

Ecotourism in Ogasawara Islands

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Abstract

Recently, people of isolated islands worldwide, especially those at low latitudes, have begun to take an interest in ecotourism. The Ogasawara Islands have good potential for ecotourism because of their unique ecology and great distance from the mainland. I therefore studied the situation regarding the islands' nature, history, culture, lifestyle, industry, environmental disruption and conservation, research, sightseeing and ecotourism, and hereby present my discussion on the perspective of ecotourism in the Ogasawara Islands. Five colonizations occurred historically in the Ogasawaras (Conventional, Old, New and New New Islanders and the 'Shimakko'). Each of these waves of people added in various ways to the cultural heritage. There is unique nature such as many endemic species and karsts. Ecological disruptions, however, have proceeded rapidly. The introduction of an express ship in 2005 will increase environmental disruption. Despite its small size, Chichijima Island is home to eight institutes. In addition, 24 universities, institutions and museums have visited Chichijima and Hahajima in the Ogasawaras. Three guide training systems were established in 2001 and 2002. About 6%-7% of the local people participated in each guide training system. In 2002, the Bonin Ecotourism Commission was also established. I suggest that it will be necessary to establish a Guide Center for promoting ecotourism to the Ogasawaras, making use of the three guide training systems, and an Institute of Natural Science for Sightseeing, making use of much available information from studies for sightseeing. I believe it would also be desirable to aim for registry with the World Heritage (Natural Heritage) in order to obtain a consensus of opinion on ecotourism among the five colonies.

Key words: ecotourism, endemic, guide training system, isolated islands, Ogasawara Islands, sightseeing, whale-watching, world heritage

1. Introduction

Although many isolated islands have beautiful, precious nature, which the inhabitants use as a sightseeing resource, they have few valuable agricultural or aquatic products or industrial resources, which are competitive with the mainland. Recently, people of isolated islands worldwide, especially at low latitudes, have begun to consider ecotourism as a means of conserving nature and providing high-quality sightseeing services while providing sustainable economic development. Ecotourism is easier to introduce to isolated islands than to the mainland because it is easier to limit the number of sightseers and control their activities than on the mainland. Such limitation and control of sightseers is an important concept in ecotourism. Also, the natural environment on isolated islands is generally more delicate than that of the mainland because there may be a few or many endemic species on isolated islands, such as the Galapagos Islands. The natural environment of isolated islands must be conserved strictly from the viewpoint of

biodiversity. Thus, ecotourism may play an important role in economic self-subsistence and development as well as natural conservation for many isolated islands.

The Ogasawara Islands have good potential for ecotourism in Japan. They are located about 1,000 km south of the mainland (Honshu, Japan) and have never been connected to the mainland (Fig. 1). As a result, many organisms of the Ogasawaras have undergone unique evolution resulting in the production of endemic species. In addition, the Ogasawaras have large, rare animals available as sightseeing resources, such as whales and sea turtles. Thus the Ogasawaras have a unique ecology and have been called the 'Oriental Galapagos' in Japan. The Japan Travel Bureau, a famous think tank for travel in Japan has evaluated the endemic flora and karst geography of the Minamijima, giving it a ranking of A for sightseeing resources that can attract many sightseers from all around Japan (Isolated Island Ecotourism Study Group, 2002).

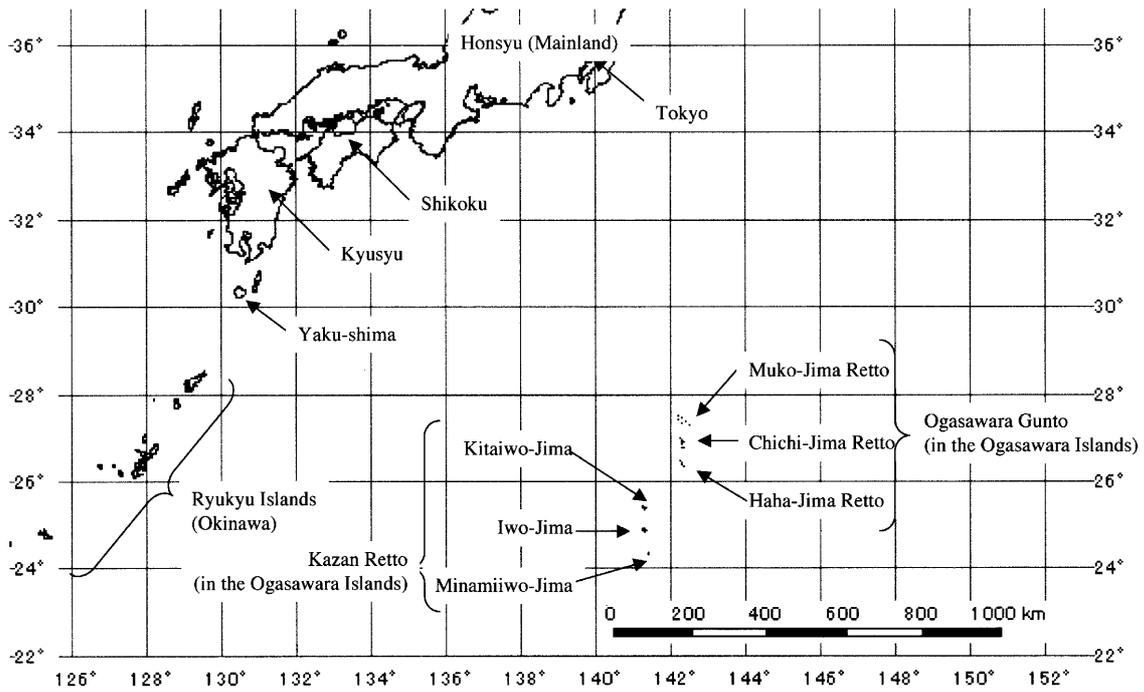


Fig. 1 Map of Ogasawara Islands (Ogasawara Gunto and Kazan Retto) including Honsyu (Mainland), Shikoku, Kyusyu and Ryukyu Islands (Okinawa).

The distance also makes them attractive for ecotourism. The number of sightseers is limited by the great distance from the mainland with the only access being a ship which takes about 25 hours to reach the Ogasawaras. Also restraining sightseeing and construction activities is the degree of legal protection, with 83% of the Ogasawara Islands registered as a National Park and laws enacted concerning conservation of many organisms and areas. These factors have resulted in much untouched nature remaining, which is one of the important factors for promoting ecotourism on isolated islands. However, there are people in the Ogasawaras who are concerned about environmental disruption of this untouched nature, because there have been discussions regarding introduction of an express ship in 2005 that will take only 16 hours to reach the islands. The express ship would bring enormous capital and have the effect of increasing sightseers in the Ogasawaras. Moreover, the Ogasawara Islands have some problems with ecological disruption even now. It is hoped that ecotourism will solve these problems and provide a balance between natural conservation and utilization of nature as a sightseeing resource.

The people of the Ogasawaras have practiced ecotourism in the field of whale-watching since 1988, when whale-watching in Japan was conducted there. The Ogasawara Whale-watching Association (OWA) has operated under voluntary rules (Fig. 2) and studied the ecology of whales to find a balance between utilization and conservation. Also, whale-watching has had large economic effects on lodges, souvenir shops, food shops, etc., as well as the sightseeing business

(Mori, 2000). Thus, the people of the Ogasawaras have basic grounds for promoting ecotourism.

I consider the Ogasawara Islands adequate for a case study of ecotourism on isolated islands. In this paper, I look into the situation regarding the nature, history, culture, livelihood, industry, environmental disruption and conservation, research and ecotourism, and discuss the perspective of ecotourism in the Ogasawara Islands.

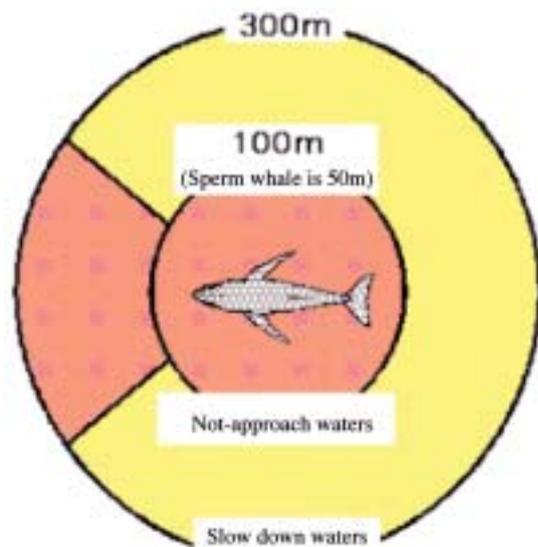


Fig. 2 A voluntary rule of Whale-watching (mainly Humpback whale and Sperm whale) established by Ogasawara Whale-watching Association.

2. Introduction to the Ogasawara Islands

2.1 Geography and climate

The Ogasawara Islands (also known as Bonin Islands in English) encompass more than 30 islets scattered in the northwest Pacific Ocean in the subtropical zone (Fig. 1). Of these islets, the largest is Chichijima, with an area of about 23.8 km², which is located about 1,000 km south of Tokyo. The Ogasawara Islands feature an oceanic topography with mild temperatures (about 23°C yearly average on Chichijima) and no frost or snow in any season. The annual precipitation is about 1,600-1,800 mm on Chichijima.

2.2 Animals

The fauna of the Ogasawara Islands has features of oceanic islands. There are many endemic species and some big sea animals in the Ogasawaras that have importance as academic material or sightseeing resources. Most of the endemic animals have been designated a national monument by the Culture Agency and are conserved by law (Sato, 1992).

2.2.1 Mammalia

There is only one endemic mammal, the Bonin flying fox, *Pteropus pselaphon* (called Ogasawara o-komori in Japanese). On land, there are three species of mouse and feral animals including goats, pigs and cats, mainly on Chichijima and its surrounding islets. In the ocean there are found about 20 species of whales. Especially noted are the humpback whale, *Megaptera novaengliae* (zato kujira in Japanese), bottlenose dolphin, *Tursiops t.aduncus* (minami hando iruka in Japanese), and spinner dolphin, *Stenella longirostris* (hashinaga iruka in Japanese), which appear along the coast within 10 km of the islands and have thus been studied academically and used as sightseeing resources.

2.2.2 Aves

The Ogasawara Islands are an important breeding site for six species of seabirds. There is also one endemic species, *Apolopteron familiare hahasima* (Hahajima meguro in Japanese) and five endemic subspecies, including *Buteo buteo toyoshimai* (Ogasawara nosuri in Japanese). *Apolopteron familiare hahasima* lives only on Hahajima and is designated as a special national monument in Japan. Three endemic species and two endemic subspecies have been lost since the age of immigration of people to the Ogasawaras. Among four seasons about 150 and 210 species are found in the Ogasawara Gunto and the Ogasawara Islands, respectively.

2.2.3 Reptilia

Conventional species of reptiles include the Bonin lizard, *Cryptoblepharus boutonii* (Ogasawara tokage in Japanese) and sea turtles. Three other lizard

species and one snail species have become naturalized. One of the naturalized lizards, *Anolis carolinensis* (the green anole) is a menace to many conventional insects. The Ogasawara Islands are the most important breeding site in Japan for the green turtle, *Chelonia mydas* (ao umi-game in Japanese) (Suganuma, 1992).

2.2.4 Amphibia

There are two introduced species, *Bufo marinus* (o-hikigaeru in Japanese) and *Rana catesbeiana* (ushi gaeru in Japanese), which were brought in as food or to destroy vermin.

2.2.5 Invertebrates

There are more than 100 species of terrestrial mollusks, about 90% of which are endemic species because of accelerated adaptive radiation (Horikoshi *et al.*, 2002). All of the terrestrial mollusks designated as national monuments are endemic species.

There are about 800 insect species, about 30% of which are endemic. It is thought that most of the insects other than the endemic species were brought in as a result of human activity (Horikoshi *et al.*, 2002).

2.3 Plants

Vascular plants in the Ogasawaras number about 500 species, about 40% of which are endemic. Most of the plants came from tropical or subtropical Southeast Asia or Japan (Honshu, Kyushu, Shikoku and Okinawa). The number of endangered or vulnerable species registered by the Ministry of Environment is about 40 (Ono, 2000). This flora is characterized by a higher ratio of pteridophytes in the Ogasawaras than on the mainland and a complete lack of fagaceous plants. This is similar the characteristics of flora on other oceanic islands such as Hawaii and the Galapagos Islands (Ono, 2002).

Because of very poor nutrient conditions, the population of algae is very small in the Ogasawaras. The number of species is more than 230 (Kasaki & Okazaki, 1980), but their endemism has not been studied yet.

2.4 Geology

The Ogasawara Islands are said to have been produced by seamount activity about 50 million years ago in the vicinity of the equator. Proof of seamount activity appears as pillow lava, which is easy to find all over Chichijima. Most of the rocks are volcanic, and include boninite, which is scarcely found outside the Ogasawara Islands, but there is limestone in parts. The areas with the limestone are sightseeing spots such as Minamijima, a small island located about one kilometer southwest of Chichijima, and at Sekimon on Hahajima. Minamijima is especially popular with many sightseers because it presents a numinous, romantic landscape with karst (doline, uvala, lapiaz, sea caves, etc.) and contains many semi-fossilized snails.

2.5 History

Sadayori Ogasawara, who was a Japanese knight, is said to have discovered the Ogasawara Islands first in 1593. Governmental officials studied and explored the Ogasawara Islands and declared them Japanese territory in 1675. The first inhabitants were five European and American and about 20 Hawaiian people in 1830. Their descendants have lived mostly on Chichijima and are called the Conventional Islanders. The population rate is said to be several percent recently. Japanese people immigrated to the Ogasawaras for the first time in 1862. Their descendants have lived mostly on Chichijima and Hahajima and are called the Old Islanders. The population rate is about 20% in 2002 (Tokyo Metropolitan Government 2002). After Japan's defeat in World War II, America governed the islands from 1946 to 1968, during which time the Japanese were required to leave, but the European and American descendants were allowed to stay. Once the Ogasawaras were returned to Japan, many Japanese immigrated there. They are called the New Islanders. The population increased rapidly from 285 people in 1968 to 1,014 in 1973. From about 10 to 15 years ago, many young people in their 20s and 30s have immigrated to the Ogasawara Islands from the mainland. They are called the New New Islanders. The young generations who were born in the Ogasawara Islands after the recession from America in 1968 are called 'Shimakko.' Thus the history of the Ogasawaras is complicated. The complication resulted in the establishment of five colonies (Conventional, Old, New, and New New Islanders and the Shimakko).

2.6 Culture

The Tokyo Metropolitan Government, which has jurisdiction in the Ogasawaras, has designated twelve cultural heritages in the islands. Of these, the Nanyo-Odori (South Seas Dance) accompanied by Ogasawara folk songs is most popular with sightseers and local people. The European and American Islanders inherited the dance and folk songs. Generally, members of the Nanyo-Odori Preservation Club perform the dance for sightseers and local people at public events. Recently, hula dancing has been fashionable on Chichijima. There are more than 100 hula dance members. They are changing the Hawaiian hula dance into an Ogasawaran hula dance, using Ogasawaran folk songs. The New New Islanders discovered and inherited the dance culture. The hula dance team performs the Ogasawaran-style hula dance to sightseers and local people at public events together with the Nanyo-Odori.

Although the Tokyo Metropolitan Government has not designated it a cultural heritage, Takonoha-zaiku a kind of basketry using the leaves of the Takanoki tree (an endemic plant) is also popular with sightseers and local people. The Takanoha-zaiku Study

Group makes and sells baskets, coasters, bracelets, and other handicraft items. The Conventional Islanders established Takanoha-zaiku and the Old Islanders inherited it (Hasegawa, 1989).

2.7 Lifestyle and infrastructure capacity

Transportation to Chichijima is very inconvenient, with the Ogasawara-Maru ferry ship only travelling to Chichijima once each six days from Tokyo and taking 25 hours. There is no public airport in the Ogasawara Islands. Despite the inconvenience, about 2,000 people live on Chichijima and about 400 on Hahajima. Most of the people are Old, New and New New Islanders. Ogasawara Village Office (2000) aimed at increasing the population to be 3,000.

Prices of food, sundry goods, gasoline, housing rents, etc., are very high. For example, the price of gasoline in the Ogasawaras is about twice that on the mainland. House rental costs in the Ogasawaras are similar to prices in central Tokyo, preventing many people from immigrating.

The capacity of water supply and sewerage is 2,500 people in Chichijima and 1,000 people in Hahajima (Ogasawara Village Office interior data 2003). The capacity of waste disposal is 3,000 people in Chichijima and 2,000 people in Hahajima (Tokyo Metropolitan Government 1992). The capacity of electric power is 4,340 people in Chichijima and 1,160 people in Hahajima (Tokyo Metropolitan Government 1992).

2.8 Industry

In 1995, 23.8% of the local people were engaged in services industries, mostly for tourists (Ogasawara Village Office 2000). The income for tourism is about 810 million-yen in 2000 (Isolated Islands Eco-tourism Study Group 2003). Another 32.5% were public officers and 20.3% were builders (Ogasawara Village Office 2000). The ratio of workers engaging in agriculture was only 3.5% in 1995 (Ogasawara Village Office 2000), because of the unsuitability of the islands for much agriculture due to acid and salty soils and lack of space. The total agricultural yield was 110 million-yen in 2002 (Tokyo Metropolitan Government 2002). The ratio of workers engaged in fishing was 5.0% in 1995 (Ogasawara Village Office 2000), and the total fishery yield was 503 million yen in 2002 (Tokyo Metropolitan Government 2002). The annual ordinary income reported by the Ogasawara village office in 2002 was 3,902 million-yen (Tokyo Metropolitan Government 2002). Thus the main industries of the Ogasawara Islands are tourism and construction business. As demand for construction business is decreasing, however, the degree of the islands' economic dependence on tourism becomes higher year by year.

3. Environmental Disruption and Conservation

3.1 Whales

Whale-watching has been conducted mainly around Chichijima and Hahajima, where humpback whales, *Megaptera novaeangliae* (zato kujira in Japanese) are observed in winter and spring. This started in 1988, the first time whale-watching was done in Japan. One year later in 1989, the Ogasawara Whale-watching Association (OWA) established voluntary rules (Fig. 2), which have been implemented by OWA and respected by most of the whale-watching boats. Whale-watching trips to observe sperm whales, *Physeter catodon* (makko kujira in Japanese) have been conducted since 1995.

Recently, dolphin watching and swimming with bottlenose dolphins, *Tursiops t.aduncus* (minami hando iruka in Japanese) and spinner dolphins, *Stenella longirostris* (hashinaga iruka in Japanese) have been popular among sightseers. Several boats often approach a group of dolphins, so there is concern that the boats are causing stress to the dolphins and that swimmers with the dolphins could be involved in accidents. However, there has been no effective rule regarding dolphin watching and swimming. The OWA established a guideline for dolphin swimming in 2002. However, the guideline has not been generally recognized to Ogasawarans and sightseers. OWA has held the meeting about the guideline to get a consensus of opinion since 2003.

3.2 Bonin flying fox

The Ministry of Environment has designated the Bonin flying fox, *Pteropus pselaphon* (Ogasawara o-komori in Japanese) a critically endangered species in the red data book. There were calculated to be 130-150 individuals of the Bonin flying fox on Chichijima in 1998-1999 (Inaba, 1999). Moreover, Inaba *et al.* (2002) has indicated that their numbers decreased sharply in 2001-2002 and the number now is estimated at 65-80. In their paper they said the reason for the decrease was unknown. The Tokyo Metropolitan Government, Ministry of Environment and Institute of Boninology have studied the ecology and looked into reasons for the decline since 2001. The Bonin flying fox is one of the popular sightseeing resources, but there are no effective guidelines regarding it.

3.3 Birds

The Ministry of Environment has designated the Bonin Islands wood pigeon, *Columba janthina nitens* (akagashira karasubato in Japanese) an endangered species in the red data book. The Tokyo Metropolitan government caught three individuals of the pigeons in 2001 and has tried to breed them. Recently two wood pigeon bore in 2002 and 2003 under artificial breeding. Moreover the Forestry Agency

has established 'Bonin Islands wood pigeon Sanctuary' at Chichijima since 2002. The route for observation will be constructed from 2003. Now the pigeon begins to be used as the sightseeing resource.

Minamijima is one of the important breeding sites in the Ogasawara Islands for the brown booby, *Sula leucogaster* (katsuo-dori in Japanese), wedge-tailed shearwater, *Puffinis pacificus* (onaga mizunagi-dori in Japanese) and Bulwer's petrel, *Bulweria bulwerii* (anadori in Japanese). Many sightseers, however, disturb them. The Tokyo Metropolitan Government has constituted sightseeing routes carefully to avoid this.

The Mukojima island group is an important nesting site for the short-tailed albatross, *Diomedea albatrus* (ahodori in Japanese), Laysan albatross, *Diomedea immutabilis* (ko-ahodori in Japanese) and black-footed albatross, *Diomedea nigripes* (kuroashi ahodori in Japanese). In particular, the short-tailed albatross had been declared extinct worldwide in 1949, but was later rediscovered on Torishima, an island about 570 km south of Tokyo. In 2000, one short-tailed albatross was found at Yomejima in the Mukojima island group for the first time since the declaration. In 2001, the number of short-tailed albatrosses was calculated at 1,480 in Torishima where is 430 km north of Chichijima (Tokyo Metropolitan Government & Institute of Boninology, 2001). Recently, whale-watching and diving boats have begun to use these albatrosses in Mukojima island group as a sightseeing resource. However, there are no effective guidelines regarding them.

3.4 Green turtles

The Ministry of Environment has designated the green turtle, *Chelonia mydas*, a vulnerable species in the red data book. The green turtle, however, is not only a sightseeing resource but also an important food resource in the Ogasawara Islands. In 1880, the number of green turtles caught for food and tortoiseshell was 1,852.

Today, 135 are taken annually. The Tokyo Metropolitan Government used to conduct artificial hatching of green turtles from 1910 to the end of World War II. These days, the Ogasawara Marine Center (OMC) has been conducting artificial hatching since 1982. Recently, the number of green turtles has tended to increase in the Chichijima island group (Horikoshi *et al.*, 2002), but it is not obvious if this tendency is the result of the artificial hatching. The OMC has also been providing environmental education for sightseers and local people through its green turtle breeding and releasing program.

3.5 Plants

The Ministry of Environment has designated about 40 endemic species found in the Ogasawaras as threatened species in the red data book (Ono, 2002). In particular, *Melastoma tetramerum* (munin no botan in Japanese) and *Calanthe hattorii* (asahi ebine in

Japanese) have been propagated and transplanted by Tokyo University and Chuogakuin High School, respectively.

On Hahajima, a naturalized plant, *Bischoffia javanica* (akagi in Japanese), has been interfering with the growth of endemic plants such as *Elaeocarpus photiniaefolius* (shima horutonoki in Japanese), the seeds of which are one of the important foods for *Columba janthina nitens*. In 2002, the Forestry Agency also held an 'Akagi Removal Tour' with about 100 sightseers from the mainland.

High grazing pressure from goats, *Capra hircus* (yagi in Japanese) had caused a decrease in endemic plants and an outflow of red soil into the coral seas of Minamijima and the Mukojima island group. The Tokyo Metropolitan Government, Institute of Boninology and other related institutions have tried to remove all of the goats from the Mukojima island group and Nishijima (of the Chichijima island group) since 1997. The Tokyo Metropolitan Government also removed all of the goats from Minamijima in 1971-1972, and has removed goats from Chichijima since 1976 (the Ogasawara Village Office took over in 1992). Moreover, the Tokyo Metropolitan Government and Ogasawara Wildlife Study Group have planted seeds and seedlings of various native plants on Mukojima island group. On Minamijima, the Ogasawara Village Office and Ogasawara Wildlife Study Group have removed a naturalized plant, *Cenchrus brownii* (kurinoiga in Japanese) with many volunteers from among the local people since 2001. The Tokyo Metropolitan Government and the Forestry Agency have planted or transplanted the native grasses on exposed areas of Minamijima since 2001 and 2002, respectively.

3.6 Geology

Minamijima consists of limestone, so there are precious karsts such as lapiaz and many semi-fossils such as *Mandarina luhuana* (hirobeso kata-maimai in Japanese). Because the Ministry of Environment designated Minamijima a special conservation area in 1972, the destruction and removal of all things on Minamijima are prohibited by law in Japan. Nevertheless, sightseers visiting Minamijima have destroyed the lapiaz by treading on it and some collected the semi-fossils. The Ogasawara Village Office and Ogasawara Tourist Association each established voluntary rules for conservation and use of Minamijima in 2001. Recently Tokyo Metropolitan Government also has operated a rule for adequate utilization of Minamijima since 2003. These rules suggest that guides should control and direct the sightseers so as to minimize their impact on nature.

3.7 Whole nature

The Ogasawara Village Office established an ordinance in 1973 to protect nature and the living environment by prohibiting people from abandoning cars. In 1998, they established an ordinance for ethical considerations in breeding of cats in order to conserve nature and protect environmental health.

4. Research

4.1 Institutes on Chichijima

Table 1 lists institutes on Chichijima. Despite its being such a small island with an exiguous population, Chichijima has eight research institutes. Each institute has its own field of study, but there exist no network organizations or systems connecting these institutes, so information from their respective research is rarely shared with other researchers or the local people.

Table 1 Institute in Chichi-Jima in 2002.

Institute name	Administrator	Number of full-time staff	Main field of study (species)
Tokyo Metropolitan University	Tokyo Metropolitan Government	0	Bird, Plant, Geology, Goat, Insect, Sea archin, Oceanology, Education
Ogasawara Subtropical Agriculture Center	Tokyo Metropolitan Government	13	Plant, Insect
Ogasawara Fishery Center	Tokyo Metropolitan Government	17	Fish, Crustacea, Oceanology
Ogasawara Marine Center	Ogasawara Village Office	2	Sea turtle, Whale
Institute of Boninology	Non Profit Organization	3	Bat, Sea turtle, Bird, Calling crab
Ogasawara Wildlife Study Group	Non Profit Organization	1	Plant, Vegetation recovery
Ogasawara Whale-Watching Association	Voluntary Organization	3	Whale, Dolphin, Ecotourism
National Astronomical Observatory	Nation	0	Galaxy

4.2 Institutes visiting from the mainland recently

Table 2 lists institutes that have sent delegations from the mainland recently. In recent years, representatives of 24 universities, institutes and museums have visited the Ogasawara Islands. Two thirds were from universities. Most came in order to study the nature, but there were also some sociological and historical investigations.

Most of the researchers from the mainland cooperated with institutes on Chichijima, but afterwards they almost always took away their results, so those were not immediately available. Later, they always sent a report on their investigations to the cooperating institute on Chichijima. As a result, there is a large accumulation of information in the form of these reports in the Ogasawara Islands, but the contents of the reports are rarely made available to the local people. In other words, almost all of the information that researchers from the mainland make flows out to the mainland and is not provided to the people of the Ogasawaras.

5. Sightseeing

5.1 Characteristics of the sightseers

Figure 3 shows the annual number of passengers on the Ogasawara-Maru (the ferry ship), and the breakdown by purpose of visit, and numbers of passengers on cruise ships for Chichijima in 1993-2001. The total number of sightseers (whose purpose was to engage in sightseeing, fishing, diving or relaxing on cruise ships) has been about 17,000-18,000 and has tended to decrease slightly. Passengers on business have decreased since 1998. The total number of passengers (on the Ogasawara-Maru plus cruise ships) has been 26,000-29,000. The mean annual number of investigators and researchers from 1992 to 2001 is as 511, indicating that on the average 43 investigators and researchers visit the Ogasawara Islands each month.

Figure 4 shows the seasonality of the mean number of Ogasawara-Maru passengers in 1994-1996 and

Table 2 Institute visiting from the mainland recently.

Category	Institute name	Administrator	Main field of study (species)
University	Tokyo University	Nation	Whale, <i>Pteropus pselaphon</i> , Botany, Squid
	Kyoto University	Nation	Sea turtle, Crab, Histry, Ethnology
	Tohoku University	Nation	Terristrial shell
	Hokkaido University	Nation	Phycology, Sea turtle
	Kyusyu University	Nation	Phycology
	Yamagata University	Nation	Phycology, Geology
	Tokyo University of Fisheries	Nation	Sea turtle
	Shizuoka University	Nation	Ethnology
	Mie University	Nation	Whale
	Gifu University	Nation	Botany
	Tokai University	Private	Whale, Shark, Crab
	Otsu Women's University	Private	Sociology
	Komazawa University	Private	Botany, Physical geography
	Toho University	Private	Biocenology, Albatross
Hosei University	Private	History	
Rikkyo University	Private	Ecotourism	
Institute	Forestry and Forest Products Research Institute	Independent Administrative	<i>Columba janthina nitens</i> , <i>Apalopteron familiare hahasima</i> , Dragonfly, <i>Bischoffia javanica</i>
	National Institute for Environmental Studies	Independent Administrative	Conservation of subtropical island ecology
	Japan Wildlife Research Center	Foundation	Vegetation recovery, Goat
	Hoshino Wildlife Research Center	Cooperation	Ant
Museum	National Science Museum	Nation	Decapod
	Natural History Museum and Institute, Chiba	Chiba Prefectural Government	Marine Invertebrate
	Kanagawa Prefectural Museum of Natural History	Kanagawa Prefectural Government	<i>Anolis carolinensis</i>
	Takao Museum of Natural History, Tokyo	Tokyo Metropolitan Government	

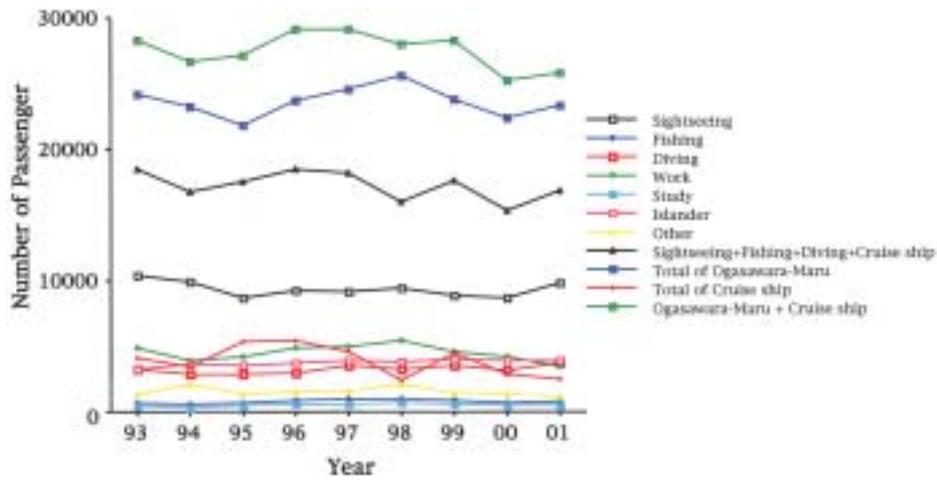


Fig. 3 Annual number of Ogasawara-Maru (Ferry ship) passenger divided into the purposes and cruise ship passengers for Chichijima in 1993-2001.

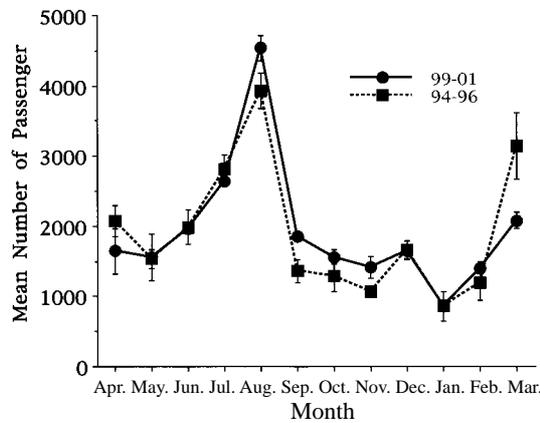


Fig. 4 Seasonality of mean number of Ogasawara-Maru (Ferry ship) passenger in 1994-1996 and in 1999-2001.

1999-2001. There are two peaks, one in spring and the other in summer, in both 1994-1996 and 1999-2001. The height of the spring peak was about half that of the summer peak in 1999-2001. The number of passengers in August was about four times that in January in both 1994-1996 and 1999-2001. The number visiting between August and November in 1999-2001 clearly increased compared with the figure for 1994-1996. This is because swimming with dolphins and sperm whale watching have become popularized. The number visiting in April and March in 1999-2001, however, clearly decreased from the figure in 1994-1996, because humpback whale watching lost popularity. The main reason for this was that whale-watching has come to be conducted in about 16 other regions of Japan, so people do not need to travel all the way to the Ogasawaras to enjoy it, but meanwhile the popularity of sperm whale and dolphin watching has tended to stabilize the seasonality in the number of passengers.

Table 3 shows the frequency of repeat visitors for sightseeing in the Ogasawara Islands and Okinawa. The proportion of first-time visitors to the Ogasawaras was 71.6%, which is 25.6% higher than to Okinawa. The proportions of second-time, third-time and fourth-

Table 3 Frequency of repeat of sightseers in the Ogasawara Islands and the Okinawa. Data of the Ogasawara Islands is extracted by Ogasawara Tourist Association (1999). Data of the Okinawa is extracted by Okinawa Prefecture (1998).

	Ogasawara (%)	Okinawa (%)
First	71.6	46.0
Second	11.6	19.3
Third	3.4	8.5
Fourth	9.0	21.2
No answer	4.4	5.0

time visitors to the Ogasawaras were about half those to Okinawa.

5.2 Institutions for sightseers

There was one hotel, one youth hostel and 44 homes offering lodging for tourists on Chichijima, and one youth hostel and 14 homes offering lodging for tourists on Hahajima in 2000. The total number of beds on Chichijima in 2000 was 948 and on Hahajima, 202. The capacity of beds in Chichijima and Hahajima is estimated to be 2,374 (Tokyo Metropolitan Government, 1992).

Table 4 lists public sightseeing faculties on Chichijima and Hahajima. There are six institutions on Chichijima, three times the number on Hahajima. The total number of public sightseeing faculties on Chichijima is 33, about twice the number on Hahajima.

5.3 Sightseeing resources

Table 5 lists sightseeing resources in the Ogasawara Islands. There are many potential or scarcely used resources for diving or snorkeling tours or experience activities. Stargazing and bird watching resources are expected to gain in importance in the future. Furthermore, other islands beyond Chichijima, Hahajima and Minamijima have been scarcely used as sightseeing resources.

5.4 Sightseeing cooperation

Table 6 lists styles of tours and number of coopera-

tive arrangements among the Ogasawara Tourist Association and Hahajima Tourist Association in August 2002. The total number of ocean-going tours is about three times that of land tours on Chichijima. The total number of ocean-going tours from Chichijima is about eleven times that from Hahajima, while the total number of land tours on Chichijima is about 3.5 times that on Hahajima. Thus there is much more tourism activity on Chichijima than on Hahajima. Moreover, it is clear that ocean-going tours from Chichijima exceed land tours greatly.

5.5 Express ship (Techno-Super-Liner)

The Ministry of Land, Infrastructure and Transport told the people of the Ogasawaras in 2002 that an express ship (the Techno-Super-Liner: TSL) will be introduced in 2005 and will take about 16 hours to reach Chichijima from the mainland. Responding to a questionnaire, 31% of Ogasawarans belonging to the

Table 4 Public sightseeing faculties in Chichi-Jima and Haha-Jima.

	Chichi-Jima	Haha-Jima
Institution	Ogasawara Visitor Center Ogasawara Subtropical Agriculture Center Ogasawara Fishery Center Ogasawara Marine Center Ogasawara Tourist Association Ogasawara Whale-Watching Association	Ross Memorial Haha-Jima Tourist Association
Number	6	2
Kursaal	Mikazukiyama-Hokuroku Sakaiura Tyuozan Kominato Miyanoama	Okimura Miyukihama
Number	5	2
Lookout	Mikazukiyama Wheather Station Tsurihama Ngasaki Asahidaira Hatsuneura Tyuozan Nakayamatoge Takayama	Nagahama Kensaki Samegasaki Suribachi Kofuji
Number	9	5
Park	Ogamiyama	Wakihamanagisa
Number	1	1
Root for Nature Observation	Denshinyama Hatsuneura Chichi-Jima Kaigansen Takayama Minamizaki Asahiyama	Nishidai Chibusayama Hahajimasan Minamizaki
Number	6	4
Undersea Park	Hyotan-Jima Hitomaru-Jima Anijimaseto Minami-Jima	Miyukinohama Hirashima
Number	4	2
Harbor	Tobiuosanbashi Aotodaiganpeki	Okikou
Number	2	1
Total Number	33	17

Ogasawara Tourist Association answered that they hope a loan for their expanding business toward the introduction of the TSL (Ogasawara Tourist Association, 2000). In response to another questionnaire, 57.3% of Ogasawarans belonging to the Ogasawara Board of Trade said that the introduction of the TSL would be effective in improving their business (TSL Introduction Assistant Society, 2002). Thus, many managers anticipate economic effects from the TSL. On the other hand, some local people are concerned about environmental disruption resulting from increased tourism brought by the TSL.

6. Ecotourism

6.1 Whale-watching

The Ogasawara Whale-watching Association (OWA) has made a point of conserving whales since its establishment when voluntary rules were established for whale-watching boats (Fig. 2). These rules, created by local people, play an effective role as guidelines. The OWA has also studied the ecology of whales and utilized the results as information for whale-watching guides and publicity for the Ogasawara Islands. The effectiveness of these voluntary rules has been verified from the results. The whale-watchers and repeat visitors who have been to

Table 5 Sightseeing resources in the Ogasawara Islands.

Tour style	Category	Already used resource	Potential or scarcely used resource
Watching	Whales	<i>Megaptera novaeangliae</i>	
		<i>Physeter catodon</i>	
		<i>Tursiops t.aduncus</i>	
		<i>Stenella longirostris</i>	
	Sea turtle	<i>Chelonia mydas</i>	
	Endemic bird	<i>Apalopteron familiare hahasima</i>	
			<i>Buteo buteo toyoshimai</i> <i>Columba janthina nitens</i>
	Sea bird	<i>Sula leucogaster</i>	<i>Diomedea albatrus</i>
		<i>Puffinus pacificus</i>	<i>Bulweria bulwerii</i>
		<i>Diomedea immutabilis</i>	
		<i>Diomedea nigripes</i>	
	Endemic Mammal	<i>Pteropus pselaphon</i>	
	Geology	Karst in Minami-Jima	
Karst in Haha-Jima			
Heart rock			
Fungus	<i>Mycena chlorophos</i>	Noctilucent fungus	
Heritage	Wreckage of cargo ship		
	Nanyo-Odori		
	Ross stone		
Fish	<i>Triaenodon obesus</i>		
Other			
		Star Noctiluca	
Field trekking	Plant	All plants	
	Vegetation	Dry and mesic type	
	Mammal	<i>Capra hircus</i>	
	Bird	All birds	
	Heritage	War remains	Monument
	Island		All Ogasawara Islands
Diving and Snorkeling	Marine organism	Fish	Sea slug
		Shrimp	Seaweed
		Crab	Trepang
		Coral	<i>Triaenodon obesus</i> <i>Manta birostris</i>
Experience activity	Nature	<i>Chelonia mydas</i>	Vegetation recovery Investigation Agriculture Fishery
	Culture		Craft work Nanyo-Odori Hula-Dance

the Ogasawaras several times are satisfied with these voluntary rules.

Figure 5 shows the seasonality in the number of Ogasawara-Maru ferry passengers in 1986-1987 (before whale-watching started), and in 1993-94 and 1997-98 (after whale-watching started). It shows that the number of passengers increased between February and April after whale-watching commenced. Today, sperm whale and dolphin watching and swimming with dolphins are also popular with sightseers. The economic effects overall of whale-watching were calculated to be 436 million yen in 1999 (Mori, 2000).

Whale-watching in the Ogasawara Islands keeps a balance between utilization and conservation in promoting the local economy. Thus, whale-watching in the Ogasawaras may be a successful example of ecotourism on isolated islands.

6.2 Guide training systems

There are three guide-training systems in the Ogasawara Islands. The Hahajima Tourist Association established a forest guide training system in 2001. In 2001, 24 people (about 6% of the people on Hahajima) were certified. The Hahajima Tourist Association has held meetings and training sessions for forest guides several times since its establishment.

The Ogasawara Whale-watching Association (OWA) established a whale-watching interpreter (guide) system on Chichijima and Hahajima in 2001 (Ichiki, 2002). 171 Ogasawarans (about 7% of the people on Chichijima and Hahajima) have been certified between 2001 and 2003. The OWA has held meetings and training sessions for whale-watching interpreters and local people in general each month since its establishment. The OWA also holds

Table 6 Tour style and number of cooperation belonging to Ogasawara Tourist Association and Haha-Jima Tourist Association on August 2002.

		Chichi-Jima	Haha-Jima
Ocean	Diving	8	1
	Whale-watching of <i>Megaptera novaeangliae</i>	15	
	Whale-watching of <i>Physeter catodon</i>	9	
	Dolphin swimming & Minami-Jima & Ani-Jima undersea park	10	1
	Minami-Jima tour	1	
	Muko-Jima Retto tour	4	
	Haha-Jima tour	2	
	Sea kayak	8	1
	Fishing	9	
	Wind surfing shool	1	
	Sunset cruise	1	
	Night tour	1	
	Charter boat	6	3
	Snorkeling		1
	Total number	75	7
Land	Treking guide	9	1
	John beach tour	2	
	Night tour	9	
	War remain tour	1	
	Island sightseeing by car	1	2
	Rent-a-car, bicycle, motorcycle	6	5
	Total number	28	8
Total number of ocean and land		103	15

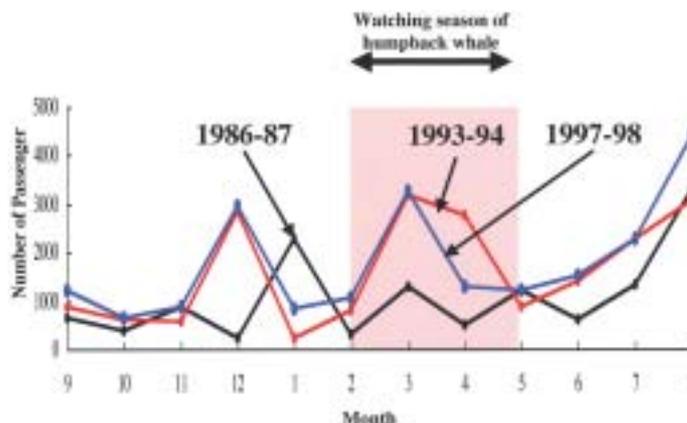


Fig. 5 Seasonality of number of Ogasawara-Maru (Ferry ship) passenger in 1986-1987 (before conducting whale-watching), in 1993-1994 (after conducting whale-watching) and in 1997-1998 (after conducting whale-watching). This figure is reedited from figure 8.3 of Mori and Yamada (1996).

classes and examinations for certification twice a year.

The Tokyo Metropolitan Government established a nature guide system on Chichijima and Hahajima in 2002. The school time for certification is about 20 hours. About 140 Ogasawarans (about 6% of the people on Chichijima and Hahajima) have attended the lectures. The Tokyo Metropolitan Government will hold meetings and guide training sessions for nature guides from 2003. Thus, about 6%-7% of the local people have participated in each guide training system.

6.3 Sightseeing promotion plans

There are two promotion plans in effect for the Ogasawara Islands. The Ogasawara Village Office spelled out a basic plan, the 'Ogasawara Island Sightseeing Promotion Plan' (also called the Blue Diamond Plan) in 2000. This plan has the distinct goal of the Ogasawara Village Office developing the present sightseeing industry into the core industry of the Ogasawara Islands by introducing ecotourism. The plan also aims for the Ogasawara Village Office to elevate self-sufficiency of the Ogasawaras by activating the whole economy of Ogasawara Village and providing the people of the Ogasawaras a satisfying living.

The Tokyo Metropolitan Government spelled out the 'Sightseeing Industry Promotion Plan of the Tokyo Metropolitan Government.' This plan calls for the Tokyo Metropolitan Government to construct a new Tokyo Metropolitan version of ecotourism in the Ogasawaras and it involves three goals. The first of these is to conserve nature in the Ogasawaras by building a system balanced between conservation of nature and utilization for sightseeing. The second goal is to create new sightseeing resources and industries. The third goal is to conduct education and edification to cultivate an understanding of and interest in nature.

Thus both administrations have introduced the concept of ecotourism in their sightseeing promotion plans for the Ogasawara Islands.

6.4 Bonin (Ogasawara) Ecotourism Commission

The Bonin (Ogasawara) Ecotourism Commission was established in 2002. The aim of the commission is to contribute to the development of Ogasawara Village by popularizing the concept of ecotourism and providing a balance between the conservation of various environmental resources and their sustainable use. The members of the commission must belong to the Ogasawara Board of Trade, the Ogasawara Tourist Association, the Ogasawara Whale-watching Association, the Hahajima Tourist Association or the Ogasawara Village Office. Thus the commission consists of members from the fields of sightseeing, commerce, administration and research. The commission is financially supported by the Ogasawara Village Office. Its organization and support provide

a good example of administrative and civil institutions promoting ecotourism cooperatively.

In 2003 the commission had the important goal of drafting a charter for Ogasawara Ecotourism and a prospectus for ecotourism in the Ogasawara Islands. The commission also aims to create an integrated guide training system for all the guide fields certified by the commission or the Ogasawara Village Office and a guide field control system to promote conservation. The commission is expected to become a core organization for ecotourism in Ogasawara Islands (Tokyo Metropolitan Government, 2003).

7. Discussion

7.1 Necessity for an Institute of Natural Science for Sightseeing

There are many natural and cultural attractions in the Ogasawara Islands. In particular, the unique flora and fauna, including many endemic species, has academic and world-class value. Therefore, many researchers visit from the mainland and exploit the attractions of nature (Table 2). What they dig up (the information from their studies), however, does not reach the local people, guides and sightseers. Many reports on their studies accumulate at the eight institutes on Chichijima, but what has been indicated as important is for the nature guides to get the information from the studies to present to the sightseers as a way of elevating the quality of the guide program (Minami *et al.*, 2002; Isolated Island Ecotourism Study Group, 2002). The information from the studies should also be utilized in making zoning maps, guidelines and voluntary rules and in estimating the capacity for sightseers.

The unique nature also characterizes the nature of Ogasawara Islands. So, the unique nature will produce unique sightseeing resources only in the Ogasawara Islands, which cannot be produced at other sightseeing spots. It is found from results of a questionnaire that most of sightseers feel the attraction of the Ogasawara Islands from the unique nature and the blue ocean (Tokyo Metropolitan Government & RPI Co. Ltd., 2002).

It will be necessary to have an institute such as an Institute of Natural Science for Sightseeing to find and compile such information from studies and put them to use in sightseeing in the Ogasawara Islands. The Land Agency's Regional Development Bureau (1997) also indicated that for sightseeing in the Ogasawara Islands it is important to maintain and accumulate information from studies in the Ogasawara Islands. The Institute of Natural Science for Sightseeing would perpetually help to produce new sightseeing resources and conserve nature.

7.2 Necessity for a Guide Center

The Ogasawara Islands have three guide training systems, but there are few opportunities for trained

guides to put their training into practice. Moreover, it is inefficient and confusing to the tourists that there are three guide systems operating on two small islands (Chichijima and Hahajima). Therefore an organization such as a Guide Center is necessary in order to coordinate the contents of the three guide training systems and to certify excellent guides. It is also desirable for the Guide Center to provide the guides information from research by liaising with the Institute of Natural Science for Sightseeing, to establish conservation areas and period, to permit the entrance of conservation areas, to take an entrance fee, to punish the certified guides disobedient to decided rules, and introduce trained guides to sightseers. The Institute of Natural Science for Sightseeing and the Guide Center would be symbolic of the Ogasawaras' sightseeing and nature conservation, like the Charles Darwin Research Center and the National Park Conservancy in the Galapagos Islands (Tokyo Metropolitan Government, 2001).

7.3 Consensus of opinion

There are two factors promoting ecotourism in social communities worldwide (Shikida, 2002): movements critical of environmental disruption and movements critical of the decline of the social economy. In the Ogasawara Islands, an express ship (the TSL) is expected to bring more sightseers than the Ogasawara-Maru ferry ship has heretofore. Moreover, some kinds of environmental disruption are already occurring in the Ogasawara Islands today. The people of the Ogasawaras, especially those engaged in the sightseeing industry, have a strong movement critical of environmental disruption, and even those who are not engaged in it have some concern about environmental disruption. On the other hand, most of the Ogasawarans are strongly critical of the decline in the social economy because public works projects have been decreasing there rapidly. So the people of the Ogasawaras have substantially the two factors bringing a trend towards ecotourism.

The Bonin Ecotourism Commission is working on drafting a charter for Ogasawara Ecotourism and a prospectus for ecotourism in order to promote a common consciousness among most of the people of the Ogasawaras toward ecotourism. It will be difficult, however, to achieve this unification of consciousness only by diffusing these charter and prospectus because there are different ways of thinking and culture among the five colonies (Conventional, Old, New and New New Islander, and Shimakko). The National Land Agency's Regional Development Bureau also indicated that it would be difficult to reach a consensus in consciousness among the people of the Ogasawaras because of differences in thinking and activities arising from differences in the background of each culture. Okuda (2002), however, said that for the introduction of ecotourism to be successful, it is most important to make a unique plan for eco-

tourism on the basis of understanding and consensus of opinion among the local people and to put the plan into practice. Nakai (2002) also said that to promote ecotourism, it is necessary to provide the local people a common understanding about the benefits for nature, culture and society. The key word for common understanding among the five colonies would be 'nature' because all five colonies share a love and understanding of the unique ecology of the Ogasawara Islands. In order to achieve a consensus of opinion on ecotourism in the Ogasawara Islands it would be preferable to set up a nobler and more convincing goal for the nature of the Ogasawaras transcending the boundaries of each colony.

I propose making registration for World Heritage (Natural Heritage). The goal would invigorate most of the people of the Ogasawaras toward the practice of ecotourism and the process of registration would help achieve a consensus of opinion on ecotourism among the five colonies. There are two standards to meet in order to achieve World Heritage (Natural Heritage) registration. The first standard is prominent and universal natural values in the area to be registered. The second is that the nature be conserved to a fair degree by law, regulation or long-term establishment. The natural environment of the Ogasawaras obviously has prominent and universal natural value. Iwahashi (2002) also concluded that the hurdles for registering the Ogasawara Islands for Natural Heritage are much lower than were those for Yakushima and the Shirakami Mountains, which achieved Natural Heritage registry in 1993. Moreover, the natural environment is protected at present by six laws, one Forest Agency establishment, one Tokyo Metropolitan Government establishment and two Ogasawara Village Office ordinances (Kobayashi, 2002). The level of legal protection of nature in the Ogasawara Islands is similar to or stricter than that of Yakushima or the Shirakami Mountains.

Thus, initiating the process toward Natural Heritage registration would be one effective way to promote ecotourism in the Ogasawara Islands. Iwahashi (2002) said that the Ogasawara people must change their consciousness and lifestyles in order to achieve World Heritage registry. In order to promote ecotourism in the Ogasawaras, in time it will be important for the Bonin Ecotourism Commission, which is centrally in charge of ecotourism there, to provide direction to the people of the Ogasawaras and each organization and institute and to control and conserve the natural environment and culture with balancing utilization and conservation of the sightseeing resources.

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