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Convention Concerning the Protection of the World Cultural and Natural Heritage

IUCN Evaluation of Nominations of Natural and Mixed Properties to the World Heritage List

Addendum

Report to the World Heritage Committee
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Prepared by IUCN - The World Conservation Union
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ASIA/PACIFIC

SHIRETOKO

JAPAN

WORLD HERITAGE NOMINATION –IUCN TECHNICAL EVALUATION

SHIRETOKO (JAPAN) ID No: 1193

1. DOCUMENTATION

i) **Date nomination received by IUCN:** April 2004

ii) **Dates on which any additional information was officially requested from and provided by the State Party:** IUCN requested supplementary information on the 20 August 2004, after the field mission, and 2 February 2005, after the IUCN WH Panel. State Party responses were received on 5 November 2004 and 30 March 2005 respectively.

iii) **IUCN/WCMC Data Sheet:** 1 [the nomination which contains 136 references]

iv) **Additional Literature Consulted: :** Hattori H., 2004. **Plankton and seasonal sea ice**. Unpublished report provided to evaluation mission; Nature Conservation Bureau, 1985. **Conservation Reports of the Onnebetsu-Dake Wilderness Area, Hokkaido, Japan**. Environment Agency, Japan; Ohtaishi N., and Nakagawa, H. (1988) **Animals of Shiretoko. Hokkaido** University Press, Sapporo English Summary.Sakurai Y., 2004. **The rich marine environment and ecosystem around Shiretoko – towards coexistence with the fisheries.** Unpublished report provided to evaluation mission. Sato K., 2004. An Introduction to Vegetation of the Daisetsuzan Mountains. **Journal of Development Policy Studies**, Hokkai-Gakuen Univ, No 73:23-38; Tatewaki M., 1963. Phytogeography of the Islands of the North Pacific Ocean. **Proceedings of the Tenth Pacific Science Congress**, University of Hawaii, pp 23-28; Tatewaki M., (1958) **Forest Ecology of the Islands of the North Pacific Ocean** University of Sapporo, Japan.

v) **Consultations:** 12 external reviewers provided input to this evaluation report. Extensive consultation was carried out in Japan with representatives of relevant government agencies, local communities and other stakeholders.

vi) **Field Visit:** David Sheppard, July, 2004

vii) **Date of IUCN approval of this report:** April 2005

2. SUMMARY OF NATURAL VALUES

Shiretoko is located in the northeast of Hokkaido, the northernmost island of Japan. The Shiretoko Peninsula is approximately 25 km wide at its base and protrudes 70 km into the southern boundary of the Sea of Okhotsk. The nominated property includes the terrestrial area from the central part of the Peninsula to the tip of the peninsula (Shiretoko Cape) and the surrounding marine area. The total area of the nominated property is 56,100ha comprising a core area of 34,000 ha and a buffer area of 22,100 ha.

The Shiretoko peninsula was formed by volcanic activities and uplift from the Pacific Plate subducting under the North American Plate. The Peninsula comprises a number of volcanoes running along the centre of the peninsula and including the highest peak within the nominated property, Mount Rausu (1,661m). The coastlines on the east and west sides of the peninsula were formed by a combination of volcanic activities, tectonic movement and marine erosion. For example, sea cliffs around Utoro range from 60m to 120m in height and were formed from andesitic lava from the eruption of Mt Rausu 80,000 years ago and subsequent marine erosion.

The key feature of the property is the productivity of the marine and terrestrial ecosystem, reflecting the formation of seasonal sea ice at the lowest latitude among the world's seasonal sea ice in the northern hemisphere. The formation of the sea ice plays an integral role in the formation of the phytoplankton which develops on the nutrients supplied by the sea ice. Blooms of ice algae and other phytoplankton occur earlier in spring as ice melts faster than other sea ice areas. The phytoplankton is the primary producer in the marine ecosystem and provides the source of food for krill and zooplankton such as small shrimp, which in turn become food for small fish, crustacean and shellfish. These in turn become food sources for fish, marine mammals, such as seals and sea lions, as well as birds including the Steller's sea eagle and the White-tailed eagle. In addition, salmon and trout swim upstream to spawn and become an important food source for terrestrial species, including the brown bear and the Blakiston's fish-owl.

The significance of the sea ice in contributing to the high productivity of the ecosystem within the nominated property reflects three distinct conditions affecting the Sea of Okhotsk in general and this property specifically. The first condition is the double-layered water structure of the Sea of Okhotsk, with the surface and lower layers of the water having a large difference in salinity. The second condition is that the Sea of Okhotsk is

surrounded by lands with limited exchange of seawater with the open sea. This low level of exchange contributes to maintaining the double-layered water structure with different salinity levels. The third condition is the distribution of atmospheric pressure in the area, causing cold air from Siberia to blow into the area and providing a chilling effect on the seawater. As noted, the seasonal sea ice contributes to the productivity of both the marine and terrestrial ecosystems.

In relation to the marine ecosystem, two hundred and twenty three (223) species of fish have been collected from the coastal waters of the Shiretoko Peninsula, with the composition of species reflecting the effects of the seasonal sea ice in winter, as well as the differential in water temperature throughout the year, with cold water temperatures in winter and the warmer surface temperatures of the property from August to September, due to the warm Soya current. Ten species of salmonid species have been found in the coastal waters of the Shiretoko Peninsula and thus a majority of the 13 species in the Pacific Ocean and 12 in the Sea of Okhotsk are represented in the group. The coastal waters of the Shiretoko Peninsula are recognized for their global importance for salmonid species and also as a key migration route for salmonids.

The nominated property also has important populations of marine mammals and cetaceans. The sea ice around Shiretoko is particularly important for the feeding, resting and breeding of marine mammals, since the coastal waters of Shiretoko are rich in food and the ice that covers the sea in winter provides protection from predators and waves. Twenty eight (28) species of marine mammals have been identified in the costal area of Shiretoko. These include the Steller Sea Lion, which is listed as Endangered in the IUCN Red List of Threatened Species, as well as a number of other important marine mammal species. The Steller Sea Lion is one of the flagship species within the nominated property and the coastal waters of the Shiretoko Peninsula are essential for over-wintering and feeding for this species. The Walleye Pollack is a particularly important fish species for the diet of the Steller Sea Lion. The Sea Lions rest along the near shore waters about one km from the coast and feed along the edge of the continental shelf near the isobathymetric line of 200 metres.

There are seven cetacean species commonly distributed in the coastal waters adjacent to the Shiretoko Peninsula, including within the waters of the nominated property. The coastal waters of the Shiretoko Peninsula are important as a cetacean feeding and breeding site and also as a route for their seasonal migration. Species include the Minke Whale, the sperm whale and the Dall's porpoise, with the nominated property providing the only confirmed breeding site in the West Pacific Ocean for the latter species. In addition, some species are infrequently found within the waters of the Shiretoko Peninsula, including the Sei Whale (Listed as Endangered on the IUCN Red List of Threatened Species) and also two rare and little known beaked whales.

In relation to the terrestrial ecosystem the majority of the vegetation is in a natural or semi natural condition. Various types of virgin vegetation are present from the coastline to the mountain peaks, 1,600m high. Further, the complex and undulating topography and the differences in weather conditions between the east and the western sides of the Shiretoko Peninsula create a variety of habitats and as a result, Shiretoko contains a diverse range of terrestrial fauna and flora. A number of endemic plant species are found within the property, including *Viola kitamiana* which is endemic to the Shiretoko Mountain Range and a number of plant species found within the nominated property are listed in the IUCN Red List of Threatened Species. While the altitude variation within the property is only 1,600 m from the coast to the highest peak (Mount Rausu), alpine plants such as the Japanese stone pine and other alpine plant communities are developed at relatively low altitudes, due to an upper forest line at about 800 m. The forest within the nominated property is a Pan Mixed Forest Zone and consists of a mosaic of three types of forests: (a) cool temperate deciduous broad-leaved forest with species such as Japanese Oak, Painted Maple and Japanese Linden*;* (b) sub-arctic evergreen coniferous forest with species such as Sakhalin fir*,* Yeso Spruce and Sakhalin Spruce; and (c) mixed forest combining the above cool temperate deciduous broad leaved forest and sub-arctic evergreen coniferous forest.

The nominated property supports a range of animal species, combining northern species from Sakhalin and southern species from Honshu. There are thirty five (35) species of terrestrial mammals within the nominated property, including three species of one family of Chiroptera which are listed as Endangered or Lower Risk (LR) in the IUCN Red List of Threatened Species. The property has one of the highest recorded densities of brown bear populations in the world, with estimates up to 35 bears per 100 km^2. This, in turn, reflects the very small home range of brown bears in the Shiretoko Peninsula, at 15 km^2 on average, among the smallest home ranges for brown bears in the world.

A rich diversity of avifauna is found within the nominated property, with two hundred and sixty four (264) species of birds recorded in the Peninsula, including 9 species listed on the IUCN Red List of Threatened Species. Shiretoko is recognized as one of the world's Important Bird Areas (IBA) by Birdlife International. The nominated property provides particularly important habitat for the Blakiston's fish owl (Endangered on the IUCN Red List of Threatened Species) and the previously mentioned Stellar sea eagle. It has been estimated that there are less than 1,000 Blakiston's fish owls left in the world, with a significant number of these found in the Shiretoko Peninsula. It has been estimated that the global number of Steller sea eagles is around 5,000 (Birdlife International) and more than 2,000 have been recorded as over-wintering within the Shiretoko Peninsula. The nominated property is also an important wintering site for the White-tailed eagle, with up to 600 individuals recorded at the property in winter. These three species, along with the black woodpecker, are designated as Natural Monuments in Japan, due to their rarity and high scientific value. The coastal areas of Shiretoko are also important for migratory seabirds. Specifically the sea cliffs along the coast from Utoro on the western side of the Peninsula to Shiretoko Cape are important breeding grounds for a range of species, with particular

importance as a breeding site for the Japanese Cormorant.

In autumn, both Steller's sea eagle and White-tailed eagle feed upon the salmon which swim upstream and in winter they hunt the Walleye Pollack. Two hundred and fifty five (255) species of fish have been recorded in the rivers of the Shiretoko Peninsula. The nominated property is noted as a key breeding area for the nine salmonid species found in the rivers of the Shiretoko Peninsula. Rivers specifically play an important role as a spawning and wintering area for these species. In particular the Shiretoko Peninsula is the southernmost habitat in the world for the sea run of the Dolly Varden.

3. COMPARISON WITH OTHER AREAS

The nominated property lies within Udvardy's "Manchu-Japanese Mixed Forest" Biogeographic Province. The Central Sikhote-Alin in Russia is the only World Heritage (WH) property within the same Udvardy Biogeographic Province. This property, at 406,200 ha is much larger than the nominated property and is one of the world's largest temperate wilderness areas. On a comparative basis it is clear that the forest within Shiretoko (total area 56,100 ha) cannot compare with the Shitote Alin property in terms of forest biodiversity nor in general terms of species diversity or coverage of this province. However the range of other attributes of the nominated property is important and particularly the higher level of marine biodiversity exhibited at the property. Shiretoko also exhibits clearer and exceptional evidence of the interaction between the marine and the terrestrial environments.

From the global perspective there are 11 other natural WH properties within the same "Temperate broad – leaved forests or woodlands, and sub polar deciduous thickets" biome of Udvardy. Among the existing WH properties there are only two which feature the interaction of the terrestrial and marine environment, Sikhote-Alin, mentioned above, and Volcanoes of Kamchatka, also in Russia. The Volcanoes of Kamchatka property was inscribed on the WH List for its wide range of volcanic attributes as well as its biodiversity. This property has a higher diversity of salmonid fish species but the level of diversity of terrestrial mammals and birds is higher in the nominated property, also due to its more southward location, with Shiretoko having 35 species of terrestrial mammals and 264 species of birds compared to the 33 species of terrestrial mammals and 145 species of birds found in the Volcanoes of Kamchatka. It is further noted that the seasonal sea ice within the nominated property is formed by the specific conditions of the Sea of Okhotsk while the east coast of the Kamchatka Peninsula (where the WH property faces) usually does not have sea ice.

There are three comparable large continental/maritime natural WH properties at broadly similar latitudes in North America – (a) Olympic National Park bordering the Pacific Ocean in Washington State; (b) Gros Morne National Park on the western Atlantic seaboard in Newfoundland and Labrador province in Canada; and (c) the Redwood National Park situated along the Pacific Coast in California. The Olympic National Park (Oregonian biogeographic province) is an outstanding temperate rainforest but its climate is very different (much wetter and warmer) than Shiretoko and its forest is more coniferous. Olympic is also not listed for its biodiversity value or endangered species. Gros Morne National Park, likewise, is not listed under criterion (iv); it is wetter and cooler (in summer) than Shiretoko and it lacks the forest community diversity of the latter. The Redwood National Park is characterised by virgin temperate rainforests, mainly consisting of giant conifers and exhibits a different range of species from the nominated property and it does not exhibit the same interaction of terrestrial and marine features of the nominated property, neither is it influenced by the seasonal sea ice.

The Udvardy's "Manchu-Japanese Mixed Forest" Biogeographic Province also extends across provinces of north-east China (Heilongjiang and Jilin) to the North Korean border. The most significant site in this area is Changbai Mountain Nature Reserve (190,582 ha). This site is a Biosphere Reserve but lacks any lowland forest (below 300m) or any coastal landforms and biota. It is noted that similar ecosystems, and especially the same type of forest vegetation as well as comparable interactions between terrestrial and marine ecosystems also occur on the two southernmost islands of the Kuril island chain, adjacent to Shiretoko.

In addition to the comparison with other properties within the same Udvardy Biogeographic Province and Biome, it is noted that there are a number of distinctive features which strengthen the case for the nominated property being of Outstanding Universal Value. These include:

- The productivity of the marine and terrestrial ecosystem, reflecting the formation of seasonal sea ice at the lowest latitude among the world's seasonal sea ice;
- The interaction between the marine and terrestrial environment within the nominated property;
- The high number of flora and fauna species within the nominated property that are endemic and/or listed as Threatened on the IUCN Red List of Threatened Species (refer above section);
- The nominated property also has particular importance as a site for the protection of a number of globally threatened bird species, including the Steller's sea eagle, the Blakiston's Fish - owl and the White-tailed eagle, as well as being a significant site for migratory birds, such as Short tailed shearwater. Birdlife International suggests the ornithological importance of the site relates to the "site's significant numbers of globally threatened bird species, to its significant assemblage of species whose breeding distributions are largely or wholly confined to one biome, and to the fact that it holds, on a regular basis, more than 1% of a biogeographic population of a waterbird species"
- The fact that this property has one of the highest densities of brown bear populations in the world is also an important, although secondary, attribute. It is noted that densities in Shiretoko compare with brown bear population densities observed in coastal areas of Alaska and Kamchatka, with bears in these areas

also having access to salmon. However, it is noted that the high figure estimated for the Shiretoko nomination is exceeded by at least two Alaskan island populations (40 bears per 100 km^2) (pers. comm. IUCN/SSC Bear Specialist Group). Thus the high density of the brown bear at the nominated property is a key feature but by itself probably not sufficient to justify "Outstanding Universal Value".

- The property has particular significance for salmonid species. The IUCN/SSC Salmon Specialist Group notes there are nine Natural World Heritage properties established within the natural range of Pacific salmon (Shirakami Sanchi in Japan, Central Sikhote-Alin in Russia, Volcanoes of Kamchatka in Russia, Wrangel Island Reserve in Russia, Kluane/ Wrangell-St. Elias/Glacier Bay/Tatshenshini-Alsek in Canada and the USA, Olympic National Park in USA, Redwood National Park in USA, Yosemite National Park in USA, and Nahanni National Park in Canada). Most of these properties, however, include higher elevation areas that do not necessarily encompass critical habitat for salmon, or only provide partial protection of watersheds that support salmonids. Exceptions to this include the Olympic National Park in the USA and the Volcanoes of Kamchatka in Russia. The 3.7 million km^2. The Kamchatka property includes the world's greatest diversity of salmonoid fish as well as important populations of seabirds and marine mammals. The IUCN/SSC Salmon Specialist Group notes the particular significance of the Shiretoko property is that it encompasses habitat in more than a dozen small watersheds and supports several species of Pacific salmonids, including White spotted charr, Japanese huchen or Sakhalin taimen, masu salmon, chum salmon and pink salmon. The nominated property has specific importance as it is the southernmost habitat in the world for the sea run of the Dolly varden. The importance of the property is underlined by the fact that many of the salmon river ecosystems in the region have been significantly altered through land use practices and various forms of channel modification and impoundment.

- The nominated property represents the lowest latitude of the world's seasonal sea ice. This is a particularly interesting feature but is not by itself sufficient as a feature to represent Outstanding Universal Value. However the enormous productivity of the marine and terrestrial ecosystem within the nominated property is, as noted above, a direct consequence of the seasonal sea ice and thus the sea ice is a major contributing factor to the conservation value of the nominated property.

4. INTEGRITY

4.1 Legislation and Management Plan

The nominated property is protected through a number of national laws and regulations. These include The Nature Conservation Law (1972), the National 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). A comprehensive administrative scheme is proposed for the nominated property to ensure effective integration of the various management objectives for the property and to ensure cohesive management for the core and buffer zones. Several management plans exist for the nominated property and this includes both a Park Plan for the Shiretoko National Park and the Regional Administration and Management Plan for the National Forest. These plans have been developed through a consultative process, involving relevant stakeholders, and set out clear management objectives and strategies for the nominated property.

In general, these and other laws provide an effective matrix of legal protection for the nominated property, within its current borders. IUCN finds the legal and management planning basis satisfactory (while noting the points below in section 4.4) but notes that the management plan may need to be revised in future, particularly in relation to the need to address anticipated tourism pressures and to ensure the effective protection and management of marine resources within the nominated property.

4.2 Boundaries

The boundaries of the nominated property consist of those of existing legally designated protected areas. The nominated property is classified into a core area and a buffer area for management purposes. As previously noted, the total area of the nominated property is 56,100 ha comprising a core area of 34,000 ha and a buffer area of 22,100 ha. The core zone consists of a number of specially protected areas, including the Onnebetsudake Wilderness Area and the Special Protection Zone of the Shiretoko National Park. The buffer area includes land surrounding the core area and also the sea area within the coastline of the nominated property. IUCN notes that the terrestrial boundaries are logical and protect the key terrestrial features of the property, although there are some construction and recreation-related developments in the settlements which need more consideration in future.

In relation to the marine boundaries IUCN notes that the boundaries were originally proposed as being one kilometre from the shoreline. In discussions with the State Party following the Evaluation Mission, the Japan Government, including relevant Ministries, Local Government Authorities and key stakeholders, agreed to extend the marine boundaries to a distance of three kilometres from the shoreline. This corresponds to the depth of 200 metres which encompasses the key marine ecological area for marine biodiversity. The IUCN Evaluation Mission also noted the need to ensure effective protection of marine resources within the nominated property and for adequate protection of flagship species, such as the Steller sea lions. This is further elaborated in section 4.4 below.

4.3 Management of the terrestrial environment

The level of management of the terrestrial component of the nominated property is high and the area's physical features retain a high degree of natural integrity. As noted, effective management plans cover the nominated property, and these set out clear management objectives and strategies. There are adequate resources to ensure

the implementation of the provisions of the management plans and these are available from a range of sources, including the Ministry of the Environment, Forestry Agency, Hokkaido Prefectural government and the local towns adjacent to the nominated property (Shari Town and Rausu Town). The National Parks Foundation, Shiretoko Branch, also contributes to the management of the property, particularly through clean-up activities and the management of facilities within the park. In total there is an amount of approximately US$11.6 million per annum available from the various sources for the management of the nominated property (and also areas surrounding the property, in the case of the Forestry Agency). The IUCN evaluation mission was particularly impressed by the close cooperation between the Ministry of Environment and the Forestry Department, as well as the excellent collaboration between the different levels of government (national, prefectural and the local towns). The involvement of external partners and stakeholder groups, such as the National Parks Foundation and the Shiretoko 100 Sq Metre Trust also makes a major contribution to the effective management of the nominated property.

Tourism and wildlife management are important issues within the terrestrial component of the nominated property. In relation to tourism, it is estimated there are approximately 2.34 million visitors per annum to the Shiretoko Peninsula. Summer is the high season but some 300,000 people also come to see the sea ice (January to March). Popular tourism activities include the nature walks to Shiretoko-goko lakes and Kamuiwakka, trekking around Lake Rauso, sightseeing from Shiretoko Pass and climbing in the Shiretoko mountain range. Nature sightseeing from the sea on tour boats is another popular attraction.

The IUCN Evaluation Mission (June 2004) noted some signs of soil erosion around the high mountain trails, underlining the need for clear management strategies and actions. The high density of bear populations in proximity to an increasing number of visitors also underlines the need for effective management of bear - human interactions, particularly in and around main tourist destinations. The State Party, working with NGOs and local communities, is addressing these problems, particularly through a range of non-lethal ways, including through increased public awareness, and the short term closure of key visitor use areas, as required. Ecotourism is clearly promoted by the authorities. In July 2004 a "Shiretoko Ecotourism Promotion Council" was established. This council will formulate an ecotourism strategy for Shiretoko by the end of 2005. Ecotourism has clear potential for positive and also negative impact, in relation to the nominated property. It is important to develop the ecotourism strategy, building on experience from within the property and from elsewhere. Elements for possible consideration in this strategy include: (i) a Trail Management Strategy, based in part on existing scientific research relating to trail use and impacts; (ii) considering developing Limits of Acceptable Change indicators for different zones within the park, in relation to visitor use; (iii) promotion of visitor use strategies within a regional context should use levels become too high; and (iv) management of bear - human interactions.

Wildlife management is also an important issue within the property. Specifically, the Sika deer is another abundant and high profile species at Shiretoko and the deer population has been subject to major fluctuations. It is noted that Sika Deer populations are rapidly increasing all over Japan and that effective deer control is a broader wildlife management issue within Japan. As for regulated ungulate populations elsewhere, such as in the Yellowstone National Park, there is debate as to whether and how to prevent such dramatic oscillations. High deer densities greatly alter the natural vegetation, so the debate centres on whether the effects of the deer are natural, or due to long term human imposed changes in the ecosystem. (IUCN/SSC Bear Specialist Group, pers. comm.). The management plan for the property notes that a study will be undertaken to monitor the relation between population density and the impact on the forest ecosystem. Results from this study will be used to identify effective measures for the future management of deer populations. IUCN notes that there might be potential conflicts between the management of Sika deer and the desire of visitors to see wildlife, and that effective management will be required.

4.4 Management of the marine environment/fisheries management

The IUCN Evaluation Mission noted that there is currently a broad range of fishing activities within and adjacent to the nominated property. The Nomination document notes that the: "fishing industry uses set nets, gill nets and aquaculture in the coastal waters of the Shiretoko Peninsula. The major marine resources harvested are salmon and trout, Sagittated calamari, Walleye Pollack and kelp. There have been almost no changes in production volume in the last 10 years for most of the fisheries resources. The level of catches in the fisheries operating in the coastal waters of the Shiretoko Peninsula is supported by the high production level of the sea. Fisheries activities are controlled by the Fisheries Law and other regulations issued by the Hokkaido Prefectural government, voluntary restrictions by the fisheries industry, as well as artificial production and fry release programme for salmon and trout".

IUCN notes that fishing has been undertaken in the area for a considerable period of time and it is a vitally important industry in the region. Considerable consultation has taken place with fisheries interests and there has been a high level of cooperation in relation to the prescriptions in the management plan regarding fisheries, such as those relating to restrictions and prohibitions on capture of Sakhalin surf clams and sea urchins, and prohibitions on certain fishing methods. However, IUCN notes that there appear to be declining levels of catch of key fish species within and adjacent to the nominated property.

As noted above, the potential significance of the nominated property as being of Outstanding Universal Value derives from the inter-relationship between the terrestrial and the marine ecosystems. Further, the protection of any property as World Heritage implies the highest possible level of legal protection for the property as a whole, both for terrestrial and marine components. Accordingly the protection and management of the marine component of the nominated property is of high

importance. The IUCN mission communicated with the State Party after the evaluation mission and raised a number of issues relating to the management of the marine component of the property, including concerns regarding:

- the level of protection of the marine component of the nominated property;

- the level of fishing currently occurring within the nominated property. Concerns were also raised in relation to what appeared to be declining levels of catch of the Walleye Pollock within and adjacent to the nominated property, as this species is one of the main food sources of the Stellar Sea Lion, the Steller's sea eagle and the White tailed eagle, which are flagship species of the nominated property;

- potential impacts of aquaculture, including the release of trout; and

- the need for consideration of stricter controls of fishing within key breeding, spawning and nursery sites for key fish species within the nominated property and in the adjacent areas, as far as they are functionally related ecologically to the nominated property. Potentially this could be achieved by the establishment of a number of Fisheries Resource Protection Areas (FRPA) and this should be undertaken through consultation with appropriate scientific bodies and fisheries experts.

The State Party response to these matters noted, inter alia:

- that resource levels of the Walleye Pollack have, in fact, been stable within the nominated property but have been generally declining throughout the Sea of Okhotsk. The Government manages the resources by setting the Total Allowable Catch (TAC) based on surveys from relevant fisheries organisations. There have also been self imposed controls on fishing of Walleye Pollack, for example, by reducing the number of fishing boats operating gill nets (from 324 to 181 during the period 1990 to 2003);

- their intent to develop within the next 5 to 10 years a "Multiple Use Integrated Marine Management Plan": "in order to conserve the marine area within the nominated property as a World Heritage Area". This plan would include mechanisms for ensuring the conservation of the marine life, based on a detailed assessment of the state of marine life, fisheries operations and leisure fishing within the nominated property and the surrounding areas; and

- that governments and relevant stakeholders will review new measures to control fisheries activities within the nominated property. These new measures would be modelled after the existing fishing ban in certain areas and periods, which are voluntarily adopted by local fishermen and fisheries organisations, to conserve and manage the Walleye Pollack stock. The new measures will be presented to the Shiretoko Nominated property Regional liaison Committee by 2008.

IUCN notes the increasing evidence from around the world to support the link between the establishment of well managed marine protected areas (MPAs) and the conservation of fisheries stocks. It is further noted that there are currently many global efforts underway to develop representative marine protected areas, including within the Great Barrier Reef Marine Protected Area, which provides one example of a representative marine protected areas system. These examples have shown the need for management policies to be based on the best available science and the critical importance of working closely with the fisheries sector and relevant interests. A further important lesson is that effective consultation takes time and effort.

IUCN supports the development, within the next three years, of the Multiple Use Integrated Marine Management Plan and the study as proposed by Japan. It is important that such an integrated management plan draw on appropriate scientific expertise and that it clearly identify measures for strengthening marine protection within the nominated property. This may include restrictions on fishing within key breeding, spawning and nursery sites for key fish species within the nominated area, as well as reviewing strategies for expanding the boundaries of the marine component of the nominated property. Any future boundaries should consider the need to adequately protect key locations and migration routes for the Steller sea lions and cetacean species. The Plan should include clear and time bound objectives and strategies and the effectiveness of the measures within the plan on marine resources should be assessed after a five year period.

Following consultation between the State Party and IUCN, the State Party has recently agreed to shorten the period for the development of the Marine Management Plan and also to extend the marine boundary from 1km to 3km off the shoreline. IUCN considers these to be positive developments and recommends a mission after two years, if this property is inscribed, to assess the impact of the Plan and the marine extension on the ecological functionality and the fisheries resources of the property.

4.5 Dam Construction on Rivers

The nominated property has important values for salmonid species (IUCN/SSC Salmon Specialist Group, pers. comm.) and salmon species are an important food source for a number of important species within the nominated property, including the Steller's sea eagle and White tailed eagle which feed upon the salmon swimming upstream in summer. Providing for the free movement of fish species within the nominated property should be an important element of the overall management in relation to the restoration and maintenance of natural river flows and processes. An important element of this is the need to consider installation of ecologically efficient fish ladders to allow for the free movement of salmon on all structures maintained on the rivers in the nominated property and strict regulations of leisure fishing in the lower courses of the streams (buffer zones or outside the nominated property).

Currently nine out of the forty-four rivers within the nominated property have artificial modification, mainly in the form of dam construction. These have been installed to protect human life and properties from the impacts of severe weather events and associated disasters, such as landslides. The nomination document notes that: "The impact of these constructions on salmon is not clear yet, and is going to be investigated" (pg 21). Subsequent to the Evaluation Mission, IUCN raised this issue with the State Party and noted the importance of further research and possibly remedial action, which could potentially involve the removal of some of these structures in the future and/or the installation of fish ladders.

IUCN considers that it is important that more research, providing substantial results within a definite span of time, be undertaken in relation to the impact of dam construction on populations of salmonid species. Such research could include aspects such as the:

- extent to which specific streams are used for spawning by each of the salmonid species;
- specific impact of dams in relation to impeding salmon migration; and
- establishment of a monitoring program to regularly assess status and trends of the populations of salmonid fishes.

IUCN considers that a Salmonid Management Plan, as one component of the overall management plan for the property is necessary. It should include an assessment of the current practice of salmonid management by releasing artificially reared fry. Such a Management Plan should be developed to ensure the above issues are adequately addressed. It is important that this draw on appropriate scientific expertise and the IUCN/SSC Salmonid Specialist Group may be able to assist this process. The Plan should include clear and time-bound objectives and strategies and the effectiveness of the measures within the plan on marine resources should be assessed after a five year period

5. ADDITIONAL INFORMATION

5.1 Public support and involvement

The nominated property features a very high level of involvement of local communities and stakeholder groups. It is particularly noteworthy as the setting for the innovative Shiretoko 100 square metres movement, an innovative mechanism for individuals and organisations to support conservation through specific donations and support. This model has become a pioneering model, inspiring similar efforts throughout East Asia and other parts of the world. Similarly, the involvement of stakeholders involved in fisheries has been noteworthy and very effective.

5.2 Scientific Research

There are a number of innovative scientific research programmes throughout the nominated property and these are, to the fullest extent possible, linked to the development of management strategies within the nominated property. It is important that these research programmes be expanded in the future, particularly to address key issues for management, including the management of bear and Sika deer populations and to contribute to the development of management plans for marine resources, salmonid species and ecotourism.

5.3 Neighbouring Islands

There are clear and apparent similarities between the environment and ecology in Shiretoko and the neighbouring islands. It is noted that there has been contact between Japanese and Russian researchers. Should it be possible for the States Parties to agree to promote the conservation of these properties in the future, there may be the potential for development of these properties as a wider "World Heritage Peace Park".

5.4 Involvement of Indigenous Peoples

Shiretoko was reverently called by the Ainu People as "sir.etok" (the end of mother earth) indicating the importance of this area for traditional inhabitants. It is important, as reinforced in the management plan (page 214 of the nomination document) to "study the culture of the Ainu people and the traditional wisdom and skills of the local residents in order to determine the methods to preserve, manage and realize sustainable use of the natural environment". Accordingly it is considered important that representatives of the Ainu people, such as through the Hokkaido Utari (Ainu) Association, have the opportunity to be involved in the future management of the property, including in relation to the development of appropriate ecotourism activities which celebrate the traditional customs and uses of the nominated property

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

Shiretoko has been nominated under natural criteria (ii), (iii) and (iv)

Criterion (ii) Ecological Processes

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. This process supports the formation of phytoplankton which develops on the nutrients supplied by sea ice. Blooms of ice algae and other phytoplankton occur earlier in spring as ice melts faster than other sea ice areas. The phytoplankton is the primary producer in the marine ecosystem and provides the source of food for krill and zooplankton such as small shrimp, which in turn become food for small fish, crustacean and shellfish. These in turn become food sources for marine and terrestrial species which provide the basis for the outstanding ecological processes exhibited at the property. IUCN considers the nominated property, including the proposed extension to 3 kilometres off the shoreline, is an outstanding example of the linkage between marine and terrestrial ecological processes and ecosystems. IUCN considers that the nominated property meets this criterion

Criterion (iii) Superlative natural phenomena, scenic beauty

The nominated property derives its primary visual impact from a range of natural landscapes that vary with the season. These features include the scenic coastline, with sea cliffs more than 100 metres high and mountain scenery. IUCN considers that this property is very beautiful but considers that these values are of significance at the regional level and cannot compare to other coastal and mountain sites already inscribed on the WH List, under this criteria, such as Lord Howe Island (Australia) and the Volcanoes of Kamchatka (Russia). IUCN considers that the nominated property does not meet this criterion

Criterion (iv) Biodiversity and threatened species

Shiretoko has particular importance for a number of marine and terrestrial species. These include a number of endangered and endemic species, such as the Blackiston's Fish owl and the plant species V*iola kitamiana*. The property is globally important for a number of salmonid species and for a number of marine mammals, including the Steller's sea Lion and a number of cetacean species. The property has significance as a habitat for globally threatened sea birds and is a globally important area for migratory birds. The nominated property also exhibits excellent examples of forest ecosystems with a very limited area of distribution. IUCN considers that the nominated property meets this criterion

7. DRAFT DECISION

IUCN recommends that the Committee adopt the following draft decision:

The World Heritage Committee,

1. *Having examined Document* ***WHC-05/29.COM/8B***

2. *Inscribes Shiretoko, Japan, on the World Heritage List on the basis of natural criteria (ii) and (iv).*

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

   Criterion (iv): *Shiretoko has particular importance for a number of marine and terrestrial species. These include a number of endangered and endemic species, such as the Blackiston's Fish owl and the plant species Viola kitamiana. The site is globally important for a number of salmonid species and for a number of marine mammals, including the Steller's sea Lion and a number of cetacean species. The site has significance as a habitat for globally threatened sea birds and is a globally important area for migratory birds.*

3. *Notes that the State Party has agreed to extend the Marine Boundary of the property from 1km to 3 km off the coastline, and that such extension is "de facto" in place awaiting legal designation by the end of 2005.*

4. *Requests the State Party to:*

   (i) Expedite development of a Marine Management Plan, to be completed by 2008, to clearly identify measures for strengthening marine protection and the possibilities of extending the boundaries of the marine component of the property;

   (ii) Send a map and details of the final boundaries of the property, as well as a copy of the law supporting them, to the World Heritage Centre once they have been confirmed in law;

   (iii) Develop a Salmonid Management Plan to identify impacts of dams and strategies to address this impact; and

   (iv) Address other management issues included in the evaluation report, including in relation to tourism management and scientific research.

5. *Encourages the State Party to invite a mission to the property in 2 years from its inscription to assess progress with the implementation of the marine Management Plan and its effectiveness in protecting the marine resources of the property.*

6. *Commends the State Party for the commendable process for public consultation involved in the preparation of this nomination document; the preparation of an excellent nomination dossier; and for effectively addressing IUCN recommendations to enhance the conservation and management of this property.*

Map 1: General Location of nominated property

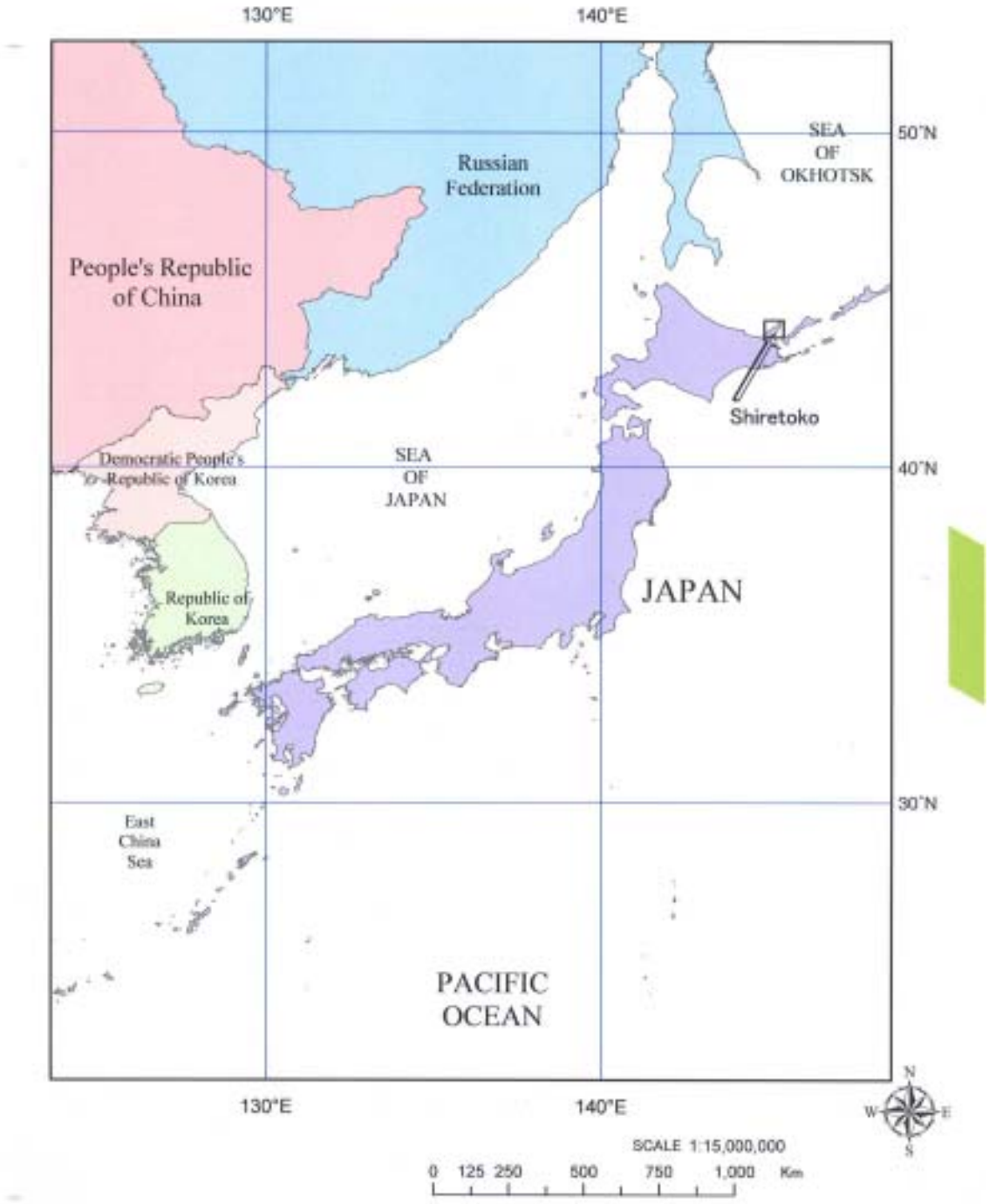
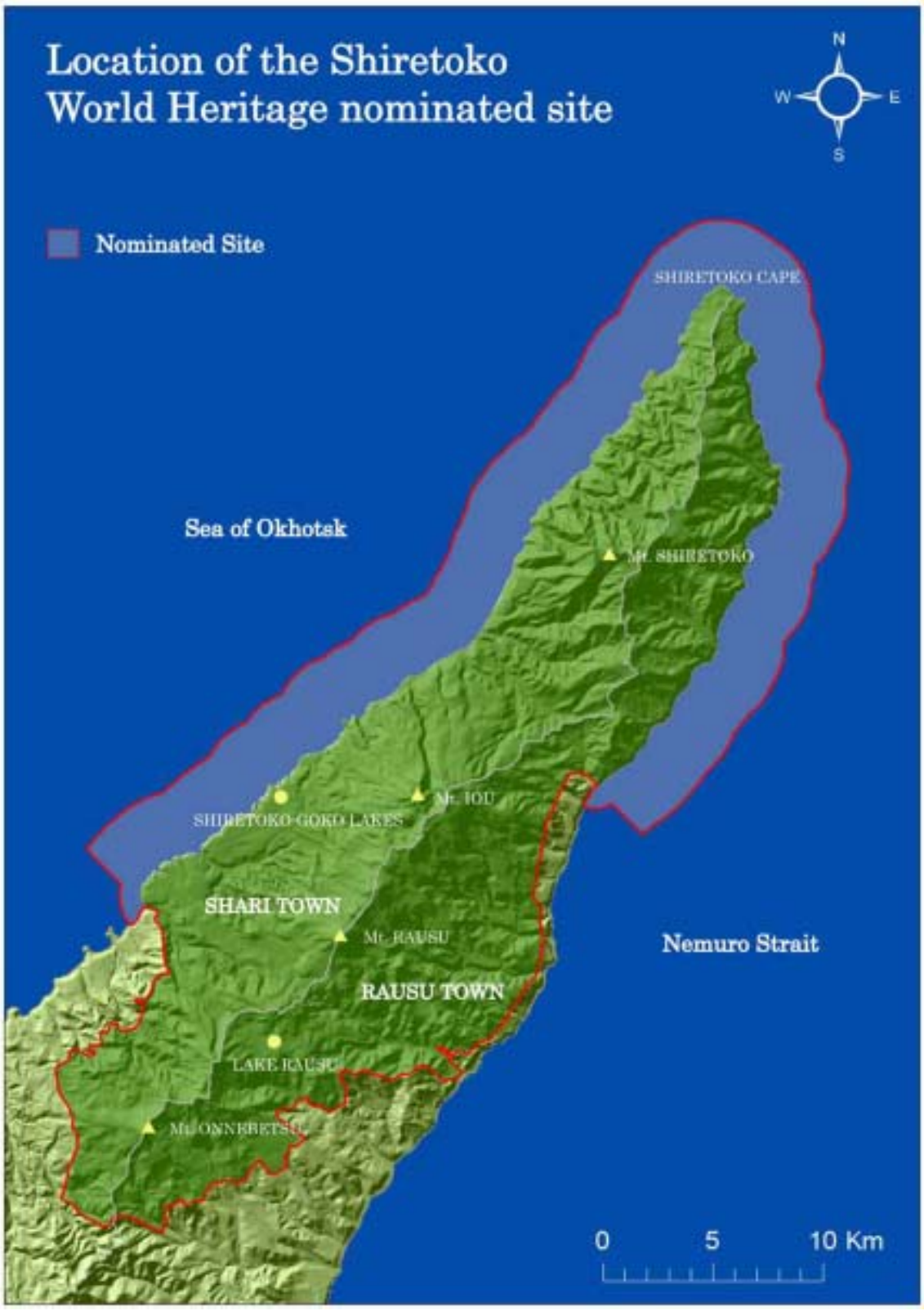


Figure 1-1 Location of Shiretoko Peninsula in Japan

Map 2: Boundaries of nominated property



LATIN AMERICA / CARIBBEAN

ISLANDS & PROTECTED AREAS

OF THE GULF OF CALIFORNIA

MEXICO

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

ISLANDS AND PROTECTED AREAS OF THE GULF OF CALIFORNIA (MEXICO) - ID N° 1182

1. DOCUMENTATION

i) Date nomination received by IUCN: April 2004

ii) Dates on which any additional information was officially requested from and provided by the State Party: IUCN letter requesting supplementary information sent 26 October 2004. State Party response received on 7 December 2004.

iii) IUCN/WCMC Data Sheet: 10 references.

iv) Additional Documentation Consulted: UNESCO, 2002, **Proceedings of the World Heritage Marine Biodiversity Workshop, Hanoi, Vietnam,** World Heritage Papers 4; UNEP-WCMC, 2002, **Coral Reefs Atlas of the World;** UNEP-WCMC, 2003, **Seagrass Atlas of the World;** GBRMPA, WB, IUCN, 1995, **A Global Representative System of Marine Protected Areas.** Vol. III; Bezaury-Creel, J.E. (in print), **Las Áreas Protegidas Costeras y Marinas de México**; Walter, B.W, 1960. **The distribution and affinities of the marine fish fauna of the Gulf of California**, in Systematic Zoology, Vol. 9, No.3; Sala, E.O, Aburto.G, et al, 2002, **Marine Conservation at a regional scale: developing a science-based network of marine reserves in the Gulf of California,** in Scince, Vol. 298; WWF-Mexico. **Base de datos de biodiversidad, procesos ecológicos, físicos y socio-económicos para la definición de prioridades de conservación de biodiversidad en el Golfo de California;** Case. T.J, Cody.M, Ezcurra. E, 2002; **A New Island Biogeography of the Sea of Cortés.**

v) Consultations: 10 external reviewers consulted. Staff from the National Commission for Protected Areas of Mexico (CONANP); Staff from Regional Divisions of CONANP; Staff from the Regional Division of the Navy; experts from WWF, TNC working in the nominated area; local communities and representatives of the Seri Indigenous Peoples; and other national and local institutions involved in the management of the property.

vi) Field Visit: Pedro Rosabal, September / October, 2004.

vii) Date of approval of report by IUCN: April 2005

2. SUMMARY OF NATURAL VALUES

The nominated serial property comprises 244 islands, islets and coastal areas that are located in the Gulf of California in North-eastern Mexico, extending from the Colorado River Delta in the north to 270 km southeast of the tip of the Baja California Peninsula. All the component sites included in this serial nomination lie within nine protected areas declared by law. The total area of the nominated property is 1,838,012ha, of which 405,242ha are terrestrial and 1,432,770ha are marine areas, which represents 5% of the total area of the Gulf of California. The property's marine extension is smaller than that of the Great Barrier Reef in Australia and the Galapagos Marine Reserve in Ecuador, but it is the largest of all the others marine properties on the WH List. The nine protected areas clusters included in the nomination are outlined in Table 1 below.

The Gulf of California extends 1,557km from the Colorado River delta to a line between Cabo San Lucas and Cabo Corrientes on the mainland, well to the south. It averages about 175km wide overall, widening towards the south. The Baja California Peninsula parallels the mainland for about 1,130km. The Gulf and its islands are a result of the crustal movement which began to detach the peninsula from the continent 17 to 25 million years ago. As a sea it is only about 4.5 million years old. The separation is continuing, and faulting in the northernmost part of the Gulf related to tectonic movements has thrown up many plant, coral and animal fossils dating from a warmer past. It also represents a unique example in which, in a very short distance, there are simultaneously "bridge islands" (populated by land in ocean level decline during glaciations) and oceanic islands (populated by sea and air).

The geological and oceanographic processes occurring in the Gulf trapped a portion of the Temperate Eastern Pacific marine waters in its upper part, isolating it from the rest of the region's water mass. This process resulted in the formation of a gradient of habitats that go from temperate, in the Upper Gulf and Colorado River Delta in the north, to tropical, in the south, where the gulf opens up to the influence of the Eastern Pacific marine waters. This unique marine ecoregion, named the Sea of Cortez Ecoregion (Case et al, 2002), contains a variety of benthic (both deep and shallow) and pelagic environments that range from coral reefs to wetland to upwelling areas. The ecoregion sustains a wealth of ecosystems and populations of numerous species of macro algae, bony and cartilaginous fish, marine mammals, and sea birds, among other taxonomic groups.

There are some 900 islands and islets in the Gulf, 244 of which are included in this serial nomination. Most are barren, volcanic and mountainous with mainly rocky

Table 1: The nine protected areas clusters included in the nomination

Protected Area	Location	Terrestrial Area (ha)	Marine Area (ha)
Upper Gulf of California & Colorado River Delta Biosphere Reserve (Cat. VI, IUCN)	Baja California, Sonora, San Luis.	-	541,229
Islands of the Gulf of California. Flora and Fauna Reserve (Cat. VI, IUCN)	Baja California, Baja California Sur, Sinaloa	358,000	-
Isla San Pedro Mártir Biosphere Reserve (Cat. VI, IUCN)	Sonora	203	29,962
El Vizcaíno Reserve. Biosphere Reserve (Cat. VI, IUCN)	Baja California Sur	-	49,451
Bahía de Loreto. National Park (Cat. II, IUCN)	Baja California Sur	22,606	183,975
Cabo Pulmo. National Marine Park (Cat. II, IUCN)	B. California Sur, Los Cabos	-	7,111
Cabo San Lucas. Flora & Fauna Reserve (Cat. VI, IUCN)	B. California Sur, Los Cabos.	211	3,785
Islas Marías. Biosphere Reserve (Cat. VI, IUCN)	Nayarit	24,028	617,257
Isla Isabel. National Park (Cat. II, IUCN)	Nayarit	194	-
TOTAL		**405,242**	**1,432,770**

shores, and, except for a few that were in the past mined for guano, undisturbed. Many have yet to be accurately described as research in the islands is difficult due to their isolation, lack of water, and extreme climatic conditions. The islands and coastal areas included in the nomination are representative of the Sonoran desert, biologically one of the outstanding desert regions of the world. Tiburón Island, the largest in the Gulf, is almost in pristine condition as it is considered a sacred site for the Seri Indigenous Peoples.

The dominant flora in the nominated serial property is that of the Sonoran desert with its many varieties of succulents and cactus, including some of the tallest cacti in the world; over 25m high. There are 695 species of vascular plants recorded in the nominated area, 28 species or subspecies being endemic. Variations in the diversity of habitats and plants on the islands are due mainly to proximity to the coast, island size and elevation: the islands of Tiburón and Espiritu Santo have 298 and 235 species respectively, while Isla San Pedro Mártir has only 27. The harsh conditions, the isolation and variations from north to south have resulted in high speciation and endemism. These have also limited settlement by man. The Islas Marias, located in the lower Gulf coasts, which fall within the Udvardy's Sinaloan Biogeographic region, have a relict biota of continental dry tropical habitat species. The marine environment is fragile but diverse, being situated between the Pacific tropical and temperate ecoregions. The marine flora presents 626 species of macroalgae that form submarine forests that protect and feed large concentrations of invertebrate life.

The diversity of land forms, vegetation types, the isolation and difficult access to the islands and the abundance of marine life influence the importance for birds. There are 181 species of birds in 19 orders and the property hosts nesting sites for more than 90% of the world's population of Heermanns Gulls, the world's fourth largest population of blue-footed booby and 70% of the world's population of Black Storm Petrel.

The Gulf can be divided into four oceanographic zones: The Upper Gulf, the Great Islands, the Central Gulf, and the Southern Gulf. The wide mouth of the Gulf is open to the Pacific Ocean and the Islas Marías and Isla Isabel lie near its southern end. The serial nomination includes representative component sites of each of these zones, thus showing the whole spectrum of natural values and ecological processes occurring in the Gulf of California. Moreover in the relatively limited area covered by the Gulf, almost all key oceanographic processes that can be seen in the world's oceans occur, including different types of upwelling systems, including wind-driven and current driving, tidal mixing associated to tides that can reach over 10m high, and hydrothermal vents. These oceanographic processes contribute to the Gulf's immense marine productivity, considered one of the highest in the planet's oceans, and have prompted the property to be called "an ocean oasis". There are 31 species of marine mammals (75% of Mexico's and 39% of the world's total number of species), 34 species of marine cetaceans (a third of the world's total), 891 species of fish in 441 genera including 90 endemic species and over 150 rocky and sandy coastal species; 73% of the fish are tropical. Five of the 8 world's sea turtles species are present in the area. There are also 4,848 recorded macro-invertebrates.

The waters of the ***Upper Gulf and Colorado River Delta*** are shallow (50-200m) and becoming more saline (to 35.5ppm) as a result of the upstream diversions of the Colorado River, which started in 1909. But they have a

variety of intertidal wetlands and sandy and rocky coasts of coquina (cemented molluscs). The sea floor is mud and silts near the delta, sandy and rocky further south. In this area there are 18 species of marine mammal. One of most important for conservation is the so-called "vaquita", or Gulf porpoise, which is one of the world's four rarest marine mammals. There are also sea lion, 5 species of dolphin, 11 species of whales and 161 species of fish, 42 of them endemic. Marine invertebrate include 35 species of mollusc and 190 decapods.

The Flora and Fauna Reserve of the ***Islands of the Gulf*** provide nursery and breeding grounds for some 30,000 California sea lions (25% of the Mexican total population). *There are* grazing and wintering grounds for five out of the world's eight marine turtles: leatherback, hawksbill, loggerhead, black or Pacific green and olive ridley. The poisonous yellow-bellied sea snake is common. The terrestrial fauna is not abundant except for birds for which 154 species of terrestrial birds are recorded, 45 being migratory. Mammals are not diverse though 30 species are listed as nationally threatened, mainly small rodents. The antelope jack rabbit, coyote, ring-tailed cat, and mule deer are to be found on the larger islands. There are 115 species of reptiles, 48 of them (42%) being endemic and 25 being nationally endangered or in need of protection.

The small isolated ***Isla San Pedro Mártir*** Biosphere Reserve is one of the best preserved islands in the Gulf. The vegetation of Isla San Pedro Mártir is representative of the Sonoran desert with only 27 species, dominated by an open forest of cardon (*Pachycerus pringlei),* a columnar cactus that can reach up to 25m high. The surrounding waters, influenced by temperate currents in winter and spring and tropical currents in summer and autumn, are biologically very rich. There are two endemic reptiles: San Pedro Mártir lizard and the side-blotched lizard. The only native mammal is also a Gulf endemic, the fish-eating bat. All five of the Gulf's turtles swim around the island: leatherback, hawksbill, loggerhead, Pacific green and olive ridley. Ten land birds and 17 seabirds are recorded. These include the world's fourth largest population of blue-footed booby, Mexico's largest population of brown booby, and large colonies of brown pelican and red-billed tropicbird. There is a very large sea lion colony of 2,500 individuals, while aggregations of bottlenose dolphins and fin whales are frequently seen offshore.

The ***El Vizcaíno Reserve*** is a narrow coastal strip with a marine buffer zone. The coast is arid but offshore currents and surges entrain high waves and nutrient enriched waters. The dense algae and seagrass growing on the sandy and rocky seabed nurse rich invertebrate and vertebrate marine life. Over 300 species of fish are recorded, most of them common to the Central Gulf. Sea lions are abundant. Other marine mammals occurring are the elephant seal, common and long-beaked dolphins, grey, humpback and blue whales, and Baird's beaked whale.

Bahía de Loreto National Park comprises twelve barren islands set in very productive, warm and shallow seas. On the islands of Bahía de Loreto National Park 262 species of vascular plants are recorded, 120 of them in the coastal zone. The Bay has 161 species of macroalgae, red (73% cover), green and brown, sheltering plentiful phytoplankton. Carmen Island has a large mangrove forest of red, black and white mangroves and a mantle of dense macroalgal growth. There are 25 species of land mammals; 13 of them bats, and 51 terrestrial reptile species. The Bay's marine life is particularly rich. The existent dense macroalgae shelters, rich in phytoplankton and zooplankton, provide nursery conditions for larval reef fish. Here 299 species of macroinvertebrates have been recorded to date, 120 being species of the rocky reef, the most diverse environment. Six out of the seven invertebrates protected in Mexico are found in the Bay, including the giant sea cucumber, mother-of-pearl and winged oyster. The giant squid uses the area as a spawning site in summer. The Bay is characterized by a large concentration of marine mammals: 30 occur, among them the blue, fin, humpback, sperm, killer, gray, Cuvier's beaked and Bryde's whales. There are also the California sea lion, elephant seal, Risso's dolphin, spinner dolphin and striped dolphin. There are 53 species of reef fish recorded, including dorado, roosterfish, blue marlin, striped marlin, sailfish, swordfish and yellowtail kingfish. Sharks occur in large populations, among them the pelagic thresher, the bigeye thresher, silky shark and bull shark. Attracted by the variety of habitats and food, all five of the Gulf's marine turtles are found here and normally migratory species, such as the hawksbill, are often resident.

Cabo Pulmo National Marine Park has the only coral reef in the Gulf. This reef, about 20,000 years old, is one of the oldest and most important in the eastern Pacific. On shore, 5m sand dunes and alluvial sands and gravels overlie relatively recent sedimentary, Tertiary clastic and Pre-Cambrian crystalline rocks. Marine terraces and offshore basalt bars at depths between 2m and 20m form the substrate for coral communities. The Southern Gulf here is over 2,000m deep and is open for 200km to strong tidal currents and summer storms from the Pacific, which bring high waves. There are many endemic and, as yet undescribed, invertebrate species, especially in the intertidal zones. The terrestrial wildlife is typical of the Baja California desert with 2 species of mammal, the jackrabbit, mule deer; 4 species of bird and 22 species of reptiles. The marine flora and fauna is little studied except for the coral reef. Dense macroalgae provide a protective mantle for the organisms of the reef. These include 226 of the Gulf's 891 species of fish, 154 species of marine invertebrates and 25 species of corals. There is a non-breeding colony of sea lions offshore. All five of the Gulf's sea turtles occur, as do bottlenose, spinner and rough-toothed dolphins and, in winter, humpback, fin and Bryde's whales.

Nearby ***Cabo San Lucas Reserve*** protects a deep submarine canyon with spectacular submarine sand cascades, extending from 15m below sea level to 2000m below sea level at the bottom of the canyon. The ocean environment is still very intact with water transparency down to 35-40m. The subtropical North Equatorial current passes west through the area, under the tropically warm surface and above cold north Pacific water at depth. This creates an exceptional flow of plankton that conditions the presence of abundant marine life, which complements the exceptional underwater scenery.

The volcanic ***Islas Marías Biosphere Reserve*** has very varied sea currents and sea-bed conditions and the islands, having been separated from the mainland for some eight million years, preserve a relict dry tropical forest fauna. The main types of vegetation are deciduous and sub-deciduous tropical forest, subtropical matorral with low spiny forest, and mangroves. There is also coastal dune, cliff and secondary vegetation. In relation to the flora, 387 vascular plant species are recorded, including 11 endemic or restricted-range species with high priority for conservation. The fauna, distributed over four islands, includes 19 species of mammals, 24 reptiles and three amphibians. The Tres Marías raccoon and Tres Marías cottontail rabbit are endemic. Reptiles include river crocodile, green iguana, Boa constrictor and Mexican spiny-tailed iguana. There are 158 bird species, 23 of which are endemic. Marine life is highly diverse, with 21 sharks, 10 rays, and 302 species of fish reported in the area around the islands. Sea lion, humpback, Bryde's, grey and killer whales, bottlenose dolphins and spotted dolphins are also present.

The small ***Isla Isabel National Park*** is notable for its birds. It hosts 90% of the world's population of Heermanns Gulls. The dominant garlic-pear tree is a favoured roost of the magnificent frigate bird, with populations of over 11,000 individuals. The flat sedge of the grassland provides essential cover for nesting sooty terns. Other notable species are brown pelicans, the brown booby, blue-footed booby, white-tailed tropicbird, brown noddy and red-footed boobies. There are few terrestrial animals, including six reptiles, one amphibian, and one bat. The marine fauna around the islands includes 79 reef fishes, 22 shark and 10 ray species. The surrounding seas are visited by whale sharks, olive ridley, black and hawksbill turtles, humpback and killer whales, dolphins and California sea lions.

3. COMPARISON WITH OTHER AREAS

As of 2003, 15 properties inscribed on the WH List primarily for their marine values; 7 of them include island ecosystems. There are another 26 properties inscribed on the WH List which also include marine areas, 18 of which include islands. The components that form this serial nomination are within the Sonoran and Sinaloan Udvardy's Biogeographic Provinces, where no property has been inscribed in the WH List. In addition, the Gulf of California is identified in IUCN's Analysis of the WH List (*The World Heritage List: Future priorities for a credible and complete list of natural and mixed sites*, April 2004) as an area that should receive priority.

The nominated serial property represents a combination of desert islands of different origin in an enclosed and highly productive sea described by Jacques Cousteau as 'the world's aquarium'. It is one of the less disturbed ecosystems in the world, highly valuable both for conservation and to science. It has great diversity of fishes, marine mammals, birds and macro-invertebrates, and endemic flora and fauna.

The nominated serial property can be compared with the Galapagos Islands of Ecuador and Banc d'Arguin of Mauritania. The Galapagos are an isolated group of volcanic islands with high biodiversity and endemism. However, the nominated property includes a sample of much more complex marine systems, since, in this limited area, almost all oceanographic processes occurring in the world's oceans occur. The Banc d'Arguin is a desert coast with island mangroves, but few rocky islands, located in an open marine system associated to the Atlantic Ocean. On the contrary, the nominated property is located in a closed marine basin between two arid land masses which condition the formation of a gradient of habitats that go from temperate, in the north of the Gulf, to tropical in the south, where the Gulf opens up to the Eastern Pacific marine waters.

Similar enclosed seas are the Red Sea and the Arabian Gulf, where the Hawar Islands of Bahrain have been nominated. Both are enclosed between subtropical deserts and contain a variety of coasts and islands. They are, however, much less complex from the oceanographic and ecological point of view than the nominated property. The coral-based Tiran Islands of the northern Red Sea and the Dahlakh and Farasan Islands of the south are all isolated, inhabited islands yet less biologically diverse when compared to the nominated serial property.

This serial property has been nominated for inscription under the four natural criteria of the Convention. Annex 1 to this report summarises a comparative assessment of the nominated serial property with other marine and insular properties and in relation to each of the four criteria. The assessment shown in this annex indicates that:

(a) The nominated serial property has very important values in relation to criterion (i) when compared to other WH natural marine and insular properties. However, there are a number of properties already inscribed in the WH List under this criterion that offer greater coverage of the key stages of Earth evolution, such as the Australian Fossil Mammals site that is considered among the world's 10 greatest fossil sites; Ischigualasto – Talampaya Natural Parks (Argentina) that contain the most complete continental fossil record known for the Triassic Period; Miguasha Park (Canada) which is considered to be the world's most outstanding illustration of the Devonian Period known as the "Age of Fishes" and Monte San Giorgio (Switzerland) which is regarded as the best fossil record of marine life for the Triassic Period; just to mention a few. In addition, while the nominated serial property is located in an area that represents one of the most recent (4.5 Million years) and active phenomenon of land separation in the world; there are other locations that can better show this geological process, such as the Rift Valley in Africa.

(b) In relation to criterion (ii) the property also ranks high when compared to other marine and insular WH properties, being almost or at least of equal significance to the Galapagos. It represents an exceptional example in which, in a very short distance, there are simultaneously "bridge islands" (populated by land in ocean level decline during glaciations) and oceanic islands (populated by sea and air). As noted by Georges E. Lindsay "The Sea of Cortez and its Islands have been called a natural

laboratory for the investigation of speciation". Moreover, almost all major oceanographic processes occurring in the planet's oceans are present in the nominated property, giving it extraordinary importance for the study of marine and coastal processes.

(c) The nominated serial property is of striking natural beauty and provides a dramatic setting due to the rugged forms, with high cliffs and sandy beaches contrasting with the brilliant reflection from the desert and the surrounding turquoise waters. Some of the islands have red and dark orange geological formations giving the impression of having parts of the Grand Canyon transferred to the sea. All this diversity of forms and colours is complemented with a wealth of birds and marine life. One can encounter whales, sea turtles and different species of dolphins around the islands on a daily basis, making a trip to these islands a vivid experience of the nature's grandeur. The diversity and abundance of marine life associated to spectacular submarine forms and high water transparency makes the property a diver's paradise. Encounters with rays, sea lions, shark whales and large sharks are common. While Cocos Island is famous for encounters with hammerhead sharks, it is common to encounter several species of large sharks in the nominated property.

(d) The diversity of terrestrial and marine life is extraordinary and constitutes a unique ecoregion of high priority for biodiversity conservation. The number of species of vascular plants (695) present in this serial property is higher than that reported in other marine and insular properties included in the WH List. The number of species of fish (891) is also highest when compared to a number of marine and insular properties; in addition the marine endemism is also important, with 90 endemic fishes. The serial property contains 39% of the world's total number of marine mammal species and a third of the world's total number of marine cetacean species, including the "vaquita", or Gulf porpoise, which is one of the world's four rarest marine mammals. It also includes 181 species of birds with 90% of the world's population of Heermanns Gulls. In addition this serial property includes a good sample of the Sonora desert ecosystems, considered one of the richest in the world in terms of deserts biodiversity.

4. INTEGRITY

4.1. Ownership and Legal Status

From the 244 islands proposed in this serial nomination the majority are property of the Federal government and only 10 are of private ownership. One of these private islands, Isla Tiburón, belongs to the Seri indigenous Peoples, who consider it a sacred site, thus there is no habitation on the island and it is only used on a few occasions throughout the year for ceremonial activities. Most private owners do not live on the islands but on the mainland, mostly in rural settlements that have been excluded from the nomination.

All of the islands nominated are protected areas under the General Law for Ecological Balance and Environmental Protection of Mexico (1994). In accordance to article 44 of this law private owners have to comply with the conservation and management provisions declared for each protected area at the time of its declaration, as well as with the regulations included in their management plan. Thus, in practical terms all the islands under this nomination are protected and managed by the National Commission for Protected Areas (CONANP) often under co-management arrangements with local communities. All of the marine areas included in the nomination are federal property.

4.2. Boundaries

The boundaries of the islands correspond to their physical limits down to the level marked by low tides. However, not all of the islands have a marine protected area around them, which has been noted by a number of independent reviewers of the nomination as a limitation for biodiversity conservation that should be urgently addressed. In June 2001, Mexican President, Vicente Fox, launched an initiative to create marine protected areas around all the islands of the Gulf of California. The National Commission for Protected Areas has been mandated to implement this initiative and it is currently implementing a consultative process with the Ministry of Fisheries, local governments and fishermen groups. As a result it is expected that in 2005 the protected areas of Isla San Lorenzo, and Isla Marietas will be complemented by a marine protected area surrounding them. It is also expected that the marine component of the Upper Gulf of & Colorado River Delta Biosphere Reserve will be extended substantially during 2005 in order to enhance the protection of the "vaquita", or Gulf porpoise.

4.3. Management

Management of the protected areas included in this nomination is exercised by the National Commision for Protected Areas (CONANP), which is a specialized agency of the Mexican Ministry of the Environment and Natural Resources (SEMARNAT). CONANP is a decentralized agency thus direct management activities are implemented by CONANP's Division for the Northwest Region that has 11 operational units with 50 permanent staff working on the protection of these areas. During the field mission it was possible to interact with almost all staff working in the nominated property; all of them are highly professional and fully committed to implementing their duties in a very difficult region.

The annual budget dedicated to the management of the protected areas is US$ 1,092,195 from CONANP, US$ 710,400 from a number of projects funded by different donors and US$ 412,776 from a GEF project aiming to enhance the Mexican Protected Areas System. All of the operational units have at least one speed boat for patrolling the areas and other management activities. Conservation, management and ecological research is also supported by a number of NGOs working in the Gulf of California, mainly WWF, CI, TNC and PRONATURA. The in-kind contribution associated to this support is around US$ 450,000 per year. Since 1999, financial support of US$ 13,320,000 has been

obtained from the private sector, mainly through outstanding contributions from Pemex (Mexican Oil/Gas Company), Ford, Nestlé, Bimbo, and Coca-Cola. This funding is mainly supporting management operations and patrolling activities. This support is extremely valuable as the management of the islands is very expensive due to their isolation and extreme living conditions. Patrolling and management is implemented through campaigns of 2-3 weeks in each of the protected areas where staff rotate while staying in temporary field camps.

There is an Integrated Management Programme for the entire serial property (Programa de Manejo del Área de Protección de las Islas del Golfo de California) that was approved by the government of Mexico in the year 2000 which guides conservation and management activities in all of the protected areas of the Gulf. As noted above its implementation is coordinated by CONANP Division for the Northwest Region. Specific management plans have been prepared for the Upper Gulf of & Colorado River Delta Biosphere Reserve (1995), El Vizcaíno Biosphere Reserve (2000), Bahía de Loreto National Park (2000) and Isla Espíritu Santo (2000). The management plan for Isla Isabel National Park has been concluded and it is expected to be approved by the government in early 2005. The management of other islands, that still don't have specific management plans, is done through the implementation of yearly Operational Plans that are guided by the Integrated Management Programme prepared for the Gulf's protected areas. Surveillance operations and enforcement in the islands and marine areas, including control of illegal fishing and non-authorized tourism and sport fishing operations, is actively supported by the Navy that has a large number of armed speed boats throughout the Gulf.

4.4. Human use of the area

4.4.1. Human Occupation

Most of the islands are free of human presence due to their difficult access and extreme climatic conditions. Only 6 islands are inhabited, with populations of usually 35 to 50 people, mostly local fishermen. One exception is Maria Grande Island, which forms part of the Islas Marías, where a penal colony has been located since 1905, and it maintains a population of 1801 people. The government of Mexico is considering a plan to relocate this penal colony in the next 2-3 years in order to fully dedicate the site for nature conservation.

4.4.2. Fisheries

The main economic activity in the Gulf of California is fishing, both commercial and traditional, that takes place in coastal areas, as well and in the deepest parts of the Gulf. This activity is of importance both for the national economy, as well as to local people. Around 70 commercial species are exploited, mainly shrimp, gulf grouper, anchovies, sardines, dorado, squid and different species of marlin. Exploitation of fisheries resources is authorized by means of fishing permits granted by the Ministry of Agriculture, Cattle Raising and Fisheries. Those permits are controlled by local inspectors of this Ministry and by the Navy.

For the objectives of assessing this nomination two issues need to be considered: fishing associated to the protected areas and that occurring in the rest of the Gulf. In the protected areas that include marine protected zones, fishing is not allowed. In protected areas that do not yet include marine protected zones, only traditional fishing (hook-and-line), granted by the necessary permits, is allowed. Enforcement of fishing regulations around protected areas by the Navy is quite effective, particularly after the recent strengthening of the Navy forces in the Gulf with a higher number of fast speed boats acquired by the government for anti-drugs operations. While, as noted in point 4.2 above on boundaries, it would be highly desirable to have marine protected zones around all existing protected areas to enhance conservation of marine biodiversity, at this point the existing enforcement of fisheries regulations around protected areas can be considered satisfactory.

The situation is quite different in relation to the rest of the Gulf. Current fishing levels have exceeded maximum sustainable levels in most commercial fisheries and there is evidence of considerable reduction in the stocks of shrimps, marlin, sailfish and tunas. This is mainly due to overfishing, illegal fishing, and lack of compliance with regulations on sport fishing. While all experts interviewed during the mission noted the strong capacity for resilience of the Gulf of California due to its high productivity associated to the upwelling of nutrients, they also noted with concern that if overfishing continues this can negatively impact on the terrestrial and marine biodiversity of the nominated property, as most species are highly dependant on a healthy marine environment throughout the entire Gulf. This concern is well known by the government of Mexico that, in order to address this issue, is launching a programme for the Marine Ecological Planning of the Sea of Cortez. This will be coordinated by the National Institute of Ecology with the participation of the Ministry of the Environment, CONANP, the Ministry of Agriculture, Cattle Raising and Fisheries, and a number of other agencies, research centres and local and international NGOs. This plan, which should be concluded in the biennium 2005-2006, should guide further conservation efforts in the Gulf including revision of the existing fishing regulations.

4.4.3. Tourism Development

The islands and the marine environment associated to them are particularly appealing to visitors, thus tourism is becoming a particular source of revenue for the regional economy and particularly for local communities. However this is creating problems as not all of the tourist companies operating on the islands are conducting their activities in an orderly fashion. It is also difficult to control the number of visitors as many are coming with their own boats from the USA. The number of visitors is still relatively small, estimated between 1,000-3,000 visitors/ year for the overall serial property. Much higher numbers exist in the area of the city of La Paz where a number of tourist resorts exist. There is little doubt that the number of visitors is steadily increasing. In order to address this issue CONANP has recently adopted (2004) Guidelines for Tourism and Ecotourism activities in the Gulf of California that are going to be reinforced through the Regional Division of CONANP, the Navy, local governments. The guidelines are also going to be promoted to local communities operating small tourist businesses, through environmental education and capacity development activities.

4.4.4 Research

Research activities needs to be implemented on the basis on legal permits granted by CONANP. While research is allowed in protected areas and its implementation essential to guide conservation and management interventions, it has produced a number of impacts in some of the islands and the species they contain. The Regional Division of CONANP is therefore taking measures to control the development of research activities in the islands by enhancing patrolling during research activities and developing the capacity of visiting scientists on how to interact with the fragile environment existing on the islands.

4.5 Other threats

A number of reviewers and people interviewed during the field mission noted that the main threat to the future integrity of the property is associated to the development of the so-called "Nautical Stairway for the Sea of Cortez". This project has been promoted by the Federal Government, through the National Fund for the Promotion of Tourism. Its aim is to take advantage of the potential nautical tourism and its enormous potential market in western U.S.A. The objectives of this project are to promote the conservation of the Gulf's ecosystems while creating new opportunities to improve the quality of life of local communities. However the project foresees the development of a number of sport ports and marinas along the coast of the Gulf.

During the field mission all the experts and representatives of local communities interviewed were against this project and noted concern over its potential impact to the long-term integrity of the property. IUCN was informed that the original project was subject to a full revision as the costs-benefits analysis prepared did not properly consider the huge investments required to operate in a region of extreme climatic conditions. As a result, IUCN was informed, the project has been re-dimensioned in order to reduce its impacts. Additional information on this has been requested from the State Party but has not yet been provided. So far no investment has been made in the nominated property towards the development of this project.

Considering all of the information above in Section 4, IUCN considers that the nominated serial property meets the conditions of integrity as required under the Operational Guidelines of the Convention.

5. ADDITIONAL COMMENTS

5.1. Justification for Serial Approach

When IUCN evaluates a serial nomination it asks the following questions:

(a) What is the justification for the serial approach?

The Gulf of California represents a unique ecoregion where the huge biodiversity and marine productivity is the result of complex ocean-land-islands interactions supported by complex ecological and oceanographic processes. As noted in Sections 2 and 3 all of the islands are different representing a complex natural puzzle, in which each of them plays a particular ecological role. Individually each island and marine area displays different geological, geomorphological and ecological features that fit within the overall framework of the Gulf of California. It is therefore very difficult, if not impossible, to try to identify a single area that could be representative of this complex region.

(b) Are the separate components of the property functionally linked?

There is a strong functional linkage between all components proposed in this serial nomination associated to the influence of the climatic, geomorphological and complex oceanographic processes occurring in the Gulf. There are also strong biological connections among them, for example frigate birds that have been marked in Isla Isabel, at the south of the Gulf, have then been observed in other islands at the central and northern parts of the Gulf. Marine mammals that have been marked by photographic techniques are also changing locations between the islands throughout the year as the marine productivity patterns change, particularly during the autumn and winter.

(c) Is there an overall management framework for all of the components?

As noted in Section 4.3, there is an Integrated Management Programme for the entire serial property (Programa de Manejo del Área de Protección de las Islas del Golfo de California) that was approved by the government of Mexico in the year 2000 which guides conservation and management activities in all of the protected areas of the Gulf.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

This serial property has been nominated under all four natural criteria.

Criterion (i): Earth's history and geological features

As noted in Section 3, while the nominated serial property includes islands of different origins and it is of importance for geological research, it does not rank highly when compared to other properties already inscribed in the WH List under this criterion. IUCN considers that the nominated serial property does not meet this criterion.

Criterion (ii): Ecological processes

The property ranks higher than other marine and insular WH properties as it represents a unique example in which, in a very short distance, there are simultaneously "bridge islands" (populated by land in ocean level decline during glaciations) and oceanic islands (populated by sea and air). As noted by Georges E. Lindsay "The Sea of Cortez and its Islands have been called a natural laboratory for the investigation of speciation". Moreover, almost all major oceanographic processes occurring in the planet's oceans are present in the nominated property, giving it extraordinary importance for the study

of marine and coastal processes. These processes are indeed supporting the high marine productivity and biodiversity richness that characterize the Gulf of California. IUCN considers that the nominated serial property meets this criterion.

Criterion (iii): Superlative natural phenomena or beauty and aesthetic importance

The nominated serial property is of striking natural beauty and provides a dramatic setting due to the rugged forms of the islands, with high cliffs and sandy beaches contrasting with the brilliant reflection from the desert and the surrounding turquoise waters. The diversity of forms and colours is complemented by a wealth of birds and marine life. The diversity and abundance of marine life associated to spectacular submarine forms and high water transparency makes the property a diver's paradise. IUCN considers that the nominated serial property meets this criterion.

Criterion (iv): Biodiversity and threatened species

The diversity of terrestrial and marine life in the nominated serial property is extraordinary and constitutes a unique ecoregion of high priority for biodiversity conservation. The number of species of vascular plants (695) present in this serial property is higher than that reported in other marine and insular properties included in the WH List. The number of species of fish (891) is also highest when compared to a number of marine and insular properties. In addition the marine endemism is important, with 90 endemic fishes. The serial property contains 39% of the world's total number of marine mammal's species and a third of the world's total number of marine cetacean's species. In addition the serial property includes a good sample of the Sonora desert ecosystems, considered one of the richest deserts in the world from the biodiversity point of view. IUCN considers that the nominated serial property meets this criterion.

The nominated serial property, as discussed in Section 4, meets the conditions of integrity as required under the Operational Guidelines of the Convention.

7. DRAFT DECISION

IUCN recommends that the World Heritage Committee adopt the following draft decision:

The World Heritage Committee,

1. *Having examined Document* ***WHC-05/29.COM/8B****,*

2. *Inscribes the Islands and Protected Areas of the Gulf of California on the World Heritage List on the basis of natural criteria (ii), (iii) and (iv).*

   Criterion (ii): *The property ranks higher than other marine and insular WH properties as it represents a unique example in which, in a very short distance, there are simultaneously "bridge islands" (populated by land in ocean level decline during glaciations) and oceanic islands (populated by sea and air). As noted by Georges E. Lindsay "The Sea of Cortez and its Islands have been called a natural laboratory for the investigation of speciation". Moreover, almost all major oceanographic processes occurring in the planet's oceans are present in the property, giving it extraordinary importance for the study of marine and coastal processes. These processes are indeed supporting the high marine productivity and biodiversity richness that characterize the Gulf of California.*

   Criterion (iii): *The serial property is of striking natural beauty and provides a dramatic setting due to the rugged forms of the islands, with high cliffs and sandy beaches contrasting with the brilliant reflection from the desert and the surrounding turquoise waters. The diversity of forms and colours is complemented by a wealth of birds and marine life. The diversity and abundance of marine life associated to spectacular submarine forms and high water transparency makes the property a diver's paradise.*

   Criterion (iv): *The diversity of terrestrial and marine life in the serial property is extraordinary and constitutes a unique ecoregion of high priority for biodiversity conservation. The number of species of vascular plants (695) present in this serial property is higher than that reported in other marine and insular properties included in the WH List. The number of species of fish (891) is also highest when compared to a number of marine and insular properties. In addition the marine endemism is important, with 90 endemic fishes. The serial property contains 39% of the world's total number of marine mammal's species and a third of the world's total number of marine cetacean's species. In addition the serial property includes a good sample of the Sonora desert ecosystems, considered one of the richest deserts in the world from the biodiversity point of view.*

3. *Commends the State Party for its efforts in conserving this complex property, as well as to all other institutions, NGOs and the private sector that are contributing to its conservation.*

4. *Recommends the State Party to:*

   (i) continue working towards creating marine reserves around all of the islands included in this serial property and, subsequently, to propose these areas as an extension of the WH property;

   (ii) keep the Committee informed on the revised plan proposed to develop the "Nautical Stairway for the Sea of Cortez" and to ensure that the revision of this project place due considerations on the international responsibility of the State Party in ensuring the long-term integrity of the property;

   (iii) keep the Committee informed on progress achieved towards the development and implementation of the Marine Ecological Planning of the Sea of Cortez.

Annex 1: Descriptive Comparative Analysis of serial nomination "Islands and Protected Areas of the Gulf of California" (Mexico)

WH property	(i) - Earth's History and geological features	(ii) - Ecological Processes	(iii) - Superlative Natural Phenomena/ Exceptional Natural Beauty	(iv) - Biodiversity and Threatened Species
Shark Bay, Australia	Contains the most diverse and abundant examples of stromatolitic microbialities in the world.	The Hamelin Pool stromatolites are considered the world's classic site for the study of these living fossils.	It contains the largest seabed in the world and a number of coastal features of exceptional beauty.	Contains 5 out of the 26 globally threatened mammal species of Australia. There are 323sp of fishes, 230 birds, 100 reptiles, 620sp of plants and 80sp of corals.
Heard and MacDonald Islands, Australia	Limestone and volcanic accumulations located in the Kerguelen plateau which raises 3,700m above the deep sea floor. The only active volcano in Australia.	Exceptional combination of processes occurring between glaciated, marine and volcanic systems.	Huge populations of penguins in a spectacular setting of glaciers and active volcano.	Important breeding location for Antarctic fur seal. 7sp of mammals, 16% of the world's population of macarroni penguin. 15sp of fishes.
Belize Barrier Reef System, Belize	Submarine shelf is the drowned expression of a low-relief karst surface with sinkholes and fault blocks that have created submarine escarpments.	Interaction between coastal areas including mangroves, coral reefs and seagrass beds systems.	World's second largest barrier reef system and one of the few sites where a major barrier reef meets the coast.	500sp of fish, 65sp of corals, and 178sp of vascular plants in the islands and islets.
Brazilian Atlantic Islands, Brazil	Peaks of submarine volcanic system raising from the ocean floor some 4000m deep. Origin between 1.8 - 12.3 million years.	Complex insular and marine ecological systems.	Complex coastline with high cliffs and 16 sandy beaches. Isolated and pristine atoll with large lagoon.	Relict of Insular Atlantic Rainforest. 95sp of fishes, 15sp of corals, 2 reptiles and 400 vascular plants.
Cocos Island National Park, Costa Rica	Islands of volcanic origin with rugged relief. Underwater landscape consist of stepwise shelve and a shallow submerged fringing reef.	Only island in the tropical eastern Pacific that supports a humid tropical forest. Important larval dispersal centre in the Pacific.	Impressive landscape of step cliffs covered by forest in a marine setting.	Critical habitat as a nursery for marine life. 300sp of fishes, 87sp of birds, 32sp of corals, 3sp of turtles, 235 sp of vascular plants.
Galapagos Islands, Ecuador	Origin associated with the meeting of 3 major tectonic plates. Combination of younger volcanic areas in the west with older areas in the east. On-going volcanic processes.	Influenced by the convergence of 3 major eastern Pacific marine currents. On-going ecological and biological processes that conditioned speciation and endemism.	One of the top dive sites in the world. Underwater wildlife spectacle with diversity of underwater geomorphologic forms.	Melting pot of species forming a distinct biotic province. 447sp of fishes, 57sp of birds, 10 marine mammals, 625sp of vascular plants.
Komodo National Park, Indonesia	Regional volcanism within Pleistocene and Holocene deposits, with conglomerates and raised coral formations forming a rugged topographic.	Fringing and extensive coral reefs and sea grass beds systems of high marine productivity.	Park's landscape is regarded as among the most dramatic in Indonesia with rugged hillsides, dry savanna and pockets of vegetation contrasting with white sandy beaches.	Only place in the world with a population of around 5,700 Komodo dragon. 72sp of birds, 13 mammals, 102sp of vascular plants.

WH property	(i) - Earth's History and geological features	(ii) - Ecological Processes	(iii) - Superlative Natural Phenomena/ Exceptional Natural Beauty	(iv) - Biodiversity and Threatened Species
Ujung Kulon National Park, Indonesia.	Geologically part of a young Tertiary mountain system overlaying pre-Tertiary strata. Central and Eastern Ujung Kulon comprise raised Miocene limestone formations. Extensive local modifications following 1883 Krakatau eruption.	Complex association of primary lowland rainforest with sand dunes formations and fringing reefs.	High scenic attraction associated to its forests, coastline and islands in a natural setting. Contains the most extensive remaining stand of lowland rainforest in Java.	Several sp of threatened plant and animal species are present, notably the Javan rhinoceros. 2 endemic sp of primates, 259sp of birds and 57sp of vascular plants.
Banc d'Arguin National Park, Mauritania.	Island and coastline largely composed of windblown sand from the Sahara desert with large expanse of mudflats.	Important coastal processes associated to the large mangrove swamp that is a relict of a vast estuary. It provides and important breeding and nursery area for fishes.	Its scenery is mainly associated to the largest association of wintering waders in the world.	Largest colonies of water birds in West Africa and worldwide with between 25,000 - 40,000 pairs belonging 15sp of birds.
Tubbataha Reef Marine Park, Philippines.	Classic atoll reef with an altitude of 2m to 100m deep with associated lagoon of 24m deep.	Unique role in larvae dissemination and fish's recruitment within the whole Sulu Sea system.	Represents a unique example of pristine atoll reef with high diversity of marine life in extensive reef flat that alternate with a 100m perpendicular submarine wall.	Important centre of larvae dispersion in the Sulu Sea with 379sp of fishes, 46sp of birds and 46sp of coral.
East Rennell, Solomon Islands	Group of islands of volcanic origin formed along a spreading mid-ocean ridge in the late Cretaceous and early Eocene. Its structure indicates a phase of active uplifting following a long history of subsidence.	Ecological marine and coastal processes associated to the on-going atoll development.	It is the world largest raised coral atoll. Lake Tegano, in the central basin of Rennell Island, is the largest body of enclosed water in the insular Pacific.	Constitutes a major transition point in the sequence of decreasing floral diversity eastward into the tropical Pacific. 43sp of birds, 14 reptiles and 650 vascular plants are reported.
Islands and PAs of the Gulf of California, Mexico.	The sites are located in an area that is one of the most recent (4.5 Million years) and active land separation in the world. The Gulf is a new ocean in the first stages of formation, thus important for geological research. There are three types of islands: of sedimentary origin, volcanic and those originated by uplifting processes.	It represents a unique example in which in very short distance there are simultaneously "bridge islands" (populated by land in ocean level decline during glaciations) and oceanic islands (populated by sea and air). Almost all major oceanographic processes occurring in the planet's ocean occurs and can be studied in this area.	It is one of the world's remaining wildernesses with most islands and marine areas in pristine conditions. The islands provide a dramatic setting due to their rugged forms with high cliffs and sandy beaches surrounded by turquoise waters. The diversity and abundance of marine life associated to spectacular submarine forms and high water transparency makes the site a diver's paradise.	The site is considered and "ocean oasis" and the "world's aquarium" for its diversity and abundance of marine life, with 891sp of fishes, 34 cetaceans, 5sp of marine turtles and 25 sp of corals. It is also important worldwide for its marine endemism, with 90sp of endemic fishes. It includes 181sp of birds with 90% of the world's population of Heermanns Gulls.

Map 1: General Location of nominated property