

## **Yakushima National Park and World Heritage: Political Ecology Approach**

Hidayat Herman<sup>1\*</sup> and Nagashima Shunsuke<sup>2\*\*</sup>

*1: Indonesian Institute of Sciences (LIPI), Gatot Sbroto Street No. 10, Jakarta 12710,  
Indonesia*

*2: Research Center for the Pacific Islands, Kagoshima University, Korimoto 1-21-24,  
Kagoshima, 890-8580, Japan*

*\*Corresponding author*

*\*\*Present Address: Office for Islands, 112 Kawaharada-Honmachi, Sado-city, Niigata,  
952-1314, Japan*

*E-mail: hermanhidayat246@gmail.com*

### **Abstract**

Achieving national park and world heritage site status was a major effort and big struggle for stakeholders. This paper examines the way that governmental officers, whether central or local, provided regulation, funds, and encouragement of infrastructure facilities. Additionally, the national park officer is actively involved regarding local communities' participation, NGOs, academics, a hydrological electricity company, farmers, travel agency owners, hotel and *minshuku* (private house) owners, and so forth. The conceptual and theoretical framework was political ecology, which highlights the role of stakeholders to analyze partnership management, landscape protection, protection of animals, biodiversity, and plants, patrolling to control the protected and special zone, and academic research in the wilderness area. The findings of this fieldwork were that partnership management among stakeholders at Yakushima National Park as a World Heritage site was necessary and eventually influenced the maintenance of the ecosystem, water supply, and environmental services to increase tourism.

**Key words:** national park, partnership management, political ecology, stakeholders, tourist industry, world heritage

## Introduction

Japan's land territory covers 380,000 km<sup>2</sup>, positioning her as the 61<sup>st</sup> largest territory in the world. However, Japan's territorial waters and economic exclusive zone combined is 12 times as large as its land area (4,470,000 km<sup>2</sup>), the sixth largest in the world KUWAHARA (2013)<sup>1</sup>. Thirty registered national parks cover 2,091,163 million ha and occupy 5.5% of the country's total landmass. They play a significant part in forest conservation and have a crucial role in protecting Japan's rich ecosystems, such as forests, waters, wetlands, seashores, coral reefs, and oceanic wildlife, and preserving them for future generations.

The National Park System aims to protect the scenery that represents Japan's natural beauty and to provide opportunities for visitors to experience, enjoy, and learn about the country's natural environment<sup>2</sup>. Yakushima is a national park located 60 km south-southwest of the Kyushu mainland in Kagoshima Prefecture. Kagoshima Prefecture comprises 605 islands, of which 28 are inhabited. As a World Heritage site, Yakushima Natural Park is a unique ecosystem of forest trees, particularly *sugi* (Japanese Cedar), in Yakusugi Land. One of the biggest trees is *Jomon Sugi*, which has a circumference of 16.4 m, a height of 25.3 m, and is estimated to be between 2,600 and 7,200 years old.

Yakushima National Park was designated as a World Heritage site in 1993 by the UNESCO Committee for its significant ongoing ecological and biological processes in the evolution and development of terrestrial, freshwater, coastal, and marine ecosystems; communities of plants and trees; biodiversity; and animals. From an economic and social perspective, recognition of Yakushima National Park as World Heritage had the effect of rapidly developing tourism in Kagoshima City, particularly on Yakushima Island. It influenced the rapid development of infrastructure (roads, ports, and an airport), transportation (ferry, tippy jet ship, rental cars and buses and airplanes),<sup>3</sup> and it increased the need for accommodations for the tourists that visit the island (restaurants, hotels, *minshuku* (private houses that provide food and lodging), *ryokan* (Japanese-style hotels), guest houses, youth hostels, and so on).

This study takes a political ecology approach which appears the actors movement on how far Yakushima National Park's management to be implemented. In addition, it focuses on partnership management among stakeholders in the management of Yakushima National Park and World Heritage site regarding aspects, such as a landscape protection, animal and plant protection, patrols of protected and special zones, implementation of regulations on portable toilets for visitors to *Jomon Sugi*, and academic research in wilderness areas. The positive effects of partnership management eventually maintained the ecosystem and water

1 First is the US, Australia, Indonesia, New Zealand, Canada, and Japan. Also, refer to Japan Institute of Construction Engineering: [http://www.jice.or.jp/quiz/kaisetsu\\_04.html/02](http://www.jice.or.jp/quiz/kaisetsu_04.html/02), accessed on January 5, 2013.

2 National Parks of Japan 2012. For further information, see the website (<http://www.env.go.jp/park/>), last accessed on February 9, 2013.

3 The tippy jet ship was originally used for transportation among islands in 1989 in Kagoshima Prefecture. However, it rapidly developed for sea transportation after Yaskushima National Park was designated as World Heritage in 1993 because domestic and foreign tourists visited this site (interview on January 15, 2013).

supply, contributed to *Yakushima Denko* (environmental services using electricity), and increased tourism in Yakushima National Park.

## Methodology

The term “political ecology” was the theoretical framework used in this study to highlight the stakeholders' activities. Scientists use a variety of definitions (BLAIKIE and BROOKFIELD 1987, BRYANT and BAILEY 1997, PETERSON 2000, TUK-PO *et al.* 2003, HIDAYAT 2004, BIRSACK and GREENBERG 2006). PATERSON (2000: 69) considers “political ecology as an approach that combines the concerns of ecology and political economy to represent an ever-changing dynamic tension between ecological and human change, and between diverse groups within society at scales from the local individual to transnational as a whole”. The above discussion on political ecology suggests that political ecology is a framework for investigating the subject of stakeholders that are actively involved in managing aspects of national parks and World Heritage. It is a generic term used for field research that connects two types of studies by bringing the political and economic perspectives into the study of environmental disruption. It includes small studies centered on local societies (e.g., cultural anthropology, applied anthropology) and large studies from the national or global standpoint (e.g., political economy). After reviewing the previous literature, the political economy framework was adopted in this study to analytically discuss the nature of the activities and logic of stakeholders (actor analysis, such as the role of the government, private sector, non-governmental organizations (NGOs), and the local community) among the other frameworks of political ecology used in this study (Fig. 1).

To explain some of the study's observations, the concept of “partnership management” was employed to support the stakeholder (actor) analysis. A “partnership” in this study refers to an arrangement in which two or more individuals share the profits and liabilities of a business venture. Generally, a partnership is any cooperative endeavor undertaken by multiple parties, which can be governments, non-profit organizations, businesses, individuals, or combinations thereof, and partnerships' goals can widely vary.<sup>4</sup> Similar to the definition of “partnership management”, it is the

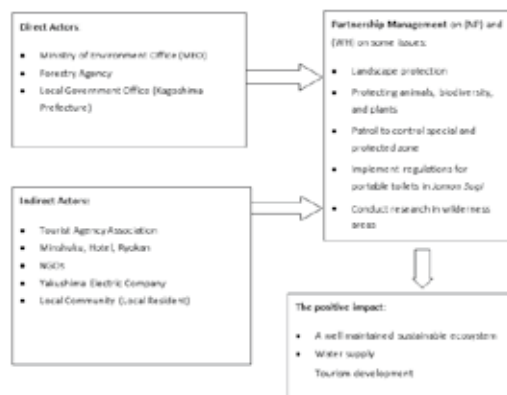


Fig. 1. Analysis of Stakeholder Management of Yakushima National Park and World Heritage, modified from Fieldwork data and adapted theoretical framework of BLAIKIE and BROOKFIELD (1987).

4 Partnership definition/Investopedia. See <http://www.investopedia.com/terms/p/partnership> (accessed December 14, 2016).

process of monitoring and maintaining effective, productive, and harmonious relationships among partners. Partnership management can be as informal as telephone or e-mail interactions or social visits and it can be as formal as written, signed agreements that partners periodically review.<sup>5</sup>

Regarding the management of Yakushima National Park as World Heritage, partnership management concerns the extent to which stakeholder activities (direct and indirect actors) actively involve management of concerns, such as landscape protection; animal, biodiversity, and plant protection; patrols to control special and protected zones; and implementation of regulations on portable toilets in *Jomon Sugi*. The results of partnership management ultimately influenced the sustainability of the ecosystem, water supply, and the development of tourism.

### Site and Data Collection

Yakushima Island was chosen as the study site because Yakushima National Park is considered the most popular national park and World Heritage tourist destination in Japan. In addition, to analyze the application of the partnership management model for national parks and World Heritage sites that actively involve stakeholders' activities, the study considered the roles of the Office of the Ministry of Environment (MOE), Forestry Agency, and local government (Kagoshima Prefecture), the private sector (Tourist Agency Association; Hotel, Minshuku, Ryokan Association; and Yakushima Electric Company), and local communities.

Fieldwork was conducted on Yakushima Island for 30 days between January and March of 2013. The data comprised in-depth interviews gathered through purposive sampling and biodiversity (flora and fauna) observations in the Yakushima National Park and World Heritage Area. The field observations covered the Shiratani Unsuikyo (Shiratani Area), Yakusugi Land (Natural Recreation Forest, Arakawa District), Forest railroad, Senpiro-notaki Waterfall, Ohko-no-taki Waterfall, and Nagata village.

The key informant identified targets for interviews who were actively involved in partnership management at both sites (Miyanoura and Anbo) and owned a *minshuku* (a private house that provides food and lodging). Fifteen interviews on Yakushima Island were conducted: (1) a member of the Ministry of Environment Office, (2) a member of the Forestry Agency office, (3–4) two members of Yakushima Government office, (5–6) two officers of the Yakushima Office for Statistics Agency, (7–9) three *minshuku* owners, (10–11) three NGO officers for nature and animal conservation, (13) an orange farmer, and (14–15) two officers of *Yakushima Denko* (Hydrology Electricity) Company. The interviewees were 40 to 64 years old, with a median age of 50.

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5 "Partnership and Partnership Management." 2007. In *Partnership Resources for Implementing the WWF Project*. WWF Network Standard (accessed December 14, 2016).

## Results and Discussion

### Review of Natural Parks

Natural parks are established to preserve beautiful scenic areas and their ecosystems and to contribute to the health, recreation, and culture of citizens. The law was enacted in 1957. The Japanese natural park system includes three types of parks: national parks, quasi-national parks, and prefectural natural parks.<sup>6</sup> Currently, there are 401 registered natural parks in Japan: 30 national parks, 56 quasi-national parks, and 315 prefectural natural parks (Table 1). The Natural Environment Bureau of the MOE is responsible for managing all of Japan's national parks. Quasi-national parks are designated by the MOE in response to requests from local governments, and the prefectural natural parks are designated and managed by local governments. The budgets for national parks are responsible for their management, and the MOE has established budgets for the Natural Park Facility Development Program, the Green Worker Program, night soil disposal improvement, and the auxiliary ranger program. The missions of the natural parks are to conserve natural resources and provide public access to nature for enjoyment. To achieve these goals, the natural parks provide recreation, such as natural recreation forests (Arakawa and Shiratani areas) in Yakushima National Park, trails, and campgrounds.

The national parks were established in Japan in 1911. Parliament discussed the establishment of national parks based on a petition, and their development in 1920 was discussed by members of the Diet (Japanese Parliament) to prepare legislation. The National Park Law was finalized in 1931. The first designated parks were designated in March of 1934, namely, Setonaikai (i.e., Seto Island Sea), Unzen, and Kirishima. In 1957, the Natural Parks Law was enacted to replace the 1931 legislation<sup>7</sup>.

Positive development occurred between the 1960s and the 1970s–1990s based on the increasing numbers of visitors to the national parks. Many visitors enjoyed the national parks; mountain climbing, hiking, and recreation in the natural forest and experiencing

Table 1. Statistics on Japan's natural parks.

Park type	No. of parks	Park area (ha)	Percentage of total land area <sup>a</sup>
National parks	30	2,091,163	5,533
Quasi-national parks	56	1,362,613	3,606
Prefectural natural parks	315	1,977,528	5,233
Total	401	5,431,304	14,372

Source: Ministry of Environment Office 2010.

<sup>a</sup>The total land area of Japan is 37,790,697 ha (Area Surveys for Japan by Prefecture and Municipality as conducted by the Geographical Survey Institute, 2004).

6 Definition of "National Park": Places of excellent scenic beauty and important ecosystems and worthy of designation as national scenic sites. Definition of "Quasi-national Park": Places of natural scenic beauty almost equal to that of the national parks. Definition of "Prefectural Natural Park": Places of local significance as designated by the local government (MOE 2011).

7 MOE 2011.

the fascinating landscapes of the valleys, rivers, and coastal seas were among the popular activities at the parks. These activities enabled visitors to deeply interact with nature, the ecosystem, forests, and marine resources. According to the Japan Tourist Agency, in 2004, visitors to the national parks reached 3.5 million, 2.9 million people visited quasi-national parks, and 2.6 million people visited prefectural natural parks<sup>8</sup>. Claims of increasing numbers of tourists at the end of the 1990s are debatable because, according to JONES (2012), “in Japan and other developed countries, visitation at Nature-Based Tourism (NTB) destinations such as national parks rose steeply in the postwar Japan, but has since peaked and is now in a state of decline.”<sup>9</sup> However, I disagree with Jones’ opinion, and I argue that the numbers of visitors to national parks are still increasing based on the findings of Yakushima National Park and World Heritage (1991–1992) that the number had reached 25,049, but was predicted to be 40,975 in 1995–1996 and 50,379 in 2008–2009<sup>10</sup>.

Environmental pollution occurred in urban areas along with development and excessive development activities subsequently created social problems. To solve the problems, the government established the Environmental Agency in 1971 and finally decided to establish the MOE. In 2002, a new law regulated the activities in special zones, created regulated use areas, and prepared new systems for scenic landscape protection agreements.

Parkland ownership is complex in Japan, incorporating private land, state land, and local governmental land. Therefore, one characteristic of Japanese natural parks is that a variety of landowners cooperatively maintain the parks’ landscapes. The rationale for this is that Japan has a small land area and is densely populated with a long history of private land ownership. From this perspective, the Japanese government needed to create natural parks in places recognized as needing nature preservation, which were not necessarily owned by the government.

## **Yakushima National Park**

### *Summary of Yakushima National Park as a National Park and World Heritage Site*

Yakushima National Park’s history can be traced back to the sixteenth century (1612) when the Shimazu clan directly controlled the area. To gain control in 1624, the Shimazu established an official ship office and major ports and checkpoints to monopolize trade in Yakusugi<sup>11</sup>.

Later, the Meiji government (1868–1912) proposed a forestry sector as public ownership and a large part of the forest on Yakushima Island was established as a national forest. Yakushima Island gave a logging concession in 1923 to a private company. Kosugidani village, located up the Ambo River between 600 and 1,500 m above sea level was established to house the workers. In addition, Ishizuka village was a residential area created four km up from Kosugidani village. The area of concession included about 2,900

8 MOE 2010.

9 For further discussion, see “Changing Demographics in Japan’s National Parks: Towards a Targeted Marketing Strategy for Nature-Based Tourists.” Please refer to *Tourism and Hospitality Management*, Vol. 18, No. 1, pp. 95-109, 2012.

10 Yakushima Town Office Statistic 2012, published by Yakushima Local Government Office.

11 Diagram Yakushima 2000: 55, published by Yakushima Environmental Culture Foundation.

ha of Yakusugi primeval forest targeted for cutting. The workers numbered 540 people with 113 households at the height of the logging in 1960 (KUWAHARA *et al.* 2010).

Massive logging of Yakusugi began in 1955 and lasted until the 1970s, and the excessive cutting eventually influenced the forest. NGOs and local people responded with a huge protest of the serious effects of deforestation, which was causing soil erosion and downstream flooding. The resulting negotiations among the four types of interested stakeholders (government, private enterprises, local people, and NGOs) were canceled and, in 1970, Kosugidani and Ishizuka villages were completely shut down by the government after nearly five decades in operation.

As stated above, the national parks occupied about 5.5% of Japan's land and preserved that land for future generations. Yakushima Island, which is number 29 of Japan's 30 national parks, is located 60 km south-southwest of the Kyushu mainland in Kagoshima Prefecture. It is a roughly circular island about 130 km around. The island's center is dominated by peaked mountains more than 1,800 m tall, such as Mt. Miyanoura, which, at 1,935 m, is the highest mountain on Kyushu Island. Thus, Yakushima is well known as the "Alps on the Ocean" (Diagram Yakushima 2000). This unique topography has created a range of climates on the island, from subtropical in the coastal areas to subarctic in the mountains, where it snows in January and February.

Yakushima Island comprises about 50,000 ha, which mostly is covered with national forest (40,000 ha covering 76% of the island) (Forestry Agency 2012). In 1964, Yakusugi forest (18,738 ha) became a national park with the goal of providing opportunities to experience, enjoy, and learn about Yakushima Island's natural environment of forests, waters, trees, ecosystems, and marine resources. The National Park Special Area (Kirishima-Yaku National Park) was gazette in 1964 under the National Parks Law and comprises land on Yaku Island and Kirishima National Park on mainland Kyushu. A Forest Ecosystem Reserve was established in 1992 of the nominated area and some adjacent blocks of land. Its development in the center of Yakushima Island and parts of the island's southern and western coastal lowlands was accepted as a Biosphere Reserve in 1980<sup>12</sup>.

In December 1993, part of Yakushima Island was inscribed on the World Heritage List during the Committee Meeting in Columbia. The total World Heritage area is 10,747 ha, which is approximately 21% of the total land area of Yakushima Island. The area stretches from Miyanoura-dake in the central mountains, westward toward the ocean over Kuniwari-dake, south to Motchom-dake, and east to Aiko-dake. Thus, the World Heritage area includes mountains and hills, and ranges from latitude 30° 15' to 30° 23' north, and 130° 23' to 130° 38' degrees east.

There is a long history of conservation on Yakushima Island, beginning with the designation of an Academic Reference Forest Reserve in the national forest implemented in 1924 to establish conservation measures in the area. The area was named the Yakushima Old Growth Japanese Cedar Forest Natural Monument, which was changed in 1954 to Special Natural Monument, and it was incorporated as a national park in 1964. A decade

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12 Yakushima World Heritage Area Management Plan 2010, published by Ministry of Environment Japan (MOE).

later, in 1975, the area was further designated as a Wilderness Area,<sup>13</sup> and it was established and expanded in 1980 to become the Biosphere Reserve site. In 1993, it was appointed as a World Heritage area (including the Yakushima National Park), and, in 2005, Nagata village beach was designated as a Ramsar Site to protect the indigenous turtle population<sup>14</sup>. Fig. 2 shows the types of protected areas on Yakushima Island.

Based on the World Heritage convention, the area was deemed “an outstanding example representing significant on-going 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 considered to “contain superlative natural phenomenon or areas of exceptional natural beauty and aesthetic importance”<sup>15</sup>. Therefore, the rationale for selecting Yakushima National Park as a World Heritage site included its unique forest flora, such as the ancient Yaku-sugi cedars (Jomon Sugi, Kigensugi, Hahakosugi, and so on), and it was obviously based on an ecological perspective. Yakushima National Park is strong evidence for forest conservation practices. The biodiversity of its species is identified and categorized using the biological diversity and fauna of World Heritage properties, such as *Abies firma* (Japanese fir), *Apodemus speciosus* (Large Japanese Field Mouse), *Ardisia crenata* (Coralberry), *Camellia sasanqua* (Camellia), *Castanopsis cuspidate* (Chinquapin),

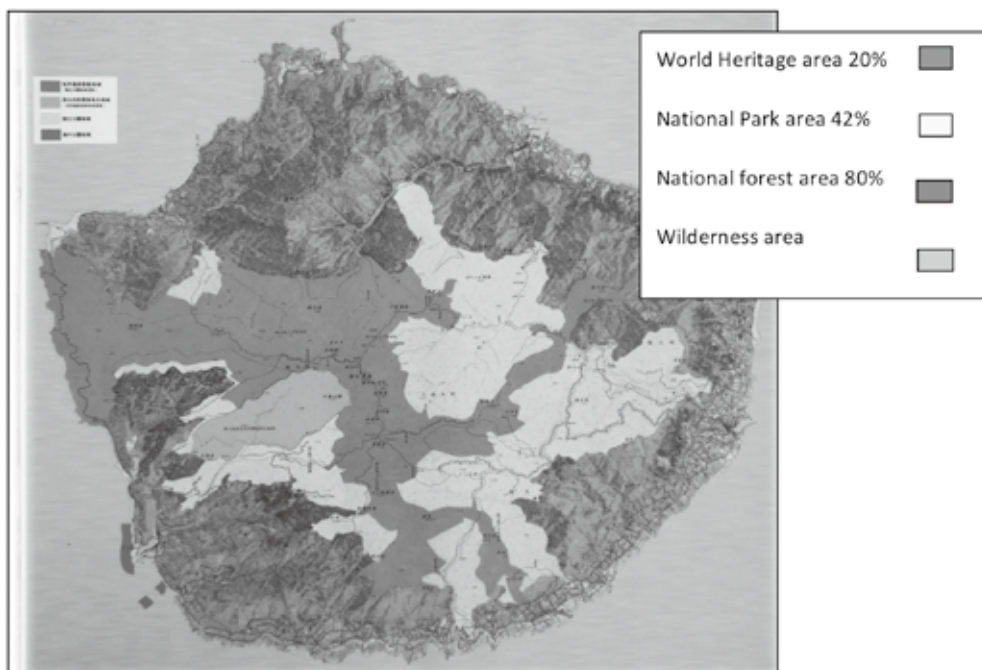


Fig. 2. Protected areas on Yakushima Island by type, modified from Yakushima Protected Areas Map.

13 It is defined as an area that fulfills the following conditions: (1) it has not been affected by the activities of man, (2) it has preserved the primitive conditions, (3) it is of considerable area in size, and (4) its natural environment is to be conserved. This definition is by the Director-General of the Environment Agency, according to the Nature Conservation Law (MOE document 2004).

14 Yakushima World Heritage Area Management Plan 2010, published by Ministry of Environment Japan (MOE).

15 Yakushima World Heritage Area-Management Plan 2010: 43, published by Ministry of Environment Japan (MOE).



*Cervus Nippon* (Sika Deer), *Chloranthus glaber*, *Columba janthina* (Japanese Wood Pigeon), and *Cryptomeria japonica* (Japanese cedar)<sup>16</sup>.

There is just one town on Yakushima Island, named Yakushima-cho, within which there are 24 villages. The total population in 2010 was 13,589 persons (6,641 males and 6,948 females). The working population (15 to 64 years old) was 57.3% of the population (4,005 men and 3,774 women)<sup>17</sup>. Recently, the population has mostly worked in the primary industry (agriculture, forestry, and fishery). From this perspective, the islanders and outsiders have interacted, and, therefore, a harmonious coexistence between nature and people should be maintained on Yakushima Island.

### **Implementation of Partnership Management**

The discussion on partnership management at Yakushima National Park as a World Heritage site, which actively involves stakeholders, such as direct and indirect actors (government, private sector, NGOs, academics, and local people), covers some issues to be considered, such as a landscape protection, protecting animals and plants, patrols to control the special and protected zone, bringing in portable toilets, and conducting research in wilderness areas. In addition, it was interesting to review local farmers' responses regarding orange farms' environmental services, such as water use from the dam and waterfall for electrical power supplies provided by *Yakushima Denko* (Yakushima Electricity Company).

As discussed above, three institutions (the MOE; Forestry Agency of Kyushu-Yakushima branch office; and the local government, namely, Yakushima Town Office) are responsible for developing partnerships to manage and monitor the Yakushima National Park and World Heritage site. Therefore, the first part of the discussion concerns a Landscape Protection Agreement as an objective of the Natural Park Law. The relevant actors, such as the Forestry Agency, local government, MOE, park management organizations, and other stakeholders (e.g., local community and local authorities), must recognize that constructing buildings or other structures that might alter the natural environment or landscape is restricted. Moreover, felling trees and removing other plants, extracting soils or rocks, capturing animals, influencing biodiversity, and other activities in the special and core zones are strictly forbidden.

In this context, park operations can be conducted through necessary partnership management among landowner (Forestry Agency), MOE, local government, and park management organizations that have the ability to manage lands in national parks and quasi-national parks. Based on the agreement, park management organizations are created to manage and protect the land on behalf of the landowner. In this sense, park management organizations have a duty to perform vegetation restoration, maintain park facilities, disseminate information, and so on. Another task of the MOE, the Yakushima Environmental Culture Learning Center, and the Yakushima World Heritage Conservation Center near Anbo is to hold poster exhibitions about national parks. They provide necessary

<sup>16</sup> Yakushima-UNESCO World Heritage Centre 2010, see the website (<http://whc.UNESCO.org/en/list>).

<sup>17</sup> National Census 2010, Yakushima Office 2011.

information on World Heritage performance by disseminating information and offering training on awareness to students, visitors, and local communities that focuses on protecting the environment and the forest ecosystem (interview on January 23, 2013).

The MOE office holds trainings and academic scientific committee discussions on the environment and natural ecosystem for local communities, students, visitors, and NGOs' officers at least twice per year. In addition, the Forestry Agency provides signboards on the characteristics and ages of the trees, plants, animals, and vegetation in the natural recreation forest. The Forestry Agency also constructs boardwalks in the natural recreation forests of Shiratani Unsui-kyo, the Jomo Sugi Cedar area, the natural recreation forest in Yakusugi Land, Arakawa district, and hiking areas in the mountains. The funds for the wooden walkway, stairs, forest operations on reforestation, salaries, and maintenance of forest trees derives from the sales of trees at least 30 years old that are identified for cutting in the national forest areas by a private company. For example, the prices of *Sugi* and *Hinoki* were JPY 15,000/m<sup>3</sup> and JPY 18,000/m<sup>3</sup>, respectively, in 2012-2013. Meanwhile the local government (*Kagoshima Prefecture*) was tasked to construct and maintain the transportation infrastructure, such as roads and bridges toward recreation facilities from Anbo to Yakusugi Land and from Miyanoura to Shiratani Unsui-kyo and its surroundings.

The second part of the discussion considers the need to protect animals and plants. One mission of Yakushima National Park and the other natural parks is to protect exceptional natural landscapes (forests, coral reefs, fauna, and flora). Capture or collection of animals and plants inside national parks' and quasi-national parks' special zones is prohibited without permission to ensure the diversity of the natural parks' ecosystems. According to an interview with a Forestry Agency officer in Anbo, the increasing numbers of monkeys and deer (populations of approximately 20,000 and 15,000, respectively), which exceed the local human population of Yakushima of 13,589 persons, threaten forest rehabilitation (young tree leaves) and local agriculture (oranges and vegetables). The Forestry Agency has been tasked to cover fences for forest rehabilitation in the special zones to protect young trees from monkeys and deer (interview on January 22, 2013). To slow the increase in the number of deer, the Forestry Agency invited a Sakura Jima Hunting Association from Kagoshima City to cull the deer (Fig. 3). For example, it was determined that, in 2012, 340 to 400 deer could be culled and returned to the earth. One deer costs JPY 5,000 to be exactly paid for the hunter.

The third part of the discussion is about establishing patrols to control activities in the special and protected zone. To achieve these patrols, a partnership is needed among the Forestry Agency, the MOE, and local staff. Furthermore, ranger staff under the authority of the Forestry Agency has increased from 10 to 30 rangers using volunteers.



Fig. 3. *Yakusika* (profile view of a Deer of Yakushima).

Fourth, the discussion concerns plans to provide portable toilets for *Jomon Sugi* and to charge each visitor an entrance fee of JPY 1,000. Both issues were put forth by the Yakushima Town Office, which invited other stakeholders, such as the MOE branch office, the Forestry Agency, the Tourist Association, and members of the local community. Ultimately, the Yakushima Town Office took responsibility for handling the portable toilets in certain places and a recycling system for the waste (interview on January 23, 2013). The goal of the plan was to reduce the number of tourists to *Jomon Sugi*, particularly during the peak season, which experiences about 300,000 visitors. This huge number of people were causing environmental damage and pollution. The plan was implemented in the middle of 2013.



Fig. 4. Kigensugi tree in Yakusugi Land area. The tree has a circumference of 8.1 m and is estimated to be 3,000 years old.

During the peak of tourism season (July and August) and the golden week in May, tourists pour into Yakushima for hiking, mountain climbing, and visiting the natural recreation forest in *Jomon Sugi*, Shiratani Unsuikyo, and Yakusugi Land (Fig. 4). The role of the Park Management Officer, which is supported by the local governmental office (policing/enforcement aspect) is to strictly ban the use of individual vehicles in certain recreational areas because of limited parkland. Therefore, visitors should use public transportation (e.g., bus) from Miyanoura and Anbo to certain destinations in the recreation natural forest. The prohibition of individual vehicles is intended to prevent damage to vegetation, habitats, and the breeding environments of wild animals by road vehicles in the parklands.

Fifth, there is a discussion on conducting research in the wilderness areas. Studies on ecology should create professional research partnerships, such as universities, Yakushima World Heritage Conservation Center, and the Yakushima Forest Environment Conservation Center. The goals of the ecological research are to learn about the current natural environment by collecting new plant and ecosystem specimens. The results of the research should produce academic reports and documents, and should disseminate information to public users (interview on January 23, 2013).

#### **NPOs (Non-Profit Organizations)**

One relevant NPO is Yakushima Biodiversity, which aims to protect endangered species and to collect basic data on plants, such as *Gentiana*, *Yakushima pinus amamiana*, and *pinus armandi*, in the special zone. Kenshi Tetsuka is a leader of Yakushima Biodiversity, who

manages 160 members and conducts fieldwork on endangered species during the summer. Altogether, there are 1,900 plants and 90 endemic species registered in Yakushima National Park. To conduct fieldwork over a three to four day period, the NPO establishes a camp in the forest and uses a GPS system to map and monitor conditions. The NPO collects basic data on endangered species for Yakushima Town Office. It also disseminates information to educational institutions in Yakushima, such as elementary through high schools, about the ways that they work to maintain nature and the ecosystem (forest trees and plants) and publishes basic data for the socialization of the next generation. The NPO's funds derive from the Yakushima Town Municipality Office and Yakushima Environmental Culture Foundation.

The importance of protecting *umigami* (sea turtle) is urgent in the Nagata Inaka-hama Beach area. In addition, the Japanese belief that the *kame* (turtle) is the symbol of life is because it can live to 100 years of age (interview on February 6, 2013). The turtle is identified as an endangered species by the *CITES (Convention on International Trade in Endangered Species)* of Wild Flora and Fauna Convention, and the Japanese government has worked to protect it. The turtle actually migrated from Inaka-hama beach to Canada, United States (USA) beach while they still baby and median age and returned again in adult age to original place (Inaka-hama), Nagata area for having eggs and breeding in summer time namely in June and July. As shown in the passway picture that most turtle had color red and and blue color (Fig. 5).

The local government collaborated with Yakushima Umigame-Kan, an NPO, to protect the turtles. The local government provided office space for the NPO in the Nagata village area near the Inaka-hama Beach by renting houses to NPO volunteers and providing infrastructure for a turtle life exhibition. Tickets to the exhibition cost JPY 800 for a video and lecture on the regulation campaign (such as not using artificial lights at the beach, not walking on certain sandy areas, providing a guide for every visitor to the beach) (interview on March 7, 2013). The NPO officer also campaigned and is actively involved in increasing the participation of local people and elementary through secondary school students. For example, the officer has campaigned to ban the use of turtle eggs as food, to protect the landscape, and to clean the beach twice each year.

In fact, there are two species of turtle (red and blue) visited at the Nagata village beach. Both species must be protected according to the CITES Convention. Because of the NPO's campaign, the local people have gained awareness of protecting the turtle population of the Nagata Inaka-hama Beach and visitors' behaviors are friendlier toward the ecosystem (interview on February 6,



Fig. 5. The red and blue turtles at Inaka-Hama Beach, Nagata village.

Table 2. Blue turtle breeding variations from April through December in the Inakahama Beach Area.

Month	No. of landings	No. of breeding	Normal	Abnormal	% of frequency breeding
4	9	4	339	0	44.4
5	660	418	6,704	59	63.3
6	1,845	1,071	9,368	11	58.0
7	2,344	1,140	13,563	24	48.3
8	141	78	0	0	55.7
9	0	0	0	0	-
10	0	0	0	0	-
11	0	0	0	0	-
12	0	0	0	0	-
Total	4,999	2,711	30,217	94	54.1

Source: *Yakushima no Okeru Umigame Setai Chosa Hokoku* (Research Report on Turtle Life in Yakushima, NPO Yakushima Umigame-Kan, 2011).

2013). For example, 200 turtle eggs were found in 1987, 1,500 turtle egg were counted in 1989–2000 (an average of 136 per year), which increased to 4,000 eggs in 2000–2013 (an average of 308 per year). This change was very likely due to the success of the campaign aimed at the local community to protect the turtle eggs.

A field survey<sup>18</sup> estimated that every egg in a range of 1,500–2,000 units just live to be children 100 and among of them could to be an adult reached 3–10. It is frequently often that turtle almost the range time 60 years do not give ‘eggs’ because of lack their meal and happened on environmental pollution. The reason for the declining numbers of baby turtles is that, although most of them could swim as far as Canadian and the US beaches, most of them are eaten by predators, such as sharks or whales. Some of them die because they are caught in fishing nets. However, some adults just make swimming in near distance, such as the surrounding South Korean and China Sea. Obviously, the campaign to protect turtle is very necessary. This means that the campaign directed at the local people and students to maintain turtle habitat has had a positive effect. In June and July, which is the peak of the turtle breeding and egg-laying period in the Inaka-Hama Beach sand, many visitors come to watch this fascinating process of turtle life (Table 2).

The NPO office in Nagata village also collaborated with Fukuoka and Miyazaki NPOs to help them maintain turtle life in their areas. Sharing among NPOs for turtle maintenance is very significant. There are challenges, such as climate change, which is influencing ocean currents changes in the sea and is related to El Niño storms. These factors should be considered as threats to future efforts to maintain the turtle population.

### Environmental services

The stakeholders' maintenance of Yakushima National Park has produced sustainable ecosystems, green forests, water supplies, and an advantageous environment. A sustainable water supply from the forest to the river and waterfall eventually could be used for

18 NPO Office Report 2011.

Table 3. Generator production (kW).

Type	Generator	Permitted Power
Water	Tenpirodaki	1,300
	Anbo River 1	23,200
	Anbo River 2	34,000
	Total	58,500
Diesel	1	6,200
	2	6,200
	3	12,750
	Total	25,150
Total		83,650

Source: Yakushima Denko (2011).

hydropower by an electricity company and for agriculture. For example, there are several waterfalls, such as *Senpiro-no-taki*, *Torohki-no-taki*, and *Ohko-no-taki*, and the river in Anbo. In this sense, environmental service derives from forest resources that ultimately produce water for Yakushima Denko. The electricity company regularly produces 83,650 kW, of which almost 90% is used for local household energy supplies, private companies, governmental offices, and public uses in Yakushima. This company started operation as *Yakushima Denki Kogyo* in June of 1952. About 49.5% of the shareholders belong to Taheo Semento, 22.4% belong to Showa Denko, 5.9% belong to Higashi-sho, 4.9% belong to Mizuho Cop Bank, 4.4% belong to Nihon Rutsubo, and 3.7% belong to Nihonkoe. The breakdown of the 83,650 kW of hydropower produced for electricity production is shown in Table 3. The turbine generator engine uses the Fuji Denki brand.

### The Management System

The electricity company independently uses a clean management system, and it usually audits its finances using a public accountant. It is necessary to implement management that is responsible to all of the shareholders. The company is very healthy in its operations and achieves annual profits. The company seeks no economic incentives or subsidies from the government. It functions in a normal market. As a result, Yakushima Denko distributes electricity to consumers based on a rational market. The company annually pays Kagoshima Prefecture for environmental services to maintain the water supply, which costs about JPY 85,000,000 (interview on February 5, 2013).

In 2012, Yakushima Denko celebrated 60 years in operation. The company shows its commitment to participate in maintaining the sustainability of the Yakushima National Park ecosystem by using one to two percent of its profits on corporate social responsibility through donations to and sport competitions in local communities and governmental offices. For example, the company donated a bus with 30 seats to the Yakushima Town Office, and it has sponsored competitions, such as soccer, cycling to the mountainside, and sea fishing. These events actively involved the NPO, local community, and elementary, secondary, and high school students. Friendships and mutual understandings between consumers and the company resulted from these events. These activities are very important to healthy and

accountable businesses on Yakushima Island.

There are some challenges to maintaining adequate water supplies, which had happened at least twice annually. The temporary outages were due to climate change, such as big El Niño effects, *taifu* (storms), and electrical activity in the atmosphere. When the water supply stops, it eventually stops the hydropower needed to generate the electricity, and the company then makes an effort to use diesel to guarantee that the electricity always flows.

The Yakushima protected areas were designated as World Heritage in 1993. The water use is very strictly monitored because the public and the NPO can participate in management control by reading information and empirically understanding the situation, but tourists simply hike and climb mountains. The company obtains 100% of its water supply from forest resources. Thus, the company is actively involved in maintaining forested areas, particularly protected forests and wilderness areas, by partnering with the Forestry Agency and the MOE.

### **Local farmer Responses to Plant Orange Groves**

Farmers own land outside the Yakushima National Park forest, and they have occupied the land that borders the national forest for a long time. According to the informant, their land originally was passed down from their grandparents (the current farmers are third generation). In Mugio district near Anbo, there are 156 households, of which about 30% are categorized as farming households. During the 30 years since about 1993, while Yakushima Island was being considered for World Heritage designation, most of the farmers cultivated orange groves that were very fruitful and productive. However, circumstances have recently changed. Most of the farmers are aging (65–70 years old) and there is no regeneration. Most of the young adults work in Kagoshima City or other cities. Only a few households continue to work the orange groves. For example, Michihiro is 60 years old and his wife, Chiyomi, is 58 years old. He has two daughters, one of whom is married, and she and her husband would like to continue working as farmers. This family owns four ha of orange groves.

Michihiro previously worked as a shop manager in Miyanoura. He gained experience with local agricultural products, distribution, and the marketing of agricultural goods. He is familiar with trading and became licensed with a certificate in agricultural management through institutional training in Kagoshima City before he decided to be a farmer. To operate their farm, this family gets support from volunteers from Tokyo Agricultural University. For example, in 2012, volunteers worked at the orange grove for one to two months and received accommodations, but no pay. According to Daisuke, an informant, he prefers to be a volunteer to learn in the field for practical farming, production, distribution, and marketing (interview on February 6, 2013). This valuable experience is necessary to his future job to be an entrepreneur in agro-bisness.

The Tangkang Orange tree (Fig. 6) from Kagoshima was originally developed in Okinawa, Ogasawara, and Miyazaki, but most of those areas have declined in production. For example, Okinawa suffered an insect contamination and production declined over a decade. In contrast, the orange trees planted without fertilizer or other chemicals are very



fruitful. The Tangkang Orange from an organic farm is appealing, and Yakushima Island has a suitable climate, weather, and soil to plant and develop the Tangkang Orange. Originally, farmers used fertilizer made of waste and animals. The brand of the Tangkang Orange product from the eco-farm is the Hankan Tangkang. Production began 20 years ago (1993), and, when the orange trees were young, they yielded 30 tons per ha. The highest production occurs in January and February



Fig. 6. Tangkang Orange tree in Mugio, Yakushima.

(winter) or during the rainy season. Recently, production only reached 15–18 tons per ha because most of the trees are aging. The aging trees will be cut down because, theoretically, the bases renew soon after they reach 20–25 years old (interview on February 6, 2013).

Kagoshima Prefecture, through the Yakushima Cho office, gives economic incentives to the farmers, particularly the orange farmers. The incentive has been a subsidy to farmers not as direct money, but indirectly by paying for about 50% of the cost of fences to protect the fruit from monkeys to help maintain the farms. The government also installed a water supply pipe under the road to water the cultivated land. The reasons for the incentive highlight maintenance of the brand image that Yakushima Island is the largest orange producer in Kagoshima Prefecture. Therefore, the Tangkang Orange is very fruitful and fascinating as an *omiyage* (special gift) for tourists and is displayed in shops in Kagoshima City, particularly in Miyanoura and Anbo.

The purpose of the Tangkang Orange should highlight sustainable business. Therefore, to achieve the company's goal to share knowledge with young people, particularly those who want to explore volunteer work on orange farms, the company focuses on the values on mutual help, understanding, and friendship to deliver the product throughout the Japanese market on time through entrepreneurship and accountable management. The company is prepared for regeneration and to compete with other companies in the future. To reach this goal, the Tankan Company is open to any students who want to practice agricultural principles, production, and management. Because the company has had success as a producer of oranges and in processing products from oranges, such as juice, ice creams, chocolates, and sweets, the processing aspect is economically viable and gives additional value, such as income, job creation, and diversification. The constraints of orange farming in the field are threats, such as birds, monkeys, heavy rains, and sometimes *taifu* (storms) during the winter.

### Tourists and Hotels

During the process of becoming a national park, the numbers of tourists visiting Yakushima Island were relatively low (Tables 4–5). When Yakushima National Park was



Table 4. Numbers of three largest tourist visits to the Kagoshima Islands.

Island	Fiscal year 1970	Fiscal Year 1971	Fiscal year 1972	Total
Nagashima	19,000	21,000	31,500	71,000
Tanegashima	26,000	51,000	71,000	148,000
Yakushima	97,000	122,000	147,000	366,000

Source: *Kagoshima Kikakubu Rito Shinkoka* (Promotion of Developing Project of Tourism Kagoshima Prefecture, 1974).

Table 5. Tourist accommodations by island, 1972.

Island	No. of <i>Minshuku</i> and hotels	Capacity / No. of people
Nagashima	6	169
Tanegashima	7	260
Yakushima	24	1,420

Source: *Kagoshima Kikakubu Shinkoka*, 1974.

Table 6. Tourist visits to Yakushima Island (by ship or airplane) after World Heritage designation.

Year	Ship	Airplane	Total	Compared(%) to previous year
1996	195,880	56,958	252,838	98.5
1997	202,721	61,013	263,734	104.3
1998	211,288	68,447	279,735	106.1
1999	193,927	66,234	260,161	93.0
2000	191,570	71,507	263,077	101.1
2001	209,697	76,580	286,277	108.8
2002	204,531	85,004	289,535	101.1
2003	228,436	86,330	314,766	108.7
2004	203,271	90,561	293,832	93.3
2005	231,332	85,552	316,884	107.8
2006	251,239	81,985	333,224	105.2
2007	332,028	74,359	406,387	122.0
2008	310,531	75,456	385,987	95.0
2009	251,931	75,930	327,861	84.9
2010	258,062	75,157	333,219	101.6

Source: *Tane-Yaku-Kanko-Renraku Kyogikai* (Yakushima Tourist Bureau, published by Yakushima Town Office Statistic (2012).

designated a World Heritage site in 1993, tourism on Yakushima Island by air and ship rapidly increased between 1996 and 2010, and there were 94 registered tourist agencies. According to a Yakushima Town officer, the rapid growth in tourism highlights two factors. First, the establishment of the natural recreation forest in *Jomon Sugi*, *Shiratani Unsuikyo*, *Yakusugi Land*, and so on were well managed and maintained by stakeholders. Second, the tourist agencies launched an effective campaign for eco-tourism in the mass media (television and Internet) that influenced domestic and foreign tourism (interview on January 23, 2013).

The increasing numbers of tourists after 1993 positively correlated with the rapid

Table 7. *Yakusugi Shizenkan* (visitors to Yakusugi Museum), Fiscal Years 1991– 1992 through 2010–2011.

Fiscal Year	No. of visitors	Fiscal Year	No. of visitors
1991–92	25,049	2001–02	45,088
1992–93	31,889	2002–03	51,028
1993–94	32,258	2003–04	58,271
1994–95	38,354	2004–05	54,219
1995–96	40,975	2005–06	46,716
1996–97	47,275	2006–07	39,991
1997–98	38,776	2007–08	44,202
1998–99	45,256	2008–09	50,379
1999–00	42,253	2009–10	41,523
2000–01	40,688	2010–11	41,915

Source: *Yakusugi-Shizenkan* (Visitor in Yakusugi Museum, published by Yakushima Town Office Statistic (2012)

development of *minshuku*,<sup>19</sup> *ryokan*,<sup>20</sup> and hotels on Yakushima Island. Transportation modes for tourists, such as ships and airplanes also rapidly developed (Table 6). The numbers of visitors to Yakusugi Museum increased (Table 7), suggesting that eco-tourism at the Yakushima National Park and World Heritage site was a favorite among tourists in Japan from the 1990s until 2011. In addition, the paper focuses to appeal the profile of Yakushima Nature Activity Center (YKNA) as Tourist Agency and also three owners of Minshuku in Yakushima as integral part of participation to establish tourist sector.

### Tourist Guide Agencies

MATSUMOTO Takashi is the President of Yakushima Nature Activity Center (YKNA/ Tour Agency). He previously lived in Tokyo. Currently, his wife is the editor of the journal *Shemeno shima* (The Island Life). He likes to stay on Yakushima Island because of the atmosphere, his children's educations, and because there is no pollution. He stated that tourism is rapidly developing into an industry and that urban people inherently appreciate the excellent environment (interview on February 6, 2013).

The company was established in 1993. He needed only eight months to decide whether to establish the company, after which he conducted fieldwork and a feasibility study to start the business. The company's philosophy is to help maintain the ecosystem, nature, forests, and waters, and to actively involve tourists to appreciate and to maintain the natural

19 "Minshuku": A private house own by an individual person providing bed and meals. The *minshuku* has rapidly developed to more than 41 units; the cost is about JPY 8,000 per night since Yakushima became a World Heritage in 1993. The hotels accounted for 11 units in 2012, such as the big hotels (Iwasaki, Sankara, JR Hotel, Yakushima Grand Hotel, Seaside Hotel, and so on). The cost of hotels were more than JPY 15,000 per night (see Practical Travel Guide, Yakushima Island, 2012) (<http://www.jnto.go.jp>), accessed January 12, 2013.

20 "Ryokan" are Japanese-style hotels. There are a few *ryokan* in Yakushima, such as Shisuikan, Kamome-so, and Tashiro Bekkan. The cost of *ryokan* exceeds JPY 8,000–15,000 per night. Most older visitors prefer *ryokan* over hotels. For the students, there are youth hostels, such as Portside and Yakushima Youth Hostel, and the cost is less than JPY 8,000. There also are guest houses, such as *Wa no Cottage Sen no ie* and *Chinryu-an*.

environment. In this sense, eco-tours are tourists' favorite target, which is to *Jomon Sugi*, because tourists can observe the ecosystem of forest, landscape, geology, plants, animals, insects, and so on. Tourist can travel to *Jomon Sugi*, with takes about five or six hours on foot, and can use their five senses along the way. Yakushima National Park and World Heritage site represents a complete environmental ecosystem, such as forests, plants, waters, and animals.

The company has an obligation to maintain and conserve nature programs through lectures to *Shogakko*, *Chuogakko*, and *Kotogakko* (elementary through high school) at least once per year. The subject of the training and discussion with students in school and of practice in the field is ecosystem interaction among plants, animals, and so on. In addition, the lessons on eco-guide how to keep pupils' mind and behave in order to appreciate the nature. Many high school students are interested in becoming tour guides and they can join the company. This company is widely open to any tour guide who wants experience and income. The rationale is that Yakushima National Park has many resources and is interesting to the many tourists to visit here.

### **The Workforce**

The company has four permanent staff, but the tour guide profession has about 200 workers. These workers can work with the company, particularly during the golden time in May and in summer (June-August) when tourism is at its peak, for hiking, mountain climbing, kayaking the Anbo, and visiting Nagata Inka-hama to see the turtles on the beach. In July through September of 2012, the number of tourists reached 1,300 per day. During ten days in September, tourists spent two or three days there, and the number was 300 to 500 people total. The flood of tourists during the summer has created a busy time for the company's tour guide service. The tour guide fee for a one-day trip to *Jomon Sugi* is JPY 15,000/per person. The height of the tourist experience is a visit to *Jomon Sugi* in summer, where tourists usually spend one night. This has led to the discussion on portable toilets and charging every tourist JPY 1,000 to enter the *Jomon Sugi* area (which would go to maintenance of the environment and nature). The stakeholders related to the Tourist Association include the travel agency's hotels, individual hotels, NGOs on environmental nature, the MOE, and the Forestry Agency's branch office. In 2013, Yakushima Town Office invited these stakeholders to discuss a regulation to bring portable toilets and the entrance fees. According to the Yakushima *Cho* (town) Officer, it will be decided this year (2013). To this point, the company has not been paying taxes to the Yakushima Town Office, but it gives a voluntary donation.

### **Conclusion**

Yakushima was a logging area from 1923 until 1970, when it was stopped due to forest degradation that eventually created soil erosion and flooding. The ecological damage shifted attention to ecological conservation, which focused on tourism in the newly

established national park. As discussed, Yakushima National Park and World Heritage site is categorized as a unique and fascinating area of Japan for eco-tourism. One aspect of the uniqueness of Yakushima Island is that nature and humans have worked together to create an environment conducive to a healthy lifestyle. In this sense, the close relationship and coexistence of the local community and the environment on Yakushima Island is being encouraged as a community development model based in Kagoshima Prefecture.

The effect of best quality on environment could encourage urban people with high incomes to visit as tourists and return to the natural life. They are deeply aware that, to recover health, spirit, inspiration, and motivation to improve work performance, nothing is better than a visit to the highest quality environment and ecosystem, such as forests, plants, animals, waters, and seaside beaches. The need for better performance is provided by the high quality of the Yakushima environment as an eco-tourism destination.

The tourism industry after Yakushima National Park was designated as a World Heritage site in 1993 boomed from 147,000 registered tourists in 1972 to 252,838 registered tourists in 1996. In 2010, there were 333,219 registered tourists. The growth of tourism created a need for public transportation (airplane, ship, bus, and rental car), restaurants, hotels and *minshuku*, tour guide travel agencies, electricity, and so on which correlated with the economic growth on Yakushima Island in particular and Kagoshima City in general.

Hence, Yakushima as a National Park and World Heritage site should be properly managed through partnership management in synergic cooperation with other institutions on some strategic issues, such as a protecting landscapes, protecting animals and plants, patrolling to control the protected and special zone, and maintenance of the *Jomon Sugi* environment (most frequented tourist destination) by installing portable toilets, and conducting research in the wilderness area. For example, the partnership management model has been practiced by the MOE, Forestry Agency, local government (Yakushima Town Office), and park management organizations to share ideas and cooperate on construction in the Natural Recreation Forest (*Shiratani Unsuikyo*, *Jomon Sugi*, and *Yakusugi Land*). Efforts are directed at public infrastructure (roads and bridge), stairs, signs, control of animal populations (e.g., deer and monkeys), forest rehabilitation, and research in the wilderness area.

In addition, the roles of other stakeholders, such as NGOs; *Yakushima Denko* (Yakushima Electric Company); Tourist Guide Agency Association; and Hotel, *Minshuku*, *Ryokan*, Youth Hotel, and Guest House Association are very significant. In this context, the protection of turtle life regarding breeding and eggs in Inaka-hama Beach, Nagata village, through the socialization of local people and tourists has been very productive and fruitful. The turtle is categorized as an endangered species (*CITES* Agreement) and Japan is a signatory to the agreement.

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