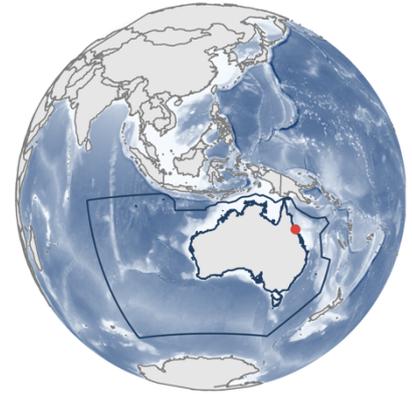


147.08°E 147.12°E 18.67°S 18.71°S



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

LODESTONE REEF ISRA

Australia and Southeast Indian Ocean Region

SUMMARY

Lodestone Reef is located on the Great Barrier Reef, Queensland, Australia. It is situated ~70 km off Townsville. The area comprises a section of a reef that is part of a group of mid-shelf reefs separated by ~40-60 m deep channels. The habitat is characterised by a coral reef slope, reef flat, and back reef. It is mainly influenced by east to southeasterly trade winds that drive a general northward flow. Within this area there are: **threatened species** and **undefined aggregations** (Grey Reef Shark *Carcharhinus amblyrhynchos*).

CRITERIA

Criterion A - Vulnerability; Sub-criterion C5 - Undefined Aggregations

— AUSTRALIA —

— 0-45 metres —

— 5.75 km² —





DESCRIPTION OF HABITAT

Lodestone Reef is located on the Great Barrier Reef, Queensland, Australia. It is situated ~70 km off Townsville. This area comprises a section of the 8.7 km² Lodestone Reef, which is part of a group of mid-shelf reefs that includes Wheeler, Helix, and Glow reefs among others. These reefs are separated by wide channels with a depth of ~40–60 m. The habitat is characterised by a coral reef slope, reef flat, and back reef (Espinoza et al. 2015). Coral cover is high and dominated by *Acropora* spp.

This area is influenced by east to southeasterly trade winds and waves, by seasonal cyclones, and by coastal counter currents. The South Equatorial Current and East Australian Current are strongest along the shelf edge, but in mid-shelf waters their influence is dampened by the Great Barrier Reef, with a predominant northward flow in this area driven by the trade winds (Choukroun et al. 2010).

This Important Shark and Ray Area is benthic and pelagic and is delineated from 0–45 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

One Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species regularly occurs in the area. This is the Endangered Grey Reef Shark (Simpfendorfer et al. 2020).

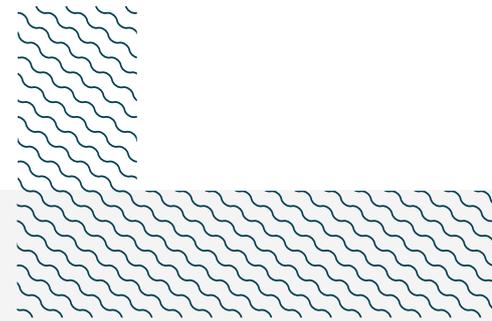
SUB-CRITERION C₅ – UNDEFINED AGGREGATIONS

Lodestone Reef is an important area for undefined aggregations of one shark species.

Passive acoustic telemetry data show that Grey Reef Sharks regularly aggregate in this area (Espinoza et al. 2015; M Espinoza unpubl. data 2025). A total of 40 Grey Reef Sharks (20 females, 20 males) were tagged with internal acoustic transmitters in the broader region around Lodestone (n = 13), Helix (n = 10), Wheeler (n = 7), Glow (n = 5), and other reefs (n = 5) between January 2012 and August 2013 (Espinoza et al. 2015). Their size ranged from 52–142 cm fork length (FL), and included 10 immature and 10 mature males, and six immature and 14 mature females. A total of seven females and seven males were detected within the area, with records between April 2012 to April 2014. Aggregations were defined as three or more tagged individuals detected at a receiver within five minutes. Aggregations in consecutive five-minute bins were grouped into an event, and its duration was calculated.

There were ~320,000 detections recorded at this reef, but five receivers had few detections (0.2–1.7% of total) and one additional receiver (10.1% of detections) recorded only few and sporadic aggregations. These were excluded and the remaining two receiver locations were used to define the boundary of the area. There were 4,953 five-minute bins with aggregations recorded within the area, grouped into 3,088 aggregation events that lasted between 0.2–94 min (mean = 6.3 min). Aggregations comprised 3–7 individuals at a time (mean = 3.2 individuals). As aggregations lasted up to 1.5 h, these events comprised up to nine unique tagged sharks (64% of total), but a maximum of seven (50% of total) were recorded at the same time. There was a seasonal signal, with aggregations persisting longer and comprising more individuals during July–September. There were also more aggregations during August (25.1% of total) and September (14.6%) compared to other months. This

was partly driven by mature females being detected less frequently during October–February, potentially related to mating and parturition outside the receiver array. Aggregations were recorded on 357 of 677 days (53%). Combined, the data show that specific locations in the northwest of this reef (i.e., this area) regularly host aggregations of Grey Reef Sharks that last up to ~1.5 h. Only three of 11 reefs with receivers in this study off Townsville had significant aggregations of Grey Reef Sharks. Additionally, only 14 of 40 Grey Reef Sharks tagged in group of reefs were detected at reefs other than their home reef, generally only spending a few hours to days before returning to their home reef. At Lodestone Reef specifically, only four individuals were detected at other reefs, with one shark initially tagged, and mostly (99%) detected, at Brewer Reef. The limited movement highlights their high residency and site fidelity, and the individual importance of Lodestone Reef (Espinoza et al. 2015; M Espinoza unpubl. data 2025). More information is required to understand the nature and function of these aggregations.



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Mario Espinoza (Universidad de Costa Rica) 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 2025 ISRA Region 08 – Australia and Southeast Indian Ocean workshop for their contributions to this process.

We acknowledge the Traditional Owners of Country throughout Australia and recognise the continuing connection to land, waters, and culture. We pay our respects to Elders past, present, and emerging.

This factsheet has undergone review by the ISRA Independent Review Panel prior to its publication.

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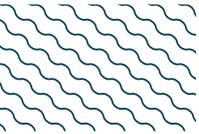
QUALIFYING SPECIES

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													
<i>Carcharhinus amblyrhynchos</i>	Grey Reef Shark	EN	0-280	X							X		

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Triaenodon obesus</i>	Whitetip Reef Shark	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.





REFERENCES

Choukroun S, Ridd PV, Brinkman R, McKinna LIW. 2010. On the surface circulation in the western Coral Sea and residence times in the Great Barrier Reef. *Journal of Geophysical Research: Oceans* 115: C06013. <https://doi.org/10.1029/2009jc005761>

Espinoza M, Heupel MR, Tobin AJ, Simpfendorfer CA. 2015. Residency patterns and movements of grey reef sharks (*Carcharhinus amblyrhynchos*) in semi-isolated coral reef habitats. *Marine Biology* 162: 343–358. <https://doi.org/10.1007/s00227-014-2572-x>

Simpfendorfer C, Fahmi, Bin Ali A, Dharmadi, Utzurrum JAT, Seyha L, Maung A, Bineesh KK, Yuneni RR, Sianipar A, et al. 2020. *Carcharhinus amblyrhynchos*. *The IUCN Red List of Threatened Species* 2020: e.T39365A173433550. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T39365A173433550.en>