

Blue lines indicate the area meeting the ISRA Criteria; dashed lines indicate the suggested buffer for use in the development of appropriate place-based conservation measures

BORA BORA ISRA

New Zealand & Pacific Islands Region

SUMMARY

Bora Bora is located in the Society Islands in French Polynesia. The area encompasses the lagoon of Bora Bora that is separated from the open ocean by a barrier reef. It is characterised by coral reefs, sandy substrates, and seagrass beds. Within this area there are: **threatened species** (e.g., Spotted Eagle Ray *Aetobatus ocellatus*); **reproductive areas** (Reef Manta Ray *Mobula alfredi*); and **undefined aggregations** (e.g., Spotted Eagle Ray).

CRITERIA

Criterion A - Vulnerability; Sub-criterion C1 - Reproductive Areas; Sub-criterion C5 - Undefined Aggregations

FRENCH
 POLYNESIA

0-200 metres

34.07 km²





DESCRIPTION OF HABITAT

Bora Bora is located in the Society Islands of French Polynesia. The area encompasses the lagoon of Bora Bora, a shallow, sheltered body of water encircling the island that is separated from the open ocean by a barrier reef and the entrance of the channel. Bora Bora is a volcanic island, with the Baie de Povai outlining the former caldera (Blais et al. 2000). The lagoon's maximum depth is ~50 m, with surrounding ocean depths plunging to approximately 1,000 m. The area is characterised by coral reefs, sandy substrates, and seagrass beds (Lecchini et al. 2021; V Poly pers. obs. 2024).

The area is influenced by warm water temperatures between 25–30°C and high salinity supporting a diverse marine ecosystem. Nutrient cycling in the lagoon is driven by natural and anthropogenic sources (Lecchini et al. 2021). The climate of Bora Bora is characterised by a hot and wet season during the austral summer (November–April), and a colder and drier period in the winter (May–October) (Gabrié and Salvat 1985). Trade winds blow from the northeastern to southeastern directions (Pirazzoli et al. 1985).

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 200 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Two Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species regularly occur in the area. These are the Endangered Spotted Eagle Ray (Finucci et al. 2024) and the Vulnerable Reef Manta Ray (Marshall et al. 2022).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Bora Bora is an important reproductive area for one ray species.

Between 2002–2024, the area was surveyed using citizen science representing 34% (n = 216) of the total observations of Reef Manta Rays. More focused surveys using photo-identification with snorkel and scuba (n = 635 days) were also undertaken between 2015–2024 (Carpentier 2023; A Carpentier & V Poly pers. obs. 2024). During 2015–2024, 2,077 photo-identification sighting reports of 87 individuals were collected detailing behavioural activity. Courtship behaviour was observed in 11.2% (n = 231) of observations. A total of 34 courtship trains were reported from 2021 to 2023, with one to eight males following one or two females (Carpentier 2023; V Poly pers. obs. 2024). Mating trains lasted from two days and up to several weeks, and a record of four weeks was reported through photo-identification of a mating train on a single female, which is one of the longest durations for a courtship train recorded globally for the Reef Manta Ray (Carpentier 2023; G Stevens pers. comm. 2024). Additionally, a total of 30 different pregnancies of 15 individuals (33% of the 46 females identified in the area) were recorded between 2002–2010 and 2020–2024, based on observations of the distended abdominal region of the animals (Carpentier 2023). Pregnant Reef Manta Rays are more frequently sighted inside the lagoon during the later stages of pregnancy, which may suggest that the area plays a crucial role in the species' reproductive success, offering better protection from oceanic predators (A Carpentier & V Polly pers. obs. 2024).

Seven (8% of individuals) young-of-the-year (YOY) Reef Manta Rays have also been identified in the area (disc width [DW] size of <200 cm and light-coloured patterns on the back and belly spots)

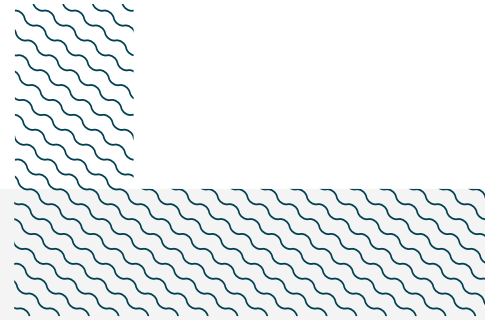
(Carpentier 2023; A Carpentier & V Poly pers. obs. 2024). Size-at-birth for this species in the wild is 130-150 cm DW (Marshall et al. 2010) and a male born in human care at 182 cm DW grew to 261 cm DW by the age of 10 months (Nozu et al. 2017; Murakumo et al. 2020). Given the size at birth and this rapid early growth, all individuals <200 cm DW were classified as neonates or YOY. One of these individuals was a male identified as a YOY in 2015, who is still monitored (2024) through photo-identification in the area (Carpentier 2023; French Polynesia Manta Project unpubl. data 2024), indicating that the area is important for the growth and development of the species.

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Bora Bora is an important area for undefined aggregations of two ray species.

Between 2021 and 2024, year-round and regular observations during photo-identification surveys for Reef Manta Rays revealed regular annual aggregations of Spotted Eagle Rays at three main sites within the area (V Poly pers. obs. 2024). Aggregations of Spotted Eagle Rays ranged from three individuals to over 152 (A Carpentier & V Poly pers. obs. 2024). The primary observed behaviour appeared to be resting while swimming (V Poly pers. obs. 2024). Additionally, between October 2020 and November 2021, Spotted Eagle Rays within aggregations were counted during 32 surveys, with a maximum of 152 individuals and an average aggregation size of 47 animals (A Carpentier unpubl. data 2024). During this period, aggregations were observed every month except January. Further information is required to confirm the nature and function of these aggregations.

The area is a year-round aggregation site for Reef Manta Rays. Between 2015-2024, 635 surveys conducted with photo-identification in the area recorded a total of 2,062 sightings of 87 individuals (French Polynesia Manta Project unpubl. data 2024). Cleaning behaviour was observed in 84.7% (n = 1,746) of the observations across a network of cleaning stations (three main sites), with up to 15 individuals being cleaned at the same time (French Polynesia Manta Project unpubl. data 2024). Almost all Reef Manta Rays identified in this area (90.4%) were observed cleaning at least once. In 13.5% of the cases (n = 31), courtship and cleaning behaviour occurred during the same observations (French Polynesia Manta Project unpubl. data 2024). Additionally, from a total of 54 Reef Manta Rays monitored between 2021-2023 in Bora Bora, 46 individuals were seen at two or three of the different cleaning stations in the area, indicating high connectivity within the area (Carpentier 2023). Between 2015-2024, feeding behaviour of Reef Manta Rays was recorded in this area in 6.5% (n = 134) of the total sightings (n = 2,062) (French Polynesia Manta Project unpubl. data 2024). Feeding aggregations with a maximum of 18 individuals, involved strategies such as chain feeding (Carpentier 2023; A Carpentier & V Poly pers. obs. 2024), where Reef Manta Rays line up head-to-tail, forming a line of several individuals moving together through the water column along a horizontal plane (Stevens et al. 2018). Reef Manta Rays aggregate in the area to feed on the high concentrations of zooplankton that may be driven by the Island Mass Effect, however, further information is needed to understand feeding dynamics and seasonality (French Polynesia Manta Project unpubl. data 2024).



Acknowledgments

Virginie Poly (Manta Trust), Alice Carpentier (Manta Trust; Observatoire des Requins de Polynésie), Maya Santangelo (Manta Trust), Fanny Martre (Direction de l'Environnement de Polynésie Française), Kori Burkhardt (Mao Mana Foundation with Direction de l'Environnement de Polynésie Française), and Marta D Palacios (IUCN SSC Shark Specialist Group - ISRA Project) contributed and consolidated information included in this factsheet. We thank all participants of the 2024 ISRA Region 10 - New Zealand and Pacific Islands workshop for their contributions to this process.

This factsheet has undergone review by the ISRA Independent Review Panel prior to its publication.

This project was funded by the Shark Conservation Fund, a philanthropic collaborative pooling expertise and resources to meet the threats facing the world's sharks and rays. The Shark Conservation Fund is a project of Rockefeller Philanthropy Advisors.

Suggested citation

IUCN SSC Shark Specialist Group. 2024. Bora Bora ISRA Factsheet. Dubai: IUCN SSC Shark Specialist Group.

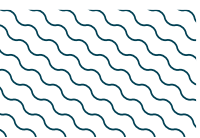
QUALIFYING SPECIES

Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met								
				A	B	C1	C2	C3	C4	C5	D1	D2
RAYS												
<i>Aetobatus ocellatus</i>	Spotted Eagle Ray	EN	0-40	X						X		
<i>Mobula alfredi</i>	Reef Manta Ray	VU	0-711	X		X				X		

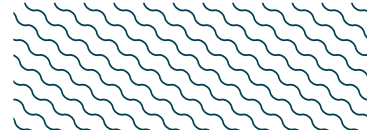
SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Carcharhinus melanopterus</i>	Blacktip Reef Shark	VU
<i>Galeocerdo cuvier</i>	Tiger Shark	NT
<i>Negaprion acutidens</i>	Sharptooth Lemon Shark	EN
<i>Rhincodon typus</i>	Whale Shark	EN
<i>Triaenodon obesus</i>	Whitetip Reef Shark	VU
RAYS		
<i>Pateobatis fai</i>	Pink Whipray	VU

IUCN Red List of Threatened Species Categories are available by searching species names at www.iucnredlist.org. Abbreviations refer to: CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient.



SUPPORTING INFORMATION



There are additional indications that this area is part of a movement corridor for Reef Manta Rays between Bora Bora and Maupiti (separated by a minimum linear distance of 50 km).

Movements between Maupiti and Bora Bora have been recorded regularly and predictably between 2014 and 2024, with 31 distinct individuals identified through photo-identification observed travelling between these islands. This accounts for 36% (n = 84) of the identified individuals from Maupiti and 35% (n = 87) of those from Bora Bora, indicating the presence of a movement corridor between these locations and regular travel between the islands (French Polynesia Manta Project unpubl. data 2024). The reasons for these inter-island movements are not clearly identified; however, 45% (n = 14) of these individuals were female and 55% (n = 17) were male. The number of recorded movements between the islands varied among individuals, with a minimum of one way and a maximum of three roundtrips.



REFERENCES

- Blais S, Guille G, Guillou H, Chauvel C, Maury RC, Caroff M. 2000.** Géologie, géochimie et géochronologie de l'île de Bora Bora (Société, Polynésie Française). *Comptes Rendus de l'Académie des Sciences-Series IIA-Earth and Planetary Science* 331(9): 579-585. [https://doi.org/10.1016/S1251-8050\(00\)01456-7](https://doi.org/10.1016/S1251-8050(00)01456-7)
- Carpentier A, Berthe C, Ender I, Jaine F, Mourier J, Stevens G, De Rosemont M, Clua E. 2019.** Preliminary insights into the population characteristics and distribution of reef (*Mobula alfredi*) and oceanic (*M. birostris*) manta rays in French Polynesia. *Coral Reefs* 38(6): 1197-1210. <https://doi.org/10.1007/s00338-019-01854-0>
- Carpentier A. 2023.** Study on reef manta ray (*Mobula alfredi*) and oceanic manta ray (*M. birostris*) in French Polynesia. Final Report by the Sharks and Rays Observatory of French Polynesia, in collaboration with the Manta Trust, for The Direction of the Environment of French Polynesia. French Polynesia.
- Finucci B, Rigby CL, Armstrong AO, Rezaie-Atagholipour M. 2024.** *Aetobatus ocellatus*. *The IUCN Red List of Threatened Species* 2024: e.T42566169A124549514.
- Gabrié C, Salvat B. 1985.** General features of French Polynesian islands and their coral reefs. In *5th International Coral Reef Congress, Tahiti* 1: 1-16.
- Lecchini D, Bertucci F, Schneider D, Berthe C, Gache C, Fogg L, Waqalevu V, Maueau T, Sturny V, Bambridge, et al. 2021.** Assessment of ecological status of the lagoon of Bora-Bora Island (French Polynesia). *Regional Studies in Marine Science* 43: 101687. <https://doi.org/10.1016/j.rsma.2021.101687>
- Marshall AD, Bennett MB. 2010.** Reproductive ecology of the reef manta ray *Manta alfredi* in southern Mozambique. *Journal of Fish Biology* 77(1): 169-190. <https://doi.org/10.1111/j.1095-8649.2010.02669.x>
- Marshall A, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Pacoureau N, et al. 2022.** *Mobula alfredi* (amended version of 2019 assessment). *The IUCN Red List of Threatened Species* 2022: e.T195459A214395983. <https://dx.doi.org/10.2305/IUCN.UK.2022-1.RLTS.T195459A214395983.en>
- Murakumo K, Matsumoto R, Tomita T, Matsumoto Y, Ueda K. 2020.** The power of ultrasound: Observation of nearly the entire gestation and embryonic developmental process of captive reef manta rays (*Mobula alfredi*). *Fisheries Bulletin* 118(1): 1-7. <https://doi.org/10.7755/fb.118.1.1>
- Nozu R, Murakumo K, Matsumoto R, Matsumoto Y, Yano N, Nakamura M, Yanagisawa M, Ueda K, Sato K. 2017.** High-resolution monitoring from birth to sexual maturity of a male reef manta ray, *Mobula alfredi*, held in captivity for 7 years: changes in external morphology, behavior, and steroid hormones levels. *BMC Zoology* 2: 14. <https://doi.org/10.1186/s40850-017-0023-0>
- Pirazzoli PA, Brousse R, Delibras G, Montaggioni LF, Sachet MH, Salvat B, Sinoto YH. 1985.** Leeward islands, Maupiti, Tupai, Bora Bora, Huahine, Society archipelago. In *5th International Coral Reef Congress, Tahiti* 1: 17-72.