

Outline:

Long-Term Monitoring Plan for the Shiretoko World Natural Heritage Site

1. Objective

Long-term monitoring is implemented for adaptive management of the heritage site based on scientific knowledge, within the scope of the management measures stipulated in the Management Plan for the Shiretoko World Natural Heritage Site.

This Plan was formulated in order to define the monitoring items and contents required for “effective and efficient” implementation of adaptive management.

2. Basic Monitoring Policy

This Plan establishes the evaluation items required for implementation of adaptive management, and defines the monitoring items and contents used to obtain the necessary data for each evaluation item.

1) Evaluation items

The following evaluation items are applied to determine whether the criteria of the Shiretoko World Natural Heritage Site are being upheld, whether UNESCO and IUCN recommendations are being complied with, and whether management is being carried out according to the Heritage Site Management Plan:

- I The productivity of a unique ecosystem is being maintained.
- II The interaction between marine and terrestrial ecosystems is being maintained.
- III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List.
- IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources.
- V Impact of river constructions has been lessened so as to maintain river ecosystems that can support salmonid species reproduction.
- VI Excessive influence of high sika deer (*Cervus nippon yessoensis*) population density on the ecosystem of the heritage site is not occurring.
- VII Recreational utilization of the site and other human activities are being balanced with conservation of the natural environment.

VIII Impacts, or potential impacts of climate change are being tracked early.

2) Monitoring items

A list of monitoring items (Appendix) used to obtain the necessary data for each evaluation item has been prepared. Multiple items are set to evaluate each individual item. There are 37 monitoring items in all, classified as follows in accordance with the implementing body.

i) Monitoring items implemented by relevant government agencies

*In this case, “relevant government agencies” refers to the Ministry of the Environment, the Forestry Agency, and the Hokkaido Government.

ii) Monitoring items implemented in cooperation with local governments, related bodies, experts, and other government agencies besides those mentioned in i)

Surveys and research that does not fit the above two classifications will be considered and implemented under a third classification, “iii) Other surveys and research”

3) Monitoring methods and evaluation criteria

As much as possible, monitoring methods, evaluation indicators and evaluation criteria are to be “easily implementable,” “indicators that allow advance detection of future changes,” and “easy to evaluate.” The methods and criteria may be flexibly revised, even during the implementation period, as the situation requires.

4) Implementation of monitoring and sharing of results

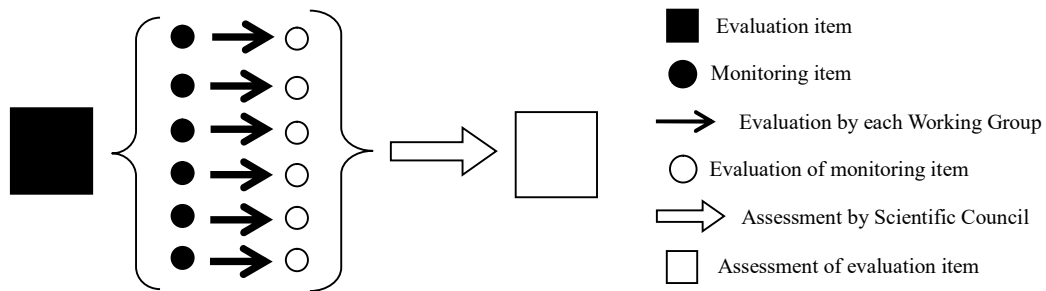
Monitoring is implemented through close collaboration and cooperation between all relevant parties, and information on monitoring and survey results are shared as needed.

3. Evaluation procedure

Evaluation items are assessed based on the evaluation of monitoring items. Each monitoring item is evaluated individually based on the monitoring results.

The Scientific Council makes assessments of each of the eight evaluation items. In principle, each individual Working Group, etc. makes evaluation of each monitoring item.

Schematic diagram of evaluation procedure



Evaluation item for each Working Group are to be individually assigned in accordance with the field of specialization, as follows, so as to harness the specialized expertise of each Working Group. Each Working Group is to make assessments of the monitoring item(s) relevant to that Working Group's evaluation items.

For monitoring results which it is difficult for a Working Group to assess, a committee member selected from the Scientific Council or Working Groups is to make assessments on behalf of the Working Group. Also, monitoring items which only apply to evaluation items VI, VII and/or VIII are to be assessed by the Scientific Council.

4. Framework of the plan

1) Duration of plan

The duration of one period of the plan is 10 years, with the first period beginning in April 2012 and ending in March 2022. Deliberations on the continuation and/or revision of the plan are to be held every five years or so.

2) Other

Relevant government agencies determine the contents of monitoring projects each year based on this Plan, and perform the necessary monitoring and surveys for that fiscal year to the extent of their ability. Each fiscal year, the delegation of duties may be revised as needed. Each Working Group makes assessment of the monitoring results used to evaluate that Working Group's designated evaluation items.

(1) Monitoring items implemented by relevant government agencies

No.	Monitoring item	Evaluation item corresponding to monitoring item
1	Observation of water temperature and chlorophyll-a using satellite remote sensing	I The productivity of a unique ecosystem is being maintained. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources. VIII Impacts, or potential impacts of climate change are being tracked early.
2	Fixed-point observation of water temperature using marine observation buoys	I The productivity of a unique ecosystem is being maintained. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources. VIII Impacts, or potential impacts of climate change are being tracked early.
3	Seal habitation survey	I The productivity of a unique ecosystem is being maintained. III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources. VIII Impacts, or potential impacts of climate change are being tracked early.
4	Marine flora and fauna and habitation survey (periodic shallow-sea survey)	I The productivity of a unique ecosystem is being maintained. II The interaction between marine and terrestrial ecosystems is being maintained. III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List.
5	Shellfish quantitative survey in shallow seas	I The productivity of a unique ecosystem is being maintained. II The interaction between marine and terrestrial ecosystems is being maintained.
6	Survey of spectacled guillemot, black-tailed gull, slaty-backed gull, and Japanese cormorant populations, nesting site distribution, and number of nests	II The interaction between marine and terrestrial ecosystems is being maintained. III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources. VII Recreational utilization of the site and other human activities are being balanced with conservation of the natural environment.
7	Survey of recovery of vegetation from sika deer impact (Forestry Agency 1ha enclosure)	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.
8	Survey of recovery of vegetation from sika deer impact (Ministry of the Environment enclosure at Shiretoko Cape)	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.
9	Survey of sika deer browsing pressure in experimental density manipulation zones	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.
10	Wide-area vegetation survey to gauge sika deer feeding pressure	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring. VII Recreational utilization of the site and other human activities are being balanced with conservation of the natural environment. VIII Impacts, or potential impacts of climate change are being tracked early.
11	Periodic growth and distribution surveys of <i>Viola kitamiana</i>	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.
12	Wide-area aerial count of wintering sika deer populations	VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.

List of monitoring items

Appendix

13	Survey of habitation of terrestrial invertebrates (primarily insects) (including survey of alien species)	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.
14	Survey of habitation of land birds	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.
15	Survey of habitation of large, medium-sized and small mammals (including survey of alien species)	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.
16	Preparation of wide-area vegetation map	II The interaction between marine and terrestrial ecosystems is being maintained. III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.
17	Monitoring of number of salmon running upstream, spawning grounds, and number of spawning beds in rivers	II The interaction between marine and terrestrial ecosystems is being maintained. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources. V Impact of river constructions has been lessened so as to maintain river ecosystems that can support salmonid species reproduction.
18	Survey of habitation of freshwater fish, in particular the Dolly Varden (<i>Salvelinus malma</i>) that characterizes the freshwater fish fauna in Shiretoko (including survey of alien species)	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. V Impact of river constructions has been lessened so as to maintain river ecosystems that can support salmonid species reproduction. VIII Impacts, or potential impacts of climate change are being tracked early.
19	Site utilization survey	VII Recreational utilization of the site and other human activities are being balanced with conservation of the natural environment.
20	Survey of sighting and encounters with brown bears, including any damage incurred	VII Recreational utilization of the site and other human activities are being balanced with conservation of the natural environment.
21	Meteorological observation	VIII Impacts, or potential impacts of climate change are being tracked early.
22	Survey of wintering population of sea eagles	II The interaction between marine and terrestrial ecosystems is being maintained.
23	Survey of population, breeding status, reproductive rate and number of fledglings, and food sources of Blakiston's fish-owl. Tracking of migration and distribution through tagging and attachment of transmitters. Number of dead, sick and injured and investigation of causes	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List.
24	Tracking of project implementation status through preparation of annual reports	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VII Recreational utilization of the site and other human activities are being balanced with conservation of the natural environment.
25	Tracking of social environment through preparation of annual reports	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VII Recreational utilization of the site and other human activities are being balanced with conservation of the natural environment.

(2) Monitoring items implemented in cooperation with local governments, related bodies, experts, and other government agencies besides those m

No.	Monitoring item	Grounds for selection *Evaluation item corresponding to monitoring item
①	Aerial observation of sea ice distribution	I The productivity of a unique ecosystem is being maintained. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources. VIII Impacts, or potential impacts of climate change are being tracked early.
②	Biological survey of ice algae	I The productivity of a unique ecosystem is being maintained. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources.
③	Tracking of changes in fish catches compared to Hokkaido Suisan Gensei [Statistics on Fisheries in Hokkaido]	I The productivity of a unique ecosystem is being maintained. III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources.
④	Ascertainment and assessment of walleye pollock stock (survey used to set total allowable catch [TAC])	I The productivity of a unique ecosystem is being maintained. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources.
⑤	Walleye pollock spawning survey	I The productivity of a unique ecosystem is being maintained. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources.
⑥	Survey of number of Steller sealions migrating to Japan seacoast, number killed due to human actions (by gender), characteristics	I The productivity of a unique ecosystem is being maintained. III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources. VIII Impacts, or potential impacts of climate change are being tracked early.
⑦	Survey of damage caused by Steller sealions	IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources.
⑧	Status of reproduction at white-tailed eagle nesting sites and monitoring of fledglings	II The interaction between marine and terrestrial ecosystems is being maintained. III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List.
⑨	Survey of total wintering population of sea eagles throughout Hokkaido	II The interaction between marine and terrestrial ecosystems is being maintained.
⑩	Analysis of oil, cadmium, mercury, etc. in seawater	IV Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources.
⑪	Ground population count survey at major sika deer wintering grounds (including habitation surveys of other mammals)	III Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List. VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.
⑫	Qualitative survey of sika deer population through observation of body weight, pregnancy rate etc. among culled and naturally deceased sika deer	VI Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring.

(3) Other surveys and research

No.	Monitoring item	Grounds for selection *Evaluation item corresponding to monitoring item
(1)	Observation and prediction of changes in sea ice volume	*Surveys and research which provide evidence of heritage site's value by clarifying workings of site's ecosystem, or contribute to the formulation of specific external measures, are to be proactively pursued in collaboration and cooperation with local governments, related bodies, experts, and other government agencies
(2)	Capture, reproduction, population estimates, migration and distribution patterns, and damage caused by brown bears	
(3)	Survey on current status and changes to genetic diversity of salmonid species	
(4)	Survey of seasonal migration of wintering sea eagle populations and consumption of human-provided and naturally occurring food resources	
(5)	Survey of damage caused by seals	