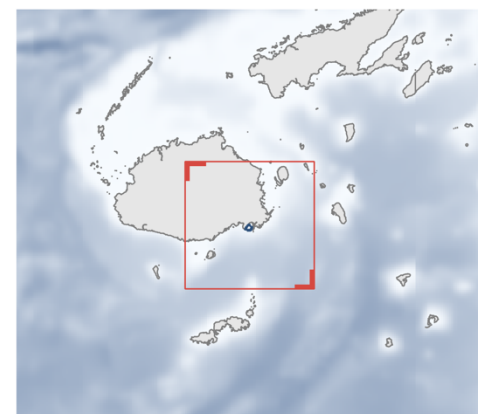
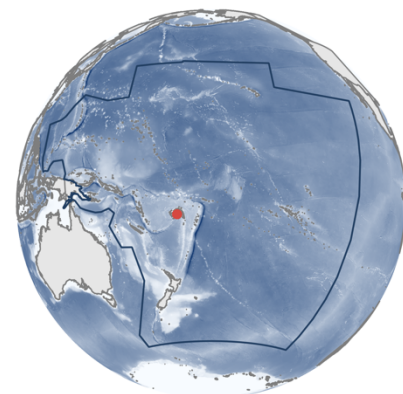
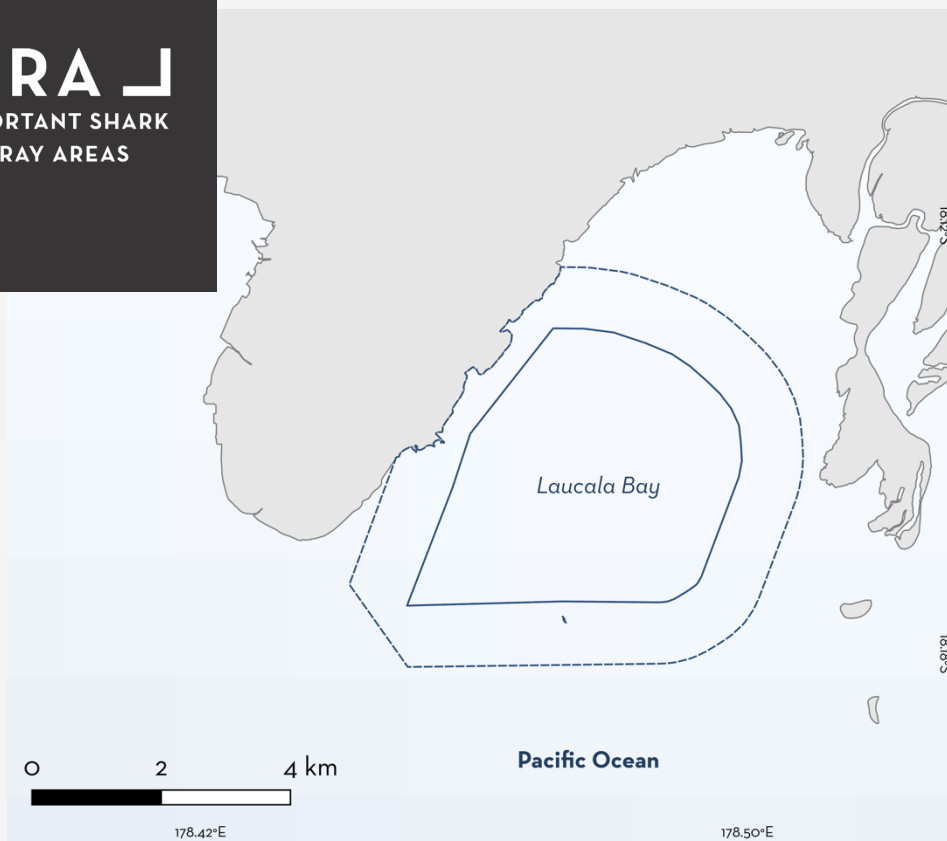




Blue lines indicate the area meeting the ISRA Criteria; dashed lines indicate the suggested buffer for use in the development of appropriate place-based conservation measures

LAUCALA BAY ISRA

New Zealand & Pacific Islands Region

SUMMARY

Laucala Bay is located on the southeast coast of Viti Levu Island in Fiji. The area is a large lagoon surrounded by a barrier reef to the south and the Rewa River estuary and mangrove system to the east. The habitat is characterised by mudflats, sandbanks, and high turbidity in the water column. Large amounts of freshwater discharge into the area from seven creek and river systems, leading to high nutrient loading and suspended sediments. Within this area there are: **threatened species** (e.g., Reef Manta Ray *Mobula alfredi*); and **feeding areas** (e.g., Oceanic Manta Ray *Mobula birostris*).

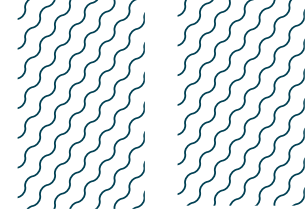
CRITERIA

Criterion A - Vulnerability; Sub-criterion C2 - Feeding Area

FIJI

0-40 metres

16.08 km²



DESCRIPTION OF HABITAT

Laucala Bay is located on the southeastern tip of Viti Levu, Fiji's largest island. Laucala Bay is a large, flat, coastal lagoon encompassed by a barrier reef to the south, and the Rewa mangrove forest and Rewa River estuary to the east/northeast (Gordon & Vierus 2022). The bay experiences two tidal cycles per day.

The climate is influenced by the South Pacific Convergence Zone with a wet warm season from November–April and a cool dry season from May–October (Koliyavu et al. 2021). The habitat is characterised by mudflats and sandbanks. Laucala Bay is connected to the open ocean by two small channels in the barrier reef in the south. Large amounts of freshwater discharge into the bay from seven different creeks and river systems, including Fiji's largest river, the Rewa River. Seasonal outflow is typically highest in January and February, although isolated tropical cyclones heavily influence the flow (Kostaschuk et al. 2001). Additionally, treated domestic, commercial, and industrial wastewater discharges into the northern part of the bay (Koliyavu et al. 2021). These freshwater sources contribute to the highest recorded anthropogenic nitrogen outflow concentrations in Fiji (Kuempel et al. 2023) and generally result in high sediment loading and turbidity, with a low visibility of <3 m (L Gordon pers. obs. 2023).

This Important Shark and Ray Area is benthopelagic and is delineated from surface waters (0 m) to 40 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 Oceanic Manta Ray (Marshall et al. 2022a) and the Vulnerable Reef Manta Ray (Marshall et al. 2022b).

SUB-CRITERION C2 – FEEDING AREAS

Laucala Bay is an important feeding area for two ray species.

Opportunistic boat-based surveys undertaken between 2018–2021 first identified this feeding area. Dedicated drone surveys (n = 857) were then conducted between 2022–2023 throughout the year when conditions allowed it. The survey path was chosen based on previous sightings. Manta ray locations were recorded, and individuals were identified by taking an identification photo of their ventral surface from the drone (L Gordon unpubl. data 2018–2024). Manta ray species were distinguished based on their colouration on both the dorsal and ventral surface (Gordon & Vierus 2022).

Oceanic Manta Rays regularly and predictably feed in this area (Gordon & Vierus 2022; L Gordon unpubl. data 2024). Drone surveys recorded 462 sightings of 16 different individual Oceanic Manta Rays, and almost all were feeding (94% of sightings) in aggregations of 2–8 individuals. Thirteen individuals (81%) have been re-sighted in the area over consecutive months and years, indicating that the area is used regularly and predictably. Oceanic Manta Rays were either surface-feeding or somersault-feeding. Surface feeding is characterised by their upper jaw above or skimming the water surface, while somersault feeding is characterised by the animal making complete 360° loops in the water column (Stevens et al. 2018). Sightings peak seasonally between July–October when rainfall is

low, suggesting that very high freshwater inflows at other times of the year likely decrease prey abundance in this area. Preliminary zooplankton samples indicated that feeding sites have a complex zooplankton community including copepods, chaetognaths, and sergestids, while copepods dominate non-feeding sites (Gordon 2023). High site fidelity is unusual for this species (M Guerrero pers. comm. 2022) highlighting the importance of this feeding area.

Reef Manta Rays also regularly feed in this area (Gordon & Vierus 2022; L Gordon unpubl. data 2022–2024). While the species was not recorded in opportunistic boat-based surveys in 2018–2021, a total of 35 sightings of 10 individuals have been recorded in the drone surveys of 2022–2024. All Reef Manta Rays were surface-feeding or somersault-feeding, and both manta ray species were sometimes feeding together. Sightings of Reef Manta Rays are seasonal between March and July, while Oceanic Manta Ray sightings peak in the second half of the year. Nine of the ten identified individuals have been re-sighted in Laucala Bay over consecutive years, confirming that the area is used repeatedly. Three of these individuals have also been re-sighted multiple times over consecutive years in the north Kadavu region ~70 km south of Laucala Bay (L Gordon unpubl. data 2024).

Acknowledgments

Luke Gordon (The Manta Trust), Tom Vierus (Independent Researcher), and Christoph A Rohner (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. Laucala Bay 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>Mobula alfredi</i>	Reef Manta Ray	VU	0–711	X			X					
<i>Mobula birostris</i>	Oceanic Manta Ray	EN	0–1,246	X			X					

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.



REFERENCES

- Gordon L, Vieras T. 2022.** First photographic evidence of oceanic manta rays (*Mobula birostris*) at two locations in the Fiji islands. *PeerJ* 10: e13883. <https://doi.org/10.7717/peerj.13883>
- Gordon L. 2023.** Manta Project Fiji Impact Report. Suva: Manta Project Fiji.
- Koliyavu T, Martias C, Singh A, Mounier S, Gerard P, Dupouy C. 2021.** *In-Situ* variability of DOM in relation with biogeochemical and physical parameters in 2017 in Laucala Bay (Fiji Islands) after a strong rain event. *Journal of Marine Science and Engineering* 9(3): 241. <https://doi.org/10.3390/jmse9030241>
- Kostaschuk R, Terry J, Raj R. 2001.** Tropical cyclones and floods in Fiji. *Hydrological Sciences Journal* 46(3): 435-450. <https://doi.org/10.1080/02626660109492837>
- Kuempel CD, Thomas J, Wenger AS, Jupiter SD, Suárez-Castro AF, Nasim N, Klein CJ, Hoegh-Guldberg O. 2023.** A spatial framework for improved sanitation to support coral reef conservation. *Environmental Pollution* 342: e123003. <https://doi.org/10.1016/j.envpol.2023.123003>
- Marshall A, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Derrick D, Herman K, Jabado RW, Liu KM, et al. 2022a.** *Mobula birostris* (amended version of 2020 assessment). *The IUCN Red List of Threatened Species* 2022: e.T198921A214397182. <https://dx.doi.org/10.2305/IUCN.UK.2022-1.RLTS.T198921A214397182.en>
- Marshall A, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Pacoureaux 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>
- Stevens G, Fernando D, Dando M, Di Sciara G. 2018.** *Guide to manta and devil rays of the world*. Princeton: Princeton University Press.