

Nature Conservation on Yakushima Island : Kagoshima Prefecture's Efforts

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Abstract

The mountain area of Yakushima Island was inscribed on the World Nature Heritage List in 1993 because of its unique fauna, flora and landscape. The area is also conserved by national organizations under four types of nature protection systems. These are “wilderness areas,” “national parks,” “forest ecosystem reserves” and “natural monuments.” The Kagoshima Prefectural Government has also been making some efforts for nature conservation on Yakushima Island according to the Yakushima Environmental Culture Village Concept. These include establishment of a foundation, advancement of environmental education, nature protection activities, and supporting NGO activities. Furthermore Kagoshima Prefecture oversees the Yakushima Mountain Utilization Measure Council which is expected to deal with current problems such as mountain facilities, overuse, eco-tourism and expenses.

Key words: forest ecosystem reserve, Kagoshima Prefectural Government, national park, natural monument, wilderness area, world nature heritage, Yakushima Environmental Culture Village Concept, Yakushima Island, Yakushima Mountain Utilization Measure Council

1. Outline of Yakushima's Landscape

Yakushima Island is located approximately 60 km south of the southern-most region of Kyusyu, one of Japans' four main islands, between the East China Sea and the Pacific Ocean. The Island belongs to Kagoshima Prefecture in Japan, and is dividing two administrative “towns”, Yaku-cho and Kamiyaku-cho.

The island's area is approximately 500 square km

and it has a relatively circular perimeter of 132 km. In the central part of the island, there is a mountain range that contains over 45 mountains including Mt. Miyanoura-dake 1,935 m above sea level, the highest mountain in Kyusyu region in Japan (Figs. 1 & 2). There are many rivers running down these mountains, creating deep valleys. The climate is warm and rainy. The average annual temperature in the plains is 19.1°C, and the annual precipitation is estimated to be over 4,000 mm in the plain areas, and 10,000 mm in the mountainous areas.

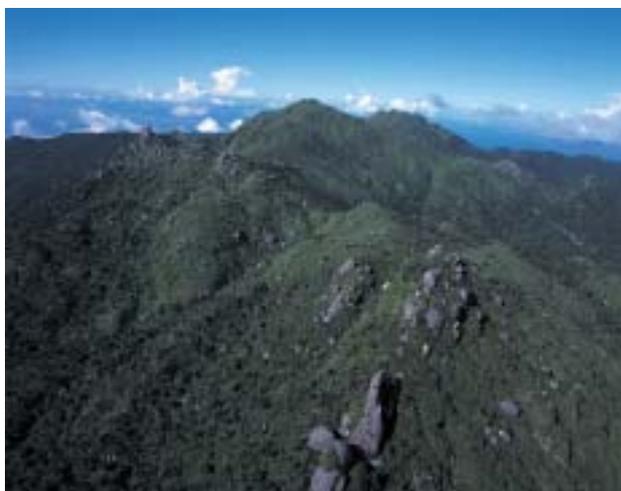


Fig. 1 Mt. Miyanoura-dake.

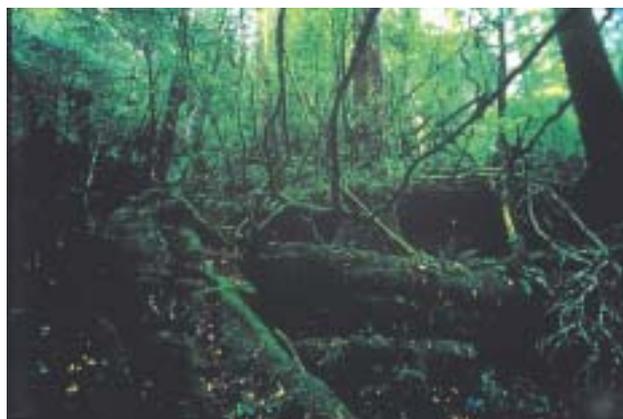


Fig. 2 Inside views of forest of Yakushima Island.

Yakushima Island abounds in Yaku-sugi (*Cryptomeria japonica*) trees (Fig. 3), which are thousands of years old and unique in the world, as well as many plants, and animals, which are unique to the area and/or endangered. It also contains a wide representation of species in vertical distribution, from species seen on the coastal regions to those only seen in the sub alpine region.

As for flora, there is a remarkable variety of plants inhabiting in the island. They range from sub-tropical plants, such as the banyan tree (*Ficus superba* var. *japonica*) near the seashore, and sub-tropical/temperate plants, such as *Machilus thunbergii*, chinquapin (*Castanopsis cuspidate*) and evergreen oaks further inland, to the temperate zone plants, such as fir trees, *Trochodendron aralioides*, etc., and subalpine plants such as *Pseudosasa owatarii* and rhododendron



Fig. 3 Yaku-sugi (*Cryptomeria japonica*: Jomon Sugi).



Fig. 4 *Rhododendron degronianum* var. *yakushmanum*.

(*Rhododendron degronianum* var. *yakushmanum*) (Fig. 4), all of which show vertical distribution on the island. Furthermore, there are natural old growth forests unique to Yakushima Island, in which many old and giant Yaku-sugi reign solemnly. These plants and trees show different vegetation from the mainland of Japan, creating a unique forest ecosystem. One to a geological quirk, there are over 1,900 varieties of plants and trees (including those that are endemic to the island) distributed over the island. There are 94 endemic species that are in their northernmost occurrence. The island is also extremely different from the mainland, missing most of the mainland's natural vegetation, such as Japanese beech (*Fagus crenata*) and other temperate climate deciduous, broad-leaved forests, while having over 600 varieties of mosses on such a small island.

Next, as for fauna, the island has various endemic subspecies because of a rich and quasi-primitive habitat produced by its environment in that the island was separated from the Kyushu mainland some 1,500 years ago. This combination has produced various subspecies, including *Cervus nippon yakushimae* (Fig. 5) and *Macaca fuscata yakui* (Fig. 6), that are sub-endemic to the island. There are over 150 known species of birds on the island. Four of these



Fig. 5 *Cervus nippon yakushimae*.



Fig. 6 *Macaca fuscata yakui*.

species, including *Turdus celaenops* and *Erithacus akahige tanensis*, are sub-endemic to the island. Within these 150 species, there are also four species, including *erithacus komadori* and *columba janthina*, that are designated natural monument of Japan. There are also 15 species of reptiles, eight species of amphibians, and approximately 1,900 species of insects which are confirmed to inhabit the island, making this small island extremely abundant in fauna for its size.

Lately, with increasing public awareness of nature conservation, it is admitted that the unique ecosystem and the extraordinary natural scenery of Yakushima Island have supreme value globally. Therefore, the central area of the island was inscribed on the World Nature Heritage List in December 1993, based on the World Heritage Convention. The area was deemed "an outstanding example representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems, and communities of plants and animals." It was also deemed to "contain superlative natural phenomenon or areas of exceptional natural beauty and aesthetic importance."

On the other hand, Yakushima Island has a long history of inhabitation, due to its own climate and rich nature. In medieval times, it was considered an important strategic point for shipping and transportation routes. In more recent times, primary industry (agriculture, forestry and fisheries) has been one of the key factors supporting the economy of the island (Fig. 7). Therefore, while interaction has taken place between the islanders and outsiders, there has been a harmonious coexistence between nature and people on the island (Fig. 8). Currently, there are small villages scattered on the seashore, with a total population of approximately 13,707 residents (as of 2000). As for transportation links to the Kyushu mainland, air and sea (ferries and jetfoils) routes are open and in use.

2. Nature Conservation System of Yakushima's Heritage Area

The nature conservation system of the island is extremely complex. Before the island was inscribed on the World Nature Heritage List, almost the identical area of the island had been generally conserved under four types of nature protection systems that had strictly different purposes, different areas, different jurisdictions, and different regulations. These were "wilderness areas", "national parks", "forest ecosystem reserves" and "natural monuments". The outline of each system is as follows.

2.1 Wilderness areas

A "wilderness area" is defined as an area that fulfills the following conditions: it has not been affected by the activities of men; it has preserved a primitive condition; it is of a considerable area in size; and



Fig. 7 Forestry is basic industry of Yakushima Islands.



Fig. 8 Natural products used by local people.

there is a particular need for its natural environment to be conserved. When a particular area fulfills these criteria, it is designated and managed as a "wilderness area" by the Minister of Environment, Government of Japan, according to the Nature Conservation Law.

The Hanayama district within the Yakushima mountains area was designated the Yakushima Wilderness Area in May 1975, based on the aforementioned law. All of the Yakushima Wilderness Area is included in the Heritage Area.

Activities such as construction of buildings, felling of trees or bamboo, collection of animals and plants, collection of fallen leaves and branches, making fires and engaging in other activities that may have an adverse effect on the conservation of the natural environment, are prohibited in this area except in certain special circumstances, such as academic research.

2.2 National parks

The aim of national parks is to protect scenic beauty and also to promote the use of areas, and simultaneously to contribute to people's health, recreation and enlightenment. National Parks are designated and maintained by the Minister of Environment, Government of Japan, in accordance with the Natural

Parks Law.

The entire Heritage Area, excluding the Wilderness Area, has been designated the “Kirishima-Yaku National Park” in accordance with the aforementioned law.

There are two distinct areas: the Special Zone and the Special Protection Zone. The Special Zone holds importance from both conservation and usage perspectives, and activities such as construction of buildings and felling of trees require the approval of the Minister of Environment. The Special Protection Zone aims for strict conservation of the core-areas of parks. Aside from regulation of the Special Zone, activities such as collecting or harvesting animals or plants, collecting fallen leaves and branches, making fires, etc., require the approval of the Minister of Environment. These delineations are set according to the Protection Plan drawn up for each national park, and the parks are regulated according to these delineations.

Furthermore, to conserve nature, and simultaneously to promote its appropriate use, walking paths, shelters, etc., are constructed according to national park usage plans.

2.3 Forest ecosystem reserve

A “forest ecosystem reserve” is an area established and managed by the Forestry Agency, Government of Japan, based on national forest management rules. Its goals are to maintain natural environments consisting of forest ecosystems, to protect plants and animals, to preserve gene pools, to advance technology of forest management, and to contribute to academic research, etc., conserving areas with a substantial amount of old growth forests, that represent the forest zone in Japan. The central area of Yakushima Island was designated the Yakushima Forest Ecosystem Reserve in March 1992, based on the above-mentioned rules. The Preservation Area is that which shows the most primeval state of the forest in the reserve and that calls for strict maintenance of the forest ecosystem. Aside from academic research and emergency measures taken during times of natural disaster, changes are basically left up to natural succession without human disturbance. In the Conservation and Utilization Zones, which serve as a buffer to prevent environmental change outside the reserve from directly affecting the forest in the Preservation Area, no forestry operations for the purpose of timber production are conducted, yet, according to the natural conditions, educational use or recreational use that does not accompany large-scale development may be conducted.

Almost all of the Yakushima Forest Ecosystem Reserve overlaps the forest within the Heritage Area.

2.4 Natural monuments

The Minister of Education and Science, under the Law for the Protection of Cultural Properties, can

designate certain animals and plants (including habitat areas, breeding grounds, migration grounds and natural habitats) and geological minerals (including areas that have extraordinary natural phenomena) that are of high academic interest in Japan and are particularly important as “natural monuments”. Among natural monuments, those of special importance can be designated “special natural monuments”.

Within the Heritage Area, the Yakusugi Old Growth Forest is designated a special natural monument. Of the animal and plant species inhabiting the area, the following four species are designated natural monuments: *Erithacus komadori*, *Columba janthina*, *Turdus celaenops*, and Iijima warbler *Phylloscopus iijimae*.

Activities that may change current condition of these natural monuments, or activities that may have an effect on their conservation, require approval of the Commissioner for Cultural Affairs.

The Heritage Area will be managed through close collaboration among the administrative bodies concerned with the aforementioned systems: the Ministry of Environment, Forest Agency, Agency for Cultural Affairs, Kagoshima Prefecture, Yaku-cho and Kamiyaku-cho.

To promote more effective cooperation and collaboration for the management of the Heritage Area, the “Yakushima World Heritage Area Liaison Committee” was established as a forum for coordination and communication among the administrative bodies. The committee will promote mutual cooperation and collaboration, as well as manage the Heritage Area in a unified, appropriate and smooth manner.

3. Yakushima Environmental Culture Village Concept

Before Yakushima Island was inscribed as a World Natural Heritage, Kagoshima Prefecture had designated Yakushima a model area for regional/ community development in symbiosis with nature in the Yakushima Environmental Cultural Village Concept, and formulated the master plan for the Yakushima Environmental Culture Village as a guideline for regional development. Based on the Master Plan, Kagoshima prefecture has been promoting an array of measures in cooperation with the central government, local municipalities and local residents. The Master Plan was created on the basis of discussion held in three study groups at the national, prefectural and island level, which included involvement of eminent scholars, relevant institutions and local residents. The orientation of the regional development outlined in the Master Plan serves as an essential guideline not only for Kagoshima Prefecture, but also for the relevant institutions and parties concerned with the nature conservation and regional promotion of Yakushima.

Fundamental guidelines and the project scheme for the Yakushima Island Environmental and Cultural

Village are shown in Fig. 9 and Fig. 10. The major points of emphasis in the work undertaken by Kagoshima Prefecture are the establishment of the Yakushima Environment Culture Foundation as the parent body for the promotion of the Environment Culture Village Concept, and the construction of the Yakushima Environment Cultural Village Center (YECVC) – a visitor center (Figs. 11 & 12) – and the Yakushima Environmental Culture Learning Center (YECLC) (Fig. 13) to serve as core facilities for environmental studies and education (Fig. 14).

The YECVC is the key facility that provides

comprehensive information, guidance and exchange opportunities. It introduces the nature and culture of Yakushima Island through wide screen movies and regular exhibitions, gives information about environmental studies and displays special products. The YECLC is the key facility for environmental studies of nature on Yakushima Island. It offers various environmental study seminars on the importance of symbiosis among people, nature and environment preservation (Fig. 15). The center responds to requests by offering training courses and providing guides and volunteers for visitors.

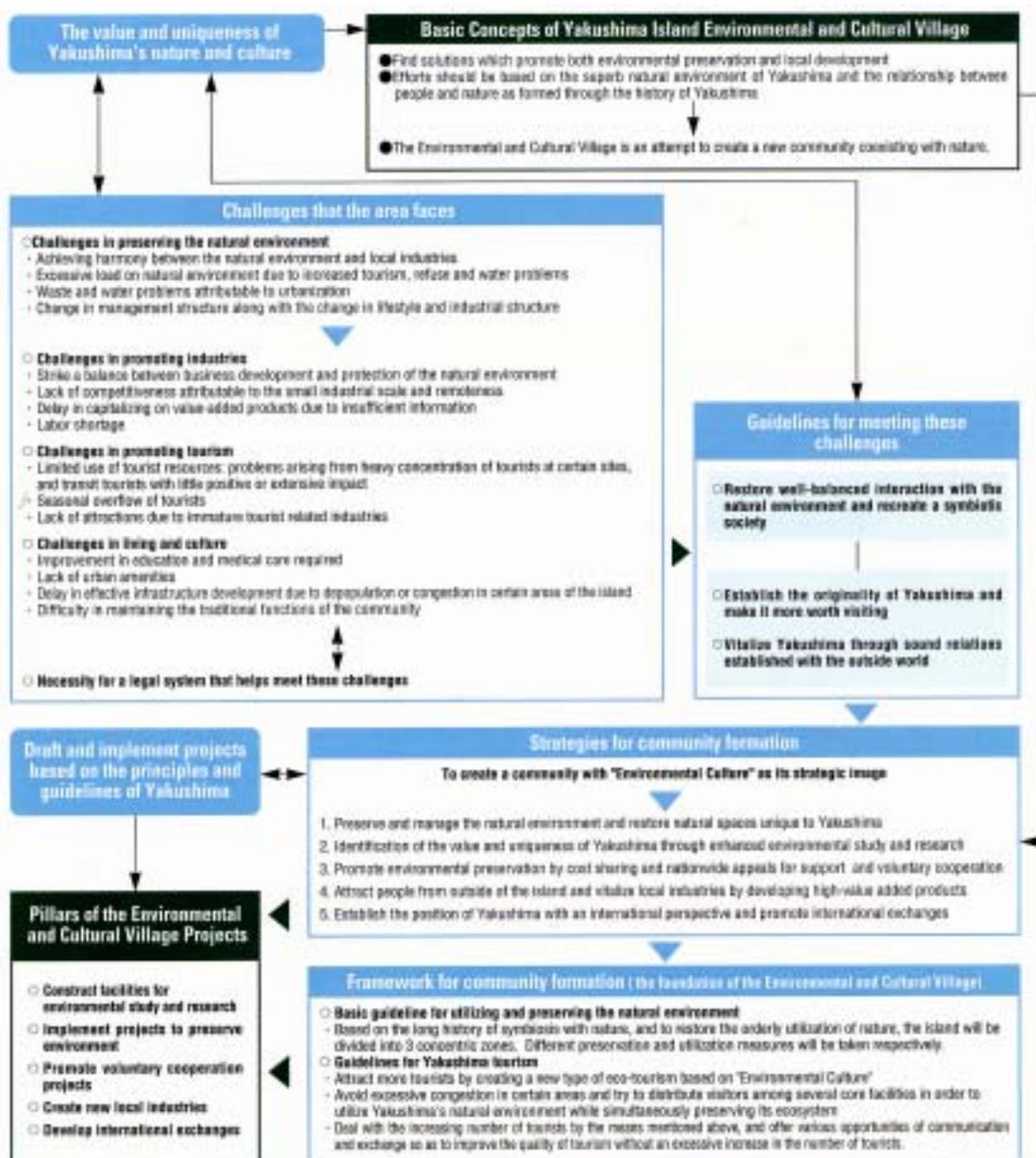


Fig. 9 Fundamental guidelines for Yakushima Island Environmental and Cultural Village. The master plan for Yakushima Island Environmental and Cultural Village was drawn up in November, 1992.

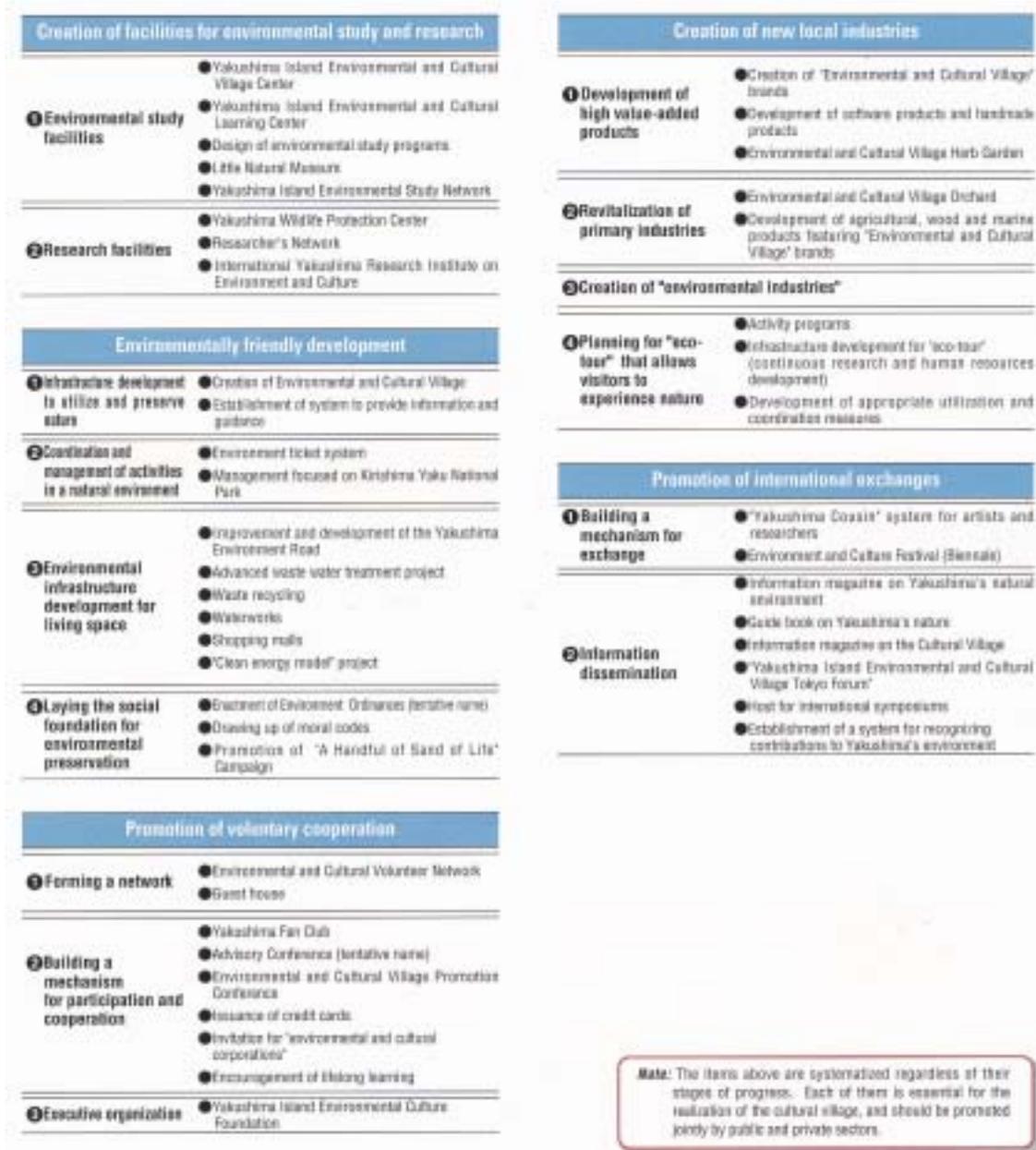


Fig. 10 Project Scheme for the Creation of Environmental and Cultural Village.



Fig. 11 Yakushima Environmental Cultural Village Center (bird's-eye view).



Fig. 12 Yakushima Environmental Cultural Village Center (exhibition room).



Fig. 13 Yakushima Island Environmental Culture Learning Center (bird's-eye view).



Fig. 14 Location map of YECVC and YECLC.

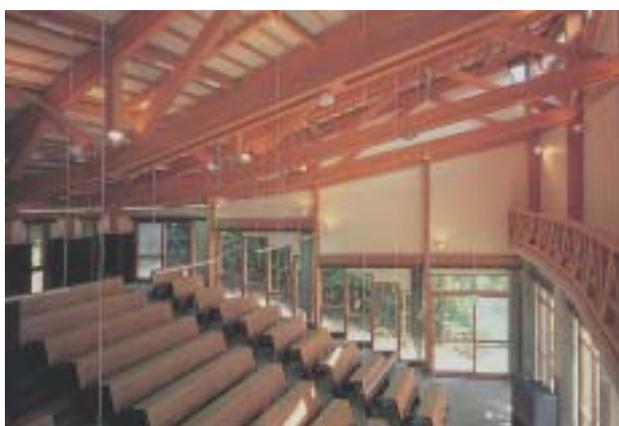


Fig. 15 Yakushima Island Environmental Culture Learning Center (lecture room).

3.1 Yakushima nature experience seminars

These seminars are open to everyone from school children to adults regardless of home prefecture. Seminars are held once a month usually with a schedule of three days and two nights. They are genuine environmental study programs focusing on outdoor activities by the sea, along rivers and in the mountains.

Each seminar differs in theme, type of participants and content, so participants are invited accordingly from all over Japan. In addition, other seminars are also open for islanders with a schedule of two days and one night.

Every seminar is planned and coordinated by permanent staff of the Yakushima Island Environmental Culture Foundation (described later), and carried out by well-trained instructors. Residents of the island join seminars occasionally as instructors of traditional lifestyles of the island.

3.2 Yakushima short programs

These are one to two hours study programs open to anyone. They offer an opportunity to get basic knowledge about the environment on Yakushima and are available for even single participants. They are held once every Saturday and Sunday, and once a day during the summer vacation.

3.3 One-day study programs

These are nature observation outings or study meetings for local parents and children. Held six times a year, they are joint programs held by the Ministry of Environment and the local authorities Kamiyaku-cho and Yaku-cho.

3.4 Independent environment study programs

These programs are offered as part of the educational activities for elementary and junior high school children, or at the request of eco-tour organizers and others who are involved in environmental activities. Visitors choose a program from those offered at the Learning Center.

4. Yakushima Island Environmental Culture Foundation

The Yakushima Island Environmental Culture Foundation was inaugurated in March 1993 by Kagoshima Prefecture, Yaku-cho and Kamiyaku-cho. The foundation is the central organization devoted to the promotion of the "Yakushima Island Environmental and Cultural Village."

In order to preserve the nature of Yakushima and to create a new community coexisting with nature, the foundation implements various projects such as nature protection activities and Environment preservation support projects. The foundation is also commissioned by Kagoshima Prefecture to manage and operate the YECVC and YECLC.

4.1 Environment preservation support programs

In order to protect the Jomon Cedar from the impact of increasing visitors, as a result of their touching the bark, climbing the branches, making bonfires and so on, the Foundation assists with mountain patrols, distribution of educational pamphlets to mountain climbers, mountain path maintenance, etc.

4.2 Nature protection activities

Activities include raising Yakushima Rhododendrons from seed to sapling to return to the forest, and cultivating shade plants to protect loggerhead turtles.

4.3 Environmental education programs

Organizing various seminars (described above).

4.4 Cultural Projects

Publishing the "Yakushima Report," organizing and participating in events commemorating the designation as a World Nature Heritage Site, and other projects designed to introduce the activities of the Foundation both inside and outside Kagoshima Prefecture.

4.5 Management and operation of the core facilities

The Foundation is managing the core facilities, YECVC and YECLC, entrusted to by Kagoshima Prefecture.

5. Kagoshima International Conference on World Nature Heritage

Kagoshima Prefecture hosted the Kagoshima International Conference on World Nature Heritage (KICWNH), with the UNESCO World Heritage Center as cosponsor, in May 2000. The heads of the 19 local governments gathered in Kagoshima city and Yakushima Island from 13 countries. This conference enabled local governments to share experiences and lessons with each other, and to send out a clear message to the international community in the form of the Yakushima Summit Declaration, which outlines the paths that local governments should follow in the 21st Century in order to ensure conservation of World Nature Heritage Sites and promote regional/community development making sustainable use of the World Nature Heritage.

6. Yakushima Mountain Utilization Measure Council

The Kagoshima Prefectural Government has joined forces with the World Nature Heritage Council to implement various measures based on the Environmental Cultural Village Concept. Furthermore Kagoshima Prefecture controls the Yakushima Mountain Utilization Measure Council. It also makes plans, implements and cooperates with specific projects such as educating mountain climbers in proper

etiquette and the protection of the Jomon Cedar, working together with the ranger office of the Ministry of Environment, Forest Management Office of the Forestry Agency, police stations, and relevant local authorities including town offices, tourism associations and the Cultural Village Foundation. The Council holds four meetings annually where discussions take place on the following: (1) contents of pamphlets, brochures and posters for teaching etiquette; (2) schedule and roles and responsibilities for monitoring the environment surrounding the Jomon Cedar during the peak season; and (3) installation of temporary toilets.

Recently, opinions have been expressed that this council should not limit its activities to specific projects alone but should also deal with the preservation of the natural environment of Yakushima as a whole, so discussions should take place on political endeavors, institutional improvement and basic principles. This is attributed to the fact that this council is responsible for the preservation of the natural environment of the whole mountain area, not limited to the World Nature Heritage Area alone. Most of the parties involved in natural environment preservation participate, and the council meets frequently.

However, the current problem of preserving Yakushima's natural environment is complex, including the maintenance of mountain trails, improvement of facilities for treating sewage, countermeasures against over-usage of the area, and appropriate ecotourism. In solving these problems, institutional improvements consisting of a legal system and financial resources should be taken into consideration. This means unprecedented measures are required. No time has been set yet for discussing these issues in the future.

7. Current Problem of Preserving Yakushima's Natural Environment

The followings are the author's views on some, but not all, of the issues in relation to natural environmental preservation on Yakushima. Please understand that these are mostly the author's personal views since there have not been in-depth discussions on these matters in the past, and each relevant organization has its own different perspectives.

Firstly there is the problem of facilities such as mountain paths and shelters in mountainous areas including the World Nature Heritage Area. Mountain paths were, with a few exceptions, created naturally by climbers. Therefore who is responsible for their maintenance has not been established. This has resulted in great devastation of vegetation and damage to root systems. Due to the increasing number of climbers, paths have widened and subsequently collapsed. According to investigations by Kagoshima University, the number of climbers from January 2000 to December of the same year was

approximately 46,000. Improvements have been made by the Kagoshima Prefectural Government with subsidies from the Ministry of Environment. It is necessary to consider making long-lasting paths that are in harmony with nature. According to the system we established in 2001, the Ministry of Environment, which is responsible for national parks, hires local mountain guides to carry out maintenance such as cutting grass and repairing wooden paths and ladders. However, due to limited budgets, it is impossible to cover the whole mountainous area. In addition, since the effective term of this system is limited, there are problems of securing future financial resources for continuation of the project. Based on the past two years of "mountain path maintenance projects," in-depth working manuals have been compiled by local guides and others who are involved.

The mountain shelters do not have toilet facilities. Wastes buried or discharged around huts have the potential for causing eutrophication that could damage natural vegetation or pollute mountain streams. The introduction of water-powered treatment systems is urgently required.

Secondly, there is also the problem of overuse. The estimated number of 46,000 climbers is concentrated in the vacation months between May and August. Furthermore, most follow the same route to the Jomon Cedar or Mt. Miyanoura, the highest peak in Kyushu. Since there is only one mountain climbing route in use, the opinion has been raised to limit the number of climbers. According to other opinions, climbers should be dispersed to less used routes. On the other hand, other people say, there is no need to regulate the number of climbers because of the limited number of transportation routes. There is a natural limit to the number of climbers.

Some people say that we should establish an act obliging climbers to register in order to avoid disasters. Both Yaku-cho and Kamiyaku-cho have expressed an idea to install a manned-gate at the starting point of each trail to check climbers with the joint goals of improving their manners and securing

their safety. According to this year's amendments of Natural Parks Law, it is now possible to regulate off-limits areas or the number of climbers in national parks. In dealing with measures against overuse, there will need to be various discussions with different perspectives based upon these opinions and institutional features.

Thirdly, there is a problem of quality and fee systems for guides resulting from the increasing demand for eco-tourism. The number of eco-guides has increased to about 80 from 10 at the time of the designation of Natural Heritage Site. Because there is no official qualification system, some have pointed out that the quality of some of the guides is in question. As for the guide fees, general opinion says they are too expensive. In addition, fees vary widely; from a flat fee of approximate \$125.00 per climber per day, to approximate \$250.00 per guide per day which is divided among a number of climbers.

Dealing with the quality of guides, some say that guides should be required to acquire a minimum level of technical skills and knowledge. As for fees, the contents and quality of services must be clarified to help users to make a choice. As a part of the supporting projects of the Environmental Cultural Village Foundation, we have already established a study workshop where the guide system is being discussed. We are now discussing what local guides can do by themselves.

The last problem is about the expense. In order to implement solutions to the problems mentioned above, financial resources are needed. Specifically, climbers should pay a fee for entering the mountains. This point will be discussed when the above-mentioned matters are considered. The Kagoshima Prefectural Government has also been conducting basic research with the view of collecting fees to visit the island of Yakushima.

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