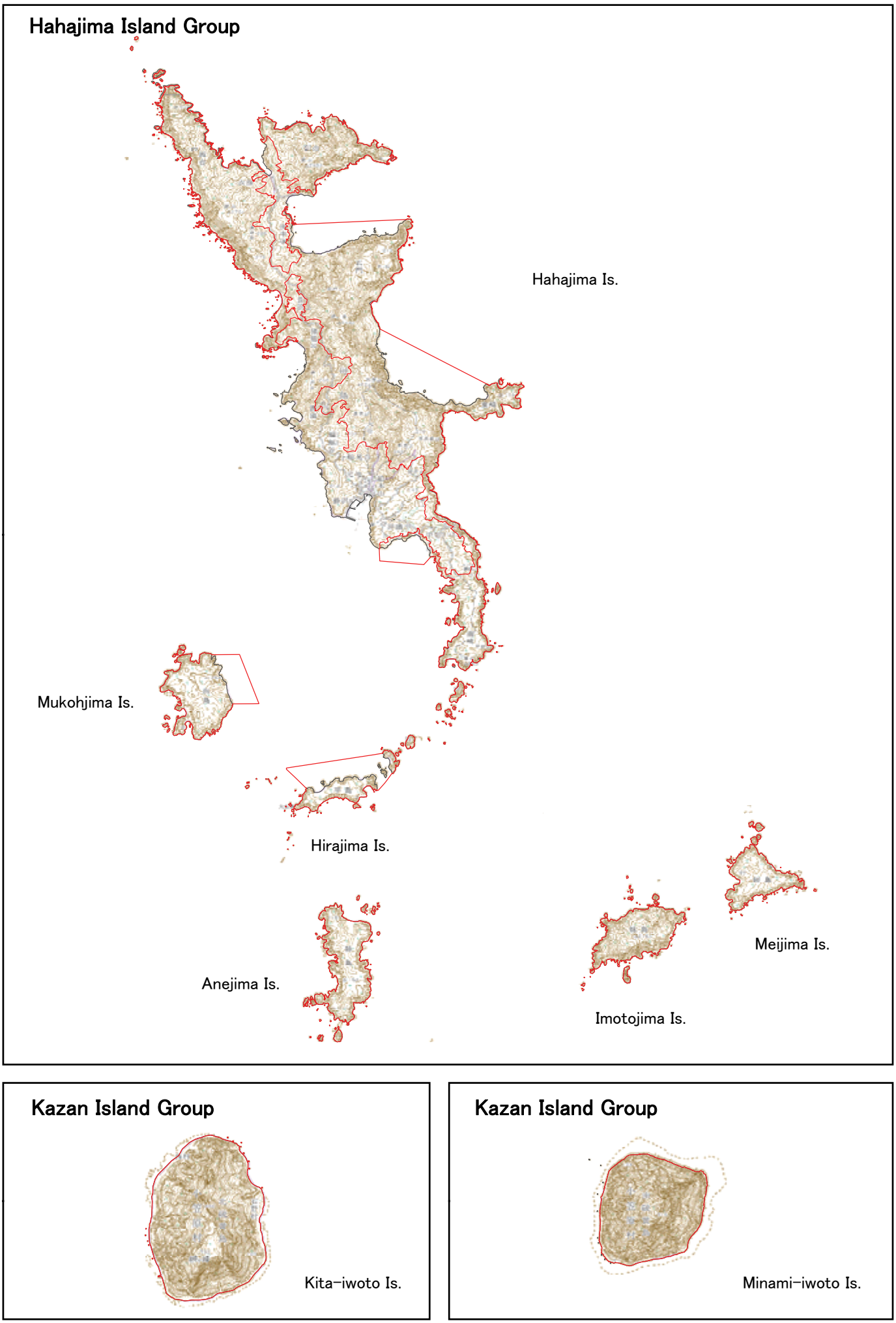



Fig. 1-2 Boundary of the nominated property
(Hahajima Island Group, Kita-iwoto and Minami-iwoto)
*(Source: 'Yokosuka' Geographic Information (1/25,000) of Geographical Survey Institute)*




Fig. 1-3 World Heritage Management Area - Main scope of the Management Plan -

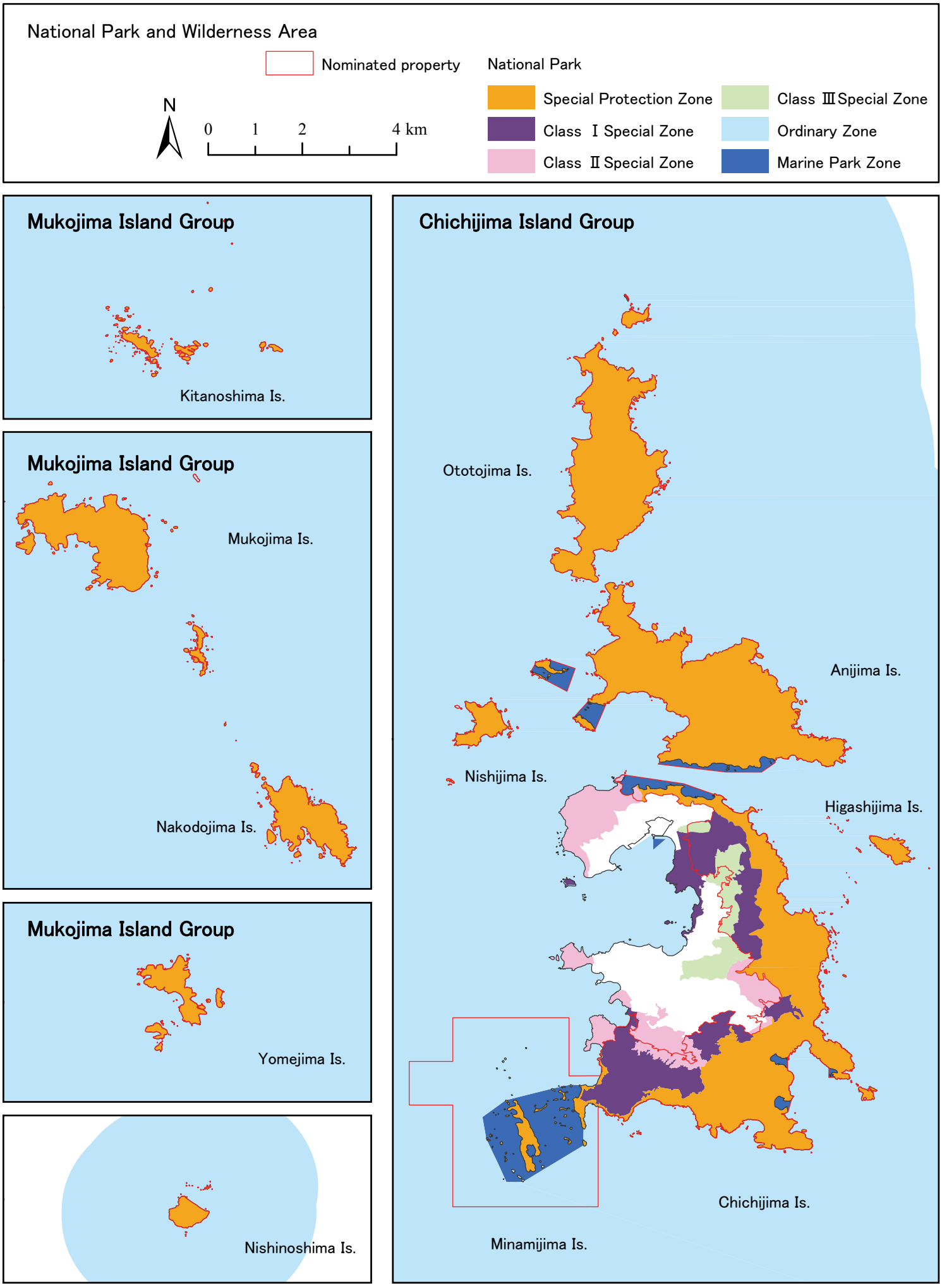



Fig. 1-4 Ogasawara National Park
(Mukojima Island Group, Chichijima Island Group, and Nishinoshima)

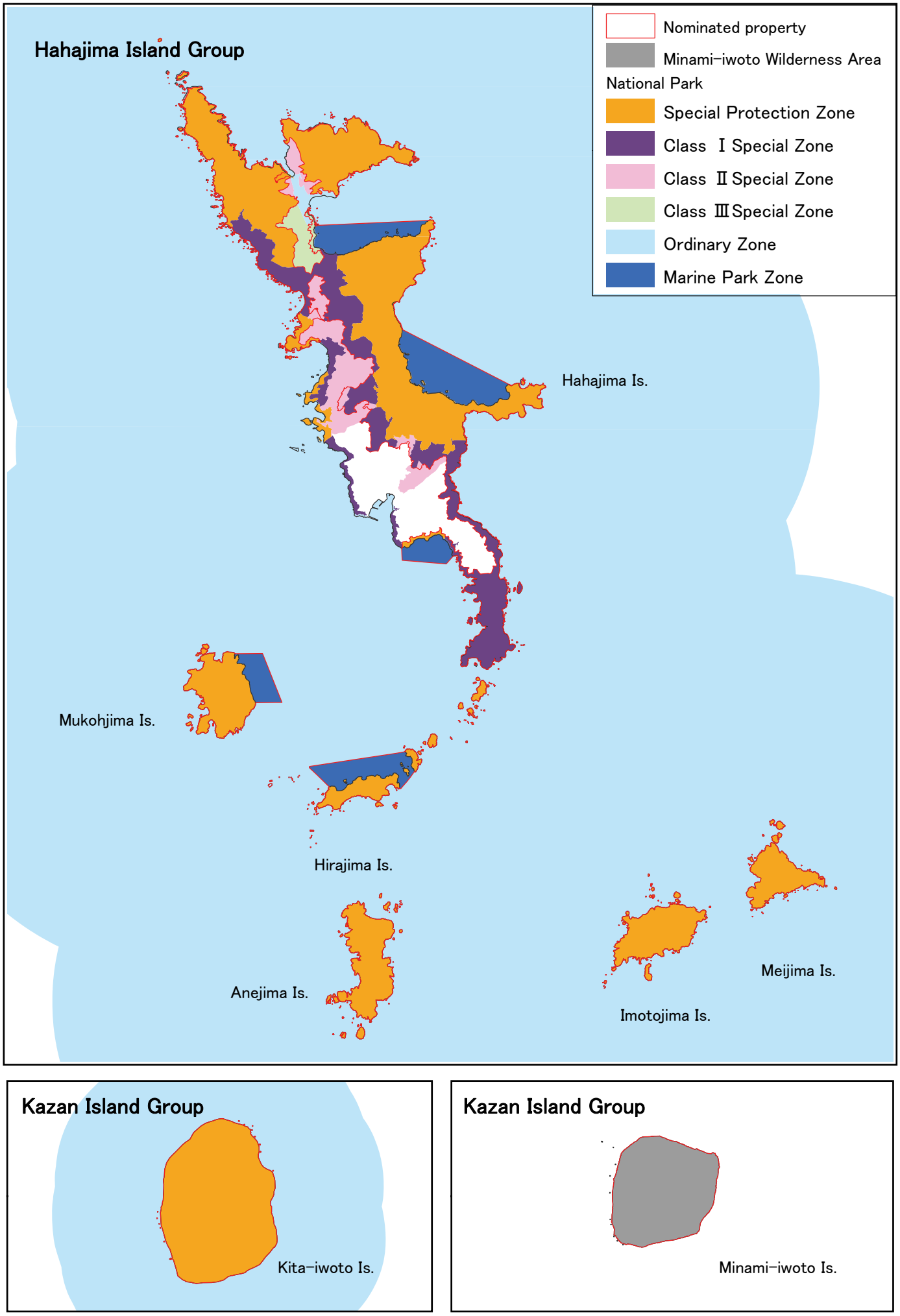
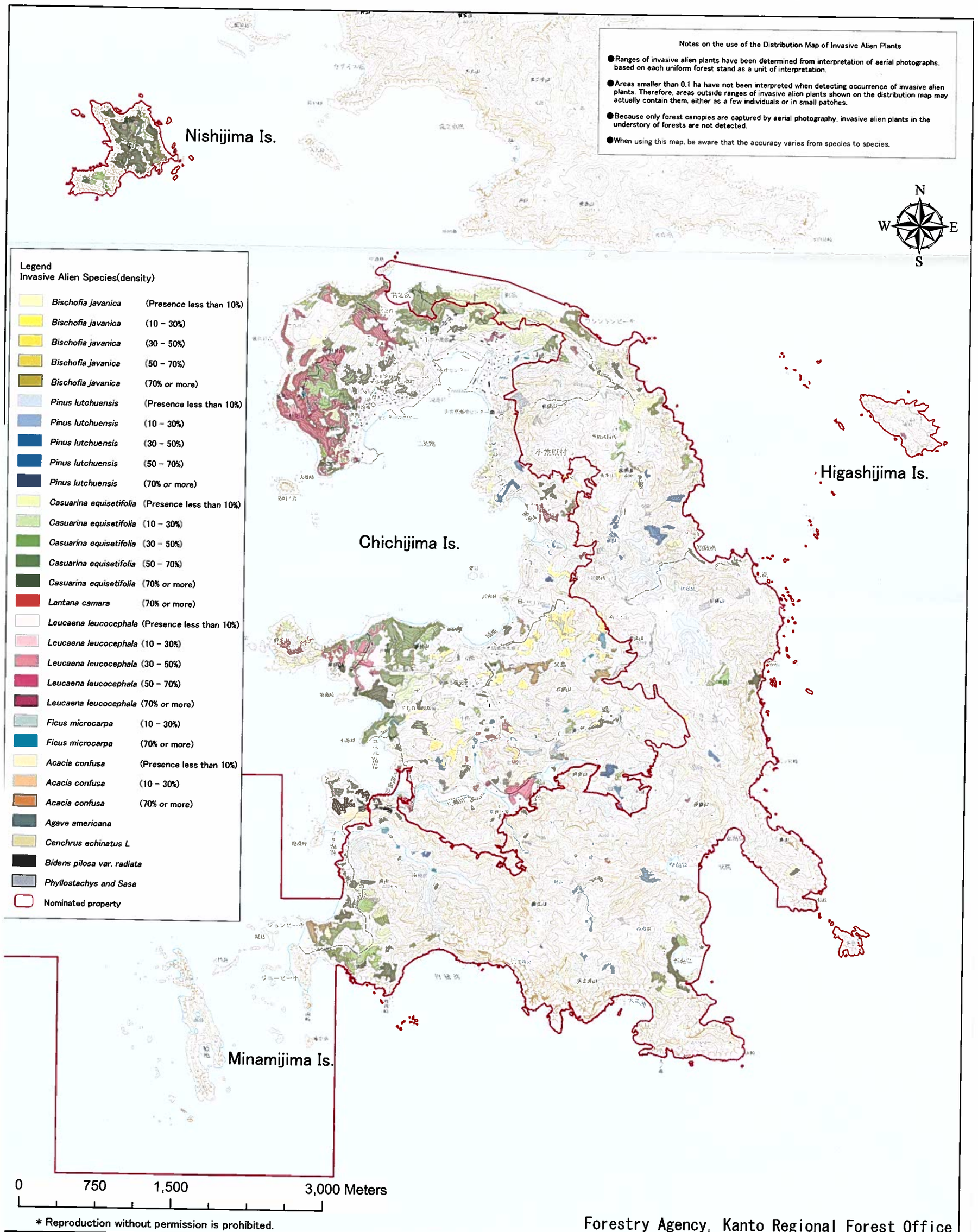



Fig. 1-5 Minami-iwoto Wilderness Area and Ogasawara National Park
(Hahajima Island Group, Kita-iwoto, and Minami-iwoto)

# Fig. 2-1 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

## Chichijima Island Nishijima Island Higashijima Island Minamijima Island




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Forestry Agency, Kanto Regional Forest Office

This Distribution Map of Invasive Alien Plants was produced as an output from the Project for the Survey on Distribution of Invasive Alien Plants on the Ogasawara Islands in fiscal 2009 (Forestry Agency). The map image in the background of this Distribution Map was taken from GISMAP 25000R+ published by Hokkaido-Chizu Co., Ltd., which was produced from 1:25,000 topographic maps of Geospatial Information Authority of Japan with permission of Director General of the Authority (permission No. 185-25665 for business use in 2009). The Distribution Map was prepared by superimposing the GIS data for national forests and the GIS data depicting the ranges of invasive alien plants prepared from the analysis of aerial photographs taken in the period from November 2008 to January 2009 on the map image.

# Fig. 2-2 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

## Chichijima Island Nishijima Island Higashijima Island Minamijima Island

Notes on the use of the Distribution Map of Invasive Alien Plants

- Ranges of invasive alien plants have been determined from interpretation of aerial photographs, based on each uniform forest stand as a unit of interpretation.
- Areas smaller than 0.1 ha have not been interpreted when detecting occurrence of invasive alien plants. Therefore, areas outside ranges of invasive alien plants shown on the distribution map may actually contain them, either as a few individuals or in small patches.
- Because only forest canopies are captured by aerial photography, invasive alien plants in the understory of forests are not detected.
- When using this map, be aware that the accuracy varies from species to species.

N
W E
S

Nishijima Is.

Higashijima Is.

Chichijima Is.

Minamijima Is.

Legend
Invasive Alien Species(density)

- *Casuarina equisetifolia*(Presence less than 10%)
- *Casuarina equisetifolia*(10 – 30%)
- *Casuarina equisetifolia*(30 – 50%)
- *Casuarina equisetifolia*(50 – 70%)
- *Casuarina equisetifolia*(70% or more)
- Nominated property

0 750 1,500 3,000 Meters

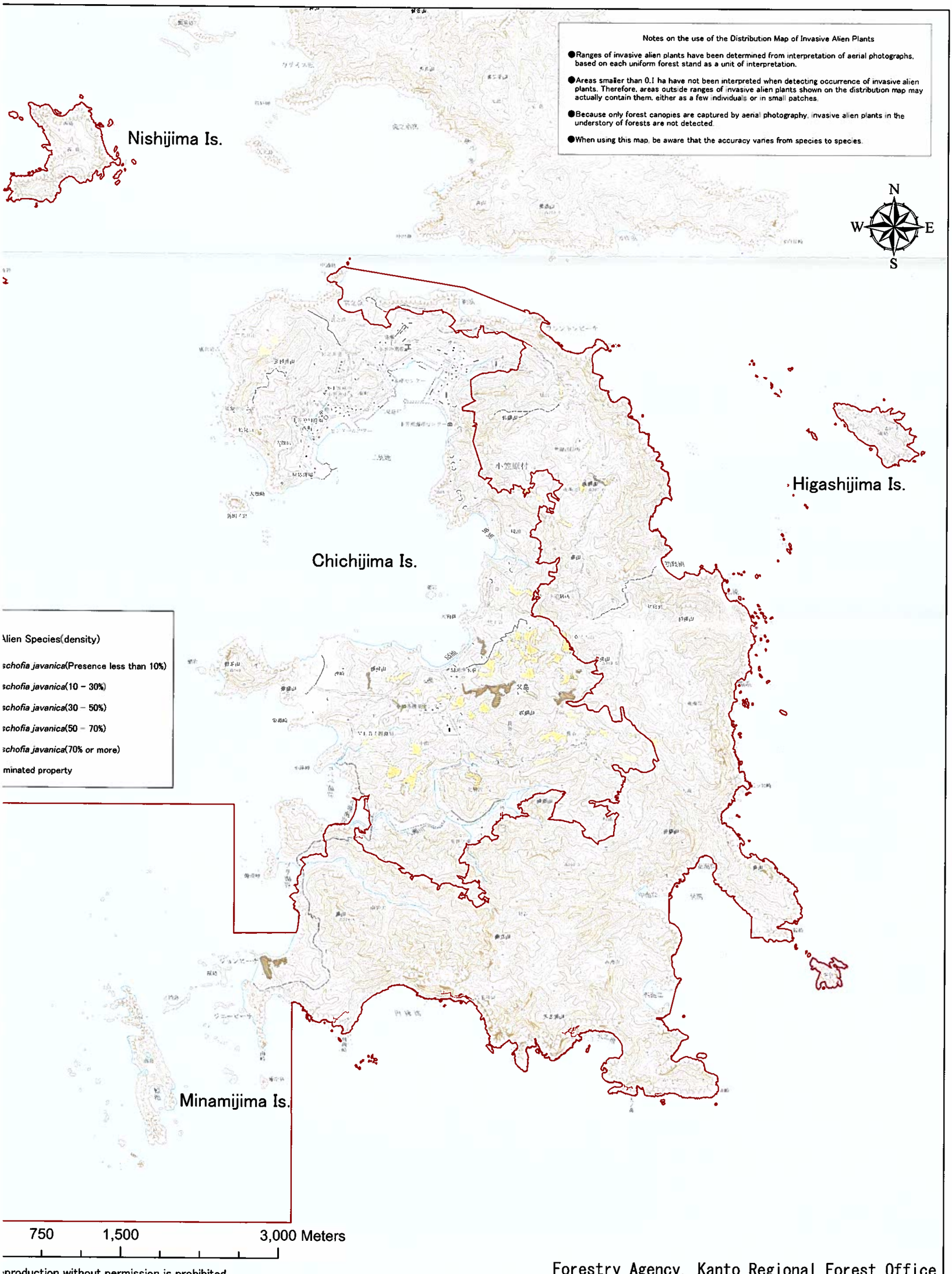
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Forestry Agency, Kanto Regional Forest Office

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The Distribution Map was prepared by superimposing the GIS data for national forests and the GIS data depicting the ranges of invasiva alien plants prepared from the analysis of aerial photographs taken in the period from November 2008 to January 2009 on the map image.

# : 2-3 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

## Chichijima Island Nishijima Island Higashijima Island Minamijima Island




Forestry Agency, Kanto Regional Forest Office

Map of Invasive Alien Plants was produced as an output from the Project for the Survey on Distribution of Invasive Alien Plants on the Ogasawara Islands in fiscal 2009 (Forestry Agency). The map imago in the background of this Oistribution Map was taken i000R+ published by Hokkaido-Chizu Co., Ltd., which was produced from 1:25,000 topographic maps of Geospatial Information Authority of Japan with permission of Director General of the Authority (permission No. 185-25665 for business use in 2009). Map was prepared by superimposing the GIS data for national forests and the GIS data depicting the ranges of invasive alian plants prepared from the analysis of aerial photographs taken in the period from November 2008 to January 2009 on the map image.

# Fig. 2-4 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

## Chichijima Island Nishijima Island Higashijima Island Minamijima Island

Notes on the use of the Distribution Map of Invasive Alien Plants

- Ranges of invasive alien plants have been determined from interpretation of aerial photographs, based on each uniform forest stand as a unit of interpretation.
- Areas smaller than 0.1 ha have net been interpreted when detecting occurrence of invasive alien plants. Therefore, areas outside ranges of invasive alien plants shown on the distribution map may actually contain them, either as a few individuals or in small patches.
- Because only forest canopies are captured by aerial photography, invasive alien plants in the understory of forests are not detected.
- When using this map, be aware that the accuracy varies from species to species.

N
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S

Nishijima Is.

Higashijima Is.

Chichijima Is.

Minamijima Is.

Legend
Invasive Alien Species(density)

- *Lantana camara*(70% or more)
- Nominated property

0 750 1,500 3,000 Meters

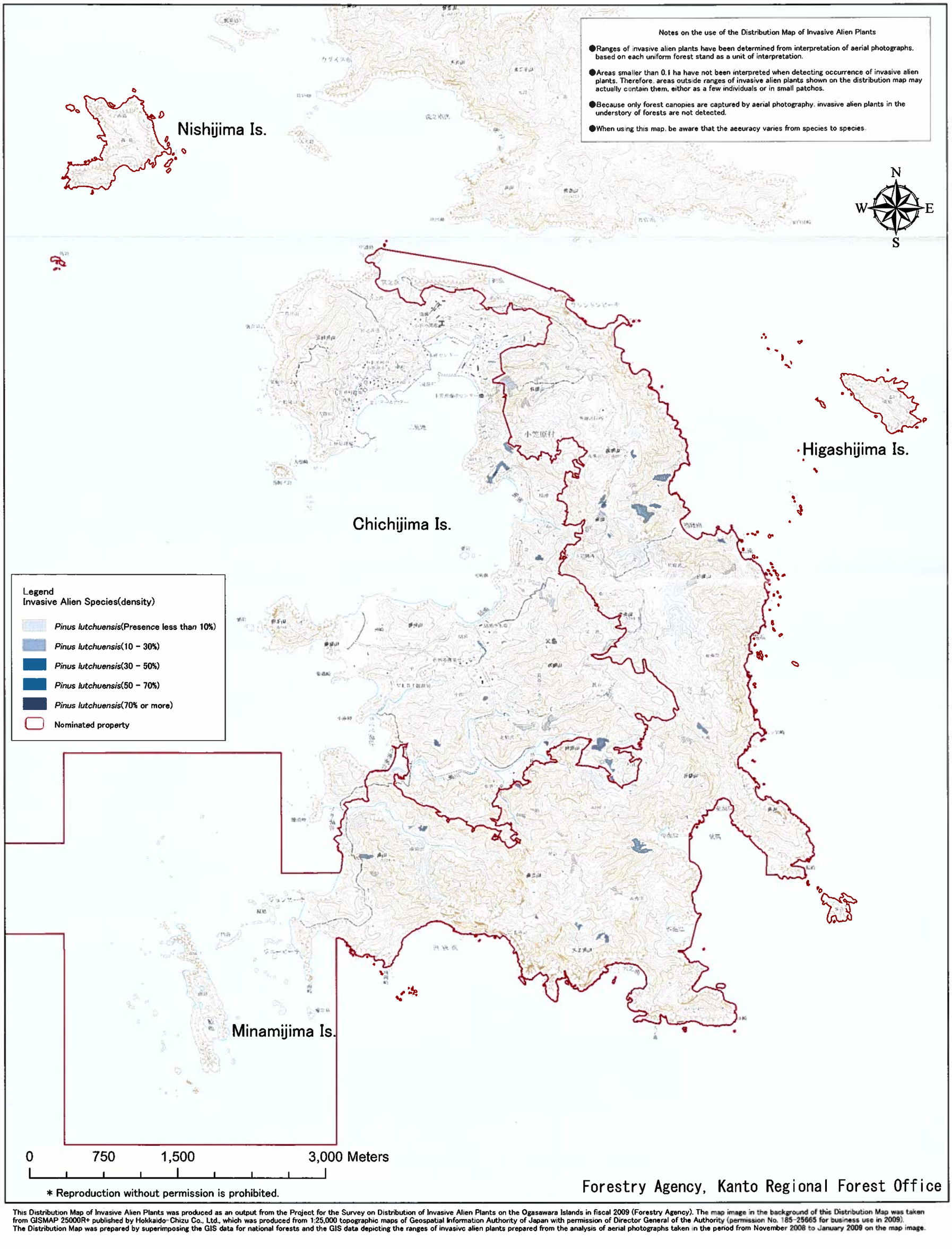
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# Fig. 2-5 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

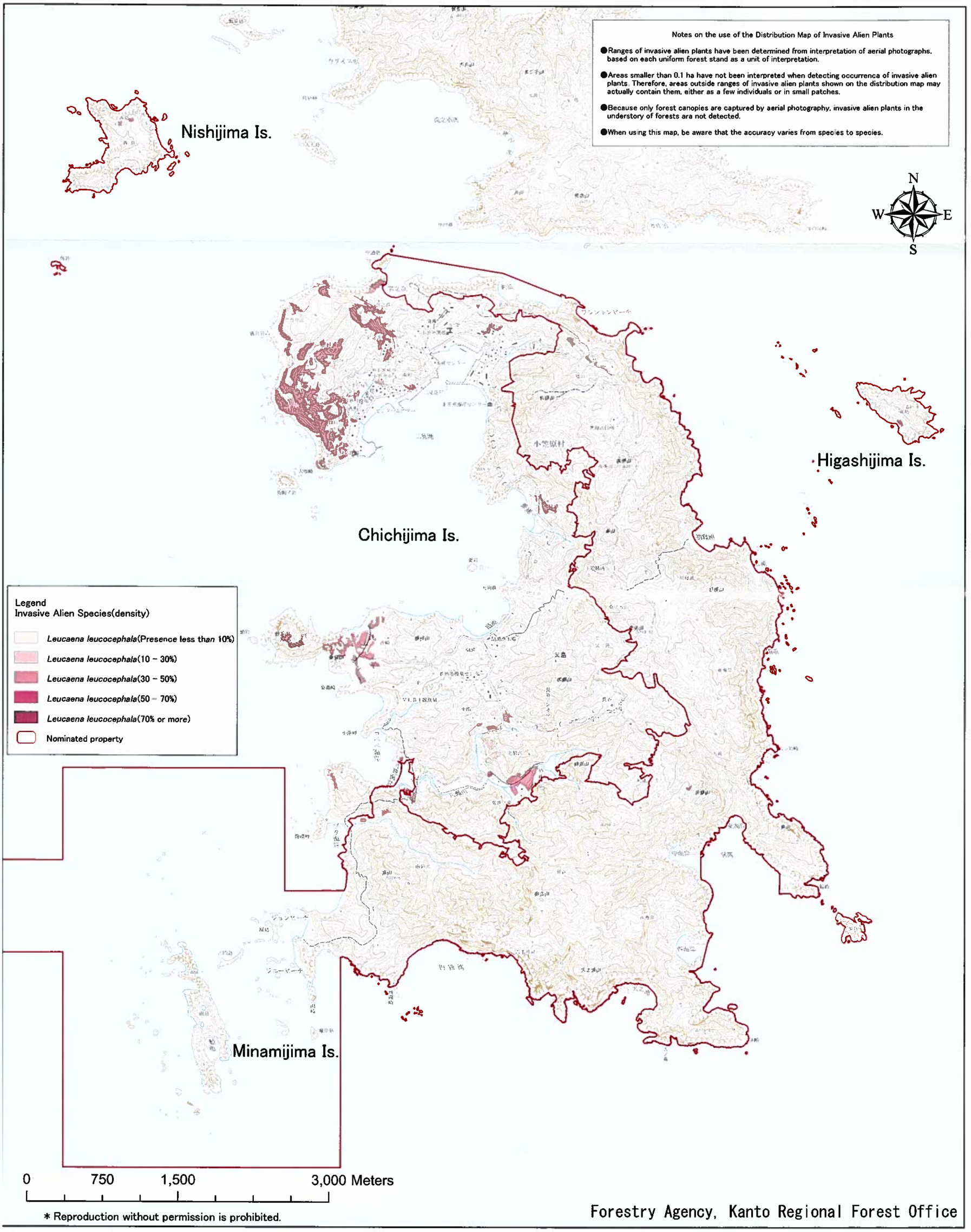
## Chichijima Island Nishijima Island Higashijima Island Minamijima Island




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# Fig. 2-6 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

## Chichijima Island Nishijima Island Higashijima Island Minamijima Island




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Forestry Agency, Kanto Regional Forest Office

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The Distribution Map was prepared by superimposing the GIS data for national forests and the GIS data depicting the ranges of invasive alien plants prepared from the analysis of aerial photographs taken in the period from Novembar 2008 to January 2009 on the map image.

# Fig. 3-1 Distribution Map of Invasive Alien Plants on the Ogasawara Islands
## Anijima Island Ototojima Island Magojima Island




Magojima Is.

Ototojima Is.

Anijima Is.

**Notes on the use of the Distribution Map of Invasive Alien Plants**

- Ranges of invasive alien plants have been determined from interpretation of aerial photographs, based on each uniform forest stand as a unit of interpretation.
- Areas smaller than 0.1 ha have not been interpreted when detecting occurrence of invasive alien plants. Therefore, areas outside ranges of invasive alien plants shown on the distribution map may actually contain them, either as a few individuals or in small patches.
- Because only forest canopies are captured by aerial photography, invasive alien plants in the understory of forests are not detected.
- When using this map, be aware that the accuracy varies from species to species.

Legend
Invasive Alien Species(density)

| | |
|---|---|
| *Pinus lutchuensis* | (Presence less than 10%) |
| *Pinus lutchuensis* | (10 - 30%) |
| *Pinus lutchuensis* | (30 - 50%) |
| *Pinus lutchuensis* | (50 - 70%) |
| *Pinus lutchuensis* | (70% or more) |
| *Casuarina equisetifolia* | (Presence less than 10%) |
| *Casuarina equisetifolia* | (10 - 30%) |
| *Casuarina equisotifolia* | (30 - 50%) |
| *Casuarina equisetifolia* | (50 - 70%) |
| *Casuarina equisetifolia* | (70% or more) |
| *Lantana camara* | (70% or more) |
| *Ficus microcarpa* | (70% or more) |
| *Lagerstroemia subcostata* | (30 - 50%) |
| Nominated property | |

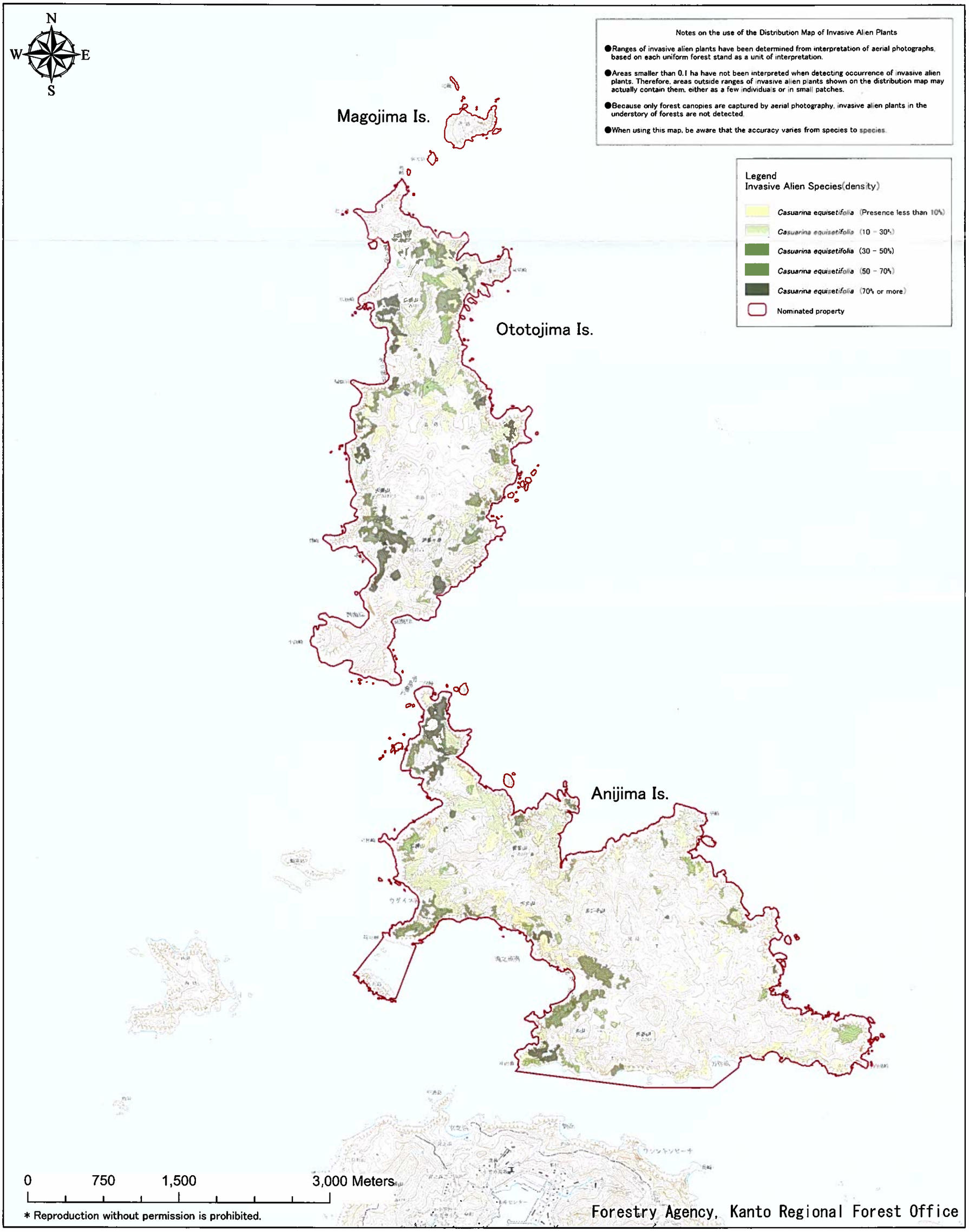
0 750 1,500 3,000 Meters

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Forestry Agency, Kanto Regional Forest Office

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# Fig. 3-2 Distribution Map of Invasive Alien Plants on the Ogasawara Islands
## Anijima Island  Ototojima Island  Magojima Island




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# Fig. 3-3 Distribution Map of Invasive Alien Plants on the Ogasawara Islands
## Anijima Island  Ototojima Island  Magojima Island

N
W E
S

Notes on the use of the Distribution Map of Invasive Alien Plants

- Ranges of invasive alien plants have been determined from interpretation of aerial photographs, based on each uniform forest stand as a unit of interpretation.
- Areas smaller than 0.1 ha have not been interpretad whan detecting occurronce of invasive alien plants. Therefore, areas outside ranges of invasive alien plants shown on the distribution map may actually contain them, either as a few individuals or in small patches.
- Because only forest canopies are captured by aerial photography, invasive alien plants in the understory of forests are not detected.
- When using this map, be aware that the accuracy varies from species to species.

Legend
Invasive Alien Species(density)

*Lantana camara* (70% or more)

Nominated property

Magojima Is.

Ototojima Is.

Anijima Is.

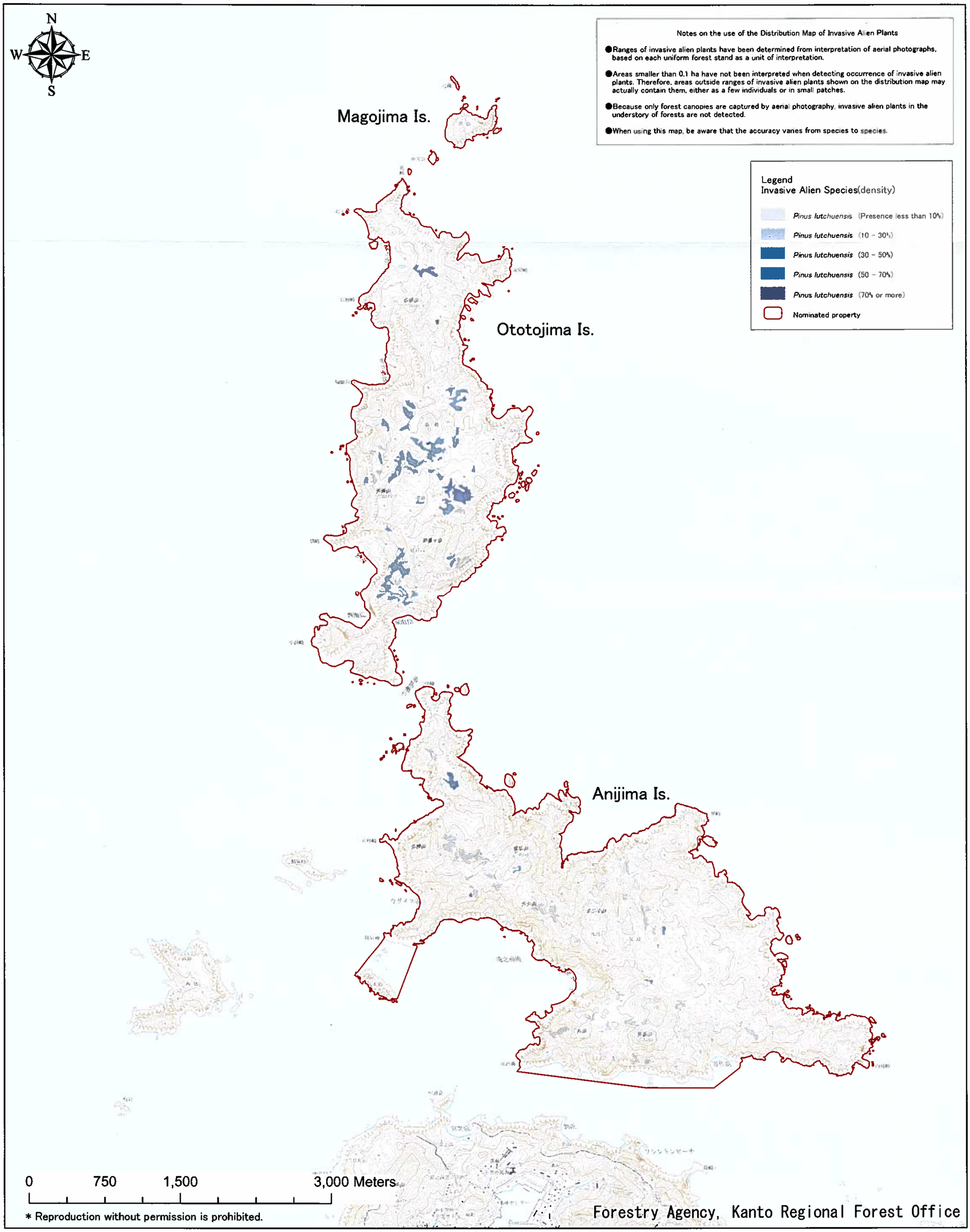
0 750 1,500 3,000 Meters

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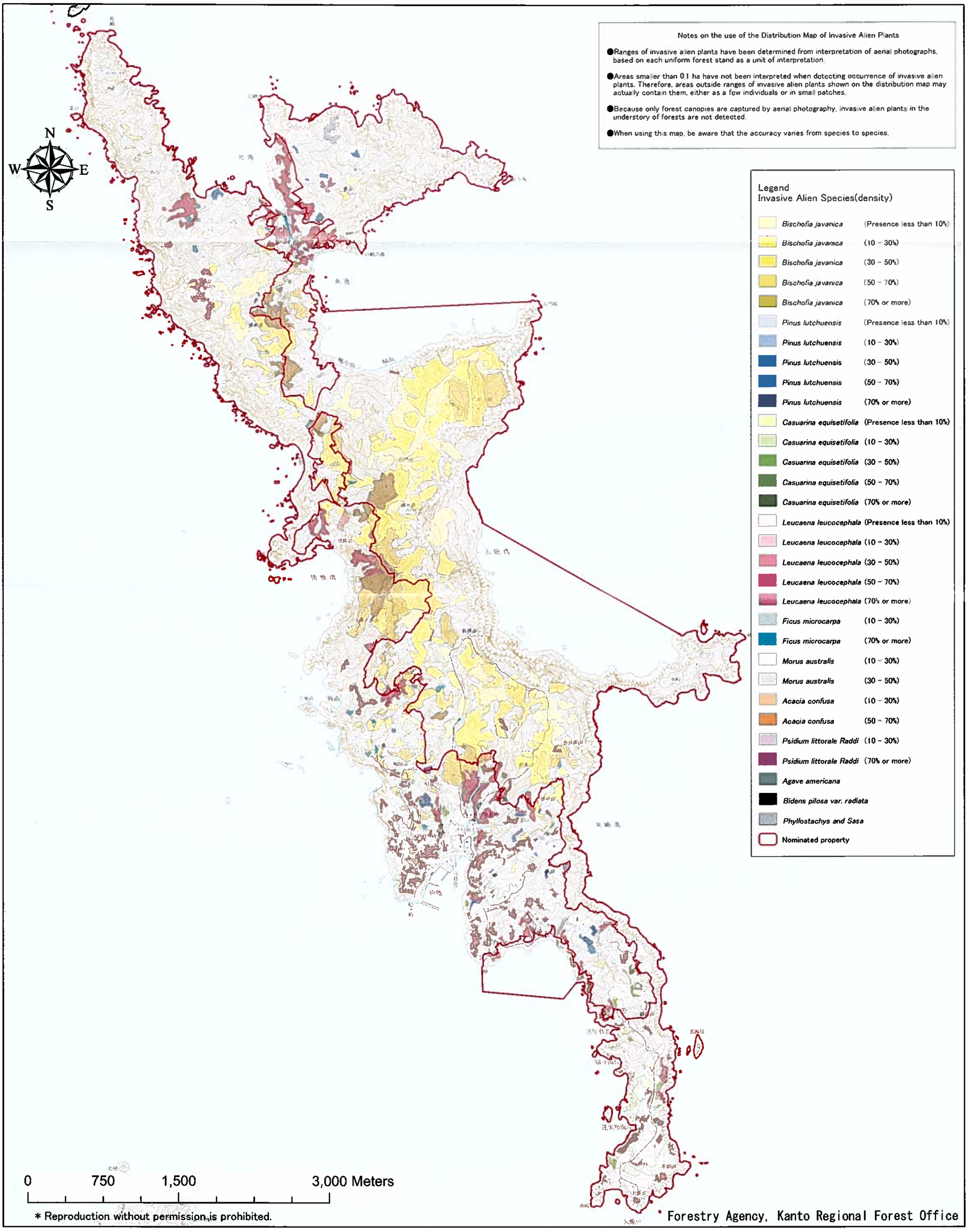
# Fig. 3-4 Distribution Map of Invasive Alien Plants on the Ogasawara Islands
## Anijima Island  Ototojima Island  Magojima Island




This Distribution Map of Invasive Alien Plants was produced as an output from the Project for the Survey on Distribution of Invasive Alien Plants on the Ogasawara Islands in fiscal 2009 (Forestry Agency). The map image in the background of this Distribution Map was taken from GISMAP 25000R+ published by Hokkaido-Chizu Co., Ltd., which was produced from 1:25,000 topographic maps of Gaospatial Information Authority of Japan with permission of Director General of the Authority (permission No. 185-25665 for business use in 2009).
The Distribution Map was prepared by superimposing the GIS data for national forests and the GIS data depicting the ranges of invasive alien plants prepared from the analysis of aerial photographs taken in the period from November 2008 to January 2009 on the map image.

# Fig. 4-1 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

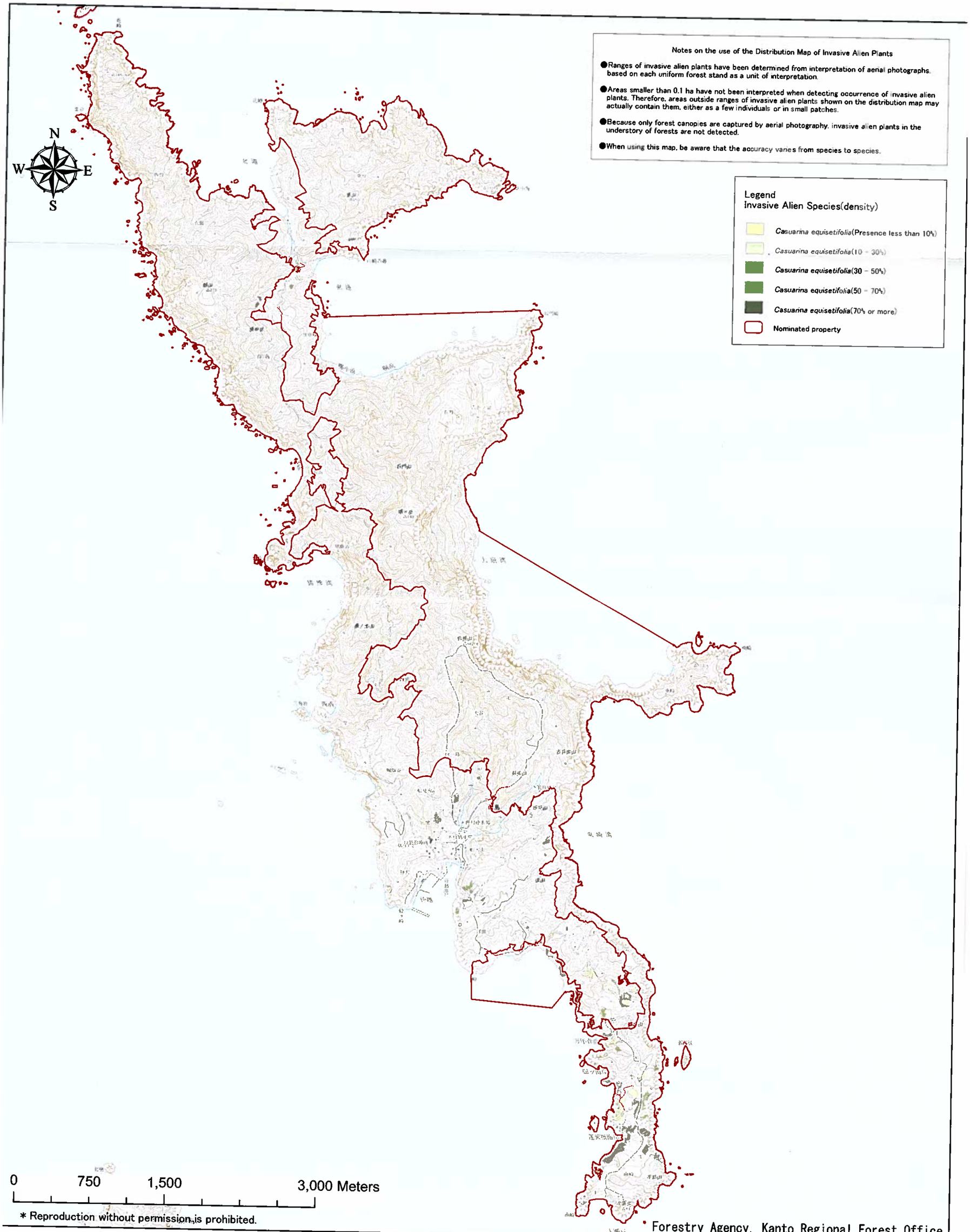
## Hahajima Island




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# Fig. 4-2 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

## Hahajima Island



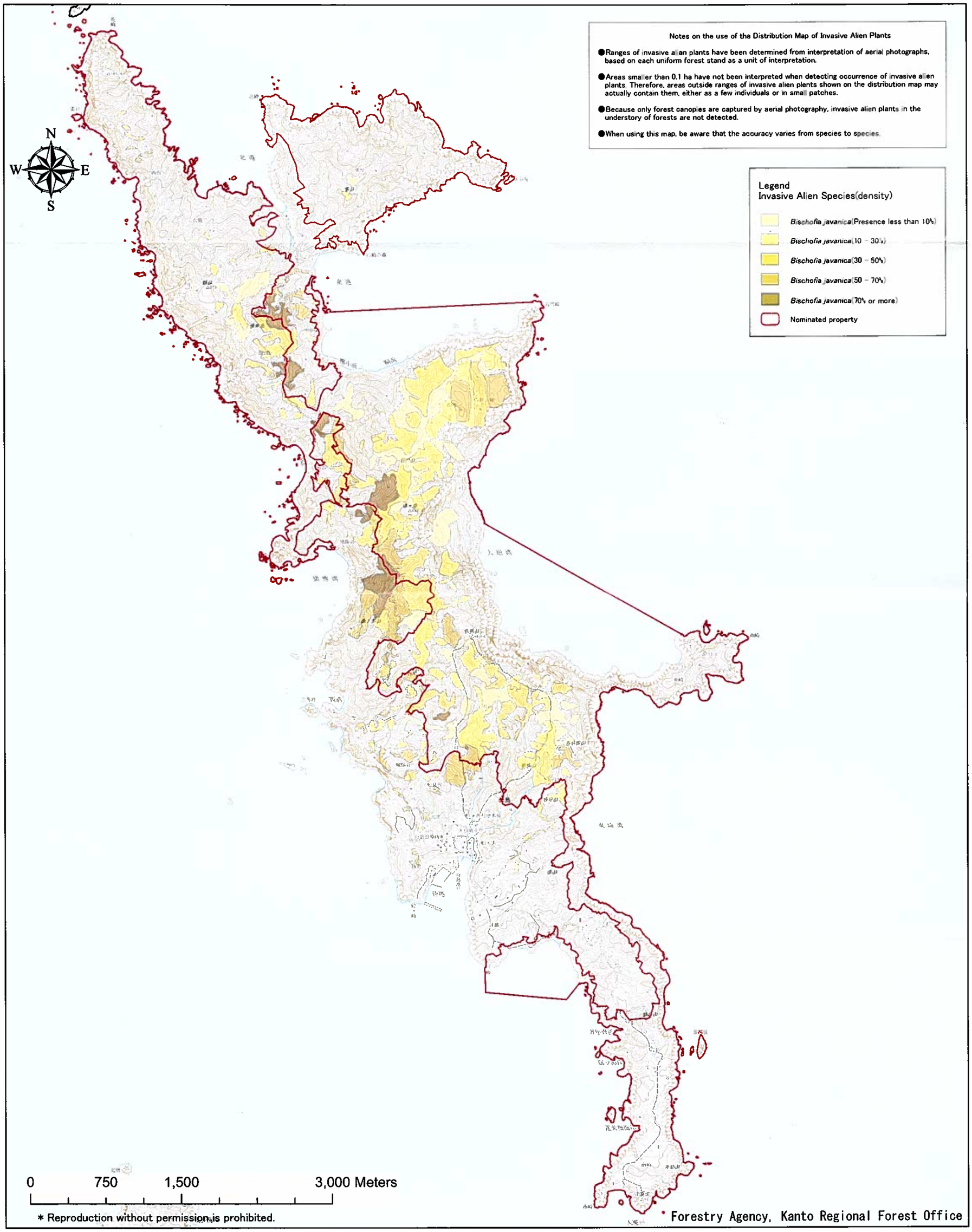

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Forestry Agency, Kanto Regional Forest Office

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# Fig. 4-3 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

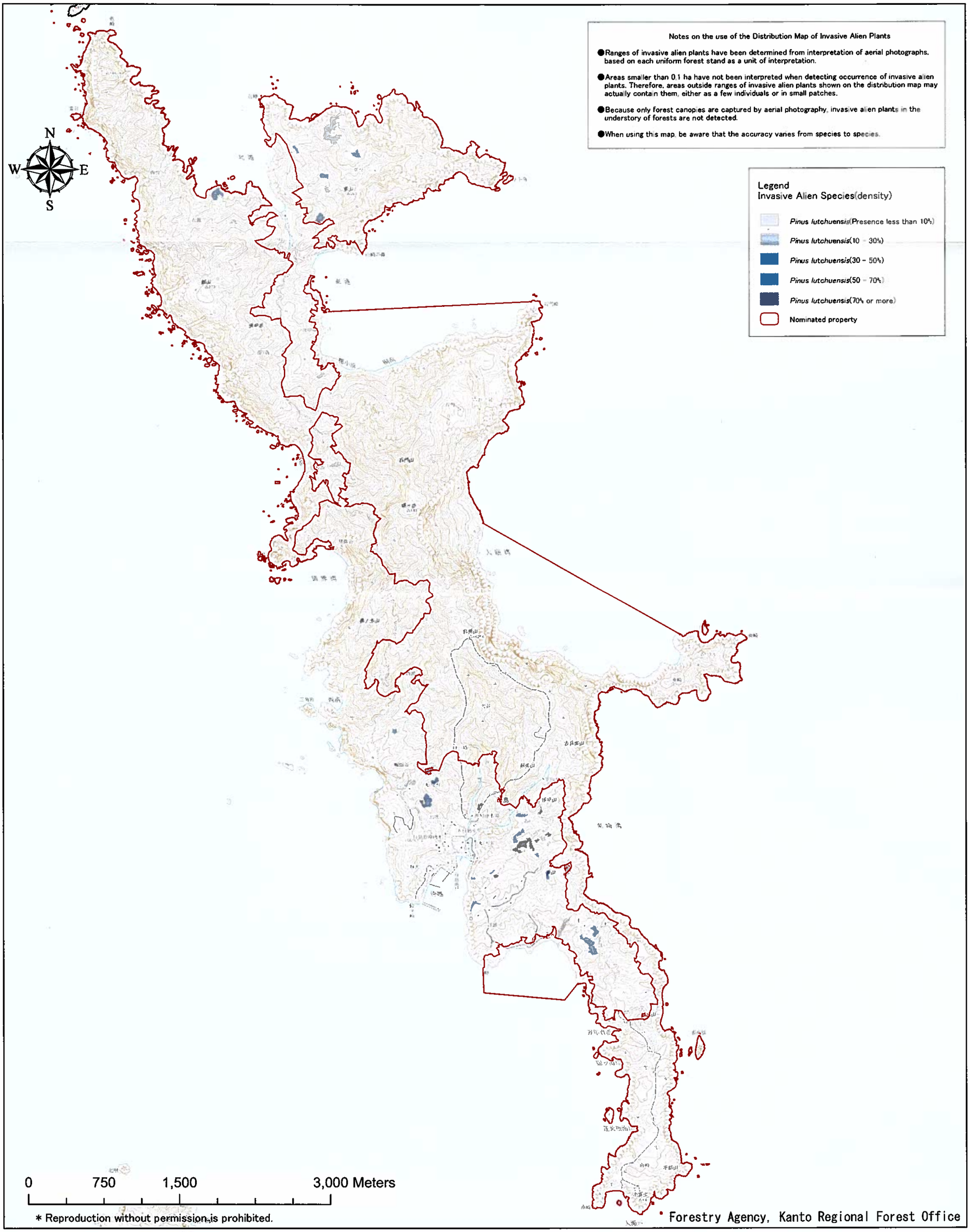
## Hahajima Island




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# Fig. 4-4 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

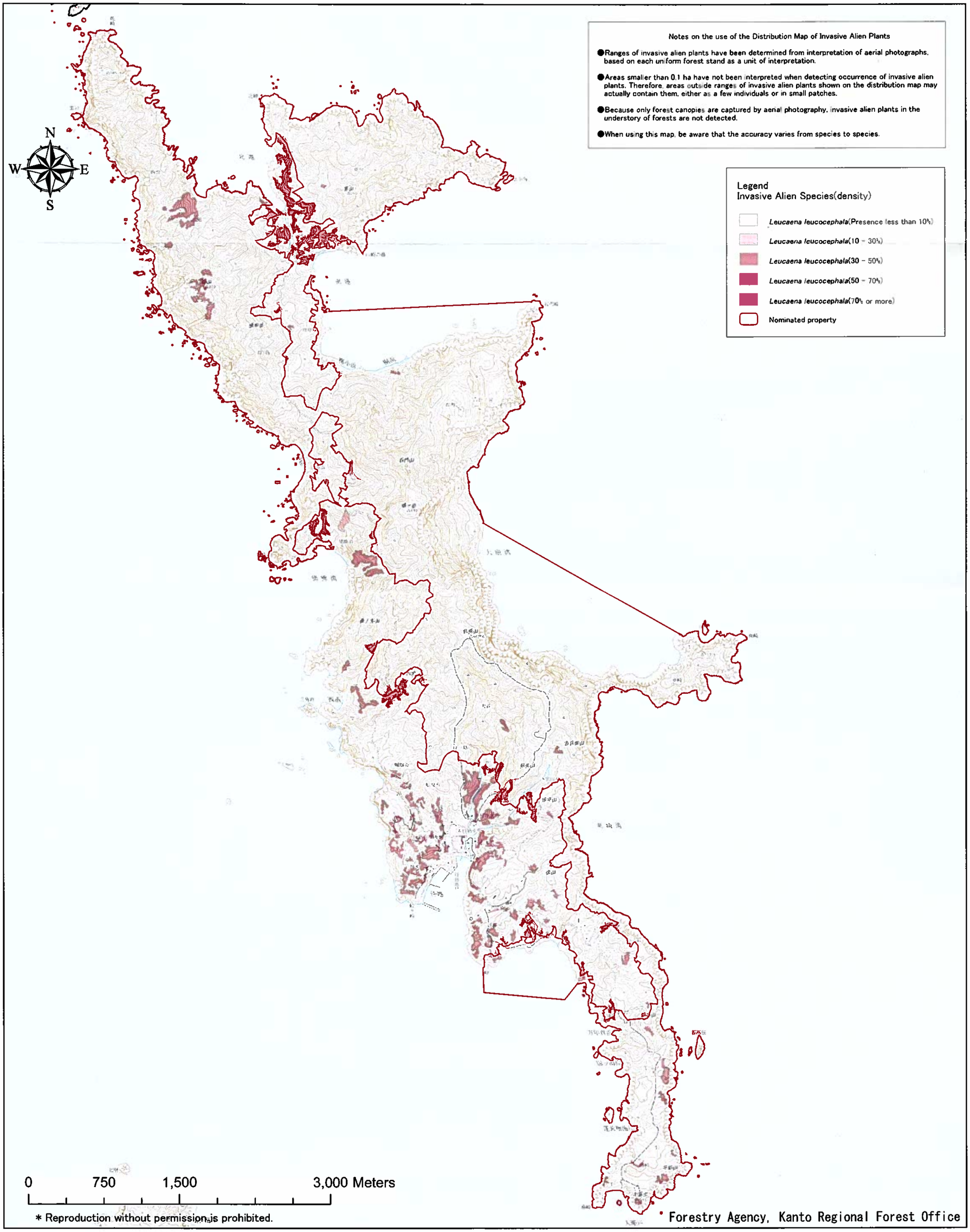
## Hahajima Island




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# Fig. 4-5 Distribution Map of Invasive Alien Plants on the Ogasawara Islands

## Hahajima Island




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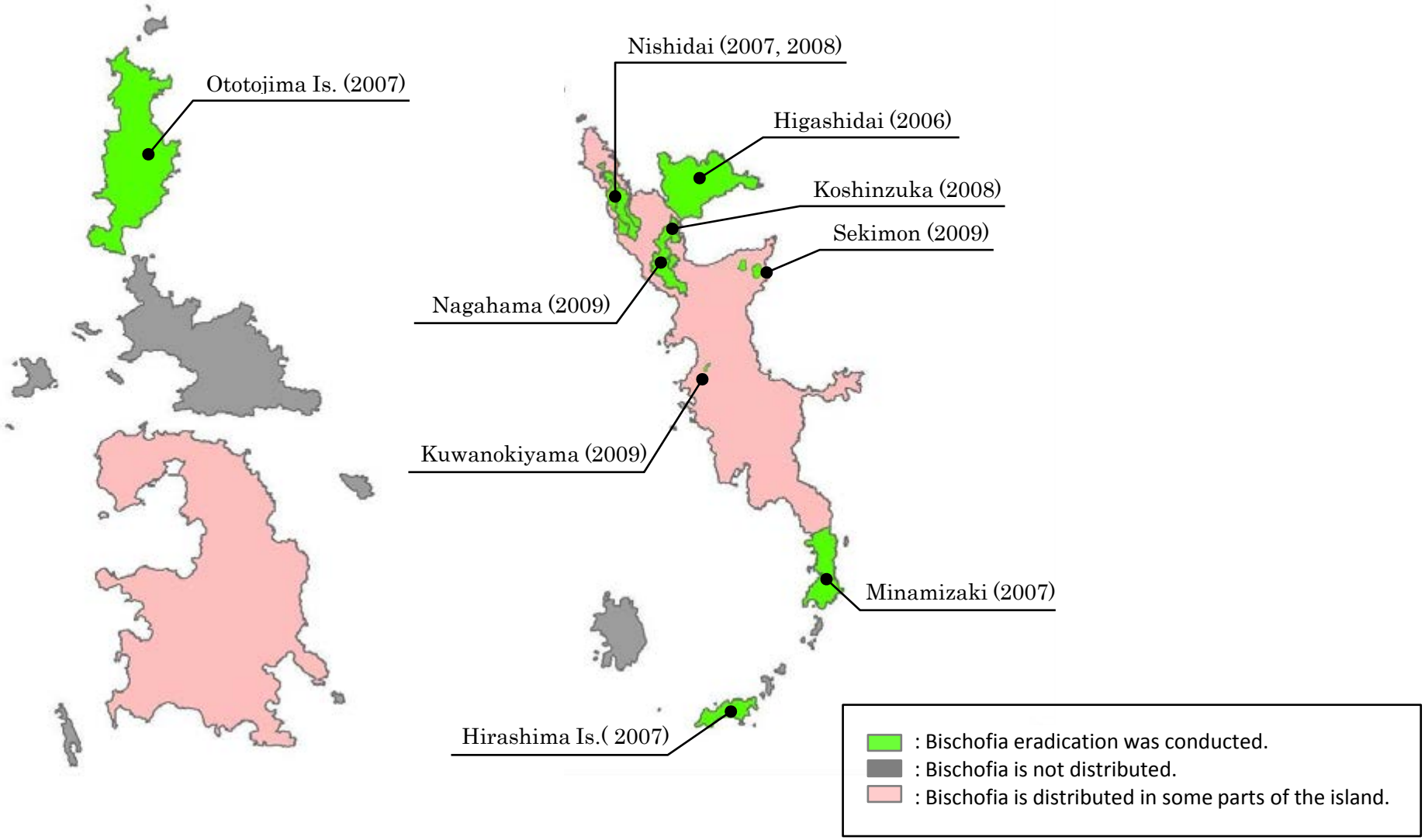



Fig.5 Areas of Bischofia eradication

Eradication projects of *Bischofia javanica* were taken place in green areas during the year indicated. Bischofia is not distributed on the gray colored islands. The species remains in pink areas but not necessary the whole area. The actual distributions of Bischofia trees in 2009 are shown in Fig. 2-3 and Fig. 4-3.

# Summary of Development Permits

◆Applicable ordinance

Article 47 (or Article 48) of the "Ordinance on the Protection and Restoration of Natural Environments in Tokyo"

1. Acts that require a development permit

● Applicable acts

Applicable acts are those stipulated in the Ordinance, such as construction of buildings or other structures, or housing, in lands containing natural areas* of a certain size.

> *A "natural area" refers to forested land, grassland, farmland, ponds, marshes or other land in a similar state. Whether a tract of land qualifies as a "natural area" is to be determined by field surveys.
> *A "certain size" refers to the following conditions: (I) one-third or more of the total area slated for a development act is a natural area, or (II) land contains a tract of natural area that totals 1,000 square meters or more.

1. Acts for the construction (new construction, renovations, or additions) of buildings or other structures (with the exception of acts that apply in 2 to 7 below).
2. Acts for housing
3. Acts for the construction of golf courses, athletic fields, and similar outdoor athletic facilities
4. Acts for the construction of amusement parks or similar outdoor recreation facilities
5. Acts for construction of roads (roads refer to those stipulated in Article 2(1)(a) of the Road Traffic Act)
6. Acts for the construction of parking lots, material storage places, or workplaces
7. Acts for the construction of cemeteries (cemeteries refer to those stipulated in

Article 2(5) of the Graveyards and Burials Act)

8. Mining of minerals or quarrying of earth or rock

9. Reclaiming or filling of land by earth and sand or similar (materials used for land reclamation and filling, excluding waste stipulated in Article 2(1) of the Waste Management and Public Cleansing Act) (with the exception of acts that apply in 1 to 8 apply)

- Applicable size

  An area of 3,000 square meters or more for a type A area,* and an area of 1,000 square meters or more for type B area.

  A *type A area" primarily refers to urbanized areas (excluding scenic zones), while a "type B area" mainly refers to scenic zones and urbanization control areas, the details of which are stipulated in the Enforcement Ordinance.

  In cases where an act requires a development permit, and the area slated for the act exceeds 30,000 square meters, or the governor deems it necessary, it becomes necessary to seek the approval of Tokyo Nature Conservation Council for the relevant plan.

  Note: even in cases where the conditions above apply, there are acts that are deemed not applicable under the ordinance. Please contact the offices available to find out if the regulations above apply to acts in the particular plan.

# Conservation Program for the Bonin flying fox (*Pteropus pselaphon*)

Ministry of Education, Culture, Sports, Science and Technology
Ministry of Agriculture, Forestry and Fisheries
Ministry of Land, Infrastructure, Transport and Tourism
Ministry of the Environment

## I. Purpose of the program

The Bonin flying fox (*Pteropus pselaphon*), which belongs to the family Pteropodidae, is the only mammal endemic to the Ogasawara Islands. It is a herbivore that mainly forages on fruits. As a large seed disperser and pollinator, the Bonin flying fox is a crucial member of the ecosystems of the oceanic islands that make up Ogasawara. At present, its occurrence has been confirmed only on Chichijima, Hahajima and the Kazan Island Group. Its population in all of the Ogasawara Islands is estimated to be about 300 individuals at most. In the past, several hundred individuals were confirmed on Hahajima, which is part of the Ogasawara Archipelago, but the population had rapidly plummeted to a very small number by the 1970s. At present the total abundance is expected to be about 130, most of which occur on Chichijima. Hence, they are deemed in serious danger of extinction in the near future.

In winter on Chichijima, Bonin flying foxes exhibit behavior not seen in other flying foxes, such as forming clusters in a colonial roost during the day in which individuals rest huddled together, and this is likely to be related to the development of a distinctive society. Currently, the Ogiura area on Chichiijma is the only confirmed winter roosting site. In winter, this roost is used by almost all individuals on Chichijima and is thought to be closely linked to breeding behavior.

Pressures thought to affect this species include: development around the colonial roost in winter; decrease of native forest vegetation; competition for food resources with rats; entanglement in bird netting and other netting used to prevent damage to crops; predation by housecats that have adapted to the wild (hereinafter “feral cats”); and anthropogenic disturbance of the roost.

The objective of the program is to create a society in which the Bonin flying fox can coexist harmoniously with people and to make the stable survival of this species in its natural state possible. This is to be achieved by: continuing to collect population, distribution and other data on this species; continuing to monitor it; mitigating or eliminating factors that place pressure on this species; maintaining or improving environments necessary for this species’ survival; striking a balance with human activities such as agriculture; raising public awareness of the need to protect this species; and facilitating the proper use of this species as a resource for tourism.

## II. Program area

Ogasawara Islands, Tokyo

## III. Program details

**1. Ascertaining population and other data**

In order to carry out the program properly and effectively, the following studies will be conducted as necessary. If changes are seen that merit concern, steps contributing to the preservation of the Bonin flying fox such as additional studies to identify the causes will then be taken.

**(1) Understanding the biological characteristics of the species**

In order to take the proper steps to conserve this species, it is necessary to ascertain basic ecological and biological information. Steps to obtain such biological information shall be taken, including studies of life history, feeding habits, migration and dispersal, home range, reproductive ecology, and population dynamics of the species in its natural state.

Individuals captured for injuries or diseases, and for studies will, whenever possible, undergo pathological and parasite tests to monitor the introduction or spread of contagious diseases. In addition, genetic information will be analyzed and compared to elucidate the genetic exchange among populations on the Ogasawara Archipelago and the Kazan Island Group and to study genetic diversity within individual populations, thereby gathering basic data necessary for the conservation of the species.

**(2) Population/distribution surveys and monitoring**

Surveys and research will be conducted to study population and distribution of the Bonin flying fox on Chichijima and Hahajima, and thereby determine important habitats. Habitats there will be monitored regularly. For islands in the Ogasawara Archipelago other than Chichijima and Hahajima, although the species' occurrence has not been reported, efforts will be made to search for foraging or other signs, and to gather sighting or other information. In the Kazan Island Group, efforts will be made to gain a better understanding of populations and distribution through the relevant studies.

**(3) Habitat surveys and monitoring**

Studies will be conducted of the vegetation, topography, and climate in and around habitat areas to understand the conditions crucial for the species' survival, and changes to those factors will be monitored regularly.

**(4) Identifying factors affecting the maintenance of populations**

Results from (1), (2), and (3) above will be analyzed with care taken to maintain populations, and factors affecting the maintenance of populations will be identified.

**2. Maintaining and improving environments in the species' habitats**

To ensure the stable survival of the Bonin flying fox in a natural state, it is important to keep the colonial roost, feeding grounds, and other areas crucial to this species in good condition.

Steps will be reviewed based the findings of the studies described in III.1 above. The following measures will then be taken as necessary to maintain and improve environments ideal for its survival.

In addition, efforts will be made to ensure the conditions necessary for the survival of this species whenever utilizing or developing land in its habitats.

**(1) Ensuring supplies of food resources by restoring native forest vegetation**

The Bonin flying fox feeds on the fruits of native plants such as *Pandanus boninensis* and *Machilus kobu*, but these plants are declining in number due to invasions by bishop wood (*Bischofia javanica*) and other alien plant species. At present, this species is largely dependent on agricultural crops for food, and is therefore causing damage to farm crops. For this reason, efforts will be made to ensure supplies of this species' natural food sources by restoring native vegetation through the eradication of alien plant species. If necessary, the possibility of planting native plants will also be studied.

Furthermore, the possibility of building feeding grounds will be studied as necessary to prevent food shortages due to environmental changes resulting from steps taken to prevent damage to crops or to eradicate alien plant species.

**(2) Conserving the colonial roost**

Because this species forms a colonial roost in winter, efforts will be made to conserve the roost as well as areas adjacent to it.

**(3) Mitigating the impact of alien species**

The impact of feral cats, rats, and other alien species that affect this species through predation or competition for food resources will be studied, and methods to control or eradicate the former will be studied and carried out. Special attention will be given to finding out the extent to which feral cats encroach upon the colonial roost and surrounding areas.

**(4) Patrolling important habitats**

Patrols and signage will be instituted to help conserve environments important to this species, such as forests rich in trees that the species feeds at, the colonial roost, and their environs.

**3. Striking a balance with human activities such as agriculture**

The survival of the Bonin flying fox is currently inextricably tied to human activity, as attested by

the fact that it is causing damage to crops (including damage to plants grown in home gardens) but there are also instances of this species becoming entangled in bird nets set up to prevent damage to crops, as well as concerns over disturbances caused by people encroaching on its habitats.

For these reasons, efforts will be made to determine the degree of damage to crops caused by this species. Further, safe and effective damage prevention methods will be researched, developed, and spread, and early detection systems will be put in place to find individuals that have been caught up in nets as quickly as possible. Attempts shall also be made to set up nets in such a manner that prevents this species from entanglement, whether they are for crop protection or other.

In addition, efforts shall be made to study forms of tourism as it relates to this species, such as the encroachment upon important habitats by tourists there for the purpose of watching, spotting, photography, etc. Modes of utilization of this resource in ways that contribute to sustainable local development and the stimulation of the local economy will be studied, and steps will be taken to promote the appropriate utilization of this species in tourism.

**4. Rescuing sick and injured individuals**

Systems shall be created among the concerned parties for rescuing or collecting Bonin flying foxes whenever, for example, there are sick or injured individuals caught in bird nets, etc. Rescued individuals will be returned to the wild when possible. If returning an individual to the wild is not a viable possibility, it will be studied to gain a better understanding of biological characteristics, to establish rearing methods, to raise awareness, or otherwise be used to contribute to the conservation of the species.

Individuals that have died will be examined to determine the cause of death to whatever extent possible. Mechanisms for preserving individuals and utilizing them later will be studied and the outcomes of those efforts will be used to further contribute to conservation measures.

**5. Promoting awareness**

In view of the actual conflict between the Bonin flying fox and people, in order to make the program effective, understanding on the part of local governments, the parties carrying out the different aspects of the program, local residents, tourists, and other members of the public, is crucial. For this reason, activities to raise awareness among the public of the need to protect this species and to inform them of the results of population/distribution studies and other aspects of the program's progress will be undertaken. The activities are expected to promote consideration and cooperation in conserving the species and to facilitate the development of voluntary conservation activities by the community.

The program will also seek to train specialists who will further research into this species, conduct related studies, and advance the cause of properly conserving this species.

**6. Gaining cooperation in order to promote the program effectively**

In implementing the program, steps will be taken to facilitate partnerships among the national government, local governments, persons with expertise in the biology, ecology and other aspects of this species, as well as groups and community residents participating in activities to protect this species, so that the program may proceed effectively.

United Nations
Educational, Scientific and
Cultural Organization

Organisation
des Nations Unies
pour l'éducation,
la science et la culture

Organización
de las Naciones Unidas
para la Educación,
la Ciencia y la Cultura

Организация
Объединенных Наций по
вопросам образования,
науки и культуры

منظمة الأمم المتحدة
للتربية والعلم والثقافة

联合国教育、
科学及文化组织

**The Culture Sector**

H. E. Mr Isao Kiso
Ambassador Extraordinary and
Plenipotentiary, Permanent
Delegate of Japan to UNESCO
100, avenue de Suffren
75015 PARIS

CLT/74/WHC/P/APA/11/486

29 July 2011

**Subject: Inscription of *Ogasawara Islands* (N 1362) Japan, on the World Heritage List**

Dear Ambassador,

I have the pleasure to inform you that the World Heritage Committee, at 35th session (UNESCO, 19 – 29 June 2011), examined the nomination of the ***Ogasawara Islands*** and decided to **inscribe** the property on the World Heritage List. The decision of the Committee concerning the inscription is attached below.

I am confident that your government will take the necessary measures for the proper conservation of this new World Heritage property. The World Heritage Committee and its Secretariat, the World Heritage Centre, will do everything possible to collaborate with you in these efforts.

The *Operational Guidelines for the Implementation of the World Heritage Convention* (paragraph 168), request the Secretariat to send to each State Party with a newly inscribed property a map of the area(s) inscribed. Please examine the attached map and inform us of any discrepancies in the information by **1 December 2011**.

The inscription of the property on the World Heritage List is an excellent opportunity to draw the attention of visitors to, and remind local residents of, the *World Heritage Convention* and the outstanding universal value of the property. To this effect, you may wish to place a plaque displaying the World Heritage and the UNESCO emblems at the property. You will find suggestions on this subject in the *Operational Guidelines for the Implementation of the World Heritage Convention.*

In many cases States Parties decide to hold a ceremony to commemorate the inscription of a property on the World Heritage List. Upon request to the World Heritage Centre by the State Party, a World Heritage Certificate can be prepared for such an occasion.

I would be grateful if you could provide me with the name, address, telephone and fax numbers and e-mail address of the person or institution responsible for the management of the property so that we may send them World Heritage publications.

7, place de Fontenoy
75352 Paris 07 SP, France
Tél. : +33 (0)1 45 68 11 30
Fax : +33 (0)1 45 68 55 70

www.unesco.org

Please find attached the brief descriptions of your site, prepared by IUCN and the World Heritage Centre, in both English and French. As these brief descriptions will be used in later publications, as well as on the World Heritage website, we would like to have your full concurrence with their wording. Please examine these descriptions and inform us, by **1 December 2011** at the latest, if there are changes that should be made. If we do not hear from you by this date, we will assume that you are in agreement with the text as prepared.

Furthermore, as you may know, the World Heritage Centre maintains a website at http://whc.unesco.org/, where standard information about each property on the World Heritage List can be found. Since we can only provide a limited amount of information about each property, we try to link our pages to those maintained by your World Heritage property or office, so as to provide the public with the most reliable and up-to-date information. If there is a website for the newly inscribed property, please send us its web address.

The full list of the Decisions adopted by the 35th session of the World Heritage Committee will be sent to you in due course.

As you know, according to paragraph 172 of the *Operational Guidelines for the Implementation of the World Heritage Convention*, the World Heritage Committee invites the States Parties to the *Convention* to inform the Committee, through the World Heritage Centre, of their intention to undertake or to authorize in the area protected under the *Convention* major restorations or new constructions which may affect the outstanding universal value of the property.

May I take this opportunity to thank you for your co-operation and for your support in the implementation of the *World Heritage Convention.*

Please accept, dear Ambassador, the assurances of my highest consideration.

Kishore Rao
Director
World Heritage Centre

cc: National Commission of Japan for UNESCO
IUCN
UNESCO Office in Beijing

**Extract of the Decisions adopted by the 35th session of the World Heritage Committee (UNESCO, 2011)**

**Decision: 35 COM 8B.11**

The World Heritage Committee,

1. Having examined Documents WHC-11/35.COM/8B and WHC-11/35.COM/INF.8B2,

2. Inscribes the **Ogasawara Islands, Japan**, on the World Heritage List under **criterion (ix)**;

3. Adopts the following Statement of Outstanding Universal Value:

**Brief synthesis**

The Ogasawara Islands are located in the North-Western Pacific Ocean roughly 1,000 km south of the main Japanese Archipelago. The serial property is comprised of five components within an extension of about 400 km from north to south and includes more than 30 islands, clustered within three island groups of the Ogasawara Archipelago: Mukojima, Chichijima and Hahajima, plus an additional three individual islands: Kita-iwoto and Minami-iwoto of the Kazan group and the isolated Nishinoshima Island. These islands rest along the Izu-Ogasawara Arc Trench System. The property totals 7,939 ha comprising a terrestrial area of 6,358 ha and a marine area of 1,581 ha. Today only two of the islands within the property are inhabited, Chichijima and Hahajima.

The landscape is dominated by subtropical forest types and sclerophyllous shrublands surrounded by steep cliffs. There are more than 440 species of native vascular plants with exceptionally concentrated rates of endemism as high as 70% in woody plants. The islands are the habitat for more than 100 recorded native land snail species, over 90% of which are endemic to the islands.

The islands serve as an outstanding example of the ongoing evolutionary processes in oceanic island ecosystems, as evidenced by the high levels of endemism; speciation through adaptive radiation; evolution of marine species into terrestrial species; and their importance for the scientific study of such processes.

**Criterion (ix):** The property's ecosystems reflect a range of evolutionary processes illustrated through its rich assemblage of plant species from both a Southeast Asian and a Northeast Asian origin. There is also a very high percentage of endemic species in selected taxonomic groups, resulting from these evolutionary processes. Within the flora it is an important centre for active, ongoing speciation.

The Ogasawara Islands provide valuable evidence of evolutionary processes through their significant on-going ecological processes of adaptive radiation in the evolution of the land snail fauna as well as in their endemic plant species. The examples of fine-scale adaptive radiation between and sometimes within the different islands of the archipelago are central to the study and understanding of speciation and ecological diversification. This is further enhanced by the relatively low extinction rates in taxa such as the land snails.

It is the combination of both the concentration of endemism and extent of adaptive radiation evident in the Ogasawara Islands which sets the property apart from other places illustrating evolutionary processes. When taking into account their small area, the Ogasawara Islands show exceptionally high levels of endemism in land snails and vascular plants.

**Integrity**

The boundaries of the serial property cover the key values of the property and are well designed. The zonation and the legal protection provide an appropriate framework, while the boundaries of Ogasawara National Park serve as a functional overall buffer zone. Marine protected areas are partly included, contributing to more effective management of the terrestrial-marine interface and thus integrity. Integrity issues are mostly related to external threats, most importantly invasive alien species. The effects of invasive alien species and historic logging have already altered many of the archipelago's habitats. Future invasions have the potential to compromise the very values the Ogasawara Islands have been recognized for and therefore need careful and continuous attention. Possible future air access, as well as increased visitation and corresponding development potentially have strong and even irreversible effects in a fragile island environment. Control of access to the islands and of alien invasive species, two in part overlapping issues, is of critical importance for the conservation of the archipelago.

**Protection and management requirements**

The majority of the property is state-owned and under the authority of various agencies. Some land is owned by Ogasawara Village with some other areas privately owned. The property contains five legally designated categories of protected area managed by three national Government agencies and is surrounded by the much larger Ogasawara National Park serving as a functional buffer zone. The property is protected through seven pieces of national legislation which overlap in jurisdiction and objectives specifying the mandate of the Ministry of the Environment, the Forestry Agency and the Cultural Agency. Any jurisdictional conflicts are resolved through an interagency Regional Liaison Committee structure.

The 2010 multi-agency Ogasawara Islands Management Plan and companion Ogasawara Islands Ecosystem Conservation Action Plan cover a wide area of 129,360 ha and include controls beyond the property such as ship navigation routes. The plans deal with critical issues such as access to the islands and control of alien invasive species. Management activities are detailed for the different island groups within the property with clear coordination mechanisms and monitoring plans prescribed. The plan is based on scientific knowledge and includes timetabled and prioritized actions.

The property benefits from strong links and dialogue between researchers, managers and community. Particularly commendable is the role of the Scientific Council and the approach to research which is adaptive and management-oriented. Local involvement and the maintenance of community benefits are crucial elements in the management of this remote archipelago.

4. Commends the State Party on the major and increasing conservation investments evident in the nomination, a high level of community participation, the multi-agency approach taken and the decision to increase the marine area of the property during the nomination process;

5. Requests the State Party to:

a) Continue its efforts to address invasive alien species;

b) Ensure all significant infrastructure development, including for tourism and access to the islands, is subject to rigorous prior environmental impact assessment;

6. Strongly encourages the State Party to:

a) Consider further expansion of the property's Marine Park Zones to facilitate more effective management and thereby enhance the integrity of the marine-terrestrial ecosystem dynamic,

b) Develop and implement a research and monitoring programme to assess and adapt to the impacts of climate change on the property,

c) Ensure careful tourism management in anticipation of increased future visitation and, in particular, to strengthen the Ogasawara Ecotourism Council integrating the Scientific Council as a member of the Ogasawara Ecotourism Council and advising on appropriate tourism policies that protect the island's values,

d) Ensure careful regulation and incentivization of commercial operators to manage visitor impacts, including through mandatory requirements and certification incentives for tourism operators.

**Surface and coordinates of the property inscribed on the World Heritage List by the 35th session of the World Heritage Committee (UNESCO, 2011) in accordance with the *Operational Guidelines*.**

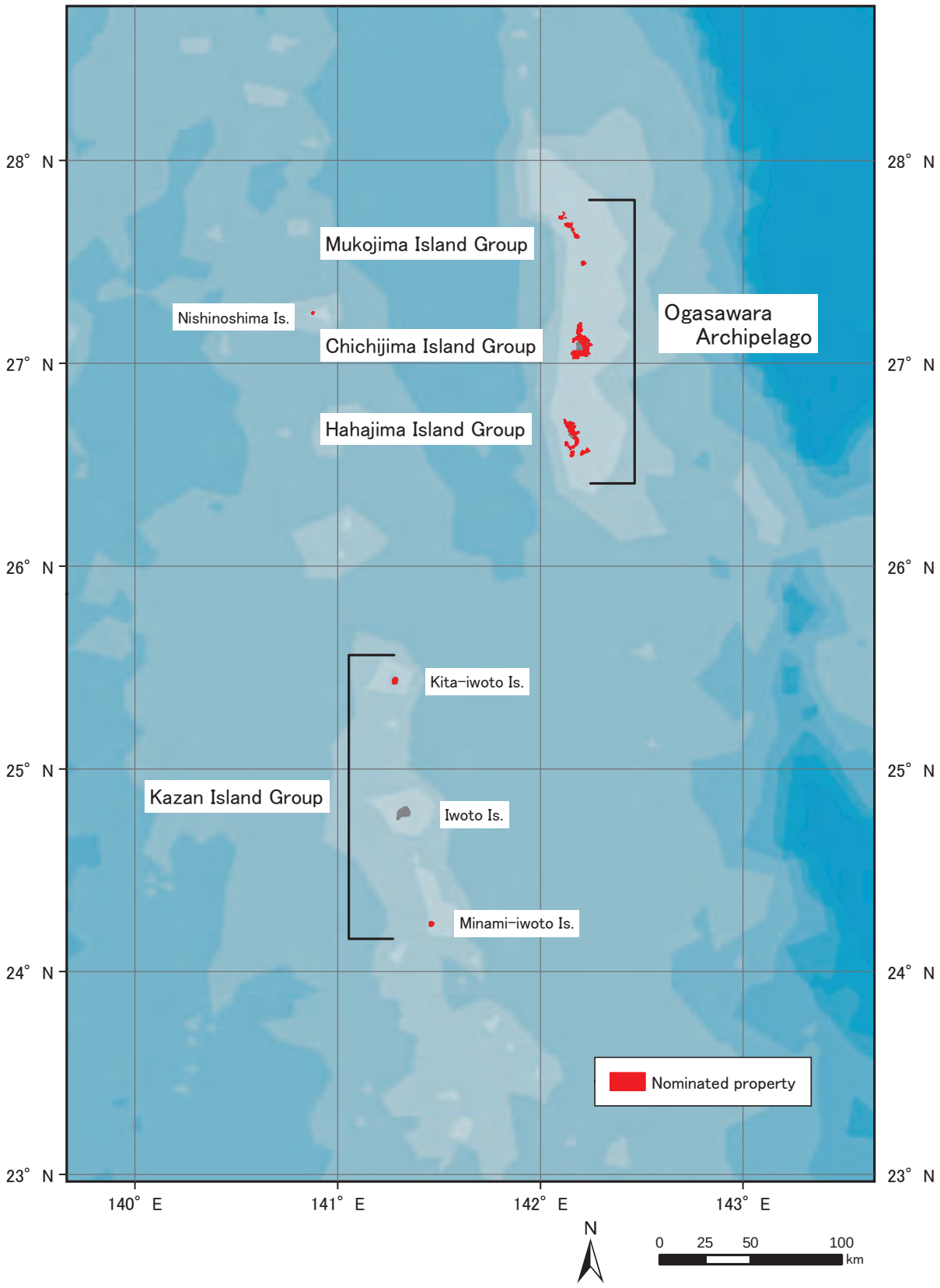
| | **Japan** | | | |
|---|---|---|---|---|
| ***N 1362*** | Ogasawara Islands | | | |
| | | | | |
| **Serial ID No.** | **Name** | **Property** | Buffer zone | Centre point coordinates |
| 1362-001 | Kitanoshima and peripheral reefs | 34 | | N27 43 06 E142 05 59 |
| 1362-002 | Mukojima and peripheral reefs | 285 | | N27 40 52 E142 08 20 |
| 1362-003 | Nakodojima and peripheral reefs | 147 | | N27 37 40 E142 10 42 |
| 1362-004 | Yomejima and peripheral reefs | 77 | | N27 29 47 E142 12 38 |
| 1362-005 | Ototojima and peripheral reefs | 536 | | N27 09 59 E142 11 27 |
| 1362-006 | Anijima and peripheral reefs | 812 | | N27 07 21 E142 12 35 |
| 1362-007 | Some parts of Chichijima and peripheral reefs | 1,410 | | N27 04 12 E142 12 33 |
| 1362-008 | Nishijima and peripheral reefs | 51 | | N27 07 02 E142 10 00 |
| 1362-009 | Higashijima and peripheral reefs | 26 | | N27 05 36 E142 14 42 |
| 1362-010 | Minamijima and peripheral reefs | 33 | | N27 02 18 E142 10 30 |
| 1362-011 | Marine area | 1,171 | -- | |
| 1362-012 | Some parts of Hahajima and peripheral reefs | 1,419 | | N26 40 01 E142 09 20 |
| 1362-013 | Mukohjima and peripheral reefs | 144 | | N26 36 11 E142 07 47 |
| 1362-014 | Hirajima and peripheral reefs | 64 | | N26 35 07 E142 09 18 |
| 1362-015 | Meijima and peripheral reefs | 94 | | N26 34 10 E142 13 54 |
| 1362-016 | Anejima and peripheral reefs | 153 | | N26 33 15 E142 09 23 |
| 1362-017 | Imotojima and peripheral reefs | 131 | | N26 33 33 E142 12 35 |
| 1362-018 | Marine area | 410 | | |
| 1362-019 | Kita-iwoto and peripheral reefs | 557 | | N25 25 60 E141 16 56 |
| 1362-020 | Minami-iwoto | 355 | | N24 14 06 E141 27 45 |
| 1362-021 | Nishinoshima and peripheral reefs | 30 | | N27 14 48 E140 52 33 |
| | TOTAL | 7 939 | -- | |

**Brief Description in English**

The property includes more than thirty islands clustered in three groups and covers a surface area of 7,393 ha. The islands offer a variety of landscapes and are home to a wealth of fauna, including the Bonin flying fox, a critically endangered bat, and 195 endangered bird species. 441 native plant taxa have been documented on the islands, whose waters support numerous species of fish, cetaceans and corals. Ogasawara Islands' ecosystems reflect a range of evolutionary processes illustrated through their assemblage of plant species from both South-East and North-West Asia, alongside many endemic species.

**Brief Description in French**

Le bien compte plus de trente îles qui forment trois groupes et couvrent un total de 7 393 ha. Elles offrent une grande variété de paysages et hébergent une faune riche, dont la roussette des Bonins qui est en danger critique d'extinction et 195 espèces d'oiseaux dont beaucoup sont en danger. On a décrit 441 taxons de plantes indigènes sur ces îles et leurs eaux comptent de nombreuses espèces de poissons et de cétacés, ainsi que des espèces coralliennes. Les écosystèmes des îles d'Ogasawara reflètent tout un éventail de processus évolutionnaires, combinant des espèces de plantes d'Asie du Sud-Est et d'Asie du Nord-Ouest ainsi que de nombreuses espèces endémiques.




Location map of the nominated property

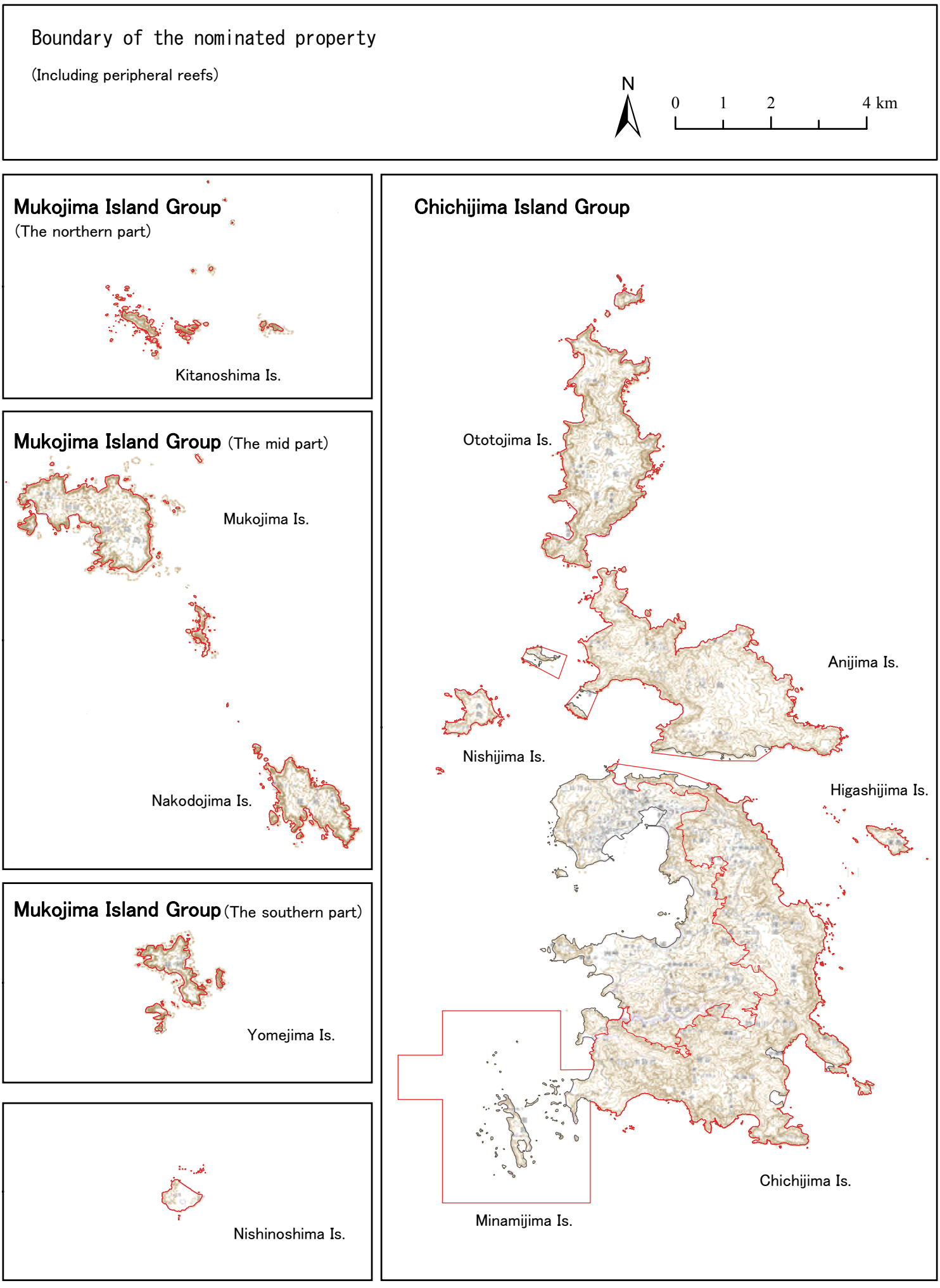



Fig. 1-1 Boundary of the nominated property
(Mukojima, Chichijima Island Groups and Nishinoshima)
*(Source: 'Yokosuka' Geographic Information (1/25,000) of Geographical Survey Institute)*

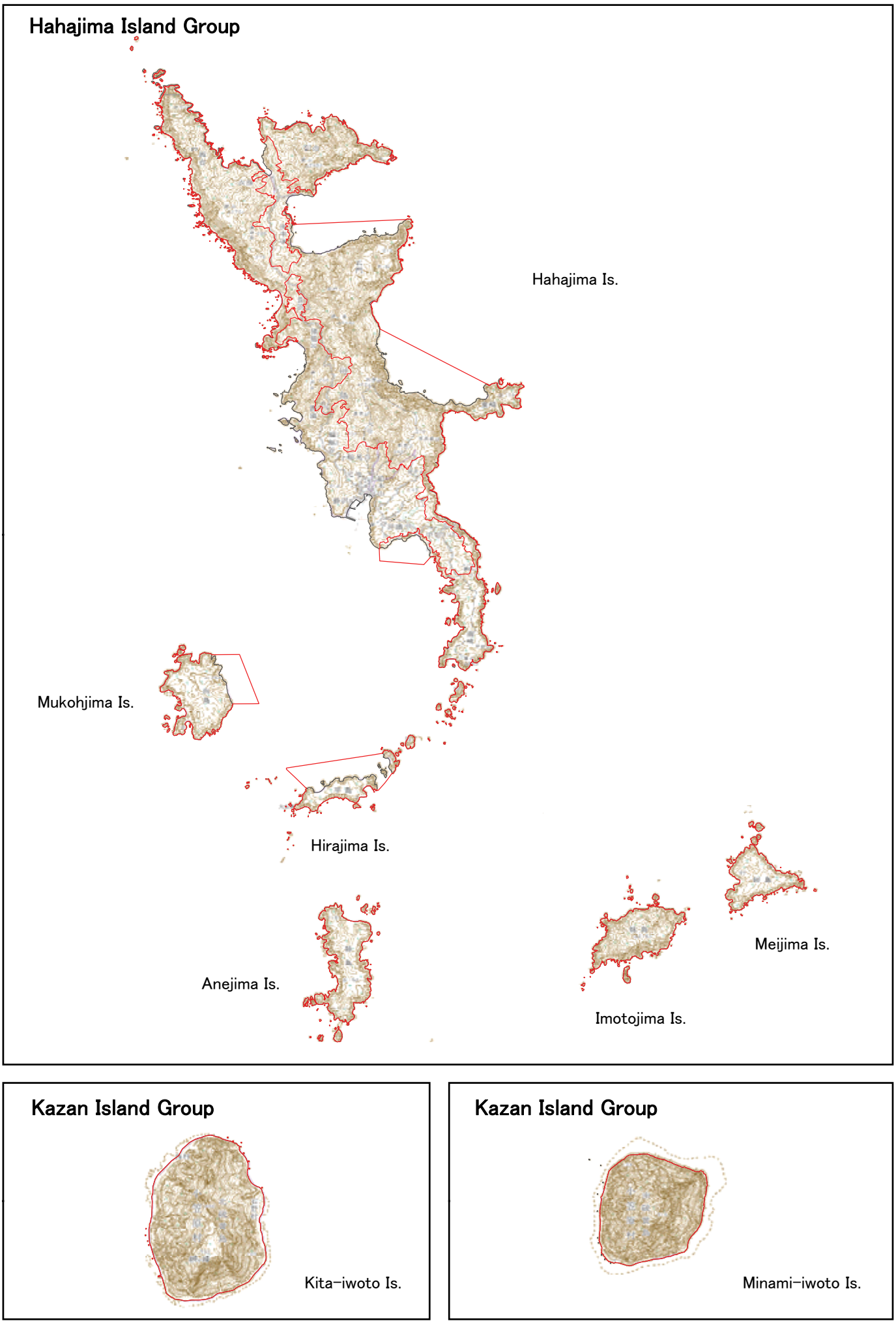



Fig. 1-2 Boundary of the nominated property
(Hahajima Island Group, Kita-iwoto and Minami-iwoto)
*(Source: 'Yokosuka' Geographic Information (1/25,000) of Geographical Survey Institute)*