# State of Conservation Report of Shiretoko (Japan) (N1193)

In Response to the Decision at the 43th Session of the World Heritage Committee

**Japan**

**November 2020**

## 1. Executive summary of the report

In collaboration with the Ministry of the Environment, Forestry Agency, Agency for Cultural Affairs, Hokkaido Prefectural Government, and other related organizations, and based on scientific reviews at the Shiretoko Natural World Heritage Site Scientific Council, Japan reports as below in response to the issues raised in World Heritage Committee Decision 43 COM 7B.10.

- Regarding Paragraph 3 of the Decision, joint monitoring of Steller sea lions (*Eumetopias jabatus*) with Russia has been conducted in the Kuril Islands and there is a plan to develop a population dynamic model using the monitoring results. The analysis results will be submitted to the World Heritage Centre as soon as they become available.

- Regarding Paragraph 4 of the Decision, the combined use of capturing and non-lethal measures has mitigated the level of damage caused by Steller sea lions and helped avoid a rapid deterioration of fishery. However, since the non-lethal methods currently used are effective only at a low level, the combined management with culling at the current level will be maintained, while continuing the scientific monitoring data accumulation and the analysis stated in the paragraph 2.1, to eventually review the level of culling.

- Regarding Paragraph 5 of the Decision, the monitoring of Steller sea lions is normally conducted by direct counting from onshore spots. This means that the data obtained are clearly too small to make an estimate of the overall population level of Steller sea lions migrating to the Nemuro Strait that inhabit the vast sea area including the southern part of the Kuril Islands. Due to this situation, the mark-recapture method has just been introduced to estimate the population level. After obtaining the results using this method, a management model of Steller sea lions is to be developed. The plan or process to develop the management model will be stated in the Multiple Use Integrated Marine Management Plan (which is reviewed once every five years).

- Regarding Paragraph 6 of the Decision, the IUCN Advisory mission was invited in 2019. The recommendations made in the report of the Advisory mission have been discussed.

- Regarding Paragraph 7 of the Decision, the monitoring of the impact of climate change in Shiretoko has been conducted. Efforts will be made to promptly detect its impact. In addition, there will be accelerated efforts to examine and develop adaptive management strategies.

There are no other conservation issues identified nor development projects which may impact on Outstanding Universal Value of the property.

Public access to the conservation report is acceptable.

## 2. Response to the Decision of the World Heritage Committee

Regarding the issues raised in Decision 43 COM 7B.10 of the 43rd session of the World Heritage Committee, Japan sincerely reports as follows:

### 2.1. Response to Paragraph 3 of the Decision

**Paragraph 3:** Welcomes the joint surveys undertaken by the States Parties of Japan and the Russian Federation concerning the Western Steller Sea Lion rookeries in Russia and their plans to develop a population dynamic model of this subspecies to inform management, and requests the States Parties to submit the findings to the World Heritage Centre once they are available;

a) According to a research conducted by Japan, the resighting of brandings made it clear that Steller sea lions migrate to the Nemuro Strait almost exclusively originated in the Kuril Islands. Furthermore, the satellite tracking of Steller sea lions migrating to the Nemuro Strait showed that they inhabit the area including the southern part of the Kuril Islands, except during the breeding period.

b) This research on the origin of the migrating Steller sea lions indicates a possibility that they are forming a subgroup within the Kuril Islands. Currently, Japan is studying the population level by applying the mark-recapture theory based on the results of the resighting of brandings.

c) In addition to the joint monitoring conducted in the Kuril Islands with Russia, biological data such as the age and sexual maturity of Steller sea lions captured in the Nemuro Strait are being collected. It is planned to develop a population dynamic model using these data.

d) The results of the above research and analysis will be submitted to the World Heritage Centre as soon as they become available.

### 2.2. Response to Paragraph 4 of the Decision

**Paragraph 4:** Noting the reported ongoing damage caused by pinnipeds to coastal fisheries and the conclusion that the non-lethal measures used have not yet been effective in reducing the damage, also requests the State Party to provide justification for the need to continue culling in terms of its effectiveness in reducing the damage to fisheries and urges the State Party to reconsider the current level of culling of the Western Steller Sea Lion based on a precautionary approach considering that accurate and comprehensive data on this subspecies continues to be lacking and until such data is available to inform management;

a) Damage to fisheries

- To achieve the sustainable use of fishery resources, local fishers have adopted voluntary management measures such as establishing an upper limit on the number of ships they operate, setting a non-fishing period or non-fishing days during their operation periods, reducing operation hours, restricting fishing gears and methods that can be used, and regulating sizes of their catches. In addition, to secure stable fisheries livelihoods, they are working on raising the unit price of their catch through the maintenance of their freshness and reducing production costs.
- The combined use of capturing and non-lethal measures such as relocating fishing nets depending on the situation of Steller sea lions' migration and driving Steller sea lions away using non-lethal bullets from shot guns has controlled the damage to the current level and helped avoid a rapid deterioration of fishery.

Table 1. Damage caused by Steller sea lions to fisheries

(million yen)

| 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 |
|---|---|---|---|---|---|---|---|
| 209 | 357 | 212 | 175 | 177 | 213 | 213 | 170 |

(Hokkaido Prefectural Government)

Table. 2. Number of captured Steller sea lions in Nemuro Strait

(number of individuals)

| 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 |
|---|---|---|---|---|---|---|---|---|
| 10 | 14 | 13 | 15 | 15 | 15 | 14 | 15 | 15 |

(Hokkaido Prefectural Government)

b) Non-lethal mitigation measures for the damage to fisheries

- In addition to capturing, measures such as relocating fishing nets depending on the situation of Steller sea lions' migration and driving Steller sea lions away using non-lethal bullets from shot guns have so far been used to reduce the damage to fisheries. Furthermore, as an effort to prevent the damage to nets, a verification test was conducted in 2018 and 2019 using reinforced gill nets in the fishing of walleye pollock, *Gadus chalcogrammus*, using fixed gill nets practiced in Nemuro Strait. In comparison with normal gill nets, reinforced gill nets have several challenges such as higher costs and difficulties in operating. However, there have been reductions in the damage to gill nets and experiments will be continued on the wider use of reinforced gill nets.
- The national and local governments are supporting measures adopted by local fishers against fishery damage, such as driving away Steller sea lions and introduction of modified fishing gear, including reinforced gill nets and the use of non-lethal bullets from shot guns.

c) Conclusion

- The combined use of capturing and non-lethal measures such as relocating fish nets depending on the situation of Steller sea lions' migration and driving Steller sea lions away using non-lethal bullets from shot guns has controlled the damage to the current level and helped avoid a rapid deterioration of fishery.
- Given that the non-lethal methods currently used are only having a low level of effectiveness, however, above-mentioned scientific data accumulation and analysis in response to Paragraph 3 of the Decision will be continued, while maintaining the current level of culling, to eventually review the level of culling.
- While monitoring Steller sea lions migrating to the Nemuro Strait and continuing efforts to mitigate the damage they cause to fisheries, efforts will be made to achieve both the stable fisheries livelihoods through the sustainable use of fishery resources and conservation of the marine ecosystems.

**2.3. Response to Paragraph 5 of the Decision**

**Paragraph 5:** Notes with concern the lack of detail on the monitoring and management of the Western Steller Sea Lion in the Management Plan and the Multiple Use Integrated Marine Management Plan, and further requests the State Party to ensure that these documents are further strengthened and reflect such a

precautionary approach towards management of the Western Steller Sea Lion population;

a) The direct counting from onshore spots has been used to monitor Steller sea lions. Specifically, the number of Steller sea lions swimming in the coastal area is counted from a few fixed points along the coast. This method is designed to comprehend the number of Steller sea lions that use the coast of the Shiretoko Peninsula like a snapshot image. This means that the data obtained are clearly underestimated the overall population level of Steller sea lions migrating to the Nemuro Strait that inhabit the vast sea area including the southern part of the Kuril Islands.
b) Accordingly, the estimation of the population level using the mark-recapture method has been started as stated in 2.1 above. There is a plan to develop a management model of Steller sea lions migrating to the sea area around the Nemuro Strait after obtaining the results from this method.
c) While there is a plan to develop a management model of Steller sea lions, changes in the capturing management method are not considered at this stage. Until the above-mentioned management model is completed, its development process will be stated in the Multiple Use Integrated Marine Management Plan (which is currently reviewed every five years).

**2.4. Response to Paragraph 6 of the Decision**

**Paragraph 6:** Also welcomes the State Party's commitment to restore the Rusha River to its most natural state possible, including the progress made in assessing options for the removal of three check dams and alternatives to the bridge, and notes with appreciation the State Party's invitation for an IUCN Advisory mission in Autumn 2019 to provide further advice on this matter;

As for the Advisory mission, Dr. Peter Rand, the chair of the IUCN Species Survival Commission's Salmonid Specialist Group, was invited to conduct field inspections from September 23 to 25, 2019, and made recommendations on further actions necessary to restore the Rusha River to the most natural state possible.
A report of the field inspections of the mission was presented to Japan in March 2020. The following is our response to the recommendations made in the report.

**Recommendation 1:** Enhance the simulation modelling for the Rusha River restoration to include biological variables such as the role of large woody debris and measures of spawning habitat quality, before deciding on how the dam will be modified.

- Dam modifications are progressing pursuant to the improvement policy developed based on the results of hydraulic model experiments and numerical simulations. We plan to conduct these works under a six-year plan while confirming and verifying the impact of modifications.
- We understand the role of large woody debris including the expansion of the habitat of fish.
- Unfortunately, there is no simulation modelling that factors in large woody debris. However, model experiments have confirmed that dam modifications would not make any change to the area of suitable spawning beds and the trap area of woody debris. It is expected that the river channel splitting and restoration of subsurface flows would improve the spawning habitat.

**Recommendation 2:** Adopt an adaptive management approach with periodic evaluation for dam removal and the physical and biological monitoring of the river system, working in close collaboration with the River Construction Working Group and other relevant stakeholders.

- The national and local governments discuss and examine the dam improvement plans with the River Construction Working Group and local groups, including stakeholders. Based on the monitoring results, we conduct evaluations on partial removal of check dams and implement the adaptive management approach that reviews the plan and revises practices as needed.

**Recommendation 3:** Assess the feasibility of the use of booms at the river mouth to capture large woody debris as a way to balance river restoration needs and the fishery stakeholder concerns.

- The results of hydraulic model experiments and numerical simulations showed that three check dams would maintain their function of stabilizing slopes at the flanks of the dams even after modifications and river channel splitting would appear only within the 40-meter sections of each dam where its body would be removed. It is therefore unlikely that any woody debris would be produced within these sections.
- Booms cannot be installed due to safety and technical concerns such as their potential destruction by strong waves around the Shiretoko Peninsula and the consequent difficulty in obtaining understanding from local fishers.
- With regard to woody debris flow from the upstream of the River, it has been confirmed that they are trapped at river flooding in broad riverbed area at a river bend about 300 meters upstream of the third dam. The situation of woody debris flows after the partial removal of the dams will be closely monitored and the effect of the bent terrain in trapping woody debris will be examined as needed. (Refer to the map below for the conditions of the meander reaches where a wide riverbed develops.)

Sedimentary area at river bend（200-380 meters upstream of No.3 dam）

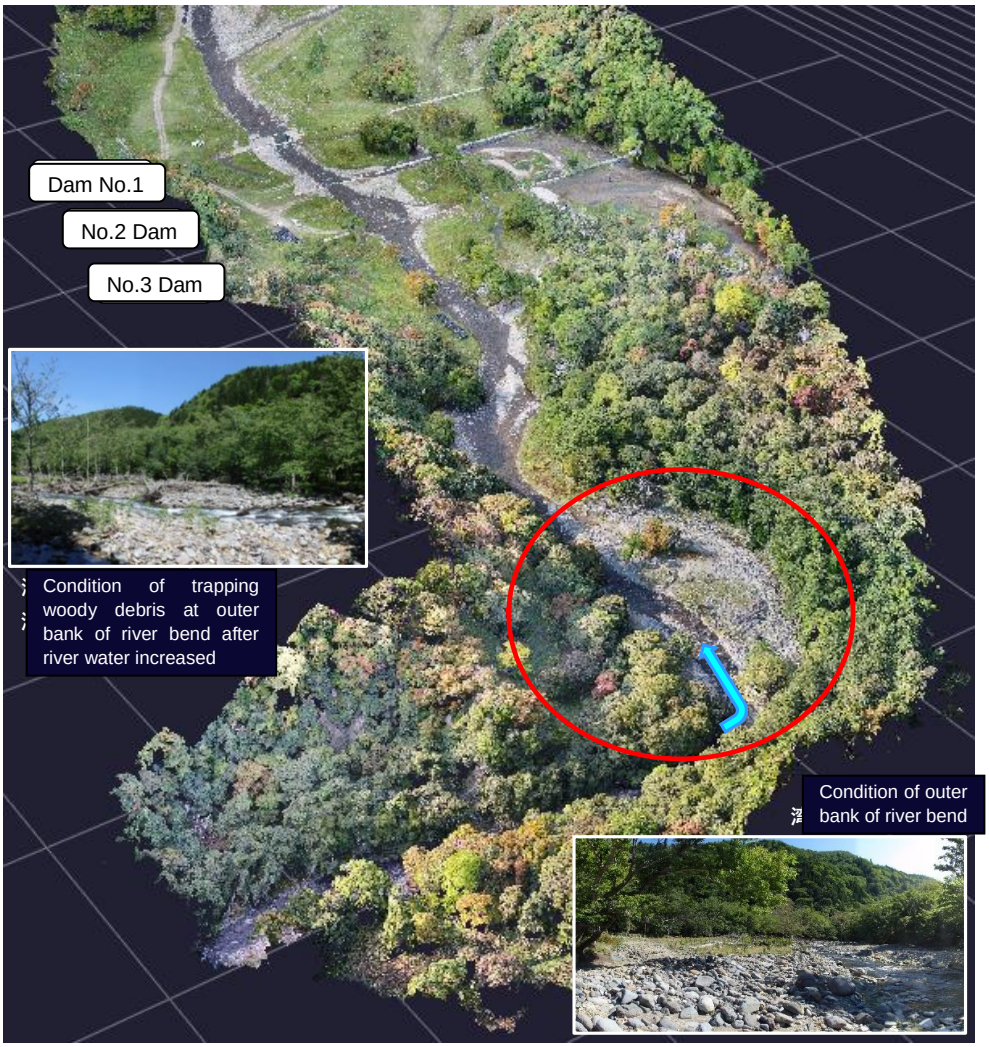
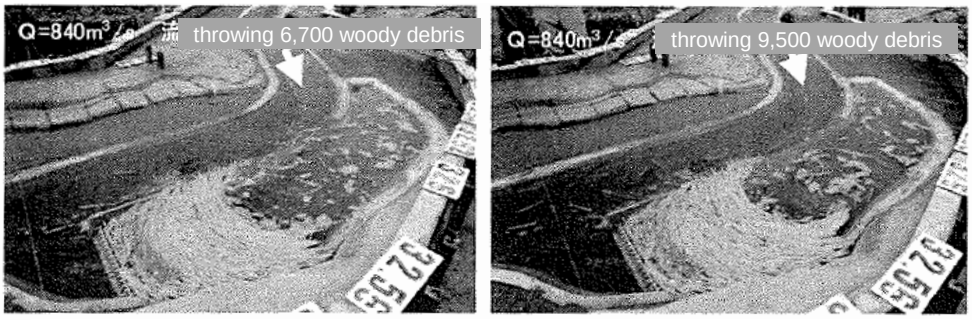



Image of trapping woody debris at river flooding




Source: picture 6.5.6, page 211, Woody debris and disaster

**Recommendation 4:** Closely monitor the impacts of the riverbed path pilot project, especially in relation to erosion, fish passage and disturbance to the benthic habitat, and take prompt remedial actions as necessary based on solid scientific understanding. This pilot project should not be replicated until there is sufficient evidence to support that there will be no impact on the ecosystem or that its impact can be satisfactorily mitigated.

- With respect to the upstream migration of fish, monitoring will be conducted to check if riverbed path does not prevent the upstream migration of salmonids. Based on the monitoring results, improvement measures will be taken as needed.
- The project will not be replicated until the monitoring results confirmed that there is sufficient evidence to support that there will be no impact on the ecosystem or that its impact can be satisfactorily mitigated.

**Recommendation 5:** Organize periodic meetings for all relevant stakeholders and with invited specialists to exchange ideas and concerns, and to highlight the on-going efforts on river restoration.

- The Shiretoko Natural World Heritage Site Regional Liaison Committee established in 2005 to liaise and coordinate with local concerned bodies and stakeholders has meetings regularly with the participation of the members of the Shiretoko World Natural Heritage Site Scientific Committee, who are specialists. The Liaison Committee will continue to invite specialists on the river restoration.

### 2.5. Response to Paragraph 7 of the Decision

**Paragraph 7:** Encourages the State Party to continue monitoring the impacts of climate change on the property and to develop adaptive management strategies to minimize any impacts of climate change on its Outstanding Universal Value (OUV);

a) Monitoring

Following consideration by the Scientific Council, the Kushiro Nature Conservation Office, Hokkaido Regional Forest Office, and the Hokkaido Prefectural Government developed the Long-Term Monitoring Plan for Shiretoko Natural World Heritage Site in 2012 (as reported in the previous state of conservation report submitted in November 2018). It is a plan on monitoring activities that are necessary for maintaining the value of the property. Based on the Plan, monitoring of the impact of climate change on Shiretoko focuses on sea ice, vegetation, ichthyofauna, water temperature, weather information, and so on. The monitoring of each of these items has been conducted continuously.

In 2019, the results of past monitoring activities were compiled, and survey methods, evaluation implementation structures and so on were reviewed to revise the Plan and to improve monitoring activities concerning climate change (the revised Plan is attached). As an example, to accurately

comprehend the impact of climate change on alpine vegetation, which is thought to be vulnerable to the impact of climate change, surveys and analyses were started to estimate long-term changes in alpine vegetation using aerial photos. Monitoring will be continued with advice from the Scientific Council to promptly detect the impact of climate change on the value of the heritage site.

b) Adaptive management strategy

The actions taken so far include: collecting information on research by academic and research institutions, including future predictions; examining experimental adaptive measures for component elements of forest ecosystems; and gathering information on the adaptive strategies developed overseas for the natural world heritages. Furthermore, Japan recently established a basic policy and other measures for promoting adaptation measures for climate change. Specifically, the Climate Change Adaptation Act was established in 2018 and the Climate Change Adaptation Plan was approved by the cabinet. Based on the Plan, the "Guidelines for Considering Climate Change Adaptation Measures in Protected Areas such as National Parks" were developed in 2019.

Based on the above knowledge and policies, examinations for the development of adaptive management strategy in Shiretoko will be accelerated, referring to "Climate Change Adaptation for Natural World Heritage Sites - A Practical Guide (2014)" published by the World Heritage Centre. Since sufficient knowledge has not been obtained concerning the major impact of climate change on the OUV from a long-term viewpoint, selection of evaluation indicators, and future prediction of evaluation targets, further efforts will be made to collect and analyze basic data and to facilitate research, and the monitoring plan may be revised as needed.

The existing property management measures that are considered to increase the resilience of ecosystems in Shiretoko, such as those contributing to the recovery of vegetation through the management of the population of sika deer and improvements of the habitat of salmonids through modifications to river constructions, will be positioned as important adaptive measures.

**3. Other current conservation issues identified by the State Party which may have an impact on the property's Outstanding Universal Value**

There are no other conservation issues identified by Japan which may impact the Outstanding Universal Value of the property.

4. **In conformity with Paragraph 172 of the *Operational Guidelines*, describe any potential major restorations, alterations, and/or new construction(s) intended within the property, the buffer zone(s) and/or corridors or other areas, where such developments may affect the Outstanding Universal Value of the property, including authenticity and integrity.**

There are no development projects in and around the property which may affect the Outstanding Universal Value of the property.

## 5. Public access to the state of conservation report

Japan accepts upload of full reports for public access on the World Heritage Centre's State of Conservation Information System.

**6. Signature of the Authority**

鳥居敏男

TORII Toshio
Director-General
Nature Conservation Bureau
Ministry of the Environment
Government of Japan

本郷浩二

HONGO Koji
Director-General
Forestry Agency
Government of Japan

今里譲

IMASATO Yuzuru
Deputy Commissioner
Agency for Cultural Affairs
Government of Japan

# Long-Term Monitoring Plan for the Shiretoko Natural World Heritage Site (Amendment)

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

April, 2019

## 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 Natural World 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 Natural World 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. The reasons for selecting each evaluation item are shown in Appendix 1.

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 yesoensis*) 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 used to obtain the necessary data for each evaluation item has been prepared. Multiple monitoring items are set to evaluate each individual item. There are some monitoring items that correspond to different evaluation items since the items that contribute to the evaluation of multiple evaluation items are selected (so as not to increase the number of monitoring items), There are 37 monitoring items in all, classified as follows in accordance with the implementing body (Appendix 2).

i) Monitoring items mainly implemented by relevant government agencies
*In this case, “relevant government agencies” refers to the Ministry of the Environment, the Forestry Agency, and the Hokkaido Prefectural 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

Regarding the monitoring items for each evaluation item, the implementing bodies, evaluation bodies, monitoring methods, evaluation indicators, and evaluation criteria are as shown in Appendix 3. No evaluation criteria are established for the monitoring items that are designed to collect basic information as reference data to be used for considering various measures. 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, indicators and criteria may be flexibly revised, even during the implementation period, as the situation requires.

4) Implementation of monitoring and sharing of results

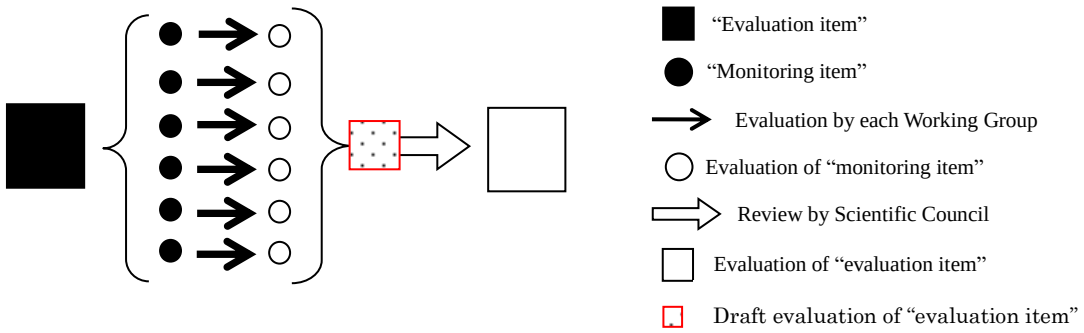
Monitoring is implemented through close collaboration and cooperation among all relevant parties, and information on monitoring and survey results are shared as needed.

3. Evaluation procedure

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

The Scientific Council makes evaluation of each of the eight evaluation items. In principle, each individual Working Group and Advisory Panel[1] (hereinafter referred to as "WG/AP") 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 evaluate the monitoring item(s) relevant to that Working Group's evaluation items.

- ✧ Marine Area Working Group: I, IV
- ✧ Sika Deer and Brown Bear Working Group: VI
- ✧ River Construction Advisory Panel: V
- ✧ Appropriate Use and Ecotourism Working Group: VII

If it is difficult for the WG/AP to evaluate the monitoring results, it is not precluded for a member of the Scientific Council or an external expert or the Review Meetings who can make an evaluation to make such an evaluation in place of the WG/AP.
Furthermore, each WG/AP independently or jointly prepares a draft evaluation for evaluation items. The Scientific Council then confirms the draft evaluation and determines an evaluation for the evaluation item. Evaluation of the evaluation items is to start where possible to complete the evaluation during the period of this plan.

4. Framework of the plan

1) Duration of plan

[1] The River Construction Working Group was reorganized as the River Construction Advisory Panel.

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. If there is any monitoring item for which it is difficult or not appropriate to conduct an evaluation annually based on factors such as the implementation status of surveys, WG/AP which is in charge of the said evaluation will determine an appropriate timing and other details of the evaluation. Each fiscal year, the delegation of duties may be revised as needed.

Formulated in February 2012
Partially revised (1st) in February 2015
Entirely reviewed (1st) in March 2019

# Evaluation items and reaons for selection

Appendix 1

| | Evaluation item | Reason for selection | Basis for selection |
|---|---|---|---|
| I | The productivity of a unique ecosystem is being maintained | This was one of the criteria on which Shiretoko was inscribed as a natural world heritage. | Criterion (ix):<br>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. |
| II | The interaction between marine and terrestrial ecosystems is being maintained | This was one of the criteria on which Shiretoko was inscribed as a natural world heritage. | Criterion (ix):<br>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. |
| III | Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List | This was one of the criteria on which Shiretoko was inscribed as a natural world heritage. | Criterion (x):<br>Shiretoko has particular importance for a number of marine and terrestrial species. Combining northern species from the continent and southern species from Honshu, the property supports a range of animal species. These include a number of endangered and endemic species, such as the Blackiston's Fish owl and the plant species Viola kitamiana. The property has one of the highest recorded densities of brown bear populations in the world. The property has significance as a habitat for globally threatened sea birds and is a globally important area for migratory birds. |
| IV | Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List | This is recommended in the UNESCO/IUCN Report. | Recommendation 4:<br>Consider identifying and designating locally relevant conservation zones, including no take zones, and practices within the marine habitat to ensure sustainable productivity of the marine biodiversity, including for sustainable production of the fishery resource.<br>---<br>Recommendation 6:<br>Address the declining population trends of the two indicator species - Walleye pollock and Stellar Sea lion – through sound management interventions for their sustainable conservation within the property and through cooperative measures with relevant parties for areas outside the marine component of the property. |
| V | Impact of river constructions has been lessened so as to maintain river ecosystems that can support salmonid species reproduction | This is recommended in the UNESCO/IUCN Report. | Recommendation 7:<br>Continue and accelerate measures to promote the free movement of salmon within the property and also to increase salmon escapement.<br>---<br>Recommendation 9:<br>Continue and accelerate monitoring efforts within the property, with particular attention to the impact of the modification of constructions on the movement of salmon populations within and outside the property. |
| VI | Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring. | This is recommended in the UNESCO/IUCN Report. | Recommendation 10:<br>Clear indicators should be developed to help define acceptable and unacceptable limits for the impact of grazing from Sika Deer on natural vegetation in the property. |
| VII | Recreational use of the site and other human activities are being balanced with conservation of the natural environment. | This is stated in the Management Plan for the Shiretoko Natural World Heritage Site. | p.9<br>4. Basic policies of management<br>f. Recreational use and conservation of the natural environment:<br><br>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. |
| VIII | Impacts, or potential impacts of climate change are being tracked early. | This is stated in the Management Plan for the Shiretoko Natural World Heritage Site. | p.9<br>4. Basic policies of management<br>g. Management from a broad perspective:<br><br>The heritage site will be properly managed in consideration of global issues such as climate change, which have a serious impact on the site's ecosystem. |

# List of long-term monitoring items

Appendix 2

(1) Monitoring items mainly implemented by relevant government agencies

| No. | Monitoring items | Corresponding evaluation items |
|---|---|---|
| 1 | Observation of the water temperature and chlorophyll a using satellite remote sensing | I, IV, VIII |
| 2 | Fixed-point observation of water temperature using ocean observation buoys | I, IV, VIII |
| 3 | Seal survey | I, III, IV, VIII |
| 4 | Marine biota and distribution survey (shore region survey) | I, II, III |
| 5 | Shellfish quantative survey in shore region | I, II |
| 6 | Survey of spectacled guillemot, black-tailed gull, slaty-backed gull, and Japanese cormorant populations, nesting site distribution, and number of nests | II, III, IV, VII |
| 7 | Survey of vegetation change (forest vegetation and grassland vegetation) in sika deer population control area | VI |
| 8 | Survey of vegetation shift throughout the Shiretoko Peninsula (forest vegetation, coastal vegetation, and alpine vegetation) | III, VI, VIII |
| 9 | Growth and distribution surveys of the rare plant Viola kitamiana | III, VIII |
| 10 | Survey of sika deer status in their main wintering grounds (aerial counting survey and terrestrial counting survey) | VI |
| 11 | Terrestrial invertebrate survey (mainly insects) | III, VI |
| 12 | Terrestrial bird survey | III, VI |
| 13 | Survey of small- and medium-sized mammals (including survey of alien species) | III |
| 14 | Preparation of wide-area vegetation map | III, VIII |
| 15 | Survey of damage to human activities caused by brown bears | VIII |
| 16 | Survey of the brown bear population in the Shiretoko Peninsula | II, III |
| 17 | Monitoring of the number of salmonnids migrating upstream, spawning grounds, and spawning beds in rivers | II, IV, V |
| 18 | Survey of freshwater fish, in particular the Dolly Varden that characterizes the freshwater ichthyofauna in Shiretoko (including survey of alien species) | III, V, VIII |
| 19 | Management and measures for appropriate use | VII |
| 20 | Promotion of appropriate use and ecotourism | VII |
| 21 | Change in the number of visitors | VII |
| 22 | Survey of the number of wintering sea eagles | II |
| 23 | Survey of the Blakiston's fish-owl, including the number of breeding pairs, tagged youngs, dead, sick and injured individuals and their causes | III |
| 24 | Tracking of the project implementation status through preparation of annual reports | III, VII |
| 25 | Tracking of the social environment through preparation of annual reports and so on | III, VII |
| 26 | Meteorological observation | VIII |

# List of long-term monitoring items

Appendix 2

(2) Monitoring items that require cooperation from local governments, related bodies, experts, and other government agencies

| No. | Monitoring items | Corresponding evaluation items |
|---|---|---|
| a) | Aerial observation of seasonal sea ice distribution by aircraft, satellites, and so on | I, IV, VIII |
| b) | Biological survey of ice algae | I, IV |
| c) | Tracking of changes in fish catches based on Statistics on Fisheries in Hokkaido | I, III, IV |
| d) | Ascertainment and assessment of walleye pollock stock (survey used to set total allowable catch [TAC]) | I, IV |
| e) | Walleye pollock spawning survey | I, IV |
| f) | Number of Steller sea lions migrating to the coat of Japan, number of dead individuals due to human activities, and their sex and characteristics | I, IV, VIII |
| g) | Survey of damage caused by Steller sea lions | IV |
| h) | Survey of the reproduction status of the white-tailed eagle in their nesting sites and monitoring the number of fledglings | II, III |
| i) | Survey of the total number of wintering sea eagles throughout Hokkaido | II |
| j) | tracking of changes in fish catches compared to Hokkaido Suisan Gensei [Statistics on Fisheries in Hokkaido] | IV |
| k) | Killer wale survey | I, III, IV, VIII |

(3) Other surveys and research

| No. | Monitoring items | Corresponding evaluation items |
|---|---|---|
| (1) | Observation and prediction of changes in sea ice volume | *Surveys and research which provide evidence of heritage site's value by clarifying mechanisms of site's ecosystem, or contribute to the formulation of measures for specific matters, 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 of brown bears, and the status of their damage | |
| (3) | Survey on the current status and changes to genetic diversity of salmonids | |
| (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 | |

# Monitoring methods for long-term monitoring items for each evaluation item

Appendix 3

| Evaluation item | No. | Monitoring item | Implementing body | Evaluation body (WG and so on in charge) | Monitoring method | Evaluation Indicator | Evaluation Criteria |
|---|---|---|---|---|---|---|---|
| I. The productivity of a unique ecosystem is being maintained | 1 | Observation of the water temperature and chlorophyll a using satellite remote sensing | Under consideration | Marine Area WG | Analyze MODIS data to observe the water temperature and chlorophyll a in the waters around the Shiretoko Peninsula. | Water temperature and chlorophyll a | The figures do not deviate from the long-term fluctuation range (use them as primary data to evaluate other monitoring results). |
| | 2 | Fixed-point observation of water temperature using ocean observation buoys | MOE | Marine Area WG | Install one ocean observation buoy off the coast of Utoro, Shari Town and off the coast of Konbuhama, Rausu Town, respectively, to observe the water temperature between spring and autumn. | Water temperature | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures). |
| | 3 | Seal survey | Hokkaido Prefectural Government | Marine Area WG | Conduct visual surveys from land and ocean. | Number of migrating individuals | Any serious problem is caused in the protection and management of seals (any threat of extinction is caused). |
| | 4 | Marine biota and distribution survey (shore region survey) | MOE | Marine Area WG | Conduct inventory surveys on fishes, sea algae, and invertebrates in the shore region along the coast of the Shiretoko Peninsula. | Biota, density, and distribution | The status and diversity are maintained almost at the same level as they were at the time of inscription (or as of base data). |
| | 5 | Shellfish quantative survey in shore region | MOE | Marine Area WG | Establish 50cm x 50cm quadrats in the fixed survey points established off the coast of the Shiretoko Peninsula and record the number of individual shellfish that have appeared inside the quadrants. | Density and species composition | The status and diversity are maintained almost at the same level as they were at the time of inscription (or as of base data). |
| | a) | Aerial observation of seasonal sea ice distribution by aircraft, satellites, and so on | 1st Regional Coast Guard Headquarters | Marine Area WG | Conduct surveys on the distribution status of sea ice. | Distribution status of sea ice | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | b) | Biological survey of ice algae | Tokai University and Hokkaido University | Marine Area WG | Comprehend the primary production biomass within the sea ice during the time the ocean is covered with sea ice. | Primary production biomass within the sea ice during the time the ocean is covered with sea ice | *It is difficult to establish an evaluation criteria at this stage because there is barely any accumulated data. Comprehending zooplankton biomass will allow to estimate a low-order food chain. |
| | c) | Tracking of changes in fish catches based on Statistics on Fisheries in Hokkaido | Department of Fisheries and Forestry, Hokkaido Prefectural Government | Marine Area WG | Conduct surveys on fish catches. | Fish catch | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | d) | Ascertainment and assessment of walleye pollock stock (survey used to set total allowable catch [TAC]) | Fisheries Agency | Marine Area WG | Comprehend resource level and trends of walleye pollock (*Gadus chalcogrammus* ). | Resource level and trends | It is generally maintained above the resource status at the time of inscription. |
| | e) | Walleye pollock spawning survey | Rausu Fisheries Cooperative and Kushiro Fisheries Research Institute | Marine Area WG | Conduct surveys on the spawning sites and amount of spawned eggs of walleye pollock. | Spawning sites and amount of spawned eggs | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | f) | Number of Steller sea lions migrating to the coat of Japan, number of dead individuals due to human activities, and their sex and characteristics | Hokkaido National Fisheries Research Institute, etc | Marine Area WG | Conduct surveys on the number of migrating Steller sea lions. | Number of migrating Steller sea lions | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | k) | Status of killer whales | University Alliance for Hokkaido Orca Research Project (Uni-HORP) | Marine Area WG | Conduct individual identification surveys | Number of identified individuals | Under consideration |

# Monitoring methods for long-term monitoring items for each evaluation item

Appendix 3

| Evaluation item | No. | Monitoring item | Implementing body | Evaluation body (WG and so on in charge) | Monitoring method | Evaluation Indicator | Evaluation Criteria |
|---|---|---|---|---|---|---|---|
| II. The interaction between marine and terrestrial ecosystems is being maintained | 4 | Marine biota and distribution survey (shore region survey) | MOE | Marine Area WG | Conduct inventory surveys on fishes, sea algae, and invertebrates in the shore region along the coast of the Shiretoko Peninsula. | Biota, density, and distribution | The status and diversity are maintained almost at the same level as they were at the time of inscription (or as of base data). |
| | 5 | Shellfish quantative survey in shore region | MOE | Marine Area WG | Establish 50cm x 50cm quadrats in the fixed survey points established off the coast of the Shiretoko Peninsula and record the number of individual shellfish that have appeared inside the quadrants. | Density and species composition | The status and diversity are maintained almost at the same level as they were at the time of inscription (or as of base data). |
| | 6 | Survey of spectacled guillemot, black-tailed gull, slaty-backed gull, and Japanese cormorant populations, nesting site distribution, and number of nests | MOE | Marine Area WG | Count the number of breeding in each zone from the Utoro Port to Aidomari Port via the Shiretoko Cape. For spectacled guillemot, count the number of individuals in the ocean within the range where their population is confirmed. Also record any change in the number of nests. | Number of nests, number of colonies, and any drastic change in specific colonies | The number of nests is maintained almost at the same level as it was at the time of inscription. |
| | 16 | Survey of the brown bear population in the Shiretoko Peninsula | Relevant agencies | Sika Deer and Brown Bear WG | Collect information on the number of individuals that have died due to human activities; survey on the long-term trend of the population of brown bear (feces count survey, automatic camera survey, number of sightings from sightseeing ships, etc.) | - Number of female brown bears that have died due to human activities<br>- Increase/decrease in the number of brown bears | - The number of female brown bears that have died due to human activities in the past five years is less than 75.<br>- No significant decline in the number of brown bears is cofirmed. |
| | 17 | Monitoring of the number of salmonids migrating upstream, spawning grounds, and spawning beds in rivers | Fosrestry Agency and Hokkaido Prefectural Government | River Construction Advisory Panel | Conduct surveys on the number of parent fish migrating upstream and spawning beds to estimate the number of pink salmon migrating upstream in the Rusha River, Teppanbetsu River, and Rusa River. | Number of fish migrating upstream, number of spawning beds, and impact of river constructions on fish migrating upstream and spawning | Salmonids are migrating upstream in each river and continually reproducing.<br>Obstacles posed to fish migrating upstream by river constructions are circumvented to the extent possible. |
| | 22 | Survey of the number of wintering sea eagles | MOE | Marine Area WG | Record the number of species, number of individuals, and whether adult or young, alongside the coastal roads on the Shiretoko Peninsula, along rivers, and on drift ice. | Number of wintering sea eagles | The status is maintained almost at the same level as it was at the time of inscription. |
| | h) | Survey of the reproduction status of the white-tailed eagle in their nesting sites and monitoring the number of fledglings | White-tailed eagle Monitoring Research Group | Marine Area WG | Visually comprehend the condition of the nesting sites of white-tailed eagle | Number of pairs, success rate of breeding, reproduction ability (number of fledglings per breeding pair) | The number of pairs, success rate of breeding, and reproduction ability are maintained almost at the same level as they were at the time of inscription. |
| | i) | Survey of the total number of wintering sea eagles throughout Hokkaido | Joint Research Group | Marine Area WG | Comprehend the number of wintering sea eagles throughout Hokkaido | Carrying capacity for the wintering sea eagles | Reference data (no criteria) |

# Monitoring methods for long-term monitoring items for each evaluation item

Appendix 3

| Evaluation item | No. | Monitoring item | Implementing body | Evaluation body (WG and so on in charge) | Monitoring method | Evaluation Indicator | Evaluation Criteria |
|---|---|---|---|---|---|---|---|
| II. Biodiversity is being maintained at the same level as when the site was inscribed on the World Heritage List | 3 | Seal survey | Hokkaido Prefectural Government | Marine Area WG | Conduct visual surveys from land and ocean. | Number of migrating individuals | Any serious problem is caused in the protection and management of seals (any threat of extinction is caused). |
| | 4 | Marine biota and distribution survey (shore region survey) | MOE | Marine Area WG | Conduct inventory surveys on fishes, sea algae, and invertebrates in the shore region along the coast of the Shiretoko Peninsula. | Biota, density, and distribution | The status and diversity are maintained almost at the same level as they were at the time of inscription (or as of base data). |
| | 6 | Survey of spectacled guillemot, black-tailed gull, slaty-backed gull, and Japanese cormorant populations, nesting site distribution, and number of nests | MOE | Marine Area WG | Count the number of breeding in each zone from the Utoro Port to Aidomari Port via the Shiretoko Cape. For spectacled guillemot, count the number of individuals in the ocean within the range where their population is confirmed. Also record any change in the number of nests. | Number of nests, number of colonies, and any drastic change in specific colonies | The number of nests is maintained almost at the same level as it was at the time of inscription. |
| | 8 | Survey of vegetation shift throughout the Shiretoko Peninsula (forest vegetation, coastal vegetation, and alpine vegetation) | MOE and Forestry Agency | Sika Deer and Brown Bear WG | Conduct a regular vegetation survey in the fixed survey areas established throughout the Shiretoko Peninsula to comprehend the coverage, height, regeneration of the plants growing there and change in the rate of feeding traces, feeding volume, and so on of sika deer. | Forest vegetation: seedling density, lower branch density, composition and height of lower layer vegetation, rate of feeding traces and feeding volume<br>Coastal vegetation/alpine vegetation: composition of plant community, vegetation heigh, rate of feeding traces, and feeding volume | Forest vegetation: The conditions existing in or before the 1980 is restored.<br>Coastal vegetation: The conditions in or before the 1980s are maintained or restored.<br>Alpine vegetation: The conditions in or before the 1980s are maintained. |
| | 9 | Growth and distribution surveys of the rare plant *Viola kitamiana* | MOE | Sika Deer and Brown Bear WG | Concerning the rare plants in the Shiretoko Peninsula such as *Viola kitamiana* , conduct surveys on the growth status and factors that threat their growth in their major habitats. | Distribution of the population, number of individuals and coverage of the population monitored, and threats to them | The population of rare plants are maintained. |
| | 11 | Terrestrial invertebrate survey (mainly insects) | MOE | Sika Deer and Brown Bear WG | Use pitfall traps, box light traps, and sweeping at the existing vegetation protection fences and in the wider survey area of feeding pressures in the Shiretoko Cape, Horobetsu, Rausu and others (once every five years or so). | Entomofauna, density, distribution, and alien species distribution status | Diversity has not generally declined in comparison with the situation at the time of inscription.<br>Non-discovery of Designated Invasive Alien Species other than the large earth bumblebee.<br>No significant increase in the large earth bumblebee. |
| | 12 | Terrestrial bird survey | MOE | Sika Deer and Brown Bear WG | Record the species and numbers of individual birds confirmed by the line census method or spot census method. | avifauna, density, distribution, and alien species distribution status | Diversity has not generally declined in comparison with the situation at the time of inscription. |
| | 13 | Survey of small- and medium-sized mammals (including survey of alien species) | MOE and Forestry Agency | Sika Deer and Brown Bear WG | Install automatic cameras to understnd the invasion status of raccoons. At the same time, record the occurring status of other mammals. | Mammalian fauna, density, distribution, and alien species distribution status | Diversity has not generally declined in comparison with the situation at the time of inscription.<br>Non-discovery of the raccoon. |
| | 14 | Preparation of wide-area vegetation map | MOE and Forestry Agency | Sika Deer and Brown Bear WG | Prepare a 1:25,000 vegetation map and so forth by reading the existing vegetation maps, aerial photos, satellite images, and so on, and conducting field surveys. Compare any change in high moors, forest limits, and Japanese stone pine zones using new and old vegetation maps and so forth. | Status of plant communities and changes in high moors, forest limits, and Japanese stone pine zones. | No human-made change has been caused.<br>No change has occurred in the distribution of high moors, forest limits, and Japanese stone pine zones. |
| | 16 | Survey of the brown bear population in the Shiretoko Peninsula | Relevant agencies | Sika Deer and Brown Bear WG | Collect information on the number of individuals that have died due to human activities; survey on the long-term trend of the population of brown bear (feces count survey, automatic camera survey, number of sightings from sightseeing ships, etc.) | - Number of female brown bears that have died due to human activities<br>- Increase/decrease in the number of brown bears | - The number of female brown bears that have died due to human activities in the past five years is less than 75.<br>- No significant decline in the number of brown bears is cofirmed. |
| | 18 | Survey of freshwater fish, in particular the Dolly Varden that characterizes the freshwater ichthyofauna in Shiretoko (including survey of alien species) | Forestry Agency | River Construction Advisory Panel | Conduct surveys on the ichthyofauna, the number of river resident type of Dolly Varden, and change in the water temperature in the Iwaubetsu River and so on. | Number of Dolly Varden, status of alien species, and water temperature | The amount of resource is maintained. Eradicate alien species and minimize sighting information. No long-term rise in the water temperature in the summer. |

# Monitoring methods for long-term monitoring items for each evaluation item

Appendix 3

| Evaluation item | No. | Monitoring item | Implementing body | Evaluation body (WG and so on in charge) | Monitoring method | Evaluation Indicator | Evaluation Criteria |
|---|---|---|---|---|---|---|---|
| — | 23 | Survey of the Blakiston's fish-owl, including the number of breeding pairs, tagged youngs, dead, sick and injured individuals and their causes | MOE | Protection and Recovery Project Review Meeting | Tag the pairs of Blakiston's fish-owls whose habitat is confirmed to identify their hatchlings. Investigate the dead, sick and injured individuals upon their discovery . | Number of pairs, breeding success rate (e.g. number of tagged youngs) | Number of pairs: Their number is maintained almost at the same level as it was at the time of incription.<br>Breeding success rate (number of pairs with successful breeding/number of breeding pairs confirmed): The rate is maintained almost at the same level as it was at the time of incription. |
| | 24 | Tracking of the project implementation status through preparation of annual reports | MOE, etc. | Scientific Council (matters to be reported) | Comprehend the project implementation status by relevant institutions and various groups. | Project implementation status by relevant institutions and various groups | Reference data (no criteria) |
| | 25 | Tracking of the social environment through preparation of annual reports and so on | MOE, etc. | Scientific Council (matters to be reported) | Organize various statistics on demographics and industrial activities. | Population and number of people employed in each industry | Reference data (no criteria) |
| | c) | Tracking of changes in fish catches compared to Hokkaido Suisan Gensei [Statistics on Fisheries in Hokkaido] | Department of Fisheries and Forestry, Hokkaido Prefectural Government | Marine Area WG | Conduct surveys of fish catches. | Fish catch | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | h) | Survey of the reproduction status of the white-tailed eagle in their nesting sites and monitoring the number of fledglings | White-tailed eagle Monitoring Research Group | Marine Area WG | Visually comprehend the condition of the nesting sites of white-tailed eagle | Number of pairs, success rate of breeding, reproduction ability (number of fledglings per breeding pair) | The number of pairs, success rate of breeding, and reproduction ability are maintained almost at the same level as they were at the time of inscription. |
| | k) | Killer wale survey | University Alliance for Hokkaido Orca Research Project (Uni-HORP) | Marine Area WG | Conduct individual identification surveys | Number of identified individuals | Under consideration |

# Monitoring methods for long-term monitoring items for each evaluation item

Appendix 3

| Evaluation item | No. | Monitoring item | Implementing body | Evaluation body (WG and so on in charge) | Monitoring method | Evaluation Indicator | Evaluation Criteria |
|---|---|---|---|---|---|---|---|
| IV. Conservation of marine ecosystems within the heritage site is being balanced with stable fishing through sustainable use of fisheries resources | 1 | Observation of the water temperature and chlorophyll a using satellite remote sensing | Under consideration | Marine Area WG | Analyze MODIS data to observe the water temperature and chlorophyll a in the waters around the Shiretoko Peninsula. | Water temperature and chlorophyll a | The figures do not deviate from the long-term fluctuation range (use them as primary data to evaluate other monitoring results) |
| | 2 | Fixed-point observation of water temperature using ocean observation buoys | MOE | Marine Area WG | Install one ocean observation buoy off the coast of Utoro, Shari Town and off the coast of Konbuhama, Rausu Town, respectively, to observe the water temperature between spring and autumn. | Water temperature | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures). |
| | 3 | Seal survey | Hokkaido Prefectural Government | Marine Area WG | Conduct visual surveys from land and ocean. | Number of migrating individuals | Any serious problem is caused in the protection and management of seals (any threat of extinction is caused). |
| | 6 | Survey of spectacled guillemot, black-tailed gull, slaty-backed gull, and Japanese cormorant populations, nesting site distribution, and number of nests | MOE | Marine Area WG | Count the number of breeding in each zone from the Utoro Port to Aidomari Port via the Shiretoko Cape. For spectacled guillemot, count the number of individuals in the ocean within the range where their population is confirmed. Also record any change in the number of nests. | Number of nests, number of colonies, and any drastic change in specific colonies | The number of nests is maintained almost at the same level as it was at the time of inscription. |
| | 17 | Monitoring of the number of salmonids migrating upstream, spawning grounds, and spawning beds in rivers | Fosrestry Agency and Hokkaido Prefectural Government | River Construction Advisory Panel | Conduct surveys on the number of parent fish migrating upstream and spawning beds to estimate the number of pink salmon migrating upstream in the Rusha River, Teppanbetsu River, and Rusa River. | Number of fish migrating upstream, number of spawning beds, and impact of river constructions on fish migrating upstream and spawning | Salmonids are migrating upstream in each river and continually reproducing.<br>Obstacles posed to fish migrating upstream by river constructions are circumvented to the extent possible. |
| | a) | Aerial observation of seasonal sea ice distribution by aircraft, satellites, and so on | 1st Regional Coast Guard Headquarters | Marine Area WG | Conduct surveys on the distribution status of sea ice. | Distribution status of sea ice | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | b) | Biological survey of ice algae | Tokai University and Hokkaido University | Marine Area WG | Comprehend the primary production biomass within the sea ice during the time the ocean is covered with sea ice. | Primary production biomass within the sea ice during the time the ocean is covered with sea ice | *It is difficult to establish an evaluation criteria at this stage because there is barely any accumulated data. Comprehending zooplankton biomass will allow to estimate a low-order food chain. |
| | c) | Tracking of changes in fish catches based on Statistics on Fisheries in Hokkaido | Department of Fisheries and Forestry, Hokkaido Prefectural Government | Marine Area WG | Conduct surveys on fish catches. | Fish catch | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | d) | Ascertainment and assessment of walleye pollock stock (survey used to set total allowable catch [TAC]) | Fisheries Agency | Marine Area WG | Comprehend resource level and trends of walleye pollock (*Gadus chalcogrammus* ). | Resource level and trends | It is generally maintained above the resource status at the time of inscription. |
| | e) | Walleye pollock spawning survey | Rausu Fisheries Cooperative and Kushiro Fisheries Research Institute | Marine Area WG | Conduct surveys on the spawning sites and amount of spawned eggs of walleye pollock. | Spawning sites and amount of spawned eggs | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | f) | Number of Steller sea lions migrating to the coat of Japan, number of dead individuals due to human activities, and their sex and characteristics | Hokkaido National Fisheries Research Institute, etc | Marine Area WG | Conduct surveys on the number of migrating Steller sea lions. | Number of migrating Steller sea lions | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | g) | Survey of damage caused by Steller sea lions | Hokkaido Prefectural Government | Marine Area WG | Conduct surveys on damage caused by Steller sea lions to fishery | Situation of damage | *It is difficult to establish specific numerical targets as these are basic statistical data. |
| | j) | Analysis of oil, cadmium, mercury, etc. in seawater | Hydrographic and Oceanographic Department, Japan Coast Guard | Marine Area WG | Analyze contamination concentration on the sea surface and in seafloor deposits by oil, PCB, heavy metal, and so on | Contamination concentration on the sea surface and in seafloor deposits by oil, PCB, heavy metal, and so on | Concentration is at or below the standard figure. |
| | k) | Status of killer whales | University Alliance for Hokkaido Orca Research Project (Uni-HORP) | Marine Area WG | Conduct individual identification surveys | Number of identified individuals | Under consideration |

# Monitoring methods for long-term monitoring items for each evaluation item

Appendix 3

| Evaluation item | No. | Monitoring item | Implementing body | Evaluation body (WG and so on in charge) | Monitoring method | Evaluation Indicator | Evaluation Criteria |
|---|---|---|---|---|---|---|---|
| V. Impact of river constructions has been lessened so as to maintain river ecosystems that can support salmonid species reproduction. | 17 | Monitoring of the number of salmonids migrating upstream, spawning grounds, and spawning beds in rivers | Fosrestry Agency and Hokkaido Prefectural Government | River Construction Advisory Panel | Conduct surveys on the number of parent fish migrating upstream and spawning beds to estimate the number of pink salmon migrating upstream in the Rusha River, Teppanbetsu River, and Rusa River. | Number of fish migrating upstream, number of spawning beds, and impact of river constructions on fish migrating upstream and spawning | Salmonids are migrating upstream in each river and continually reproducing.<br>Obstacles posed to fish migrating upstream by river constructions are circumvented to the extent possible. |
| | 18 | Survey of freshwater fish, in particular the Dolly Varden that characterizes the freshwater ichthyofauna in Shiretoko (including survey of alien species) | Forestry Agency | River Construction Advisory Panel | Conduct surveys on the ichthyofauna, the number of river resident type of Dolly Varden, and change in the water temperature in the Iwaubetsu River and so on. | Number of Dolly Varden, status of alien species, and water temperature | The amount of resource is maintained. Eradicate alien species and minimize sighting information. No long-term rise in the water temperature in the summer. |
| VI. Excessive influence of high sika deer population density on the ecosystem of the heritage site is not occurring. | 7 | Survey of vegetation change (forest vegetation and grassland vegetation) in sika deer population control area | MOE and Forestry Agency | Sika Deer and Brown Bear WG | Establish fixed survey areas and survey lines in forest vegetation and grassland vegetation to survey the composition, vegetation rate, rate of feeding traces, and feeding volume in vegetation, flowering densities of benchmark seeds, and so on. In addition, estimate the recovery process based on surveys of the fenced-in areas from which deers are kept out. | Seedling density, lower branch density, composition and height of plant community, number of flowering roots, rate of feeding traces and feeding volume | The vegetation is restored to the staus before the 1980s. |
| | 8 | Survey of vegetation shift throughout the Shiretoko Peninsula (forest vegetation, coastal vegetation, and alpine vegetation) | MOE and Forestry Agency | Sika Deer and Brown Bear WG | Conduct a regular vegetation survey in the fixed survey areas established throughout the Shiretoko Peninsula to comprehend the coverage, height, regeneration of the plants growing there and change in the rate of feeding traces, feeding volume, and so on of sika deer. | Forest vegetation: seedling density, lower branch density, composition and height of lower layer vegetation, rate of feeding traces and feeding volume<br>Coastal vegetation/alpine vegetation: composition of plant community, vegetation heigh, rate of feeding traces, and feeding volume | Forest vegetation: The conditions existing in or before the 1980 is restored.<br>Coastal vegetation: The conditions in or before the 1980s are maintained or restored.<br>Alpine vegetation: The conditions in or before the 1980s are maintained. |
| | 10 | Survey of sika deer status in their main wintering grounds (aerial counting survey and terrestrial counting survey) | MOE, etc. | Sika Deer and Brown Bear WG | Aerial counting survey: Fly a helicopter at low altitudes throughout the entire Shiretoko Peninsula once every five years to count the number of wintering sika deer and to record their location information. The survey has been conducted annually in some parts of the Peninsula (entire heritage area) since 2014.<br>Terrestrial counting survey: Light census in major wintering spots, etc. | Aerial counting survey: Number of deer spotted during the wintering period (spotting density)<br>Territorial counting survey: Number of deer spotted in each unit of distance or per indicator | Aerial counting survey: The number is controlled less than five to ten deer per square kilometer in the Shiretoko Cape district and less than five deer per square kilometer in the Horobetsu-Iwaobetsu district and Rusha-Aidomari district (the Rusha district is not included in the target area)<br>Terrestrial counting survey: The number is controlled under the level recorded at the time a survey began in each survey area (1988 in the Horobetsu-Iwaobetsu district; 2009 in the Rusha-Aidomari district; 2007 in the Makoi district; and 2004 in the Minehama district). |
| | 11 | Terrestrial invertebrate survey (mainly insects) | MOE | Sika Deer and Brown Bear WG | Use pitfall traps, box light traps, and sweeping at the existing vegetation protection fences and in the wider survey area of feeding pressures in the Shiretoko Cape, Horobetsu, Rausu and others (once every five years or so). | Entomofauna, density, distribution, and alien species distribution status | Diversity has not generally declined in comparison with the situation at the time of inscription.<br>Non-discovery of Designated Invasive Alien Species other than the large earth bumblebee.<br>No significant increase in the large earth bumblebee. |
| | 12 | Terrestrial bird survey | MOE | Sika Deer and Brown Bear WG | Record the species and numbers of individual birds confirmed by the line census method or spot census method. | avifauna, density, distribution, and alien species distribution status | Diversity has not generally declined in comparison with the situation at the time of inscription. |

# Monitoring methods for long-term monitoring items for each evaluation item

Appendix 3

| Evaluation item | No. | Monitoring item | Implementing body | Evaluation body (WG and so on in charge) | Monitoring method | Evaluation Indicator | Evaluation Criteria |
|---|---|---|---|---|---|---|---|
| VII. Recreational use of the site and other human activities are being balanced with conservation of the natural environment. | 6 | Survey of spectacled guillemot, black-tailed gull, slaty-backed gull, and Japanese cormorant populations, nesting site distribution, and number of nests | MOE | Marine Area WG | Count the number of breeding in each zone from the Utoro Port to Aidomari Port via the Shiretoko Cape. For spectacled guillemot, count the number of individuals in the ocean within the range where their population is confirmed. Also record any change in the number of nests. | Number of nests, number of colonies, and any drastic change in specific colonies | The number of nests is maintained almost at the same level as it was at the time of inscription. |
| | 15 | Survey of damage to human activities caused by brown bears | MOE, etc. | Sika Deer and Brown Bear WG | Collect information on damage and dangerous incidents caused by brown bears, problematic behavior by people, and the operation status of facilities through questionnaire surveys, reports by people, implementation of measures against brown bears, etc. | Number of incidents where a brown bear caused physical damage to humans; occurrence of dangerous incidents; problematic behavior by people; operation status of facilities; number of brown bear captured as harmful animals; damage to the agriculture, forestry, and fishery industries caused by brown bears. | - Incidents of hysically harm to people by brown bears are controlles.<br>- The number of dangerous incidents arising from problematic behavior of people and dangerous incidents related to fishing activities are controlled to a total of 12 or less during a five-year period<br>- Damages caused to agriculture in Shari Town and the affected area are reduced by 10% by JFY2020 in comparison with JFY2016 |
| | 19 | Management and measures for appropriate use | MOE, etc. | Appropriate Use and Ecotourism WG | Refer to the contents of the Shiretoko White Paper, materials on the Review Meeting on Appropriate Use and Ecotourism, and the interviews conducted to administrative organs and so on to select and list management practices and measures for appropriate use. | Implementation status of management and measures | Management and measures are implemented to carry out "9. Implementing Measures" of the Shiretoko Ecotourism Strategy. |
| | 20 | Promotion of appropriate use and ecotourism | MOE, etc. | Appropriate Use and Ecotourism WG | Comprehend the status concerning the promotion of appropriate use and ecotourism based on interviews to parties involved in the use of the heritage area. | Project implementation status based on the Basic Policies of the Shiretoko Ecotourism Strategy, increase/decrease in users, change in customer segments, concerns about the natural environment | Appropriate use and ecotourism are promoted based on (1) and (2) of "5. Basic Policies" of the Shiretoko Ecotourism Strategy. |
| | 21 | Changes in the number of visitors | Relevant government agencies and business operators, etc. | Appropriate Use and Ecotourism WG | Comprehend the number of users in major user facilities through the user number count based on user counting and surveys, etc. | Number of users in each user facility | No criteria (monitoring to comprehend the actual usage status) |
| | 24 | Tracking of the project implementation status through preparation of annual reports | MOE, etc. | Scientific Council (matters to be reported) | Comprehend the project implementation status by relevant institutions and various groups. | Project implementation status by relevant institutions and various groups | Reference data (no criteria) |
| | 25 | Tracking of the social environment through preparation of annual reports and so on | MOE, etc. | Scientific Council (matters to be reported) | Organize various statistics on demographics and industrial activities. | Population and number of people employed in each industry | Reference data (no criteria) |

# Monitoring methods for long-term monitoring items for each evaluation item

Appendix 3

| Evaluation item | No. | Monitoring item | Implementing body | Evaluation body (WG and so on in charge) | Monitoring method | Evaluation Indicator | Evaluation Criteria |
|---|---|---|---|---|---|---|---|
| VIII. Impacts, or potential impacts of climate change are being tracked early. | 1 | Observation of the water temperature and chlorophyll a using satellite remote sensing | Under consideration | Marine Area WG | Analyze MODIS data to observe the water temperature and chlorophyll a in the waters around the Shiretoko Peninsula. | Water temperature and chlorophyll a | The figures do not deviate from the long-term fluctuation range (use them as primary data to evaluate other monitoring results). |
| | 2 | Fixed-point observation of water temperature using ocean observation buoys | MOE | Marine Area WG | Install one ocean observation buoy off the coast of Utoro, Shari Town and off the coast of Konbuhama, Rausu Town, respectively, to observe the water temperature between spring and autumn. | Water temperature | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures). |
| | 3 | Seal survey | Hokkaido Prefectural Government | Marine Area WG | Conduct visual surveys from land and ocean. | Number of migrating individuals | Any serious problem is caused in the protection and management of seals (any threat of extinction is caused). |
| | 8 | Understanding vegetation shift throughout the Shiretoko Peninsula (forest vegetation, coastal vegetation, and alpine vegetation) | MOE and Forestry Agency | Sika Deer and Brown Bear WG | Conduct a regular vegetation survey in the fixed survey areas established throughout the Shiretoko Peninsula to comprehend the coverage, height, regeneration of the plants growing there and change in the rate of feeding traces, feeding volume, and so on of sika deer. | Forest vegetation: seedling density, lower branch density, composition and height of lower layer vegetation, rate of feeding traces and feeding volume<br>Coastal vegetation/alpine vegetation: composition of plant community, vegetation heigh, rate of feeding traces, and feeding volume | Forest vegetation: The conditions existing in or before the 1980 is restored.<br>Coastal vegetation: The conditions in or before the 1980s are maintained or restored.<br>Alpine vegetation: The conditions in or before the 1980s are maintained. |
| | 9 | Growth and distribution surveys of the rare plant *Viola kitamiana* | MOE | Sika Deer and Brown Bear WG | Concerning the rare plants in the Shiretoko Peninsula such as *Viola kitamiana* , conduct surveys on the growth status and factors that threat their growth in their major habitats. | Distribution of the population, number of individuals and coverage of the population monitored, and threats to them | The population of rare plants are maintained. |
| | 14 | Preparation of wide-area vegetation map | MOE and Forestry Agency | Sika Deer and Brown Bear WG | Prepare a 1:25,000 vegetation map and so forth by reading the existing vegetation maps, aerial photos, satellite images, and so on, and conducting field surveys. Compare any change in high moors, forest limits, and Japanese stone pine zones using new and old vegetation maps and so forth. | Status of plant communities and changes in high moors, forest limits, and Japanese stone pine zones. | No human-made change has been caused.<br>No change has occurred in the distribution of high moors, forest limits, and Japanese stone pine zones. |
| | 18 | Survey of freshwater fish, in particular the Dolly Varden that characterizes the freshwater ichthyofauna in Shiretoko (including survey of alien species) | Forestry Agency | River Construction Advisory Panel | Conduct surveys on the ichthyofauna, the number of river resident type of Dolly Varden, and change in the water temperature in the Iwaubetsu River and so on. | Number of Dolly Varden, status of alien species, and water temperature | The amount of resource is maintained. Eradicate alien species and minimize sighting information. No long-term rise in the water temperature in the summer. |
| | 26 | Meteorological observation | MOE and Forestry Agency | Scientific Council (matters to be reported) | Conduct surveys on the temperature, precipitation, insolation, snow depth at Shiretoko Pass, Cape Shiretoko, Mt. Rausu, etc. | Temperature, precipitation, insolation, snow depth | The figures do not deviate from the long-term fluctuation range (use them as primary data to evaluate other monitoring results). |
| | a) | Aerial observation of seasonal sea ice distribution by aircraft, satellites, and so on | 1st Regional Coast Guard Headquarters | Marine Area WG | Conduct surveys on the distribution status of sea ice. | Distribution status of sea ice | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | f) | Number of Steller sea lions migrating to the coat of Japan, number of dead individuals due to human activities, and their sex and characteristics | Hokkaido National Fisheries Research Institute, etc | Marine Area WG | Conduct surveys on the number of migrating Steller sea lions. | Number of migrating Steller sea lions | None (This item is for comprehending changes in the natural environment and so on and collecting basic information to consider various measures) |
| | k) | Status of killer whales | University Alliance for Hokkaido Orca Research Project (Uni-HORP) | Marine Area WG | Conduct individual identification surveys | Number of identified individuals | Under consideration |