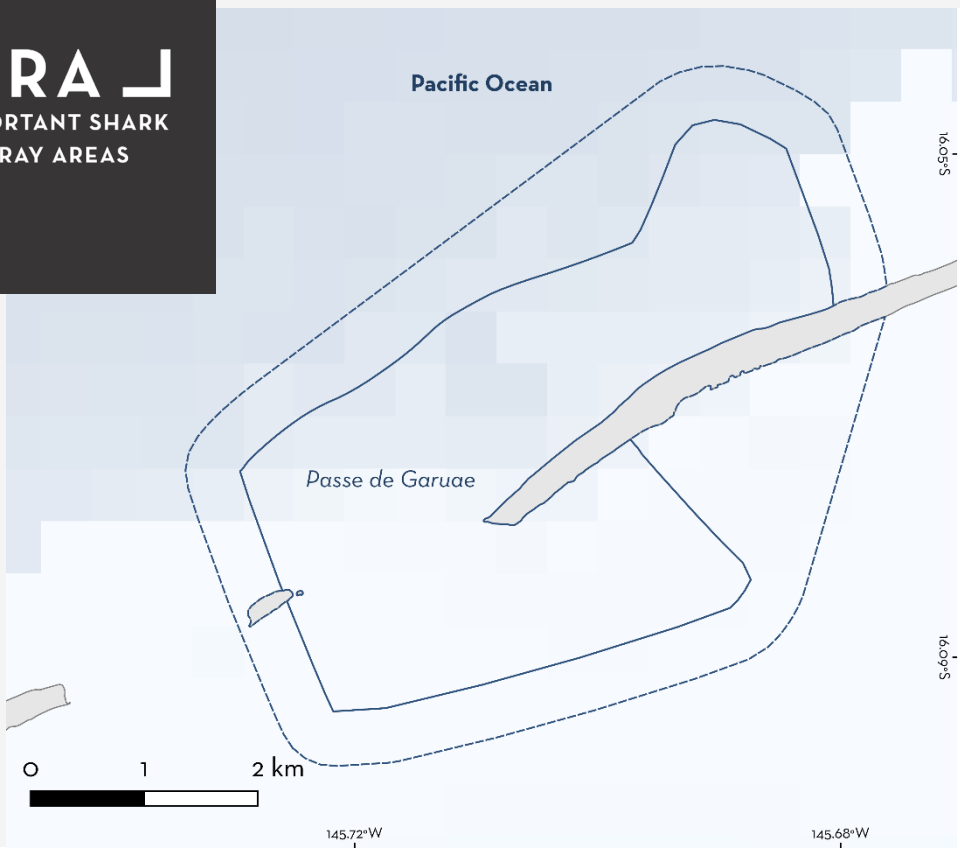
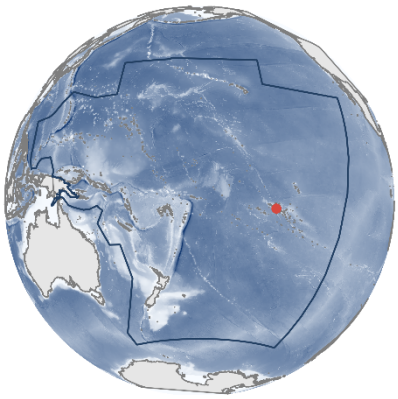
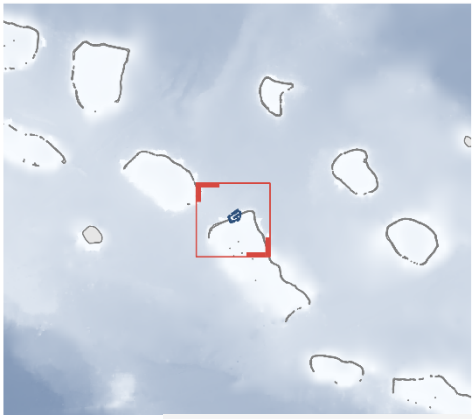
ISRA
IMPORTANT SHARK AND RAY AREAS







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

PASSE DE GARUAE ISRA

New Zealand & Pacific Islands Region

FRENCH POLYNESIA

0–750 metres

13.28 km²

SUMMARY

Passe de Garuae is located on the north of Fakarava Atoll in the Tuamotu Archipelago in French Polynesia. The area is characterised by coral reefs and sand patches inside the pass and an area inside the lagoon. The area is influenced by strong currents with incoming and outgoing currents shifting every six hours. The area overlaps with the Commune de Fakarava World Heritage Biosphere Reserve and the Kauehi Marine Key Biodiversity Area. Within this area there are: **threatened species** (e.g., Reef Manta Ray *Mobula alfredi*); **feeding areas** (Sicklefin Devil Ray *Mobula tarapacana*); and **undefined aggregations** (e.g., Grey Reef Shark *Carcharhinus amblyrhynchos*).

CRITERIA

Criterion A – Vulnerability; Sub-criterion C2 – Feeding Areas; Sub-criterion C5 – Undefined Aggregations

DESCRIPTION OF HABITAT

Passe de Garuae is located at the northern end of the Fakarava Atoll in the Tuamotu Archipelago in French Polynesia. Fakarava Atoll is 1,246 km² in size and is located in the northwestern part of the Tuamotu Archipelago. The atoll has a rectangular shape and is ~55 km long from northwest to southeast (Duvat et al. 2020), featuring a lagoon with a maximum depth of 60 m (Rougerie 1994). It is connected to the open ocean in the north through the Garuae Pass and in the south through the Tumakohua Pass. The area encompasses a 40–50 m deep pass, with one of the widest channels in French Polynesia, spanning 1.6 km across. It is characterised by coral reefs and sand patches inside the pass and a cleaning station outside the lagoon. The area is influenced by a strong current, especially during December–March, with incoming and outgoing currents shifting every six hours due to tides (J Mourier pers. comm. 2024). During the austral winter (April–October) the area is influenced by strong trade winds and distant-source swells originating from the south and southwest, while during summer (November–March) waves originate mainly from tropical cyclones (during El Niño phases) or from distant storms in northern latitudes (Duvat et al. 2020).

This area overlaps with the Commune de Fakarava World Heritage Biosphere Reserve (UNEP-WCMC & IUCN 2024) and the Kauehi Marine Key Biodiversity Area (KBA, KBA 2024).

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 750 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Three Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species regularly occur in the area. These are the Endangered Grey Reef Shark (Simpfendorfer et al. 2020) and Sicklefin Devil Ray (Marshall et al. 2022a); and the Vulnerable Reef Manta Ray (Marshall et al. 2022b).

SUB-CRITERION C2 – FEEDING AREAS

Passe de Garuae is an important feeding area for one ray species.

The area holds the regular presence of feeding aggregations of Sicklefin Devil Ray. Between 2011–2017, recreational divers and observations on social media platforms reported large aggregations of up to 50 Sicklefin Devil Rays feeding on myctophids and dense patches of zooplankton on the oceanic side of the Pass.

From July 2011 to April 2018, a citizen science initiative through the Observers of the Polynesian Shark Observatory conducted 1,272 dives in the area (Séguigne et al. 2023; Séguigne unpubl. data 2024). Divers recorded the date, time, site location, species, visually estimated sizes, sex, and estimated/counted number of individuals during 50–60 min dives (Séguigne et al. 2023). Additionally, anecdotal sightings were gathered from social media platforms (n = 2). Feeding aggregations were recorded in November 2011 (n = 30 individuals), during two consecutive days in September 2015 (n > 50) and in December 2017 (n > 50) (Observers of the Polynesian Shark Observatory unpubl. data. 2024). Further, fishers report frequent aggregations of 10–15 Sicklefin Devil Rays, coinciding with seabird feeding events in groups outside the pass (A Carpentier pers. obs. 2024). Additionally, through the citizen science initiative, a total of 120 Sicklefin Devil Ray individuals were recorded

during seven sightings, comprising five aggregations of between 3–41 individuals (mean = 23) in November and December 2011, July 2015, and September 2016, although specific behaviours were not reported (Séguigne et al. 2023; Séguigne unpubl. data 2024). These feeding aggregations may be linked to the productivity of the area that is strongly influenced by the northeast monsoon (Duvat et al. 2020).

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Passe de Garuae is an important area for undefined aggregations of one shark and one ray species.

From July 2011 to April 2018, a citizen science initiative through the Observers of the Polynesian Shark Observatory conducted 1,272 dives in the area (Séguigne et al. 2023; Séguigne unpubl. data 2024). Divers recorded the date, time, site location, species, visually estimated sizes, sex, and estimated/counted number of individuals during 50–60 min dives (Séguigne et al. 2023).

Between 2011–2018, Grey Reef Sharks were recorded on almost all dives (96.4%) (Séguigne et al. 2023). Overall, 59,390 individuals were reported, including 1,207 sightings (98.3% of the sightings) of between three and 100 individuals during a single dive (mean = 49 ± 21.16 SD) (Séguigne unpubl. data 2024). These observations were recorded each year of the survey: 2011 (n = number of sightings of more than three individuals, 28), 2012 (n = 21), 2013 (n = 235), 2014 (n = 378), 2015 (n = 365), 2016 (n = 164) and 2017 (n = 17) (Séguigne et al. 2023). Grey Reef Sharks are present in the area year-round with all months of the year with aggregations of more than 100 individuals recorded in a single dive (Séguigne et al. 2023). Courtship and mating behaviour has been observed principally in June and December, with some sporadic sightings in September and March, however, further information is required to determine the nature and function of these aggregations.

Between 2011–2018 Reef Manta Rays were recorded on 358 dives (28.2%) within the citizen science initiative (Séguigne et al. 2023). Overall, 757 observations of Reef Manta Rays were reported, including 88 sightings (24.6% of the sightings) of between three and nine individuals during a single dive (mean = 4.6 ± 3.42 SD) (Séguigne unpubl. data 2024). Aggregations were recorded in 2011 (n = number of sightings of more than three individuals, 2013 (n = 10), 2014 (n = 45), 2015 (n = 25) and 2016 (n = 7) (Séguigne et al. 2023).

Additionally, between 2009–2024, 87 sightings were collected through citizen science, and photo-identification techniques, recording a total of 62 individuals (French Polynesia Manta Project unpubl. data 2024; Carpentier 2023). The area encompasses a cleaning station, with cleaning as the main behaviour displayed by the animals (43.42% of the sightings). The 31% of the identified population in the atoll has been re-sighted at this site, and one individual has been re-sighted nine times at this site. Seasonal aggregations occur mostly between September–December. Reef Manta Rays are mostly seen at this site when the current is going out the pass (Carpentier 2023; French Polynesia Manta Project unpubl. data 2024). Courtship behaviour has also been recorded (n = 7) mostly between September–December when aggregations occur. The distinct courtship stages observed were initiation, endurance, evasion, and pre-copulation positioning (French Polynesia Manta Project unpubl. data 2024). Additionally, three heavily pregnant Reef Manta Ray were recorded in the area (French Polynesia Manta Project unpubl. data 2024). The females were determined to be pregnant by the presence of an extended abdomen (French Polynesia Manta Project unpubl. data 2024).

Acknowledgments

Alice Carpentier (Manta Trust; Observatoire des Requins de Polynésie), Nicolas Buray (Observatoire des Requins de Polynésie), Fanny Martre (Direction de l'Environnement de Polynésie Française), Maya Santangelo (Manta Trust), Virginie Poly (Manta Trust), Clémentine Séguigne (IREMP), 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. Passe de Garuae 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
SHARKS												
Carcharhinus amblyrhynchos	Grey Reef Shark	EN	0–280	X						X		
RAYS												
Mobula alfredi	Reef Manta Ray	VU	0–711	X						X		
Mobula tarapacana	Sicklefin Devil Ray	EN	0–1,896	X			X					

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Carcharhinus albimarginatus	Silvertip Shark	VU
Carcharhinus melanopterus	Blacktip Reef Shark	VU
Galeocerdo cuvier	Tiger Shark	NT
Nebrius ferrugineus	Tawny Nurse Shark	VU
Rhincodon typus	Whale Shark	EN
Sphyrna mokarran	Great Hammerhead	CR
Triaenodon obesus	Whitetip Reef Shark	VU
RAYS		
Aetobatus ocellatus	Spotted Eagle Ray	EN

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 may be an important for feeding purposes for Great Hammerheads. Within the area there are anecdotal reports of Great Hammerheads feeding or preying on Grey Reef Sharks (n = 6), with sporadic reports of predation on other species, such as Tawny Nurse Sharks (Kaina Plongee pers. comm. 2024). Compared to the southern pass of the Fakarava Atoll where Great Hammerheads are almost absent, the Passe de Garuae has more regular sightings of this species, with confirmed events of predation (Y Papastamatiou pers. comm. 2024). Further information is required to determine the importance of the area for this species.

REFERENCES

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.

Duvat VKE, Pillet V, Volto N, Terorotua H, Laurent V. 2020. Contribution of moderate climate events to atoll island building (Fakarava Atoll, French Polynesia). *Geomorphology* 354: 107057. https://doi.org/10.1016/j.geomorph.2020.107057

Key Biodiversity Areas (KBA). 2024. Key Biodiversity Areas factsheet: Kauehi Marine. Available at: https://www.keybiodiversityareas.org/site/factsheet/31335 Accessed October 2024.

Marshall A, Barreto R, Bigman JS, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, et al. 2022a. *Mobula tarapacana* (amended version of 2019 assessment). *The IUCN Red List of Threatened Species* 2022: e.T60199A214371388. https://dx.doi.org/10.2305/IUCN.UK.2022-1.RLTS.T60199A214371388.en

Marshall A, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Pacoureau N, et al. 2022b. *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

Rougerie F. 1995. Nature et fonctionnement des atolls des Tuamotu (Polynésie Française). *Oceanologica Acta* 18: 61–78.

Séguigne C, Mourier J, Clua É, Buray N, Planes S. 2023. Citizen science provides valuable data to evaluate elasmobranch diversity and trends throughout the French Polynesia's shark sanctuary. *PLOS ONE* 18(3): e0282837. https://doi.org/10.1371/journal.pone.0282837

Simpfendorfer C, Fahmi, Bin Ali A, Dharmadi, Utzurrum JAT, Seyha L, Maung A, Bineesh KK, Yuneni RR, Sianipar A, et al. 2020. *Carcharhinus amblyrhynchos*. *The IUCN Red List of Threatened Species* 2020: e.T39365A173433550. https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T39365A173433550.en

UNEP-WCMC & IUCN. 2024. Protected Planet: The World Database on Protected Areas (WDPA) and World Database on Other Effective Area-based Conservation Measures (WD-OECM) [Online], February 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: https://www.protectedplanet.net/2068 Accessed September 2024