

LATIN AMERICA / CARIBBEAN

ISLANDS & PROTECTED AREAS  
OF THE GULF OF CALIFORNIA

MEXICO



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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

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

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#### 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 Science, 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 460,788ha are terrestrial and 1,377,224ha 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 & Colorado River Delta Biosphere Reserve (Cat. VI, IUCN)	Baja California, Sonora, San Luis.	86,638	454,591
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	1,111	29,054
El Vizcaíno Reserve. Biosphere Reserve (Cat. VI, IUCN)	Baja California Sur	-	49,451
Bahía de Loreto. National Park (Cat. II, IUCN)	Baja California Sur	-	206,581
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.	-	3,996
Islas Mariás. Biosphere Reserve (Cat. VI, IUCN)	Nayarit	14,845	626,440
Isla Isabel. National Park (Cat. II, IUCN)	Nayarit	194	-
<b>TOTAL</b>		<b>460,788</b>	<b>1,377,224</b>

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 Mariás 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 overlies 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 Mariás 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 Mariás raccoon and Tres Mariás 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 Sinaloa 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 Commission 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 need 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
<b>Shark Bay, Australia</b>	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.
<b>Heard and MacDonal Islands, Australia</b>	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 macaroni penguin. 15sp of fishes.
<b>Belize Barrier Reef System, Belize</b>	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.
<b>Brazilian Atlantic Islands, Brazil</b>	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.
<b>Cocos Island National Park, Costa Rica</b>	Islands of volcanic origin with rugged relief. Underwater landscape consist of stepwise shelves 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.
<b>Galapagos Islands, Ecuador</b>	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.
<b>Komodo National Park, Indonesia</b>	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
<b>Ujung Kulon National Park, Indonesia.</b>	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.
<b>Banc d'Arguin National Park, Mauritania.</b>	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.
<b>Tubbataha Reef Marine Park, Philippines.</b>	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.
<b>East Rennell, Solomon Islands</b>	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.
<b>Islands and PAs of the Gulf of California, Mexico.</b>	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



Map 2: Boundaries of nominated property



- Nominated Islands of the Gulf of California
- Core zones
- Buffer zones
- Marine Protected Areas in the process of being established

LATIN AMERICA / CARIBBEAN

ISLANDS & PROTECTED AREAS  
OF THE GULF OF CALIFORNIA

MEXICO



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## WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

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

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#### 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 Science, 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 Mariás. Biosphere Reserve (Cat. VI, IUCN)	Nayarit	24,028	617,257
Isla Isabel. National Park (Cat. II, IUCN)	Nayarit	194	-
<b>TOTAL</b>		<b>405,242</b>	<b>1,432,770</b>

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 Mariás 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 overlies 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 Mariás 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 Mariás raccoon and Tres Mariás 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 Sinaloa 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 Commission 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 Mariás, 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 need 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
<b>Shark Bay, Australia</b>	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.
<b>Heard and MacDonal Islands, Australia</b>	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 macaroni penguin. 15sp of fishes.
<b>Belize Barrier Reef System, Belize</b>	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.
<b>Brazilian Atlantic Islands, Brazil</b>	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.
<b>Cocos Island National Park, Costa Rica</b>	Islands of volcanic origin with rugged relief. Underwater landscape consist of stepwise shelves 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.
<b>Galapagos Islands, Ecuador</b>	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.
<b>Komodo National Park, Indonesia</b>	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
<b>Ujung Kulon National Park, Indonesia.</b>	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.
<b>Banc d'Arguin National Park, Mauritania.</b>	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.
<b>Tubbataha Reef Marine Park, Philippines.</b>	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.
<b>East Rennell, Solomon Islands</b>	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.
<b>Islands and PAs of the Gulf of California, Mexico.</b>	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

