Shiretoko Peninsula is located in the north-east of Hokkaido, the northernmost island of Japan. The site includes the land from the central part of the peninsula to its tip (Shiretoko Cape) and the surrounding marine area. It 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. It has particular importance for a number of marine and terrestrial species, some of them endangered and endemic, such as Blackiston’s fish owl and the Viola kitamiana plant. The site is globally important for threatened seabirds and migratory birds, a number of salmonid species, and for marine mammals including Steller’s sea lion and some cetacean species. © UNESCO

SUMMARY

Both the conservation values specifically recognized under the Convention (World Heritage Committee, 2013) and broader conservation values are still intact, although the interaction of marine and terrestrial ecosystems are subject to some remaining pressures. The World Heritage site has an adequate and evolving legal, policy and management framework and human and financial resources are not major limiting factors. The State Party has been demonstrating its willingness and capacity to respond to challenges, including to challenges identified by the World Heritage Committee. High visitor numbers and emerging threats from new tourist activities and infrastructure development require some management attention.

Shiretoko provides an outstanding example of marine and terrestrial ecosystem linkages, and needs to be managed as such. On land, Sika deer populations are being managed to reduce their pressure on the native vegetation, but long-term commitment is needed to restore connectivity and regenerate mature broadleaf forests habitats. Although important progress has been made in recent years to optimise fish migration, more work is needed, including dam removal and bridge modifications, to restore ecosystem processes. There is a need to more formally integrate research, monitoring and adaptive management to gauge ecosystem response and stakeholder concerns following these interventions.

The management of the marine areas is complex, with direct implications on the terrestrial ecosystems as well. The most demanding challenge is probably fisheries management, balancing commercial and conservation interests. It is clear that the best possible coordination and cooperation is needed also beyond the site boundaries, including to the degree possible with neighboring States Parties. While the continued
culling of Steller sea lion does not jeopardize the survival of the species, it is a most questionable practice at best, especially when considering that the population of the locally present subspecies is recovering from dramatic past collapse and the fact that the population is not even well understood (State Party of Japan, 2016). The practice of killing marine mammals in a World Heritage site to protect assets and commercial fish stocks constitutes a reputational risk for the site and the credibility of World Heritage more broadly and should therefore be stopped. As for climate change, the expected effects on the sea ice formation deserves to be singled out, as it would directly affect the exceptional productivity of the area, which is recognized as contributing to the World Heritage value of Shiretoko. While per se beyond the scope of site management, investment in specific monitoring of change and realistic future scenarios will enhance the foundation for the best possible preparedness.
FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ Outstanding example of the interaction of marine and terrestrial ecosystems

Shiretoko provides an outstanding example of the interaction of overlapping marine and terrestrial ecosystems. The most obvious living linkages are migratory fish species, including many salmon species, which transport nutrients from the productive sea to the terrestrial ecosystems and foodwebs via the numerous rivers and creeks. Numerous mammals, including a dense population of brown bear (Ursus arctos) and countless birds prey on the salmons (UNEP-WCMC, 2011).

▶ Extraordinary ecosystem productivity

The combination of sea ice and warm summer currents contributes to the enormous productivity of the marine ecosystem. The explosive growth of phytoplankton underpins an extremely abundant marine life. The sea ice formation occurs at the lowest latitude anywhere in the northern hemisphere. The peculiar conditions result in a layered water structure in the Sea of Okhotsk, with the surface and lower layers of the water having a large difference in salinity (World Heritage Committee, 2013; UNEP-WCMC, 2011; IUCN, 2005). Phytoplankton is the primary producer in the marine ecosystem, and thus the essential foundation of the food web for krill and zooplankton, then small fish, crustaceans and shellfish, as well as terrestrial mammals and birds via the salmon migrations (IUCN, 2005; World Heritage Committee, 2013).

▶ Important habitat for both marine and terrestrial species, a number of which are threatened or endangered

Located on a peninsula in north-eastern Hokkaido reaching into the Sea of Okhotsk, Shiretoko conserves important habitat for a number of endangered and endemic species at the biogeographic meeting point of northern continental Asia and species from the Japanese islands to the south, in particular Honshu. Shiretoko is particularly important for several resident and migratory salmonid species, Walleye Pollock (Theragra chalcogramma), as well as marine mammals, including the Steller Sea Lion (subspecies Eumetopias jubatus ssp. jubatus, assessed as Endangered (EN) in the IUCN Red List of Threatened Species). Other marine mammal species seasonally or occasionally using the property include spotted seal, orca, minke and sperm Whale, Dall’s porpoise and the endangered fin whale (World Heritage Committee, 2013). The property is also recognized as a significant habitat for globally threatened sea birds and its importance to migratory birds. An impressive 264 species of birds have been recorded on the peninsula, the most charismatic ones comprising the endangered Blakiston’s fish or eagle owl (Bubo blakistoni) and wintering populations of the spectacular Steller’s sea eagle (Haliaeetus pelagicus, Vulnerable, VU), the world’s largest eagle (IUCN, 2005; World Heritage Committee, 2013). Viola kitamiana deserves to be noted as a plant endemic to the Shiretoko mountain range.

Other important biodiversity values

▶ Representations of various important forest types

The IUCN evaluation (IUCN, 2005) notes important samples of (i) cool temperate deciduous broad-leaved forest; (ii) sub-arctic evergreen coniferous forest; and (iii) mixed forest combining elements of the above forest types. The forests within the property attract limited attention in the World Heritage documentation and are not singled out as being among the most striking natural features from a narrow
World Heritage perspective. Nevertheless, there are of course important and integral elements of the ecosystem protected in the property.

Assessment information

Threats

Current Threats

A range of current threats directly affect important species, which perform important ecological roles and are among the specific conservation values of the property. Dams and other human-made modifications of water courses continue to affect fish migration, which is a key ecological feature underpinning the intricate linkages between the land and the sea. Commercial fishing puts both pressure on the target species and natural river ecosystem functions, as well as on the Steller Sea Lion, which continues to be culled even within the property. On land, the property is not spared from the well-known effects of excessive levels of Yezo Sika deer. Visitor impacts and disturbance of terrestrial and marine life, as well as conflicts between conservation and ecotourism, needs to be addressed. Other threats include risks associated with marine traffic and changing climate patterns.

- **Shipping Lanes**
  *(International marine traffic)*

  While the State Party reports the impacts and risks of international shipping as minimal, it is committed to assessing the usefulness and feasibility of the establishment of a Particularly Sensitive Sea Area (PSSA) (State Party of Japan, 2012). The World Heritage Committee (2017) recently reminded the State Party to report on the implementation of this commitment.

- **Dams/ Water Management or Use**
  *(Dams and other modifications of rivers and creeks)*

  Fish migrations, including important runs of numerous salmonids, are a key ecological feature and conservation value of the property, underpinning the intricate linkages between the land and the sea and as an important element of the local food webs. Despite the protection status, dams and river modifications have been constructed on several rivers and creeks, which are barriers to migration and affect spawning habitat (UNEP-WCMC; 2011, IUCN, 2005). The State Party refers to such structures as “check dams”, described to aim at asset protection and human safety. There are a total of 100 low-head concrete and other step structures on a total of 14 separate rivers and streams within this property (IUCN, 2019). In the case of the Rusha River, some dams were apparently built to protect salmon hatcheries. Since the inscription, the State Party has been encouraged to restore connectivity and natural river processes and optimize fish migration and habitat by removing or adapting human-made structures in or across watercourses. Important progress has since been made with monitoring indicating positive effects on several salmon species (State Party of Japan, 2012). The salmon hatchery on the Rusha River has been decommissioned, which could facilitate the removal of dams on that river intended to protect the hatchery. Despite the considerable effort and commitment, as well as documented improvements, the fact remains that key species continue to be affected by human-made river modifications and the situation requires urgent remedies (IUCN Salmonid Specialist Group, 2013; IUCN Consultation, 2020). Chakraborty and Takenaka (2019) showed that presence of artificial barriers on streams lead to poor stream health and that the fragmentation of biomass circulation has cascading effects on the riparian biota of the site. Successful restoration of fish habitat and migration routes that protects and increase fish diversity and abundance would therefore also directly enhance conservation of several terrestrial species, including the endangered Blakiston’s fish owl (Bubo blakistoni) (Takenaka, 2018).

  A recent IUCN Advisory mission to the site (IUCN, 2019), indicated some progress has been made on dam removal, but most of the foundation of the dams are still intact, affecting groundwater flow vital for creating habitat for successful reproduction and juvenile rearing of salmonids. In addition, a bridge crossing a river channel in the lower floodplain is artificially constricting the river to a single channel -
the natural state of the river is braided. The IUCN Advisory mission advises continued removal of dams and the bridge and instituting an adaptive management framework to gauge ecosystem response and stakeholder concerns following these interventions (IUCN, 2019).

▶ Livestock Farming / Grazing
(_Grazing and browsing of Yezo Sika deer_)  
Low Threat  
Inside site, widespread(15-50%)

Japan's Ministry of the Environment (n.d.) acknowledges impacts of excessive levels of Yezo Sika deer in the property and elsewhere in Hokkaido. Population control is inevitable and as long as it is in place, the impacts appear manageable.

▶ Fishing / Harvesting Aquatic Resources
(_Continuation of culling of Steller Sea Lions_)  
High Threat  
Inside site, throughout(>50%)

Steller’s Sea Lion individuals belonging to the Asian group of the Western subspecies are seasonally present in and around the property (UNESCO et al., 2017). The Western Steller Sea Lions experienced a dramatic and unexplained population decline of about 70% between the late 1970s and 1990. Although the overall abundance in the North American and Asian groups has been slowly increasing in recent years (Gelatt and Sweeney, 2016) and the Ministry of the Environment changed its national species status from endangered to quasi-endangered (NT) in 2012, culling remain a threat to this subspecies. In response to predation on commercial fish stocks and damage to gillnets, the Hokkaido Fishing Zone Coordination Commission sets an “Annual Catch Limit” (ACL), under the supervision of the Fisheries Agency of Japan and the Hokkaido government. There are serious challenges in terms of establishing reliable numbers, as acknowledged by the State Party (State Party of Japan, 2016). The subspecies occurring seasonally in the property, _Eumetopias jubatus ssp. jubatus_, is classified as “endangered” in the IUCN Red List. To cull and use non-lethal deterrence against an endangered species in a natural World Heritage property without a clear understanding of the population number and dynamics is highly questionable. Alternative practices with compensation or other incentives to the local fishing community are needed and should be reviewed (IUCN Consultation, 2020).

▶ Fishing / Harvesting Aquatic Resources
(_High levels of commercial fishing, in particular of Walleye Pollock_)  
High Threat  
Inside site, widespread(15-50%)

Walleye Pollock has been "generally declining throughout the Sea of Okhotsk" (Rao et al. 2008). The State Party reports a stabilization of the species while acknowledging that populations have not returned to pre-1989 levels (UNESCO, 2012).

▶ Tourism/ Recreation Areas
(_Impacts of tourism on land and sea_)  
High Threat  
Inside site, scattered(5-15%)

Visitor numbers increased dramatically following the site's inscription on the World Heritage list in 2005 and reached approximately 1.95 million in 2007. Mass-tourism to specific natural scenic spots is causing traffic jams, collision with wildlife, trampling of vegetation, trail erosion, human-wildlife conflicts (e.g. with brown bears, _Ursus arctos_), waste management and other issues (UNEP-WCMC, 2011; Shiretoko Ecotourism Strategy, 2013). In recent years, visitor numbers have decreased somewhat (approximately 1.75 million in 2017) and shifted more towards an experience-type use, such as climbing, trekking, sea kayaking and whale watching, which required a new management strategy integrating conventional and eco-tourism (Shiretoko Ecotourism Strategy, 2013; State Party of Japan, 2018). However, visitor impacts and disturbance of terrestrial and marine life is still being observed in some locations (UNEP-WCMC, 2011; UNESCO et al., 2017). The increase in various marine tourism activities have been reported to impact on the behaviour of Steller Sea Lions (_Eumetopias jubatus ssp. jubatus_) and the resting areas they use (State Party of Japan, 2016). Taking photos of brown bears (_Ursus arctos_) from close quarters has become increasingly popular among tourists, which has led to bears becoming familiar with human presence. Traffic jams to watch bears are also increasing. As known from other parts of Hokkaido, there is a risk that bears who got accustomed to humans then enter urban areas, a behaviour that often results in their extermination (Matsuda et al., 2018). Tourism related activities also have the potential of causing stress or other types of pressure for threatened avian species such as the
Steller's sea eagle (Haliaeetus pelagicus) and Blakiston's fish owl (Bubo blakistoni) (IUCN Consultation, 2020). Fish owls are highly susceptible to disturbance and face the risk of diminished breeding success if humans approach a nest, so the locations of fish owl sites are not available to the public. However, the advent of the “Information Age” has facilitated information sharing, which has created new threats as more and more photographers, bird watchers, and tour guides have become aware of sites and approach them too closely (Takenaka, 2018). Concern of behavioural change has also been raised following fish owl feeding near the World Heritage site and night-time viewing tours with high-powered searchlights, for the benefit of tourist photo opportunities (Matsuda et al., 2018; Chakraborty and Takenaka 2019). The Dolly Varden char (Salvelinus malma), also an important prey species of the fish owl, currently faces a growing threat from the increasing sport fishing activity in Shiretoko. Due to the small size of streams, strong impacts from fishing, with sudden and drastic declines of the species, have been observed at several sites (Chakraborty and Takenaka 2019). The conflict between conservation and ecotourism needs to be addressed further.

**Potential Threats**

The main concern and uncertainty relates to the anticipated effects of climate change, which might harm the delicate role of sea ice among other ecological factors. The long-term impacts of climate change should be assessed by development of a monitoring programme, which identifies both long and short term impacts of climate change and specifically monitors parameters such as the extent of sea ice and the impacts on populations of key indicator species (UNESCO, 2008). Tourism, already a localized concern, might become another major threat if increasing numbers will not be responded to with adequate management.

**Habitat Shifting/ Alteration**

*Changing climate affecting sea ice formation*

Initial discussions have taken place involving the Kushiro Nature Conservation Office, the Hokkaido Regional Forest Office, and the Hokkaido Government through the Scientific Council in order to better understand climate change impacts on Shiretoko with particular reference to the significant risk to the sea ice (State Party of Japan, 2012). Rao et al. (2008) argue that sea ice is the foundation of important conservation values and particularities of the property, strongly contributing to its Outstanding Universal Value. Changing temperatures would directly affect ice formation and could thereby have considerable impacts on the property. Climate change impacts on sea ice dynamics need to be better integrated into broader natural resource monitoring programmes (UNESCO, 2012).

**Overall assessment of threats**

The relatively small property is exposed to a range of current threats, likely to be aggravated by anticipated climate change and increased visitation. One particularity is that ecologically important species, which are explicitly among the main conservation values of the property are directly affected by human impacts, the most drastic example being the culling of Steller Sea Lions to protect commercial fisheries. Human-made modifications of water courses continue to affect ecosystem functions, habitat diversity fish migration, which is a key feature of the property, underpinning the intricate linkages between the land and the sea and as an important element of the local food webs. On land, the property is not spared from the well-known effects of excessive levels of Yezo Sika deer. Both mass-tourism to specific natural scenic spots and the increasing experience-type ecotourism are impacting on the terrestrial and marine life. Other threats include risks associated with marine traffic and changing climate patterns.

**Protection and management**
Assessing Protection and Management

**Management system**
- **Mostly Effective**
- The terrestrial management is based on clear mandates and follows structured management planning with strong elements of participation of sub-national government levels and local communities. Management of tourism and wildlife are focal areas of terrestrial management. Since 2013, the site has an Ecotourism Strategy that defines processes and systems to sustain both conventional tourism use and ecotourism for the conservation of natural values of the property, the promotion of high quality nature-based experiences for tourists, and local economic development (State Party of Japan, 2019). However, there is a need to strengthen tourism management and address conflicts between conservation and tourism, which is currently affecting both terrestrial and marine life (State Party of Japan, 2016; Matsuda et al., 2018; Takenaka, 2018). Chakraborty and Takenaka (2019) have also highlighted the urgent need for protection and management of connectivity and lower trophic level species, including stream and forest restoration, to ensure sustained conservation of the site’s values. The 2019 IUCN Advisory mission noted the State Party’s efforts to try to reach some balance between restoring rivers to a more natural state while still providing some protection to fishery and infrastructure. The adoption of an adaptive management system for dam removal with periodic evaluation would facilitate stakeholder concerns and aid decisions on different alternatives of dam removal or modification (IUCN, 2019).
- Management of the marine areas is also complex due to the coincidence of conservation objectives and important commercial interests, identified as a key question mark in the evaluation of the World Heritage nomination (IUCN, 2005). The dilemma is inherent to the setting and set-up of the property and will require integrated management planning at all times.

**Effectiveness of management system**
- **Some Concern**
- The management effectiveness of the terrestrial areas within the site does not raise noteworthy concerns, as long as tourism management remains effective and responds to the increasing demands and reported disturbance and pressures (State Party of Japan, 2016; Matsuda et al., 2018; Takenaka, 2018), and sika deer numbers remain under control. However, the integration of site management with the management of its surrounding landscapes could be strengthened, together with implementation of measures to meaningfully offset anthropogenic stress on the site’s ecosystem integrity. Proactively encourage restrictions on coastal and infrastructure development and protection of vegetation corridors in adjacent areas, could aid management and protection of ecological integrity and species health within the site (Chakraborty and Takenaka, 2019). In terms of identifying the exact management objectives with regard to the continued existence of river modifications, the State Party is engaged in ongoing efforts to assess and optimize migration routes and spawning habitat. However, an urgent need remain for river management to shift from artificial modification of watercourses in order to safeguard infrastructure and profit, to a more holistic vision of managing rivers for their ecological functions (Chakraborty and Takenaka, 2019). The 2019 IUCN Advisory mission, as well as research undertaken by the State Party, noted that complete dam removal would result in the greatest increase in salmon habitat. However, the role of woody debris for the ecosystem and alternative methods to manage this needs to be considered to find a balance river restoration needs and the fishery stakeholder concerns (IUCN, 2019).
- The management effectiveness of the marine parts is also of some concern, as the area is subject to different interests and objectives. While, by and large, there are no indications of a major clash between the overall objectives to conserve and harvest the marine resources, the continued killing of marine mammals inside the property illustrates the need for integrated management. The effectiveness of the marine management also requires coordination beyond the property itself, including with neighboring countries.

**Boundaries**
- **Some Concern**
- The terrestrial boundaries adequately cover key natural features, whereas the marine boundaries somewhat schematically extend 3 kilometers from the shoreline, corresponding to a depth of 200
It is clear that the management of fisheries and marine mammals has to fully consider the surrounding seas and requires cooperative efforts with neighboring countries (State Party of Japan, 2012).

There is concern regarding surrounding urbanization and development that isolate the site and results in a ‘squeeze effect’ on key species’ habitat, foraging and migration (IUCN Consultation, 2020). Appropriate long-term plans for establishing connection to the broader landscape through ecological corridors for species movement as well as for movement of abiotic components such as water and sediment, which have crucial ecosystem functions, would benefit the ecological integrity of the site and ecosystems that remain in a fragmented and fragile state from the intensive anthropogenic disruption in the 20th century (Chakraborty and Takenaka, 2019).

Integration into regional and national planning systems

The Ministry of the Environment, the Forestry Agency, the Agency for Cultural Affairs, and the Hokkaido Government in collaboration, developed the Management Plan for the site and manage the site on the basis of the plan. A Regional Liaison Committee has been established to promote conservation management through collaboration and cooperation with the local community. Similarly, a Scientific Council has been established and promotes adaptive conservation management that reflects scientific knowledge (State Party of Japan, 2012). However, increased integration between the management of the site and that of its surrounding landscapes, especially in terms of infrastructure development and ecosystem connectivity, is needed (Chakraborty and Takenaka, 2019).

Relationships with local people

The property faces a classic conflict between conservation and commercial use of natural resources, epitomized by the culling of marine mammals to protect fisheries and gear. It is clear that there are differing interests and perceptions between stakeholders, which inevitably reflect on relationships. Similarly, the differing views on the river modification indicate some tensions. A recent IUCN Advisory mission (IUCN, 2019) initiated some discussion on the need for complete dam removal and the impact a bridge on the flood plain was having on the largest river entirely contained in the World Heritage site (Rusha River). An outcome of this mission was identifying a need to adopt an adaptive management approach that includes clarifying goals for ecosystem restoration and creating opportunities for stakeholders to express concern over restoration actions. At the same time, there are no hints at major conflicts. It deserves to be noted that the property name is of indigenous origin, meaning the "the end of mother earth" in the language of the Ainu people (IUCN, 2005). IUCN (2005) called for the involvement of the contemporary Ainu in the management of the property.

Legal framework

Multiple laws and regulations at the national level are applicable, including the Nature Conservation Law (1972), the Natural Parks Law (1957), the Law on Administration and Management of National Forests (1951) and the Law for Conservation of Endangered Species of Wild Fauna and Flora (1992) (World Heritage Committee, 2013). Additional national legislation is applicable to the marine part as regards pollution and regulations for fisheries management based on the Fisheries Law. However, under the Japanese legal system, although National Park land is protected, rivers do not have protected status and therefore can be exploited relatively freely. Because Japan’s System of Natural Park (Zoning-System) is a local system, various administrative entities are involved, making it difficult to restrict the use of roads and specific areas. As many streams are relatively small, the effect of infrastructure and fishing can be drastic (Chakraborty and Takenaka, 2019). In addition, while the site itself is protected, its surrounding areas are not; and this poses another significant threat for migrating or wide ranging species.

Law enforcement

Hokkaido Prefectural Government enforced “Hokkaido Shiretoko World Natural Heritage Site Ordinance” in 2016. It consists of 18 articles that describe the goal of the heritage conservation, obligations and roles of stakeholders, decision-making process, capacity building and relationships with other laws and ordinances, but without prescribed penalties.
Implementation of Committee decisions and recommendations

The State Party has responded to all six Committee decisions so far, and has continuously been implementing requests and recommendations. One positive example is the update of the overall management plan strengthening the integration of marine and terrestrial components (UNESCO, 2012). Some other areas are also being addressed, but further progress is needed, including salmon management with the continued existence of human-made impacts on migration and spawning habitat, for example on the Rusha River; cooperation with neighboring countries on the management of fisheries and Steller’s Sea Lion; and sika deer management. The State Party is committed and management responses are in progress.

Sustainable use

Direct consumptive use and indirect touristic use are key factors of serious concern. The negative impact of the fishing industry’s culling of the Steller Sea Lions, and the unsustainable harvesting of Walleye Pollock by Russia are both current threats to the OUV of the site. The State Party reports that these impacts are being lessened due to on-going measures addressing these threats (State Party of Japan, 2012).

Sustainable finance

Conservation funding relies mostly on governmental sources from national to local level, with around three quarters covered by the federal Ministry of the Environment and the Forestry Agency (UNEP-WCMC, 2011). The same source mentions some non-governmental contributions. Funding is not a decisive bottleneck in this property.

Staff capacity, training, and development

UNEP-WCMC (2011) reports a total of 82 staff. The State Party of Japan (2012) reports most staff to be employed full time, while noting staffing levels below the optimum, particularly as regards education. It is not clear to what extent there are biological (species or habitat level) or ecosystem experts involved in conservation, monitoring and management of the site, and there might be room for improvement (IUCN Consultation, 2020). Furthermore, whilst there are some training opportunities for staff, there are no opportunities for local capacity development.

Education and interpretation programs

Education and interpretations appears to be limited despite high visitor numbers (State Party of Japan, 2012). A local non-governmental organization reports various relevant activities in this regard (Shiretoko Nature Foundation, n.d.). Chakraborty and Takenaka (2019) report on limited linguistic skills of guides inhibiting meaningful interaction with international visitors and lack of experience in guides in terms of familiarity with other natural World Heritage sites.

Tourism and visitation management

Tourist come in their millions to visit the Shiretoko World Heritage site. Peaks are the summer months, while the sea ice in mid-winter also attract some visitors (IUCN, 2005). Currently Shiretoko’s natural resources are widely seen as significant capital for tourism development. New infrastructure (outside the site, but nevertheless impacting on species) to accommodate tourist demand; as well as increased pressure on the species from tourism, are two prominent examples of new stressors. Coastal landfilling, tunnel construction, stabilization of erosion-prone hillslopes, construction of concrete breakwater and logging have taken place since the 2005 inscription to construct larger roads, which also bring in speedier traffic, thereby increasing the risk of species mortality by accident (Chakraborty and Takenaka, 2019). There is a need for management to be more proactive in engaging with development outside the site. Impacts from mass-tourism such as trail erosion, waste and risks posed by the unusually high population density of brown bear noted in the World Heritage evaluation (IUCN, 2005), indicate a need for intensive management (UNEP-WCMC, 2011; Shiretoko Ecotourism...
There has been a rapid increase of guided tours and some guides engage in night-time wildlife viewing with searchlights, baiting and tours or cruise ships venturing close to nesting sites, which disturb wildlife and might cause behavioural change. Improved regulations are needed to manage this conflict between conservation and ecotourism. Currently there is no restriction on fishing in the rivers of the site, which has resulted in high pressure on some species, and a local ‘codes of conduct’ to prohibit overharvesting should be considered (Chakraborty and Takenaka, 2019).

**Monitoring**

Mostly Effective

There is ongoing monitoring, including in response to World Heritage Committee decisions, namely as regards the sustainability of the Walleye Pollock fisheries, the seasonal presence of Steller Sea Lion, salmonid migration and spawning, and Sika deer in and near the property (State Party of Japan, 2016, 2015, 2012 and 2008). UNEP-WCMC (2011) report longstanding monitoring of brown bear and Sika deer, with otherwise a sound baseline through a solid body of published scientific work in and around the property.

**Research**

Some Concern

There is a wealth of research being undertaken at all levels by a range of actors, including governmental institutions and research agencies. A local non-governmental organization lists research among its main activities (Shiretoko Nature Foundation, n.d.). The Onnebutsedake Wilderness has been subject to particular intensive study for decades (UNEP-WCMC, 2011) and research on the habitat and ecology of the Blaksiton’s fish owl has been carried out for over two decades (Takenaka, 2018). A scientific committee consisting of experts in both terrestrial and marine conservation and management advises management (State Party of Japan, 2016). Shiretoko Forest was used in the cover page of the special feature issue on “forest biodiversity and ecosystem services” in Journal of Applied Ecology (Mori et al., 2017). Some issues raised recently following an IUCN Advisory mission indicated the need to better integrate research and management on the property by instituting a more structured, adaptive management approach, which includes describing key criteria to help define restoration, and articulating how results from research and monitoring help describe progress made toward achieving these goals (IUCN, 2019). In order to estimate the population of brown bears and to elucidate the causes of mass infestation in urban areas, research using DNA markers from feces and hair (2019-2021) is underway, aiming to establish monitoring methods.

**Overall assessment of protection and management**

Some Concern

The state Party has shown systematic and promising efforts to address identified challenges; however, the overall management effectiveness of the property is of some concern. There is room for further analysis and follow-up to the State Party commitment to restore river ecosystem function, salmonid migration routes and habitats to “as natural a state as possible” (State Party of Japan, 2016). The high visitor numbers and emerging threats from intrusive experience-type tourist activities require permanent management attention. The complexity of issues is high in the marine area and it deserves to be recalled that this has effects on the terrestrial area as well, given that the property is explicitly recognized for its intricate linkages between land and sea. The most demanding challenges are fisheries management at the appropriate scales, which implies international coordination and cooperation and the best possible understanding of future climate change scenarios to underpin preparedness.

**Assessment of the effectiveness of protection and management in addressing threats outside the site**

Some Concern

Given the mostly effective management system of the property itself and systematic and promising efforts to address identified challenges, the main threats requiring management responses stem from outside the property. However, there is still a number of important issues within the boundaries of the property, particularly the existence of a number of small dams that limit salmon migration. As is common in protected area management, this raises important questions in terms of mandate and capacity to address complex issues at scales beyond protected area boundaries.
Examples include the management of Sika deer populations, but more importantly the marine areas. This includes fisheries management, which obviously requires a scale beyond the property and the best possible harmonization with neighboring countries. Despite important progress in this regard (State Party of Japan, 2016 and 2012), there is room for further harmonizing fisheries management with the users of the Sea of Okhotsk. The continued culling of Steller Sea Lion, a species migrating across long distances, which is subject to full protection elsewhere, epitomizes the need for more sophisticated species management beyond selected areas. Legacies of past land conversion, logging, and stream modification are pervasive and continued urbanization and development in surrounding areas are impacting key ecosystem functions and the integrity of the property. Management needs to actively consider appropriate long-term plans of establishing biotic and abiotic connectivity to the broader landscape (Chakraborty and Takenaka, 2019). Finally, there is major uncertainty in terms of the expected impacts of climate change on the property. While the State Party reports on a series of initial discussions through the Scientific Council, further measures are recommended to understand and assess vulnerability in order to underpin preparedness efforts (UNESCO, 2017 and 2012).

Best practice examples
The IUCN evaluation noted shortcomings in the spatial configuration of the marine part of the then nominated property and recommended an important extension of the marine part of the nominated area (IUCN, 2005). In response, the State Party expanded the area as proposed, an encouraging example of a nomination initiative not only awarding existing conservation efforts, but resulting in concrete conservation gains.

State and trend of values
Assessing the current state and trend of values

World Heritage values

Outstanding example of the interaction of marine and terrestrial ecosystems

The most striking manifestation of linkages between the marine and terrestrial ecosystems of the property are the migrations of salmonids, which are known to influence nutrient cycles and food webs in many ways. The salmon runs support, for example, the important aggregations of wintering Steller sea eagle, white-tailed eagle, Blaksiton’s fish owl and brown bear. However, legacies of past fragmentation and modification have had a major impact on these ecological processes. Despite the considerable effort and commitment to optimise fish migration and habitats, as well as the documented improvements, the fact remains that key species continue to be affected by human-made river modifications. Most of the foundation of dams are still intact, affecting groundwater flow vital for creating habitat for successful reproduction and juvenile rearing of salmonids, and other structures are artificially constricting natural river form and function. The situation requires urgent remedies and an adaptive management framework to gauge ecosystem response and stakeholder concerns (IUCN, 2019; IUCN Consultation, 2020).

Extraordinary ecosystem productivity

The spectacular and highly particular sea-ice formation in the property directly contributes to the high ecosystem productivity in the Sea of Okhotsk, including the property. Thereby, the phenomenon directly contributes to Shiretoko’s Outstanding Universal Value. At this stage, the phenomenon and its effects continue to exist. While the site management is in no position to influence the future of the phenomenon under the overall scenario of climate change, it is clear that the best and probably only option at the site level is to invest in the best possible understanding of change and realistic future
Important habitat for both marine and terrestrial species, a number of which are threatened or endangered  

The management framework could be much improved since the World Heritage inscription, namely through the successful revision of the management plan based on previously somewhat dispersed management guidance. Thereby, there is well-structured and comprehensive guidance on all key aspects. The habitat for the terrestrial species of particular conservation interest is well protected within the site. However, without a meaningful protection of prey species such as salmonids and the safeguarding of green corridors beyond the property, conservation of the apex species is likely to remain a highly challenging task (Chakraborty and Takenaka, 2019).

While the management of the more complex migrations of several species of salmonids continues to face challenges and question marks, important progress has been made and there are strong and credible commitments to further invest in analysis and follow-up. The most striking question mark is the culling of Steller sea lion even though its presence is a noteworthy conservation value in its own right.

### Summary of the Values

**Assessment of the current state and trend of World Heritage values**  

Overall, the specific and formally recognized World Heritage values (World Heritage Committee, 2013) have not been subject to fundamental change. The property continues to provide important marine and terrestrial habitats to a large array of species, none of which is existentially threatened in the property. The productivity of the marine ecosystem and its intricate linkages with the adjacent terrestrial ecosystems remains functional, although human-made river modifications continue to affect the migration of salmonids and thereby these linkages.

**Assessment of the current state and trend of other important biodiversity values**  

The cool temperate deciduous broad-leaved forest and sub-arctic evergreen coniferous forest are important and integral elements of the ecosystem protected in the property. Some hints at threats are related to high pressure from high populations of Sika deer which are known to seriously affect native vegetation across Hokkaido's forests (UNEP-WCMC, 2011, IUCN, 2005). The challenge is well documented and understood by management. It has also been reported that due to past logging activities, natural forests currently only occupy a fraction of their historical patch size and that there is a lack of suitable mature broadleaf vegetation for species such as Blakiston’s fish owl. These forests are fundamental for key terrestrial species survival, but the process to regenerate mature broadleaf forests is a slow one and is still in its early stages, and therefore require continued management commitment (Chakraborty and Takenaka, 2019; IUCN Consultation, 2020).

### Additional information

**Benefits**

**Understanding Benefits**

**Fishing areas and conservation of fish stocks**  

The fishing industry is of major importance locally and in the wider region, benefiting from the conservation of the property but also risking to exceed its capacity unless carefully monitored and managed.
Factors negatively affecting provision of this benefit:
- Overexploitation: Impact level - Moderate, Trend - Continuing

History and tradition, Sacred natural sites or landscapes
The property's name originates from the Ainu words for "the end of mother earth", a place of high significance for the indigenous inhabitants of the peninsula and Hokkaido more broadly (IUCN, 2005). Ainu people, language and culture are critically endangered.

Outdoor recreation and tourism, Natural beauty and scenery
The property is well-known for its scenic values and is today an attractive outdoor destination with a broad range of activities carried out on land and sea.

Importance for research
Both the unusually high marine productivity and the interactions between marine and terrestrial ecosystems in an area with a relatively high degree of naturalness provide important research opportunities.

Carbon sequestration, Soil stabilisation, Coastal protection, Flood prevention
The natural terrestrial vegetation, mostly comprised of various forest types, provides the broad range of forest ecosystem services, while the modest scale puts their importance beyond the local level in perspective.

Tourism-related income, Provision of jobs
Shiretoko directly and indirectly generates both employment and income, namely in the tourism and fisheries sector.

Summary of benefits
Shiretoko was originally inhabited by the indigenous Ainu, who referred to the area as the "end of mother earth". This legacy deserves to be respected, including as regards the role of contemporary descendants of the Ainu. Shiretoko forms part of a highly productive marine area, which contributes to rich fisheries from local subsistence to commercial level. Despite some conflicts, fisheries benefit from the conservation of the property. Another important benefit is the attractiveness for tourism and recreation, which translates into both health benefits and generation of local jobs and income. Otherwise, Shiretoko offers very attractive research opportunities and it delivers the well-documented range of forest ecosystem services.

Projects

Compilation of active conservation projects

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IUCN World Heritage Outlook: https://worldheritageoutlook.iucn.org/
Shiretoko - 2020 Conservation Outlook Assessment
The State Party has established a Scientific Committee for the property, which forms working groups and panels to respond to information gaps and management challenges and conduct corresponding projects. Ongoing activities include, but are not limited to, the River Construction Advisory Panel or Committee, the Marine Area Working Group (WG), the Sika Deer and Brown Bear WG (formerly the Terrestrial Ecosystem WG and the Bear WG merged in 2017) and the Proper Use of Nature and Ecotourism WG. All are directly relevant to understanding, monitor and manage the Outstanding Universal Value of the property. For example, in order to estimate the population of brown bears in Shiretoko and to elucidate the causes of mass infestation in urban areas, research using DNA markers from feces and hair (2019-2021) is underway, aiming to establish monitoring methods.

In 2013, the above commission prepared the Shiretoko Ecotourism Strategy. According to the Ministry of the Environment of Japan it aims at “sharing future objectives for promoting tourism to Shiretoko and methods for achieving this among all of the stakeholders” (Ministry of the Environment of Japan, 2017).
REFERENCES

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