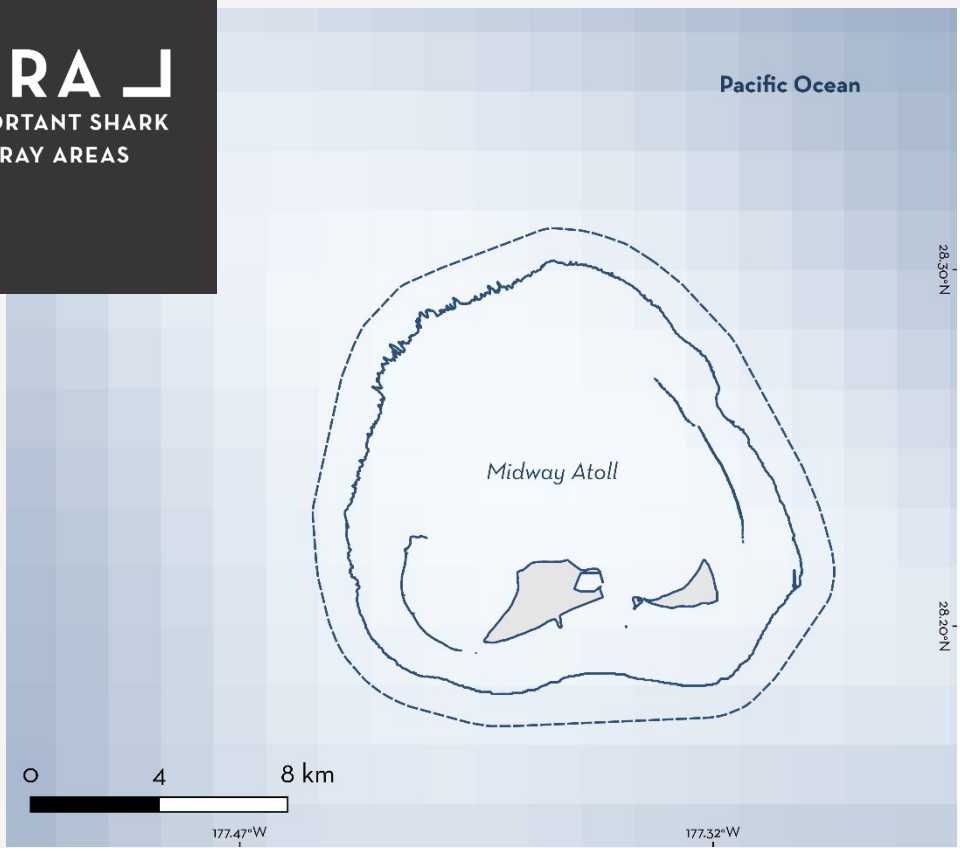
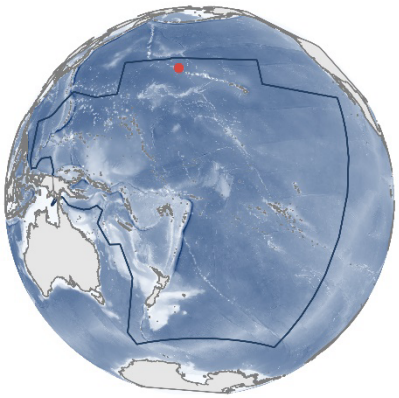
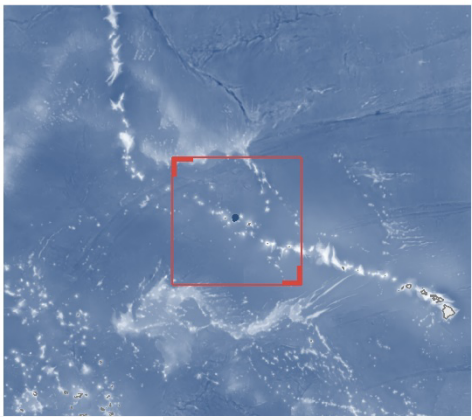
ISRA
IMPORTANT SHARK AND RAY AREAS







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

MIDWAY ATOLL ISRA

New Zealand & Pacific Islands Region

HAWAII

0–50 metres

136.1 km²

SUMMARY

Midway Atoll is located near the west end of the Northwestern Hawaiian Islands of the United States of America. The area consists of a circular-shaped atoll with three islands: Sand Island, Eastern Island, and Spit Island. A barrier reef surrounds a shallow lagoon and is characterised by sandy substrates and reef patches all around the atoll. The area overlaps with the Northwestern Hawaiian Islands Key Biodiversity Area and with the Papahānaumokuākea Marine National Monument. Within this area there are: **feeding areas** (Tiger Shark *Galeocerdo cuvier*) and **undefined aggregations** (Galapagos Shark *Carcharhinus galapagensis*).

CRITERIA

Sub-criterion C2 – Feeding Areas; Sub-criterion C5 – Undefined Aggregations

DESCRIPTION OF HABITAT

Midway Atoll is located near the west end of the Northwestern Hawaiian Islands of the United States of America. It is found ~2,100 km from O'ahu and ~130 km from Pearl & Hermes Atoll. The area is a circular-shaped atoll with three islands: Sand Island (the largest), Eastern Island, and Spit Island. A barrier reef surrounds a shallow lagoon ~10 km in diameter (except on the western side) and is characterised by sandy substrates (Schroeder & Parrish 2006). Reef patches are separated by sandy flats all around the atoll (Schroeder & Parrish 2006). The area is influenced by northwest oceanic swells that produce strong bottom surges during boreal winter (Schroeder & Parrish 2006). Sea surface temperatures range from ~20°C in February to ~27°C in July (Desch et al. 2009).

The area overlaps with the Northwestern Hawaiian Islands Key Biodiversity Area (KBA 2024) and with the Papahānaumokuākea Marine National Monument (UNEP-WCMC & IUCN 2024).

This Important Shark and Ray Area is benthic and pelagic and is delineated from inshore and surface waters (0 m) to 50 m based on the bathymetry of the area.

ISRA CRITERIA

SUB-CRITERION C2 – FEEDING AREAS

Midway Atoll is an important feeding area for one shark species.

Anecdotal observations of Tiger Sharks predating on Laysan Albatross *Phoebastria immutabilis* and Black-footed Albatross *Phoebastria nigripies* have been documented as common in East Island during summer months since the 1980s (Schroeder & Parrish 2006; Spring 2024; Y Papastamatiou pers. obs. 2024). Tiger Sharks tagged at French Frigate Shoals and Pearl & Hermes Atoll in Hawaii were detected moving to Midway Atoll during these summer months. It was estimated that the probability of a Tiger Shark moving from French Frigate Shoals to Midway Atoll was ~3% (Papastamatiou et al. 2013).

Laysan Albatross and Black-footed Albatross use Midway Atoll as a breeding area from October–July and this is one of the main breeding sites for these species in the Northwestern Hawaiian Islands (Arata et al. 2009). Breeding adults and sub-adults arrive around October to the area and leave it around July along with hatch-year birds. Adults start to make foraging trips to feed the chicks around December-January (Arata et al. 2009). Chick-rearing season runs from February–June when chicks start to fledge (Arata et al. 2009). Tiger Sharks have been reported to move to locations in the Northwestern Hawaiian Islands with large albatross colonies like Midway Atoll during the fledging season to feed on them (Holland et al. 1999; Arata et al. 2009; Meyer et al. 2010). Predictable shark foraging migrations to the area are consistent with the feeding behaviour reported for the species around the globe (Heithaus et al. 2007; Werry et al. 2014).

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Midway Atoll is an important area for undefined aggregations of one shark species.

Based on multiple survey data, Galapagos Shark aggregations have been reported from Midway Atoll year-round. Midway Atoll has been surveyed using multiple methods between 2000–2017. Baited Remote Underwater Video Stations (BRUVS) deployed in September 2014 (n = 12), stationary point counts surveys (25 m transect lines during a timed five minute with four replicates) conducted between August–September 2014–2017 (n = 58), and towed diver surveys (undertaken up to 30 m

depth and covering ~2.5 linear km in ten five-minute segments) conducted between July–October 2000–2008 (n = 74) recorded the regular presence of Galapagos Sharks aggregations (average = 5.7 individuals) in the area (Holzwarth et al. 2006; CREP-PIFSC 2017a, 2017b; ESD-PIFSC 2018; ESD-PIFSC 2019).

Between 2000–2003, towed dive surveys were conducted at ten different sites across the Northwestern Hawaiian Islands and Midway Atoll had the highest densities for Galapagos Shark and (Holzwarth et al. 2006). This species was most abundant in forereef habitats and in channels (Holzwarth et al. 2006). Acoustic telemetry monitoring between 2001–2003 showed that Galapagos Shark (n = 6) distribute mostly in forereef and channel habitats but move to shallow lagoons (Lowe et al. 2006).

Historical records from the 1960s and 1970s indicate that Galapagos Sharks were the most abundant shark species in the atoll (Randall et al. 1993; Papastamatiou et al. 2006). Galapagos Sharks between 60–225 cm total length (TL) were observed in 31 of 74 towed dive surveys conducted in the area between 2002–2008. Aggregations were recorded in all years and ranged from three to ten individuals (CREP-PIFSC 2017b; ESD-PIFSC 2019). After 2010, aggregations of >20 Galapagos Sharks were reported anecdotally in Midway Atoll (Dale et al. 2011; Y Papastamatiou pers. obs. 2011). Further, Galapagos Sharks were observed in 66.6% (8/12, 6–40 m depths) of the BRUVS deployed in 2014 at 13–73 m depths with MaxN values (maximum number of individuals of a species observed in a single frame) ranging from 1–9 individuals (CREP-PIFSC 2017b). In stationary point surveys conducted between 2014–2017, Galapagos Shark (n = 66) were observed in 28 of the 58 surveys with aggregations of three sharks observed all years (ESD-PIFSC 2018). These are small-scale surveys that cover small areas and where aggregations are not well captured (Brainard et al. 2019). The presence of Galapagos Sharks in such surveys confirms their contemporary presence and suggests that aggregations still occur in the area. Since 2017, no additional surveys have been conducted in the area. Additional information is required to determine the nature and function of these aggregations and assemblages.

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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 galapagensis	Galapagos Shark	LC	0–528							X		
Galeocerdo cuvier	Tiger Shark	NT	0–1,275				X					

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Carcharhinus amblyrhynchos	Grey Reef Shark	EN
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 the area may be important for undefined aggregations of one shark species.

Grey Reef Sharks between 80–175 cm TL were observed in five of 74 towed dive surveys (6.7%; 2003: 3/17; and 2008: 2/16) conducted in the area between 2002–2008. Grey Reef sharks were observed as single individuals or in groups of three (CREP-PIFSC 2017a; ESD-PIFSC 2019). Grey Reef Sharks (n = 11) were observed in eight of the 32 stationary point surveys conducted in 2014 (ESD-PIFSC 2018). This species was not observed in surveys conducted in 2015 and 2017. Additional information is needed to confirm the regularity of these aggregations.

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