

Ogasawara Islands

Management Plan

(English translation for World Heritage nomination)

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Forestry Agency
Agency for Cultural Affairs
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Ogasawara Village
Japan

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1. Introduction

The Ogasawara Islands, located in the northwestern Pacific Ocean to the south of the Japanese Archipelago, consist of sporadically distributed islands extending approximately 400 km from north to south. Each component island is an oceanic island that, since time of origin, has never been connected by land to the continent. The Ogasawara Islands were uninhabited until 1830 and were therefore called the “Bonin Islands” (“bonin” derives from the Japanese word meaning no inhabitation). The ecosystems of these oceanic islands have been preserved very well.

The Ogasawara Islands were formed by island arc volcanic activities approximately 48 to 44 million years ago. In no other place in the world is it possible to observe on-land records of the initial stages of-island arc formation at the subduction zone of oceanic tectonic plates. In addition, the organisms of the Ogasawara Islands have diverse origins. Not only have many endemic species been produced through unique evolutionary processes, but many of these species still survive today, providing the opportunity for us to observe their ongoing evolutionary processes.

In recognition of the value of the natural environment of the Ogasawara Islands, which feature globally rare ecosystems and geologic characteristics, and to pass this environment on to future generations as the common property of all humanity, the Ogasawara Islands Management Plan (hereafter referred to as the “Management Plan”) has been prepared and is presented herein.

2. Basic Information of the Plan

1) Objectives of the Management Plan

The objectives of the Management Plan are to clarify basic policies concerning the enforcement of various conservation and management instruments and to promote appropriate and smooth conservation and management of the natural environment of all the Ogasawara Islands (for the purpose of this Management Plan, the phrase “Ogasawara Islands” refers to the Ogasawara Archipelago, the Kazan Island Group (known as Volcano Islands), Nishinoshima Island, and the surrounding marine area), including the area constituting the natural property nominated for inscription on the World Heritage List (hereafter referred to as the “nominated property”). The Ministry of the Environment, the Forestry Agency, the Agency for Cultural Affairs, the Tokyo Metropolitan Government, and Ogasawara Village (hereafter referred to as the “management authorities”) are responsible for the various instruments for conservation and management of the natural environment.

For the conservation and management of the

Islands, the management authorities aim to achieve close mutual communication and cooperation with other administrative agencies, the residents of the Ogasawara Islands, business stakeholders engaged in tourism, agriculture, and fishery, researchers, nonprofit organizations (NPOs), visitors including tourists, and other stakeholders (hereafter referred to collectively as “stakeholders”).

2) Scope of the Management Plan

The nominated property is composed of all the islands of the Ogasawara Archipelago excluding Chichijima and Hahajima, most parts of Chichijima and Hahajima, as well as the whole islands of Nishinoshima, Kita-iwoto, and Minami-iwoto.

For the purpose of conservation and management of the natural environment of the nominated property, actions such as the removal of the impacts of alien species need to be taken. Because most of these actions must be implemented integrally without distinction between the nominated property and its surroundings, this Management Plan covers the entire Ogasawara Islands including the nominated property, surrounding land, and marine areas, in addition to ship navigation routes.

The geographical area covered by this Management Plan is shown in the figure below, together with the area that is nominated for inscription on the World Heritage List.

3) Goal and Target Period of the Management Plan

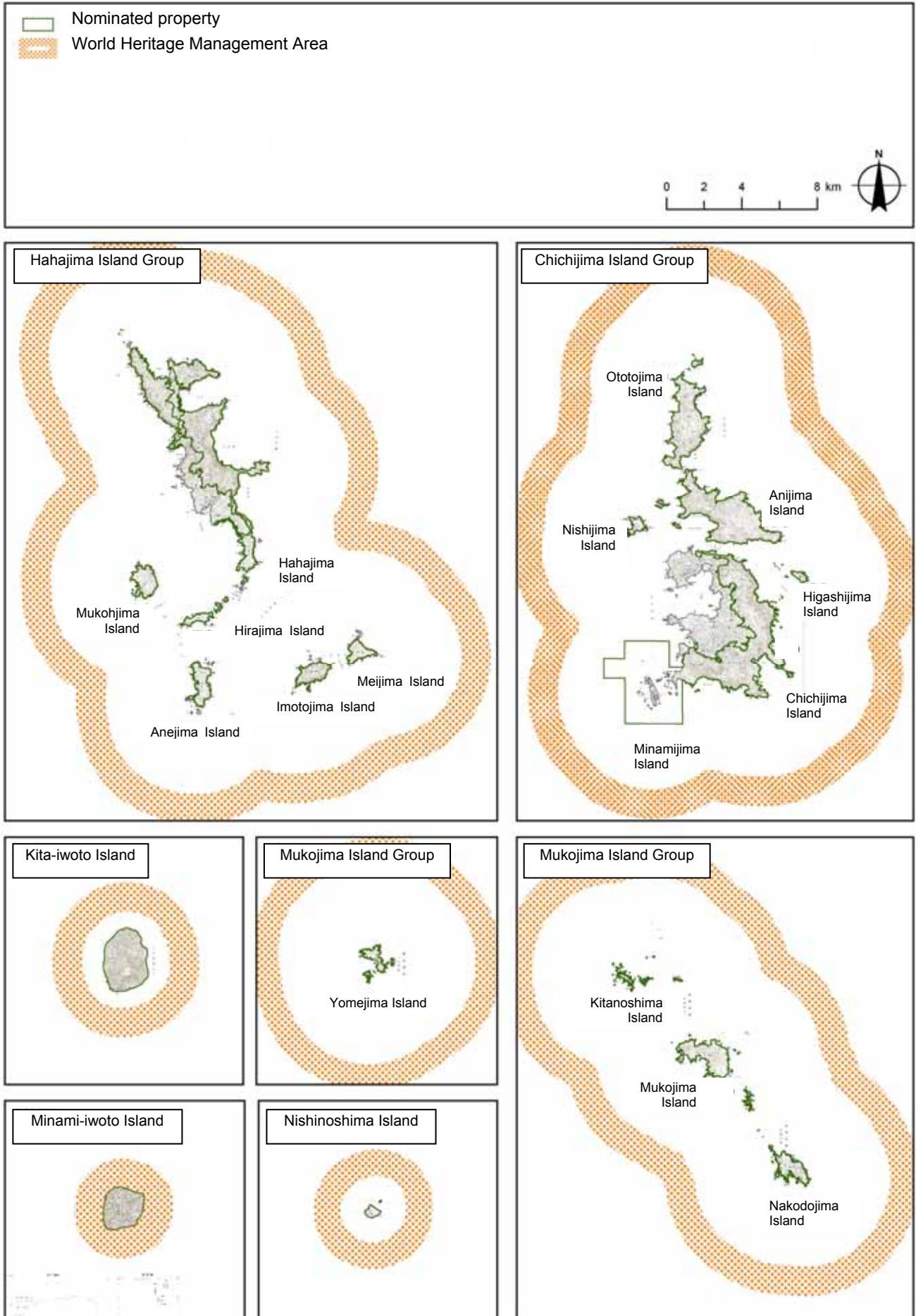
This Management Plan contains management measures necessary to achieve the overall management goal. It sets out activities to be implemented over the next 5 to 10 years to achieve long-term goals. The plan will be reviewed and revised as necessary, in response to changes in the natural environment and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

4) Relation with the Action Plan and Other Plans

The Action Plan is a detailed plan under the Management Plan that complements the Management Plan. The Action plan demonstrates the priority sequence and process of short-term targets and activities.

Individual plans based on different laws created by each management authority and individual project implementation plans shall take into account the Management Plan and Action Plan. Consolidated planning framework shall therefore be established.

Fig. 1-1 World Heritage Management Area



3. Overview of the Ogasawara Islands

1) Location of the Ogasawara Islands

The Ogasawara Islands lie in the northwestern Pacific to the south of the Japanese Archipelago, with Chichijima Island, located approximately 1,000 km from Tokyo, and other islands sporadically distributed over 400 km from north to south. The islands are divided into the Ogasawara Archipelago (consisting of the Chichijima Island Group, the Hahajima Island Group, and the Mukojima Island Group), and the Kazan Island Group and surrounding isolated islands such as Nishinoshima. Chichijima, the home of the local government office of Ogasawara Village, is located at 27°40'N latitude, 142°1' E longitude. The central point of Hahajima is located at 26°0'N latitude, 142°44' E longitude.

2) General Information

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

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

The Ogasawara Islands are protected by designation as a Wilderness Area under the Nature Conservation Law, a National Park under the Natural Parks Law, a Natural Monument under the Law for the Protection of Cultural Properties, a Forest Ecosystem Reserve under the National Forests Administration and Management Bylaw, and a National Wildlife Protection Area under the Wildlife Protection and Appropriate Hunting Law. As a result, the characteristic topological and geological features and unique ecosystems of these oceanic

islands are securely conserved.

3) Natural Environment

i) Geology

The Ogasawara Islands make up an oceanic island arc that was formed on an oceanic crust (Fig. 2-1). The Izu-Ogasawara (Bonin) Arc, on which the Ogasawara Archipelago and the Kazan Island Group rest, is an island arc-trench system extending 1,500 km in length that was formed along the eastern edge of the oceanic Philippine Sea plate as a result of the subduction of the Pacific plate 48 Ma (Ma: *megaannum*, or million years ago). The Izu-Ogasawara Arc is one of the most studied in terms of geophysics, geology, and petrology because of its scientific importance as a typical example of an oceanic island arc.

Within the geological features of the Izu-Ogasawara Arc, a continuous history of island arc growth, from its birth to the present date, is recorded in the form of changes in Chemical magma composition and volcanic activity. In addition, middle crust, origin of continental crust, has been formed beneath the arc, which demonstrates the ongoing evolution proceeds 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 138 families, 445 genera, and 745 species of vascular plants (including subspecies, and varieties) have been recorded, of which, 441 are native, and 161 are endemic.

The typical vegetation of the nominated property includes sclerophyllous scrub that adapted to dry climates, and subtropical rainforest that occurs in cloud belts at high elevations.

Sclerophyllous scrub is a forest composed of the shrubs and small trees range in height from around five to eight meters. Three types of sclerophyllous scrub communities can be seen covering the relatively gentle slopes atop Chichijima and Anijima: Distylio-Pouterietum dubiae, *Distylium lepidotum* variant of Machilus koku-Schimetum mertensianae, and *Osteomeles lanata* association (sclerophyllous scrub), the latter being one of the plant communities in rocky desert on a continent. On Hahajima Island Group, *Pittosporum parvifolium* var. *beecheyi*, endemic to this island group, grows in the sclerophyllous scrub of Wikstroemio-Pouterietum-dubiae dominated by *Planchonella obovata* var. *dubia*, *Rhaphiolepis indica* var. *umbellata* and other such species. These characteristic sclerophyllous scrubs of the Hahajima Island Group have formed on steep slopes, ridges, and wind-beaten terrain with poorly developed soil.

In the Sekimon locality of Hahajima, the Pisonio-Elaeocarpetum photiniaefoliae subtropical rainforest community grows to a height of 20 m or so. It contains many plants of Southeast Asian origin, such as *Elaeocarpus photiniaefolius*, *Pisonia umbellifera*, *Ardisia sieboldii*, *Planchonella obovata*, *Morus boninensis*, *Celtis boninensis* and *Melia azedarach*. The forests dominated by *Ardisia sieboldii* and *Schima mertensiana* are the Machilus boninensis-Ardisietum sieboldii and are spread over a large area in Hahajima. Sclerophyllous shrubs of Dendrocacaliatum crepidifoliae dominated by *Dendrocacalia crepidifolia* (Asteraceae), the species endemic to the Ogasawara Islands, occur on the steep slopes and wind-beaten terrain in the cloud belts of Hahajima.

iv) Animal

[Terrestrial animals]

The structure of the fauna on Ogasawara Islands is quite distinctive: some taxa are completely absent, or conversely proportions of certain taxa are large. These phenomena account for the extremely disharmonic biological communities typical of oceanic islands. As for the terrestrial fauna on the Ogasawara Islands (except birds, which can migrate relatively easily), there are only one mammal species, the Bonin flying fox (*Pteropus pselaphon*), two reptile species, the Ogasawara snake-eyed skink (*Cryptoblepharus nigropunctatus*) and the Micronesian gecko (*Perochirus ateles*), and no amphibians.

On the other hand, it is clear that the area is characterized by an abundance of endemic species and subspecies that evolved on the islands.

BirdLife International has recognized the islands as one of the Endemic Bird Areas of the World, because they are the habitats for the endemic Ogasawara Islands honeyeater (*Apalopteron familiare*) and the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*). The five regions of the nominated property is identified as Important Bird Area. Matsudaira's storm-petrel (*Oceanodroma matsudairae*) breeds only on one island in the world, Minami-iwoto, although it has wide home range from the African coast through Southeast Asia to the western Pacific Ocean. The black-footed albatross (*Phoebastria nigripes*) breeds on both the Ogasawara Islands and Hawaiian Islands, but the Hawaii group differs genetically from the one which breeds in the Ogasawara Islands. These examples show that the Ogasawara Islands are important habitats for wider-ranging seabirds as well.

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

In addition, with respect to freshwater animals, 40 fish species, 17 gastropod species, nine shrimp species, seven crab species, and six hermit crab species have been reported. These include some peculiar species whose life histories were marked by transitions from coastal waters to brackish water or from brackish water to fresh water, making the Ogasawara Islands a valuable area to study the evolutionary processes from saltwater to fresh water.

[Marine animals]

With regard to marine fauna, although 23 whale species, 795 fish species, 1031 gastropod species, and 226 hermatypic coral species have been reported around the coastal waters of the Ogasawara Islands, barriers such as ocean currents and distance from

continental coasts have limited the number of species. Most of the component species arrived at the islands coincidentally. In addition, fewer endemic species of marine animals are generally seen in small areas compared with terrestrial animals. However, in areas separated from large land masses by large distances, such as the Ogasawara Islands, a number of endemic species exist, most notably those that inhabit coastal and brackish water environments.

Among these, six families and 23 species of whales have been recorded in waters adjacent to the Ogasawara Islands. Eighty-six known species of cetaceans exist in the world. Excluding the four species that spend their entire lives in freshwater, 82 species are found in the world's oceans. This means that about 30% of all Cetacean species inhabit waters adjacent to the Ogasawara Islands. These species represent nearly all cetacean species that are distributed or migrate in the subtropical waters of the North Pacific. The number of species is comparable to that observed in the Gulf of California, the Gulf of Mexico, and the coastal waters of the Hawaiian Islands and Ryukyu Islands, indicating that the waters off the nominated property are an important habitat for cetaceans.

4) Social Environment

i) History of human settlement

The Ogasawara Islands are traditionally said to have been discovered in 1593 by Sadayori Ogasawara. The first settlements on the Ogasawara Islands were established on Chichijima in 1830 by five Westerners and about ten Pacific Islanders, mainly from the Hawaiian Islands. Surveys and pioneering efforts by the Edo Shogunate and later by the Meiji government of Japan followed. In 1876, the islands were internationally recognized as Japanese territory.

In the late Taisho and early Showa Periods, from the 1920s to the 1930s, the subtropical climate was exploited to grow fruits and maintain a supply of vegetables during winter. The fishery industry grew, with bonito, tuna, whales, and coral as the chief products. At its height during these periods, the population of the islands exceeded 7,000 people.

In 1944, as the tide of the Pacific War turned against Japan, all island residents (6,886 persons) except for military personnel were forcibly evacuated to the mainland of Japan.

In 1945, after the end of the war, Ogasawara was placed under the control of US military forces and island residents of Western descent were allowed to return to the island. The islands were returned to Japan in 1968, after which Japanese former island residents began to return. On August 20, 1970, the Ogasawara Islands Reconstruction Plan was announced, based on the Act on Special Measures for the Ogasawara Islands Reconstruction (enacted in December, 1969). The Plan included the land use plan, which designated the areas for residents, agriculture, and nature conservation. Approximately 2,400 people now live on the islands of Chichijima and Hahajima.

ii) Visitors

The only way to get to the islands is by boat. Most commonly, visitors take the *Ogasawara Maru* ocean liner, a journey that takes about 25.5 hours one way from Tokyo Takeshiba Pier to Chichijima. Under this condition, about 25,000 people visit the islands per year.

iii) Major economic activities

The main industries of the Ogasawara Islands are tourism, agriculture, and fisheries. For tourism, appropriate use of nature has been promoted through ecotourism. Out of 25,000 tourists per year, approximately 16,000 people visit Ogasawara for its unique ecosystems and the beautiful sea. On the other hand, farming in the area takes advantage of the warm climate to produce agricultural products such as fruits and vegetables, and inshore fishing mainly of swordfish has been conducted.

iv) Land ownership

National forest, which is under the authority of the Forestry Agency, accounts for about 80% of the

nominated property. Other than the national forest, the property includes state-owned land administered by the Ministry of Finance, the Ministry of the Environment (MOE), etc., and land owned by the Tokyo Metropolitan Government (TMG) and Ogasawara Village, as well as privately owned land.

4. Management Goals and Basic Principles

1) Management Goals

The management authorities and stakeholders share the overall goal stated below.

■ Overall goal

The Ogasawara Islands are a globally precious place that records the evolutionary processes of the Earth and life. They illustrate the formation process of a marine island arc, which was the origin of the continental crusts characterized by unique ecosystems consisting of endemic species in the ongoing evolutionary process of adaptive speciation. Through proper understanding of this place of outstanding universal value, and with co-existence between nature and people, the exceptional natural environment of the Ogasawara Islands shall be passed on in sound condition to future generations.

2) Basic Principles

To achieve this overall goal, the management authorities will implement systematic management of the entire Ogasawara Islands area, with the understanding and proactive cooperation of all stakeholders, based on the basic principles listed below.

(1) Conservation of the Outstanding Natural Environment

i) Conservation of "evidence" of the process of oceanic island arc formation

The Ogasawara Islands are the only area where the development process of an oceanic island arc, which triggered the formation of continental crusts, can be observed from its formation to the present day. Topographical and geological features of the Ogasawara Islands including boninite, dike, pillow lava, and sulfide ore deposits will be protected by appropriate enforcement of protective instruments. These resources will be protected also by raising awareness to promote adequate understanding of their values among stakeholders such as island residents.

ii) Conservation of endemic species, threatened species, and unique ecosystems

The management authorities will protect the endangered endemic species that have evolved on the Ogasawara Islands, the unique ecosystems that have developed on individual islands, and the breeding sites for various marine species and subtropical seabirds by introducing appropriate protection systems and conservation and management measures.

Thus, conservation and management measures shall focus on removing factors such as alien species that adversely affect the mechanisms of the islands' unique ecosystems, protecting endemism on a

genetic level, and conserving the ecosystems over the long term.

(2) Removal and Avoidance of Impacts of Alien Species

i) Promotion of alien species countermeasures based on integrated ecosystem management

Since 1830 when the first settlers arrived, the Ogasawara Islands have been affected by the combined impacts of alien species deliberately or accidentally brought to the islands by the movements of island residents and government or economic activities.

It is now known that once an environment has allowed alien species to enter and establish certain direct or indirect interspecific relationships, such as an ecological food chain or symbiosis, expelling only the specific alien species can increase the number of other alien species or adversely affect the endemic species that have become dependent on the expelled alien species. Therefore, it is crucial to adaptively manage the islands' ecosystems by monitoring any change in the ecological dynamics among all species after implementing alien species countermeasures.

Thus, the alien species countermeasures introduced on the Ogasawara Islands shall not include only the expulsion of specific alien species. Rather, efficient and effective measures aimed at removing the adverse effects of the alien species will be implemented based on knowledge and methodologies for sound conservation obtained through the study of regionally different and complex interspecific relationships.

ii) Prevention of the introduction and dispersion of new alien species

In addition to removing pre-existing alien species, prevention of the introduction and dispersion of new alien species is also important. Prevention of the introduction and dispersion of new alien species must be promptly undertaken by all management authorities and stakeholders, such as island residents, visitors, and businesspeople as part of their daily activities on the Ogasawara Islands.

Therefore, all people on the Ogasawara Islands must recognize how their activities may risk introducing alien species that adversely affect island ecosystems and act appropriately to avoid or reduce this risk to prevent the introduction and dispersion of new alien species.

(3) Harmony between Daily Life of Humans and Nature

i) Environmental considerations when implementing individual projects

When conducting projects and research, including conservation and management measures, on the Ogasawara Islands, not only the alien species but also all possible risks shall be adequately considered, and projects shall be carefully and meticulously conducted to avoid any detrimental effects to the unparalleled natural environment.

ii) Lifestyle and livelihood in harmony with nature

Lifestyle and livelihood in harmony with the islands' natural environment will be promoted. This measure will focus on island residents to ensure that they adequately appreciate the value of the outstanding natural environment of the Ogasawara Islands, consider the natural environment in daily or commercial activities, and actively participate in ecosystem conservation and management activities. At the same time, island residents will be able to enjoy the benefits of these measures.

(4) Adaptive Conservation and Management

i) Adequate monitoring and information

Preliminary data will be obtained before introducing any conservation and management measure, and monitoring will be carried out to detect any change of the natural environment after implementing such a measure. Thus, it will be possible to implement adaptive conservation and management activities that utilize the information obtained from monitoring results based on the island-specific long-term goals described in this document.

In addition to long-term monitoring of ecosystem dynamics and continuous implementation of alien species measures for some species, the growing concern about the effects of climate change on World Heritage sites must be taken into account. Therefore, a long-term continuous monitoring program will be implemented to determine the effects of climate change.

ii) Scientific approach and consensus building

To implement conservation and management measures for the Ogasawara Islands in an adaptive manner, each step of a conservation and management measure needs to be scientifically evaluated. For this purpose, scientific advice will be obtained from the Ogasawara Islands Natural World Heritage Nominated Property Scientific Council (hereafter referred to as the Scientific Council), established in 2006. Research findings and recommendations will be shared with the management authorities, and the measures will be continuously implemented.

On the other hand, to effectively implement conservation and management activities, not only the management authorities concerned, but also all island residents need to understand, agree upon, and participate in the conservation activities. For this purpose, mutual understanding will be promoted for issues that require coordination with the life of residents etc. via the Ogasawara Islands Natural World Heritage Nominated Property Liaison Committee (hereafter referred to as the Regional Liaison Committee), established in 2006 to serve as a liaison and coordinate between the management authorities and stakeholders.

5. Management Measures

1) Proper Enforcement of Protective Instruments

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

(1) Wilderness Areas

Wilderness Areas are designated and administered by the Minister of the Environment based on the Nature Conservation Law. Its purpose is to provide necessary protection for virgin natural environments of a significant scale without being influenced by human activities. In these wilderness areas, acts that may affect the conservation of the natural environment, such as constructing, reconstructing, or expanding buildings or other structures, felling trees and bamboos, collecting animals and plants, collecting fallen leaves and branches, and making fire, are prohibited, except for special cases such as scientific research. For areas where human entry is likely to cause impact on the environment, strict conservation measures, such as designating these areas as Restricted Entry Zones, will be implemented.

Minami-iwoto, one of the Ogasawara Islands, has been designated as the Minami-iwoto Wilderness Area since 1975, and the entire Minami-iwoto area became a Restricted Entry Zone in 1983 to statutorily protect the pristine ecosystems unique to the oceanic island.

(2) National Parks

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

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

In a Special Zone, permission from the Minister of the Environment is required for acts such as constructing, reconstructing or extending structures, felling trees and bamboos, mining minerals,

extracting soil and stones, clearing land or changing the feature of land, and collecting designated plants. In a Special Protection Zone, in addition to the acts listed above, acts such as collecting and capturing plants and animals, collecting fallen leaves or branches, and making fire require permission from the Minister of the Environment. In a Marine Park Zone, permission from the Minister of the Environment is required for acts such as collecting and capturing tropical fish and coral, and changing the feature of the seabed. In an Ordinary Zone, acts such as constructing large-scale structures beyond a certain limit and reclaiming the surface of the sea require sending a notification to the Minister of the Environment.

Most of the terrestrial area of the Ogasawara Islands was designated as Ogasawara National Park in 1972 based on the Natural Parks Law. Most parts of the islands are designated as Special Protection Zones, which are the most stringently protected areas, or Class I Special Zones, where protective measures similar to these of Special Protection Zones are taken.

There are 51 families and 138 species of vascular plants, including endemic species such as *Rhododendron boninense* and *Callicarpa parvifolia*, which are legally protected from collection or damage as “designated plants” within the Special Zone. In the same way, the endemic damselfly (*Indolestes boninensis*) and the endemic dragonfly (*Hemicordulia ogasawarensis*) are protected as “designated animals” and their capture or harm are restricted.

These measures statutorily conserve unique topographical and geological features, plants, and animals, including endemic or threatened species, and the habitat environments of these species.

(3) Forest Ecosystem Reserves

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

In 1994, the eastern coast of Hahajima was designated forest ecosystem reserve. Then, in 2007, after a review of the areas covered by the system, the area was expanded to cover national forests on nearly all of the main and subsidiary islands of the Ogasawara Islands (aside from areas being used for public works projects), in order to conserve the unique forest ecosystems of the Ogasawara Islands

for future generations. Forest Ecosystem Reserve now covers more than 80% of the nominated property.

The Preservation Zone subcategory in Forest Ecosystem Reserve includes the area where the typical biota as well as endemic and threatened species is found. Its purpose is to maintain, restore, and properly preserve forest ecosystems in their original form. This designation allows for acts deemed necessary based on established scientific evidence to preserve or restore endemic diversity or forest ecosystems, but in principle dictates that the area is left to follow its course of nature, without human interference.

The Conservation and Utilization Zone subcategory is designed as a buffer zone that prevents the direct influence of external environmental changes that might affect the forest ecosystem of the Preservation Zone. As a general rule, the Conservation and Utilization Zone aims to conserve and restore forest ecosystems of the same quality as the Preservation Zone and is thus treated in a similar manner. Additionally, the use of forests is permitted for educational and other purposes to the extent that such use does not adversely affect its function.

These areas represent approximately 70% of the entire (land) area covered by the Management Plan, which systemically conserves the forest ecosystem that sustains biological communities and endemic and threatened species etc.

(4) National Wildlife Protection Areas

National Wildlife Protection Areas are designated by the Minister of the Environment based on the Wildlife Protection and Appropriate Hunting Law to protect wildlife of national and international importance. The purpose is to provide protection to wildlife and enforce appropriate requirements on hunting, thereby ensuring the conservation of biodiversity that in turn enables people to enjoy the blessings and benefits of nature. Hunting is prohibited in Wildlife Protection Areas. In addition, the areas where the protection of wildlife and their habitats is deemed especially necessary are designated as Special Protection Areas and permission must be obtained from the Minister of the Environment to carry out certain development acts.

The Ogasawara Islands National Wildlife Protection Area was designated in 1980 because of the islands' status as habitats for threatened wildlife, such as the endemic subspecies of Eurasian buzzard (*Buteo buteo toyoshimai*), the Bonin honeyeater (*Apalopteron familiare*), the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*), the endemic greenfinch (*Carduelis sinica kittlitzi*), and the albatrosses. In 2009, the area was renewed with extension as Ogasawara Archipelago National Wildlife Protection Area to include the surrounding marine area. Nishinoshima was designated as a National Wildlife Protection Area in 2008 because it is a breeding ground for the colonies of the masked booby (*Sula dactylatra*), the Tristram's storm-petrel (*Oceanodroma tristrami*), the great crested tern

(*Thalasseus bergii*), and others. Kita-iwoto and its surrounding marine area were designated as a National Wildlife Protection Area in 2009, because of its importance as habitats or a breeding site for seabirds including the red-footed booby (*Sula sula*) and the red-tailed tropicbird (*Phaethon rubricauda*). As described above, most areas of the Ogasawara Islands and marine areas surrounding the islands have been designated as a national wildlife protection area, and birds including seabirds and animals including the Bonin flying fox (*Pteropus pselaphon*) are statutorily protected.

(5) National Endangered Species of Wild Fauna and Flora

National Endangered Species of Wild Fauna and Flora are the designated species of wild fauna and flora that are in danger of extinction based on the Law for the Conservation of Endangered Species of Wild Fauna and Flora. It is therefore illegal to capture, harm, kill, collect, damage, transfer, etc. these species, except for activities such as scientific research for which permission is obtained. Conservation program defined by the law will be implemented, including activities such as breeding and habitat maintenance, as necessary to preserve National Endangered Species of Wild Fauna and Flora.

Of the wildlife on the Ogasawara Islands, one species of mammals, the Bonin flying fox (*Pteropus pselaphon*) (designated in December 2009), five species of birds including the albatrosses, the endemic subspecies of the Eurasian buzzard (*Buteo buteo toyoshimai*) and the Japanese wood-pigeon (*Columba janthina nitens*), five species of insects including an endemic tiger beetle (*Cicindela bonina*), and 12 species of plants including *Rhododendron boninense* and *Callicarpa parvifolia*, have been designated as National Endangered Species of Wild Fauna and Flora. Conservation programs as defined by the Law for the Conservation of Endangered Species of Wild Fauna and Flora have been drawn up for 19 species, including the wood-pigeon and the endemic orchid (*Calanthe hattorii*), by the Minister of the Environment and the heads of national administrative agencies, and these programs are being implemented. For the Bonin flying fox, designated as national endangered species in 2009 (designated in December), the conservation program is currently being prepared.

Conservation and management of these species within their habitats will be conducted in coordination with the conservation programs defined by the law for the Conservation of Endangered Species of Wild Fauna and Flora and the Management Plan.

Table 1-1 List of designated species in the conservation program defined by the law for the Conservation of Endangered Species of Wild Fauna and Flora

Group	Species
Plant	<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>Phoebastria albatrus</i>
	<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 are designated by the Minister of Education, Culture, Sports, Science and Technology based on the Law for the Protection of Cultural Properties. Its purpose is to protect animals or plants (including their habitats, breeding sites, stopover points for migratory birds and native habitats) and geological minerals (including areas of unique natural phenomenon) which have significant scientific value for the country. Acts which change the current state of Natural Monuments or affect their preservation require permission from the Commissioner of the Agency for Cultural Affairs.

Of the animals that occur on the Ogasawara Islands, one mammal species of the Bonin flying fox, (*Pteropus pselaphon*), four bird species including the Bonin honeyeater (*Apalopteron familiare*) (a special natural monument) and the endemic subspecies of Japanese wood-pigeon, 10 insect species including *Celastrina ogasawaraensis* and *Boninthemis insularis*, and a land snail group (including 12 families such as Helicinidae and Euconulidae), as well as two other species have been designated as National Natural Monuments. The entire area of Minami-iwoto is a Nature Protection Area and designated as a National Natural Monument, and the submerged karst at Minamijima is also designated as a National Natural Monument for its geological features and minerals. The protective instruments described above statutorily protect the outstanding natural environments that sustain unique land snails and topographical or geological characters showing adaptive divergence radiation.

(7) Systems Related to Alien Species Measures

According to the Invasive Alien Species Act, animals and plants introduced into Japan from

overseas that harm or may harm ecosystems are designated as “Invasive Alien Species”.

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

2) Strategic Conservation of Ecosystems by Island

Various activities focused on alien species countermeasures have been initiated by the management authorities on the Ogasawara Islands. Based on the results of these activities, the management authorities will continue effective conservation of Ogasawara ecosystems through cooperation and close coordination of stakeholders based on long-term goals and activities.

As a short-term strategy, an Ecosystem Conservation Action Plan under the Management Plan has been evaluated and prepared. The action plan presents short-term targets, priorities, and details of countermeasures based on knowledge of interspecific relationships that vary by island. Ecosystem conservation and management measures, including alien species countermeasures, will be appropriately and systematically implemented based on this action plan. (Interspecific relationships on Anijima are described below as an example.)

◇ Strategic conservation of ecosystems by island based on interspecific interactions

The Ogasawara Islands are composed of many small oceanic islands, and island-specific species differentiation has occurred such that each island has its own ecosystem and unique species composition. In addition, relationships between humans and the environment, changes in the relationships, and the effects of alien species have affected each island differently. Therefore, each island is taken as a base unit, and island-specific goals and activities have

been defined for each island. Ecosystem conservation and management measures will be implemented based on these individual goals and directions.

For the ecosystem conservation and management, knowledge and expertise will be developed, and by focusing on island-specific complex interspecific relationships, changes in interspecific relationships that accompany project implementation on each island will be estimated. Based on these estimates, efficient and effective measures will be implemented, including measures to protect endemic species and remove the adverse effects of alien species, concurrently or alternately.

◇ Ecosystem conservation with a focus on the movement of wide-ranging species between islands

Ecosystems on the Ogasawara Islands are influenced by and connected to each other in a complex manner by flying mammalian, avian, and insect species and by the “flying” seeds of plant species.

Flying animals, including the endemic subspecies of Japanese wood-pigeon, Bonin flying fox, albatrosses, seabirds, and endemic dragonflies, migrate among islands and play important roles in the ecosystems of oceanic islands (e.g., by seed dispersal or “seeding”). To preserve these flying creatures and sustain their roles, including seeding, and to conserve and manage the entire Ogasawara Islands region, the adverse effects of alien species must be eliminated, and breeding sites and habitats must be preserved in coordinated efforts among islands.

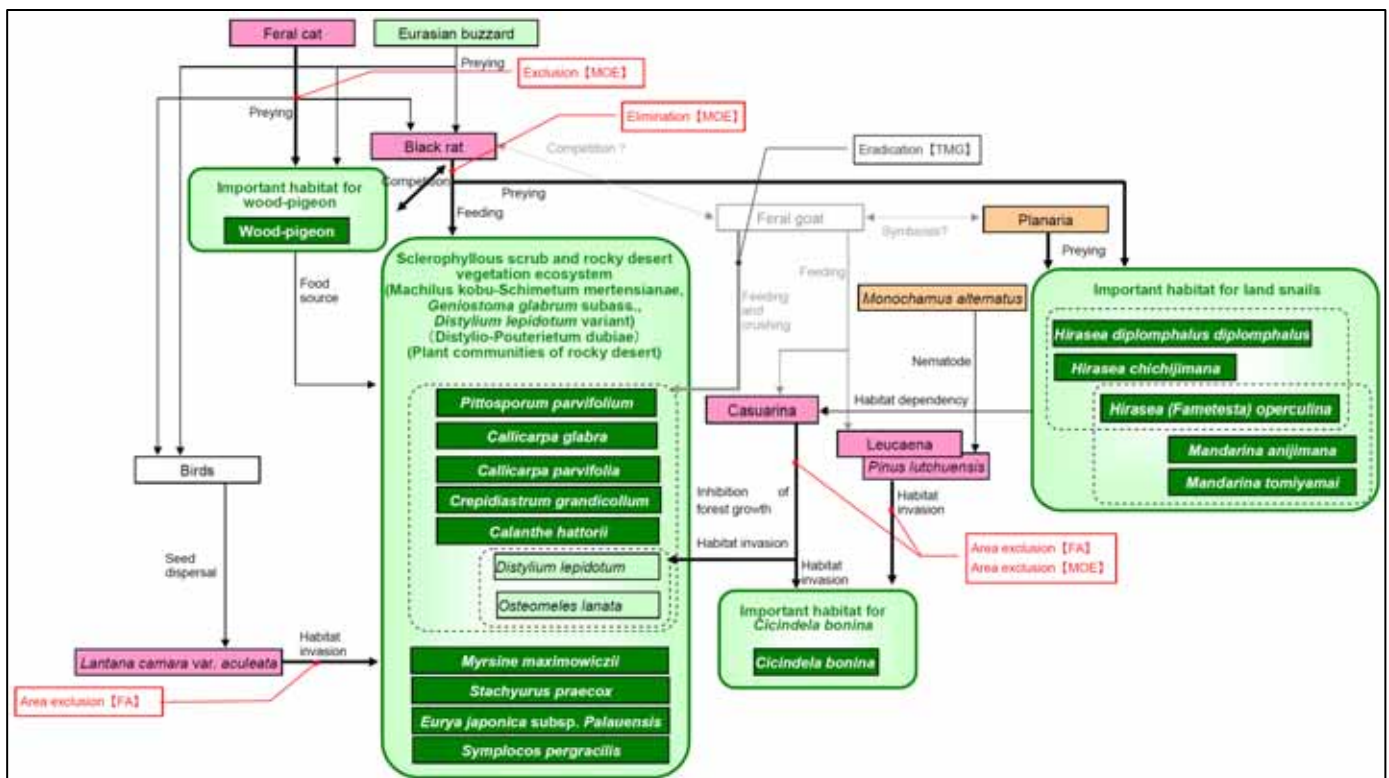


Fig. 1-2 Interspecific Relationship by Island (Example of Anijima Island)
 MOE: Ministry of the Environment, FA: Forestry Agency, TMG: Tokyo Metropolitan Government
 Refer to the Ogasawara Islands Ecosystem Conservation Action Plan (page 12) for the original figure.

(1) Chichijima Island (Chichijima Island Group)

(i) Existing condition

Chichijima is the largest island of the Ogasawara Islands and has diverse environmental aspects including a mountain peak of approximately 300 m above sea level. This island is home to more than 80% (129 species) of all endemic plant species on the Ogasawara Islands. Dense sclerophyllous scrubs, distributed from the Higashidaira and Mt. Chuosan region to the Yoakedaira and Nagasaki region, are important habitat for various threatened endemic plants and animals and are important for conservation of biodiversity on Chichijima.

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

(ii) Long-term goals

- To conserve sclerophyllous scrubs and other ecosystems
- To conserve *Schima mertensiana* forests and other ecosystems
- To conserve the habitats of the endemic subspecies of Japanese wood-pigeon, with the goal of stabilizing the habitation of this species in combination with actions to be implemented on the other islands
- To conserve the habitats of land snails.
- To conserve the habitats of the Bonin flying fox, with the goal of stabilizing the habitation of this species in combination with actions to be implemented on the other islands

(iii) Activities

Conservation of sclerophyllous scrub and Schima mertensiana forest [target area: Y / H / S]*

The sclerophyllous scrub vegetation in the entire Higashidaira region, where Chichijima's original vegetation is still well preserved, will be appropriately conserved. In *Schima mertensiana* forests, which are widely distributed in the central to southern parts of the island, conservation and management measures such as elimination of alien species will continue to be conducted in an adaptive manner, considering already established interspecific relationships. Feral goats are the major impact factor. Expulsion of goats will be conducted (e.g., by setting up fences) in conservation priority areas of endemic plant species. In addition, alien plants such as *Casuarina* and *Bischofia* will be eliminated mainly in important regions for conservation, and sclerophyllous scrub and *Schima mertensiana* forest will be conserved.

For endemic plants such as *Rhododendron*

boninense, *Symplocos kawakamii*, *Pittosporum parvifolium*, *Melastoma tetramerum*, and *Calanthe hattorii*, habitat conservation will involve the continuation of periodic patrols, monitoring, and alien species measures that build on already obtained results.

Habitat conservation for wood-pigeon [H / S]

A sanctuary to conserve important habitat for the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*) has already been established in Higashidaira by the Forestry Agency. Various protective measures are being employed, such as securing water holes and conducting patrols. Other additional measures to recover and conserve the wood-pigeon breeding grounds and habitat will include a preliminary exclusion of feral cats, for example by setting up fences, and the removal of other alien species impacts.

Because the wood-pigeon moves among islands, including Hahajima, Anijima, and Ototojima, unified conservation measures will be conducted for habitats in all these areas with the aim of achieving steady habitation.

Habitat conservation for land snails [S / Y]

The southern region and Yoakedaira are important habitat for land snails such as *Mandarina chichijimana*, which are valuable in ecological and evolutionary biology studies. In these regions, measures will focus on preventing the introduction of predatory flatworm and conserving the habitat of existing land snails.

Habitat conservation for the Bonin flying fox

Chichijima has the largest population of the Bonin flying fox (*Pteropus pselaphon*) in Ogasawara. This species is designated as a National Endangered Species of Wild Fauna and Flora and a Natural Monument and legally protected.

Their main habitat overlaps with areas of human activities including farmlands and residential areas. Various conservation issues exist, including entanglement in nets set up to protect against crop damage by the flying fox. Groups of Bonin flying foxes use group gregarious resting sites especially in winter, which is assumed to be related to their breeding behavior; thus, conservation of resting sites is very important for conservation of the species. However, concerns have been raised that tourists' coming too close to roosts or feeding sites may have adverse effects.

For this situation, conservation measures for this species should be created assuming co-existence with humans in the same place. The population of this endemic animal is continuously monitored, and activities such as selecting suitable agricultural nets and correct installation methods, and providing these instructions to farmers in nearby areas are currently carried out to reduce entanglement in nets. In addition, the bat resting sites were designated as a Designated Special Protection Area of a Special Protection Area of a Wildlife Protection Area in 2009 and activities which may impact the species,

such as taking photographs, are now prohibited. Henceforth, building awareness among farmers as well as farmer-support measures will continue to be carried out and measures that allow for coexistence and coordination of conservation and ecotourism use within the resting site and its surroundings will be promoted.

As this species was designated as the National Endangered Species of Wild Fauna and Flora in 2009, the conservation program defined by the Law for the Conservation of Endangered Species of Wild Fauna and Flora will be created for the species to achieve steady habitation on Ogasawara Islands and collection of scientific information and habitat maintenance will be promoted for conservation of this species, in addition to the measures mentioned above.

Habitat conservation for endemic insects

Habitat conservation for endemic insects will be promoted by area exclusions of the green anole and cane toad, and re-colonization by insects flying from nearby islands such as Anijima is anticipated.

Other measures

At Futami Port, the gateway to the Ogasawara Islands, and nearby areas, an intensive campaign will be conducted to reduce green anole numbers to a low-density level and prevent them from spreading to peripheral islands.

For all of Chichijima, countermeasures against cats, including those in residential areas, will be prepared based on the action plan established by the Ogasawara Cat Liaison Committee. Based on the action plan, cat -keeping codes will be enforced to decrease the number of feral cat supply sources. In addition, programs to catch feral cats will be continuously carried out in mountain areas around the designated exclusion zone.

Coordinated feral goat measures covering all of Chichijima are currently being prepared; the elimination will be based on evaluations of elimination methods. Henceforth, continuous implementation of strategic elimination will be conducted to promptly reduce the population to a low-density level, with the ultimate aim of island-wide eradication.

*Target area codes: [H] Higashidaira and Mt. Chuosan region, [Y] Yoakedaira and Nagasaki region, [S] Southern region

(2) Anijima Island (Chichijima Island Group)

(i) Existing condition

Anijima has a dry climatic condition. This island supports the largest sclerophyllous scrub forests among the Ogasawara Islands, as well as rocky desert plant communities. Of the vascular plants on the island, approximately 41.3% (95 species) are endemic. Rare endemic plants and animals inhabit Anijima, including the tiger beetle *Cicindela bonina*, which is found only on Anijima, and a number of land snails. The level of human-induced disruption is also lower than that on other islands.

(ii) Long-term goals

- To conserve sclerophyllous scrub and other ecosystems as well as the habitats of *Cicindela bonina*
- To conserve the habitats of land snails
- To conserve the habitats of the endemic subspecies of Japanese wood-pigeon with a view to stabilizing the habitation of this species in combination with actions to be implemented on the other islands

(iii) Activities

Conservation of sclerophyllous scrub

Among alien animals, feral goats, which had been the main impact factor for sclerophyllous scrub vegetation, have nearly been eradicated. Now, elimination of the black rat targeting its eradication is planned. Appropriate conservation measures will also be carried out for the sclerophyllous scrub including rocky desert vegetation and natural *Schima mertensiana* forests distributed in surrounding hollows and ravine bottoms through the removal of impact factors, including the black rat, and monitoring.

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

Habitat conservation for land snails

Anijima is an important habitat for many land snails, such as *Mandarina anijimana*, which are important for ecological and evolutionary biology studies. Elimination of the black rat, which is believed to cause grazing damage, is planned, targeting its eradication. However, the black rat is also a known food of the endemic subspecies of Eurasian buzzard; thus, careful and adequate measures are being conducted under continued monitoring.

Habitat conservation for wood-pigeon

Anijima is one of the habitats of the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*). Wood-pigeon habitat is being conserved by excluding feral cats, which are assumed to inhabit the wood-pigeon habitat in small numbers. In addition, because the wood-pigeon moves among islands such as Chichijima and Ototojima, unified conservation measures are being conducted in these habitats with the goal of achieving steady habitation.

(iv) Verification model focusing on interspecific interaction

An Ecosystem Conservation Action Plan has been prepared for the Ogasawara Islands focusing on interspecific interactions in all islands and

regions based on the results etc. of various surveys and studies. On the basis of this action plan, ecosystem conservation measures are being promoted.

A typical ecosystem of Anijima is sclerophyllous scrub, and Anijima is one of the important islands for conservation. However, multiple alien species have been identified that required urgent measures. Therefore, comprehensive monitoring surveys have been conducted on Anijima, and a verification model focused on interspecific interaction is being developed. Based on this model, conservation measures are being developed through estimation, implemented, evaluated, and improved. Using this proactive approach, carried out on Anijima as a model, efficient and effective measures will be developed considering interspecific interactions and adaptation for all the other islands and regions.

(3) Ototojima Island (Chichijima Island Group)

(i) Existing condition

Ototojima has a moderately humid climate and relatively rich soil compared to the other islands of the Chichijima Island Group. *Schima mertensiana* forests are widely distributed on Ototojima. These forests provide the habitats and breeding sites for biological communities of woodland. Ototojima is currently the only island that has all five dragonfly species endemic to Ogasawara, including *Indolestes boninensis*. In addition, a pure population of *Morus boninensis* is also found on the island.

(ii) Long-term goals

- To conserve *Schima mertensiana* forests and other ecosystems
- To conserve the habitats of endemic dragonflies
- To conserve the habitats of the endemic subspecies of Japanese wood-pigeon with a view to stabilizing the habitation of this species in combination with actions to be implemented on the other islands

(iii) Activities

Conservation of Schima mertensiana forests

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

Extensive invasion by *Bischofia* was a concern. However, this species has been eradicated at the early stage of its invasion. Now, feral goat, black rat, and *Casuarina* will be eliminated. However, as the black rat is a food source of the endemic subspecies of Eurasian buzzard, an appropriate approach is required.

In addition, the forests will be conserved as the habitats of other endemic species such as *Morus*

boninensis.

Habitat conservation for endemic insects including five endemic-species of dragonfly

Bullfrogs and feral pigs, which likely impacted endemic dragonfly species, have been eradicated. Endemic insect habitats will be conserved by removing alien impacts while conducting ongoing monitoring. Additional measures include preventing desiccation of waterside areas that serve as dragonfly breeding grounds.

Habitat conservation for wood-pigeon

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

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

(4) Nishijima Island (Chichijima Island Group)

(i) Existing condition

Nishijima is one of the peripheral islands of Chichijima and has a relatively small total area. Endemic plant species including *Cirsium boninense*, and various endemic land snails have been found on this island. As feral goats have been eradicated, ecosystems recovery is expected on the island.

(ii) Long-term goals

- To conserve ecosystems of native vegetation as a long-term effort

(iii) Activities

Ecosystem management considering endemic species

Endemic species such as land snails still inhabit Nishijima. For conservation of endemic species, elimination of alien species such as black rats, *Casuarina* species, and *Leucaena* will be conducted in an adaptive manner considering the already developed interspecific relationships on the island.

In addition, ecosystems of this island will be conserved as the habitats of endemic plants such as *Cirsium boninense*.

(5) Higashijima Island (Chichijima Island Group)

(i) Existing condition

Although Higashijima is a peripheral island of the Chichijima group and has a relatively small total area, it provides the breeding grounds for seabirds such as Audubon's shearwater (*Puffinus lherminieri bannermani*), an endemic breeding subspecies of the Ogasawara Islands, and the wedge-tailed shearwater (*Puffinus pacificus*). As feral goats and black rats have been completely eliminated, ecosystem recovery is expected.

(ii) Long-term goals

- To conserve the breeding sites of seabirds
- To conserve the ecosystems of native vegetation as a long-term effort

(iii) Activities

Conservation of seabird breeding grounds

To conserve the breeding grounds of seabirds such as Audubon's shearwater (*Puffinus lherminieri bannermani*), the wedge-tailed shearwater (*Puffinus pacificus*), and Bulwer's petrel (*Bulweria bulwerii*) that currently breed on Higashijima, monitoring and follow-up measures will be conducted following the elimination of black rats, which preyed on seabirds.

Ecosystem management considering endemic species

For conservation of endemic species still inhabiting the island, measures such as elimination of alien plants will be conducted in an adaptive manner considering the already established interspecific relationships.

Habitats and colonies of endemic plants such as *Lobelia boninensis* and *Ixeris longirostra* will be conserved.

(6) Minamijima Island (Chichijima Island Group)

(i) Existing condition

Minamijima is one of the peripheral islands of Chichijima. The island has a relatively small total area. It is formed of elevated coral reef containing limestone and has characteristic drowned karst topography. The island also provides breeding grounds for seabirds including the wedge-tailed shearwater (*Puffinus pacificus*). Feral goats have been eradicated and its vegetation is starting to recover. Minamijima is used for ecotourism in accordance with the applicable rules for appropriate use.

(ii) Long-term goals

- To conserve the breeding sites of seabirds
- To conserve the ecosystems of native vegetation as a long-term effort

(iii) Activities

Conservation of seabird breeding grounds

To conserve the breeding grounds of seabirds such as the wedge-tailed shearwater (*Puffinus pacificus*) and Bulwer's petrel (*Bulweria bulwerii*) that breed on Minamijima, appropriate conservation will be promoted by elimination of alien species such as the black rat, which creates predation pressure on seabirds, with continued monitoring, and by complying with the current utilization rules to avoid impacts from human use.

Ecosystem management considering endemic species

For conservation of endemic species still inhabiting the island, elimination of alien plants

such as *Cenchrus echinatus* will be continued in an adaptive manner, considering already established interspecific relations. Approaches such as limiting utilization will also be enforced.

Conservation of the island also protects the habitats of endemic and threatened plants such as *Lobelia boninensis*, *Ixeris longirostra*, and *Lycium sandwicense*.

(7) Hahajima Island (Hahajima Island Group)

(i) Existing condition

Hahajima is the second largest island after Chichijima among the Ogasawara Islands. It has a humid climate, including a cloud belt that forms at a mountain peak approximately 400 m above sea level. Under this climatic condition, a subtropical rainforest, vegetation unique to Hahajima has developed in the Sekimon region, and *Ardisia sieboldii* forests cover a large area of the island. Various endemic plants and animals including *Procris boninensis* and *Celastrina ogasawaraensis* inhabit these areas of advanced forest vegetation. In addition, this island also provides important habitats for the endemic subspecies of Japanese wood-pigeon.

(ii) Long-term goals

- To conserve subtropical rainforest and other ecosystems
- To conserve *Ardisia sieboldii* forest and other ecosystems
- To conserve the sclerophyllous scrub typical of the Hahajima Island Group and other ecosystems
- To conserve the habitats of endemic insects such as *Celastrina ogasawaraensis*
- To conserve the breeding sites and habitats of *Carduelis sinica kittlitzii* and seabirds
- To conserve the habitats of the endemic subspecies of Japanese wood-pigeon with a view to stabilizing the habitation of this species in combination with other actions to be implemented on the island
- To conserve the habitats of land snails

(iii) Activities

Conservation of subtropical rainforest, *Ardisia sieboldii* forest, and sclerophyllous scrub typical of the Hahajima Island Group [S / NC / M]*

Activities such as exclusion of alien species will continue in an adaptive manner considering the already established interspecific relationships in the following areas: subtropical rainforest covering the entire area of Sekimon, where Hahajima's original vegetation is still well preserved; the *Ardisia sieboldii* forest and the *Schima mertensiana* forest, which occupy a large area and widely distributed in the north-central part of the island.

Among these activities, minimizing the impact of *Bischofia*, the major impact factor, is particularly important. *Bischofia* elimination is being

strategically carried out.

In addition, conservation of the island protects the habitats of threatened and endemic plants, including *Piper postelsianum*, *Claoxylon centinarium*, *Morus boninensis*, *Hymenasplenium cardiophyllum*, *Dendrocacalia crepidifolia*, and *Calanthe hoshii*, and animals, such as endemic land snails.

In the Minamizaki region, which tends to be a relatively dry part of Hahajima, sclerophyllous scrub typical of the Hahajima Island Group is found, similar to on many of the peripheral islands of Hahajima. To conserve existing endemic species such as land snails, considering already established interspecific relationships, alien species such as *Casuarina* will continue to be eliminated.

Habitat conservation for endemic insects including *Celastrina ogasawaraensis* [S / NC / M]

Although the green anole has impacted the endemic insects of Hahajima, precious endemic insects such as *Celastrina ogasawaraensis*, *Parnara ogasawarensis*, and *Rhinocypha ogasawarensis* still inhabit the island. Area exclusions of the green anole, as well as of the cane toad, have already been carried out. Conservation measures for the food plants of these insects have also been conducted. As these activities continue and expand, the existing habitat for endemic insects on the island will be conserved.

Habitat conservation for *Carduelis sinica kittlitzi* and seabirds [M]

Feral cats have been removed from certain areas of the Minamizaki region, which is an important habitat for *Carduelis sinica kittlitzi* and seabirds such as the wedge-tailed shearwater (*Puffinus pacificus*). As feral cat expulsion continues and expands, seabird habitat will be conserved.

Habitat conservation for wood-pigeon [S / NC]

In the Sekimon region, an important habitat for the endemic subspecies of Japanese wood-pigeon (*Columba janthina nitens*), no major impact by alien species has been observed to date. However, because wood-pigeons move between the Hahajima and Chichijima island groups, impacts of feral cats and other alien species will be removed to achieve steady wood-pigeon habitation within the Ogasawara Islands as a whole.

Habitat conservation for land snails [S / NC / M]

On Hahajima, the entire southern area around Minamizaki, the ridge area including the Sekimon region, and the western coastal area are important habitat for land snails. By removing the impacts of alien species such as black rats and by continuing to conduct monitoring, habitat for the characteristic land snails will be conserved.

Other measures

As a preventive measure to keep predatory flatworm (*Platydemus manokwari*) from invading Hahajima from Chichijima, visitors' shoe soles will continue to be completely cleaned when they

board and disembark from the *Hahajima Maru*, a cargo-passenger boat connecting the islands. Information will continue to be provided to raise public awareness of this issue.

Feral cat measures for all of Hahajima, including residential areas, will be prepared based on the action plan established by the Ogasawara Cat Liaison Committee. Based on the action plan, appropriate rules for keeping domestic cats will be enforced to reduce the number of feral cat sources. Catching activities will also continue in mountain areas around the designated exclusion zone for feral cats.

*Target area codes: [S] Sekimon region, [NC] North-Central region, [M] Minamizaki region

(8) Mukohjima Island (Hahajima Island Group)

(i) Existing condition

Mukohjima, one of the peripheral islands of Hahajima, is surrounded by sea cliffs and has a very dry environment. It includes the sclerophyllous scrub typical of the Hahajima Island Group, which has been preserved in a good condition, with little apparent disturbance by human influences or alien species. The island is also extremely important as a habitat for endemic plants including *Symplocos boninensis*, which grows only in this island. In addition, the endemic subspecies *Carduelis sinica kittlitzi* inhabits Mukohjima, and the endemic subspecies of Japanese wood-pigeon has also been identified.

(ii) Long-term goals

- To conserve the sclerophyllous scrub typical of the Hahajima Island Group and other ecosystems
- To conserve the habitats of *Carduelis sinica kittlitzi* and the Bonin honeyeater (*Apalopteron familiare*)

(iii) Activities

Conservation of sclerophyllous scrub typical of the Hahajima Island Group

To conserve the sclerophyllous scrub typical of the Hahajima Island Group, which remains in good condition, the impacts of alien species such as *Casuarina* will be removed in an adaptive manner considering already established interspecific relationships. In addition, the forest will be conserved as the habitats of endemic plants such as *Symplocos boninensis*.

Habitat conservation for endemic birds

Mukohjima is an important habitat for endemic birds such as *Carduelis sinica kittlitzi* and the Bonin honeyeater (*Apalopteron familiare*). The habitat will be conserved by excluding the impacts of alien species and by continued monitoring.

(9) Anejima Island (Hahajima Island Group)

(i) Existing condition

Anejima is a peripheral island of Hahajima. It is a long island, stretching from north to south. Forests originating from forestation by early settlers are still widely distributed, and sclerophyllous scrub typical of the Hahajima Island Group also occurs on the island. Endemic plants including *Juniperus taxifolia* and *Euonymus boninensis* inhabit this island.

(ii) Long-term goals

- To conserve the sclerophyllous scrub typical of the Hahajima Island Group and other ecosystems

(iii) Activities

Conservation of sclerophyllous scrub typical of the Hahajima Island Group

Sclerophyllous scrub typical of the Hahajima Island Group is distributed on the plateau. This scrub forest will be conserved through activities such as removing the impacts of alien species such as *Casuarina* in an adaptive manner, considering already established interspecific relationships.

In addition, the forest will be conserved as the habitats of endemic plants such as *Juniperus taxifolia*, *Lobelia boninensis*, and *Euonymus boninensis*.

(10) Imotojima Island (Hahajima Island Group)

(i) Existing condition

Imotojima, a peripheral island of Hahajima, is the most humid island among the relatively dry peripheral islands. It includes the sclerophyllous scrub typical of the Hahajima Island Group, which has been preserved in a good condition, with little apparent disturbance by human influences or alien species. This island is important as a habitat for endemic plants and includes species such as *Crepidiastrum linguifolium*, *Crepidiastrum ameristophyllum*, and *Ajuga boninsimae*. Endemic terrestrial birds including *Carduelis sinica kittlitzi* have also been identified on this island.

(ii) Long-term goals

- To conserve the sclerophyllous scrub typical of the Hahajima Island Group and other ecosystems
- To conserve the habitats of *Carduelis sinica kittlitzi* and the Bonin honeyeater (*Apalopteron familiare*)

(iii) Activities

Conservation of sclerophyllous scrub typical of the Hahajima Island Group

To conserve the sclerophyllous scrub typical of the Hahajima Island Group, which remains in good condition, the impacts of alien species such as *Leucaena* will be removed in an adaptive manner considering already established interspecific

relationships.

In addition, the forest will be conserved as the habitats of endemic plants such as *Crepidiastrum linguifolium*, *Crepidiastrum ameristophyllum*, and *Ajuga boninsimae*.

Habitat conservation for endemic birds

Imotojima is an important habitat for endemic birds such as *Carduelis sinica kittlitzi* and the Bonin honeyeater (*Apalopteron familiare*). Their habitats will be conserved by excluding the impacts of alien species and by continued monitoring.

(11) Meijima Island (Hahajima Island Group)

(i) Existing condition

Meijima is a peripheral island of Hahajima with a highly dry environment. Sclerophyllous scrub typical of the Hahajima Island Group is widely distributed on the island, which is inhabited by endemic plants including *Crepidiastrum linguifolium*. This island is also a habitat for endemic dragonflies including *Boninagrion ezoin* and *Boninthemis insularis*.

(ii) Long-term goals

- To conserve the sclerophyllous scrub typical of the Hahajima Island Group and other ecosystems

(iii) Activities

Conservation of sclerophyllous scrub typical of the Hahajima Island Group

Sclerophyllous scrub typical of the Hahajima Island Group is distributed on the plateau of Meijima. To conserve the scrub forest, which remains in good condition, the impacts of alien species such as *Leucaena* will be removed in an adaptive manner considering already established interspecific relationships.

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

(12) Hirajima Island (Hahajima Island Group)

(i) Existing condition

Hirajima is a peripheral island of Hahajima. It has a relatively small total area and is the closest island to Hahajima. *Bischofia* has been eradicated. Endemic plants including *Lobelia boninensis* also inhabit the *Miscanthus boninensis* community distributed along the edges of the island.

(ii) Long-term goals

- To conserve the native vegetation and other ecosystems as a long-term effort

(iii) Activities

Ecosystem management considering endemic species

To conserve endemic species still inhabiting the

island, the impacts of other alien species will be removed in an adaptive manner considering already established interspecific relationships. This activity will be accompanied by ongoing monitoring.

(13) Mukojima Island (Mukojima Island Group)

(i) Existing condition

Although feral goats used to inhabit Mukojima, their eradication has been completed. Now, grassland vegetation covers most parts of the island; some areas of *Ardisia sieboldii* forest and other plants are distributed at various locations on the island. Insect species endemic to Mukojima, including *Chlorophorus kusamai* and *Tamamushia virida fujitai* (an endemic subspecies), inhabit these forests.

In addition, the black-footed albatross (*Phoebastria nigripes*) and the Laysan albatross (*Phoebastria immutabilis*) breed on Mukojima and Torishima. In addition to them, the short-tailed albatross (*Phoebastria albatrus*) once bred there, and the sub-adult individuals of the species are still observed flying in from outside the island. Efforts to create a new albatross breeding site are currently underway. This island is therefore an important breeding ground for albatrosses.

(ii) Long-term goals

- To conserve *Ardisia sieboldii* forest and other ecosystems
- To conserve the breeding sites of three species of albatross

(iii) Activities

Ecosystem management of Ardisia sieboldii forest and other habitat types

On Mukojima, ecosystem management of *Ardisia sieboldii* forest and other habitat types will be carried out in an adaptive manner.

Feral goats, a major impact factor, have been eradicated, and other alien species will also be eliminated, including black rats, *Leucaena*, and alien bamboo and dwarf bamboo species; these species are inhibiting factors for forest recovery.

Habitat conservation for endemic insects

Mukojima is an important habitat for endemic insect species of the Mukojima Island Group, such as *Chlorophorus kusamai* and *Tamamushia virida fujitai* (a Mukojima subspecies), both of which are forest insects. Therefore, insect habitat will be conserved by removing the impacts of alien species.

Conservation and creation of breeding grounds for three albatross species

Mukojima and the adjacent island of Torishima are breeding grounds of two species of albatross, the Laysan albatross (*Phoebastria immutabilis*) and black-footed albatross (*Phoebastria nigripes*). On Mukojima, following the Albatross Protection

and Breeding Project Plan, continuous activities have been carried out to create a new breeding ground for the short-tailed albatross (*Phoebastria albatrus*) that formerly bred on the island. Toward the goal of steady breeding and habitation by the three albatross species, overgrowth by alien plants will be removed and the site will be conserved to serve as a persistent breeding ground.

(14) Kitanoshima Island (Mukojima Island Group)

(i) Existing condition

Kitanoshima, a peripheral island of Mukojima, includes much sloped land. Most of the island is covered by natural grassland that includes endemic plants such as the endemic thistle (*Cirsium boninense*). The island has not been invaded by feral goats and rats and it provides good breeding grounds for seabirds including the wedge-tailed shearwater (*Puffinus pacificus*).

(ii) Long-term goals

- To conserve the breeding sites of seabirds
- To conserve the native vegetation and other ecosystems

(iii) Activities

Conservation of seabird breeding grounds

Kitanoshima is an important breeding ground for seabirds such as the wedge-tailed shearwater (*Puffinus pacificus*) and Bulwer's petrel (*Bulweria bulwerii*). Ongoing monitoring is being conducted to conserve their breeding grounds.

Ecosystem management considering endemic species

For conservation of endemic species currently inhabiting the island, suppressing factors will be excluded in an adaptive manner considering already established interspecific relationships.

(15) Nakodojima Island (Mukojima Island Group)

(i) Existing condition

Nakodojima is one of the peripheral islands of Mukojima. It has a concave landscape with cliffs on its eastern and western edges. This island was once inhabited by feral goats, however, they have already been eradicated. Although forest vegetation is distributed at the eastern end of the island, soil erosion has occurred in some parts of the island, and soil erosion prevention measures have been initiated. In addition, the island provides breeding grounds for seabirds including the black-footed albatross (*Phoebastria nigripes*).

(ii) Long-term goals

- To conserve the breeding sites of seabirds
- To conserve the native vegetation and other ecosystems as a long-term effort

(iii) Activities

Conservation of seabird breeding grounds

Nakodjima is a breeding ground for seabirds such as the black-footed albatross (*Phoebastria nigripes*) and brown booby (*Sula leucogaster*). To conserve their breeding grounds, the impacts of alien species such as black rats, which cause predation damage, will be removed, and ongoing monitoring will be conducted.

Ecosystem management considering endemic species

Following feral goat eradication, measures to prevent soil erosion and to eliminate alien plants have been conducted to recover vegetation and conserve endemic species. These activities will continue in an adaptive manner considering already established interspecific relationships.

(16) Yomejima Island (Mukojima Island Group)

(i) Existing condition

Yomejima, one of the peripheral islands of Chichijima, is composed largely of gently sloped land. This island was once inhabited by feral goats, however, they have already been eradicated. Now, most of the island is covered by grassland vegetation including endemic plants such as the endemic grass (*Paspalidium distans*). The island also provides breeding grounds for seabirds including the black-footed albatross (*Phoebastria nigripes*).

(ii) Long-term goals

- To conserve the breeding sites of seabirds
- To conserve the native vegetation and other ecosystems as a long-term effort

(iii) Activities

Conservation of seabird breeding grounds

Yomejima is a breeding ground for seabirds such as the black-footed albatross (*Phoebastria nigripes*) and wedge-tailed shearwater (*Puffinus pacificus*). To conserve their breeding grounds, predation impacts by alien species such as black rats will be removed, and monitoring will continue.

Ecosystem management considering endemic species

To conserve endemic species that still inhabit the island, elimination of alien species such as black rats will be conducted considering already established interspecific relationships, in an adaptive manner.

(17) Nishinoshima Island (Other Islands)

(i) Existing condition

Nishinoshima is the youngest of the Ogasawara Islands, and its current shape was created by a volcanic eruption in 1973. Because it is isolated, has only a short history as an island, and is still under the influence of active volcanic activity, the vegetation coverage is poor. On the other hand, the island provides breeding grounds for many

seabirds including the wedge-tailed shearwater (*Puffinus pacificus*) and brown booby (*Sula leucogaster*).

(ii) Long-term goals

- To conserve ecosystems unique to oceanic islands

(iii) Activities

Determine the existing condition

Nishinoshima is a young island. Thus, it is expected that vegetation succession has been progressing since land formation and will eventually create a complex ecosystem. The ecosystem will be maintained appropriately, with surveys conducted as necessary to determine the existing condition. By these surveys, successional changes in vegetation will be observed, and the status of possible alien species introduction will be monitored.

(18) Kita-iwoto Island (Other Islands)

(i) Existing condition

Kita-iwoto is surrounded by steep coastal cliffs and has a hilly landscape. The highest mountain of the islands peaks at 792 m above sea level, where a cloud belt forms with a characteristic humid climate. Various endemic plants and animals inhabit the island, including endemic species of the Kazan Island Group such as the endemic tree-fern (*Cyathea tuyamae*), epiphyllous fern, and the Bonin flying fox (*Pteropus pselaphon*).

(ii) Long-term goals

- To conserve ecosystems unique to oceanic islands

(iii) Activities

Determine the existing condition

Kita-iwoto features ecosystems characteristic of oceanic islands. Research to determine the existing condition will be continued.

Conservation of seabird breeding grounds

Seabirds are an extremely important characteristic of the oceanic island ecosystem found on Kita-iwoto. Seabird habitat will be conserved by eliminating alien species such as black and brown rats and also by continued monitoring.

(19) Minami-iwoto Island (Other Islands)

(i) Existing condition

Minami-iwoto is a steeply sloped conically shaped island surrounded by steep coastal cliffs and containing the highest peak (916 m above sea level) of the Ogasawara Islands. A cloud belt forms around the mountain peak, where a characteristic humid environment exists. There is no record of past human settlement on Minami-iwoto, and ecosystems typical to oceanic islands exist in a pristine condition. Species

endemic only to Minami-iwoto include *Satozo 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 that remain in a primeval condition

(iii) Activities

Determine the existing condition

On Minami-iwoto, an ecosystem characteristic of oceanic islands is maintained in primeval condition. Any possibility of human influence on the environment will continue to be avoided as much as possible, and surveys will be conducted as necessary to determine the existing condition. By clarifying the mechanisms of the primeval ecosystem of oceanic islands through these activities and also by continuously monitoring the introduction of alien species, the ecosystem of Minami-iwoto will be maintained.

3) Prevention of Introduction and Dispersion of New Alien Species

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

■ Long-term goals

The management authorities and stakeholders will deepen their understanding of the unique ecosystems of the oceanic Ogasawara Islands, proactively prevent risks of their own activities' causing the introduction and spread of new alien species, and work toward sustainable conservation of the ecosystems of the Ogasawara Islands in coexistence with human activities.

As people and commodities move within the Ogasawara Islands, attention must be paid to the introduction and dispersion of alien species, depending on the subjects and nature of the activities, routes, and targets. Main activities and introduction routes are presented below.

(1) Ecosystem Conservation, Management, and Research

i) History of past efforts

- As a part of ecosystem conservation and management measures, various activities, including measures against alien species as part of nature restoration projects, threatened species conservation activities, and various surveys and research projects, are carried out on the Ogasawara Islands.
- When initiating a nature restoration project, the administrative agency executing the project orders the project contractor to comply with all applicable laws and regulations. In 2004, the Tokyo Metropolitan Government has prepared Guidelines for Environment-conscious Public Works in the Ogasawara Islands, which describes precautionary measures to prevent the introduction and dispersion of alien species and to promote awareness.
- Survey or research activities present the risk that an alien species may attach itself to or contaminate study equipment and luggage carried by the investigators, or to human bodies or clothing.
- To deal with this risk, information on alien species that require attention and preventive measures has been promptly distributed and shared using researchers' information networks (e.g., mailing list) to promote awareness. Each investigator or researcher implements these preventive measures voluntarily.
- During the surveys conducted on Minami-iwoto in 2007 and Kita-iwoto in 2008, preventive measures against alien species were reviewed in detail, and dispersion prevention measures were practiced by all participants.
- When conducting a survey or study in a Forest

Ecosystem Reserve of a national forest, permission must be obtained to enter the forest based on the utilization rules stipulated by the Conservation Management Plan. All study members are obliged to attend a training seminar regarding forest use before permission is granted. In addition, researchers must submit an activity report.

ii) Future actions

Preparation of common requirements applied to all investigations and projects

Once the dispersion prevention measures and their details are clarified, agreement from relevant administrative agencies will be obtained, and the measures will be documented as common requirements.

Making the common requirements mandatory for investigations and projects

Compliance with the common requirements will be made mandatory for all contractors involved in conservation and management measures conducted by administrative agencies, such as projects for nature restoration, protection, and breeding projects.

In addition, for survey or research activities, applicants are strictly instructed to follow the common requirements for the Ogasawara Islands; instructions are given during legal processes such as when applying for permission to enter a Forest Ecosystem Reserve and permission based on Natural Parks Law and other regulations.

Provision of facilities required to carry out preventive measures

Facilities and other items needed to carry out preventive measures will be assessed and prepared.

Execution of additional measures for a specific area or action

For each individual nature restoration project, a review committee of researchers will be assembled as necessary to define additionally required measures and ensure their implementation.

For peripheral islands and other areas such as Minami-iwoto that require especially careful approaches, additional measures will be reviewed and implemented as needed.

Establishing a collection and management system for information on the introduction and dispersion of alien species

A system to allow investigators, researchers, and project contractors to rapidly share information on the introduction and dispersion of new alien species identified during monitoring surveys or project executions will be established.

In addition, all information sources will 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 the mainland of Japan or the Ryukyu Island Group.
- To address this issue, the Tokyo Metropolitan Government has developed Guidelines for Public Facilities, which give due consideration to the scenery of the Ogasawara (Chichijima and Hahajima) in 2008. The recommended tree species list identifies tree species that cause no adverse effect to the ecosystems endemic to Ogasawara; these tree species are currently produced on the Ogasawara Islands or expected to be produced in the future based on advice from academic experts.
- In addition, to avoid genetic mixing, environmental considerations are enforced during the construction of public facilities; examples include using only domestic tree species that were produced within the islands and avoiding the use of closely related species that may crossbreed with endemic species.
- Among private operations, the Chichijima Futami Port area is designated as a Special Scenic Zone by the Tokyo Cityscape Plan. Parties involved in port landscaping are given instructions based on the recommended tree species list described above.

[Construction works]

- Construction work carries some risks. For example, alien species may be attached to or contaminate construction materials, machinery, and other vehicles and may be dispersed by the construction work.
- The Tokyo Metropolitan Government has prepared Guidelines for Environment-conscious Public Works in the Ogasawara Islands, which describes precautions to prevent the introduction and dispersion of alien species. In addition, the Handbook for Construction Work in Ogasawara Islands has been prepared to promote awareness.

ii) Future actions

Strict enforcement of government guidance and enrichment of management schemes

Greening and construction operations are often implemented outside the World Heritage nominated properties on Chichijima and Hahajima. To conserve the nominated properties, guidance on preventative measures for alien species dispersal will be thoroughly provided for various types of operations conducted on these islands. In addition, details of the existing guidelines will be reviewed and revised as necessary based on the latest information.

Greening and construction operations carried out by other administrative agencies shall be conducted in the manner applied to the projects of the Tokyo Metropolitan Government.

(3) Tourism Use on the Ogasawara Islands

i) History of past efforts

- Tourism use of the natural environment on the Ogasawara Islands carries a risk of dispersing alien species attached to tourists' shoes and clothing. In addition, although the number of incidents may be limited, a risk of contamination of the boats and other vehicles used for transportation between peripheral islands must be considered.
- To prevent the dispersion of predatory flatworms, the tourist associations, guides, and other related parties carry out measures such as cleaning passengers' shoe soles with seawater prior to landing.
- In addition, to promote awareness, the Ogasawara Ecotourism Association has prepared the Ogasawara Rulebook and has been distributing it to island residents, guides, and other stakeholders. Furthermore, relevant administrative agencies and other parties have been preparing and distributing materials such as booklets, posters, and videos to raise awareness among island residents and tourists of how the use of the natural environment poses risks of alien species introduction and dispersion. Awareness-raising seminars are also held for guides and other groups.
- On Minamijima and in the entire Sekimon region of Hahajima, tourists are requested to follow a "Tokyo Nature Guide" approved by the Tokyo Metropolitan Government as defined in Ecotourism by the TMG and to obey the Rules for Appropriate Use. In addition, in the Sekimon region, tourists are requested to follow the Guidelines for Hahajima's Sekimon area established by Hahajima Nature Guide Administration Council.
- In Forest Ecosystem Reserves in national forests, the routes available for tourists are limited by the Conservation Management Plan. Utilization rules are set, such as requiring tourists to attend a training course or to be accompanied by a guide etc. who has completed the training course. In addition, guides etc. must submit activity reports for any conducted activities.

ii) Future actions

Enhanced guidance for execution of preventive measures for tourism use

The rules that must be adhered to and the actions that must be taken to prevent the introduction and dispersion of alien species will be compiled and documented as a comprehensive action guideline (guidebook) for tourists, island residents, tourism-related businesses, guides etc. Instruction and guidance will continue to be provided through training courses and other measures.

(4) Agricultural Activities

i) History of past efforts

- Agricultural seeds and plant supplies from the mainland of Japan, the Ryukyu Islands, or foreign countries carry a risk of alien species dispersal

from farmland and gardens. Alien species may also be attached to or contaminate agricultural supplies including seeds and seedlings, agricultural products, commercial soil, livestock, and livestock feed.

- However, undertaking an integrated investigation to collect information on seed and supply types and routes is difficult because no limit exists on purchasing routes, and farmers often purchase supplies directly from seed and seedling companies on the mainland of Japan.
- On the other hand, the Plant Protection Act prohibits the transfer of certain important designated pests. To enforce this act, the Tokyo Metropolitan Government is conducting insect pest control activities in cooperation with relevant agencies to promote sound agricultural practices in Ogasawara.
- To control the introduced fruit fly (*Bactrocera dorsalis*), insect pest control projects had been carried out since 1969, and complete eradication of this pest was confirmed in 1984. To avoid reinvasion, monitoring has been carried out continuously, and systematic countermeasures have been established for early detection and control in case of reinvasion. For the alien snail (*Achatina (Lissachatina) fulica*), surveys and research have been conducted, and pest control activities are currently being carried out focusing mainly on Hahajima, where endemic land snails have been designated National Monuments.
- In addition, the Tokyo Metropolitan Government provides farmers with information on preventing alien species introduction.

ii) Future actions

Providing information and technical assistance for the prevention of existing alien species dispersion

With regard to the plant species that have already been introduced for agricultural purposes, on the precondition that stakeholders undertake responsible management of those species, a list of significantly invasive agricultural plant species has been prepared and is provided to farmers and other stakeholders, along with information on appropriate management methods to prevent dispersion. Technical assistance on control techniques will be provided as necessary.

Providing information and technical assistance to prevent dispersion of alien species that are not yet introduced

To help guard against the introduction of new invasive plant species for agricultural purposes, a list of significantly invasive agricultural plant species will be prepared and released. Farmers planning to introduce new agricultural plant species will be advised to have a preliminary consultation with the management authorities, who will provide guidance on whether the species should be introduced and how to manage it.

Handling of plants with soil

Transporting seedlings, plants, and other materials in soil presents the risk of introducing predatory flatworm or unknown pathogens. In addition to conducting technical evaluations and providing information, building a facility for safe handling of such materials will be considered.

Preparation and operation of a control system against alien species introduction

In cooperation among the management authorities and other stakeholders, a management system will be prepared to conduct activities such as: provision of risk information regarding the introduction of new plant species or plants in soils from areas off the islands; technical assistance on management methods following the introduction of such plants; removal of alien species that may be attached to or contaminating plants and soil; and measures to reduce risks. Measures to encourage the sustainable development of agriculture that supports conservation of the outstanding natural environment of the Ogasawara Islands will be considered.

(5) Introduction of Domesticated Animals and Garden Plants

i) History of past efforts

- Domestic animals present a number of risks in regard to alien species dispersal. Domestic animals may be abandoned or released by their owners or may carry pathogens. Because pets can be purchased by mail order etc. or brought directly onto the islands by island residents and visitors, it is difficult to collect integrated information on domestic animals on the islands.
- Research conducted in 2008 identified almost all domestic animals kept on Chichijima and Hahajima.
- Domestic dogs must be registered by their owners at their municipal government under the Rabies Prevention Act.
- For domestic cats, the Ogasawara Village Domestic Cats Raising Ordinance stipulates that cats must be registered, and it prohibits behavior such as the abandonment of domestic cats.
- The Ogasawara Cat Liaison Committee was established when predation on wild animals and plants were identified. The committee has recently been promoting awareness of appropriate cat ownership behavior and microchip implantation for domestic cats.

ii) Future actions

Enhancement of appropriate cat ownership

Compliance with the Ogasawara Village Domestic Cats Raising Ordinance will be enhanced and necessary measures to promote appropriate care and management of domestic cats, such as promoting microchip implantation for domestic cats, will be carried out.

Promoting awareness of the importance of appropriate pet ownership

Information on the effects of abandoned pets on local ecosystems will be conveyed to island residents to further their understanding and cooperation regarding appropriate care and management of domestic animals.

In addition, information will be provided to island residents who bring in new domestic animals and tourists who bring along domestic animals when visiting the islands to build awareness of risks associated with bringing in domestic animals and precautions and to promote strict pet management on the islands.

Ensuring strict pet management

For all pet animals, including not only cats and dogs but also birds, tropical fish, insects, and other types of pets, island residents and tourists must responsibly care for and manage their pets to avoid the dispersion of abandoned or released pets.

Regarding pets etc. brought in from outside the islands, a control system will be prepared to provide appropriate measures including preliminary consultations and guidance.

The management authorities will compile comprehensive action guidelines, creating social imperatives original to the Ogasawara Islands as described above. The management authorities will also continue to promote awareness among island residents to make sure that these guidelines will be followed by the residents and visitors thereafter..

Handling gardening plant species in the same manner as agricultural species

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

(6) Movement of Goods and People

i) History of past efforts

- Regular cargo and passenger ship services bring commodities and people to the islands. People may bring in alien species deliberately; however, these activities may also cause accidental introduction of alien species attached to vehicles such as cars and motorcycles, carried on the luggage, clothes, and shoes of island residents and tourists, or contaminating foods and other materials.
- To address this issue, when passengers disembark from the *Ogasawara Maru* or *Hahajima Maru*, visual inspection is conducted on products brought into Chichijima and Hahajima from the mainland of Japan, to determine whether any animals or plants are being brought in. As a preventive measure to keep the predatory flatworm (*Platydemus manokwari*), which has already invaded Chichijima, from entering Hahajima, passengers' shoe soles are cleaned with sea water before they disembark from the *Hahajima Maru*.

- The management authorities and other stakeholders are also promoting awareness by activities such as distributing booklets and displaying posters that inform island residents and visitors about how to prevent alien species introduction. Integrated lessons are also being presented in elementary and junior high schools. In addition, an informational video is played on the *Ogasawara Maru* ocean liner and in the waiting area of for the *Hahajima Maru*. On the *Hahajima Maru*, an announcement cautions passengers on the risks of bringing in soil.
- Alien species including the tropical fire ant (*Solenopsis geminate*) and the paper wasp (*Ropalidia marginata*) that have not been identified on islands such as Chichijima and Hahajima have been found on Iwoto. No regular transport of people or supplies to or from Iwoto occurs; therefore, awareness of the accidental introduction of alien species is being promoted among stakeholders associated with some of the limited activities on the island, including those by the Self Defense Forces or those visiting graves on the island.

of the same border controls will be developed for the irregularly scheduled boat services to the Ogasawara Islands.

ii) Future actions

Continuously promoting awareness among island residents and visitors

On the Ogasawara Islands, Futami Port on Chichijima is the only port that allows persons and supplies from the mainland of Japan to be brought in, and the only route connecting Chichijima and Hahajima is the sea route between Futami Port and Oki Port.

Programs to promote awareness of alien species introduction will be enriched and reinforced and shared with residents and visitors travelling between Chichijima, Hahajima, and the mainland of Japan. Awareness-promoting activities will also be actively initiated for tourism businesses and other parties.

Stakeholders engaged in the limited activities on Iwoto will be continuously reminded to strictly follow precautions to prevent alien species from Iwoto from being transported to Chichijima and Hahajima via luggage, clothes, and other belongings.

Development of conditions that will allow for successful execution of waterfront countermeasures

To prevent the introduction and dispersion of new alien species with the movement of persons and supplies, activities to promote awareness and understanding among island residents and visitors will be carried out. With regard to periodical boat services, notification procedures concerning in-coming goods, animals and plants as well as the system necessary for their inspection and treatment will be considered and tested on a trial basis in an effort to put in place the infrastructure for effective border controls. In addition, conditions allowing for successful implementation

4) Environmental Considerations in Individual Projects and Research

To achieve the long-term goals listed below, the management authorities and participants in various projects and surveys shall enforce the environmental considerations described below, with understanding and cooperation among stakeholders including researchers.

i) Long-term goals

- Thorough incorporation of environmental consideration in individual projects and surveys

The individual projects and surveys that are conducted on the Ogasawara Islands must not only fulfill their own purposes but also avoid and minimize negative impact on the environment; in this regard, the management authorities are responsible for ensuring that activity plans are carefully checked beforehand, due consideration is incorporated thoroughly in the implementation phase, and post-implementation evaluations are made.

ii) Past efforts and future actions

[Strictly executing environmentally conscious measures]

Preparation and adjustment of action plans for various projects and studies

When executing projects and surveys including public work projects, coordination and collaboration among the management authorities and other stakeholders shall be instituted prior to the initiation of a project or survey.

In addition, a review meeting will be organized as necessary to acquire advice from researchers in various fields and also to obtain understanding among island residents and stakeholders when executing projects and surveys.

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

When executing projects and surveys, the management authorities and project contractors must ensure careful and meticulous implementation based on the characteristics of each project so as not to harm the natural environment.

The management authorities and other stakeholders that implement projects or surveys will continuously enhance awareness-promoting activities and provide appropriate information, with advice and cooperation from researchers etc. The management authorities and other stakeholders will also promote understanding of the natural environment among all project workers and implement environmentally conscious measures. The Tokyo Metropolitan Government has already implemented environmentally conscious measures based on the Guidelines for Environment-conscious Public Works in the

Ogasawara Islands. The management authorities and other stakeholders will share and update this information when executing environmentally conscious measures in their projects and surveys.

[Countermeasures against risks other than alien species]

Prevention of water pollution and conservation of river environments when executing a project

The rivers in and around the nominated property on Chichijima provide important habitats for endemic species including the endemic freshwater shrimp (*Paratya boninensis*) and the endemic freshwater gobi fish (*Rhinogobius* sp. Bl.). When executing a project such as river improvement work, these habitats shall be considered in the project design, and the project contractors will be instructed to conduct environmentally conscious measures including prevention of water pollution.

Countermeasures against the risk of genetic disruption posed by planting or reintroduction for reinforcement

Planting and reintroduction for reinforcement as part of ecosystem conservation and management purposes must be carefully evaluated and implemented considering the risk of genetic disruption. Therefore, such planting or reintroduction projects must be planned carefully by evaluating the purpose, methods, sites, risks, effect, etc. of each project individually based on scientific knowledge.

5) Promotion of Lifestyle in Harmony with Nature

To achieve the long-term goals listed below, the management authorities will promote deep understanding and support from and will cooperate closely with island residents and business entities engaged in tourism, agriculture, and fisheries on the Ogasawara Islands. Activities related to the conservation and management of natural environment will be promoted, as described below.

i) Long-term goals

●Realization of lifestyle in harmony with nature

Toward the establishment of the symbiotic lifestyle and industry of the Ogasawara Islands, every resident and business understands the value of the excellent natural environment of the Ogasawara Islands and the need for its conservation and management, participates in activities for the conservation and management of the natural environment, and makes efforts to build the symbiotic living environment so that people can enjoy bountiful life in harmony with nature.

●Training human resources to support the future of the Ogasawara Islands

Toward the vision of harmony with nature, training is provided to build the human resources to care for the islands into the future; this includes strengthening the education of children at school and in the home.

ii) Past efforts and future actions

Awareness-promoting activities for island residents

When conducting activities, especially measures against alien species, purposes and methodologies have been fully explained to island residents to build common awareness, understanding, and cooperation.

Information on the value of the Ogasawara Islands' outstanding natural environments (e.g., topographical and geological features, ecosystems, and biodiversity) and on the conservation and management of the natural environments (e.g. alien species measures) will continue to be provided through various media. Opportunities to exchange opinions will also be expanded to build further understanding and ongoing cooperation among island residents. In addition, environmental awareness among island residents will be promoted through activities such as promoting an Ogasawara Islands lifestyle that achieves good harmony with nature.

To raise awareness among all the island residents, new residents in Ogasawara Village will be provided with information on the rules for environmental conservation and other issues.

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

Prevention of the introduction and dispersion of new alien species greatly related to island residents' daily activities, including their agricultural practices and pet care activities. Understanding, cooperation, and participation of island residents are indispensable for conservation and management activities including measures against alien species. Therefore, all island residents will be asked to participate in the preparation of a declaration to establish a lifestyle that considers the natural environment of oceanic islands and to realize a livelihood in coexistence with nature.

Conducting educational activities for children

Numerous educational activities for children have been conducted to teach local children the value of the Ogasawara Islands' outstanding natural environment and ways to conserve and manage that environment. For example, researchers have been invited to classrooms.

To continue to teach the children who will take over the environmental conservation and management of the Ogasawara Islands in the future, sound educational materials will be developed and provided. For this purpose, educational institutions, administrative agencies, researchers, local NPOs, and other stakeholders will cooperate to prepare educational programs for schools and homes, strengthen understanding among teachers, and enrich the base of natural environment education. Other possible activities include providing opportunities for children to voluntarily participate in environmental conservation and management activities.

Elimination of alien species by volunteers

From the perspective of the involvement of residents in the conservation and management of the natural environment of the Ogasawara Islands, voluntary participation of island residents in alien species elimination have been promoted, including projects to eliminate alien plants and lower the green anole population around residential areas.

Such activities will be continued, and efforts will be made to ensure that the participants and other island residents properly understand these activities.

In addition, to promote understanding of peripheral islands among island residents, implementation of alien species elimination activities by volunteers on peripheral islands will also be considered and initiated.

Industrial development in harmony with the natural environment

Activities such as proper utilization of natural resources, inhibition and elimination of alien species, and appropriate management of land including fallow lands will be promoted. Various projects for self-directive regional development and economic growth on the Ogasawara Islands will also be initiated through industrial development that incorporates conservation of the natural environment as an added value. An

example is a farming enterprise that increases its asset value by executing appropriate countermeasures against alien species, confining adverse effects, or reducing impacts on threatened wild plants and animals.

Preparation of a structure to support good life among island residents

To achieve “Sustainable Islands” as presented as a future vision in the Third Ogasawara Village Comprehensive Plan, Ogasawara Village will take the role of contact point for island residents and prepare a structure to support life on the islands that includes factors such as awareness raising, education, volunteering, pet management, and promotion of industrial undertakings that contribute to conservation and management of the natural environment. This structure will be created in full coordination with activities conducted by the management authorities.

6) Promotion of Wise Use and Ecotourism

To achieve the long-term goals listed below, the management authorities will promote understanding and cooperation among visitors coming to the Ogasawara Islands for sightseeing or other purposes in close coordination with tourism business entities. Activities will be implemented to promote wise use and ecotourism, as described below.

i) Long-term goals

- Sustainable use of the natural environment through the promotion of wise use and ecotourism

To conserve the natural environment of the Ogasawara Islands vulnerable to the impacts of human activities and to achieve sustainable tourism, rules for appropriate use will be set out and enforced, as well as nature-experiencing activities and voluntary activities being promoted.

ii) History of past efforts

[Terrestrial Areas]

Tourism use of the Ogasawara Islands has been carried out by establishing and enforcing rules for appropriate use, such as rules in place since 2003 requiring visitors to be accompanied by a nature guide etc. on Minamijima and the Sekimon region of Hahajima.

For example, Minamijima, a peripheral island of Chichijima, has drowned karst terrain, a characteristic landscape that has become an important sightseeing spot on the Ogasawara Islands. Tourism use of the island without any utilization rules had led to severe degradation of vegetation. For this reason, based on the Guidelines for the Protection and the Appropriate Use of Nature on the Islands of Tokyo, the Rules for Appropriate Use were defined to allow for the coexistence of both tourism use and ecosystem conservation. These rules stipulate that tours must be accompanied by a nature guide, and they define the number of visitors allowed and the available routes for visitors, etc. Conservation measures, monitoring, and surveillance by park rangers have also been conducted. As a result, the island’s vegetation is recovering.

In addition, to prevent tourism from harming the value of the fragile ecosystems in Preservation Zones of Forest Ecosystem Reserves, visitors are generally limited to a designated route and asked to accompany a guide etc. who has attended a mandatory seminar and has been certified to enter these areas; this measure was developed in 2008 to form a balance between use and conservation.

In addition to these rules based on applicable guidelines, various voluntary rules, including the Ogasawara County Codes, have been defined and appropriately enforced.

[Marine Areas]

Almost all of the whales that inhabit and migrate

within the subtropical North Pacific (composed of 23 species in 6 families) have been identified in the ocean surrounding the Ogasawara Islands. The humpback whale (*Megaptera novaeangliae*) and sperm whale (*Physeter macrocephalus*) have also been observed to breed in adjacent ocean areas, making this an important marine area.

To utilize the value of this marine area, the first whale watch in Japan was held on the Ogasawara Islands in 1988. As part of developing whale watching as an aspect of local tourism, voluntary rules for conservation of whale habitats have been introduced and successfully established. In addition, various voluntary rules related to other marine uses, such as dolphin swims and diving, have been defined and enforced appropriately.

iii) Future actions

Voluntary rules etc.

Voluntary rules for appropriate use of the natural environment, including the Ogasawara Country Code and whale watching rules, are now deeply rooted in the local communities, contributing to ecosystem conservation on the Ogasawara Islands. These rules will be strictly enforced, and will be revised and supplemented as necessary.

The Rules for Appropriate Use, based on the Guidelines for the Protection and the Appropriate Use of Nature on the Islands of Tokyo, for Minamijima and for the Sekimon region of Hahajima, and rules from the Conservation Management Plan to properly conserve Forest Ecosystem Reserves, will continue to be applied adequately.

Promotion of wise use by guides

In areas where visitors must be accompanied by a certified guide, utilization rules will continue to be enforced. In other routes or areas with relatively pristine conditions, visitors will be recommended to accompany a certified guide.

It is also a goal to be achieved in the future that all the residents recognize and understand their role as guides, as excellent guides help people understand correctly the value of the excellent natural environment including geological features and ecosystems and thereby contributes to the appropriate use of the natural environment. In addition, a registration system will be established for professional guides in order to improve their skills.

Promotion of nature-experience activities and volunteer activities

Nature-experience activities and volunteer activities by island residents and visitors are important in furthering understanding of the natural environments of the Ogasawara Islands and advancing citizen participation in conservation and management activities. On the other hand, the impacts associated with such activities in important areas must be minimized.

Therefore, ecotours or other activities that include the elimination of alien species as an

activity will be planned and developed with due consideration of the natural environments and regulation by laws etc. Environments and systems that can accommodate such activities will be prepared.

In addition, information on outstanding natural environments (e.g., topographical or geological features, ecosystems, and biodiversity) which are the subjects of interest should be provided so that island residents and visitors can experience these environments in nearby places without stepping into important areas.

Ogasawara Ecotourism Association and promotion of ecotourism

Ecosystem-promotion activities will be led by the Ogasawara Ecotourism Association composed of commerce and industry associations, tourist associations, the Ogasawara Whale Watching Association, agricultural cooperatives, fisheries cooperatives, local NPOs, and administrative agencies in the village. Such activities will be expanded in close coordination with ecosystem conservation and management based on the Master Plan for Ecotourism.

7) Monitoring and Information

To achieve long-term goals, the management authorities will promote monitoring activities and use of the information described below in close collaboration with researchers and NPOs and with understanding and cooperation from other stakeholders.

i) Long-term goals

●Monitoring and research

To obtain basic information for the adaptive conservation and management of the Ogasawara Islands, monitoring and research by the management authorities, researchers, and others shall be conducted to understand long-term changes in the natural environment etc.

●Promotion of information sharing and use

By gathering, accumulating, and sharing the information, findings, and techniques obtained or developed by monitoring and studying the natural environment of the Ogasawara Islands, the management authorities and researchers can establish more effective and sustainable conservation and management measures.

ii) Past efforts and future actions

Monitoring of conservation and management activities

When conducting conservation and management measures, including those to remove alien species, the effects of these measures on natural environments have been monitored and evaluated, and the results have been reflected in subsequent measures as necessary.

In the future, to further promote adaptive management, changes in natural environments will be evaluated, and possible impacts of measures against alien species will be predicted beforehand considering interspecific interactions. These estimates will then be reflected in the implemented measures.

In addition, findings from previous activities will be reflected in subsequent conservation and management measures, with the help of advice from researchers of the Scientific Council or other academic groups.

To combat alien species, multiple measures are sometimes conducted in parallel. Therefore, when conducting monitoring, the management authorities shall appropriately share roles, collaborate with one another, and endeavor not to cause any burden to ecosystems.

Monitoring of use

Use of the Ogasawara Islands has been monitored to avoid impact to the natural environment in areas including Minamijima and Forest Ecosystem Reserves. In addition, the numbers of persons using the connecting ocean liners and main facilities, as well as the dynamics of use, are being monitored.

In the future, in addition to these monitoring

activities, planning and implementation of projects that influence the dynamics of use (e.g., sidewalk and road construction, consideration of flight service establishment) will also be monitored.

Long-term monitoring

To identify unexpected impacts on the natural environment caused by factors such as the introduction and dispersion of new alien species, climate change, or tsunami, drought, or typhoon events, long-term monitoring of the natural environment of the Ogasawara Islands will be initiated.

This long-term monitoring will be conducted in conjunction with ongoing monitoring activities, such as the Monitoring Sites 1000 (by the Ministry of the Environment) and Forest Resource Monitoring Program (by the Forestry Agency and the Tokyo Metropolitan Government).

Promotion of study and research activities

Because studies of the natural environment are indispensable when executing adaptive conservation and management, the management authorities and researchers will collaboratively promote research and survey activities.

Researchers shall conduct studies that will have clear implications for conservation and management of the natural environment of the Ogasawara Islands and will contribute to the Ogasawara Islands by sharing the study results with relevant parties in Japan and overseas.

To minimize the effects posed by entering important areas or other actions during these studies, voluntary rules for researchers, describing precautions applicable to each study field, have been prepared and are enforced among researchers on an experimental basis.

Sharing and utilization of information obtained through monitoring, study, and research

When implementing conservation and management measures, access to the latest information on an implementation site and its surrounding area is indispensable. Therefore, a database system to archive, update, search, and browse information, including geographic information, has been developed and is being continuously maintained.

As a part of effectively reflecting study results in conservation and management measures, database users can browse and share information on the website. Information will be continuously updated and maintained to successfully achieve adaptive management. In addition, to strengthen bidirectional information exchange between the management authorities and researchers, a system of mailing lists and bulletin boards has been created. Using this system, progress and mutual effects are monitored in a cross-sectional manner at various steps from planning to post-implementation of each measure; this helps the management authorities and researchers effectively and comprehensively implement projects and studies in concert with one another.

To promptly correspond about an incident that requires an urgent response, such as the introduction of a new alien species, the mechanism of information sharing described above will be utilized to quickly report and share information among the management authorities and researchers. The management authorities and researchers will implement appropriate measures by sharing roles based on the management system described below.

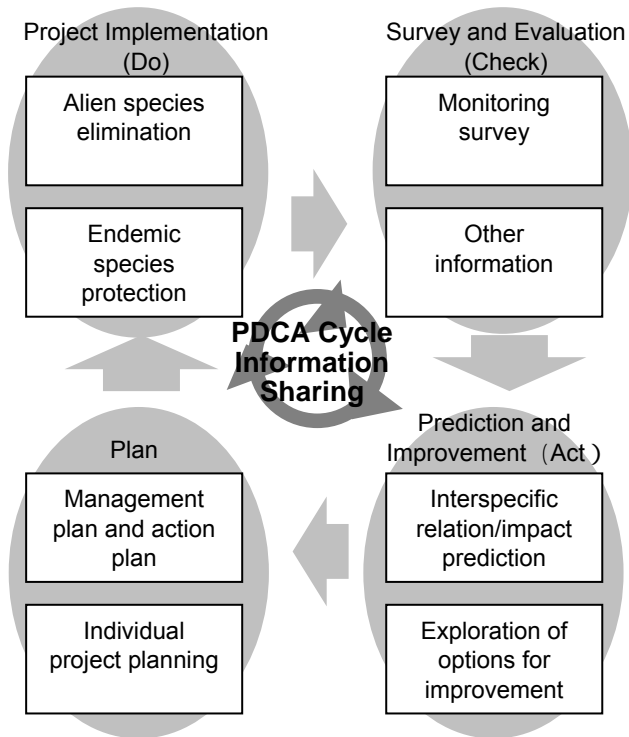


Fig. 1-3 Cycle of Adaptive Management

6. Management System

Appropriate sharing of roles and close collaboration and cooperation among the management authorities and stakeholders are necessary to adequately and smoothly implement conservation and management of the natural environment of the Ogasawara Islands.

Therefore, conservation and management of the Ogasawara Islands shall be conducted under a system that promotes close collaboration and cooperation among the members of the Regional Liaison Committee, with advice from researchers of the Scientific Council.

The Management Plan shall be reviewed as necessary based on the results of monitoring surveys and changes in the social environment. Such revision will reflect appropriate scientific advice from the Scientific Council and consensus from the Regional Liaison Committee.

1) Coordination among Stakeholders

Conservation and management of the Ogasawara Islands will be conducted through close collaboration and cooperation among the management authorities and stakeholders.

The Regional Liaison Committee, established in 2006, will serve as a liaison for coordination among the management authorities and stakeholders, including other related organization, for conservation and management of the Ogasawara Islands.

In addition, to achieve a good balance between conservation of the outstanding natural environment and the life of island residents, opinions and suggestions from island residents and related organizations will be widely heard, and coordination and consensus formation will be promoted.

On the other hand, among the conservation and management measures targeting individual species, for those requiring collaboration and cooperation of the management authorities and stakeholders (e.g., conservation of the Bonin flying fox, *Pteropus pselaphon*; measures against feral cats, feral goats, Bischofia, and Casuarina), individual liaison systems or other appropriate schemes will be established so that the measures will be conducted effectively.

2) Adaptive Management System based on Scientific Findings

Adaptive conservation and management of the Ogasawara Islands based on research, surveys, monitoring, and evaluations of the natural environment and their results will be conducted based on advice from the Scientific Council established in 2006, the same year the Regional Liaison Committee was established.

A system of close collaboration and cooperation with the Regional Liaison Committee will be formed and maintained, and collaboration, cooperation, and information exchange with local NPOs and researchers will also be promoted.

As necessary, review meetings will be held for each measure implemented by each of the management authorities; collaboration between the Scientific Council and those involved in the review meeting will be encouraged to establish an adaptive conservation and management system that deals with a range of measures from individual projects to overall conservation and management.

3) Management Authorities

The management authorities will collaboratively implement the conservation and management measures described in the Management Measures of this Plan.

Collaboration, cooperation, and role sharing among the authorities involved in various projects and surveys will also be further enhanced.

i) Ministry of the Environment (Kanto Regional Environment Office of Japan and Ogasawara Ranger Office)

Ministry of the Environment manages various systems related to areas such as the designated Wilderness Areas, National Parks, and National Wildlife Protection Areas. It carries out the management at Kanto Regional Environment Office of Japan and the Ogasawara Rangers' Office. In addition, the Basic Plan for the Conservation and Restoration of the Natural Environment of Ogasawara was drawn up. Based on this plan, various projects, including measures against alien species and the conservation program defined by the law for the species designated as National Endangered Species of Wild Fauna and Flora, are being promoted. Surveys of preventive measures against the introduction and dispersion of new invasive alien species are also implemented.

ii) Forestry Agency (Kanto Regional Forest Office and National Forest Division, Ogasawara General Office, Ministry of Land, Infrastructure, Transport and Tourism)

Forestry Agency manages various systems related to areas such as designated Forest Ecosystem Reserves. The Kanto Regional Forest Office of the Forestry Agency and the National Forest Division, Ogasawara General Office, Ministry of Land, Infrastructure, Transport and Tourism are currently conserving and managing the national forests including the areas designated as the Ogasawara Islands Forest Ecosystem Reserves. In 2008, the Conservation Management Plan was defined as the comprehensive guideline for the Ogasawara Islands Forest Ecosystem Reserves based on the recommendation of the Ogasawara Islands Forest Ecosystem Reserve Conservation and Management Committee composed of scientists. Conservation and management of the unique forest ecosystems of the Ogasawara Islands are being carried out based on this plan.

Activities such as measures against alien species, the conservation program defined by the law for the species designated as National Endangered Species of

Wild Fauna and Flora, population survey and monitoring for the endemic subspecies of Japanese wood-pigeon, as well as coordination of utilization and protection are also carried out.

iii) Agency for Cultural Affairs (and Tokyo Metropolitan Government Board of Education and Ogasawara Village Board of Education)

The Agency for Cultural Affairs conserves and manages Natural Monuments and provides related technical assistance. Its authority is partly transferred to the Tokyo Metropolitan Government Board of Education, and its activities are exercised through the Ogasawara Village Board of Education.

The Agency for Cultural Affairs also provides support and instruction to projects aimed at coexistence of the Bonin flying fox (*Pteropus pselaphon*) and agriculture implemented by the Ogasawara Village.

iv) Tokyo Metropolitan Government (Ogasawara Islands Branch Office etc.)

The Tokyo Metropolitan Government shares the responsibility for the management of National Parks with the Ministry of the Environment and implements projects such as measures against alien species, erosion control, vegetation restoration, the conservation program defined by the law for the species designated as National Endangered Species of Wild Fauna and Flora, and environmental monitoring surveys. It also shares management of Natural Monuments with Ogasawara Village. In addition, it establishes and implements rules for the appropriate use of Minamijima and of the Sekimon region of Hahajima in collaboration with Ogasawara Village and works to promote awareness on

preventing alien species introduction and dispersion.

The Tokyo Metropolitan Government, as a main 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 measures against alien species, raising environmental awareness, eliminating damage by alien species to livelihoods and agriculture, registering domestic cats, and controlling feral cat populations.

The Ogasawara Village Board of Education shares the management of Natural Monuments with the Tokyo Metropolitan Government.

4) Management of Implementation of the Plan

This Management Plan as well as the Ecosystem Conservation Action Plan and individual project plans are evaluated by the Scientific Council*, a subordinate body organized as necessary under the Scientific Council, or by an individual evaluation organization. Evaluations are based on assessments and estimates from monitoring surveys. Results of evaluations are reflected in each plan, and project progress is managed.

* Although the organization that conducts the overall evaluation of this plan is the Regional Liaison Committee, evaluation and progress management from the scientific viewpoint are led by the Scientific Council.

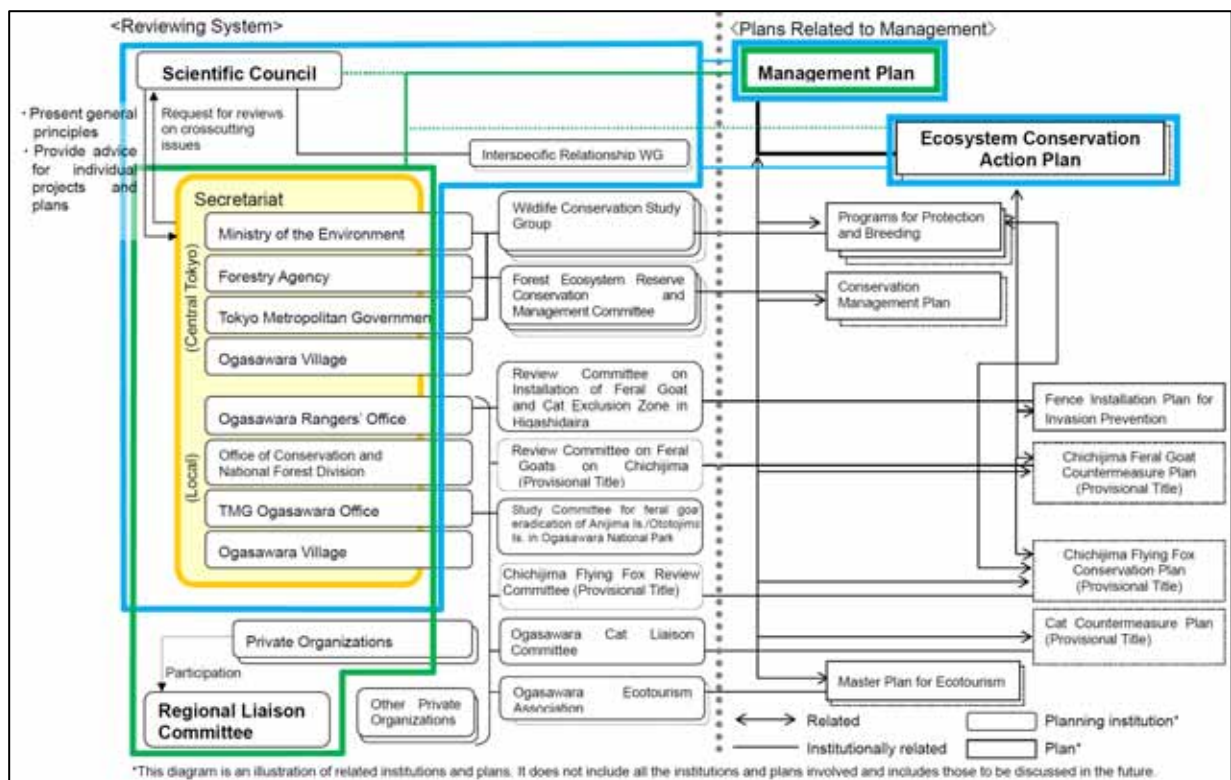


Fig. 1-4 Conceptual framework of relationships among reviewing systems and various plans

7. Conclusion

All of the Ogasawara Islands are oceanic islands, and each features a unique ecosystem consisting of many endemic species that have undergone unique processes of speciation. The islands provide a glimpse of the magnificent experiments of biological evolution. In addition, island arc volcanic activities that played an important role in the history of the Earth from its early stage up to the present activities can be seen on these islands.

On the Ogasawara Islands with globally peerless natural environments, various actions shall be taken with the aim of increasing the beauty both of the natural environment of the Ogasawara Islands and of the local communities existing in harmony with that natural environment not only through coordination among the management authorities, but also through the active participation and cooperation of stakeholders.