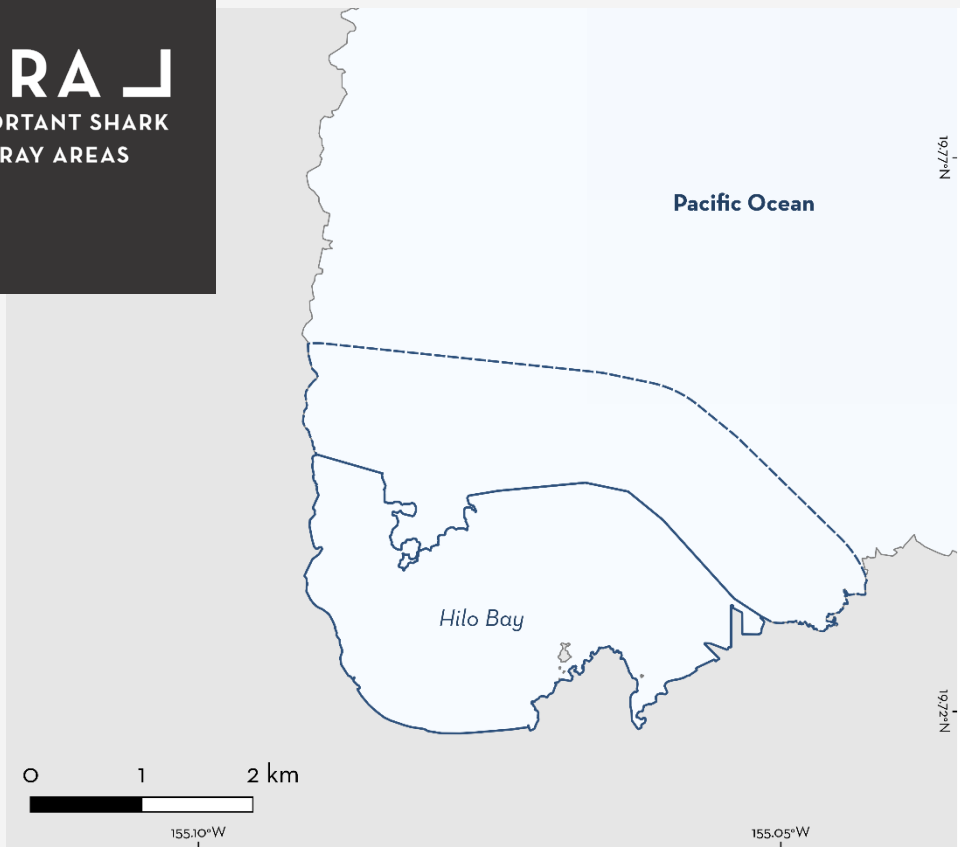
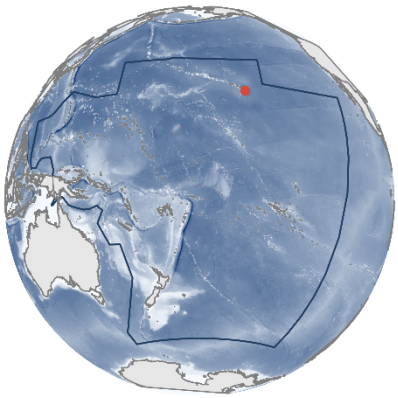
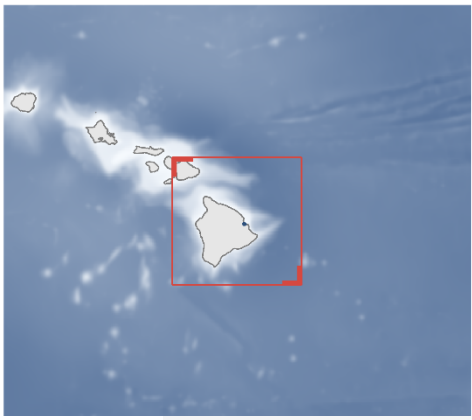
ISRA
IMPORTANT SHARK AND RAY AREAS







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

HILO BAY ISRA

New Zealand & Pacific Islands Region

HAWAII

0–15 metres

6.4 km²

SUMMARY

Hilo Bay is located on the eastern side of Hawaii Island of the United States of America. This estuarine area has a high freshwater input from two rivers: Wailuku River to the west and Wailoa River to the east. In addition, the eastern part of the area in enclosed by a breakwater and an opening to the Pacific Ocean on the western side of the bay. The area is characterised by sandy, muddy, slit, rocky, and reef substrates. Within this area there are: **threatened species** (e.g., Blacktip Shark *Carcharhinus limbatus*) and **reproductive areas** (e.g., Scalloped Hammerhead *Sphyrna lewini*).

CRITERIA

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

DESCRIPTION OF HABITAT

Hilo Bay is located on the eastern side of the Big Island in the Hawaiian Islands of the United States of America. The area includes one small island, Coconut Island. This tropical estuarine area has a high freshwater input from two rivers: Wailuku River (the largest river in Hawaii) to the west and Wailoa River to the east (Lucas et al. 2023). Wailuku River sources surface waters while Wailoa River it is the main source of groundwater. In addition, the eastern part of the area in enclosed by a breakwater and in the west is the opening to the Pacific Ocean (Wiegner et al. 2013). The area is characterised by sandy, muddy, slit, rocky, and reef substrates. Average salinities range ~35 ppt in the outer part to ~16 ppt around the river mouth (Wiegner et al. 2013; Lucas et al. 2023). Sea surface temperatures are ~22–25°C (Wiegner et al. 2013; Lucas et al. 2023).

This Important Shark and Ray Area is benthic and pelagic 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 Blacktip Shark (Rigby et al. 2021).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Hilo Bay is an important reproductive area for two shark species.

Fishing surveys in the area have revealed the regular presence of neonates and young-of-the-year (YOY) Blacktip Sharks (Wallingford 2014; D Bartz unpubl. data 2024). Between March–November 2013, 11 fishing trips were conducted in the area. During each trip, two longlines with 30 hooks were set for 1–2 hours. Of 117 sharks caught, 92 where Blacktip Sharks measuring between 65–110 cm total length (TL) with 26 neonates having open or partially healed umbilical scars and the other fully healed scars (Wallingford 2014). The majority of individuals (n = 80) were <90 cm TL, which is close to the reported size-at-birth for the species (38–72 cm TL; Ebert et al. 2021), confirming they were likely to be neonates or YOY individuals. Further, fishing surveys using hook and line conducted between 2022–2024 captured 14 Blacktip Sharks measuring 60–100 cm TL (D Bartz unpubl. data 2024). Another 14 individuals were observed but broke the line and could not be measured; however, sizes were similar to those measured and were thus also likely to be neonates or YOY individuals. Sharks were captured year-round (February, April, June, July, August, September, and November) at depths of 0–15 m in sandy, muddy, slit, rocky, and reef substrates. In addition, Blacktip Sharks, including neonates and YOY, have been reported as being commonly caught by recreational and commercial fisheries in this area since the 2000s (D Bartz unpubl. data 2024).

Local ecological knowledge has revealed that neonates and YOY Scalloped Hammerheads regularly occur in the area (D Bartz unpubl. data 2024). Interviews with 32 fishers showed that in the 1950s and 1960s, they caught between 10–12 small hammerhead sharks per day. The majority of catches were made from shore, with fishers stationed either along the Hilo bayfront, 'Isles' (just outside of the Wailoa River mouth), or along the breakwater. Sharks were commonly caught in mud flats in front of the bayfront at 0–5 m depths, in rocky, reef, and sandy substrates in Isles, and in reef and sandy patches near the breakwater. All these sites within the estuary make a suitable habitat for these early

life stages. Sharks were commonly caught between July–September. Fishers reported declines in catches of Scalloped Hammerheads since the 1990s with catches of Scalloped Hammerhead not very high but still regularly reported (D Bartz unpubl. data 2024). In addition, anecdotical observations indicate that pregnant female Scalloped Hammerheads come to the bay to pup (Division of Aquatic Resources Hawaii 2024) as they do in other shallow estuaries in Hawaii (e.g., Kaneohe Bay; Duncan & Holland 2006). Recent monitoring using environmental DNA and citizen science has shown that the area is still important for these life stages even if their abundances are not as high as in the 1960s (D Bartz unppubl. data 2024). From fishing surveys conducted between 2022–2024, one neonate Scalloped Hammerhead (~45 cm TL) was sampled near the Wailuku River mouth (D Bartz unpubl. data 2024). In August 2024, local fishers incidentally hooked three neonates using a dunking setup (weighted lead line attached to main hook like) and cut squid as bait near the opening of the Wailoa River mouth and the harbour entrance to the bay. Individuals measured ~45 cm TL and one had an open umbilical scar.

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Danielle Bartz (University of Hawai'i at Manoa) and Emiliano García-Rodríguez (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
SHARKS												
Carcharhinus limbatus	Blacktip Shark	VU	0–140	X		X						
Sphyrna lewini	Scalloped Hammerhead	CR	0–1,043	X		X						

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Galeocerdo cuvier	Tiger Shark	NT
Triaenodon obesus	Whitetip Reef Shark	VU
RAYS		
Mobula alfredi	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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