

World Heritage Sites

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ROCK ISLANDS SOUTHERN LAGOON PALAU

The Rock Islands of Palau's southern lagoon in the western Pacific are part of a tropical archipelago of 445 small lushly forested raised coral islands surrounded by a shallow lagoon within a barrier reef. 94% of the site is marine. The intricate coasts contain a maze of caves and karstic features, basins, inland marine lakes, seagrass and algal beds, beaches and mangrove swamps in an exceptional array of habitats that supports a high density and diversity of species and, in over 50 'marine lakes', an unusual level of endemism. It also contains the eloquent relics of a departed culture forced by drought and inadequate food to emigrate from a very beautiful and long inhabited but marginal environment.

COUNTRY

Palau

NAME

Rock Islands Southern Lagoon

MIXED CULTURAL AND NATURAL WORLD HERITAGE SITE

2012: Inscribed on the World Heritage List under cultural criteria (iii) and (v) and natural criteria (vii), (ix) and (x).

STATEMENT OF OUTSTANDING UNIVERSAL VALUE

The UNESCO World Heritage Committee adopted the following Statement of Outstanding Universal Value at the time of inscription:

Brief Synthesis

The Rock Islands Southern Lagoon consists of numerous large and small forested limestone islands, scattered within a marine lagoon protected by a barrier reef. The property lies within Koror State, immediately to the south of Palau's main volcanic island Babeldaob in the western Pacific Ocean.

The marine site covers 100,200 ha and is 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.

The islands contain a significant set of cultural remains relating to an occupation over some five thousand years that ended in abandonment. Archaeological remains and rock art sites are found in two island clusters - Ulong and Ngemelis, and on three islands - Ngeruktabel, Ngeanges, and Chomedokl. The remains of former human occupation in caves, including rock art and burials, testify to seasonal human occupation and use of the marine ecosystem, dating back to 3,100 BP and extending over some 2,500 years.

Permanent stone villages on a few islands, some dating back to between 950 and 500 BP, were occupied for several centuries before being abandoned in the 17th-18th centuries, when the population moved to larger islands. The villages include the remains of defensive walls, terraces and house platforms. The settlements reflect distinctive responses to their local environment and their abandonment demonstrates the consequences of population growth and climate change impacting on subsistence in a marginal environment. The descendants of the people who moved from the Rock Islands to the main islands of Palau identify with their ancestral islands through oral traditions that record in legends, myths, dances, and proverbs, and traditional place names the land- and seascape of their former homes.

The abandoned islands now provide an exceptional illustration of the way of life of small island communities over more than three millennia and their dependence on marine resources. They also are seen as ancestral realms by the descendants of those who migrated to the main island of Palau and this link is kept alive through oral traditions.

Criterion (iii): The Rock Islands cave deposits, burials, rock art, abandoned remains of stonework villages and middens bear exceptional testimony to the organisation of small island communities and their harvesting of marine resources over some three millennia.

Criterion (v): The abandonment of Rock Island villages in the 17th and 18th centuries demonstrated by the remains of human settlement and evidence of marine harvesting activity in the Rock Islands Southern Lagoon is an exceptional illustration of the intersection and consequences of climate change, population growth, and subsistence behaviour on a society living in a marginal marine environment.

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 the property 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 the property.

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, and an exceptional variety of reef habitat, the resilience of reefs of the property 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 the property, 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 has 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.

The property contains a complete representation of the features and processes that convey the value of the property. Most of these elements do not suffer inordinately from development or neglect and are in good condition. However a conservation programme is required to ensure ongoing conservation and maintenance. The property has been largely isolated from human interference since pre-European occupation ceased. They are nevertheless highly vulnerable to uncontrolled tourism activities.

Authenticity

The form and materials of village settlements, burial caves and their setting continue to convey the cultural value of the property. Excavated deposits have been recorded and reburied, and the reports of these campaigns have been lodged with the Koror State Government. To achieve a full understanding of the remains on all the islands will need more survey work. Oral histories and ongoing cultural traditions in the main island of Palau keep alive the memories of the migration away from the Rock Islands and the histories associated with them.

Protection and Management 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.

Cultural sites within the Rock Islands Southern Lagoon are protected under Title 19 ‘Cultural Resources’ by the Historical and Cultural Preservation Act of the Republic of Palau. Underwater archaeological and historical

remains are protected under Title 19 as the 'Palau Lagoon Monument'. All the designated sites within the property should be included on Palau's National Register of historic places.

The Koror State Department of Conservation and Law Enforcement collaborates with the Palau Historic Preservation Office, Bureau of Arts and Culture in working with locally based agencies and organisations on management and research activities within the property. Koror State Regulations (1994) cover general resource use, recreational activities and the designation of protected areas within the Rock Islands Southern Lagoon. The Rock Islands Use Act was legislated in 1997 to regulate tourist activity in the islands. The laws and regulations are enforced by the Koror State Rangers. The Rock Islands Southern Lagoon Area Management Plan 2004-2008 was adopted by the Koror State Legislature and Governor in 2005 and is currently under review.

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 monitoring. 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.

IUCN MANAGEMENT CATEGORY

Unassigned

BIOGEOGRAPHICAL PROVINCE

Micronesian (5.2.13)

GEOGRAPHICAL LOCATION

Palau is a western Pacific archipelago at the western end of the Caroline Islands, now the Federated States of Micronesia, some 750 km east of Mindanao in the southern Philippines. The site consists of 445 islands and the surrounding reefs and lagoon in the southern half of Palau's main island group.

DATES AND HISTORY OF ESTABLISHMENT

1956: The Ngerukuid Islands Wildlife Preserve designated Palau's first formally protected area;

1999: The Southern Lagoon Rock Islands designated a Conservation Zone by Koror State Law K6 100B-99.

LAND TENURE

Most of the land in the property is traditionally owned by the Chiefs of Koror State, one of Palau's seven local jurisdictions. The islands are wholly owned and administered by the state of Koror, through the Koror State Department of Conservation and Law Enforcement.

AREAS

100,200 ha, of which only 6,000 ha is land. The marine buffer zone of 164,000 ha extends 12 nautical miles from the centre of Koror but excludes Babeldaob Island to the north and Peleliu Island to the south.

ALTITUDE

0-100m.

PHYSICAL FEATURES

The Rock Islands contains the whole archipelago within Palau's southern lagoon. This comprises a maze of some 445 pristine mostly small well forested raised coral islands, with 11.6 km of fringing reefs and 683 patch reefs within an enclosing barrier reef. It measures approximately 33 km by 33 km across, 6% of which is land and 94% sea. The islands are dome-shaped with wave-undercut shores and their karstic intricacy includes many coves, caves, fissures and tunnels, sinkholes and channels, inland marine lakes and inner basins, wetlands and beaches, mangrove swamps and forests, each habitat with its own species. The reef and lagoon also have a multiplicity of habitats: seagrass and algal beds, sand flats, steep undersea slopes and walls, fringing and patch reefs and a barrier reef cut by tidal channels and passes attractive to pelagic life. This concentration of habitats supports a very high density and biodiversity.

Palau's main island is volcanic. The islands are located on the southern end of a submarine volcanic ridge which forms the edge of the Pacific plate as it is subducted under the Philippine plate. The islands of the lagoon originate in uplifted limestone reefs which crown a Miocene volcanic base. The 52 enclosed marine lakes (a quarter of the world's total), were formed between 6 and 15,000 years ago by

rising sea levels and in different ways are nearly but not quite cut off from the sea. They can be 2m or 60m deep, clear or murky, with waters resembling the lagoon or layered, the bottom being anoxic. The walls of some are vertical and tree-shaded. A high level of speciation and endemism exists among their variously isolated populations. The karstic substrate of the islands is porous, there is little fresh water and the soil is thin. In the past, many small villages were built of the local stone, the ruins of walls, terraces and middens of which remain on higher ground along with early cave homes and rock art, though beach sites have often been washed away or re-used. The seas of the lagoon have many and varying colours which, with the exuberantly forested islands, the varied coastlines and wide skies, are very beautiful.

CLIMATE

Palau has a maritime tropical climate with a temperature range of between 24°C and 31°C, averaging 27.6°C. The annual rainfall is 3,760mm, falling heavier during the storm season between July and October; the average relative humidity is 82%. The islands lie beyond the typhoon belt but are affected by the oscillations of El Nino caused by climate change, and there are occasional damaging storms.

VEGETATION

The predominant vegetation of the rugged karstic substrate of Palau is subtropical moist broadleaf forest ringed by strand forest and a marine flora typical of the tropical northwestern Pacific. Palau also has the highest level of endemism in Micronesia after Guam. The Rock Islands contain 55 (42%) of Palau's 130 endemic plants, 31 (23%) of which are restricted to the islands. They harbour the endangered cycad *Cycas micronesica* (EN) in remnant native forest and the endangered endemic palms *Hydriastele palauensis* and *Ponapea palauensis*. The latter is known only from two small populations with single palms in a few moist sheltered locations. The Ngerukuid Islands Wildlife Preserve includes 113 native plants of which 30 are endemic. On ten of its islands, three endemic species, *Hydriastele palauensis* (5%), *Sterculia palauensis* (3%) and *Timonius subauritus* (3%), form 11 percent of measured trees.

The islands have at least 119 species of marine algae in 57 taxa, several of which are adapted to specific habitats. There are 4 green algae *Chlorophyta*, 16 brown algae *Phaeophyta*, 35 red algae *Rhodophyta* and 5 blue green algae *Cyanophyta*. Omodes Pass in Nikko Bay, 130m wide and 3-4m deep, has an exceptionally rich algal flora of over 75 species - 38.5% of all recorded Palauan algae, and 22 algae have been found in the Ngerukuid Islands Wildlife Preserve. Nine of the 10 seagrass species of Palau are found in the islands.

FAUNA

The islands possess all of Palau's mammals and herpetofauna. Among the mammals there is an isolated but thriving population of dugongs *Dugong dugon* (VU), and two bats, the endemic subspecies Marianas flying fox *Pteropus mariannus pelewensis* (EN) and the Pacific Sheath-tailed bat *Emballonura semicaudata* (EN). The islands contain 56 of Palau's 151 bird species and its 9 endemic birds including the near threatened species giant white-eye *Megazosterops palauensis*, non-endemic Nicobar pigeon *Caloenas nicobarica pelewensis*, ground-dove *Gallicolumba canifrons* and Micronesian imperial-pigeon *Ducula oceanica*. The Micronesian megapode *Megapodius laperouse* (EN) nests on the beaches of the Ngerukuid Islands Wildlife Preserve as does the hawksbill turtle *Eretmochelys imbricata* (CR). The green turtle *Chelonia mydas* (EN) and seawater crocodile *Crocodylus porosus* also live in the islands' waters. Exotic introduced animals have been eradicated from the site.

The islands are part of one of the most ecologically diverse ecosystems in the Indo-Pacific, with 32% of the region's coral reef fauna. This contains 746 of the over 1,350 species of Palau's fish, at least 13 of 17 reported species of shark, 7 species of giant clam, an estimated 385 species of stony corals in 66 genera, most of Palau's 150 species of soft coral and an endemic nautilus *Nautilus belauensis*. The endangered sharks include the whale shark *Rhinodon typus* (VU) and the zebra, thresher, tiger and tawny sharks, *Stegostoma fasciatum* (VU), *Alopias pelagicus* (VU), *Galeocerda cuvier* (VU) and *Nebrius ferrugineus* (VU). Endangered fish include humphead wrasse *Cheilinus undulatus* (EN) and bumphead parrotfish *Bulbometopon muricatum* (VU); the clams include giant and southern giant clams *Tridacna gigas* (VU) and *T. derasa* (VU). But it is the marine lakes which are probably the world's most biodiverse natural marine habitat. Their degree of endemism is epitomised by the five different subspecies of golden jellyfish *Mastigias papua* which have developed and proliferated in five different marine lakes. Surveys of fourteen lakes have found 311 marine invertebrates of which 131 (43%) are new to science. The increased sea surface temperatures linked to the El Niño Southern Oscillation (ENSO) resulted in extensive coral bleaching. In 1998 approximately 48 percent of Palau's colonies were bleached. Recovery was greatest in the fringing reefs which, with the shallow reef barrier reef

tops, may be potentially the most resilient to the effect on the climate of El Nino's Southern Oscillation.

CONSERVATION VALUE

This tropical western Pacific archipelago contains in its maze of caves and karstic features, rare marine lakes, seagrass and algal beds and mangrove swamps, a great concentration of resilient reef habitats which support a high density and diversity of species, and in the marine lakes, a high level of endemism. The islands, no longer inhabited, also contain the relics of a departed culture led by drought and inadequate food to emigrate after thousands of years of occupation. The area is also of exceptional conservation value for its low fishing pressure, low human impacts and limited pollution within the twelve nautical mile oceanic buffer zone. These make it important for the study of the adaptation of reef biota to climatic change, and as a regional source of larvae for reef species. The property is part of the WWF Global 200 site and the Conservation International designated hotspot of the Micronesia-Polynesian region.

CULTURAL HERITAGE

The islands were settled by a mobile cave-dwelling population of Neolithic people from the southern Philippines by 1100 BCE to 700 BCE. This developed into a culture which used cave burials and made rock art before 1000 CE. Thereafter, many defensive stone villages were built until, between c.1650 and 1750 growing numbers, drought and the overharvesting of fish forced their abandonment for the largest of Palau's islands, Babeldaob. The islands were then mined by islanders from nearby Yap for their unique stone disc currency. The west first learned of Palau after the publication of the shipwreck of an English East Indiaman in 1788. The interaction with the west established the primacy of Koror. From 1885 there came colonial regimes from Spain, Germany, Japan (1914-1945) and war, which left minor fortifications, wrecks and downed aircraft in the lagoon. After the war it became a Trust Territory of the U.S.A. until independence was gained in 1994.

The islands have the relics of 36 villages dating from the period 1000-1750 when the population totalled 4-6,000. Inter-island warfare necessitated defensive walls and chief's houses were built on high ground. Settlement was easier on the beaches but more subject to wave action and human destruction. The Ulong group has the most intact relics, including prehistoric rock art of red ochre paintings. The land was owned by clans, led by chiefs, not by individuals, and legally remains so. The cave homes, rock art, burial sites, platforms, defensive village walls and middens are mute memorials to three millennia of seasonal existence and small community life in a marginal marine environment. Palauans have pride and reverence for their ancient home and still come to the islands for recreation and commemoration, perpetuating in their customs, myths and forms of government, the culture of their former settlements.

LOCAL HUMAN POPULATION

Palau had a multicultural population in 2000 of 21,000, though the Rock Islands remain uninhabited. However, there is regulated harvesting of fish, crustaceans, turtles, invertebrates and *Trochus* shells in the lagoon. The islanders' traditional respect for their environment helps to regulate tourism which, especially diving, is the largest industry in Palau, sustaining its economy.

VISITORS AND VISITOR FACILITIES

The number of visitors to Palau between 2000 and 2010 ranged from 70,000 to 90,000 per year and is likely to increase since it is one of the world's top diving destinations. 84% of these tourists visit the Islands, the infrastructure of which is now close to site capacity. Most stay in Koror town which has a wide range of accommodation, and visit the islands and major dive sites. One marine lake, the jellyfish lake, is open to tourism; the diving is especially good in the Ngemelis Islands in the south and nearby German channel which is a cleaning station for sharks and rays. Ulong has the best array of archaeological sites, and with the Ngemelis Islands is one of the prime tourist destinations, albeit the cultural sites are far less visited - and so less subject to wear. Snorkelling, limited jet-skiing, kayaking, camping, boat touring and fishing are also possible. Some large dive shops run research on and monitoring of flagship species such as sharks, dugongs, mantas and sea turtles. There is a museum, and the Belau Tourism Association, a consortium of local tour operators, helps to promote and control tourist activities.

SCIENTIFIC RESEARCH AND FACILITIES

The islands are numerous, rugged and not easily accessible, but with reef habitats so complex and marine lakes so numerous they provide countless ongoing opportunities for the study of marine life and the past human life of the archipelago. The marine lakes, nearly isolated from the sea in different ways and differing ecological development, species and degree of endemism, form valuable well explored natural laboratories for the study of evolutionary processes and speciation. In addition, the low fishing

and human impacts and limited pollution within the buffer zone make the property valuable for the study of climate change through the adaptations of reef biota. The Ngerukuid Islands Wildlife Preserve is open only to scientists. The islands are a popular site for research

To archaeologists and anthropologists the islands' relics illustrate the three-thousand year existence of a sea-dependent culture of small island communities. Some work was started under the Japanese occupation but recent archaeological studies were initiated by the American D. Osborne in 1953-4 and 1968-9. In the 1980s the culture was further studied by researchers from South Illinois University and by others in the 2000s. Several islands have been surveyed in detail. The Koror State Department of Conservation and Law Enforcement collaborates with the Palau Historic Preservation Office and Bureau of Arts and Culture in working with locally based agencies on management and research activities within the property. The Palau Automated Land and Resource Information System maintains IKONOS, limited LIDAR and other satellite remote sensing imagery by which trends in land cover and forests can be estimated. The Palau International Coral Reef Center is a semi-governmental agency which conducts research and education on the ecological, economic and cultural importance of coral reefs through training, workshops, and conferences. There is also a dolphin research and education centre.

MANAGEMENT

The area is of great value to conservation for its biodiversity and is well covered by protective laws and regulations. Protection extends twelve nautical miles from the coast. The property is owned and administered by the state of Koror with the support of the clan chiefs' House of Traditional Leaders who claims traditional ownership rights to regulate resources. Management and zoning of both cultural and natural sites is by the Koror State Department of Conservation and Law Enforcement, enforced by the Koror State Rangers. Cultural sites are protected under Title 19 'Cultural Resources' by the Historical and Cultural Preservation Act of the Republic of Palau. Underwater archaeological and historical remains are protected under Title 19 as the 'Palau Lagoon Monument'. The Koror State Regulations of 1994 cover general resource use, recreational activities and the designation of protected areas within the property. The Rock Islands Use Act was passed in 1997 to regulate tourist activity. The site was designated a Conservation Zone under Koror State Public Law which entails over 20 state regulations prohibiting new mining, dredging, coral harvesting, permanent constructions except for tourist facilities and limited entrance by foreign commercial fishing vessels. Six management zones are delineated: Special Management, Preservation, Conservation, Tourism, Subsistence and Recreational Fishing and General Use.

Management objectives and priorities were defined in 2005 in the Rock Islands Southern Lagoon Management Plan 2004-2008, followed by the Micronesia Challenge initiative, aided by The Nature Conservancy, to preserve 30% of the region's coastal waters and 20% of its forests by 2020. In 2009 an Exclusive Economic Zone was created as a sanctuary for sharks. Coral harvesting is restricted in any part of the coral reef ecosystem and in 2010, Palau passed legislation establishing all of its waters as a Marine Mammal Sanctuary, prohibiting unregulated harvesting of marine mammals and resources. Visitor numbers are checked monthly. There is annual monitoring of the forests, rare plants, coasts, corals, water quality, fish, birds, visitor impacts and archaeological sites, and five-yearly monitoring of turtles, dugongs and crocodiles.

MANAGEMENT CONSTRAINTS

Natural disasters pose a low level of threat except from rising sea level since Palau does not lie in path of regular typhoons. Wave erosion, tree fall, animal burrowing and human re-use slowly demolish beach sites, There is some risk of invasion by exotic species such as the crown-of-thorns starfish; domestic animals are not allowed entry. Apart from tourism present human impacts are not too threatening: wastes from Koror and potential oil spills, illegal fishing with dynamite, coral and sand dredging and the low fresh water supply, though aquaculture may develop. The islands main threat comes from uncontrolled tourism, especially in vulnerable areas, and the development of Koror town. One example is the graffiti scrawled over prehistoric pictographs. Tour operators within the property must be owned by Palauans and be Palau-based but the authorities face challenges in controlling illegal operators and the numbers of tourists. Some foreign dive and tour companies do not follow local regulations or provide sufficient guidance to customers.

COMPARISON WITH SIMILAR SITES

World Heritage sites strictly comparable with the Rock Islands Southern Lagoon are those which are tropical oceanic archipelagos of beautiful forested coralline islands with cultural interest and reefs of high biodiversity. Of eighteen World Heritage sites with notable coral reefs, several are coastal not oceanic, a few have little or no forest, very few have cultural relics and six are not in the Pacific. Several have notably different hydrographic conditions, geological formations, habitats and species

arrays. Far the richest site on all counts is the coastal Great Barrier Reef trailed by the New Caledonian lagoons (where the very rich flora of the forests is not part of the site). Palau as a whole has a high coral count as does the Rock Islands lagoon itself. Its number of fish species is one of the highest, after the two richest sites, but its totals for birds and plants are relatively low. However it is one of eleven of these sites designated for scenic beauty, and one of eleven designated for both biodiversity and species interest. In addition, it has a well-researched low-key but distinctive cultural interest. Palau's exceptional feature is its marine lakes of which only Ha Long Bay, a coastal and cultural but not particularly biodiverse site, has a similar number.

STAFF

There is a staff of 52: The Director with 2 office staff and 3 professional assistants, mechanic and 5 security guards. There are 23 Koror State Rangers, 2 Conservation Rangers, enforcing the environmental protection laws and 15 volunteer maintenance staff (Beach Boys). The staff receives advice on various aspects of conservation from several governmental, semi-governmental and local agencies. There are three fast boats for staff transport and daily monitoring patrols of tourists, poaching and illegal activities. A southern surveillance station is planned for the Ngemelis Islands near the major dive destinations there.

BUDGET

Management is funded by fairly reliable and increasing revenue from tourism. Koror State collects permit fees for permitted uses and a Green Fee is collected by the Protected Area Network Fund to support the conservation and management of registered protected areas. It also finances the training of rangers and guides and the maintenance of visitor amenities from state funding of US\$1,000,000. The total revenue increased between 2009 and 2011 from US\$ 2,000,000 to US\$ 3,000,000. Supplementary support comes from national, regional and international organisations, in particular from The Nature Conservancy. Fuel for patrolling is the greatest expense.

LOCAL ADDRESS

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REFERENCES

The principal sources for the above information were the original World Heritage nomination, the IUCN evaluation report and Decision 36 COM 8B.12 of the UNESCO World Heritage Committee.

Anon (n.d.). *Types of Galapagos Marine Algae*. Jepson Herbarium, Univ. of California, Berkeley, U.S.A.

Colin P. (2009). *Marine Environments of Palau*. Coral Reef Research Foundation, Palau and Indo-Pacific Press, San Diego 2009 [and references therein].

Costion, C., Kitalong, A. & Holm, T. (2009). Plant endemism, rarity, and threat in Palau, Micronesia: A geographical checklist and preliminary red list assessment. *Micronesica* 41(1):131-164.

Costion, C. (2011). *Threatened Endangered Plants of Palau*. Thesis. University of Adelaide, Australia.

Dawson, M. *et al.* (2009). Marine lakes. In Gillespie, R. & Clague, D. (eds). *Encyclopedia of Islands*, pp.603-7. University of California Press, Berkeley.

De Oliviera, V. (2009). *Four New Additions to the Flora of Fernando de Noronha*. Federal University of Rio de Janeiro, Brazil.

Golbuu, Y., Fabricius, K. & Okaji, K. (2007). Status of Palau's coral reefs in 2005, and their recovery from the 1998 bleaching event. In Kayanne, H. *et al.* (eds), *Coral Reefs of Palau*, pp.40-50. International Coral Reef Center, Koror, Palau.

Hillary, A., Kokkonen, M. & Max, L. (2002). *Proceedings of the World Heritage Marine Biodiversity Workshop*. World Heritage Papers 4. Hanoi, Vietnam.

Ichiki, S. (2003). *Ecotourism in Ogasawara*. Ogasawara Association, Ogasawara, Tokyo 100-2101, Japan.

Idip, J. *et al.* (2007). Coastal habitat map of Palau. In Kayanne, H. *et al.* (eds), *Coral Reefs of Palau*,

pp.170-202. International Coral Reef Center, Koror, Palau.

Kittalong, H., Demao, R. & Holm, T. (2008). *Native Trees and Shrubs of Palau*. The Environment Inc. Koror, Palau.

Losos, J. & Ricklefs, R. (2010). *The Theory of Island Biogeography Revisited*. Princeton University Press, Princeton, New Jersey.

Ohba, H. *et al.* (2007). *Tropical Marine Plants of Palau*. Palau International Coral Reef Center, Koror, Palau.

Osborne, D. (1966). The archaeology of the Palau Islands: An intensive survey. *Bishop Museum Bulletin* No. 230. Bishop Museum Press. Honolulu, Hawaii.

Parmentier, R. (1987). *The Sacred Remains: Myth, History and Polity in Belau*. The University of Chicago Press, Chicago, Illinois. U.S.A.

Patris, S. *et al.* (2010). *Jellyfish Lake*. Coral Reef Research Foundation, Koror, Palau.

Pratt, H. & Etpison, M. (2008). *Birds and Bats of Palau*. Mutual Publishing L.L.C, Honolulu, Hawaii.

Rowley, D. & Jamieson, R. (2011). *Phoenix Islands Protected Area. List of Species*. New England Aquarium, Boston, Mass. U.S.A.

UNESCO World Heritage Committee (2003). *The State of World Heritage in the Asia-Pacific Region*. World Heritage Reports 12. UNESCO World Heritage Centre, Paris.

Walsh, W. *et al.* (2002). *Northwestern Hawaiian Islands/Kure Atoll. Assessment & Management Program*. University of Hawaii, Manoa, Hawaii, U.S.A.

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