

# *Ogasawara Islands Management Plan*

*(English translation for World Heritage nomination)*

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Ministry of the Environment  
Forestry Agency  
Agency for Cultural Affairs  
Tokyo Metropolitan Government  
Ogasawara Village  
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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 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 Management Plan of the Ogasawara Islands (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, 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; the management authorities are in close mutual communication and cooperation with other government organizations, 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, Chichijima and Hahajima (excluding some parts of these islands), as well as the 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

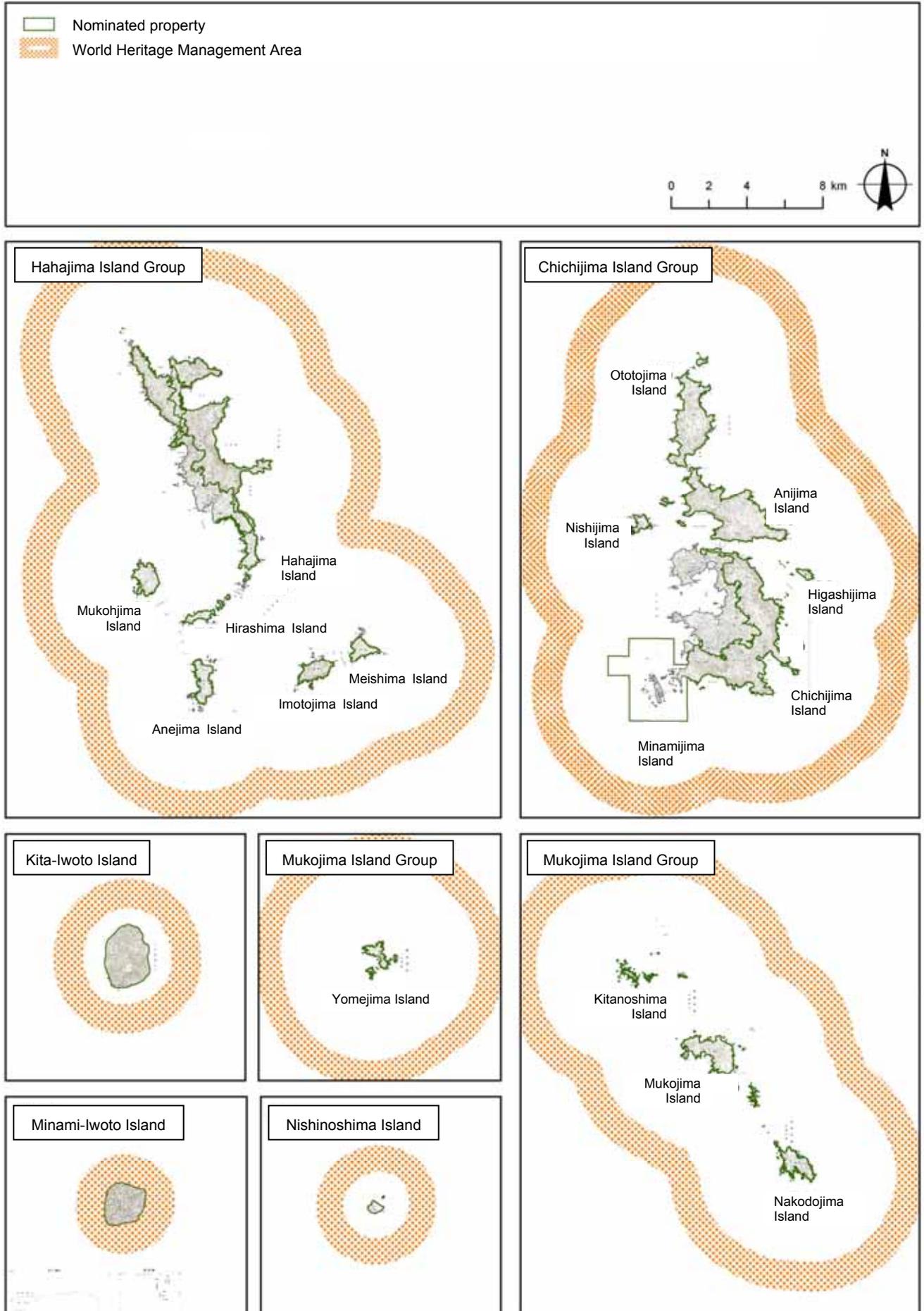
This Management Plan contains management measures necessary to achieve the overall management goal. It sets out activities to be implemented over the next 5 to 10 years to achieve long-term goals. The plan will be reviewed and revised as necessary, in response to changes in the natural environment and 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 objectives and measures.

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 Law on the Administration and Management of National Forests, 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, middle crust, origin of 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 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 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.

#### 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 141 families, 457 genera, and 745 species of vascular plants (including subspecies, varieties, and forms) 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, *Distilium lepidotum* variant of Machilio kobu-Schimetum mertensianae, and *Osteomeles lanata* association (sclerophyllous dwarf 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 dwarf scrub of Wikstroemio-Pouterietum-dubiae dominated by *Planchonella obovata* var. *dubia*, *Rhaphiolepis indica* var. *umbellata* and other such species. These characteristic sclerophyllous dwarf 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 Machilio boninensis-Ardisietum sieboldii community and are spread over a large area in Hahajima. Dwarf 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 is only one mammal species, two reptile species, 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 5 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.

104 native species of land snails have been recorded, of which 98 are endemic. For the insect fauna, 1,406 species have been recorded to date, 362 of which are endemic species (with an endemic ratio of 25.7%). There are a large number of beetles in particular, 457 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 minamiwoensis*, endemic to Minami-iwoto Island.

In addition, with respect to freshwater animals, 40 fish species, 17 gastropod species, eight 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, 801 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.

and the Ministry of the Environment, as well as lands owned by the Tokyo Metropolitan Government, Ogasawara Village, and private owners.

## 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, 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.

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 naval air 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 forcibly evacuated to mainland Japan.

In 1945, after the end of the war, Ogasawara was placed under the control of US military forces. In the following year, 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 Land Use Plan was announced. The plan was based on the Law for Special Measures for the Rebuilding and Development of the Ogasawara Islands (enacted in December 1969), which designated areas for residential, agricultural, and nature conservation uses. Approximately 2,400 people now live on the islands of Chichijima and Hahajima.

### ii) Visitors

Ogasawara has no airport. Visitors to the islands must take the *Ogasawara Maru* ocean liner, a journey that takes about 25.5 hours one way from Tokyo Takeshiba Pier to Futami Port on Chichijima.

As of August 2007, Chichijima had 51 lodging facilities (capacity 963 persons) and Hahajima had 17 (capacity 199 persons). This capacity is sufficient because the only way to get to the islands is by boat, and only about 25,000 people visit the islands per year.

### iii) Major economic activities

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

### iv) Land ownership

National forest, which is under the authority of the Forestry Agency, accounts for about 80% of the nominated property. In addition, the nominated property also includes other lands owned by the national government and administered by the Ministry of Finance

## 4. Management Goals and Basic Principles

### 1) Management Goals

The management authorities and relevant parties share the overall goal stated below.

#### ■ Overall goal

The Ogasawara Islands illustrate the formation process of a marine island arc, which was the origin of the continental crusts. They are a globally precious place that records the evolutionary processes of the Earth and life, 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 relevant parties, 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 formation process of an oceanic island arc, which triggered the formation of continental crusts, can be observed from its birth through young stages to the current adolescent stage. Evidence of oceanic island arc formation includes boninite, dike, pillow lava, and sulfide ore deposits that are found on the islands. The management authorities will preserve and appropriately protect these valuable resources by promoting understanding and consciousness among relevant parties and island residents.

##### ii) Conservation of endemic species, endangered species, and unique ecosystems

The management authority 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 endemism on a genetic level, and conserving the ecosystems over the long term.

#### (2) Avoidance and Reduction 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 intentionally or unintentionally 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 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 relevant authorities, and the measures will be continuously implemented.

On the other hand, to effectively implement conservation and management activities, not only the 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 among authorities and residents via the Ogasawara Islands Natural World Heritage Nominated Property Liaison Committee (hereafter referred to as Regional Liaison Committee), established in 2006 to serve as a liaison and coordinate between concerned administrative agencies, organizations, and residents.

## 5. Management Measures

### 1) Proper Enforcement of Protective Instruments

To conserve and manage the outstanding natural environment of the Ogasawara Islands, which includes exceptional topographical and geological features of island arc formation and unique ecosystems composed of endangered endemic plants and animals, the management authorities will engage in mutual collaboration and obtain understanding and cooperation from relevant parties to enforce the protective instruments described below.

#### (1) Wilderness Areas

"Wilderness areas" that are designated by the Environment Minister and preserved under the Nature Conservation Act are land areas that retain an intact natural state free from any effect of human activities and that require environmental conservation.

In wilderness areas, strict conservation measures are introduced so that activities which would adversely affect the natural environment, including building structures, logging trees or bamboo, hunting animals, collecting plants or deciduous leaves and tree branches, and burning open fires, are prohibited. Areas where human footsteps and presence may affect the environment can be further designated as restricted areas.

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 area in 1983 to statutorily protect the ecosystem in this unique oceanic island.

#### (2) National Parks

"National parks" are land areas that protect an outstanding natural landscape designated and controlled by the Environment Minister under the National Parks Law for the purpose of public health, recreation, and education.

—"Special zones" designate the most important areas to protect within a national park. "Special protection zones" introduce strict protective measures to protect the core park area, "marine park zones" protect the oceanic landscape, and "ordinary zones" include all other areas within national parks. Allowable activities are specifically defined for each of these areas.

In a special zone, permission from the Environment Minister is required to build a structure, log trees or bamboo, mine or collect soil and stone, prepare land, and collect designated plants. In a special protection zone, not only the activities listed above, but also catching animals, collecting plants, leaves, or tree branches, and making an open fire require permission from the Environment Minister. In a marine park zone, permission from the Environment Minister is required to catch tropical fish, collect coral, and alter the underwater landscape. In an ordinary zone, building a structure exceeding a specific size requires sending a notification to the Environment Minister.

Most islands of Ogasawara have been designated as part of Ogasawara National Park since 1972, and most are categorized as a special protection zone, with the strictest protection measures, or a first-class special zone, where the next-strictest protection measures apply.

Tracheophyte plants consisting of 138 species in 51 families including endemic plants such as *Rhododendron boninense* and *Callicarpa parvifolia* are classified as "designated plants"; collecting or damaging designated

plants is prohibited in special zones. Catching, killing, or damaging “designated animals” is also prohibited in special zones; designated animals include the endemic damselfly (*Indolestes boninensis*) and the endemic dragonfly (*Hemicordulia ogasawarensis*). These measures statutorily conserve unique topographical and geological features, plants, and animals, including endemic or endangered species, and the habitat environments of these species.

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### (3) Forest Ecosystem Reserves

“Forest ecosystem reserves” have been established in areas with a concentration of typical Japanese wild natural forests to maintain the natural environment of the forest ecosystem, protect forest plants and animals, preserve genetic resources, promote the development of forestry and forestry-related technologies, and encourage academic studies and research. The forest ecosystem reserves are designated and managed by the Forestry Agency in accordance to the National Forest Project Execution Plan, prepared based on the National Forest Administration and Management Bylaw; the latter defines in detail the specific management planning for each region for systematic management of the national forests based on the Law on the Administration and Management of National Forests.

The east coast of Hahajima was designated as a forest ecosystem reserve in 1994. Later, all national forest areas on the Ogasawara Islands except those used for public services were included in designation of the forest ecosystem reserve following a review of the area conducted in 2007. This designation reserves the unique forest ecosystems of the Ogasawara Islands for future generations.

“Preservation zones” on the islands include the distribution areas of biocenoses and endangered endemic species for which the intrinsic forest ecosystem needs to be recovered, maintained, and appropriately conserved. Therefore, the environment within the areas should generally be left as natural as possible, with limited activities to conserve and recover unique aspects of biodiversity and the forest ecosystem.

“Conservation and utilization zones” act as a buffer to keep external environmental changes from affecting the forest ecosystem within reserved areas. “Maintenance areas” are protected to the same level as reserved areas, but are available for educational or other activities so long as these activities do not deteriorate the functions of the maintenance areas. Maintenance areas represent approximately 70% of the entire (land) area covered by the Management Plan, which systemically conserves the forest ecosystem that sustains biocenoses and rare endemic species.

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### (4) National Wildlife Protection Areas

“National wildlife protection areas” are land areas for international and/or domestic wildlife protection that are designated by the Environment Minister in accordance with the Wildlife Protection and Appropriate Hunting Law. Wildlife protection and appropriate hunting laws are enacted to ensure biodiversity and to allow the public to enjoy the natural environment.

No hunting is allowed in a national wildlife protection area. Any area in a national wildlife protection area that needs special attention to protect wildlife or their habitats may be designated as a “special protection area” where certain types of development activity require permission from the Environment Minister.

The Ogasawara Islands National Wildlife Protection Area was established in 1980 to protect habitats for the

common buzzard (*Buteo buteo toyoshimai*), Bonin honeyeater (*Apalopteron familiare*), Japanese wood-pigeon (*Columba janthina nitens*), an endemic greenfinch (*Carduelis sinica kittlitzii*), and albatrosses. Marine areas surrounding the Islands were additionally designated as the Ogasawara Islands National Wildlife Protection Area in 2009. Nishinoshima has breeding sites for the masked booby (*Sula dactylatra*), sooty storm-petrel (*Oceanodroma tristrami*), swift tern (*Thalasseus bergii*), and other birds and was designated as the Nishinoshima National Wildlife Protection Area in 2008. Kita-Iwoto has habitats and breeding sites for species such as the red-footed booby (*Sula sula*) and red-tailed Tropicbird (*Phaethon rubricauda*). This island and its surrounding marine area were designated as Kita-Iwoto National Wildlife Protection Area in 2009. As described above, most areas of the Ogasawara Islands and marine areas surrounding the islands have been designated a national wildlife protection area, and birds including seabirds and animals including the Bonin flying fox (*Pteropus pselaphon*) are statutorily protected.

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### (5) National Endangered Species of Wild Fauna and Flora

The “national endangered species of wild fauna and flora” designation identifies endangered wild animal and plant species in Japan in accordance with the Law for the Conservation of Endangered Species of Wild Fauna and Flora. It is prohibited to catch, collect, kill, damage, or trade designated species unless permission is granted for research purposes. Protecting or breeding activities that include wild animal or plant breeding and habitat maintenance shall be promptly conducted as necessary to preserve national endangered species of wild fauna and flora.

Among the fauna and flora of the Ogasawara Islands, one mammalian species, the Bonin flying fox, *Pteropus pselaphon* (planned to be specified in December 2009); five avian species including albatrosses, common buzzard (*Buteo buteo toyoshimai*), and the Japanese wood-pigeon (*Columba janthina nitens*); five insect species including an endemic tiger beetle (*Cicindela bonina*); and 12 plant species including *Rhododendron boninense* and *Callicarpa parvifolia* are specified as national endangered species of wild fauna and flora. For 19 species in particular, including the Japanese wood-pigeon and the endemic orchid (*Calanthe hattorii*), the Environment Minister and the heads of national administrative divisions have established and implemented conservation programs as defined by the law for the Conservation of Endangered Species of Wild Fauna and Flora. For the Bonin flying fox, specified as national endangered species in 2009 (planned 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 Program 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	<i>Hymenasplenium cardiophyllum</i>
	<i>Piper postelsianum</i>
	<i>Pittosporum parvifolium</i>
	<i>Melastoma tetramerum</i>
	<i>Rhododendron boninense</i>
	<i>Symplocos kawakamii</i>
	<i>Callicarpa parvifolia</i>
	<i>Ajuga boninsimae</i>
	<i>Crepidiastrum grandicollum</i>
	<i>Calanthe hattorii</i>
	<i>Calanthe hoshii</i>
	<i>Malaxis boninensis</i>
	Birds
<i>Columba janthina nitens</i>	
Insects	<i>Indolestes boninensis</i>
	<i>Rhinocypha ogasawarensis</i>
	<i>Hemicordulia ogasawarensis</i>
	<i>Cicindela bonina</i>
	<i>Celastrina ogasawaraensis</i>

#### (6) Natural Monuments

“Natural monuments” designated by the Education Minister and preserved in accordance with the “Act on Protection of Cultural Properties” include plants and animals (including habitats, breeding sites, and wild birds’ landing zones) and geological features or minerals (including areas that reveal unique natural phenomena) of the greatest academic value for Japan. Any activity that may alter the current state of a natural monument or affect its preservation requires prior approval from the chief of the Agency for Cultural Affairs.

On the Ogasawara Islands, natural monuments have been designated to protect one mammalian species (the Bonin flying fox, *Pteropus pselaphon*); three avian species including the Bonin honeyeater (*Apalopteron familiare*; a special natural monument) and the Japanese wood-pigeon; ten insect species including *Celastrina ogasawaraensis* and *Boninthemis insularis*; and two land snails of the families Helicinidae and Euconulidae. The entire area of Minami-Iwoto is specified as a natural protection area, and the drowned karst landscape of Minami-Iwoto is designated as a geological natural monument. The protective instruments described above statutorily protect the outstanding natural environments that sustain unique land snails and topographical or geological characters showing adaptive divergence.

#### (7) Systems Related to Alien Species Measures

Based on the Invasive Alien Species Act, organisms that have been introduced to Japan from overseas and are known to or likely to damage ecosystems etc. are specified as “invasive alien species.”

Among the alien species that inhabit the nominated property, the green anole, cane toad, bullfrog, and flatworm planaria (*Platydemus manokwari*) are specified as invasive alien species. The Invasive Alien Species Act regulates activities such as importing, keeping, growing, storing, and transporting of these species.

## 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, effective conservation of Ogasawara ecosystems will continue through cooperation and close coordination of relevant parties based on long-term goals and the measures described below.

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 have affected each island differently and have changed over time. Furthermore, the effects of alien species may also vary by island.

Therefore, each island is taken as a base unit, and island-specific goals and measures have been defined for each island. Ecosystem conservation and management measures will be implemented based on these individual goals and directions.

As ecosystem conservation and management measures are implemented, knowledge and expertise will be developed, and by focusing on island-specific complex interspecific relationships, changes in interspecific relationships 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 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, as part of conservation and management of 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.

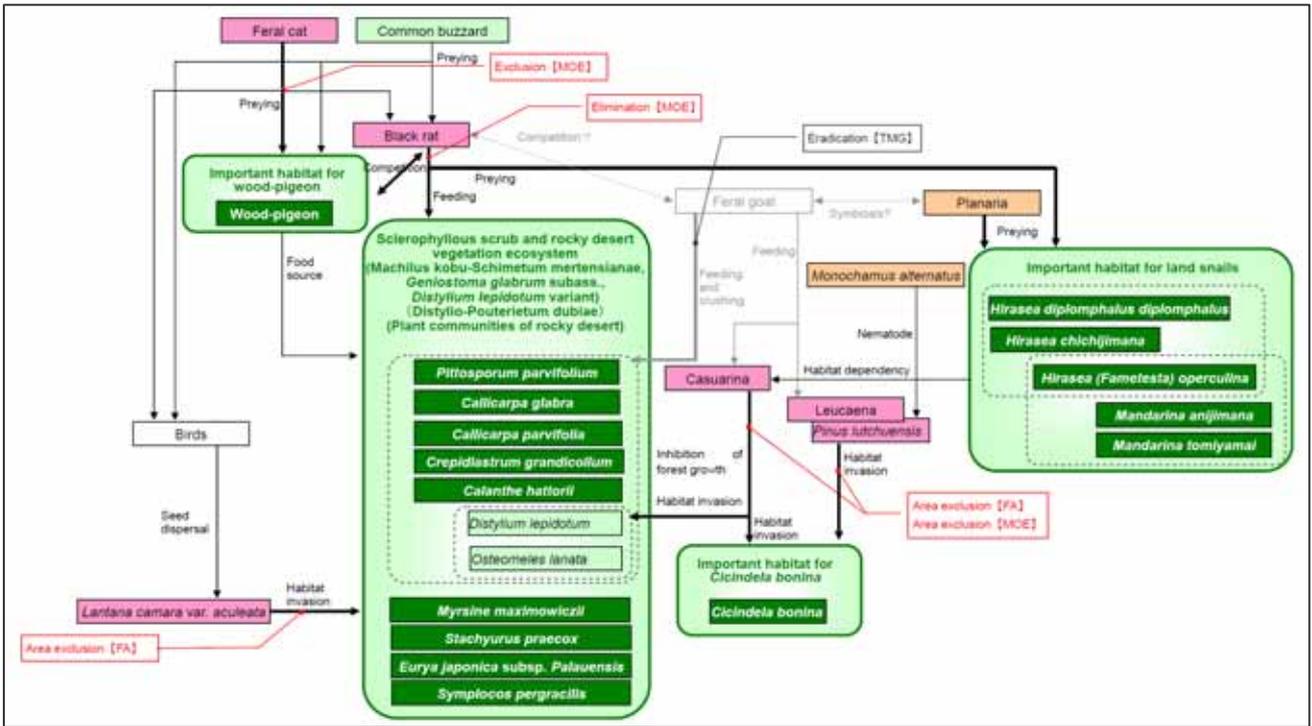


Fig. 1-2 Interspecific Relationship by Island (Example of Anijima Island)

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 endangered endemic plants and animals and are crucial for conservation of biodiversity on Chichijima.

Chichijima also provides important habitats for the Japanese wood-pigeon and Bonin flying fox. Although adverse effects of alien species have been noted, the southern and eastern regions of the island have important habitats for endemic land snails.

### (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 Japanese wood-pigeon, with the goal of stabilizing the habitation of this species in combination with other actions to be implemented on the island
- 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 other actions to be implemented on the island

### (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, ongoing activities include the elimination of alien species to promote adaptive conservation management measures 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 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 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 invasion of flatworm planaria and conserving the habitat of existing land snails.

*Habitat conservation for the Bonin flying fox*

Chichijima is a habitat for a relatively large population of Bonin flying fox (*Pteropus pselaphon*). This species is designated as a national endangered species of wild fauna and flora and a natural monument and legally protected.

Their area of activity 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 single group roosts, especially in winter, which is assumed to be related to their breeding behavior; thus, conservation of roost area 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 to reduce net-related death, such as instructing farmers in nearby areas on how to select and install bird nets, are currently carried out. In addition, the bat roost area was designated as a wildlife protection area (special 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 roost area 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 with the goal of achieving steady habitation on Ogasawara Islands. In addition to the measures mentioned above, collection of scientific information and habitat maintenance will be promoted for conservation of this species.

*Habitat conservation for endemic insects*

Habitat conservation for endemic insects will be promoted by area exclusions of the green anole and cane toad. 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 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

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## (2) Anijima Island (Chichijima Island Group)

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### (i) Existing condition

Anijima has a dry climatic condition. This island supports the largest shrub forests among the Ogasawara Islands, as well as rocky desert plant communities. Of tracheophyte 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 Japanese wood-pigeon with a view to stabilizing the habitation of this species in combination with other actions to be implemented on the island

### (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. Removal of impact factors, including the black rat, will be conducted and monitored. Appropriate conservation measures will also be carried out for the rocky desert vegetation intermingled within the sclerophyllous scrub and for the natural *Schima mertensiana* forest distributed in surrounding hollows and ravine bottoms.

In addition, by eliminating invasive plants such as *Casuarina*, focusing on areas where suppressive pressure by alien species is anticipated, and maintaining rocky desert vegetation, the habitats of precious endemic animal and plant species, including *Cicindela bonina*, *Crepidiastrum grandicollum*, and *Callicarpa parvifolia*, will be conserved.

#### 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 common buzzards; thus, careful and adequate measures are being conducted under continued monitoring.

#### Habitat conservation for wood-pigeon

Anijima is one of the habitats of the 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 of this vegetation. However, multiple alien species have been identified that required urgent measures. Therefore, comprehensive monitoring surveys have been conducted on Anijima, and measures are being developed through estimation, evaluation, and improvement using a verification model focused on interspecific interaction. 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.

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## (3) Ototojima Island (Chichijima Island Group)

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### (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 communities of woodland organisms, including a pure population of *Morus boninensis*. In addition, Ototojima is currently the only island that has all five dragonfly species endemic to Ogasawara, including *Indolestes boninensis*.

### (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 Japanese wood-pigeon with a view to stabilizing the habitation of this species in combination with other actions to be implemented on the island

### (iii) Activities

#### Conservation of *Schima mertensiana* forests

Highly natural forests of *Schima mertensiana* occupy a large area of Ototojima, particularly in the central part of the island. Considering already established interspecific relationships, activities such as exclusion of alien species will continue to be conducted in an adaptive manner.

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 common buzzard, a careful approach is required.

In addition, conservation of the forests protects 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*

Otojojima includes wood-pigeon (*Columba janthina nitens*) habitat, which is being conserved by removing the impact of feral cats.

Because wood-pigeons move to other islands such as Chichijima and Anijima, unified conservation measures will be implemented to attain steady habitation.

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#### (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 to 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, conservation of this island will protect the habitats of endemic plants such as *Cirsium boninense*.

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#### (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 species 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 to 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, black rats, which preyed on seabirds, were eliminated. Following eradication of the black rat, monitoring will be

conducted.

#### *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.

Conservation of the island also protects the habitats and colonies of endemic plants such as *Lobelia boninensis* and *Ixeris longirostra*.

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#### (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 to 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 continued monitoring. Elimination of alien species such as the black rat, which creates predation pressure on seabirds, will be conducted. Compliance with the current utilization rules will also be enforced 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 endangered plants such as *Lobelia boninensis*, *Ixeris longirostra*, and *Lycium sandwicense*.

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#### (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 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 kittlitzii* and seabirds
- To conserve the habitats of the 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 / MN / 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, which occupies a large area and is widely distributed in the north-central part of the island; and the *Schima mertensiana* forest, which covers a wide area.

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.

In addition, conservation of the island protects the habitats of endangered 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 ogasawaraensis*, and *Rhinocypha ogasawaraensis* 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 kittlitzii and seabirds* [M]

Feral cats have been removed from certain areas of the Minamizaki region, which is an important habitat for *Carduelis sinica kittlitzii* 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 wood-pigeon (*Columba janthina nitens*), no major impact by feral cats has been observed to date. However, because wood-pigeons move between the Hahajima and Chichijima island groups, feral cats 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 flatworm planaria (*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. Its sclerophyllous scrub ecosystems are typical to the Hahajima Island Group and have been preserved in good condition. Little human influence or alien species invasion can be seen. 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 kittlitzii* inhabits Mukohjima, and the 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 kittlitzii* and the Bonin honeyeater (*Apalopteron familiare*)

### (iii) Activities

*Conservation of sclerophyllous scrub typical of the Hahajima Island Group*

Sclerophyllous scrub typical of the Hahajima Island Group remains in good condition on Mukohjima. The impacts of alien species such as Casuarina will be removed, and conservation of scrub vegetation will be promoted in an adaptive manner considering the already established interspecific relationships.

In addition, forest conservation protects 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 kittlitzii* and the Bonin honeyeater (*Apalopteron familiare hahasima*). Habitat conservation will be promoted by excluding the impacts of alien species and by continued monitoring.

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#### **(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 scrubs typical to the Hahajima Island Group also occur 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 forest 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.

In addition, conservation of the forest protects the habitats of endemic plants such as *Juniperus taxifolia*, *Lobelia boninensis*, and *Euonymus boninensis*.

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#### **(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 vegetation typical to 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 kittlitzii* 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 kittlitzii* 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 that considers already established interspecific relationships.

In addition, conservation of the forest protects the habitats of endemic plants such as *Crepidiastrum linguifolium*, *Crepidiastrum ameristophyllum*, and *Ajuga boninsimae*.

#### **Habitat conservation for endemic birds**

Imotojima is a major habitat for endemic birds such as *Carduelis sinica kittlitzii* and the Bonin honeyeater (*Apalopteron familiare hahasima*). Their habitats will be conserved by removing the impacts of alien species and by ongoing monitoring.

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#### **(11) Meishima Island (Hahajima Island Group)**

##### **(i) Existing condition**

Meishima is a peripheral island of Chichijima with a highly dry environment. Sclerophyllous scrub vegetation typical to 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. The scrub forest is in good condition, and its conservation includes removing the impacts of alien species such as *Leucaena* in an adaptive manner considering the already established interspecific relationships.

In addition, conservation of the forest protects the habitats of endemic plants such as *Juniperus taxifolia*, *Lobelia boninensis*, and *Crepidiastrum linguifolium*, and endemic insect fauna.

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#### **(12) Hirashima Island (Hahajima Island Group)**

##### **(i) Existing condition**

Hirashima 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.

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#### **(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 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.

*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, by removing the impacts of alien species, insect habitat will be conserved.

*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 another species of albatross 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.

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**(14) Kitanoshima Island (Mukojima Island Group)**

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(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.

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**(15) Nakodojima Island (Mukojima Island Group)**

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(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 the already established interspecific relationships.

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**(16) Yomejima Island (Mukojima Island Group)**

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(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 the already established interspecific relationships, in an adaptive manner.

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**(17) Nishinoshima Island (Other Islands)**

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**(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 invasions will be monitored.

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**(18) Kita-Iwoto Island (Other Islands)**

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**(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.

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**(19) Minami-Iwoto Island (Other Islands)**

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**(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 minamiwoensis*. 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

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**islands that remain in a primeval condition**

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**(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. These activities will help clarify the mechanisms of a primeval ecosystem of oceanic islands and guard against invasion by alien species, thereby maintaining the ecosystem of Minami-Iwoto.

### 3) Prevention of Introduction and Dispersion of New Alien Species

To achieve the long-term goals listed below, the management authorities will implement measures against the invasion and dispersion of new alien species on the Ogasawara Islands with profound understanding and active voluntary involvement from the relevant parties.

#### ■ Long-term goals

Management authorities and relevant 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 invasion and dispersal of alien species, depending on the subjects and nature of the activities, routes, and targets. Main activities and invasion 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 restoration projects, endangered 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 invasion 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 invasion and spread of new alien species identified during monitoring surveys or project executions will be established.

In addition, all information sources will be 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 mainland Japan or the Ryukyu Island Group.
- To address this issue, the Tokyo Metropolitan Government has developed "Guidelines for Landscape-conscious Public Facility Preparation on the Ogasawara Islands (Chichijima and Hahajima)" in 2008. The "List of Recommended Tree Species" 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 “landscaping special area” by the Tokyo Metropolitan Government Landscape Plan. Parties involved in port landscaping are given instructions based on the “List of Recommended Tree Species” 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 “Ogasawara Islands Construction Work Guidelines” have 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, government guidance will be provided and preventative measures for alien species dispersal will be enforced 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 administrative agencies shall be conducted in the manner applied to the projects of the Tokyo Metropolitan Government.

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### (3) Tourism Use on the Ogasawara Islands

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#### 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 flatworms, the Tourism Association, 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 relevant parties. 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 invasion 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 Autonomous Rules established by Hahajima Nature Guide Administration Council.

- In designated 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 invasion 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.

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### (4) Agricultural Activities

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#### i) History of past efforts

- Agricultural seeds and plant supplies from mainland 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 mainland 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*

Some plant species have already been introduced for agricultural purposes on the precondition that relevant parties undertake responsible management of those species. A list of “Significantly Invasive Agricultural Plant Species” has been prepared and is provided to

farmers and other relevant parties, 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 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 snail-eating planaria 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 with management authorities, 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.

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### **(5) Introduction of Domesticated Animals and Garden Plants**

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#### **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 it was found that domestic cats were preying on wild animals. 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*

Necessary measures to promote appropriate care

and management of domestic cats such as enhanced compliance with the Ogasawara Village Domestic Cats Raising Ordinance and promotion of microchip implantation for domestic cats will be conducted.

#### *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 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.

Relevant administrative agencies will compile comprehensive action guidelines, creating social imperatives original to the Ogasawara Islands as described above. These guidelines will be distributed to island residents and visitors thereafter. The agencies will also continue to promote awareness among island residents.

#### *Handling gardening plant species in the same manner as agricultural species*

For plant species used in areas such as private gardens, information and technical assistance will be provided on highly invasive garden plant species in the same manner as for agricultural species. Island residents will be provided with information on handling plants with soil, similar to awareness-building material given to farmers.

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### **(6) Movement of Goods and People**

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#### **i) History of past efforts**

- Regular cargo and passenger ship services bring commodities and people to the islands. These activities may unintentionally also bring alien species attached to vehicles such as boats, cars, and motorcycles, carried on the luggage, clothes, and shoes of island residents, or contaminating foods and other materials.
- To address this issue, visual inspection is conducted when passengers disembark from the *Ogasawara Maru* or *Hahajima Maru*, ocean liners that arrive at Chichijima and Hahajima from Japan’s mainland, to determine whether any animals or plants are being brought in. As a preventive measure to keep the flatworm planaria (*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*.
- Management authorities and other relevant parties 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 invasion. 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 alien fire ant (*Solenopsis geminate*) and the alien 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 unintentional introduction of alien species is being promoted among relevant parties; such unintentional introduction may be 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 Japan's mainland 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 invasion will be enriched and reinforced and shared with residents and visitors travelling between Chichijima, Hahajima, and Japan's mainland. Awareness-promoting activities will also be actively initiated for tourism businesses and other parties.

Relevant parties 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 invasion and spread 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. Various frameworks etc. will be tested and evaluated to develop declaration procedures for supplies and living organisms, inspections, and countermeasures for the regularly scheduled boats to achieve conditions allowing for effective waterfront countermeasures. In addition, conditions allowing for successful implementation of the same waterfront countermeasures will be developed for the irregularly scheduled boat services among the various 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 relevant parties including researchers.

### 1) 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 should be thoroughly incorporated in the implementation phase, and post-implementation evaluations should be made.

### 2) 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 management authorities and other relevant parties 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 relevant parties when executing projects and surveys.

##### *Strictly executing environmentally conscious measures based on characteristics of a project or study*

When executing projects and surveys, 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 relevant parties that implement projects or surveys will continuously enhance awareness-promoting activities and provide appropriate information, with advice and cooperation from researchers. These parties 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 relevant parties 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 environmental conservation and management 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.

### 1) Long-term goals

#### ●Realization of lifestyle in harmony with-nature

To establish nature-harmonious lifestyles and industries suitable for the Ogasawara Islands, every resident and business of the islands must understand the value of the islands' outstanding natural environment and the need for conservation and management. Residents and businesses must participate in the conservation and management of the natural environment and strive toward lifestyles that allow for bountiful life and coexistence of humans and 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.

### 2) Past efforts and future actions

#### *Awareness-promoting activities for island residents*

When conducting activities, especially measures against alien species, it is important that the purposes and methodologies are 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 conservation and management including 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.

New residents in Ogasawara Village will be provided with information on the rules for environmental conservation and other issues to promote awareness among every island resident.

#### *Declaration of lifestyle with consideration of the natural environment of oceanic islands*

Prevention of the invasion 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 relevant parties 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.

#### *Eradication of alien species by volunteers*

Environmental conservation and management activities aimed at alien species, including projects to remove alien plants and lower the green anole population, have been carried out with voluntary participation from island residents. Such activities will be continued, and efforts will be made to ensure that island residents and other participants properly understand the activities.

In addition, to promote understanding of peripheral islands among island residents, implementation of alien species eradication 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 eradication 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 endangered 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 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.

### 1) Long-term goals

●Sustainable use of the natural environment through the promotion of wise use and ecotourism  
Appropriate rules regarding nature -experiencing activities and voluntary activities based on the principles of ecotourism will be prepared and enforced; efforts will be made to conserve the natural environment of the Ogasawara Islands, which is vulnerable to the impacts of human activities, for the realization of sustainable tourism.

### 2) 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, rules for appropriate island 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 six 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.

### 3) 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.

Utilization rules for Minamijima—and for the Sekimon region of Hahajima, which are based on applicable guidelines and rules from the Conservation Management Plan to conserve forest ecosystem reserves, will continue to be implemented.

#### *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.

In the future, awareness and understanding among island residents that they are all guides will be promoted. By this, guides with superior proficiency will be provided. Such guides can help promote correct understanding of the value of the islands' outstanding natural environments, including their topographical and geological characteristics and ecosystems, and encourage appropriate use of nature. A registration system will be established for professional guides that will highlight guides' skills and qualifications.

#### *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 relevant laws or regulations. 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) and related activities of interest should be prepared so that island residents and visitors can experience these environments in nearby places without travelling to 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, tourism

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 relevant parties.

### 1) 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, management authorities and researchers can establish more effective and sustainable conservation and management measures.

### 2) 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 concerned 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, establishment of flight service) will also be monitored.

#### *Long-term monitoring*

To identify unexpected impacts on the natural environment caused by factors such as the invasion 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, researchers and management authorities 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 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 managers 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 invasion of a new alien species, the mechanism of information sharing described above will be utilized to quickly report and share information among management authorities and researchers. Then, appropriate measures will be implemented with cooperation among related parties based on the management system described below.

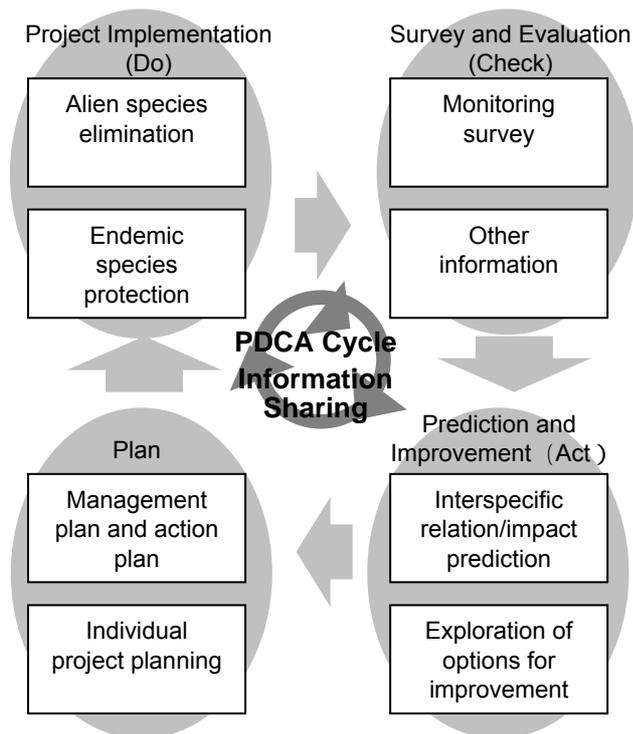


Fig. 1-3 Cycle of Adaptive Management

## 6. Management System

Appropriate sharing of roles and close collaboration and cooperation among management authorities and relevant parties 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 other related administrative agencies and organizations.

The Regional Liaison Committee, established in 2006, will serve as a liaison for coordination among management authorities and 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 management authorities and relevant organizations (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 to promote collaboration, cooperation, and information exchange with local NPOs and researchers.

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 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 Rangers' Office)**

Ministry of the Environment manages various systems related to the designated wilderness areas, national parks, and national wildlife protection areas and other areas. It carries out the management at Kanto Regional Environment Office of Japan and the Ogasawara Rangers' Office. The Basic Plan for the Conservation and Restoration of the Natural Environment of Ogasawara also defines various measures, including those against alien species and those promoting the protection and breeding of endangered wild plants and animals. Surveys of preventive measures against the invasion 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 forest ecosystem reserves on the Ogasawara Islands. In 2008, the Conservation Management Plan was defined as the comprehensive guideline for designated forest ecosystem reserves on the Ogasawara Islands 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.

The coordination of measures against alien species, projects for protection and management of endangered wild animals and plants, and population surveys and monitoring of the Japanese wood-pigeon is also being carried out by these authorities.

**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 in Ogasawara Village.

**iv) Tokyo Metropolitan Government (Ogasawara Office etc.)**

The Tokyo Metropolitan Government shares responsibility for the management and maintenance of national parks with the Ministry of the Environment and initiates projects such as those involving alien species, surface soil conservation and vegetation restoration,

promotion of the protection and breeding of endangered wild plants and animals, 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 invasion and dispersion.

The Tokyo Metropolitan Government, as a main executor 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 those involving reducing 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.

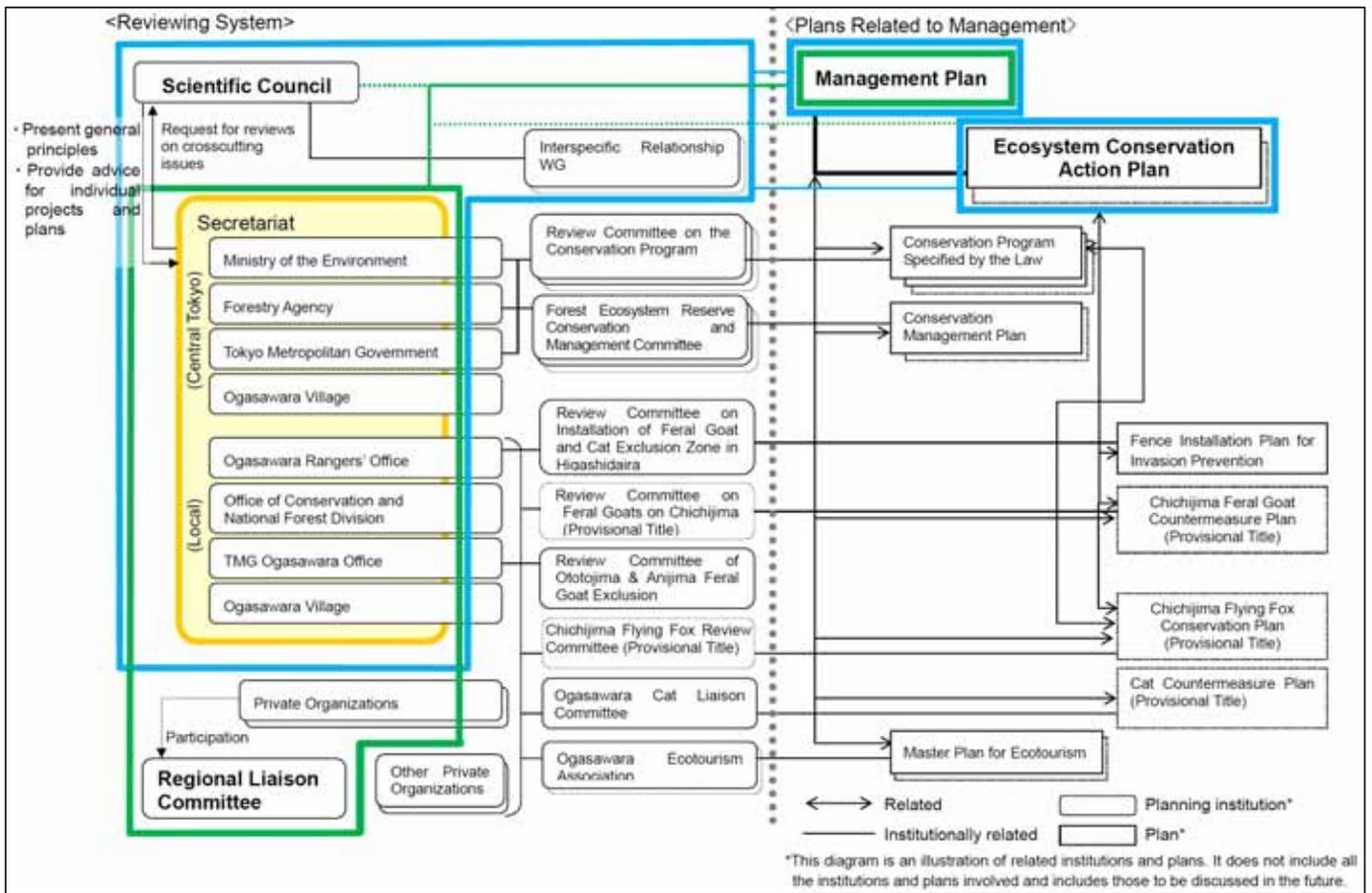


Fig. 1-4 Conceptual Framework of Relationships among Reviewing Systems and Various Plans

## **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.

The Ogasawara Islands include globally peerless natural environments, and 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 management authorities, but also through the active participation and cooperation of stakeholders.