

On the Formulation of the Shiretoko Ecosystem Conservation and Restoration Project Plan for Shiretoko National Park

In recent years, feeding damage in national parks by deer, crown-of-thorns starfish (*Acanthaster planci*) and other animals has intensified, and confirmed cases of native flora and fauna being driven away from its habitat due to non-native invasive flora and fauna have been reported. To address this matter, an ecosystem conservation and restoration project framework was established, following an amendment to the National Parks Law, to conserve or restore the ecosystems in national parks through the capture and elimination of invasive species, protection of natural vegetation, and other means. With regard to Shiretoko National Park, a Shiretoko Ecosystem Conservation and Restoration (ECR) Project Plan was formulated jointly by the Ministry of Agriculture, Forestry and Fisheries, and the Ministry of the Environment, in October 2010, in accordance with Article 38 of the National Parks Law. The aim of the plan is to conserve or restore the pristine ecosystem of the park by lessening the impact of browsing pressure from sika deer (*Cervus nippon yesoensis*). Included in the details of the plan are actions, such as monitoring and surveys, designed to assist in a comprehensive effort in adaptive management that takes into consideration ecosystemic processes and interaction between organisms. The following is an excerpt from the plan, focusing on monitoring activity.

————— Shiretoko ECR Project Plan (*excerpt*) —————

1. Duration of the ECR Project Plan

From Oct. 21, 2010 to March 31, 2015

2. Formulators of the ECR Project Plan

Ministry of Agriculture, Forestry and Fisheries, and Ministry of the Environment

3. Aim of the ECR Project

Shiretoko National Park possesses primitive and pristine natural landscapes, and highly diverse ecosystems sustained by its wide variety of wildlife. The landscape is characterised by well-developed mixed needleleaf and broadleaf forest composed of Japanese oak (*Quercus mongolica* var. *grosseserrata*), painted maple (*Acer mono*), Sakhalin fir (*Abies sachalinensis*), Sakhalin spruce (*Picea glehnii*), etc.; deciduous broad-leaved forest composed of Erman's birch (*Betula ermanii*) and *Alnus maximowiczii*; a forest community composed of a mixture of Japanese stone pine (*Pinus pumila*) scrub and other scrub; alpine plant communities that mainly cover the mountain ridges, and extensive marsh plant communities near mountain lakes and marshes; coastal plant communities that extend from the gravelly sand of the seaside up to adjoining cliffs or steep slopes; windswept grassland on the summit of coastal cliffs; and tall plant communities; together, an abundant and varied mix of plant communities. Distributed about the cliffs along the coastal strip of Shiretoko Cape and nearby areas are plant communities dominated by alpine zone plants such as black crowberry (*Empetrum nigrum* var. *japonicum*) and Siberian wormwood (*Artemisia laciniata*), and tall plant communities composed of

Angelica anomala and *Aconitum maximum* var. *misaoanum*; and the development of alpine vegetation beginning at the coast is another distinctive characteristic of the park.

In addition, salmonid species in Shiretoko migrate between the sea and river, and a wide variety of animals that rely on them as an important food source inhabit the area, 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 the white-tailed eagle (*H. albicilla*). Furthermore, both northern and southern wildlife species inhabit the same area, and this rich amalgamation is further enhanced by the interrelationship between marine and terrestrial environments, to produce Shiretoko's rich ecosystem, supported by its diverse biota and organism interactions. In acknowledgement of the importance of this complex ecosystem and its immense biodiversity, the Shiretoko Peninsula was inscribed on the World Heritage List in July 2005.

Despite the acknowledgement of its rich ecosystem, however, the adverse impact on its natural environment brought about by sika deer is intensifying. The sika deer entered the Shiretoko Peninsula from Akan in the 1970s, and their population began to increase sharply in the 1980s. In the Shiretoko Cape area, after a count confirmed that 592 individuals had passed the winter of 1998, a high population density has been maintained, with periodic fluctuation. A similar trend is observed in other wintering areas of the peninsula. Adverse effects of the increase in sika deer population include a rapid decline in and poor regeneration of specific tree species, primarily in the deer's wintering areas, owing to the deer feeding on the tree bark; a decrease in the standing crop of forest floor vegetation, and a decrease in the diversity of vegetative species; a decrease in the number of coastal plant communities, and in the number of rare plant species and/or individuals composing such communities; an increase in Aleutian ragwort (*Senecio cannabifolius*) and seaside ragwort (*Senecio pseudo-arnica*), which are not eaten by sika deer; and an increase in invasive alien species such as bull thistle (*Cirsium vulgare*). If the present high density of sika deer persists, it is feared that it may cause the extinction of rare plant species and/or populations, impact alpine vegetation, cause soil erosion on steep slopes, and other adverse effects. In July 2008, the World Heritage Committee of the United Nations Educational, Scientific and Cultural Organization (UNESCO) indicated that measures targeting the sika deer were crucial for ecosystem and biodiversity conservation in the park, and requested that adaptive management be implemented, based on the results of continuous monitoring.

The aim of the resulting ECR project is to conserve or restore the pristine ecosystem of Shiretoko National Park by reducing the impact of the browsing pressure of sika deer. The project's 'pristine' ecosystem does not signify a determinate composition of species that existed at a certain point in the past, but the dynamic ecosystem, fluctuating with ecological process, that existed prior to the Meiji Period; that is, before the initiation of modern reclamation efforts.

4. Details of the ECR Project (*a selection of items especially related to monitoring*)

1) Understanding and monitoring ecosystem status

Surveys on the inhabitation and growing status of flora and fauna characteristic of the local

ecosystem, and surveys to gather information on the condition of soil erosion, will be conducted, and monitored periodically for trend.

i) Understanding the growing status of plants

Inventory study in forest communities, a standing crop survey of woody plant leaves, a forest floor vegetation survey, a vegetation survey of coastal plant communities and alpine plant communities, and other surveys will be conducted, in order to understand the impact of sika deer browsing, and the extent of invasions and establishment of alien plants such as bull thistle over time. In addition, vegetation and other surveys will be conducted in areas both inside and outside of sika deer enclosure fences, in order to understand the extent of vegetation recovery resulting from sika deer invasion prevention measures.

ii) Understanding the inhabitation status of animals as indicators of ecosystem

Considered as indicators of the conservation and restoration of an ecosystem, small mammals, birds, amphibians, reptiles, insects, etc., will be surveyed with respect to their inhabitation status.

iii) Understanding the inhabitation status of sika deer

Count surveys to estimate the number of inhabiting sika deer, light census surveys, and other samples indicating the condition of the deer population, will be collected and analysed over time, in combination with radio-tracking surveys via attached transmitters to identify their seasonal migration routes and wintering areas.

Moreover, data on the number of sika deer caught inside Shiretoko National Park and the surrounding areas will be collected and analysed.

iv) Understanding the extent of soil erosion

To understand the progression of soil erosion, surveys using fixed-point shooting and other measures will be conducted.

2) Prevention and elimination of flora and fauna that may interfere with the conservation and restoration of park ecosystems (*contents omitted*)

3) Conservation or improvement of the inhabitation or growing environment of flora and fauna

Investigation, verification tests, and modification of the environment will be carried out, in order to improve the inhabitation and growing conditions of flora and fauna that are characteristic of a given ecosystem.

i) Investigation and verification tests of improvement methods for coastal plant communities, etc.

For those coastal plant or other communities that do not show signs of vegetation recovery, due to the severity of the sika deer impact, investigation and verification tests will be conducted, based on the results of the surveys and monitoring efforts mentioned above 1), in a search for effective inhabitation environment improvement methods.

ii) Modification of the wintering environment of sika deer (*contents omitted*)

4) Raising public awareness to increase support for conservation and restoration of park ecosystems (*contents omitted*)

5) Projects, such as surveys, deemed necessary for the initiatives above

The simplest yet most effective data collection methods for the purpose of vegetation monitoring will be sought and applied to the actual monitoring. Sika deer hunting techniques not susceptible to lower hunting rates from repeat-hunt learning will be researched, and related verification tests will be conducted as necessary.

5. Requirements for appropriate and effective enforcement of the ECR Project (*a selection of items especially related to monitoring*)

1) Assessment and revision of the ECR Project Plan

To execute the project based on the concept of adaptive enforcement, revision of the project plan shall be based on extensive assessment and verification of its contents, and of the effectiveness of the overall project. In addition, all such assessment, verification and revision of the project plan shall be informed by the advice, guidance, etc., of the Sika Deer Working Group, under the auspices of the Shiretoko World Natural Heritage Site Scientific Council.

2) Coordination with other plans related to the execution of the ECR Project

The project shall be carried out in a manner consistent with the Specified Wildlife Conservation and Management Plan (as well as the Sika Deer Management Plan in the Shiretoko Peninsula) formulated by Hokkaido Government.

(3) Implementation structure for the ECR Project (*contents omitted*)