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TUBBATAHA REEFS NATURAL PARK PHILIPPINES

Tubbataha is in the centre of the Coral Triangle between Indonesia, Malaysia and the Philippines, locus of the world's greatest coral diversity and is one of the few remaining examples of a highly diverse near-pristine coral reef. Its huge assemblages of corals, fish, marine mammals and seabirds are invaluable to science as a wildlife refuge and field laboratory, and to the regional economy as a dive site of exceptional quality and beauty.

COUNTRY

Philippines

NAME

Tubbataha Reefs Natural Park

NATURAL WORLD HERITAGE SITE

1993: Inscribed as Tubbataha Reef Marine Park on the World Heritage List under natural criteria vii, ix and x.

2010: Boundary extended under the same criteria.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE

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

Brief Synthesis

Tubbataha Reefs Natural Park lies in a unique position in the centre of the Sulu Sea, and includes the Tubbataha and Jessie Beazley Reefs. It protects an area of almost 100,000 hectares of high quality marine habitats containing three atolls and a large area of deep sea. The property is home to a great diversity of marine life. Whales, dolphins, sharks, turtles and Napoleon wrasse are amongst the key species found here. The reef ecosystems support over 350 species of coral and almost 500 species of fish. The reserve also protects one of the few remaining colonies of breeding seabirds in the region.

Criterion (vii): Tubbataha Reefs Natural Park contains excellent examples of pristine reefs with a high diversity of marine life. The property includes extensive reef flats and perpendicular walls reaching over 100m depth, as well as large areas of deep sea. The remote and undisturbed character of the property and the continued presence of large marine fauna such as tiger sharks, cetaceans and turtles, and big schools of pelagic fishes such as barracuda and trevallies add to the aesthetic qualities of the property.

Criterion (ix): Tubbataha Reefs Natural Park lies in a unique position in the middle of the Sulu Sea and is one of the Philippines' oldest ecosystems. It plays a key role in the process of reproduction, dispersal and colonization by marine organisms in the whole Sulu Sea system, and helps support fisheries outside its boundaries. The property is a natural laboratory for the study of ecological and biological processes, displaying the ongoing process of coral reef formation, and supporting a large number of marine species dependant on reef ecosystems. The presence of top predator species, such as tiger and hammerhead sharks, are indicators of the ecological balance of the property. The property also offers a demonstration site to study the responses of a natural reef system in relation to the impacts of climate change.

Criterion (x): Tubbataha Reefs Natural Park provides an important habitat for internationally threatened and endangered marine species. The property is located within the Coral Triangle, a global focus for coral biological diversity. The reefs of the property support 374 species of corals, almost 90% of all coral species in the Philippines. The reefs and seas of the property also support eleven species of cetaceans, eleven species of sharks, and an

estimated 479 species of fish, including the iconic and threatened Napoleon wrasse. The property supports the highest population densities known in the world for white tip reef sharks. Pelagic species such as jacks, tuna, barracuda, manta rays, whale sharks and different species of sharks also are common here and the property is a very important nesting, resting and juvenile development area for two species of endangered marine turtles: green turtles and hawksbill turtles. There are seven breeding species of seabirds and Bird Islet and South Islet are breeding grounds to seven resident and endangered breeding species of seabirds. The critically endangered Christmas Island Frigatebird is a regular visitor to the property.

Integrity

The property comprises two atolls (North and South Atoll) and an emergent coral cay, Jessie Beazley Reef. It includes open sea with an average depth of 750m and still displays a well preserved marine ecosystem with top predators, and a large number and diversity of coral reef and pelagic species. The property also hosts an important population of resident, nesting and feeding seabirds. The area is free of human habitation and activities and is of a sufficient size to maintain associated biological and ecological processes. The property is of an adequate size to ensure the complete representation of the key features and processes of the reef systems within it, although the maintenance of these values also requires measures to be taken outside the boundaries of the property in relation to some migratory species and the buffering of the property from threats to the marine environment that could occur in the wider area. A key aspect of the integrity of the property is the low level of fishing pressure, due to the no-take policies which are in place throughout its area.

Protection and Management Requirements

Tubbataha Reefs Natural Park is legally protected through national protected areas legislation and a range of other environmental legislation which enable action to be taken against a wide range of threats. The implementation of the legislation is assisted by clear delegation to the management authority for the property. This is a remote property and its management is therefore a significant logistical challenge, requiring a well-equipped team with operational boats, well trained and well equipped staff and a sufficient operating budget for fuel, maintenance and accommodation to ensure a strong and responsive presence on the water. Tourism visitation requires careful planning and management to ensure the values of the property are maintained, and to respect the capacity of the property, as well as visitor safety and to ensure income is returned to both site management and local communities. There are threats to the property from shipping, marine litter, fishing, marine pollution and oil exploration. Thus effective buffer zone arrangements are needed, and internationally supported legislation to protect the property from shipping threats, and greater enforcement of marine litter regulation on the High Seas by the appropriate international organisations would be a significant benefit to the property.

INTERNATIONAL DESIGNATIONS

1990: Designated part of Palawan Biosphere Reserve under the UNESCO Man & Biosphere Programme (1,150,800ha: includes Puerto-Princesa Subterranean River National Park).

1999: Designated a Wetland of International Importance under the Ramsar Convention (33,200ha).

IUCN MANAGEMENT CATEGORY

II National Park

BIOGEOGRAPHICAL PROVINCE

Philippines (4.26.13)

GEOGRAPHICAL LOCATION

The reefs are situated between the islands of Palawan and Mindanao in the middle of the Sulu Sea in the southwestern Philippines, 175 km southeast of Puerto Princesa City on Palawan, between 8°41' 33" to 9°06'05"N and 119°45' 46" to 120°03'20"E.

DATES AND HISTORY OF ESTABLISHMENT

1988: Tubbataha Reef Marine National Park (33,200ha) established under Proclamation No.306; it was also protected under Presidential Decree No.705;

1990: The Department of Environment & Natural Resources (DENR) with The Tubbataha Foundation agreed to manage the Park; the site designated part of Palawan UNESCO Biosphere Reserve;

1995: The Presidential Task Force on the Tubbataha Reefs established by Memorandum Circular 128;

1999: Tubbataha Protected Area Management Board created;

2000: Designated a Ramsar Wetland site;

2006: Tubbataha Reef Natural Park including Jessie Beasley reef established by Presidential Proclamation 1126;

2010: Boundary extended; renamed 'Reefs'.

LAND TENURE

Government, in the municipality of Cagayancillo. Managed by the Tubbataha Management Office (TMO) for the Tubbataha Protected Area Management Board (TPAMB).

AREA

33,200 ha. The Park boundaries are set at 3-nm (5.4km) from the reef edges. A 10-nm no-take buffer zone has been proposed but not yet approved by the national Congress.

ALTITUDE

Approximately +2m to 100m below sea-level.

PHYSICAL FEATURES

The site is a group of low reefs lying midway along the Cagayan Ridge, a 400km submarine ridge running northeast-southwest across the Sulu Sea in the southwest Philippines along a line of extinct volcanoes formed at the collision of the Ridge with the Philippine Arc some 15 million years ago. It is the only coral atoll in the Philippines, and consists of North and South Atoll, 8 km apart, and Jessie Beasley Reef, 20km north. The atolls have two main very different habitats: outer reef slope and lagoon. The North Atoll is an oblong platform 16km long by 4.5km wide, which completely encloses a sandy lagoon. The reef flat, which is shallow with parts emerging at extreme low tide, surrounds Bird Islet, a 0.3ha coralline sand cay. The South Atoll is a small triangular-shaped reef about 5km long by 3km wide. It is also a shallow platform enclosing a sandy lagoon with South Islet, a coralline sand cay of about 0.08ha, at its southern tip. Both islets are lightly vegetated and provide nesting sites for seabirds and marine turtles. Jessie Beasley Reef is 5km long by 3km wide and becomes a cay at low tide. These are classic reef formations with extensive reef flats, which to seaward fall 100m below sea level with often perpendicular 40-50m walls of coral-hung crevices, overhangs, ledges and caverns. The outer reef slopes have very clear water, strong wave action and currents, high oxygen, low nutrient content and a very wide depth range from about 1m to over 40m. They have much higher coral diversity and greater beauty than the lagoons. The lagoons have turbid water, little wave action, few currents, higher nutrient but lower oxygen content, higher temperatures, and a depth range from under 1m to 25m.

CLIMATE

Tubbataha is exposed to two monsoons a year. The seas are rough from June to October during the southwest monsoon and again from November to March during the northeast monsoon. Breaks between monsoons bring a week of calmness, usually before monsoonal shifts. Moderate winds from the northeast between April and June allow for regular visits to the area. The reefs are particularly vulnerable to water temperature increase due to their position in the middle of the Sulu Sea open to the flow of warm water from the north through the Mindoro Strait, and from the south through the Balabac Strait. The clear waters of Tubbataha make this even more of a threat as high light intensity contributes to bleaching.

VEGETATION

Four species of tree grow on the islets: sea almond *Terminalia catappa*, white popinac *Leucaena leucocephala*, *Pisonia grandis* and *Argusia argentia* and there are two stands of coconut *Cocos nucifera*. The sticky seeds of *Pisonia* often entrap young birds. Four species of grass, *Melapodium divaricatum*, *Portulaca oleracea*, *Chloris inflata* and *Setaria geniculata* grow on both islands. The shallower reef flats have extensive beds of ten species of sea grass, the four dominant species being *Thalassia hemprichii*, *Halophila ovalis*, *Halodule uninervis* and *H. pinifolia*. On the seaward side 79 species of algae have been recorded (DENR, 1992).

FAUNA

The Reefs, in the Indo-west Pacific faunal province, are in the world centre of coral diversity where their remoteness preserved them almost untouched until the 1980s. The reef system is healthy despite the ravages of the 1998 El Nino event, with hard coral cover ranging from 27% to 62% although intensive fishing has reduced the numbers of tuna and mackerel (UNESCO, 2009). Despite destructive

exploitation, the Park contains 396 species of corals or almost 90% of all species found in the Philippines, and 80% of all coral species found in the Sulu-Sulawesi Seas. Tubbataha has a higher species diversity per square metre than the Great Barrier Reef (Alinio & Licuanan, 2006). Moreover, by 2005 it had almost recovered from the 1998 El Niño devastation. The two distinct habitats harbour very different coral populations. In the lagoons there are extensive seagrass beds. Between 1-2m, dense coral grows, mainly *Acropora hyacinthus*, and species of *Pocillopora* and *Millepora* with some faviids; in the deeper water, growth is more patchy. 30 coral species previously unrecorded in the Philippines have been found there. Micro-atolls of *Porites* spp. and branched *Porites* characterise the back-reef (NRMC, 1982). The reef edge to the reef slope is an *Acropora* zone with branching *Montipora*, *Pocillopora*, *Porites* species and some faviids. The top of the front wall has little coral; between 1-5m growth is increasingly dense, and from 3-7m some areas are dominated by the branching *Acropora bruggmanni*. Lower on the wall is a band of soft corals, algae and sponges (these also occur on Jessie Beazley reef). At a depth of 12-20m, massive species of *Diploastrea*, *Platygyra* and *Porites* grow. The deeper stretches of the drop-off between 20-30m show foliose or plate-like species of *Pachyseris*, *Leptoseris* and *Montipora*, and lower still occur zooanthellate corals with low need for light. A species list is given in Pichon (1977).

The marine life is very rich. Sharks, turtles and rays are seen in the lagoons; eleven species of cetaceans (all listed in CITES) and eleven sharks are recorded. Big schools of pelagic fish such as species of barracuda *Sphyraena* spp., giant trevally *Caranx sexfasciatus* and tuna *Thunnus obesus* (VU), manta and spotted eagle rays *Mobula dibolus* and *Aetobatus narinari*, black-tip sharks *Carcharinus melanopterus* and whale sharks *Rhincodon typus* (VU) are common in the outer waters. The area also supports the world's highest densities of whitetip reef sharks *Triaenodon obesus*. The presence of top predator species such as tiger shark *Galeocerdo cuvier* and hammerhead shark *Sphyrna lewini* (EN) validate the ecological balance of the reef. There are 479 species of fish. Rare species include giant wrasse *Cheilinus undulatus* (EN). There are also topshells *Trochus niloticus*, giant, crocus, scaly and bearpaw clams *Tricadna gigas*, *T. crosea*, *T. squamosa* and horse-hoof clam *Hippopus hippopus*. The endangered hawksbill and green turtles *Eretmochelys imbricata* (CR) and *Chelonia mydas* (EN) nest on the islets. Tubbataha is a major nursery for fish and decapod larvae and, via the monsoon-driven currents, important to their dispersal, colonising and enriching the fisheries of Palawan and other islands of the Sulu Sea. The fish biomass and abundance are lower in the Jessie Beazley Reef as a result of overfishing before its inclusion, but these are still higher than in other reefs in the Sea. A checklist of fish species and macroinvertebrates is given in DENR (1992).

The Park is one of the few remaining refuges for a diversity of seabirds in southeast Asia. 99 species of birds, resident and migrant, have been recorded on the cays. Seven species of seabirds breed there and are found only in the Park, one being an endemic subspecies of black noddy *Anous minutus worcestri*. Bird Island has a colony of brown boobies *Sula leucogaster* and some red-footed boobies *S. sula*. South Island has a greater variety including brown boobies, red-footed boobies, common noddy *Anous stolidus*, sooty and crested terns *Sterna fuscata* and *S. bergii*. The endangered Christmas Island frigate bird *Fregata andrewsi* (CR) is a regular visitor and the Japanese night heron *Gorsachius goisagi* (EN) and Chinese egret *Egretta eulophotes* (VU) occur.

CONSERVATION VALUE

The nearly pristine coral reef of Tubbataha in the heart of the world centre of marine biodiversity, is the most biologically diverse coral system in the Philippines, and of great importance for the surrounding fisheries. It lies within a Conservation International-designated Conservation Hotspot, a WWF Marine Global 200 Eco-region, a UNESCO Biosphere Reserve and the Reef Marine Park is a Ramsar wetland.

CULTURAL HERITAGE

Cultural artefacts have been found on the reefs and will be studied (TPAMB/ WWF, 2003). A wide range of fisheries is practised in the Sula Sea, including traditional line fishing, trawling, spear fishing, offshore long line fishing and reef gleaning (PAWB, 1992). The Cagayagon annual fishing expedition to the reefs were also an initiatory experience for young boys.

LOCAL HUMAN POPULATION

On the Tubbataha reefs, there were no permanent inhabitants though during the fishing season, fishermen from Cagayancillo used to visit for a month gathering turtle and birds eggs, seabirds and fish. Patrolling Park rangers, Navy sailors and Coastguard staff use the ranger station.

VISITORS AND VISITOR FACILITIES

The reefs were first dived commercially in 1979 when the extent of damaging inroads by fishermen from distant islands became apparent. Its great biodiversity led to the area being publicised in the books *Top Ten Dive Sites of the World* and *Top Dive Sites of the World*, which attracted wide interest and a discriminating form of ecotourism: in the 1990s it was visited by approximately 1,500 national and international divers. 692 visitors in 2001 swelled to 1,422 in 2006; an average of 1,000 visitors now visits the Park during the three-month diving season in parties of about 10 per vessel. Between 2000 and 2006, 36% of the visitors were Philippino, 32% American and 32% other foreigners. The reefs can only be reached by live-aboard boats and only from the end of March to June. Visitors may land only at the Ranger Station; all other islands are off-limits. Currents are strong and changeable and strong winds and high waves make mooring very difficult as there is no shelter.

SCIENTIFIC RESEARCH AND FACILITIES

Extensive surveys were carried out in 1982 to assess the suitability of the site as a marine reserve (NRM, 1982). White studied five sites on Tubbataha in 1984; data from Palaganas & White (1989) indicated a reduction in coral cover (mean 24% decline) and chaetodontid diversity (mean 28% decline) in the same five sites. A general account was given in UNEP/IUCN (1984) and a bibliography is given in Palaganas and White (1989). Later surveys to determine reef quality, substrate cover, fish diversity and abundance, the presence of large marine fauna, and recommending management activities, revealed that the reefs had benefited from two years of protective management though this had not prevented destructive fishing (White & Calumpong, 1992). The Park's unique mid-sea location, its reef formations, emergent islands, submerged structures and high biodiversity make it an ideal laboratory for the study of ecological and biological processes, in particular larval dissemination, fish recruitment and the coral populations of the lagoons which are less studied. In 2006 a study of the benthos community structure concluded that the present management was very effective (Alinio & Licuanan), that cetacean species diversity was high (Dolar, 2006), and rich in aggregations of fish larvae (Campos *et al.*, 2006). There is ongoing research into coral cover and physical damage, coral bleaching related to the El Niño Southern Oscillation climatic event, bird populations and fish biomass (UNESCO, 2009).

MANAGEMENT

The reef is protected under the National Integrated Protected Areas System Act, the Local Government Code, the Strategic Environmental Plan for Palawan, the Philippines Fisheries Code and the Wildlife Resources Conservation & Protection Act. Earlier management was replaced in 1999 by the Tubbataha Protected Area Management Board (TPAMB) chaired by the Secretary of Defence since only the resources of the army could ensure protection of so isolated a site. TPAMB is composed of 15 members from national and local government agencies, NGOs, academics and popular organizations. It holds quarterly meetings in Puerto Princesa or Cagayancillo and has successfully adapted its strategies to the challenge of administering the site. An Executive Committee of the Navy, Coast Guard, Palawan Council for Sustainable Development, the Provincial Environment & Natural Resources Office, Dept. of Environment & Natural Resources and WWF-Philippines meets once a month to decide on operational matters and endorse TPAMB programs. Decisions are implemented by the Tubbataha Management Office (TMO) which manages the Park following annual action and financial plans. A project for a Protection, Information and Education Campaign for the Conservation of Tubbataha Reef Marine Park was launched in 1996, which aimed to train local people to participate actively in conservation of the reef (replacing frequently changed service personnel), and to explore the development of community based tourism (TPAMB/WWF, 2003).

Legally the property is entirely a no-take fishing zone but there is much illegal fishing and a 10 nautical mile buffer zone is proposed, necessary in an area of high shipping traffic. The Master Plan and management program were approved in 1999 and updated in 2002 and 2004 to incorporate practical experience of managing the reefs. Its principles are to be applied in the expanded site. The principal goals for long-term management are protection and management, survey and investigation, community development and management, focusing on the municipality of Cagayancillo; improved publicity is to be added from 2008. Patrolling and surveillance is undertaken by the Tubbataha Management Office, the Navy and the Coastguard service in 3-monthly stints. Commercial fishing, spear fishing and coral gathering are illegal under the provisions of Proclamation No.306 and are successfully prosecuted. By 2005, hard coral cover had increased since 1997 by 45.9% and soft coral cover by 12.3% - to almost the same level as before the 1997 El Niño event. (WWF, 2005), though there was a 10% decrease in 2006. The most recent survey in 2008, showed that the reef system is healthy with the highest levels of cover

in deeper areas, though fishing has reduced the numbers of tuna and mackerel. The establishment of micro-credit activities has stopped the flow of illegal fishermen from the nearby Cagayanan Islands and might, with education, be effective elsewhere (UNESCO, 2009). Monitoring is conducted by WWF-Philippines. The chief indicators are coral cover, fish numbers and visitor numbers; others, biophysical, socio-economic and managerial, include species, habitats, communities, fish-take, conflicts, management effectiveness and stakeholder recommendations. These have been studied and the conclusions absorbed into the management cycle. The whole Cagayan Ridge is also within the tri-nation marine Sulu-Sulawesi Seascape project of Conservation International.

MANAGEMENT CONSTRAINTS

Tubbataha long remained pristine due to its inaccessibility and its isolation from population centres. However, the reefs are in a region of high fishing pressure, especially after the introduction in the 1980s of motorised fishing boats from more distant islands with the use of dynamite and cyanide. Despite the establishment of the Park in 1988, a 52% decline in live coral cover was observed by 1989 due to a combination of destructive fishing and inadequate enforcement to safeguard the area. There was also increased collection of seabird and turtle eggs, aquarium fish, giant clams and topshells (DENR, 1992). An illegal seaweed farm on the islands employing up to 24,000 people was dismantled after six months. Much of the damage to Tubbataha in the 1990s was by subsistence fishermen from Cagayancillo, where stocks have been overexploited, as well as by foreign fishing operations and the large number of diving tours. Although this pressure gradually decreased, by 2004 the fish density of Jessie Beazley Reef was only 75% of that of the main reefs as a result of open access fishing before its inclusion in the Park. Poaching for endangered fish, surreptitious nocturnal collection of *Trochus* topshells continue, and fish-aggregation devices have been installed on the edge of the property to attract fish without encroachment (UNESCO, 2009).

Climate change is a threat but with strict protection the coral reef ecosystem has demonstrated more resilience and recovered more rapidly than more heavily exploited systems, exemplified by its quick recovery after bleaching had affected some 21% of its benthic communities in 1998. Oil exploration has been initiated by the government which prompted a plan for the mitigation of oil spills. One contract arranged before the expansion covers 16,500 ha of the north of the Park. Spills, sewage and waste water discharged from passing tankers could introduce pollution and alien species into the reefs. Concrete moorings dragged across the bottom and groundings by dive boats damage the coral. In addition, the protection of the reefs directly affects the Cagayangons and in 1997 UNESCO reported past resentment amongst the local people for being excluded from the conservation process.

STAFF

The Park Manager is assisted by a Finance & Administrative officer, an administrative assistant, 2 research assistant/rangers and 2 park rangers. These are supplemented by 40 trained personnel from the Navy and Coastguard who also work from the Ranger Station in the North Atoll when on the islands. These bodies patrol the Park on 3-monthly rotation. A lighthouse keeper is occasionally stationed at the lighthouse on South Islet. Extensive training is provided by TMO.

BUDGET

Early funding was very dependent on outside organisations. Between 1996 and 1998 WHF granted \$US100,000. The TMO was set up with GEF-UNDP and Packard Foundation funding. Between 2000 and 2005, WWF-Philippines contributed \$US80,000 annually, which, with contributions from the Navy and Coastguard and other donors covered the costs of operations and some 20 research programs (TPAMB,2003). By 2007, the Government contributed \$10,000 directly and \$40,000 through the Navy and Coastguard service, the WWF-Philippines grant continues and GEF-UNDP supports a conservation monitoring project. Dive tourism generated US\$60,000 in 2005. UNF has granted US\$118,800 for preparation, training and technical assistance. But \$160,000 (ideally \$240,000) is needed annually for management, operations, equipment, prosecutions and training.

LOCAL ADDRESSES

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Protected Areas and Wildlife Bureau, Department of Environment and Natural Resources, Region 4 Regional Office, Ninoy Aquino Parks & Wildlife Center, Quezon Ave, Quezon City 1100.

United Nations Commission of the Philippines, G/F Department of Foreign Affairs Building, 2330 Roxas Boulevard, Pasay City, Philippines.

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