ASIA / PACIFIC

ROCK ISLANDS SOUTHERN LAGOON

PALAU

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

ROCK ISLANDS SOUTHERN LAGOON (Palau) – ID No. 1386

IUCN RECOMMENDATION TO WORLD HERITAGE COMMITTEE: To inscribe the property under natural criteria

Key paragraphs of Operational Guidelines:
77 Property meets natural criteria
78 Property meets conditions of integrity and protection and management requirements
114 Property meets management requirements for serial properties

1. DOCUMENTATION

a) Date nomination received by IUCN: 11 March 2011

b) Additional information officially requested from and provided by the State Party: Following the technical evaluation mission the State Party was requested to provide supplementary information on 16 November 2011. The information was received on 28 November 2011, 2 December 2011, and 28 February 2012.

c) Additional Literature Consulted (non-exhaustive): Colin P. (2009) **Marine Environments of Palau.** Coral Reef Research Foundation, Palau and Indo-Pacific Press, San Diego 2009 (and references therein); Hillary A, Kokkonen M and Max L. (2002); **World Heritage Papers 4: Proceedings of the World Heritage Marine Biodiversity Workshop;** UNESCO (2005) **Operational Guidelines for the Implementation of the World Heritage Convention**. UNESCO Paris; UNESCO (2011) **World Heritage List.** http://whc.unesco.org/en/list; UNESCO WHC (2003) **World Heritage Reports 12: The State of World Heritage in the Asia-Pacific Region.** UNESCO World Heritage Centre 2003 124pp; **IUCN Red List of Threatened Species 20011.** IUCN Species Programme and IUCN Species Survival Commission http://www.iucnredlist.org/

d) Consultations: Five external reviewers consulted. The mission also met with numerous individuals representing national and state legislative bodies and government institutions, line agencies, the house of traditional leaders, research institutes, non-governmental organizations, private companies and a broad range of resource users.

e) Field Visit: Jerker Tamelander and Kohei Hibino, 9-18 September 2011.

f) Date of IUCN approval of this report: April 2012

2. SUMMARY OF NATURAL VALUES

The Rock Islands Southern Lagoon (RISL) is located within Koror State, one of the 16 states of the Republic of Palau. Palau is a Pacific Island nation with the centre of its island chain located approximately 850km north of West Papua in Indonesia, 900km east of the island of Mindanao in the southern Philippines, and 3,200km south of Tokyo, Japan. Palau forms the southwestern-most island group of the Caroline Islands of Micronesia. RISL is a predominantly marine site and includes 445 uninhabited limestone islands – commonly called “Rock Islands” from their distinctive features – surrounded by a lagoon with fringing reefs, patch reefs, and shallow water marine areas, which totals 100,200ha in area. The core zone is further surrounded by a buffer zone which totals 164,000ha and entirely consists of pelagic environment up to 12 nautical miles seaward within the jurisdiction of Koror State.

Located near the equator, Palau has a maritime tropical climate characterized by little seasonal or diurnal variation, high temperature and high humidity. Although outside of the main typhoon path, damaging storms occur occasionally and the mean annual precipitation is 3,800 mm. The islands of Palau are located on the pass way of the westward-flowing North Equatorial Current where it turns northward to feed the Kuroshio Current.

The islands of Palau are oceanic and have never been connected to continents or larger islands. The archipelago as a whole is volcanic in origin, formed during the Miocene era, with the carbonate fossil islands within RISL made up of coral reefs uplifted due to volcanic forces and eroded over millions of years. This island formation process has created a geologically complex island system with diverse island and marine habitats within RISL.

RISL is surrounded by an open ocean pelagic system and enclosed by a barrier and fringing reef system that is particularly well developed and continuous on the west side. The outer barrier reef drops off steeply creating reefal and other benthic habitat form the surface and into the aphotic zone. The fore-reefs, reef channels and passes attract an abundance of pelagic fish. The reef system contains approximately 683 patch reefs and 11.6km of fringing reefs. Within the lagoon, there are about 445 karstic islands that range from 10-100m above mean sea level, many of them displaying unique mushroom-like shapes. Islands have limited soil but the

porous and rugged karstic substrate combined with relatively abundant rainfall creates lush vegetation. The islands form complex geographical features and create diverse habitats including inner basins, coves, marine lakes, caves, arches, tunnels, forests, wetlands, sandy beaches, fringing reefs, mangroves, seagrass and algal beds. The occurrence of such diverse habitats in a relatively small geographical area is characteristic of RISL, and supports high biomass, biodiversity and species endemism.

The RISL contains 42% of Palau's 130 endemic plants and 23% of these plants are restricted to the Rock Islands. 53 of Palau's 151 bird species including all of Palau's 9 endemic bird species have been observed in the RISL. RISL is also home to diverse marine fauna and flora. Recent estimates indicate at least 385 species of hermatypic corals are found in RISL. Of the more than 1,350 species of fish recorded in Palau, at least 746 species occur in RISL, including at least 13 of 17 reported species of shark. RISL also provides important feeding grounds and refuge to Palau's dugong population, considered to be the most isolated population in the world. There are no accurate estimation of dugong population in Palau but 35-40 individuals were photographed from the helicopter at one time during a 2010 survey at Ngederrak reef, and dugongs, including calves, are frequently seen feeding and resting in certain locations within RISL.

Among the most distinctive features of RISL are the 52 marine lakes. Marine lakes are isolated bodies of seawater separated from the ocean by a surrounding land barrier. They retain some connectivity to the ocean through fissures, cracks and tunnels within the porous pit and pinnacle topography. Geological formation stage, surrounding environment, and extent of connectivity to the ocean create unique habitats and species assemblages in each lake. Long-term isolation has resulted in high endemism of populations in particularly isolated lakes. Relatively well-studied golden jellyfish found in at least five different marine lakes are genetically, morphologically and behaviourally distinct subspecies.

3. COMPARISONS WITH OTHER AREAS

RISL has been nominated under natural criteria (vii), (ix) and (x). The nomination document provides a comparative analysis that emphasizes marine lakes particularly in the context of criterion (ix).

RISL belongs to Udvardy's Micronesian province. At present there is only one natural/mixed World Heritage site (Ogasawara Islands) and three natural/mixed Tentative List sites in this province. However, the terrestrial ecosystems of the subtropical, volcanic Ogasawara Islands differ considerably from those of the tropical, raised limestone islands of RISL. The Imeong Conservation Area Tentative List site is a predominantly terrestrial site in Palau, while other two Tentative List sites (Mili Atoll Nature Conservancy (and Nadrikdrik) and Northern Marshall Islands Atolls) are marine atoll environments not comparable with the raised limestone islands, barrier and fringing reefs and marine lakes of RISL. RISL represents a terrestrial ecoregion (Tropical and Subtropical Moist Broadleaf Forest biome) and marine ecoregion (Tropical Northwestern Pacific) that are not yet represented on the World Heritage List. Palau marks the westernmost margin of the Polynesia-Micronesia terrestrial biodiversity hotspot and is identified as a marine biodiversity hotspot by Tittensor et al. (2010).

The Pacific Island region has been identified as an underrepresented region on the World Heritage List, with tropical, coastal and marine island systems and cultural landscapes considered the most under-represented categories in the Asia-Pacific Region (Hillary et al 2002). Recent World Heritage inscriptions have gone some way towards addressing this. However, RISL is distinct from existing sites on the World Heritage List. Of sites with tropical or subtropical marine components, Belize Barrier Reef (Belize), Coiba National Park and Special Zone of Marine Protection (Panama), the Great Barrier Reef (Australia), iSimangaliso Wetland Park (South Africa), Islands and Protected Areas of the Gulf of California (Mexico), Ningaloo Coast (Australia), and Sian Ka'an (Mexico) are located on continental margins. Aldabra (Seychelles), Fernando de Noronha and Atol das Rocas Reserves (Brazil) are located in different ocean basins. Eastern Pacific sites of Cocos Island (Costa Rica), Galapagos (Equador), and Malpelo (Colombia) as well as Papahanaumokuakea Marine National Monument (USA) have notably different hydrographic conditions, geological formations, habitats and species assemblages. Komodo (Indonesia) is a volcanic island without raised limestone whereas Tubbataha Reef (Philippines) is an atoll, and Phoenix Islands Protected Area (Kiribati) is a coral atoll archipelago. East Rennell (Solomon Islands), like Aldabra, is a raised atoll. Ogasawara Islands (Japan) are subtropical while Lagoons of New Caledonia (France) is predominantly a marine site and does not include forest.

Several coral reef sites are already inscribed on the World Heritage list under criterion (vii), and similar mushroom-shaped islands can be seen in Raja Ampat (on the Tentative List of Indonesia). While challenging to compare objectively, the diverse and complex marine and terrestrial habitats of RISL and in particular the maze created by the Rock Islands' iconic mushroom shapes does offer 'exceptional natural beauty and aesthetic importance', it attracts large numbers of tourists and the islands hold significant recreational and cultural value to Palauans.

One measurable aspect of 'superlative natural phenomena' in RISL is the occurrence of marine lakes in high number and density. According to Dawson et al. (2009), about 200 marine lakes are known worldwide, with a large number (i.e. 10 or more) occurring in four locations: Palau, Papua, Vietnam and Bahamas. The 52

marine lakes in RISL slightly exceeds the 47 in the Ha Long Bay World Heritage site and 40 or so occurring in Raja Ampat, while no numbers are available for the Bahamas (currently no Tentative List site). Marine lakes occur at a significantly higher density at RISL (85,900 ha, subject to boundary adjustment), than at Ha Long Bay (150,000ha) and Raja Ampat (5,000,000ha) making it of global significance.

In terms of criterion (ix), RISL is nominated as an outstanding example of the significant ongoing ecological and biological process in the evolution of marine ecosystems and communities of plants and animals, with particular attention to the marine lakes. The physical feature of marine lakes as seawater bodies entirely surrounded by land exhibits biogeographic, ecological, and evolutionary characteristics of "islands" surrounded by ocean. Species endemism within lakes and the 'replication' provided by the large number of lakes at different stages of development provides natural laboratories to test evolutionary hypotheses and for studying patterns and processes in the ecology and evolution of marine species and communities. Marine lakes are presently not explicitly represented on the World Heritage List (Ha Long Bay was not inscribed under criterion (ix)). Surveys of marine lakes in Ha Long Bay and Raja Ampat have revealed lower physical diversity than in Palau, with only one lake in each area found to have golden jellyfish. In contrast, five new subspecies of golden jellyfish have been described from different marine lakes in RISL and there remains potential of more discoveries as only few marine lakes have been studied comprehensively to date. The marine lakes of RISL have also yielded important insights into the evolution of marine taxa as evidenced by a number of peer-reviewed publications. The importance of marine lakes and its outstanding diversity in RISL is clearly of global significance.

In terms of criterion (x), surveys of 14 marine lakes have documented 311 marine invertebrate species of which 131 (43%) were previously unknown species that are likely new to science. There is evidence of high endemism in marine lakes due to isolation over geological time scale. The number of lakes yet to be comprehensively surveyed suggests high probability of further species discoveries.

All of Palau's known endemic birds, mammals, and herpetofauna as well as 40% of Palau's endemic plants can be found in the RISL, underlining the biodiversity importance of RISL. Palau's fish fauna represents about 32% of the total coral reef fish fauna in the west Indo-central Pacific region, and the second highest species density of all the "megadiversity countries" in the region.

Comparison of number of species in major taxonomic groups among existing World Heritage sites in the Pacific indicates that RISL has higher coral and fish diversity than a number of existing sites. Of the 18 confirmed Key Biodiversity Areas (KBA) including Important Bird Areas (IBA) and Alliance for Zero Extinction sites within the marine province 'Tropical Northwestern Pacific', eight fall in Palau and in RISL.

Overall the biodiversity of RISL is clearly of significance at least on regional level. However, the marine lakes represent the highest density and probably the most biologically diverse natural habitat of its kind in the world, indicating its outstanding universal value for science as well as conservation. Biodiversity science and conservation value of RISL is further illustrated by the recent discovery of a 'fossil eel' of a new taxonomic family in a cave on the outer reef. This finding illustrates the high potential of more new species discoveries within RISL and emphasizes the need for protecting its complex habitats.

4. INTEGRITY, PROTECTION AND MANAGEMENT

4.1. Protection

Palau is a signatory of the major relevant international conventions with the exception of the Ballast Water Convention. Palau has been actively promoting conservation at the regional level, particularly in the establishment and promotion of the Micronesia Challenge initiative, which aims to effectively conserve at least 30% of near-shore marine and 20% of terrestrial resources by 2020. Palau also recently declared its Exclusive Economic Zone (EEZ) a shark sanctuary by banning all commercial shark fishing.

At the national level, the Protected Area Network (PAN) Act was passed in 2003 as a comprehensive framework to support state and community level actions for natural resources conservation and sustainable development. Under the Palauan governance system, States have sovereignty and a stronger environmental management mandate than the national government. States are responsible for management of resources within their jurisdiction and development and implementation of protected area and zoning categories. The nominated property falls fully within Koror state, where protected area management is under the jurisdiction of one single authority, the Koror State Department of Conservation and Law Enforcement (KSDCLE). This enables consistent and effective protected area governance.

The customary governance system in Palau remains strong and considerable value and importance is attached to RISL. Most of the land in the nominated property is traditionally owned by the Chiefs of Koror State, and no islands in the property have been awarded to any individuals, lineage or clan. Resources of the sea and the reef are governed by the Koror State constitution, with the State owning all the living and non-living marine resources from the land to twelve nautical miles seaward. The traditional ownership system is effectively prohibiting development for private interests within the nominated property. The traditional Palauan management system called *bul*, whereby the chief of a clan can ban the extraction of certain species at certain

areas and times, has enabled easier introduction of modern conservation strategies into traditional resource management techniques. The Ngerukewid Islands Wildlife Preserve (also known as the 'Seventy Islands'), Palau's first conservation area, was originally a *bul* but came to be designated under the state and national law and regulation.

Traditional leaders are influential and respected within Koror State policy. Use and management of the property has historically been the role of traditional leaders, whose role is recognized by the state governing authority and the community. The Rock Islands Executive Committee undertakes regular consultation with traditional leaders regarding management planning. The House of Traditional Leaders is supportive of the RISL World Heritage nomination, having been elemental in initiating it, while seeking to assert its position in decisions influencing the property. This adds complexity to management and decision-making and requires multi layer consultations. However, it has to date successfully served to regulate and restrict development activities within the nominated property. It should be emphasized that conservation of the nominated property is not solely or even primarily about enhancing protection and management of biodiversity and aesthetic values, but also critical to valuing and conserving the traditional governance system and strengthening the synergies between it and statutory law.

In additional to the national environmental legislative framework, over 20 State regulations directly apply to the nominated property, governing resource use, boating and protected areas. RISL has been designated a 'Conservation Zone' under Koror State Public Law, and permanent construction or development in the Rock Islands other than tourist-related facilities is prohibited. The nominated property is governed by the Rock Islands Southern Lagoon Area Management Plan, presently undergoing review, based on which a new 5-year plan will be developed. There are six legally designated zoning areas, managed and enforced under the Koror State regulations.

There are several basic restrictions applied to all the zoning areas, including: prohibition of any new mining and dredging activities, no entry of foreign commercial fishing vessels, harvesting restrictions designated in National and State Laws, no damage allowed to any portion of the coral reef ecosystem, etc. The most strict protected area category is the Preservation Zones, prohibiting all kinds of harvesting and access to the area. The Conservation Zones prohibits all kinds of harvesting but they are open for local recreational use and tourism. These regulations control construction and destructive use in the nominated area and are consistent in their objectives to protect the key value of the nominated property.

In response to comments provided during the evaluation of the nomination, the State Party declared a special management zone of approximately ninety-six square kilometres (96km^2) in the area south of the excluded urban area and surrounding the Ngederrak protected area. The special management zone encompasses sea grass beds, patches of coral reef and sandy bottom that provide important resting and feeding areas for dugong. The zone was introduced recognizing that the area is affected by a number of activities including sand mining, some aquaculture, the dolphin facility, outfall of effluent from the sewage treatment plant, as well as relatively intense ship and boat traffic. Koror State authority will ensure that these activities will be monitored and managed in coordination with relevant regulatory agencies. Strict controls and no expansion limits will be proposed objectives for activities in the area as part of the management review process.

The field evaluation team was also told of illegal and unauthorized coral harvest for lime production at the Ngerechong Island, inhabited by two families that claim it, and at Ngereklim Island. The lime produced is for chewing areca nut (a very common practice in Palau) rather than construction, and as such production is rather more modest in scale but reliant on coral harvest from the sea. This is against the law and currently pending court decision. Koror State is anticipating that in the next three years, coral harvesting for lime production in the vicinity of Ngerechong and Ngereklim would cease with harvesting shifting to the northern island state.

IUCN considers the protection status of the nominated property meets the requirements set out in the Operational Guidelines.

4.2 Boundaries

The initial nomination dossier described and justified the boundary of the property adjacent to the urban area in the north as well as the boundary to the south adjoining Peleliu State. Boundaries on the eastern and western side of the lagoon as identified in the nomination dossier did not have clear rationale in terms of habitat, species or features they enclose within the property, and there were little explanation offered with regards to how the boundary had been defined. Neither nomination dossier text nor maps described the marine environment outside the lagoon in any great detail, and consequently did not consider sufficiently the connectivity and possible inter-dependence of lagoonal, barrier reef and pelagic near-shore environments. There was also limited rationale for exclusion of lagoonal area to the north of the nominated property (northwest of the Excluded Urban Area).

Consultation with management authorities and stakeholders during the evaluation mission confirmed that boundaries had been defined in a somewhat arbitrary fashion. While traditional management systems as well as state jurisdiction are widely understood and supported, identifying new boundaries specific to the World Heritage nominated portion of RISL was seen as challenging by many stakeholders.

As a result of consultation during the evaluation, the State Party decided to include in the property areas within the lagoon and under the jurisdiction of Koror State to the northwest of the excluded urban area and marine and land at Ngerechong. The boundaries on the eastern and western side of the lagoon were initially based on the contours of the reef but they were redefined to follow the 100-meter depth isobath which is also used by the Micronesia Challenge.

No buffer zone was defined for the property in the initial nomination dossier. While a buffer zone would seem most warranted to the north of the nominated property where it adjoins the Excluded Urban Area, this has been forfeited in order to include several important features in the property itself, including marine lakes, islands and reefs of Nikko Bay. This is defensible and indeed prudent. Activities on and around the islands are subject to appropriate regulations and management attention, which can be further strengthened as recommended in this report.

Absence of a buffer zone to the west and east of the lagoon was justified by identifying the open ocean to be conserved *de facto* through state and national legislation. This explanation lacked clearer rationale for how the property conserves and protects species whose range or habitat extends across the barrier reef and to deeper water. Following discussion during the evaluation, the State Party defined as a buffer zone all Koror State territorial waters, from the redefined property boundaries out to 12 nautical miles to the east and west of the barrier reef. This buffer zone is in its entirety under the jurisdiction of Koror State. However, national restrictions with respect to fishing and other relevant activities also apply. The National Government is mandated to conduct surveillance and monitoring for highly migratory fish and oversee maritime navigation aids within the proposed buffer zone. The designation of this buffer zone was also decided as a precautionary measure in the absence of detailed research on the habitat and species at the deeper slopes and pelagic waters.

IUCN considers that the boundaries of the nominated property meet the requirements set out in the Operational Guidelines.

4.3 Management

The 'Rock Islands Southern Lagoon Management Plan 2004-2008' was developed and adopted in 2005 by the Koror State Legislature and Governor. The development of the management plan was a state-driven initiative responding to a national recommendation that each State to develop and implement management plans. The Management Plan was created through a two-year process that engaged wide range of stakeholders at different levels. The plan, the first of its kind in Koror State, aims to provide comprehensive and coordinated management of the Rock Islands Southern Lagoon, guiding day-to-day management and coordination by the KSDCLE and other stakeholders. It covers all areas under Koror State jurisdiction, including the entire nominated property, except the urban area around Koror Island.

The Management Plan is intended to be a working document for an on-going cycle of design, implementation and review. It is currently under review, with a new Management Plan due to be in effect from 2011 through 2015. A Management Plan Taskforce Review Team with broad representation and good generation and gender balance oversees the review process. A Technical Committee consisting of the Bureau of Marine Resource and three NGOs provides review and recommendations to the Taskforce Review Team.

Traditional leaders are represented on the RISL Management Plan Taskforce Review Team, and the House of Traditional Leaders has been consulted during the nomination process. More frequent or, if appropriate, formalization of consultation with the House of Traditional Leaders and development of modalities for its participation in management could be considered. While the House of Traditional Leaders provides one mechanism for representation of traditional values in management of the property, it may also be valuable to consider means for further direct involvement of key user groups, including those involved in traditional or recreational harvesting in the property.

A Conservation Action Planning process is underway as part of reviewing the existing Management Plan. The Koror State is working toward a more collaborative effort to develop the new Management Plan by involving more closely stakeholders including technical partners in this process. However, feedback systems for adaptive management in the short-term, including decision-making, prioritization and implementation of activities, as well as information sharing among stakeholders, would benefit from further development. These should be further clarified in the second Management Plan particularly in the context of managing the nominated property to address challenges that may arise as a result of possible World Heritage status and changing pressures and threats, including managing numbers of visitors to Koror and their impact. Enhanced involvement of tourism sector and technical partners in the development, implementation and review process are also recommended.

KSDCLE is the lead management authority of the nominated property. The section has 52 staff out of which 23 are Koror State Rangers, the primary enforcers of the laws and regulations to protect environment and resources within state jurisdiction, including the nominated property. All Rangers go through a staff training course before entering on duty. Findings from the field evaluation mission indicate Rangers have clear knowledge of regulations and professional capacity to perform their duties, and that the roles and responsibilities of the Rangers are well recognized by the different stakeholders.

The Koror State Rangers office enables efficient surveillance of the Ngederrak Conservation Area and good access to other parts of the nominated property. The State Rangers have three fast boats all used for daily patrols, staff transport to the property and other duties. The Rangers conduct daily patrols to monitor activities in the areas used by tourist throughout the RISL. They also conduct 24-hour patrols for poaching and illegal activities that from time to time occur in the property. There is a plan, pending State budgetary approval, to build a surveillance station at one island in the Ngmelis Island Complex near the major dive destinations to increase the efficiency, the patrolling and the fuel. This is consistent with the objectives to strengthen and increase the efficiency of enforcement within RISL. Use of radio equipment for communications between office and patrolling rangers is limited due to the complex formation of the islands, but cell phones are used effectively as a back-up tool. Overall the State Rangers operate effectively considering the size of the area under their jurisdiction and in view of the facilities and equipment at their disposal.

The Bureau of Public Safety, Division of Marine Law Enforcement is the national entity responsible for enforcement of national laws and regulations within the EEZ beyond State jurisdiction, while the Bureau of Marine Resources Division of Fish and Wildlife Protection is enforcing National laws related to fisheries. National and State rangers mostly collaborate well in enforcing regulations, although there is some potential to enhance resource sharing between Division of Marine Law Enforcement and Koror State Rangers.

Koror State collects revenue for conservation and management of environment and resources within their jurisdiction. Permit fees are managed by the Koror State and its use restricted within the State jurisdiction, while the Green Fee is managed by the Protected Area Network Fund (PANF) board of directors for supporting the conservation and management of protected areas registered as part of the national Protected Area Network.

The total revenue of KSDCLE has been constantly increasing from 2009 to 2011 ranging from about USD 2,000,000 to USD 3,000,000. Aside from the personnel expenses, the highest expenditure is on fuel for patrolling. Based on past revenue generation and predicted tourism development the existing Koror State permit fees and the newly introduced Green Fee provide stable and sufficient financing for management of the nominated property. Further elaboration of a business plan for RISL would be beneficial.

One of the beneficiaries of potential World Heritage inscription of RISL is the tourism industry, and several companies have provided strong support to the nomination as well as to the management of the property. Some of the larger and better established tour operators are particularly environment conscious and voluntarily contribute to conservation activities. Palau Pacific Resort manages a private protected area in front of the hotel (outside the property boundary) in close collaboration with the local community, while some large dive shops are conducting research and monitoring activities to understand and protect some flagship species such as sharks, dugongs, mantas and sea turtles. The Belau Tourism Association (BTA), a consortium of local tour operators with broad if not universal membership, plays a role in controlling activities and provides a collective voice for the industry. There is some scope for strengthening the process for private sector involvement in the development of the Management Plan and planning of conservation areas.

Monitoring, research and some awareness raising activities are conducted by Koror State and wide range of other government and non-government partners. These partnerships are reflected in strong support of the nomination from NGOs, and there is a great degree of goodwill and collaboration between many NGOs. The Palau Conservation Society (PCS), Palau's first local NGO dedicated to conservation, has provided much input to the preparation of the nomination in addition to support in management planning. The Nature Conservancy (TNC) is also putting effort on conservation of nominated property through the Micronesia Challenge initiative. However, at the level of the management authority, a central coordinating mechanism for monitoring, identifying research priorities, knowledge management, dissemination of findings among agencies and to the public, and applying results in a cycle of adaptive management including a management effectiveness evaluation system is not in place. Such a mechanism is an important part of enhancing the Management Plan in its second phase.

Similarly, while many actors provide a range of communication and awareness materials regarding the Rock Islands Southern Lagoon, coordinated arrangements for visitor facilities providing information about the site and management activities are not yet in place. However, existing facilities, including Belau Natural History Museum, Palau International Coral Reef Centre, etc. provide potential facilities.

IUCN considers the management of the nominated property meets the requirements set out in the Operational Guidelines.

4.4 Threats

The tourism industry is the largest industry in Palau, sustaining its economy. The number of visitors to Palau during the last decade ranges between 70,000 and 90,000 per year (Palau Visitors Authority statistics). Tourism is likely to increase over coming years, and increasing the number of visitors to the country is a likely development target. The majority of the tourists stay in the urban area of Koror State and visit the Rock Islands and major dive sites within the nominated property. Some infrastructure is already at or close to capacity. There is concern amongst some tour operators that the

number of visitors has already exceeded the carrying capacity at some major destinations, such as the jellyfish lake, Blue corner and German Channel. The number of tourists has also increased the demand for locally caught seafood and some endangered species such as fruit bat. There is also some concern about dive and tour companies operating from abroad and/or as part of charter trips. Some of these reportedly do not follow local rules and regulations or provide insufficient information and guidance to customers. Tour operators in RISL must be owned by Palauans and based in Palau but the authorities are facing some challenges in checking and controlling illegal operators. Overall tourism numbers to Koror and RISL need to be managed carefully in order to avoid negative impacts on the environment.

One marine lake is open to tourism, the jellyfish lake, while other marine lakes are closed except for research purposes. These restrictions are keeping most of the lakes relatively intact. Marine lakes visited during the site evaluation all exhibited unique features as well as fragile ecosystems. However, at several sites there were also some signs of human impact, such as litter. Unregulated visits to marine lakes are reportedly made from time to time by poachers and, only rarely, tourists. Increasing numbers of visitors to marine lakes will threaten to alter these fragile ecosystems and should be avoided. It is recommended that closure of the marine lakes (except the jellyfish lake) is continued and enforcement strengthened, while visits to lakes currently accessible through tunnels at low tide shall be strictly regulated and restricted.

Commercial fishing vessels, in particular offshore long liners, frequently call at Palau Port to land fish, and although some license infringements occur in the EEZ and at times in State waters (12nM) these boats do not operate near the reef and in the lagoon of the nominated property. However, subsistence and recreational fishing by local people, including trolling and spear fishing, are popular. While some of the no-take areas visited during the site evaluation such as the Ngemelis Islands Conservation Zone and Ngerumekaol Spawning Area exhibit comparatively high fish populations, present day fish populations especially of valued target species is well below populations of the 1960-70s. It should be noted that some regulation has been introduced to protect particularly vulnerable and/or ecologically important species, including bumphead parrotfish and groupers. It is recommended that recreational fishing is kept under constant review in light of population trends, and that establishment of further closed areas is considered, in particular around major reef channels and surrounding reef slopes where spawning aggregations occur.

Although some illegal dugong and sea turtle poaching still occurs, a combination of changing values, enforcement of regulations and outreach has reduced poaching, but efforts need to be maintained and possibly increased to safeguard endangered species.

All the sewage from urban area of Koror is pumped to a central facility and treated before discharging to the lagoon. Water quality of the discharge is monitored every six months by EQPB. Benthic biota at the point of discharge appeared healthy at the time of the site visit, including well-developed coral assemblages. The capacity of the treatment facility is reportedly sufficient, however, the capacity of some pumping stations is exceeded during heavy rain, forcing discharge of some raw sewage directly to the sea. It is recommended that water quality monitoring is strengthened and that ecological monitoring at and in the area around the discharge is established.

The 1998 mass coral bleaching event severely impacted reefs in Palau, and killed over 30% of corals. The marine lakes were also impacted and elevated temperature caused mortality/disappearance of jellyfish. However, the event also illustrated the benefits of the complexity of reef habitats to the resilience of RISL. Some locations revealed less bleaching or mortality and faster recovery compared to other locations. While the impacts of increasing climate change effects and acidification remain considerable threats, management of the property for ecological health provides risk reduction.

Sea level rise may also have wide-ranging effects on ecosystems in the nominated property. Notable beach erosion has been observed, and although the cause of such erosion may be due to activities in the area, climate change or both, it is clear that sea level rise poses a threat. Marine lakes could also be affected by sea level rise (and changed rainfall patterns) as water exchange is a major factor characterizing them. Research and monitoring programs need to incorporate indicators of potential impacts of climate change as possible.

Expansion of aquaculture activities poses a potential threat to the property. A farm culturing milkfish for commercial purposes is located near the boundary within the nominated property in the area adjacent to the Excluded Urban Area. Although small in scale, high demand is suggesting future expansion of these farms, with some pressure on the nominated property. A bottleneck to expansion has been the limited capacity of Palau Mariculture Demonstration Center (PMDC) to supply juvenile stock and reducing the costs of pellet feeds. Giant clams are also cultivated at PMDC and the seedling stocks were freely provided to fishers for cultivation on the reefs. It is recommended that existing aquaculture will be managed and monitored under strict control, and that additional aquaculture installations aren't allowed within the nominated property and highly restricted in the vicinity of the property.

Despite the low level of development activities within RISL, there are a few exceptions. Two specially allowed commercial activities take place within the nominated property. The Dolphin Pacific is a dolphin research and amusement facility constructed and commercially operating in a sheltered bay at one of the islands, in proximity to the Excluded Urban Area. The bottlenose

dolphins in the facility (a species not naturally occurring in Palau) have been brought from Japan. Sand mining takes place under license near the Ngederrak Conservation Area. Waters adjacent to both locations appear clean with healthy benthic species assemblages, and no apparent impact was observed beyond the points of impact (construction, mining). It was reported that additional licensing of such activities will not be considered, and these two activities are subject to strict controls and no expansion limits will be proposed as part of the Management Plan review process.

Although relatively few non-native species have become established in the RISL, introduced and invasive species have the potential to alter the structure and balance of the RISL's fragile marine and island ecosystems. Human access to islands and marine lakes are likely to be a strong vector for introduction and needs to be carefully controlled. One notable species introduction is an Anemone introduced to the jellyfish lake open to tourists, which has significantly altered the lake habitat. Strategies to reducing risks of ballast water and hull fouling from foreign vessels visiting the port adjacent to the boundary of the nominated property should also be considered.

All these threats are considered to be within the range of control if proper management is conducted.

In summary, IUCN considers the nominated property does meet the conditions of integrity as outlined in the Operational Guidelines.

5. ADDITIONAL COMMENTS

5.1 Nomination process

RISL and in particular the Ngerkewid Islands Wildlife Preserve has been discussed as a potential World Heritage site several times in the past. However, misunderstanding of the role and authority of UNESCO upon inscription have held back nomination, and this issue was still raised and needed clarification in discussions with different stakeholders during the evaluation mission.

World Heritage nomination of RISL was reportedly requested and encouraged by traditional leaders. Preparation of the nomination was carried out by national and state institutions, and with considerable input and support from both NGOS and the private sector. RISL's potential inscription on the World Heritage list was widely endorsed during the mission. Positive commitments of support were also heard from wide range of stakeholders including the House of Traditional Leaders, government agencies, and the tourism industry. The stakeholder involvement and support to the nomination is considered good, and sufficient.

5.2 Additional Comments

Evaluation of cultural aspects of the World Heritage nomination of the property is carried out by ICOMOS. IUCN offers the following comments for consideration.

While the natural aspects of RISL have been a major driving force in the tourism industry, possible world heritage listing under cultural criteria may lead to increased pressures especially on the terrestrial environment. Broader awareness of cultural heritage and past human settlement on the island may increase numbers of visitors to islands previously largely untouched or visited mainly for their beaches. This will require careful management consideration. It is recommended that several sites, perhaps sites that are well documented and with features replicated also at other locations, are opened to visitors, with appropriate infrastructure installed, while other sites remain closed to tourism.

The islands, terrestrial and marine ecosystems and species in the nominated property are of considerable traditional value to Palauan people as well as to the economy of the nation. The current health of the environment in RISL is in part a result of the value people attach to it, and the strength of traditional management systems. At the same time, some traditional uses may constitute potential threats to values of the nominated property if increasing, or if new methods are adopted (e.g. more effective or destructive fishing methods, targeting endangered species). Notably, a number of activities presently carried out in the property are in breach of statutory law, although justified as traditional. Traditional and recreational activities in the property at present level may not endanger the natural values for which the monument has been nominated. Provided they do not change in favour of increased resource extraction they can also increasingly contribute to ensuring these values are maintained.

6. APPLICATION OF CRITERIA

The **Rock Islands Southern Lagoon** has been nominated under natural criterion (vii), (ix) and (x).

Criterion (vii): Superlative natural phenomena or natural beauty and aesthetic importance
The Rock Islands Southern Lagoon contains an exceptional variety of habitats within a relatively limited area. Barrier and fringing reefs, channels, tunnels, caves, arches, and coves, as well as the highest number and density of marine lakes in the world, are home to diverse and abundant marine life. The maze of dome-shaped and green Rock Islands seemingly floating in the turquoise lagoon surrounded by coral reef is of exceptional aesthetic beauty.

IUCN considers that the nominated property meets this criterion.

Criterion (ix): Ecological processes
The Rock Islands Southern Lagoon contains 52 marine lakes, more than at any other site in the world. Furthermore, the marine lakes of RISL are at different stages of geological and ecological development, ranging from lakes with high connectivity to the sea to highly isolated lakes with notably different species composition, including unique and endemic species. These features represent an outstanding example of how marine ecosystems and communities develop, and make the lakes valuable as "natural laboratories" for scientific study of evolution and speciation. Five new subspecies of the Mastigias papua jellyfish have been described from these marine lakes, and new species discoveries continue to be made both in the marine lakes as well as in the complex reef habitats of RISL.

IUCN considers that the nominated property meets this criterion.

Criterion (x): Biodiversity and threatened species
The Rock Islands Southern Lagoon has exceptionally high biological and marine habitat diversity. The marine lakes are unique in terms of number, the density at which they occur, and their varying physical conditions. With low fishing pressure, limited pollution and human impact, as well as an exceptional variety of reef habitat, the resiliency of RISL's reefs makes it a critical area for protection, including as an area important for climate change adaptation of reef biota, and potentially as a source of larvae for reefs in the region. All the endangered megafauna of Palau, 746 species of fish, over 385 species of corals, at least 13 species of sharks and manta rays, 7 species of giant clams, and the endemic nautilus are found in RISL, and the forests of the islands include all of Palau's endemic birds, mammals, herpetofauna and nearly half of Palau's endemic plants. This makes the area of exceptional conservation value.

IUCN considers that the nominated property meets this criterion

7. RECOMMENDATIONS

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

The World Heritage Committee,

1. Having examined Documents WHC-12/36.COM/8B and WHC-12/36.COM/INF.8B2,

2. Inscribes the Rock Islands Southern Lagoon on the World Heritage List under natural criteria (vii), (ix) and (x)

3. Adopts the following Statement of Outstanding of Outstanding Universal Value:

Brief synthesis
The Rock Islands Southern Lagoon is located in Palau, within Koror State and is a 100,200 ha marine site characterized by coral reefs and a diversity of other marine habitats, as well as 445 coralline limestone islands uplifted due to volcanism and shaped over time by weather, wind and vegetation. This has created an extremely high habitat complexity, including the highest concentration of marine lakes in the world, which continue to yield new species discoveries. The terrestrial environment is lush and at the same time harsh, supporting numerous endemic and endangered species. Although presently uninhabited, the islands were once home to Palauan settlements, and Palauans continue to use the area and its resources for cultural and recreational purposes. This is regulated through a traditional governance system that remains an important part of national identity.

Criteria
Criterion (vii)
The Rock Islands Southern Lagoon contains an exceptional variety of habitats within a relatively limited area. Barrier and fringing reefs, channels, tunnels, caves, arches, and coves, as well as the highest number and density of marine lakes in the world, are home to diverse and abundant marine life. The maze of dome-shaped and green Rock Islands seemingly floating in the turquoise lagoon surrounded by coral reef is of exceptional aesthetic beauty.

Criterion (ix)
The Rock Islands Southern Lagoon contains 52 marine lakes, more than at any other site in the world. Furthermore, the marine lakes of RISL are at different stages of geological and ecological development, ranging from lakes with high connectivity to the sea to highly isolated lakes with notably different species composition, including unique and endemic species. These features represent an outstanding example of how marine ecosystems and communities develop, and make the lakes valuable as "natural laboratories" for scientific study of evolution and speciation. Five new subspecies of the Mastigias papua jellyfish have been described from these marine lakes, and new species discoveries continue to be made both in the marine lakes as well as in the complex reef habitats of RISL.

Criterion (x)
The Rock Islands Southern Lagoon has exceptionally high biological and marine habitat diversity. The marine lakes are unique in terms of number, the density at which they occur, and their varying physical conditions. With low fishing pressure, limited pollution and human impact, as well as an exceptional variety of reef habitat, the resiliency of RISL's reefs makes it a critical area for protection, including as an area important for climate change adaptation of reef biota, and potentially as a source of larvae for reefs in the region. All the endangered megafauna of Palau, 746 species of fish, over 385 species of corals, at least 13 species of sharks and manta rays, 7 species of giant clams, and the

endemic nautilus are found in RISL, and the forests of the islands include all of Palau's endemic birds, mammals, herpetofauna and nearly half of Palau's endemic plants. This makes the area of exceptional conservation value.

Integrity

The property has clear boundaries and includes a large part of the lagoonal and reef habitat surrounding the main islands of Palau, as well as most land of coralline origin occurring within Koror State. This ensures a high degree of replication of habitat type. Although past and present use have altered both marine and terrestrial environments, or at least the abundance of resource species, the present conservation status of the property is good. Activities in and around the property that may impact on it are subject to specific management regulations and/or interventions. The inclusion of waters outside the barrier reef and within Koror State jurisdiction in a buffer zone further increases its ecological integrity.

Management and protection requirements

The legislative framework regulating use and management of the environment and its resources is comprehensive and clear. The area falls in its entirety in Koror State, and the management jurisdiction of Koror State Rangers is well known and respected. Management authorities are operating on relatively reliable revenue from tourism. The strength of traditional value systems including resource governance systems is an asset, and can enable management and zoning that accommodate both cultural/traditional and biodiversity conservation needs. Management objectives and priorities are defined in the Rock Islands Southern Lagoon Management Plan. Both legislative framework and management arrangements are conducive to protecting and maintaining the values of the property.

Long term protection and management requirements for the property include the need to prevent negative impacts from tourism, including maintaining access restrictions to vulnerable areas, ensuring visitor numbers are within the capacity of the property, and mitigating adverse effects from development of infrastructure and facilities in Koror. Subsistence and recreational fishing taking place within the property and in designated zones require constant review. However, the property may also be constructively used for research on and preservation of traditional knowledge of the marine environment. Additional needs include maintaining restrictions on development, including aquaculture, within the property and in the vicinity of property boundaries. An adaptive approach to management of the property and the provision for effective long term monitoring including ecosystem health and water quality are necessary in order to maintain the resilience of the property in the face of climate change.

4. Commends the State Party for its efforts to sustainably manage the nominated property and safeguard its globally significant biodiversity, spiritual, cultural and recreational values, including through modern/statutory as well as traditional/customary governance approaches, and recommends further development of the for direct involvement of key stakeholder groups including the tourism industry in management, as well as close and consistent liaison between state and national authorities in managing the property as a part of the national protected area network;

5. Requests the State Party to embark on a process to address present and potential future negative impacts of tourism on the property and adjacent areas, including through detailed projection of tourism development, careful mitigation planning as well as options for reducing or restricting visitor numbers to vulnerable areas or to the property as a whole;

6. Encourages the State Party to strengthen and formalize coordination and liaison on science and monitoring in the property among national and overseas organizations, with a view to enhancing the use of such information in the adaptive management of the property;

7. Strongly encourages the State Party to ensure effective conservation of the values of the property, including but not limited to marine lakes, habitats of unique or threatened species or where new species discoveries continue to be made, as well as particularly important areas such as spawning sites, including through establishment of further strictly protected areas if required.

Map 1: Nominated property location and buffer zone