

# Management Plan for the Shiretoko World Natural Heritage Site



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# Management Plan for the Shiretoko World Natural Heritage Site

## 1. Introduction

The Shiretoko World Natural Heritage Site (the “heritage site” ) and its surrounding marine areas are located in the southernmost area of the seasonal sea ice in the northern hemisphere. Phytoplankton blooms, which are triggered by ice algae (algae growing on the bottom surface of the seasonal sea ice) and intermediate water with rich nutrient salts (created by vertical mixing when seasonal sea ice is formed) form the base of a food web that supports a diverse range of wildlife in the area.

The chum salmon (*Oncorhynchus keta*), pink salmon (*O. gorbuscha*), masu salmon (*O. masou masou*) and Dolly Varden (*Salvelinus malma*) of Shiretoko travel between the sea and rivers and serve as an important food source for a wide range of wildlife including large mammals such as the brown bear (*Ursus arctos*) and endangered birds of prey such as Blakiston’s fish-owl (*Ketupa blakistoni blakistoni*), Steller’s sea eagle (*Haliaeetus pelagicus*) and white-tailed eagle (*H. albicilla*) as well as various marine mammals and seabirds. The rich and varied ecosystems are supported by diverse wildlife consisting of northern and southern species as well as by their coactions which reflect the complex interactions of the natural environment of land and sea. The heritage site’s natural beauty is outstanding as the area is filled with an assortment of landscapes including the steep peaks of the Shiretoko mountain range formed by volcanic activities, virgin forests which cover the mountainside, sheer cliffs along the coastline, and various marshes, lakes, and swamps.

Shiretoko was inscribed on the World Heritage List at the 29th Session of the World Heritage Committee meeting, as it was decided the site met the criteria for the outstanding universal value.

The natural environment of the heritage site, which contains globally

extraordinary value, is a common asset for all humanity and should be preserved in good form for future generations.

## 2. Objectives

In preserving the value of the heritage site in good form for future generations, the Management Plan for the Shiretoko World Natural Heritage Site (the “management plan” ) was developed to appropriately conserve and manage the extremely diverse, unique, and valuable natural environment of the heritage site.

The management plan clarifies the basic policies related to such issues as operating relevant legislations and promoting various programs, in order to implement an adequate and effective administration of the heritage site by the Ministry of the Environment, the Forestry Agency, the Agency for Cultural Affairs and Hokkaido Government, which are responsible for the various systems related to the conservation and administration of the heritage site (the “relevant government agencies” ), taking into consideration the advice of the Shiretoko World Natural Heritage Site Scientific Council, in close collaboration and cooperation among; Shari town and Rausu town (the “local governments” ); and other concerned governmental agencies and organizations closely involved in the conservation, management and utilization of the heritage site, including organizations related to fishery and tourism (the “related bodies” ).

## 3. Overview of the heritage site

### (1) Location and area size






The heritage site consists of a part of the Shiretoko Peninsula, located at the northeastern tip of Hokkaido flanked by the Sea of Okhotsk and the Nemuro

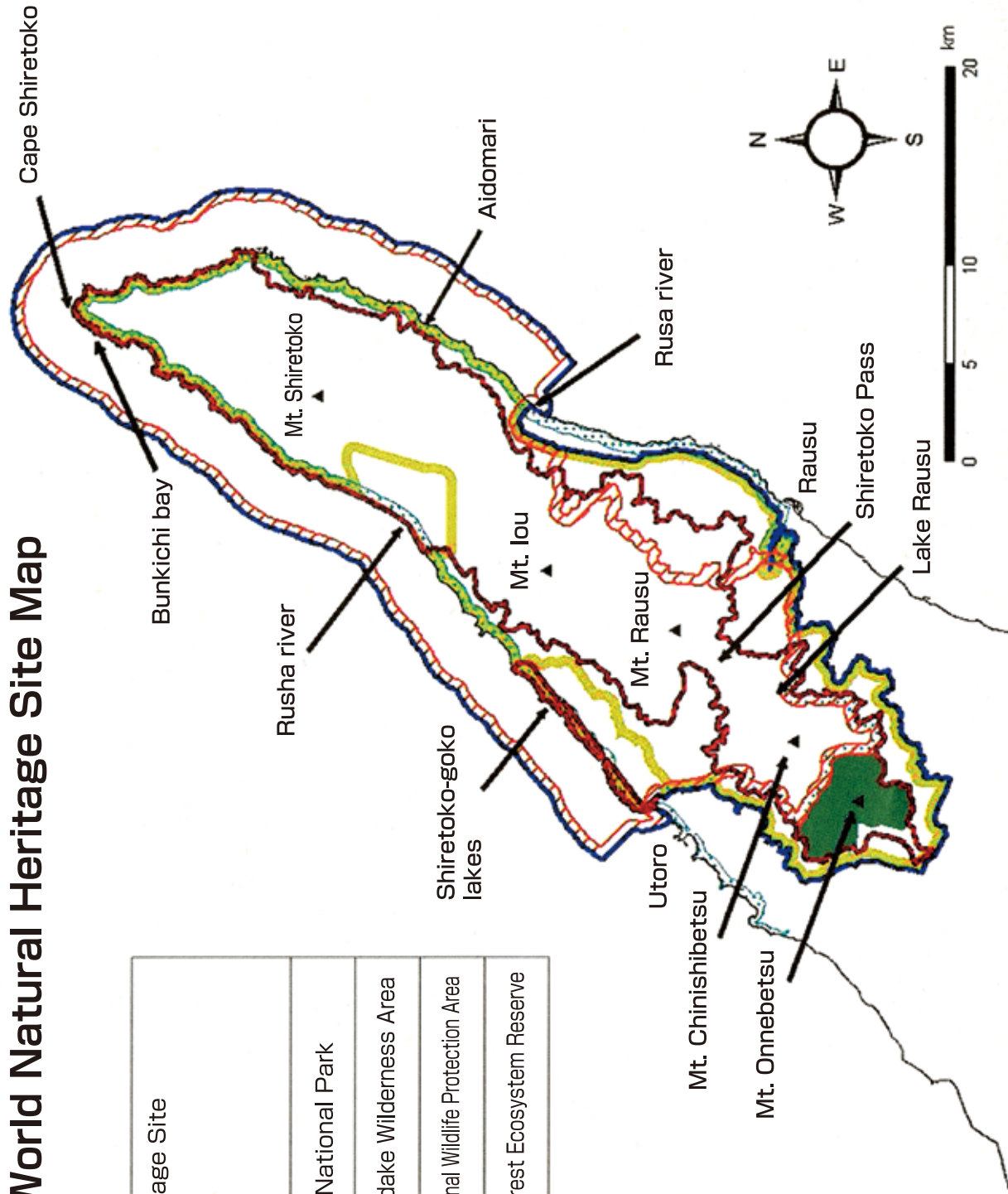


PHOTO:Ministry of the Environment

# Shiretoko World Natural Heritage Site Map

## Legend

World Natural Heritage Site	
	Area A
	Area B
Shiretoko National Park	
	Onnebetsudake Wilderness Area
	Shiretoko National Wildlife Protection Area
	Shiretoko Forest Ecosystem Reserve



Strait between 43° 56' 58" N to 44° 21' 08" N and 144° 57' 57" E to 145° 23' 02" E, and its surrounding marine areas within three kilometers from the coastline.

The relevant municipalities for the site are Shari town, Shari-gun and Rausu town, Menashi-gun in Hokkaido prefecture.

The size of the heritage site is approximately 71,100 hectares (including approx. 22,400 ha of marine area).

## (2) General description

The heritage site is one of the few rare locations in Japan where the virgin natural environment has been preserved. The steep peaks created by volcanic and other orogenic activities and sheer cliffs shaped by marine erosion have protected the rich nature and supported its diverse wildlife.

The heritage site is an outstanding example of the interaction of marine and terrestrial ecosystems which reflect the unique characteristics of the seasonal sea ice area at the lowest latitude in the northern hemisphere. Phytoplankton blooms, which are triggered by ice algae under seasonal sea ice and intermediate water with rich nutrient salts (created by vertical mixing when seasonal sea ice is formed), are the base of the food web including fish, birds and mammals that forms dynamic ecosystems of the sea, rivers and forests. In addition, the heritage site features a unique composition and distribution of species, reflecting the geographical location and diverse natural conditions. As it is situated near the eastern edge of the distribution areas of southern species and at the southwestern tip of the migratory route of northern species from the Kuril Islands, the heritage site is an area where wildlife of northern and southern species coexist. Further, the heritage site is an important breeding or wintering ground for many globally threatened species such as Blakiston's fish-owl (*Ketupa blakistoni blakistoni*) and Steller's sea eagle (*Haliaeetus pelagicus*) and therefore, it is an essential habitat for the conservation of these species. Furthermore, the natural beauty of the heritage site is outstanding, with its virgin landscape which dramatically changes with the four seasons.

The heritage site includes a number of protected areas (Onnebetsudake Wilderness Area, Shiretoko National Park, Shiretoko Forest Ecosystem Reserve and the Shiretoko National Wildlife Protection Area) designated by the Ministry of the Environment and the Forestry Agency to ensure that the natural environment is secured and preserved, undamaged from the effects of human activities. Furthermore, in the Iwaobetsu area, a part of the heritage site that underwent agricultural development in the past, private land was offered to the public domain for conservation by the Shiretoko 100 Square-Meter Forest Movement Trust, and efforts there are underway to recover nature to its original form.

## (3) Natural environment

### a. Topography and geology

The heritage site is located in the Shiretoko Peninsula which is a narrow and long peninsula approximately 25 kilometers in width at its base and 70 kilometers in length, jutting into the southern boundary of the Sea of Okhotsk. It is flanked by the Sea of Okhotsk on the west and the Nemuro Strait on the east. On the east side of the Shiretoko Peninsula lies Kunashiri Island in a close parallel with the peninsula. Mountains higher than 1,500 meters above sea level are situated along the center of the peninsula including the

highest peak of Mt. Rausu (altitude 1,660m). Apart from some marine terraces, the landscape on the peninsula is steep, with little flat ground between the peaks and the coastline. The peninsula was formed by various topographic forces such as plate movements, volcanic activities, and marine erosion which created a wide range of landscapes including curious rock formations, sea cliffs and volcanic terrain. Among the active volcanoes in the peninsula, Mt. Iou (altitude 1,562m) is world famous for spewing approximately 200,000 tons of molten sulfur in eight months in 1936.

### b. Climate

As the Shiretoko Peninsula juts out into the Sea of Okhotsk, the sea largely influences the climate of the heritage site, and the site is thus one of the areas with the highest snowfall in eastern Hokkaido. In addition, the existence of the Shiretoko mountain range has a large impact on the climate and there is a significant difference in temperature and precipitation between east and west sides of the peninsula. The Rausu side receives a high precipitation as the humid southeastern winds from the sea blow towards the Shiretoko mountain range in summer and low temperatures are frequent due to the development of sea fog. In winter, there is relatively heavy snowfall and temperatures are higher than the Shari side due to the influence of the marine climate. On the other hand, the Shari side has hot summers with little precipitation because of the foehn phenomenon on the north of the Shiretoko mountain range and of the effects of the Soya current. The temperature is low in winter due to the seasonal northwestern winds and the seasonal sea ice, which reflects more sunlight than seawater and blocks the heat from the seawater under the seasonal sea ice.

### c. Seasonal sea ice

Due to topographical and geographical conditions, the Sea of Okhotsk is the most southern (lowest latitude) ocean in the northern hemisphere as a seasonal sea ice area. The northeastern part of the Eurasian Continent, windward of the Sea of Okhotsk, is the Pole of Cold in the north hemisphere and extreme cold air outbreaks effectively chill the seawater. In addition, because the surface layer of the Sea of Okhotsk has low salinity and density, the convection current in winter can not reach the deeper layers.

When seasonal sea ice is formed in the north of the Sea of Okhotsk, intermediate water of low temperature and high salinity is produced. A portion of this intermediate water, rich in nutrient salts, spreads to the marine areas surrounding the Shiretoko Peninsula. In addition, the heritage site and its surrounding areas are situated at the southern edge of the zone where the seasonal sea ice formed in the Sea of Okhotsk reaches coasts. Ice algae proliferates under seasonal sea ice and the intermediate water



PHOTO:Ministry of the Environment



with rich nutrient salts (created by vertical mixing when seasonal sea ice is formed) rises to the surface layer due to a vertical mixing effect, triggering phytoplankton blooms which form the base of a food web consisting of zooplanktons that feed on the phytoplankton and the higher level consumers such as fish, marine mammals, and terrestrial wildlife.

#### d. Plants

The majority of the vegetation of the heritage site is preserved in virgin condition. While the altitude difference is only some 1,600 meters from the coast to the mountain peaks, alpine plants such as Japanese stone pine (*Pinus pumila*) and other alpine plant communities are developed at relatively low altitudes, and diverse vegetation is distributed vertically at the site.

In the coastal areas, the vegetation consists mainly of alpine/arctic to subalpine/subarctic plants which cover areas such as rocky coasts and the surrounding area with little development of soil.

The forest vegetation in the low altitude areas consists of a mosaic of three types of forests:

- the cool temperate deciduous broad-leaved forest with species such as Japanese oak (*Quercus mongolica* var. *grosseserrata*) and painted maple (*Acer pictum* subsp. *mono*) etc.
- the subarctic evergreen coniferous forest with species such as Sakhalin fir (*Abies sachalinensis*) and Sakhalin spruce (*Picea glehnii*) etc.
- the mixed forest which is a combination of the above cool temperate deciduous broad-leaved forest and subarctic evergreen coniferous forest.

In the subalpine zone, evergreen coniferous forests are not well-developed; instead, deciduous broad-leaved forests consisting primarily of Erman' s birch (*Betula ermanii*) and *Alnus maximowiczii* spread out. The area above the timberline is extensively covered by Japanese stone pine scrub, and local existence of wind beaten areas, snow patches, and marsh communities are found within this area as well. Despite the relatively low altitude of the vegetation, the alpine vegetation consists of diverse plant communities and creates an outstanding and beautiful landscape.

The flora is rich in variety as it contains both northern and southern species. The vascular plant flora is diverse as there are many northern species in alpine plants, while southern species co-exist. The terrestrial vascular plant flora of the Shiretoko Peninsula contains 107 families and 872 species, and alpine plants account for more than one quarter of them with 233 species. Among the alpine plants are rare species such as *Viola kitamiana*, *Chrysanthemum arcticum*, and *Astragalus japonicus*. Due to the effects of the Soya current which is the only warm current in the Sea of Okhotsk, there are both cold current-based seaweeds (which distribute also around the Kuril Islands and Sakhalin) and warm current-based seaweeds (which are mainly distributed around Hokkaido and further south) in the coastal sea areas of the Shiretoko Peninsula in spite of being situated in a seasonal sea ice area. The seaweed flora is unique in that it contains many species of warm current-based seaweeds. There are 140 species of seaweed recorded in the coastal sea areas of the Shiretoko Peninsula. Among them, there are seaweeds with a limited distribution range such as *Cymatohaere japonica*.

#### e. Animals

The heritage site supports a diverse fauna which combines northern species from Sakhalin and southern species from the main island of Japan. Almost all the terrestrial mammals and birds that widely inhabited Hokkaido in history are found at the heritage site due to its pristine virgin nature.

With regard to mammals, 36 species of terrestrial mammals and 22 species of marine mammals have been identified in the Shiretoko Peninsula and its coastal sea areas. Among them, there are globally rare species such as the Steller sea lion (*Eumetopias jubatus*) and sperm whale (*Physeter macrocephalus*). In addition, the high densities of large mammals such as the brown bear (*Ursus arctos*) and sika deer (*Cervus nippon yesoensis*) also indicate that the Shiretoko Peninsula is a high quality habitat for terrestrial mammals. In particular, the density of the brown bear population is among the highest in the world. Furthermore, the coastal sea areas of the Shiretoko Peninsula are the important wintering, feeding and breeding area for marine mammals.

With regard to birds, 275 species of birds have been recorded in the Shiretoko Peninsula including globally rare species such as the Blakiston' s fish-owl and Steller' s sea eagle. Furthermore, the heritage site is identified to be a breeding ground for Blakiston' s fish-owl, white-tailed eagle (*Haliaeetus albicilla*) and black woodpecker (*Dryocopus martius*) as well as the wintering ground for Steller' s sea eagle. These species are all designated as the Natural Monuments due to their scientific significance. The heritage site is the most important breeding ground for Blakiston' s fish-owls, providing a habitat to roughly half of the species' pairs that breed in Hokkaido. It is also the most important wintering ground for Steller' s sea eagle, gathering nearly 1,000 wintering individuals.

With regard to fish, 42 species of freshwater fish and 261 species of marine fish have been identified in the Shiretoko Peninsula and its coastal sea areas. The coastal sea areas of the Shiretoko Peninsula are mainly populated with northern fishes. However, due to the Soya current which is the only warm current in the Sea of Okhotsk, there are many species of southern fishes usually seen in tropical and subtropical seas. As a result, the area is unique within the Sea of Okhotsk in terms of the fish fauna. It is one of the key characteristics that the salmonids are significantly dominant in rivers within the heritage site.

In addition, there are eight species of reptiles, three species of amphibians and more than 2,500 species of insects reported to inhabit the Shiretoko Peninsula.

## (4) Social environment

### a. History

The nature of the heritage site has been preserved in a virgin condition due to the harsh environmental conditions which hindered development and a high level of interest among the local inhabitants on nature protection.

Prehistoric artifacts dating up to several thousand years ago have been found in the Shiretoko Peninsula. The Ainu people, in particular, were influenced by Okhotsk Culture (created by a northern fishing/hunting people who had flourished on the Sea of Okhotsk coast in around the 10<sup>th</sup> century), and had worshiped the Blakiston' s fish-owl, brown bear, and killer whale (*Orcinus orca*) as their gods. The culture they developed (hunting, fishing, plant collection, etc.) reflected that they valued the bountiful nature surrounding them.

Operation of fishing grounds began in the Shiretoko Peninsula in the 19<sup>th</sup> century. On the Rausu side, in particular, immigrants who came mainly from Toyama Prefecture started full-scale fishery development focused on cod in

the 1880s, which developed into the current diverse fisheries that cover chum salmon (*Oncorhynchus keta*), pink salmon (*O. gorbuscha*), walleye pollock (*Theragra chalcogramma*), squids, and kelp. On the Rausu side at the apical region of the Shiretoko Peninsula, some hundreds of fishery operators stayed in the area in summer to do production activities such as harvesting kelp. On the Shari side, whereas only a small number of small-scale set net fisheries had been operated before the war, people who came home after the war rapidly developed the fishery grounds, leading to a significant development of set net fishery of salmon and trout.

There were several attempts at agricultural development from the Taisho era (early 1900s) in the Iwaobetsu and Horobetsu areas on the Shari town side. However, due to the combination of harsh natural environment and changes in social conditions, settlers had gradually left the area by around 1975. Around the same time, there was increasing interest in nature protection, which led to the designation of the Shiretoko National Park in 1964. This was followed by other protected areas being designated, including the Onnebetsudake Wilderness Area, Shiretoko Forest Ecosystem Reserve, and the Shiretoko National Wildlife Protection Area. A joint program by residents and the local municipality, “The Shiretoko 100 Square-Meter Forest Movement Trust” was started in 1977 with the aim to protect abandoned agricultural lands from unregulated development and recover them as forest areas.

The nomination documents were submitted to the World Heritage Committee in January 2004, and the site was subsequently inscribed on the World Heritage List in July 2005.

#### b. Utilization of the site

As of December 2007, approximately 1.95 million tourists annually visit the Shiretoko National Park and its adjacent areas which cover a large portion of the heritage site. In particular, the Shiretoko-goko lakes, Horobetsu, Kamuiwakka, Shiretoko Pass and Rausu hot spring are popular tourist sites: as an example, some 500,000 visitors explore the nature of the Shiretoko-goko lakes annually.

There has been a change in the types of visitors, and their activities are becoming more diversified. In addition to the traditional type of visitors who join sightseeing and nature exploration tours by coach or boat, there has been an increase in visitors who participate in more active programs such as mountain climbing, trekking, and sea kayaking.

#### c. Primary industries

A large part of the heritage site (terrestrial) is covered by National Forest, the

majority of which is designated as the Shiretoko Forest Ecosystem Reserve, and currently, there are no forestry operations aiming for timber production. Fishery is the main industry for the area. The sustainable use of marine resources such as chum salmon, pink salmon, walleye pollock and kelp is promoted, with the support of high productivity of the sea.

#### d. Land ownership

National Forest, which is administered by the Forestry Agency, accounts for 95 percent of the heritage site (terrestrial). The remainder of the heritage site includes lands owned by the national government, Hokkaido Government, Shari town, Rausu town, and some private landowners.

### (5) Protective systems

The heritage site is designated as the Wilderness Area, National Park, Forest Ecosystem Reserve, and National Wildlife Protection Area.

In addition, the wildlife species in the area include the brown bear, Blakiston’s fish-owl, Steller’s sea eagle and white-tailed eagle and some of these species are protected in accordance with the Law for the Conservation of Endangered Species of Wild Fauna and Flora and Law for the Protection of Cultural Properties.

With regard to the fishery, the sustainable use of fishery resources is designed through measures such as domestic laws and regulations as well as autonomous restrictions by the fishery industry.

#### a. Wilderness Area

Wilderness Areas are designated and administered by the Minister of the Environment based on the Nature Conservation Law. Its purpose is to provide necessary protection for virgin natural environments of a significant scale without being influenced by human activities.

Based on the above law, the area surrounding Mt. Onnebetsu was excluded from the Shiretoko National Park and designated as the Onnebetsudake Wilderness Area in February 1980. The entire area of the Wilderness Area is included in the heritage site.

All activities that may impact the conservation of the natural environment are prohibited in the Wilderness Area except for special circumstances such as scientific research. The prohibited activities include: construction, reconstruction and extension of structures; logging and related activities; capturing/releasing animals or gathering/planting plants; gathering fallen leaves and branches; open fires.



PHOTO:Forestry Agency



PHOTO:Forestry Agency

## **b. National Park**

National Parks are designated and administered by the Minister of the Environment based on the Natural Parks Law. Its purpose is to protect the places of scenic beauty as well as promote its utilization as a resource for the health, recreation and culture of the people.

Based on the above law, the Shiretoko National Park was designated in June 1964. The entire area of the park is included in the heritage site. The park is classified into several zones based on the regulatory plan and each zone is protected according to the relevant requirements: The Special Zone is an area important for the protection and the utilization of the park. Activities such as the construction, reconstruction and extension of structures and logging require a permission of the Minister of the Environment. The Special Protection Zone is an area necessary to ensure the protection of the core parts of the park and is protected with more stringent requirements. In addition to the construction, reconstruction and extension of structures, and logging and related activities, activities such as capturing/releasing animals or gathering/planting plants, gathering fallen leaves and branches, and open fires require a permission of the Minister of the Environment. In the Ordinary Zone, activities such as reclamation of the surface of water require a notification to the Minister of the Environment. Furthermore, walking trails and visitor centers are developed in accordance with the utilization plan for the park in order to ensure the protection of nature and to promote adequate utilization.

## **c. Forest Ecosystem Reserve**

Forest Ecosystem Reserves are designated and administered by the Forestry Agency based on the Law on the Administration and Management of National Forests. Its purpose is to maintain the natural environment of the forest ecosystem, protect plants and animals, preserve genetic resources, develop forest operation and management technique, and promote scientific research etc. by preserving areas of virgin natural forests in reasonable scales which represent the forest zones in Japan. The reserves are set out and managed according to the Forest Management Plan based on the National Forests Administration and Management Bylaw, which defines details on plan creation for the actual administration activities of each region.

Based on the regime as described above, the central part of the Shiretoko Peninsula was designated as the Shiretoko Forest Ecosystem Reserve in April 1990. Further, the area was extended up to the Onnebetsudake Wilderness Area west of the Shiretoko Crossroad in April 2004. The Preservation Zone contains forest unit in the most virgin condition and measures are being implemented to ensure that this forest ecosystem is strictly preserved. Excluding special circumstances such as academic research activities and natural disaster relief, in principle, the area is left to follow its natural course without human intervention. The Conservation and Utilization Zone works as a buffer in order to prevent the environmental changes of the surrounding area to impacting on the forests in the Preservation Zone. In this zone, forestry operations for wood production is not allowed. In accordance with the natural conditions, the area is utilized as an educational or a recreational site without involving any large-scale development.

## **d. Wildlife Protection Area**

National Wildlife Protection Areas are designated by the Minister of the Environment based on the Wildlife Protection and Appropriate Hunting Law. Its purpose is to designate the areas of importance from the viewpoint of

international and national wildlife protection.

The area designated as the Shiretoko National Wildlife Protection Area and Special Protection Area in November 2001 based on the above law, overlaps with the heritage site. Hunting activities are prohibited in the area designated as Wildlife Protection Area. Areas deemed to be an important habitat and breeding site for wildlife are designated as Special Protection Area and certain development activities are prohibited in such areas. Furthermore, a part of the Special Protection Area is designated as Designated Special Protection Area which is under more stringent protection requirements. In addition to collecting or gathering plants except for trees and bamboos, capturing animals, and collecting fallen leaves and branches, the following activities are prohibited in the Designated Special Protection Area: Entering with dogs and other animals that may be harmful to the wildlife; observation or taking pictures of the wildlife which may affect their nesting behavior; etc.

## **e. National Endangered Species**

National Endangered Species are endangered animals or plants that inhabit or grow in Japan which are designated by the government ordinance according to the Law for the Conservation of Endangered Species of Wild Fauna and Flora.

Among the animals which inhabit the heritage site, bird species such as the Blakiston's fish-owl, Steller's sea eagle, white-tailed eagle have been designated as the National Endangered Species and activities such as capturing, killing or damaging and transfer of these species are prohibited.

## **f. Natural Monuments**

Natural Monuments are designated by the Minister of Education, Culture, Sports, Science and Technology based on the Law for the Protection of Cultural Properties. Its purpose is to protect animals or plants (including their habitats, breeding sites, stopover points for migratory birds and native habitats) and geological minerals (including areas of unique natural phenomenon) which have significant scientific value for the country.

Among the wildlife in the heritage site, four species of birds which are the Blakiston's fish-owl, Steller's sea eagle, white-tailed eagle and black woodpecker, as well as one species of insect *Vaciniina optilete* have been designated as Natural Monuments.

An activity that would alter the state of the Natural Monuments or affect their preservation requires permission of the Commissioner of the Agency for Cultural Affairs.

In addition, the Rausu geyser in the site is designated as a Hokkaido designated Natural Monument based on the Hokkaido Cultural Properties Protection Regulation and any activity that would alter the state of or affects its condition requires permission of the Hokkaido Board of Education.

## **g. Use and conservation of fishery resources**

Fishery resources are managed in accordance with autonomous regulations by fishery operators and organizations for control and utilization, breeding of resources, etc. in addition to the Regulation of Sea Fisheries Adjustment in Hokkaido and Regulation of Inland Fisheries Adjustment in Hokkaido, based on the Fisheries Law and the Fisheries Resource Protection Law.



Capture of chum salmon and pink salmon, which are major fishery resources of the Shiretoko Peninsula, is restricted in both sea and inland water, pursuant to these laws and regulations.

As regards walleye pollock, the total allowable catch is controlled by setting quotas every year according to the Law Concerning Conservation and Management of Marine Life Resources. Fishery operators, fishery organizations, and others are also making autonomous efforts in resource management utilizing various surveys, etc.

## 4. Basic policies of management

### (1) Goals of management

The heritage site is one of the few rare locations in Japan where the virgin natural environment has been preserved with its outstanding natural landscape including such features as steep mountains, sheer cliffs and seasonal sea ice. Moreover, the site is an important breeding and wintering ground for globally threatened species including Blakiston's fish-owl (*Ketupa blakistoni*), and Steller's sea eagle (*Haliaeetus pelagicus*). There is also a dense population of brown bear (*Ursus arctos*). Management of the heritage site aims to conserve the state of the natural environment and its diverse wildlife for future generations.

In particular, such management will be conducted as to maintain the values of the following criteria that were recognized by the World Heritage Committee at the time of inscription:

#### Criterion ix

Shiretoko provides an outstanding example of the interaction of marine and terrestrial ecosystems as well as extraordinary ecosystem productivity, largely influenced by the formation of seasonal sea ice at the lowest latitude in the northern hemisphere.

#### Criterion x

Shiretoko has particular importance for a number of marine and terrestrial species. These include a number of endangered and endemic species, such as the Blakiston's fish-owl and the plant species *Viola kitamiana*. The site is globally important for a number of salmonid species and for a number of marine mammals, including Steller sea lions (*Eumetopias jubatus*) and a number of cetacean species. The site has significance as a habitat for globally threatened sea birds and is a globally important area for migratory birds.

### (2) Viewpoints required for management

#### a. Collaboration and cooperation with the local communities

In order to capitalize on the local perspective from the local governments, related bodies, and local residents involved in conservation and utilization of the heritage site on a daily basis, the relevant government agencies responsible for the various systems will implement management in close collaboration and cooperation with local governments, other government agencies, and related bodies.

To ensure effective collaboration and cooperation among relevant government agencies, local governments, related bodies and the like, the Shiretoko World Natural Heritage Site Regional Liaison Committee (the "Regional Liaison Committee") has been established as a point for liaison and coordination of

the heritage site's management and for consensus building, while various opportunities are exploited to hear opinions and suggestions from a wide spectrum of local residents and related bodies to utilize the traditional wisdom about local use of nature in the site's management.

#### b. Adaptive management

As the heritage site's ecosystem consists of a wide variety of species and is complex, its future prospects are uncertain. This kind of ecosystem requires adaptive management. Therefore, relevant government agencies, local governments, related bodies, experts and others will conduct monitoring and research in collaboration. Relevant government agencies will review the heritage site's management method flexibly by conducting reexamination, etc. of the management plan, monitoring, and research according to the results. In order to advance adaptive management based on such research, monitoring, evaluation, and the results thereof, the Shiretoko World Natural Heritage Site Scientific Council (the "Scientific Council") has been established to obtain advice from a scientific standpoint.

#### c. Comprehensive management of the terrestrial and marine areas

The value of the heritage site as a World Natural Heritage lies in a rich marine ecosystem consisting of a wide range of marine life, its interaction with a virgin terrestrial ecosystem, and a diverse fauna and flora. Depending on these unique features, the site serves as an important habitat for globally threatened species including the Blakiston's fish-owl and Steller's sea eagle.

Based on the conditions of terrestrial and marine indicator species, status of plant communities and vegetation, and environmental state of water quality and flow, monitoring will be conducted on the integration and soundness of the terrestrial and marine ecosystems of the heritage site. When there are any indications of changes that may affect the natural environment, a scientific research will be conducted to analyze the cause and to determine restoration measures. Necessary actions will be taken to comprehensively conserve and manage the terrestrial and marine ecosystems.

In order to achieve the above objectives, a system to facilitate collaboration and cooperation among relevant government agencies, local governments, related bodies and experts will be established. Information sharing as well as developing and securing of human resources will be accommodated for research and monitoring projects.

#### d. Management by area classification

Included within the heritage site are areas where the virgin natural environment is preserved and areas where the natural environment is maintained in coexistence with such human activities as tourism and fishing. These areas will be managed in accordance with classifications as Areas A and B, respectively.

Area A is where strict protection and management is ensured into the future. In principle, the area is left follow its natural transition without human intervention, and any act that may interfere with the conservation of the natural environment will be strictly regulated pursuant to the various protective systems. Most of this area is designated as a Wilderness Area, Special Protection Zone or Class I Special Zone of the National Park, Preservation Zone of the Forest Ecosystem Reserve, or as a Special Protection Area of the Shiretoko National Wildlife Protection Area.

Area B includes marine area, and coexistence will be pursued between the conservation of the natural environment and utilization (including such activities as sustainable tourism and fishing) which do not harm the value of the heritage site. Consequently, certain acts are regulated, as necessary, to ensure conservation of the heritage site's natural environment. Most of this area is designated as a Special Protection Zone, Special Zone or Ordinary Zone of the National Park, Conservation and Utilization Zone of the Forest Ecosystem Reserve, or as Shiretoko National Wildlife Protection Area.

#### e. Coexistence with primary industries

Most of the National Forests, which account for 95 percent of the heritage site (terrestrial), are designated as the Shiretoko Forest Ecosystem Reserve, and currently, there is no forestry operations for timber production conducted within the site. Although there is a small area of privately owned forests within the site, forestry operations are limited to forest management such as planned tree thinning which takes into account the virgin natural landscape.

Due to phytoplankton blooms, which are triggered by ice algae and intermediate water with rich nutrient salts (created by vertical mixing when seasonal sea ice is formed), the marine areas surrounding Shiretoko are extremely rich in biological resources compared with other marine areas. The viability of the fishery industry relies on a healthy marine environment. Supported by the bountiful sea surrounding Shiretoko, the fishery industry aims to realize sustainable use of marine resources by taking necessary measures to assure coexistence with the wildlife of the heritage site.

#### f. Recreational use and conservation of the natural environment

On the premise that the virgin natural environment of the heritage site is conserved into the future and continue to enthrall people, its use for tourism, nature exploration, mountain climbing, fishing, etc. will be done in a suitable manner without making a negative impact on the natural environment. To ensure this, the Committee on the Promotion of Proper Use of Shiretoko National Park consisting of experts, related bodies, local governments, relevant government agencies and others formulate and review necessary plans and utilization rules based on scientific knowledge while ensuring consensus building in the region. In addition, the Shiretoko Eco-tourism Association will take the lead in spreading efforts based on the concept of ecotourism. Through these activities, conservation of the virgin natural environment will be ensured in a manner compatible with its recreational use, including tourism, which is a major industry in the region.

#### g. Management from a broad perspective

The heritage site will be properly managed in consideration of the following:



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the areas that are adjacent to the site and have commonality or continuity with the site's ecosystem, such as the bordering area with Russia and the base of the Shiretoko Peninsula, etc.; and global issues such as climate change, which have a serious impact on the site's ecosystem.

## 5. Management measures

### (1) Conservation of the terrestrial ecosystem and natural landscape

#### a. Basic concept

In order to conserve the virgin nature, biodiversity and outstanding landscapes of the heritage site for future generations, the basic approach focuses on maintenance and conservation of the structure and function of the ecosystems.

The basic approach is letting the natural transition take its course in principle. However, if any specific species or human activity has a significant negative impact on the ecosystem, effective measures will be taken to mitigate the impact.

#### b. Conservation and management of wildlife

##### i. Plants

The heritage site contains diverse plant communities, summarized as follows: forest communities including mixed forests of Japanese oak (*Quercus mongolica* var. *grosseserrata*), painted maple (*Acer pictum* subsp. *mono*), Sakhalin fir (*Abies sachalinensis*) and Sakhalin spruce (*Picea glehnii*), deciduous broad-leaved forests of Erman's birch (*Betula ermanii*) and *Alnus maximowiczii*, and Japanese stone pine (*Pinus pumila*) scrub; alpine plant communities along the mountain ridges; marsh plant communities around the mountain lakes and marshes; coastal plant communities from the coastal gravel field to surrounding cliffs and steep slopes; wind beaten grassland and tall-herb communities on top of the sea cliffs. The areas which contain such diverse plant communities have been designated as the Onnebetsudake Wilderness Area, the Special Protection Zone and Special Zone of the Shiretoko National Park as well as the Shiretoko Forest Ecosystem Reserve. Based on these protective systems, the site is adequately managed through coordination and cooperation built among relevant government agencies, experts, and other related bodies

As regards the vegetation of the heritage site, the following conditions are found for each vegetation zone:

##### Alpine zone (alpine vegetation):

Parts of the climb routes and designated camping sites around the Shiretoko mountain range have been desolated and there is a concern that use by climbers may have an impact on the marsh vegetation around the Shiretoko Swamp. Moreover, sika deer (*Cervus nippon yesoensis*) have been gradually spreading into the alpine zone in recent years, as evidenced by the grazing signs found on *Viola kitamiana*.

##### Subalpine zone (Erman's birch forest, *Alnus maximowiczii* forest and coniferous forest):

Though there is a slight grazing pressure by sika deer, no significant impact is found.



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Montane zone (coniferous/deciduous mixed forest):

Forest structure is changing under the influence of the grazing pressure by sika deer in nearly all areas at altitudes below 300 meters. The influence is especially significant in the wintering places on the Shari side including the Shiretoko Cape (forest area), the Rusha river basin, Horobetsu and Iwaobetsu.

Coast (costal vegetation):

Impact of the sika deer grazing pressure is found in almost every part excluding rocky and conglomerate areas. There is a significant decrease of the plant species more preferred by sika deer, notably in the Rusha area and the Shiretoko Cape (grassland area). User tread pressure on the grassland vegetation and invasion by alien species are found in the Shiretoko Cape.

Based on the conditions above, the following measures will be taken against the impact of human trampling, sika deer, and alien species.

While taking into account the diversity of the plant communities as well as the distribution of rare species, research and monitoring will be conducted in the areas important for the protection of such species. The results will be used to mitigate human impact and to determine appropriate conservation measures. In particular, the study on vegetation damage by human trampling will be continued in the Shiretoko mountain range, areas around Shiretoko Swamp, and Shiretoko Cape to determine appropriate measures such as the entry restriction, adequate guidance, and vegetation restoration. In addition, patrolling activities will be enhanced through coordination and cooperation with relevant government agencies and local governments to prevent the illegal collection of rare species such as the *Viola kitamiana* and *Chrysanthemum arcticum*.

With regard to the grazing pressures of the sika deer, surveys will be conducted on regular basis to identify the damage to the vegetation and to analyze necessary measures. In the wind beaten grassland and tall -herb communities of the Shiretoko Cape, significant damages to vegetation are caused by deer grazing and trampling. In these particular areas, deer fences have been installed for each type of vegetation to preserve endemic gene resources. In addition, monitoring will be conducted to investigate the recovery status of vegetation by removal of grazing pressure. Further conservation measures will be reviewed reflecting the results of these studies.

In addition, special attention will be given to determine the expansion of

sika deer' s impact on vegetation, with focus on the areas around the sika deer wintering places that are already seriously affected, the alpine zone that has been unaffected by the grazing pressure, and the coastal vegetation that is in good growing condition.

As regards alien plants, efforts will be made to ascertain the current state of their invasion and establishment, focusing on the coastal area, while considering countermeasures such as control and awareness programs, according to the level of impact on the ecosystem and landscape as well as efficiency of controlling.

In the area of "The Shiretoko 100 Square-Meter Forest Movement Trust" , an operation to restore the forest will be promoted with participation from a wide range of citizens, taking into account the harmonization with the surrounding forest ecosystem.

## ii. Animals

The heritage site (terrestrial) is designated as the Onnebetsudake Wilderness Area, the Special Protection Zone and Special Zone of the Shiretoko National Park as well as the Shiretoko Forest Ecosystem Reserve. These schemes ensure the conservation of habitats for a diverse wildlife from large animals with an extensive home range such as brown bears (*Ursus arctos*) and Blakiston' s fish-owl (*Ketupa blakistoni blakistoni*) to fish, amphibians, reptiles and insects that depend on the restricted specific environments. Furthermore, capturing, killing or damaging of wildlife is prohibited in the Wilderness Area and the

Special Protection Zone of the National Park. In addition, most of the heritage site is designated as the Shiretoko National Wildlife Protection Area in which hunting is prohibited and capturing wildlife requires a permission of the Minister of the Environment. The above measures are taken to ensure the appropriate management of wildlife.

According to the Master Plan of the Shiretoko National Wildlife Protection Area (March 2003), wildlife conservation and management activities will be implemented based on the following principles. In addition, since a number of wildlife may move within and outside the heritage site, the surrounding areas will also be considered in promoting conservation and management through the collaboration and coordination with relevant government agencies and local governments.

A.The basic concepts for habitat protection focus on maintaining and conserving the original structure and function of the ecosystems. As regards



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the significantly increased or decreased wildlife species, scientific research will be conducted to determine the present state and cause of such change, and to review necessary countermeasures.

B.Research will be conducted to study wildlife status, population trends, habitats and behaviors. Conservation and management plans will be developed for each wildlife species as necessary. In the operation of the plan, the present state will be monitored to feedback in reviewing the plan.

C.Awareness programs for the coexistence of people and wildlife will be promoted including guidance on appropriate use of the site, instruction of not feeding the wildlife and taking waste home, and information on wildlife behavior and habits.

D.In the basins of the Rurika and Teppanbetsu rivers which are designated as the Designated Special Protection Area of the Wildlife Protection Area, activities that affect the wildlife such as collecting or damaging plants, open fires, use of horses or vehicles, and photographing/filming are restricted.

E.The details of specific management policies for each wildlife species are described below.

#### (a) Sika deer

The population of sika deer has risen dramatically since the late 1980s. Currently, the density of the sika deer population is very high in the Shiretoko Peninsula, having a negative impact on the ecosystem and natural landscape, including significant changes in the original vegetation in certain areas such as that on the Shiretoko Cape. Management of sika deer inhabiting the Shiretoko Peninsula will be conducted in accordance with the Sika Deer Management Plan in the Shiretoko Peninsula (attached document), which was established with the aim of addressing this situation.

Management of sika deer throughout Hokkaido is conducted by Hokkaido Prefecture. As the distribution of sika deer spreads from the heritage site to the base of the peninsula and as there is interaction between the populations, management of sika deer in the Shiretoko Peninsula will be carried out in close coordination with the sika management of Hokkaido as a whole. This will include situating the Sika Deer Management Plan in the Shiretoko Peninsula as a regional plan of the Conservation and Management Plan for Sika Deer in Hokkaido.

#### (b) Brown bear

In order to appropriately conserve and manage the brown bear population in the heritage site which is among the highest density in the world, the population dynamics will be studied through projects such as behavior survey using radio transmitters and survey on the utilization status of the habitat. In particular, actions to reduce the conflicts between visitors or local residents and the bears include the removal of attractants and measures to scare away the bears as well as establishing rules including restricted actions, maintaining appropriate facilities, promoting awareness and offering information to visitors.

#### (c) Blakiston' s fish-owl

The Blakiston' s fish-owl has been designated as a National Endangered Species according to the Law for the Conservation of Endangered Species of Wild Fauna and Flora and as a Natural Monument according to the Law for the Protection of Cultural Properties. Capturing, damaging and killing the owl are prohibited. In addition, Programmes for Rehabilitation of Natural Habitats and Maintenance of Viable Populations are established based on the former law and the relevant operations are conducted in collaboration and cooperation of relevant government agencies and experts.

Most of the Blakiston' s fish-owls in the heritage site are breeding in natural conditions and only few are dependent upon artificial food supplies. Therefore, the site is a crucial habitat for the conservation of this species. It is also suggested that the site is a "source" of this owl to the surrounding areas as chicks from the breeding pairs distribute and relocate to adjacent areas.

Based on these conditions, extra effort will be made to maintain the natural environment of the areas around the rivers where breeding pairs have been identified and measures to improve habitat conditions are implemented as necessary. Furthermore, visitors are instructed not to disturb the owls' habitat. Ongoing projects will be continued with a focus on individual management of the owls, including monitoring on breeding behavior and banding to identify the relocation, distribution, and survival of fledged chicks.

#### (d) Steller' s sea eagle (*Haliaeetus pelagicus*) and white-tailed eagle (*H. albicilla*)

Both the Steller' s sea eagle and white-tailed eagle have been designated as National Endangered Species according to the Law for the Conservation of Endangered Species of Wild Fauna and Flora and as Natural Monuments according to the Law for the Protection of Cultural Properties. Capturing, killing and damaging the eagles are prohibited.

The coastal slopes of the heritage site are extensively covered with forests which are a suitable habitat for the eagles. The site is the most important environment in Hokkaido for Steller' s sea eagles and white-tailed eagles as it is the essential wintering ground that these eagles can use on a steady basis. In addition, the site is an important breeding ground for white-tailed eagles, with a high density of nests and breeding pairs. Therefore, measures are taken to conserve the forest on the coastal slopes. Furthermore, guidance and awareness programs are provided to prevent reckless approach of visitors to the nesting sites during the breeding season.



In addition, using lead bullets for hunting sika deer in Hokkaido is strictly prohibited to prevent lead poisoning of the Steller's sea eagle and white-tailed eagle.

As for comprehensive implementation of measures to protect Steller's sea eagles and white-tailed eagles, efforts will be made for identifying their migration route and behaviors while promoting research on their food sources, etc. according to the Programmes for Rehabilitation of Natural Habitats and Maintenance of Viable Populations which were established pursuant to the Law for the Conservation of Endangered Species of Wild Fauna and Flora.

#### c. Conservation of the natural landscapes

Conservation of the outstanding natural landscapes of the heritage site, represented by its mountains, lakes and marshes, waterfalls and coastal terraces, will be promoted through measures based on protective systems of Wilderness Area, National Park and Forest Ecosystem Reserve. Such measures include: the appropriate operation of the restrictions on construction, reconstruction, extension of structures, logging, and mining of minerals or extracting of soil or stones; implementation of projects related to protection and restoration of vegetation; and management of ecosystems.

In addition, waste which has drifted onto the coastline will be removed through the collaborative and coordinated efforts of relevant government agencies, local governments, related bodies and local residents.

#### d. Measures against alien species

Invasion by alien species such as raccoon (*Procyon lotor*), American mink (*Mustela vison*), large earth bumblebee (*Bombus terrestris*), and cutleaf coneflower (*Rudbeckia laciniata*) is confirmed in the Shiretoko Peninsula. Given the concern over the impact of these alien species on the heritage site's ecosystem, measures need to be advanced in different stages, including prevention of invasion to the site, early detection of and response to invasion, and extermination or control of established alien species. For this purpose, understanding regarding the current establishment state of alien species will be promoted to presume invasion routes, and implement effective measures, awareness programs, etc. considering the level of their impact and efficiency of these measures, while ensuring cooperation and collaboration among relevant government agencies, local governments, and other related bodies.

Pursuant to the Nature Conservation Law and the Natural Parks Law, releasing of animals and planting of plants are regulated in Wilderness Areas and Special Protection Zones of National Park, and acts such as



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raising, cultivation, storage, transfer, and release into the field are restricted in accordance with the Invasive Alien Species Act. With respect to each of these regulations, efforts will be made for their appropriate operation, and awareness programs will be promoted. In addition, translocation of five fish species, including brown trout (*Salmo trutta*) and brook trout (*Salvelinus fontinalis*), is prohibited in accordance with the Regulation of Inland Fisheries Adjustment in Hokkaido; efforts will be made toward promotion of awareness programs for these regulations as well.

## (2) Conservation of the marine areas

The marine areas surrounding Shiretoko have high biological productivity based on phytoplankton blooms, which are triggered by ice algae and intermediate water with rich nutrient salts (created by vertical mixing when seasonal sea ice is formed). The biological productivity supports numerous fish, marine mammals, and birds. In addition, the chum salmon (*Oncorhynchus keta*) and pink salmon (*O. gorbuscha*), which run upstream to spawn, are closely integrated with the terrestrial ecosystem since they play an important role as a food source for brown bears and birds of prey.

In light of the rich biologic production, fishing activities have long been operated in a manner that allows coexistence with marine life.

The marine environment and biological (primary) productivity, coastal environment, fish and shellfish, marine mammals, sea birds, sea eagles, and marine recreation will be managed pursuant to the Multiple Use Integrated Marine Management Plan for Shiretoko World Natural Heritage Site (attached document), which was established with the aim of maintaining a balance between the conservation of the heritage site's marine ecosystem and its appropriate use for human activities (such as fishing and marine recreation).

## (3) Conservation of the interaction between the marine and terrestrial areas

### a. Basic concept

The rich ecosystem of the heritage site is greatly influenced by the interaction between the marine and terrestrial areas. This significant interaction is one of the reasons allowing the heritage site to be inscribed on the World Heritage List under natural criterion ix. Among the heritage site's characteristics is the Dolly Varden (*Salvelinus malma*), which are distributed in most rivers, from their mouths to their upper reaches, making the site the southernmost distribution limit for this species' sea-run type; the salmonid also provides an important food resource for various wild animals including Blakiston's fish-owl. Other salmonids, including chum salmon and pink salmon, which run upstream on a massive scale, are an important food source for large mammals and birds of prey such as brown bear, Blakiston's fish-owls, Steller's sea eagles, and white-tailed eagles that are at the top of the food chain. This process brings marine-derived materials into the terrestrial ecosystem, thereby increasing its productivity and biodiversity.

In this way, the river environment plays a key role in nurturing diverse wildlife including anadromous fish, and organically linking the marine and terrestrial ecosystems through water and material circulations. Moreover, fishery activities for chum salmon and pink salmon, which fulfill an important role in nutrient circulation throughout the river, has long been conducted actively in the marine area surrounding Shiretoko. In fact, the area has developed with fishing as its key industry.



Therefore, conservation of the interaction between marine and terrestrial areas will be promoted through conservation of the river environment, and sustainable use and conservation of salmonids as a resource.

#### **b. Conservation of the river environment**

For fulfillment of the river environment's role as linking the marine and terrestrial ecosystems, it is important to ensure the run of salmonids. To this end, river constructions will be improved as necessary by the government agencies that administrate the respective constructions, when they are deemed adequate based on the result of the review by the Scientific Council on the impact on the run of salmonids and disaster prevention. After such improvements are made, monitoring will be conducted to ascertain the state of the run and spawning of salmonids and to investigate the effects of the improvement. Other river constructions will also be reviewed as needed, based on the changes in their intended purpose.

Before performing various types of acts that may have an impact on the river environment, their implementation methods and environmental conservation measures will be examined in order to ensure due consideration for avoiding negative effects on wildlife in the river.

#### **c. Utilization and conservation of salmonids**

Chum salmon, pink salmon, and masu salmon (*Oncorhynchus masou masou*) are captured by set net sea fishery, etc. in accordance with the Fisheries Law, etc. Fishing is prohibited within all rivers and around the mouths of some for purposes including resource conservation. In order to ensure sustainable fishery, artificial production and fry release programs for chum salmon and pink salmon are underway in certain rivers. The natural spawning of these species will be maintained by monitoring and research conducted on their migration, run, and spawning.

In this way, sustainable use and conservation of salmonids will be promoted pursuant to the Multiple Use Integrated Marine Management Plan for Shiretoko World Natural Heritage Site (attached document).

### **(4) Appropriate utilization of natural environment**

#### **a. Basic concept**

Utilization of the heritage site for tourism, nature exploration, mountain climbing, fishing, and other activities needs to be conducted appropriately such that its value as a World Natural Heritage site will be maintained for future generations. The heritage site's virgin natural environment will be preserved and conserved to offer a high-quality experience that will enthrall visitors. Based on this concept, utilization rules pertinent to the virgin nature of Shiretoko ( "Shiretoko Rules" ) will be established. In addition, certain restrictions and awareness programs will be introduced to ensure appropriate utilization of the natural environment.

#### **b. Appropriate Utilization**

In light of the fact that the heritage site has a virgin and fragile natural environment and is experiencing problems such as excessive use, appropriate management will be promoted in accordance with the Basic Plans of the Proper Use that establish policies on each utilization type, rules for use, direction of administration and others for each area.

In addition, users are asked to comply with "Instructions for Use" that establishes DOs and DON'Ts for users.

Furthermore, problems due to anthropogenic influence on the fragile natural environment and concentration of excessive use will be avoided by: dispersion of use and appropriate guidance of users through information provision and programs for resource utilization in relation to the diverse nature and culture of the region (including the areas surrounding the heritage site). In the areas where the scientific evidence shows that visitor use is causing or may cause vegetation degradation or damage on wildlife, a necessary review will be made on coordinating number of users and facilities by introducing a "Regulated Utilization Area" defined by the Natural Parks Law.

Continuous monitoring will be conducted on utilization state, impact of use on the natural environment, and similar aspects. Necessary review of the plans and rules will be done and measures, etc. will be taken based on the results thereof.

#### **c. Promotion of ecotourism**

The majority of the users of the heritage site enjoy sightseeing excursions by automobile or tour boat. In order to protect the value of the site for future generations, it is also important to introduce and promulgate other utilization types while implementing guidance to and monitoring of users. Such utilization types may include observation of wild animals and the natural environment based on experience-oriented programs provided by people who have knowledge of the area's natural environment and lifestyle, so that users may further deepen their understanding on the importance of the heritage site's natural environment and protection thereof.

For this purpose, the Shiretoko Ecotourism Association, in cooperation with the relevant government agencies, local governments, and related bodies, and based on the Shiretoko Ecotourism Promotion Plan, will develop human resources who can provide services such as nature interpretation in the field, lectures in exhibition facilities, and creation and implementation of utilization programs taking advantage of the wisdom and finely-tuned information from people who live and engage in industries in the region. To avoid making negative impact on the natural environment when providing above services, the Guidelines for Shiretoko Ecotourism has been established and effectively put into practice.

In promoting ecotourism, efforts will be made in close cooperation with the Committee on the Promotion of Proper Use of Shiretoko National Park so that they are based on the concept of ecotourism in which local communities take the initiative in creating a vigorous, sustainable community, and will be fostered in the areas of sightseeing excursion and accommodation as well.

#### **d. Policies on key utilization types**

##### **i. Sightseeing excursions**

The most popular type of utilization of the heritage site is sightseeing excursions by automobiles or tour boats. Areas within the heritage site which are open to sightseeing excursions by automobiles include Kamuiwakka, Shiretoko-goko lakes, Shiretoko Pass and Rausu hot spring. However, since there are relatively few auto routes, possible excursion areas are limited. Visitors can enjoy the scenery at various tourist bases or go on nature exploration and observation trips on foot.

In accordance with the importance of conserving the virgin natural environment of the heritage site, new automobile roads, which may create

problems of increased traffic, will not be constructed in principle. Existing tourist bases and outlook points will be appropriately maintained so that the tourists can use the facilities comfortably and enjoy the natural landscapes while adequate consideration will be given to prevent excessive use and impacts to the natural environment.

If there is any indication of negative impacts on the natural environment due to the increase in automobile use or if there is any negative effects on users' convenience, measures to reduce the impact such as restricting personal cars and introducing alternative transport means, and introducing low-emission cars will be studied. Effective measures will be determined with input from relevant local groups to limit the number of cars to an appropriate level and to establish an environmentally friendly transportation system. In particular, the possibility and effects of proactively introducing a shuttle bus as a mean to conserve the natural environment and offer a high quality experience will be studied. With regard to measures to restrict the number of cars during the summer in popular areas such as Shiretoko-goko lakes or the Kamuiwakka area, which have limited number of access roads, the effects of the enforced measures will be reviewed, and further enhancements and concretization will be studied with input from relevant local groups. Such measures will also take into consideration ensuring personal safety from brown bears while simultaneously providing opportunities for wildlife observation.

Since visitor use is particularly concentrated in the Shiretoko-goko lakes area within the heritage site, studies will be conducted to determine effective utilization restriction measures, guidance and awareness programs, appropriate facility management schemes, brown bear conservation and management programs. Necessary measures will be taken in order to prevent issues caused by excessive use and any conflict between people and brown bears which heavily populates the area.

With regard to the Shiretoko Crossroad which traverses through an alpine zone with Japanese stone pine vegetation, visitors may only pass through the area in principle (except for Shiretoko Pass) to minimize the impact to the natural environment. The existing roadside parking restrictions will be continued in addition to other measures to appropriately maintain and manage the road. Furthermore, studies will also be conducted with input from relevant local groups to determine appropriate utilization of Lake Rausu which is becoming popular with visitors recently.

There is also a concern that such activities as feeding wildlife and disposing waste may have a negative effect on the wildlife habits. In order to prevent such impact on the wildlife, compliance with necessary rules will be requested.

## ii. Mountain climbing and trekking

Mountain climbing and trekking are mainly conducted in the mountain areas in the heritage site.

Since these activities involve areas with virgin natural environments such as fragile alpine vegetation and habitats or breeding grounds for rare wildlife, it is necessary to prevent negative impacts on the natural environment. In addition, as these activities take place in areas with a dense brown bear population, encounter with brown bears is possible. Precautions are necessary to reduce conflicts with bears.

For the above reason, guidance and awareness programs will be provided on subjects such as necessary precautions to protect the natural environment,

appropriate reactions when encountering bears and proper management of waste and food. Further studies will be conducted to determine the negative impact caused by the visitors to the natural environment and the behavioral patterns of the bears. Appropriate measures such as use restrictions (e.g. closed period for trails, access restrictions by area or period) will be implemented as necessary. At the same time, trails and other facilities will be maintained to protect the vegetation and prevent danger to mountain climbers.

With regard to camping by the mountain climbers and trekkers, extensive instruction will be provided to prevent damage to plants and vegetation by thoughtless setting of tents and other activities even in camping grounds. In addition, in campsites where food lockers for protection against brown bears are available, campers will be instructed to use the lockers for their safety. In other locations, campers will be instructed through awareness programs to bring food containers. Furthermore, necessary measures will be promoted such as awareness programs on rules and etiquette on human waste management (including usage of portable latrines) in order to prevent negative effects on the ecosystem and landscape.

## iii. Recreational use of the marine area

There is a concern that reaching terrestrial areas such as the Shiretoko Cape by motor boats for sightseeing may be harmful to the natural environment. Measures to restrict such landings for sightseeing will be strictly enforced with the collaboration and cooperation among relevant government agencies based on the arrangements including the "Agreement on the instructions for usage restrictions of the Shiretoko Cape area."

In addition, the coast and marine area of the heritage site is a habitat and breeding ground for marine mammals and seabirds such as spectacled guillemot (*Cephus carbo*), slaty-backed gull (*Larus schistisagus*) and Japanese cormorant (*Phalacrocorax capillatus*). It is concerned that sightseeing and pleasure boats, jet skis, feeding wildlife and other reckless activities may harm marine mammals and seabirds. Therefore, necessary rules will be established to prevent negative impacts on the seabirds and marine mammals, and awareness programs will be implemented.

Some visitors to the heritage site circle the peninsula or travel to points of interest by sea kayak. There are cases these visitors need to land on shore to camp or wait for better wind. To prevent negative impacts on the coastal vegetations and wildlife, adequate use of the site will be promoted under necessary rules such as "Instructions for Use" .

During the run of chum salmon and pink salmon, visitors can enjoy fishing from tour boats and from land around the river mouths. With regard to fishing these species, measures to prevent damage to the natural environment include determining the landing points for fishing purposes, ensuring adherence to relevant laws and regulations, actively instructing visitors to take waste home and to correctly handle catches. Collaboration and cooperation will be sought from those involved in leisure fishing

activities for the implementation of the above measures.

Furthermore, rule compliance will be ensured to prevent disturbance to fishery production activities when using boats, jet skis and sea kayaks for sightseeing and leisure purposes as well as other marine leisure activities such as fishing.

iv. Other types of utilization

Wildlife such as sika deer and brown bear are commonly seen in the heritage site and photographing or observing may frighten the wildlife or interfere with their breeding activities. In addition, it is necessary to protect fragile vegetation in areas such as the alpine zone and marshes from being damaged by visitors straying off the trails to take photographs. Therefore, instructions and awareness programs will be provided to prevent such harmful behavior. The brown bear population is especially large in the basins of the Rusha and Teppanbetsu rivers and there are professional photographers and other visitors entering the area to photograph the bears. For this reason, the appropriate instruction and management including regulations pursuant to Designated Special Protection Area of the Wildlife Protection Area was designated will be carried out to prevent harmful effects from activities such as photographing.

Recreational activities on the snow during winter may negatively impact breeding and other activities of rare birds such as the white-tailed eagle. Visitors will be provided with instruction and awareness programs to take adequate actions to prevent damage to the natural environment. Visitors will also be provided with necessary information on dangerous areas such as potential avalanche sites. Use of snowmobiles and landing of airplanes are restricted in the Onnebetsudake Wilderness Area and Shiretoko National Park. These areas will be patrolled to prevent any offenders from entering the site illegally. In addition, since low-flying aircrafts may spoil other visitors' trips or be harmful to the wildlife, necessary request will be made to relevant parties to refrain from such flights.

## (5).Organization of the relevant government agencies responsible for administration of the heritage site

The relevant government agencies responsible for administration of the heritage site will promote adequate management by facilitating necessary information sharing in close collaboration.

### a. Kushiro Nature Conservation Office, Hokkaido Regional Environment Office, The Ministry of the Environment

The Utoro and Rausu Ranger Offices for Nature Conservation are responsible for the administration of the Wilderness Area, National Park and Wildlife Protection Area. In addition, they are also responsible for administration based on Law for the Conservation of Endangered Wild Fauna and Flora.

### b. Hokkaido Regional Forest Office, Forestry Agency

Abashiri Nambu District Forest Office (Utoro Forest Ranger Station and Minehama Forest Ranger Station), Konsen Tobu District Forest Office (Rausu Forest Ranger Station) and the Shiretoko Forest Center are responsible for the administration, maintenance and conservation of the National Forest in the areas such as the Shiretoko Forest Ecosystem Reserve.

### c. Hokkaido Government

The Environment and Lifestyle Division, Fisheries Division and Forestry Affairs Division of the Abashiri and Nemuro Subprefectural Office are responsible for the following activities: environmental matters, including supporting the management of the National Park and conservation and management of the wildlife in the area; fishery matters, including promoting the fishery industry and managing fishery resources through such measures as the authorization and control of fishing activities; and forestry matters, including providing guidance in the maintenance and conservation of privately held forests.

### d. Shari town

The Environment Conservation Division is responsible for activities such as nature conservation, conservation/management and research of wildlife, environmental control, and administration of "The Shiretoko 100 Square-Meter Forest Movement Trust" . The division is also responsible for providing information to local residents and promoting public awareness. In addition, Shari and Rausu towns jointly established the Shiretoko Foundation, which is responsible for activities such as the fieldwork for wildlife conservation and management and "The Shiretoko 100 Square-Meter Forest Movement Trust" .

The Fishery and Forestry Division is responsible for promoting the fishery industry, managing the fishing ports, and the administration/guidance of privately owned forests.

The Shiretoko Museum of Shari Town conducts activities such as protection and survey of cultural properties, research on wildlife, awareness activities, and conservation and management of Natural Monuments and injured wildlife.

### e. Rausu town

The Environment Division is responsible for environmental conservation activities related to nature conservation, conservation and management of wildlife, and measures for waste materials. The division also provides information and offers awareness programs in these areas.

The Fishery, Commerce and Tourism Division conducts activities to promote the fishing industry and to manage the fishing ports, and the administration/guidance of privately owned forests.

The Museum of Local History will handle the protection and survey of cultural properties, research on wildlife, education and awareness activities, and conservation and management of Natural Monuments. Being a co-founder of the Shiretoko Nature Foundation together with Shari town, Rausu town also will engage in activities to balance conservation and utilization through activities of the foundation.

## (6) Implementation of conservation and management programs

The following conservation and management programs will be implemented to appropriately conserve the heritage site for future generations.

### a. Inspectional patrols by relevant government agencies, etc.

Inspectional patrols of the heritage site are conducted by the rangers and auxiliary rangers (which are popularly known as the "Active Rangers" in Japan) of the Ministry of the Environment, foresters of Forestry Agency, superintendents of Shiretoko Wildlife Protection Area, and nature preservation

guardians of Hokkaido Government as well as by the staff members of the Shiretoko Nature Foundation and Natural Parks Foundation. The patrolling system will be further enhanced to correctly determine the level of use and the status of the natural environment and to provide guidance to visitors and control illegal actions, through information sharing among relevant government agencies and related bodies.

#### **b. Implementation of conservation and management programs**

The following measures will be implemented when determined necessary for the conservation of the natural environment, based on the results of the inspectional patrols, research, and monitoring; installation of signs, ropes, fences, etc. to prevent visitors from illegal entry; restoration of vegetation in damaged or bare areas; elimination of alien species. Other ongoing programs include clean-up operations of the heritage site, careful maintenance of visitors' facilities, as well as inspectional patrols, awareness programs and installation of fire fighting equipment to prevent forest fires. In the event of a natural disaster such as forest fire in the heritage site or its surrounding areas, appropriate measures will be implemented through the collaboration of relevant government agencies and local governments.

#### **c. Administration policies for the Shiretoko World Heritage Conservation Center and other major facilities**

The Shiretoko World Heritage Conservation Center, as the base facility for research and the heritage site's administration, will collect and accumulate information on the latest research and administration and provide it to experts, etc. The center will serve as a gateway to the heritage site and communicate its value as a World Natural Heritage to users while promoting awareness on the rules and manners in the heritage site.

As a gateway to the apical region of the heritage site, Shiretoko World Heritage Rusa Field House will provide users with lectures on rules and manners together with local real-time information for the purpose of accident prevention and environmental conservation. The Field House will also communicate the site's value as a World Natural Heritage through the connection between people and the sea.

The following facilities that are involved in conservation, administration and appropriate utilization of the heritage site will be operated under the policies described below, and coordination among facilities as well as information exchange and sharing will also be promoted.

##### **i. Shiretoko National Park Nature Center**

With the aim to conserve and restore the virgin natural environment as well as to promote its wise and sustainable use, the center will be the base facility for providing nature observation programs, and awareness programs on nature conservation themes. In addition, the center will develop and guide volunteers, and generate information including safety instructions.

##### **ii. Rausu Visitor Center**

As a key information generating facility in the Rausu hot spring district, the center will manage and administer the relevant facilities as well as promote appropriate utilization of the National Park through the collaboration and cooperation with relevant government agencies, related bodies, volunteers and others. The center will conduct surveys on natural environment and collects, archives and provides information. Through

these activities, the center will enhance its functions and facilities as a core base for environmental education and research. The center will also facilitate the capacity building of park volunteers.

Furthermore, the center will proactively collect accurate, real-time onsite information to improve its visitor information service.

##### **iii. Shiretoko Forest Center**

The center will conduct awareness promotion on the multi-functional features of the forest through activities such as awareness programs on the necessity to conserve the ecosystem and precious forests of the Shiretoko Peninsula, patrolling, management and maintenance of facilities, signs, etc. and surveys on the forest, and wildlife.

##### **iv. Shiretoko Volunteer Activity Center**

The facility will serve as an information center on the forests of the Shiretoko Peninsula and as an operation base for groups involved in forest conservation activities in the peninsula, including training, opinion exchange, etc. concerning forest volunteer activities and the like.

##### **v. Shiretoko Wildlife Protection Area Management Center**

The center will conduct research on the habits, distribution and behavior of the wildlife as well as the conservation and management of the wildlife and Wildlife Protection Area.

##### **vi. Shiretoko Museum**

The museum will conduct research on wildlife, awareness programs, conservation and management of the Natural Monuments and injured wildlife as well as collecting, archiving and providing informational material.

## **(7) Research and monitoring**

For adaptive management of the heritage site based on scientific knowledge, the relevant government agencies, local governments, related bodies and experts will work together to conduct research and accumulate scientific knowledge. Based on the results of such research, indices required for management will be set, survey items will be selected, and long-term monitoring will be implemented.

In response to the need of monitoring whether Shiretoko's value as a World Natural Heritage site is being maintained, monitoring and evaluation of monitoring results will be conducted relative to the criteria recognized by the World Heritage Committee and the agenda indicated by the World Heritage Committee and the Scientific Council. Climate change, in particular, may have an impact on the heritage site, given certain of its features (e.g. location in the southernmost area of the seasonal sea ice in the northern hemisphere). Monitoring and its evaluation will be conducted to identify the impact.

Research will be conducted on items supporting the value of the heritage site, including elucidation of the site's ecosystem structure, items concerning measures for specific issues, including review of methods to prevent invasion of alien species, and those that may lead to the development of monitoring methods. Because adaptive management of the heritage site also requires understanding the condition of the ecosystem in the border areas between Japan and Russia, cooperative efforts, including information sharing between the two countries concerning the conservation and sustainable use of the

ecosystem of the region, will be advanced.

Results of research and monitoring will be shared with relevant government agencies, local governments, related bodies, and experts, and will be provided also to the public at large via the Shiretoko Data Center built on the web for appropriate management of the heritage site.

## **(8) Measures against impact of climate change**

There is concern that the climate change may have an impact on the heritage site given certain of its features, including its location in the southernmost area of the seasonal sea ice in the northern hemisphere. In response, monitoring will be conducted in a manner that allows evaluation of the impact of climate change, along with information gathering and research on measures for adaptation to such change. After examining the results, measures practicable in the heritage site for adaptation to climate change will be explored and implemented.

## **(9) Preparation of annual reports**

Promotion of cooperation/collaboration with local communities and adaptive management thereof requires organization of information on the current condition of the heritage site, its surrounding areas, and the site-related projects/programs, as well as information sharing among the relevant government agencies, local governments, related bodies, and experts. To this end, the latest information on the natural environment of the heritage site, its surrounding areas and their social environment, in addition to the information on projects/programs related to the heritage site conducted by the relevant government agencies, local governments, related bodies, experts, etc. will be compiled in an annual report every year and used for adequate management of the site.

## **(10) Information sharing and awareness programs**

Effective information sharing and awareness programs require consideration of means according to their objective. For adequate management of the heritage site, means will be considered for each of the three major objectives.

First, in order to promote management of the heritage site in cooperation/collaboration with local communities, it is essential that local residents correctly understand the value of nature within the site and the status of its conservation and management. Meanwhile, promotion of adaptive management requires that data concerning monitoring and research be shared among the relevant government agencies, local governments, related bodies, experts, and others.

Next, in order to prevent negative impact of the use for sightseeing, etc. on the heritage site and ensure safe and sustainable use, it is important to provide correct knowledge of rules and manners concerning handling of such wild animals as brown bear, consideration for the natural environment, etc. and to raise users' awareness of their own self-responsibility and avoidance of danger to take care of themselves.

As the heritage site's management system is based both on collaboration with local communities and on scientific knowledge, it is highly commended as a model for other areas by the World Heritage Committee. For international contribution and development of a better management system, it is important to actively share information on management systems, etc. of protected areas with international organizations and people involved in other protected areas.

For this purpose, necessary information such as status of maintenance and management of the site, scientific data, and rules and manners concerning use will be effectively shared, through pamphlets, videos, websites, and annual reports on the management of the heritage site, at major facilities including the Shiretoko World Heritage Conservation Center, on the Internet, at explanatory meetings, events, international conferences, etc. in concert with promotion of awareness programs.

# **6. Implementation of the plan and other issues**

## **(1) Implementation of the plan, etc.**

In order to effectively implement the items described in the management plan and to ensure appropriate conservation and management of the heritage site, further review will be conducted as to specific roles of relevant government agencies, local governments, and related bodies etc. For this purpose, the utmost effort will be made in close collaboration and cooperation among the relevant government agencies, local governments, and other related bodies.

In addition, scientific advice will be received from the Scientific Council and collaboration and cooperation with the Regional Liaison Committee will be established in order to assess the status of the natural environment of the heritage site and to adopt appropriate measures based on scientific data.

The implementation state of the management plan will be reviewed annually and reported to the Regional Liaison Committee and Scientific Council.

With regard to details on the management of the natural environment of the heritage site and measures against specific issues which are not described in the management plan, further studies will be conducted taking into consideration results of monitoring projects, etc. As necessary, the index will be considered and action plans will be established to realize appropriate administration of the heritage site. In accordance with the advice from the Scientific Council, the Regional Liaison Committee will contribute in establishing a consensus with the input and suggestions from local residents, related bodies and experts in relevant fields. Discussions and conclusion of these studies, basic data and other information will be disclosed and shared. In the process of determining the appropriate management for the heritage site, the necessary consideration will be given to balance between the requirements for the conservation of the natural environment and for the lives of local residents and industry.

In addition, cooperative relationships will be created with local citizens' groups in the course of conserving, administrating and appropriately utilizing the heritage site. Such relationships will provide basis to invite active participation and cooperation from the local residents and establish activities that involve the local community.

The management plan will be reviewed as necessary taking into account the results of the natural environment monitoring projects and changes in the social environment. In order to properly review the plan, the process will involve advice from the Scientific Council and investigations by the Regional Liaison Committee which will obtain inputs from local residents, related bodies.



## (2) Programs by local governments

The populations of the towns of Shari and Rausu which overlap the heritage site are approximately 13,000 and 6,000 respectively and many people live in areas adjacent to the heritage site as well. In order to comprehensively conserve and manage the heritage site, it is important to promote and realize lifestyles and productive activities that are environmentally conscious in the heritage site including its surrounding areas. In addition to the programs to conserve the virgin natural environment of the Shiretoko Peninsula which is a valuable local resource, the two towns have already implemented various programs to conserve the immediate environment and to create a community that coexists with nature. Such programs include: anti-pollution measures for the rivers and sea; reduction of waste; resource saving and recycling; clean-up operations; introduction of low-emission vehicles; environmental study courses and nature experience programs for local children. Such activities will be further encouraged to enhance environmental awareness of local residents and to promote the establishment of a vibrant community.

## (3) Funding

Relevant government agencies will secure the amount of funds necessary for managing the heritage site continually and for as long as possible according to the management plans, while the relevant government agencies, local governments, related bodies, experts, and others will fully cooperate for efficient implementation of projects/programs in order to achieve maximum effects with the secured funds.

Better management of the heritage site will be pursued by utilizing funds not only from the relevant government agencies but also from local governments, other government agencies, related bodies, etc. and actively accepting donations, grants, assistance funds, etc. from users of the park, citizens, and private enterprises.

# 7. Conclusion

Shiretoko which was reverently called by the Ainu people as “shir-etok (the end of Mother Earth)” is one of the few locations in Japan where the natural environment is preserved in virgin condition due to its rugged landscape and harsh climate. It is densely populated with brown bears and Blakiston’ s fish-owls which the Ainu worshiped as their “Kamui (gods).” These animals are at the top of the diverse ecosystem consisting of a wide range of wildlife in the sea, rivers and mountains which are intimately integrated.

Instead of damaging the nature, the people living in the peninsula adapted their lives to realize sustainable use of the nature’ s bounties and created a unique local lifestyle, industry and culture. It is essential to study the culture of the Ainu people and the traditional wisdom and skills of the local residents in order to determine the methods to conserve, manage and realize sustainable use of the natural environment of the heritage site.

The Shiretoko Charter was formulated by Shari town and Rausu town with their local residents in 1974 to commemorate the 10th anniversary of the designation of the National Park. The Charter declares that the virgin nature of the Shiretoko Peninsula is a valuable property for all mankind and that it must be adequately protected and used to ensure that the environment will be preserved for future generations. In addition, there is a long range project spearheaded by the local community which has gained nationwide support to

purchase abandoned settlements to protect them from reckless development and restore virgin forests. It cannot be ignored that the concern for nature among the local residents and the grass-root activities has contributed to preserving the precious nature of the heritage site.

Various programs will be implemented through not only the collaboration and cooperation of related government agencies responsible for administration of the site but also through the active participation and cooperation with others such as local residents and related bodies in order to enhance the nature of the World Heritage site and to increase the vitality of the community coexisting with the nature.

## 【Reference】

### 1. Background to the development of the Shiretoko World Natural Heritage Site Management Plan

October 2003	Establishment of the Shiretoko Nominated Site Regional Liaison Committee
January 2004	Development of the Management Plan for the Shiretoko World Natural Heritage Nominated Site
July	Establishment of the Shiretoko World Natural Heritage Nominated Site Scientific Council Field evaluation by the International Union for Conservation of Nature (IUCN)
July 2005	Decision to inscribe Shiretoko on the World Natural Heritage List
November 2006	Development of the Sika Deer Management Plan in the Shiretoko Peninsula
September 2007	Deliberation of re-examination policy for the Management Plan for the Shiretoko World Natural Heritage Nominated Site by Scientific Council and the Regional Liaison Committee
December	Development of the Multiple Use Integrated Marine Management Plan for Shiretoko World Natural Heritage Site
February 2008	Field evaluation by the UNESCO World Heritage Centre and the IUCN
March	Deliberation of the draft outline of the Management Plan for the Shiretoko World Natural Heritage Site by the Scientific Council and the Regional Liaison Committee
July	Adoption of a decision on the state of conservation of Shiretoko at the 32nd World Heritage Committee
November	Deliberation of the blueprint for the Management Plan for the Shiretoko World Natural Heritage Site by the Scientific Council and the Regional Liaison Committee
February 2009	Deliberation of the draft Management Plan for the Shiretoko World Natural Heritage Site by the Scientific Council and the Regional Liaison Committee
May	Public hearing on the draft Management Plan for the Shiretoko World Natural Heritage Site (until June)
June	Explanatory meetings in the Shari town and Rausu town
July	Deliberation of the final-draft Management Plan for the Shiretoko World Natural Heritage Site by the Scientific Council and the Regional Liaison Committee
December	Official adoption of the Management Plan for the Shiretoko World Natural Heritage Site by the Ministry of the Environment, the Forestry Agency, the Agency for Cultural Affairs and the Hokkaido Government, that are responsible for the various system related to conservation of Shiretoko



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### 2. Members of the Shiretoko World Natural Heritage Site Scientific Council (as of December 2009)

Members of the Scientific Council (titles omitted)	
Yukio Ishikawa	Professor, Department of Agriculture and Environment, Hokkaido College, Senshu University
Keiichiro Ohshima	Professor, Institute of Low Temperature Science, Hokkaido University
Noriyuki Ohtaishi (Chair)	Professor Emeritus, Hokkaido University
Masahide Kaeriyama	Professor, Faculty of Fisheries Sciences, Hokkaido University
Koichi Kaji	Professor, Graduate School, Tokyo University of Agriculture and Technology
Masami Kaneko	Professor, Rakuno Gakuen University
Gaku Kudo	Associate Professor, Graduate School of Environmental Earth Science, Hokkaido University
Akihiro Kobayashi	Professor, Department of Agriculture and Environment, Hokkaido College, Senshu University
Mari Kobayashi	Lecturer, Faculty of Bio-industry, Tokyo University of Agriculture
Eishige Komiyama	Chief, Wild Salmon Institute
Yasunori Sakurai	Professor, Graduate School of Fisheries Sciences, Hokkaido University
Hideki Takahashi	Professor, Hokkaido University Museum
Masaru Torisawa	Deputy Director, Hokkaido Central Fisheries Experiment Station
Hajime Nakagawa	Director, Shiretoko Museum
Futoshi Nakamura	Professor, Graduate School of Agriculture, Hokkaido University
Hiroshi Hattori	Professor, Faculty of Biological Science and Technology, Tokai University
Hiroyuki Matsuda	Professor, Graduate School of Environment and Information Science, Yokohama National University
Takashi Yajima	Professor, Graduate School of Agriculture, Hokkaido University

Sika Deer Working Group (titles omitted)	
Yukio Ishikawa	Professor, Department of Agriculture and Environment, Hokkaido College, Senshu University
Hiroyuki Uno	Research fellow and Wildlife Section chief, Nature Conservation Department, Hokkaido Institute of Environmental Sciences
Koichi Kaji (Chair)	Professor, Graduate School, Tokyo University of Agriculture and Technology
Kunihiko Tokida	Senior Scientist, Japan Wildlife Research Center
Hiroyuki Matsuda	Professor, Graduate School of Environment and Information Science, Yokohama National University

Members of the Marine Area Working Group (titles omitted)	
Masahide Kaeriyama	Professor, Faculty of Fisheries Sciences, Hokkaido University
Mari Kobayashi	Lecturer, Faculty of Bio-industry, Tokyo University of Agriculture
Yasunori Sakurai (Chair)	Professor, Graduate School of Fisheries Sciences, Hokkaido University
Masaru Torisawa	Deputy Director, Hokkaido Central Fisheries Experiment Station
Mitsuhiro Nagata	Director, Salmon and Trout Resource Division, Hokkaido Fish Hatchery
Hiroshi Hattori	Professor, Faculty of Biological Science and Technology, Tokai University
Mitsutaku Makino	Researcher, National Research Institute of Fisheries Science, Fisheries Research Agency
Hiroyuki Matsuda	Professor, Graduate School of Environment and Information Science, Yokohama National University
Shuka Maruyama	Director, Resources Management Division, Hokkaido Kushiro Fisheries Experiment Station

Members of the River Construction Working Group (titles omitted)	
Masahide Kaeriyama	Professor, Faculty of Fisheries Sciences, Hokkaido University
Eishige Komiyama	Chief, Wild Salmon Institute
Yuji Seo	Chief, Institute for Watershed Ecosystem
Futoshi Nakamura (Chair)	Professor, Graduate School of Agriculture, Hokkaido University
Tomomi Marutani	Professor, Graduate School of Agriculture, Hokkaido University

### 3. Shiretoko World Natural Heritage Site Regional Liaison Committee List of member organizations/groups (as of December 2009)

(1)Member organization (Related government agencies responsible for laws, ordinances and regulations concerning the conservation/ management of the heritage site)

a)Related government agencies

- Kushiro Nature Conservation Office, Hokkaido Regional Environment Office, Ministry of the Environment
- Hokkaido Regional Forest Office, Forestry Agency

b)Local government

- Department of Environment and Lifestyle, Hokkaido Government
- Abashiri and Nemuro Subprefectural Office
- Office of Education, Hokkaido Government
- Abashiri and Nemuro District Office of Education
- Shari Town
- Rausu Town

(2)Observers (local organizations involved in the promoting conservation/ management of the heritage site)

- Rausu Town, Shiretoko World Natural Heritage Committee
- First Fishery Cooperative of Shari
- Fishery Cooperative of Utoro
- Fishery Cooperative of Rausu
- Fishery Cooperative of Abashiri
- Utoro Regional Committee
- Shiretoko Guide Association



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#### 4. Outline of the Sika Deer Management Plan in the Shiretoko Peninsula

\* For the text of the Management Plan, please visit a website of the Shiretoko Data Center (<http://shiretoko-whc.com/>).

##### • Objective of the Plan

Reduce the excessive impacts on the Heritage Site's ecosystem induced by the high population density of Sika deer.

##### • Positioning of the Plan

The plan is positioned as a regional plan under the Specified Wildlife Conservation and Management Plan "the Conservation and Management Plan for Sika deer in Hokkaido" formulated by the Hokkaido Government

##### • Basic policies

- 1) The plan adopts as a model the ecosystem before the start of modern exploitation (before the Meiji Period).
- 2) Management measures, including control of the population size, will be considered as soon as possible based on the precautionary principle.
- 3) The zones will be defined as Heritage Site (Zone A, Zone B and Specified Management Zone in Zone A) and Adjacent Zone, and management policies will be set for each zones.
- 4) In each zone, implementation areas will be stored with a consideration for priority and its feasibility. And concrete measures for management will first be taken in these areas.

5) Adaptive management methods will be employed while adequately monitoring, assessing, and examining the results to incorporate them into the management plan.

6) Impact on endangered bird species will be considered when implementing management policies.

##### • Management policies for individual zones

<Management policy common to the Heritage Site>

In principle, things will be left to natural process. However, if there is the threat of loss to endangered or indigenous plant species and communities characteristic of the Heritage Site, management measures to avoid the loss will be taken in order to ensure the conservation of biodiversity.

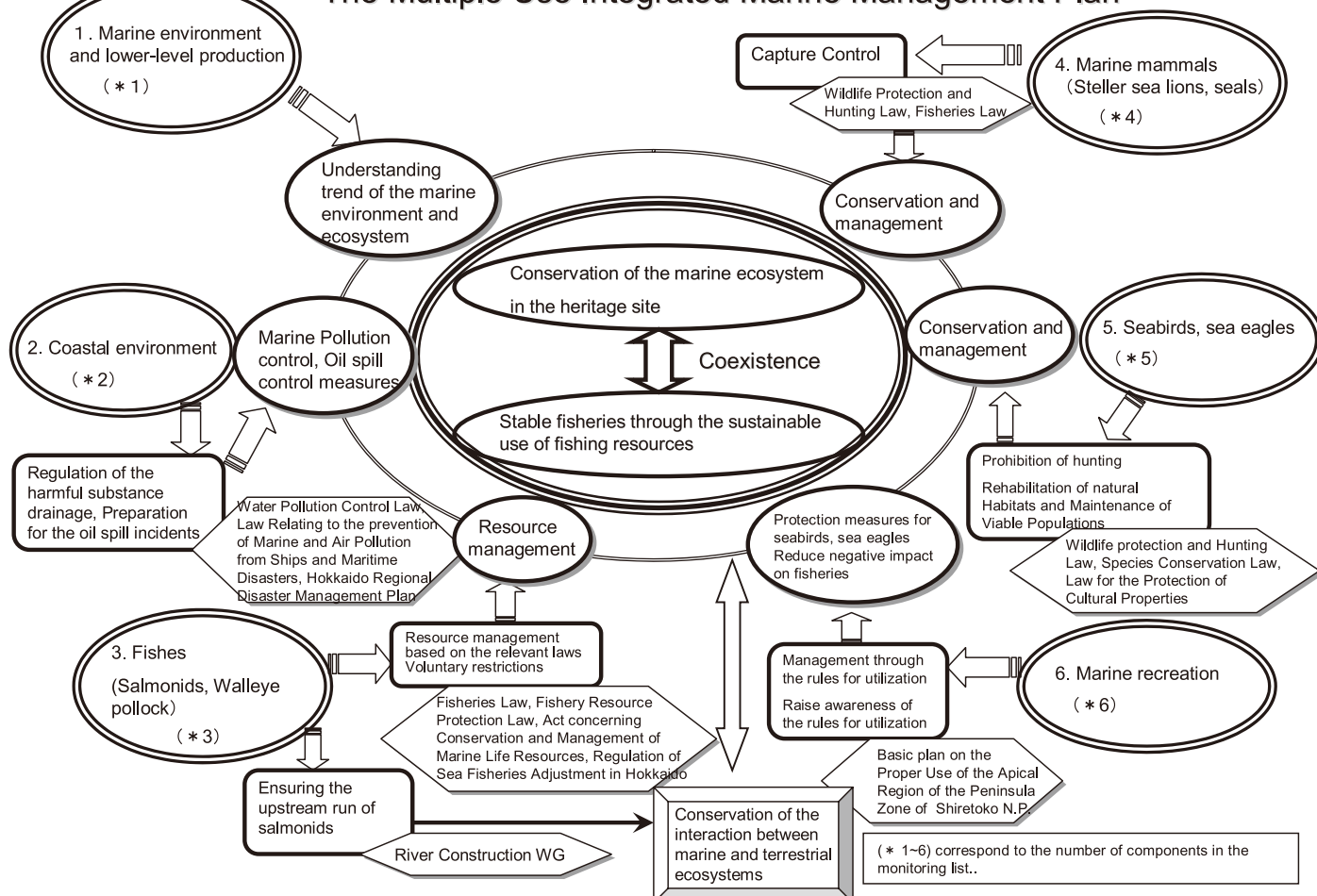
1) Heritage Site Zone A (excluding Cape Shiretoko and the Horobetsu/Iwaobetsu plateau)

a. The avoidance of human intervention is made a principle (excluding defensive measures).

b. Monitoring will be continued on the changes in biodiversity and ecological processes, if a significant impact on the vegetation due to foraging pressure by Sika deer is found, defensive measures will be taken.

## Shiretoko World Natural Heritage Site

### The Multiple Use Integrated Marine Management Plan



## 2)Specified Management Zone (Cape Shiretoko)

- a.Human intervention (defensive measures and population control) will be implemented as needed, but the wintering environment will not be changed in this zone.

## 3)Heritage Site Zone B (including the Horobetsu/Iwaobetsu plateau)

- a.Human intervention (defensive measures, population control and change of the wintering environment) will be implemented as needed.
- b.With regards to implementation, cooperation with the forest restoration project promoted by Shari town will be encouraged.

## 4)Adjacent Zone

- a.Human intervention (defensive measures, population control and change of the wintering environment) will be implemented as needed.
- b.Partnership/cooperation with projects undertaken by the Hokkaido Government, Shari town, Rausu town, the private sectors and others will be promoted.
- c.Community-based population control will be encouraged through the cooperation with the private sectors and returning benefits to the local communities. And its effects will be analyzed.

## 5. Outline of the Multiple Use Integrated Marine Management Plan for Shiretoko World Natural Heritage Site

\* For the main text of the Management Plan, please visit the homepage of the Shiretoko Data Center (<http://dc.shiretoko-whc.com/>)

### • Objective of the Plan

Satisfy both of conservation of the marine ecosystem and stable fisheries through the sustainable use of marine living resources in the marine area of the heritage site.

### • Basic policies

1)The premise of the plan is legal restrictions relating to the conservation of the marine environment, marine ecosystems and fisheries, and autonomous management measures carried out by fisheries-related laws, as well as voluntary restrictions on marine recreation.

2)The plan defines measures to conserve the marine ecosystem, strategies to maintain major marine living resources, monitoring methods for those resources, and policies for marine recreation. Based on the plan, proper management should be promoted.



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# Glossary of the Management Plan for the Shiretoko World Natural Heritage Site

Page	Line	Term	Description
8	52	Adaptive management	Adaptive management is a flexible management method. In this method, prediction of ecosystem changes and monitoring is conducted in order to manage and use natural resources within the scope that the structure and functions of ecosystem can be maintained. The measures for management and use are flexibly reviewed according to the results of prediction and monitoring, based on a feedback mechanism. In this review, interested parties share information, test hypotheses based on monitoring results, and decide direction, based on mutual consensus. (Encyclopedia of Ecology, Yo Iwasa, et al. ed., Kyoritsu Shuppan, 2003) (Partially revised excerpt)
10	12	Alien species	Species that did not originally exist in Shiretoko but were introduced artificially from other areas. Certain alien species that do or may adversely affect ecosystems, human safety, and industries such as agriculture, forestry, and fisheries are designated as the “Invasive Alien Species” based on the Invasive Alien Species Act. The raising, planting, carrying, and releasing the invasive alien species are forbidden. In recent years, invasion by the raccoon ( <i>Procyon lotor</i> ), large earth bumblebee ( <i>Bombus terrestris</i> ), cutleaf coneflower ( <i>Rudbeckia laciniata</i> ), and other invasive alien species has been confirmed in Shiretoko.
6	3	Apical region	Refers broadly to the areas of Shiretoko National Park listed below: •Coastal land area Rausu side : Northeast of Aidomari Shari side :Northeast of Shiretoko Ohashi •Coastal marine area Rausu side : Northeast of Aidomari Shari side : Northeast of Horobetsu •Inland mountains Northeast of Mt. Iou These areas have very primitive natural scenery, diverse biota, and rich ecosystems supported by biological interactions. There are no established roads or footpaths, so it is unlikely that ordinary visitors actively enter these areas.
5	14	Area with little development of soil	Areas where climatic or geological conditions have kept the soil shallow and immature such as cliffs, gravelly areas, wind-beaten areas.
9	42	Base of the Shiretoko Peninsula	Refers to areas of the Shiretoko Peninsula that are not included in the Shiretoko World Natural Heritage Site. (Cf. “Shiretoko”, “Shiretoko Peninsula”)
9	41	Bordering area with Russia	The Japanese and Russian governments signed a bilateral program (May 2009) concerning “Cooperation Program between the Government of Japan and the Government of the Russian Federation in the neighboring areas of the two states on the Study, Conservation and Rational/ Sustainable Use of Ecosystems”. The program provides for cooperation in research into ecosystems in this area, their conservation, and sustainable use. Although the agreement does not precisely designate a specific area, the general understanding is that it includes the Sea of Okhotsk border region extending from Hokkaido to the Kamchatka Peninsula.
2	17	Coaction	Refers to symbiotic interactions (syntrophy and defense symbiosis) and antagonistic interactions (predator/prey, parasitic, and competitive relationships). Ecosystems are built upon the foundations of these interactions.
9	29	Committee on the Promotion of Proper Use of Shiretoko National Park	A committee established to promote the conservation and proper use of Shiretoko National Park. The committee consists of academic experts, related bodies, and relevant government agencies. For further details, refer to the Shiretoko Data Center website ( <a href="http://dc.shiretoko-whc.com/">http://dc.shiretoko-whc.com/</a> ).

Page	Line	Term	Description
2	25	Criteria for the outstanding universal value	<p>To be included on the World Heritage List, sites must meet at least one of the following criteria outlined in the Operational Guidelines for the Implementation of the World Heritage Convention, meet criteria for authenticity and integrity, and assure the protection and management of properties. The Operational Guidelines were revised as of 2005. With the new guidelines, there is an integrated set of criteria that apply to both natural and cultural properties. Criteria (i) through (vi) below are related to cultural properties, and (vii) through (x) to natural properties. Sites meeting both cultural and natural criteria are listed as “mixed” cultural and natural heritage sites.</p> <p>Selection criteria:</p> <ul style="list-style-type: none"> <li>(i) To represent a masterpiece of human creative genius;</li> <li>(ii) To exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;</li> <li>(iii) To bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;</li> <li>(iv) To be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates <ul style="list-style-type: none"> <li>(a) significant stage(s) in human history;</li> </ul> </li> <li>(v) To be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change;</li> <li>(vi) To be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (This criterion should preferably be used in conjunction with other criteria);</li> <li>(vii) To contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance;</li> <li>(viii) To be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features;</li> <li>(ix) To be outstanding examples 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;</li> <li>(x) To contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.</li> </ul> <p>(UNESCO website in English: <a href="http://whc.unesco.org/en/criteria">http://whc.unesco.org/en/criteria</a>; in Japanese: <a href="http://www.unesco.jp/contents/isan/decides.html">http://www.unesco.jp/contents/isan/decides.html</a>; partially paraphrased for brevity/clarity)</p>
9	34	Ecotourism	Activities in which tourists are guided and instructed by guides with knowledge of tourism resources related to nature and lifestyle/culture that is closely linked with nature. Tourists can experience those tourism resources in a manner that is conducive to their protection, and deepens knowledge and understanding. Guided tours have been available in Shiretoko for over a decade. Currently, improvement in guide skills and promotion of “model” tours that offer longer stays are being reviewed. (Cf. Shiretoko Eco-tourism Association)
2	7	Food web	Species are interacted in various ways in an ecosystem. A “food web” shows the relationship between predator and prey. In Shiretoko, the ice algae proliferate on the bottom of the seasonal sea ice and the blooms of phytoplankton occur in spring when the ice melts. They serve as food for zooplankton, and ultimately the higher level consumers such as fish, marine mammals, and terrestrial species, together form a complex food web.
6	40	Forest operation	A series of human activities to nurture desired forests, including plantation, tending, thinning, and felling of forests. In its broadest sense, this term also includes felling bans.
7	38	Forest unit	A tract of forest that is distinguishable from a neighboring tract by tree species, age, or other features.
4	26	Globally threatened species	Refers to species listed as extinct in the wild (EW), critically endangered (CR), endangered species (EN), and vulnerable (VU) on the IUCN Red List.

Page	Line	Term	Description
2	5	Ice algae	Monocellular algae that grow in or on the bottom of sea ice (mostly the diatom component of phytoplankton). Light inside or on the undersurface of sea ice is usually insufficient, but ice algae are suspended within the ice so they can use even weak levels of light for photosynthesis. Seawater is vertically mixed when sea ice is formed, and nutrients from deeper layers of the sea reach the underside of sea ice. Ice algae proliferate using those nutrients. Sea ice and the attached phytoplankton form a basis for rich ecosystems of Shiretoko.
4	13	Interaction of marine and terrestrial ecosystems	Rivers carry soil, gravels, sediments, and nutrient salts (including iron) produced in the terrestrial ecosystem into the marine ecosystem. Such interactions contribute to increase marine productivity, protect the coastline, and conserve the structure and functions of the marine ecosystem. At the same time, salmonids, for example, return to rivers to spawn, and thereby transport rich ocean-derived nutrient salts to the terrestrial ecosystem. This in return raises the productivity of the terrestrial ecosystem, and sustains a variety of species including the brown bears ( <i>Ursus arctos</i> ) and Blakiston's fish-owl ( <i>Ketupa blakistoni blakistoni</i> ) that feed on salmonids. The interactions between marine and terrestrial ecosystems benefit the structures, functions and biodiversity of both ecosystems.
2	6	Intermediate water	Seawater at an ocean depth of about 200m to 800m. The intermediate water off Shiretoko is created by submerged seawater at the northwestern part of the Sea of Okhotsk when sea ice is formed. It is thought that the submergence of intermediate water takes in large amounts of iron needed for organisms to survive.
2	45	Local governments	Refers to Shari Town and Rausu Town, where the Shiretoko World Natural Heritage Site is located.
2	32	Management plan	"Management" in general refers to the acts such as administration, maintenance of a favorable condition, management of office duties, and the maintenance and administration of facilities. The Management Plan for the Shiretoko World Natural Heritage Site is a plan under which the relevant government agencies cooperate with local residents and interested parties to implement various activities in an integrated and unified manner for the purpose of convention and proper use of the site. For further details, see "2. Objectives" of the Management Plan.



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Page	Line	Term	Description
4	58	Molten sulfur	Sulfur that has melted due to high temperatures. Mt. Iou is known to have erupted four times since the middle of the 19th century, and during each eruption large amounts of molten sulfur were ejected together with steam and hot water from the explosion crater midway up the northwest face. The 1936 eruption was much larger than previous eruptions. It is thought to remain dormant for a long period of time - already over 70 years- because large amounts of energy were expended in the 1936 eruption. (Geology of Shiretoko, Shiretoko Museum eds., Shari Board of Education, Shari Town, 2007 (partially revised excerpt))
8	57	Monitoring	Long-term surveys and systematic measurements designed to detect changes in the natural environment or ecosystem as quickly as possible.
2	6	Nutrient salts	Salts derived from nitrogen (nitric acid, nitrous acid, ammonia), phosphorus (phosphoric acid), and silicon (silicic acid). These salts are necessary for the survival and reproduction of organisms. Nutrient salts are dissolved from rocks and sediment by rain, and flow into the sea through rivers. Intermediate/deep ocean layers are usually rich in these nutrient salts, and the major vertical mixing that occurs in winter carries nutrient salts from intermediate water to the surface, which leads to the proliferation of phytoplankton in the spring. In recent years it has been discovered that iron and other trace metals in seawater are also crucial nutrients for the proliferation of phytoplankton. These are referred to "trace nutrient salts". (Cf. Intermediate water)
16	53	Park volunteer	A volunteer registered with Regional Environmental Office. Their activities include: to support conservation and management of national or public parks; to enhance instruction to users; and to promote the concept of nature conservation and raise public awareness. (Excerpted from: 2008 National Parks Guide, National Parks Association of Japan [eds.], National Parks Association of Japan, 2008)
5	60	Population	A group of individuals of the same species that occupies a certain space. Conceptually speaking, there is mating and various interactions among individuals in a population. It is often defined as a local group that is to some extent separated from other populations of the same species. (Iwanami Biological Dictionary third edition, Tsuneo Yamada, et al., ed. Iwanami Shoten, 1989) (Partially revised excerpt)
5	37	Rare species	Refers to the species included in the following categories: 1) Species listed as Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), and Vulnerable (VU) on the IUCN Red List; 2) Species listed as Extinct in the Wild (EW), Threatened IA (CR), Threatened IB (EN), Threatened II (VU) on the Red List of the Ministry of the Environment; and 3) Species listed as Extinct in the wild (Ew), Critically endangered (Cr), Endangered (En), and Vulnerable (Vu) on the Hokkaido Red List. (Cf. Globally threatened species)
2	48	Related bodies	Organizations closely involved in the conservation, management and utilization of the Shiretoko World Natural Heritage Site, such as organizations related to fishery and tourism.
2	42	Relevant government agencies	The formulators of the Management Plan for the Shiretoko World Natural Heritage Site: namely, the Ministry of the Environment, Forestry Agency, Agency for Cultural Affairs, and Hokkaido prefectural government. (Cf. Shiretoko World Natural Heritage Site Regional Liaison Committee, Shiretoko Eco-tourism Association)
13	7	River constructions	Refers to all structures that are constructed over rivers in the Shiretoko World Natural Heritage Site, regardless of the purpose for their installation. These structures include anti-erosion and erosion control dams, piers, etc.
5	82	Salmonids	Salmonids described in "(3) Conservation of the interaction between the marine and terrestrial areas" in "5. Management measures" have the following two definitions: 1) In "a. Basic concept" and "c. Utilization and conservation of salmonids", salmonids refer to pink salmon ( <i>Oncorhynchus gorbusha</i> ), chum salmon ( <i>O. keta</i> ), and masu salmon ( <i>O. masou masou</i> ). All of these species are managed under the Fisheries Law and other management measures. 2) In "b. Conservation of the river environment", salmonids refer to the three species mentioned above and Dolly Varden ( <i>Salvelinus malma</i> ).

Page	Line	Term	Description
2	4	Seasonal sea ice/Pack ice	Sea ice (ice formed from frozen ocean water) that drifts. Sea ice that is attached to shorelines is called "fast ice". While most sea ice is seasonal sea ice, it is more common to use the more inclusive term "sea ice" when referring to either. (Cf. Seasonal sea ice area)
4	14	Seasonal sea ice area	Areas in which sea ice (a general term for ice formed from frozen seawater) is seen only in winter. (Cf. Pack ice)
2	10	Shiretoko	Refers to the Shiretoko World Natural Heritage Site. (Cf. "Shiretoko Peninsula", "Base of Shiretoko Peninsula")
4	39	Shiretoko 100 Square-Meter Forest Movement Trust	In 1977, Shari Town initiated a program to gather donations to buy up land and plant trees on abandoned agricultural settlements in Shiretoko National Park for the purpose of protecting them from unregulated development and recover as forest areas. The initial program met its monetary goals, so a new program was started, called the "National Trust-100m2 Movement Forest Trust". For further details, refer to the Shari Town website ( <a href="http://www.town.shari.hokkaido.jp/100m2/">http://www.town.shari.hokkaido.jp/100m2/</a> ).
17	4	Shiretoko Data Center	A website mainly for the government agencies, related bodies and academic experts involved in the management of the Shiretoko World Natural Heritage Site, as well as researchers who study the site, guides and local residents. The website provides information on the conservation and use of the Shiretoko World Natural Heritage Site, as well as meeting materials, proceedings, monitoring data, and reports. The URL for the homepage is as follows: <a href="http://dc.shiretoko-whc.com/">http://dc.shiretoko-whc.com/</a>
9	3	Shiretoko Eco-tourism Association	An association established to study ecotourism matters specific to Shiretoko and promote ecotourism therein. The association consists of related bodies. For further details, refer to the Shiretoko Eco-tourism Association website ( <a href="http://shiretoko-eco.net/modules/pico1/index.php">http://shiretoko-eco.net/modules/pico1/index.php</a> ). (Cf. Related bodies)
2	20	Shiretoko mountain range	Refers in general to the mountain range on the center of the Shiretoko Peninsula comprising the newest volcanic group of Mt. Rausu, Mt. Mitsumine, Mt. Sashirui, Mt. Okkabake, (Mt. Minami/Chienbetsu), and Mt. Iou.
2	51	Shiretoko Peninsula	Refers to a roughly 100,000-ha tract of land extending about 70 km in length east of the Okushibetsu River, Churui River, and Mt. Unabetsu of the central mountain range. Mt. Shari is not included.
8	45	Shiretoko World Natural Heritage Site Regional Liaison Committee	A committee established to liaise, coordinate, and review proper management methods with the related bodies and relevant government agencies that are involved in the management of the Shiretoko World Natural Heritage Site. For further details, refer to the Shiretoko Data Center ( <a href="http://dc.shiretoko-whc.com/">http://dc.shiretoko-whc.com/</a> ). (Cf. Related bodies)
2	43	Shiretoko World Natural Heritage Site Scientific Council	A council established to understand the natural environment of the Shiretoko World Natural Heritage Site and to give advice that is necessary for the integrated management of terrestrial and marine areas based on scientific data. The council consists of academic experts. For further details, refer to the Shiretoko Data Center ( <a href="http://dc.shiretoko-whc.com/">http://dc.shiretoko-whc.com/</a> ).
5	28	Snow patch	A patch of ground on leeward ridge slopes or depressions in which snow is present even in summer. In winter, plants are protected from low temperatures by thick snow accumulation. Vegetation differs largely depending on the duration that the snow remains, but plant communities are generally dominated by scrubs and herbaceous plants. (Cf. Plants of Shiretoko I, Shiretoko Museum, Shari Board of Education, Shari Town, 2005)
9	49	Structure and function of ecosystems	The structure of an ecosystem refers to the interactions between the nonliving (inorganic) environment and individual or group of living organisms. The functions of ecosystem means networks for biological interactions (e.g. relationships of predator and prey, symbiotic and parasitic relationships, competition for resources or mating partners), which are maintained by biodiversity.



Page	Line	Term	Description
9	66	Tall-herb communities	Communities of large perennials seen in humid areas in subalpine and montane zones, including valley and collapsed areas where forests do not occur. In Japan, these communities consist of <i>Senecio cannabifolius</i> , <i>Veratrum album</i> L. subsp. <i>oxysepalum</i> , and <i>Reynoutria sachalinensis</i> . (Ecological Dictionary, Makoto Numata (ed.), Tsukiji Shokan, 1995) (Partially revised excerpt). In Shiretoko, these communities consist of herbs that are seen from the low to subalpine and montane areas, such as the <i>Angelica anomala</i> , <i>Ligusticum hultenii</i> , <i>Petasites japonicas</i> subsp. <i>giganteus</i> , and <i>Aconitum maximum</i> var. <i>misaoanum</i> . (Cf. Plants of Shiretoko II, Shiretoko Museum eds., Shari Board of Education, Shari Town, 2006)
5	27	Timberline	The limit at which tall trees are distributed in a forest form. (Ecological Dictionary, Makoto Numata (ed.), Tsukiji Shokan, 1995)(Excerpt). The vertical distribution in Shiretoko (Mt. Rausu) exhibits: a montane zone below 750m (deciduous broad-leaved forests, mixed forests, and coniferous forests); a subalpine zone from 750m to 1,100m (Erman's birch forests); an alpine zone above 1,100m (Japanese stone pine scrub); and the timberline at about 1,100m above sea level. ( <i>Plants of Shiretoko</i> I, Shiretoko Museum [eds.], Shari Board of Education, Shari Town, 2005) (Partially revised excerpt).
5	28	Wind beaten area	An area that extremely lacks snow cover, and its surface ground, where plants should grow, is exposed directly to cold winds in winter. These areas are seen on windward sides (west to northwest) of winter winds. Scrubs such as <i>Loiseleuria procumbens</i> and <i>Arctica nana</i> , mosses, lichens, and perennial herbs grow in these areas. ( <i>Plants of Shiretoko</i> I, Shiretoko Museum eds., Shari Board of Education, Shari Town 2005) (Partially revised excerpt)
9	65	Wind beaten grassland	A type of grassland where large trees are unable to take root due to strong winds and only herbaceous plants grow. Plants seen in wind beaten area in Shiretoko Cape (the area battered by winter winds) include: alpine plants such as <i>Empetrum nigrum</i> var. <i>japonicum</i> ; plants on rocky crevices and gravel such as <i>Festuca rubra</i> ; and coastal plants such as <i>Rosa rugosa</i> and <i>Elymus mollis</i> . ( <i>Plants of Shiretoko</i> I, Shiretoko Museum eds., Shari Board of Education, Shari Town, 2005) (Partially revised excerpt)



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