

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

TIPUTA PASS ISRA

New Zealand & Pacific Islands Region

SUMMARY

Tiputa Pass is located on Rangiroa Atoll in the Tuamotu Archipelago in French Polynesia. The area is characterised by the largest and deepest channel in the atoll, with a steep drop-off at the mouth to ocean depths exceeding 200 m. The region is influenced by the Island Mass Effect and the easterly trade winds with a phytoplankton enhancement. Within this area there are: **threatened species** (e.g., Grey Reef Shark *Carcharhinus amblyrhynchos*); **feeding areas** (Great Hammerhead *Sphyrna mokarran*); and **undefined aggregations** (e.g., Spotted Eagle Ray *Aetobatus ocellatus*).

CRITERIA

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

FRENCH POLYNESIA
0-150 metres
1.13 km²





DESCRIPTION OF HABITAT

Tiputa Pass is located on the Rangiroa Atoll in the Tuamotu Archipelago of French Polynesia. Rangiroa is the largest atoll in the Tuamotus, measuring 80 km in length and 5-32 km in width. The lagoon is enclosed by an almost continuous reef flat, reaching a maximum depth of 38 m, with approximately 100 narrow passages in the fringing reefs (Kumar et al. 2019). Two major passes allow water to flow into and out of the atoll lagoon in the northwest: Tiputa Pass and another smaller pass (Vollbrecht et al. 2021). Tiputa Pass is the larger and deeper channel, ~310 m wide, with an opening on the Rangiroa Atoll barrier reef measuring 240 by 950 m (Boube et al. 2023). The depth ranges from 14 m on the lagoon side to 45 m on the ocean side, with a steep drop-off at the mouth to ocean depths exceeding 200 m. The tides in the area are semi-diurnal, with two tidal cycles per day of unequal range (mean tidal range = 0.52 m) (Kumar et al. 2019).

The region is influenced by the Island Mass Effect and the easterly trade winds, experiencing two relatively distinct seasons, a wet season from December–March and a dry season from July–October (Kumar et al. 2019; Vollbrecht et al. 2021). Water circulating through the pass results in a nearshore phytoplankton enhancement of approximately 16%, indicating that the lagoon likely provides increased nutrients for phytoplankton production compared to the surrounding oligotrophic ocean (Vollbrecht et al. 2021).

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 150 m based on the bathymetry of the area and the distribution of the Qualifying Species.

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 Critically Endangered Great Hammerhead (Rigby et al. 2019); and the Endangered Grey Reef Shark (Simpfendorfer et al. 2020) and Spotted Eagle Ray (Finucci et al. 2024).

SUB-CRITERION C2 – FEEDING AREAS

Tiputa Pass is an important feeding area for one shark species.

In January–February 2020, and between December 2020 to March 2021, 221 research dives were conducted over 123 days in the area during incoming currents. Photo-identification was used to record individuals (using natural markings, fin morphology, scars, and ventral pigmentation) and laser photogrammetry to measure their size (Boube et al. 2023). The number of sharks was determined based on identifiable individuals and those sighted simultaneously. In addition, photographs and videos from Tiputa divers (n = 600 sightings) were collected between February 2006 and May 2021 (Boube et al. 2023; T Boube pers. obs. 2024).

Great Hammerheads were recorded during 144 research dives (64%, n = 221 total number of dives), with one to 11 individuals sighted per dive (Boube et al. 2023). Despite typically being a solitary species (Rigby et al. 2019; Ebert et al. 2021), aggregations of up to nine individuals in the same field of view were observed (T Boube pers. obs. 2024). A total of 102 individual Great Hammerheads were photo-identified in the area over the 15-year period, with 43 individuals resighted across more than

one season (Boube et al. 2023; T Boube unpubl. data 2024). Between 2020–2021, 49 Great Hammerheads were identified, comprising 48 females and one of unknown sex, with sizes ranging from 147–297 cm precaudal length (Boube et al. 2023). Size-at-maturity for the species is 210–300 cm total length (TL) for females indicating these were adult animals (Ebert et al. 2021). Further, Great Hammerheads (n = 27) were acoustically tagged in February–March 2023 (n = 12) and December 2023–March 2024 (n = 15) (T Boube unpubl. data 2024). The overall residency index (calculated as the number of days detected relative to the total days between the first and last detections) ranged from 0.25 to one, with days detected varying between one and 68 days (T Boube unpubl. data 2024).

Several photographic records (n = 12 records of hunting and two of predation) have documented Great Hammerheads preying on Grey Reef Sharks and Spotted Eagle Rays in the area (T Boube pers. obs. 2024; Boube et al. 2023). Between 2021–2024, a citizen survey interviewed over 100 sea users, including fishers, guides, and residents living in the atoll, to gather information on Great Hammerhead sightings and behaviours in the area. Fourteen respondents reported witnessing predation events involving Great Hammerheads hunting Blacktip Shark, Blacktip Reef Shark, Spotted Eagle Ray, stingrays, and turtles (T Boube unpubl. data 2024). Additionally, the temporal distribution of Spotted Eagle Rays and Great Hammerheads was similar, indicating a clear relationship between their numbers during the austral summer (December–February) (Boube et al. 2023). Sightings of Great Hammerheads increased on days near the full moon (Boube et al. 2023).

From July 2011 to April 2018, a citizen science initiative through the Observers of the Polynesian Shark Observatory conducted 6,316 dives in Tiputa Pass (Séguigne et al. 2023; C Séguigne unpubl. data 2024). Divers recorded the date, time, site location, species, visually estimated sizes, sex, and estimated/counted number of individuals (Séguigne et al. 2023). Great Hammerheads were recorded on 1,332 of these dives (~21%) with an abundance between one and seven individuals (mean = 1.55 ± 1.05 SD) (C Séguigne unpubl. data 2024). Great Hammerheads were present in large numbers between November–April with males primarily sighted from August–October and females during November–May (Séguigne et al. 2023). This dataset also revealed the spatial-temporal synchrony of Great Hammerheads and Spotted Eagle Rays, showing that both species were more likely to be observed during the summer (Séguigne et al. 2023).

Rays are generally a significant part of the Great Hammerhead's diet (Ebert et al. 2021; Raoult et al. 2019; Boube et al. 2023), and in other regions, their horizontal movements often synchronise with those of their prey (Griffin et al. 2022; Guttridge et al. 2022). The seasonal presence of Spotted Eagle Rays in Tiputa Pass may be linked to reproduction during the summer (Boube et al. 2023). This predictable event likely attracts Great Hammerheads attempting to intercept their Spotted Eagle Ray prey (Boube et al. 2023), making this area an important feeding ground for the species.

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Tiputa Pass is an important area for undefined aggregations of two shark and one ray species.

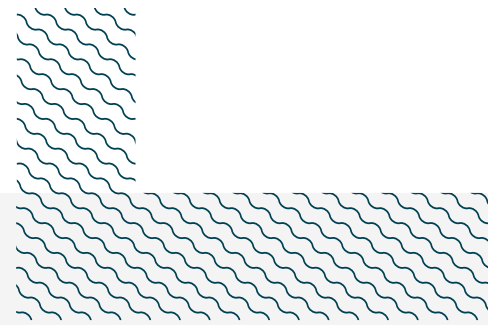
Between 2011–2018 and 2020–2021, aggregations of Grey Reef Sharks were frequently and regularly observed at incoming currents in the area during the summer (December to February) (Boube et al. 2023; Séguigne et al. 2023). From July 2011 to April 2018, a citizen science initiative through the Observers of the Polynesian Shark Observatory conducted 6,316 dives in Tiputa Pass (Séguigne et al. 2023; C Séguigne unpubl. data 2024). The probability of encountering Grey Reef Sharks for citizen science divers was 69% (n = 4,358) of conducted dives (Séguigne et al. 2023) with 68% (n = 2,963) of these encounters comprising aggregations of more than 10 individuals (C Séguigne unpubl. data 2024).

Additionally, during research dives in the summer of 2020–2021, Grey Reef Shark aggregations of more than 50 individuals were recorded in 101 out of 152 dives during incoming currents (Mokarran Protection Society unpubl. data 2024). The overall abundance of Grey Reef Shark remained consistent throughout the year (Boube et al. 2023). However, recreational divers observed them less frequently between January–May (Séguigne et al. 2023), likely due to a shift in location to areas less accessible to divers within the area (Boube et al. 2023).

Historical survey records (n = 15) from June 2004 also documented aggregations of 200–250 (\pm 50) individual Grey Reef Sharks (Descamp & Ballesta 2004). Mating behaviour was filmed in the area in 2009 and 2011, however, further information is needed to understand the nature and function of these aggregations.

Between 2018–2024, aggregations of Tiger Sharks were frequently and regularly observed within the interior of the lagoon at Tiputa Pass by Long-nosed Emperor *Lethrinus olivaceus* fishers and during research dives (K Burkhardt unpubl. data 2024). Between 2018–2024, eight research dives were conducted in the area during varying months across the entire year (January–2021, February–2024, March–2019, August–2022, September–2022, November–2018, 2020 and 2018–December). Aggregations of Tiger Sharks were sighted on all dives, ranging from three to eight individuals (K Burkhardt unpubl. data 2024). Fishers report the presence of Tiger Shark aggregations year-round, but the number of individuals is higher during new moon periods coinciding with the fishing season of the Long-nosed Emperor. A total of 32 female individuals, ranging in size from 120–500 cm in TL, have been photo-identified in the area. Among these, 11 individuals were resighted between 2018–2021 (K Burkhardt unpubl. data 2024). Additionally, fin-mounted cameras placed on two Tiger Sharks revealed interactions involving up to three individuals. Within the area, there were two records of Tiger Sharks preying on a fish and on smaller Tiger Shark individual (~120 cm TL). However, further information is needed to understand the nature and function of these aggregations.

Between 2011–2024, aggregations of Spotted Eagle Rays were frequently and regularly observed in the area by citizen scientists and during research dives (Boube et al. 2023; Séguigne et al. 2023). Between 2020–2024, 688 research dives were conducted in the area during summer months (Boube et al. 2023; Mokarran protection Society unpubl. data 2024). Spotted Eagle Rays were sighted in 69% (n = 447) of the dives and aggregations (16–100 individuals) were observed in 17% (n = 117) of the dives (Mokarran Protection Society unpubl. data 2024). Between July 2011 and April 2018, Spotted Eagle Rays were frequently sighted during citizen science dives (n = 6,316) from December–April and less frequently from August–November, suggesting a seasonal presence of these animals (Séguigne et al. 2023). During dives conducted in the area, the probability of encountering Spotted Eagle Rays was 42% (n = 2,652) (Séguigne et al. 2023), with 16% (n = 424) of these encounters comprising aggregations of more than 10 individuals (Séguigne unpubl. data 2024), including larger groups (>50 individuals) in 1% (n = 26.5) of them (C Séguigne unpubl. data 2024). Sightings of Spotted Eagle Rays in the area align with observed mating behaviour within the Rangiroa lagoon during summer, suggesting their presence may be a pre-reproduction strategy (Boube et al. 2023). However, further information is needed to understand the nature and function of these aggregations.



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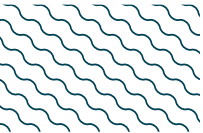
QUALIFYING SPECIES

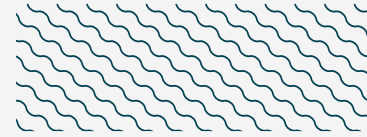
Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met									
				A	B	C1	C2	C3	C4	C5	D1	D2	
SHARKS													
<i>Carcharhinus amblyrhynchos</i>	Grey Reef Shark	EN	0-280	X							X		
<i>Galeocerdo cuvier</i>	Tiger Shark	NT	0-1,275								X		
<i>Sphyrna mokarran</i>	Great Hammerhead	CR	0-300	X			X						
RAYS													
<i>Aetobatus ocellatus</i>	Spotted Eagle Ray	EN	0-40	X							X		

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Carcharhinus albimarginatus</i>	Silvertip Shark	VU
<i>Carcharhinus falciformis</i>	Silky Shark	VU
<i>Carcharhinus limbatus</i>	Blacktip Shark	VU
<i>Carcharhinus melanopterus</i>	Blacktip Reef Shark	VU
<i>Rhincodon typus</i>	Whale Shark	EN
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CR
<i>Triaenodon obesus</i>	Whitetip Reef Shark	VU
RAYS		
<i>Mobula alfredi</i>	Reef Manta Ray	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.





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