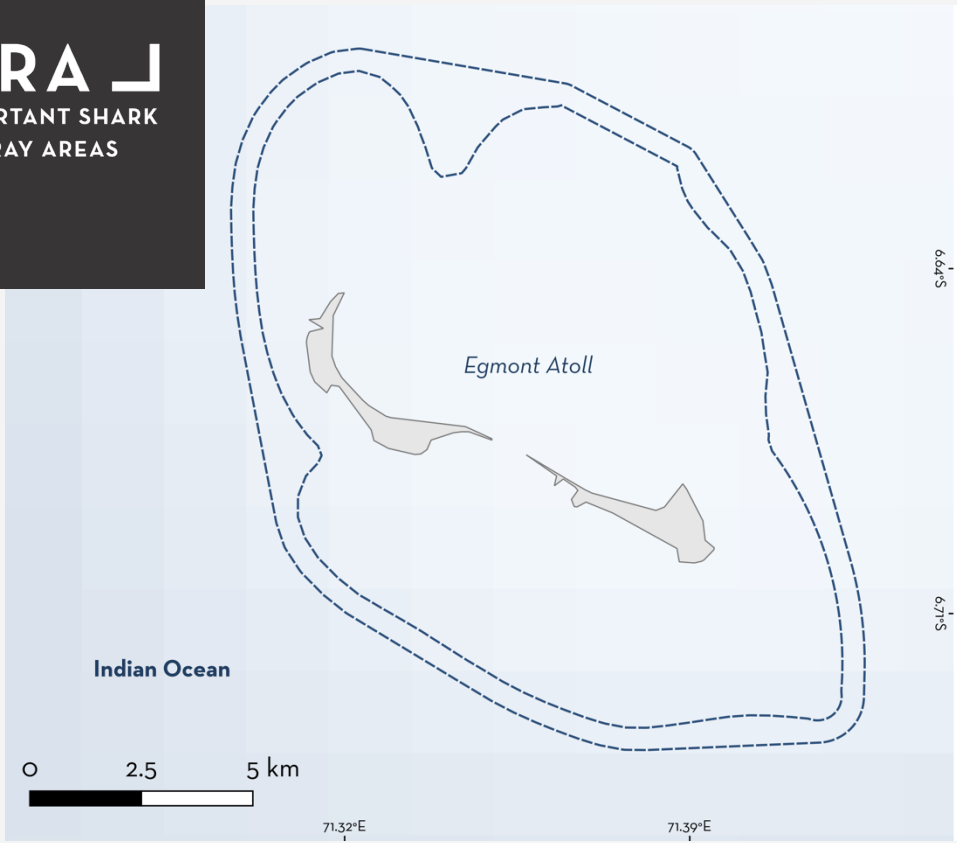
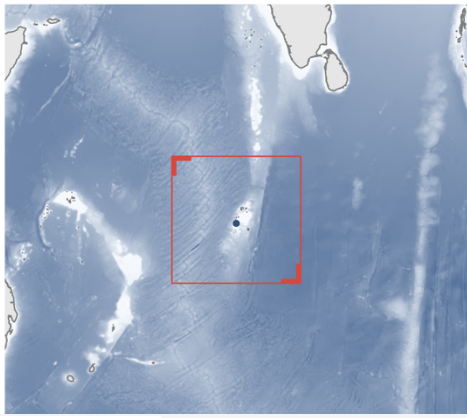
ISRA
IMPORTANT SHARK AND RAY AREAS





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

EGMONT ATOLL ISRA

Western Indian Ocean Region

SUMMARY

Egmont Atoll is located in the southern Chagos Archipelago. It is a small coral reef atoll with an interior lagoon system that is partially separated from the open ocean by reef crests and flats, with narrow connecting channel systems. The area is comprised of a multitude of habitats including sandy and rocky shores, sandy substrates, coral reefs, and, where the topography slopes steeply close to shore, pelagic waters. This area sits within the British Indian Ocean Territory Marine Protected Area. Within this area there are: **threatened species**, **feeding areas** and **undefined aggregations** (Reef Manta Ray *Mobula alfredi*).

CRITERIA

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

CHAGOS ARCHIPELAGO

0–711 metres

133.19 km²

DESCRIPTION OF HABITAT

Egmont Atoll is located in the southern Chagos Archipelago. It is a small atoll comprised of an interior lagoon system that is separated from the ocean along the southern rim by three low-lying islands that are connected by shallow, intertidal sand bars.

Along the northern rim, the lagoon is partially separated from the open ocean by intertidal reef crests that form several narrow passages except during high tide when it is fully open. From the edge of the shallow lagoon on the northern rim, the topography slopes steeply down before reaching a 50 m wide plateau 80 m from the lagoon, with a depth of 65–71 m. On the seaward side, there is a narrow ridge that inclines steeply to a height of ~10 m above the seabed, followed by another sharp slope that drops down to >100 m depth (E Robinson, P Hosegood, A Bolton unpubl. data 2023).

The geomorphology of the area, combined with oceanographic processes on the northern rim, contributes to regular and predictable zooplankton aggregations (Harris et al. 2021). For example, a sharp regional thermocline that fluctuates between 40 m and 100 m from which internal wave breaking on the steep slopes form cold-water bores, facilitates the upward transport of organisms from the thermocline, particularly during flood tides and even more intensively on spring tides, into the lagoon (Harris et al. 2021).

This region experiences two major seasons namely the southeast monsoon (April to November) characterised by strong persistent southeasterly winds, lower rainfall, and lower air temperatures, and the northwest monsoon (December to March) dominated by light north-westerly winds, higher rainfall, and warmer air temperatures (Schott & McCreary 2001).

Due to the partially enclosed morphology of the lagoon, water entering it is restricted to the narrow subtidal passages creating strong jet-like currents that increase the density of inflowing (outflowing) organisms approaching low tide (in the early stages of flood) providing rich foraging opportunities (Harris et al. 2021). Plankton sampling and oceanographic measurements obtained inside the lagoon also indicate that increased zooplankton abundance is associated with the transfer of plankton into the lagoon from the intrusion of cold-water bores created by breaking internal waves (Sheehan et al. 2019).

This Important Shark and Ray Area is pelagic and is delineated from inshore and surface waters (0 m) to 711 m based on the global depth range of the Qualifying Species.

ISRA CRITERIA

CRITERION A – VULNERABILITY

The one Qualifying Species within the area is considered threatened with extinction according to the IUCN Red List of Threatened Species™. The Reef Manta Ray is assessed as Vulnerable (Marshall et al. 2022).

SUB-CRITERION C2 – FEEDING AREAS

Egmont Atoll is an important feeding area for one ray species.

Between November 2019 and November 2021, a combination of acoustic telemetry, advanced oceanographic technologies, and stable isotope analysis were used to monitor the movements and foraging patterns of 98 Reef Manta Rays at Egmont Atoll (Harris et al. 2021, 2023, in prep.). Acoustic

tags were deployed onto 43 Reef Manta Rays and were detected by an extensive acoustic array encompassing 14 sites (Harris et al. 2021).

Residency indices (IR) show that individuals were detected on the Egmont array for a mean of 75.4% of the days they were tracked (mean number of days = 255; IR range 9.1–100%), irrespective of their sizes or maturity. One of the predominant drivers of Reef Manta Ray presence at Egmont Atoll was the Indian Ocean Dipole (IOD; Harris et al. 2023). This limits the availability of zooplankton prey for Reef Manta Rays throughout the Chagos Archipelago, except at Egmont Atoll (Harris et al. in prep.), where a complex synthesis of geomorphology and oceanographic processes enhance prey availability. For example, at Manta Alley where breaking internal waves and cold-water bores transport zooplankton from the thermocline, which becomes concentrated within the troughs on the seabed (Harris et al. 2021) leading to large feeding aggregations (> 40 individuals). As such, although Reef Manta Rays rely on Egmont Atoll all year round, it is a particularly important habitat when food resource may be scarce elsewhere (Harris et al. 2023).

Activity peaks were most pronounced from April to November, particularly on the southwest of the atoll, while between December and March, higher activity levels were recorded in the northwest. Stable isotope analysis of tissue samples taken from 55 Reef Manta Rays indicate that the species primarily feeds in nearshore environments, where primary production is enhanced due to the coastal advection of nutrients in seabird guano during periods of high rainfall (Harris et al. 2023).

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Egmont Atoll is important for the undefined aggregations of one ray species.

Aggregations of Reef Manta Rays, that vary in size from as few as five to 70 individuals, have been observed during each survey from 2019 to 2023. Three cleaning stations for Reef Manta Rays have now been identified at Egmont Atoll (Harris et al. 2023; J Harris, unpubl. data, 2023). These non-seasonal sites are consistent with them being located close to non-seasonal feeding sites, as Reef Manta Rays will typically frequent cleaning stations that are close to feeding areas (Stevens 2016; Stevens et al. 2018; Harris et al. 2020; Armstrong et al. 2021). Cleaning stations provide essential benefits for Reef Manta Rays, such as parasite removal, as well as social and reproductive interactions, while feeding hot spots provide the concentrated food source required for their energetically efficient foraging strategies (Harris et al. 2020). The behaviour of Reef Manta Rays at a cleaning station is much different from feeding areas. At a cleaning station, individuals will often spend hours hovering over the coral reef where the cleaner fish are active, while in feeding areas they are often on the surface swimming backwards and forwards over long distances.

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Joanna L. Harris (Manta Trust; University of Plymouth) and Théophile L. Mouton (IUCN SSC Shark Specialist Group – ISRA Project) contributed and consolidated information included in this factsheet. We thank all participants of the 2023 ISRA Region 7 – Western Indian Ocean 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												
Mobula alfredi	Reef Manta Ray	VU	0–711	X			X			X		

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Carcharhinus albimarginatus	Silvertip Shark	VU
Carcharhinus amblyrhynchos	Grey Reef Shark	EN
Carcharhinus melanopterus	Blacktip Reef Shark	VU
Galeocerdo cuvier	Tiger Shark	NT
Nebrius ferrugineus	Tawny Nurse Shark	VU
Negaprion acutidens	Sharptooth Lemon Shark	EN
Sphyrna lewini	Scalloped Hammerhead	CR
Sphyrna mokarran	Great Hammerhead	CR
Triaenodon obesus	Whitetip Reef Shark	VU
RAYS		
Aetobatus ocellatus	Spotted Eagle Ray	EN
Mobula tarapacana	Sicklefin Devil Ray	EN
Mobula thurstoni	Bentfin Devil Ray	EN
Pastinachus sephen	Cowtail Ray	NT

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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