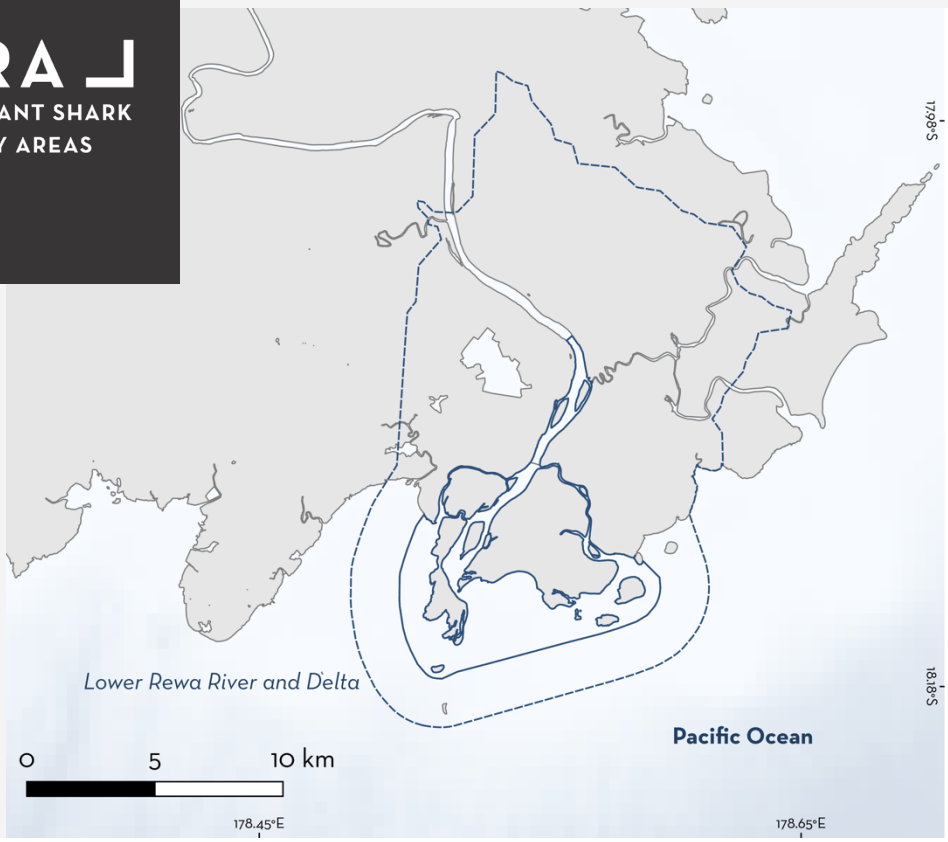
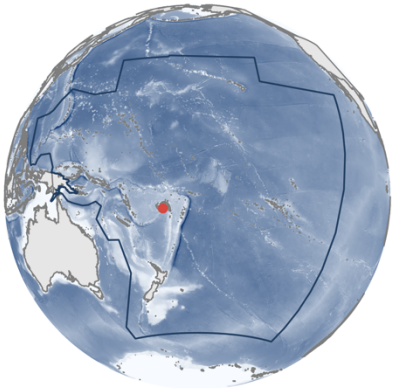
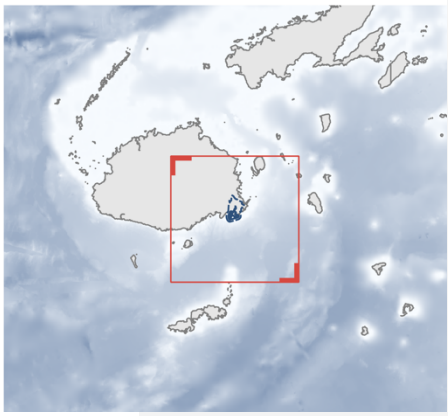
ISRA
IMPORTANT SHARK AND RAY AREAS







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

LOWER REWA RIVER AND DELTA ISRA

New Zealand & Pacific Islands Region

FIJI

0–15 metres

32.95 km²

SUMMARY

Lower Rewa River and Delta is located on the east coast of Viti Levu Island in Fiji. The area includes the lower reaches of Fiji's longest and widest river and the three river mouths and delta. The river is up to 15 m deep and has a width of 400 m near the mouth. The area is characterised by a river basin enriched with a deep deposit of alluvial soil, the largest mangrove ecosystem complex in the country, sandy beaches, and soft-mud substrates. Within this area there are: **threatened species** (e.g., Bull Shark *Carcharhinus leucas*) and **reproductive areas** (e.g., Scalloped Hammerhead *Sphyrna lewini*).

CRITERIA

Criterion A – Vulnerability; Sub-criterion C1 – Reproductive Areas

DESCRIPTION OF HABITAT

Lower Rewa River and Delta is located on the southeast coast of Viti Levu Island in Fiji. The Rewa River is the largest fluvial system in the South Pacific (Lata 2010). It originates in Tomanivi, the highest peak in Fiji, and flows southeast for 145 km, with a catchment area of 2,920 km^2. The river is formed from the convergence of the Wainibuka and Wainimala Rivers and is fed by two other major tributaries, the Waidina and Waimanu (Lata 2010). The river empties into the sea through three mouths, all within the area, with the western sections extending to Laucala Bay on the outskirts of Fiji's capital, Suva (Sykes et al. 2018). The Rewa Delta is primarily composed of fertile and well-drained alluvial deposits, supporting diverse vegetation. The coastline features various habitats, including tropical trees, the largest mangrove ecosystem complex in the country, sandy beaches, and soft-mud substrates. The eastern delta also includes the Bonatoa peat bog, the largest wetland in Fiji (Ellison 2009), and Nasoata Mangrove Island (Sykes et al. 2018). These estuaries support mangroves and seagrass meadows (Lata 2010). The river has variable depths, ranging from a few meters to 15 m in the deepest sections (Brown 2018), with a width of ~400 m. The barrier and back reef lagoon fronting the Rewa River, influenced by the large discharge of freshwater and sediments, have several reef openings and no fringing coral reefs.

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 15 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 Critically Endangered Scalloped Hammerhead (Rigby et al. 2019) and the Vulnerable Bull Shark (Rigby et al. 2021).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Lower Rewa River and Delta is an important reproductive area for two shark species.

A study undertaken between 2016–2018 regularly captured, tagged, measured, sexed, and released neonate Bull Sharks (n = 161) in the Lower Rewa River and Delta during the austral summer (November to April) (Glaus et al. 2019a). Sites were sampled during low tide, between 2–6 hours per day with a gillnet (150 x 3 m). A total of 322 fishing hours were invested between March 2016 and March 2017 (sampling throughout the year), with an additional 99 hours of sampling conducted during the summer of 2017/2018. Total length (TL), umbilical scar condition (open, semi-healed, healed; Duncan & Holland 2006), and sex of captured Bull Sharks were recorded, and individuals were tagged with an internal Passive Integrated Transponder (PIT) to examine repeat catches. Neonates had an open umbilical scar and ranged from 61–95 cm TL with a peak in size at 75–85 cm TL. While sampling was conducted throughout the first study year, neonate Bull Sharks (n = 57) were only captured between December and March. They were captured at seven sites from the three Rewa River Estuaries to 8.5 km upstream, although sampling took place to over 20 km from the Rewa Delta. Between December 2017 to March 2018, pooled catch per unit effort (CPUE) within the Lower Rewa River ranged between 0 and 12.5 neonates/hour, with the highest monthly CPUE recorded in December 2017, while surveys in February had the lowest CPUEs (Glaus et al. 2019a). Two neonates were recaptured in summer 2017 and 2018 after 59 and 74 days at liberty respectively, indicating that they use the

area over several weeks at least. Neonate and adult Bull Sharks are also captured in the Lower Rewa River and Delta in a small-scale fishery (Glaus et al. 2015; Glaus et al. 2019b). Traditional Ecological Knowledge (TEK) based on dialogues with fishers suggests significant catches in the Lower Rewa River, with reports indicating that up to 25 neonate Bull Sharks can be caught in a single net retrieval (K Glaus pers. obs. 2016). Personal observations show that neonate Bull Sharks have continued to use this area since the end of the detailed fishing studies (K Glaus pers. obs. 2022).

Additionally, pregnant Bull Sharks were tracked into the area during three parturition seasons (2016–2018). Acoustic receivers placed in the Lower Rewa River and Delta detected the presence of seven of 15 pregnant Bull Sharks that were detected in the four main rivers of Viti Levu. Pregnant individuals were recorded across three seasons, further highlighting the area's role in the reproductive cycle of Bull Sharks (Brunnschweiler et al. unpubl. data 2024). Altogether, these findings show that the area is a critical habitat for Bull Shark neonates and a likely pupping ground (Glaus et al. 2019a). While neonate Bull Sharks occur in all of Fiji's major rivers (MacDonald 1857; De Ricci 1875; Cardeñosa et al. 2016; Vierus et al. 2018; Glaus et al. 2019a; Paris 2020) and TEK showed that local fishers see and catch sharks seasonally in rivers (Rasalato et al. 2010), the Rewa River particularly stands out with highest number of Bull Sharks despite lower fishing effort when compared to other sites surveyed (Glaus et al. 2019a).

The presence of Scalloped Hammerheads in the Rewa Delta is well known to fishers, who frequently capture 'small hammerheads' in that area based on their TEK (K Brown pers. obs. 2024). Fisheries-independent surveys in the area were conducted in 2012 and in 2014–2016 (Brown 2014; Brown et al. 2016; Marie et al. 2017). The first survey from February to June 2012 made 15 gillnet (100 x 3 m) deployments with a soak time of one hour. Fishing occurred after 5 pm within an hour of sunset, as juvenile Scalloped Hammerheads are generally more active at night (Duncan & Holland 2006). Sites east and west of the Rewa Delta were initially sampled but did not result in any captures of Scalloped Hammerheads and captures were only made in the Rewa Delta. Sex, size, weight, and umbilical scar condition were recorded for each individual, with neonates having an open or semi-healed scar and young-of-the-year (YOY) individuals having a healed scar (Merson & Pratt 2001; Adams & Paperno 2007). A total of 82 Scalloped Hammerheads were captured, consisting of 51 females and 31 males and ranging in size from 49–77 cm TL (Brown 2014). The size-at-birth for the species is 31–57 cm TL (Ebert et al. 2021). Young-of-the-year individuals (n = 72) ranged 49–77 cm TL and were captured throughout the study, while neonates with a semi-healed scar (n = 10) ranging 52–63 cm TL were observed only during late summer. From mid-March onwards, almost half (43%) of the captured Scalloped Hammerheads were juveniles without a visible umbilical scar. It takes 18 days for umbilical scars to heal in captive Scalloped Hammerheads (Duncan & Holland 2006), therefore the animals with healed scars that were captured in the first sampling session would have most likely been born in January 2012. A single large Scalloped Hammerhead was seen in the area in December, suggesting the possibility that this was an adult female either before or after parturition (K Brown pers. obs. 2012).

A second fishing survey was conducted from September 2014 to March 2016, using the same methodology (Marie et al. 2017). The east and west of the Rewa Delta, outside the area, was sampled too, but no Scalloped Hammerheads were captured there (Marie et al. 2017). Gillnet deployment occurred between sunset and midnight. A total of 311 gillnet deployments were conducted, equivalent to 667.1 standardised hours. A total of 1,054 Scalloped Hammerhead were captured, with 796 tagged, including 101 (12.7%) recaptures (Marie et al. 2017). During the entire study, 12 tagged sharks were recaptured up to four times, and 89 sharks were recaptured once over a period of 1–174 days. These frequent recaptures support site fidelity of neonates and YOY individuals to the area. Captured Scalloped Hammerheads (n = 1,054) ranged in size from 46–116.5 cm TL. Neonate and YOY individuals were observed throughout the year, with a higher prevalence of neonates between

October to February. More YOY individuals were observed between March and September. This shows that parturition occurs in the area during summer (Brown 2014; Brown et al. 2016; Marie et al. 2017). Additionally, small-scale fishers in the area reported catches of up to 50 small Scalloped Hammerheads per week per fisher at the beginning of summer (Marie et al. 2017), further highlighting the importance of this area for the early life stages of the species.

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Kelly Brown (The University of the South Pacific), Kerstin Glaus (The University of the South Pacific), 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.

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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
RAYS												
Carcharhinus leucas	Bull Shark	VU	0–256	X		X						
Sphyrna lewini	Scalloped Hammerhead	CR	0–1,043	X		X						

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Carcharhinus limbatus	Blacktip Shark	VU
Stegostoma tigrinum	Indo-Pacific Leopard Shark	EN
RAYS		
Aetobatus ocellatus	Spotted Eagle Ray	EN
Pateobatis fai	Pink Whipray	VU
Rhynchobatus australiae	Bottlenose Wedgefish	CR

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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