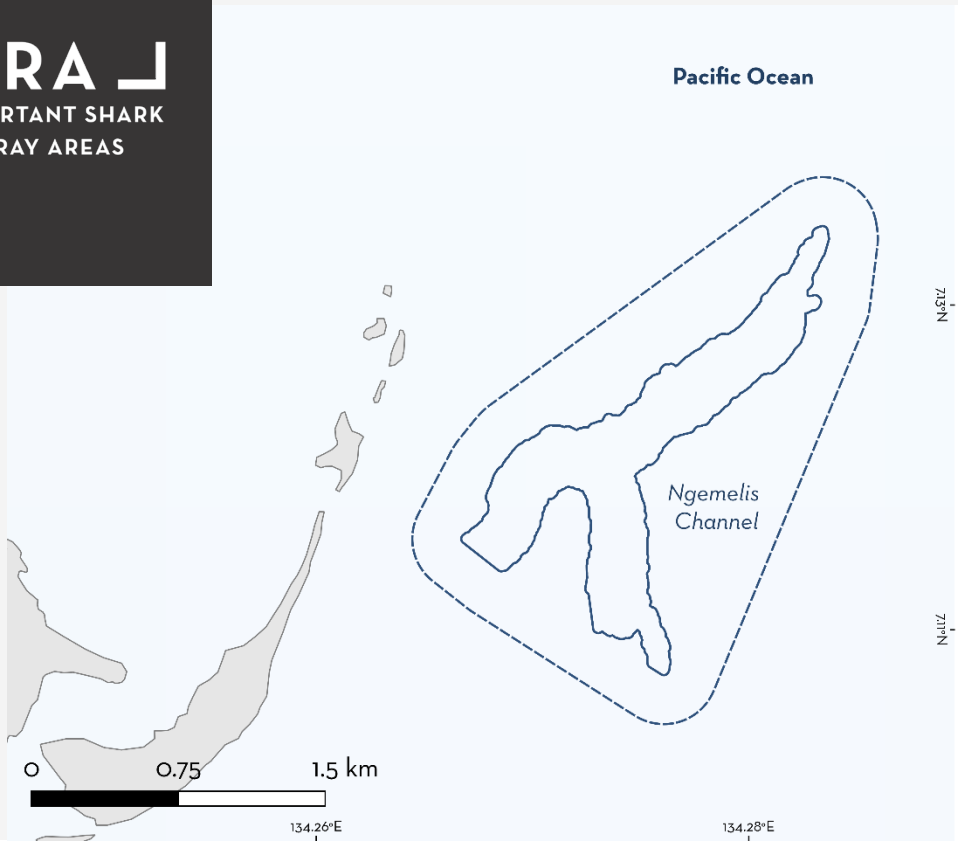
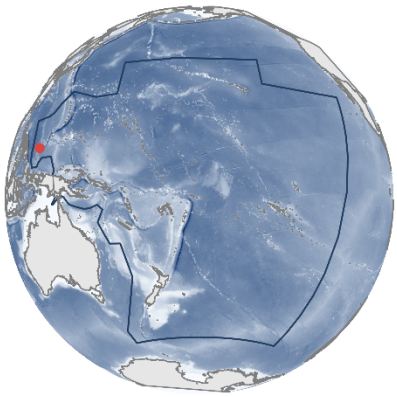
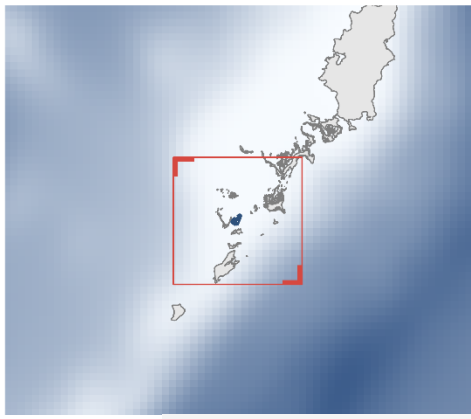
ISRA
IMPORTANT SHARK AND RAY AREAS





*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*

## NGEMELIS CHANNEL ISRA

**New Zealand & Pacific Islands Region**

**PALAU**

**0–40 metres**

**0.98 km²**

## SUMMARY

Ngemelis Channel is located in Koror, Palau. The area is situated east of Ngemelis Island. The mouth of the channel has a sandy substrate with numerous coral heads and coral formations while the slope is covered with a large variety of hard corals. Within this area there are: **threatened species** (e.g., Reef Manta Ray *Mobula alfredi*); **reproductive areas** (Grey Reef Shark *Carcharhinus amblyrhynchos*); **resting areas** (Whitetip Reef Shark *Triaenodon obesus*); and **undefined aggregations** (e.g., Reef Manta Ray).

## CRITERIA

**Criterion A – Vulnerability; Sub-criterion C1 – Reproductive Areas; Sub-criterion C3 – Resting Areas; Sub-criterion C5 – Undefined Aggregations**

## DESCRIPTION OF HABITAT

Ngemelis Channel is located in Koror, Palau. The area is situated east of Ngemelis Island and is a natural incomplete channel which has been modified by dredging. The dredged passage connected to this area is locally known as 'German Channel' and funnels the outgoing and incoming tides from the inner lagoon creating current in the area. This triggers a bottleneck effect during incoming lunar tide as the cold nutrient-rich waters from the ocean concentrate at the mouth of the channel (Prieto 2015). The mouth of the channel has sandy substrates with numerous coral heads and coral formations including patches of lettuce coral and giant clams (Harel-Bornovski & Bornovski 2015). The northern and eastern slopes that border the areas where diving occurs are covered with a variety of hard corals (Harel-Bornovski & Bornovski 2015). This is the terminal end of a large submarine canyon (Etpison & Colin 2013). The entrance depth ranges from 3–10 metres, gradually sloping to 40 metres (Harel-Bornovski & Bornovski 2015).

This Important Shark and Ray Area is benthic and pelagic and is delineated from surface waters (0 m) to 40 m based on the bathymetry of the area.

# ISRA CRITERIA

## CRITERION A – VULNERABILITY

Three Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species regularly occur in the area. These are the Endangered Grey Reef Shark (Simpfendorfer et al. 2020a); and the Vulnerable Whitetip Reef Shark (Simpfendorfer et al. 2020b) and Reef Manta Ray (Marshall et al. 2022).

## SUB-CRITERION C1 – REPRODUCTIVE AREAS

Ngemelis Channel is an important reproductive area for one shark species.

Between 2009–2024, recreational dives were conducted at Ngemelis Channel twice per week (~100 dives/year). During this period, aggregations of 10–40 neonate/young-of-the-year (YOY) Grey Reef Sharks were observed on 80% of dives year-round. Visual estimates of their total length (TL) ranged between 60–80 cm TL (T Harel-Bornovski pers. obs. 2009–2024). The size-at-birth for this species is 45–60 cm TL (Ebert et al. 2021), indicating these individuals were neonates or YOY. Adult females with fresh mating scars are observed in nearby areas between December–April, however, since the early 2000's females with fresh mating scars have been recorded as late as July similar to other areas in Palau (T Harel-Bornovski pers. obs. 2009–2024). Given the timeframe of mating scar observations, the 12–14-month gestation period of Grey Reef Sharks (Ebert et al. 2021), and the year-round presence of young age classes, the pupping time is unknown in this area. The number of young Grey Reef Sharks in the area slowly declines over a few months throughout the year as they are predated on (J Alpert pers. obs. 2013–2024).

## SUB-CRITERION C3 – RESTING AREAS

Ngemelis Channel is an important resting area for one shark species.

Between 2009–2024, recreational dives were conducted at Ngemelis Channel year-round (~100 dives/year). Whitetip Reef Sharks are predictably sighted (~90% of dives) resting on the sandy

substrate in groups of up to 10 individuals (~0.5 m apart) at depths of 20–30 meters (T Harel-Bornowski pers. obs. 2024). This is one of three areas in Palau where Whitetip Reef Sharks can be regularly and predictably observed resting in groups. Within this area and the Ulong dive area, Whitetip Reef Sharks are mostly seen resting on the sandy substrate, while in Ngemelis wall, they are seen resting in groups inside caves and on the reef (T Harel-Bornowski pers. obs. 2024).

From 2007–2012, 62 dive guides recorded counts of individual sharks sighted for 2,360 dives at 52 dive sites in Palau (Vianna et al. 2014). The total number of dives at 'German Channel' dive site was 385. Whitetip Reef Sharks were observed in 81% of dives with a mean daily relative abundance (mean value of all dives on a given day at the same site) of four (0.2 SE) Whitetip Reef Sharks in the area supporting the numbers of individuals observed in aggregations (Vianna et al. 2014).

## SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Ngemelis Channel is an important area for undefined aggregations of one shark and one ray species.

Between 2009–2024, recreational dives were conducted at Ngemelis Channel year-round (~100 dives/year). During this period, aggregations of up to 10 (average = five) adult Grey Reef Sharks were observed on ~80% of the dives year-round. Grey Reef Sharks usually swim together near the mouth of the channel and sometimes with jaws open to be cleaned, at depths between 20–35 m (T Harel-Bornowski pers. obs. 2024). Records of Grey Reef Sharks at cleaning stations in groups within the area are available on social media channels highlighting their regular and predictable occurrence in aggregations in this area. Further information is required to understand the function and nature of this aggregation.

Between 2010–2015, aggregations of 3–5 Reef Manta Rays were regularly and predictably seen within the area seasonally (October and May) (Etpison & Colin 2013; Prieto 2015). Aggregations can reach up to 20 individuals when the incoming current is strong, before the new and full moons (Etpison & Colin 2013). Between 2010–2013, a total of 235 individuals were identified using photo identification (Etpison & Colin 2013). Reef Manta Rays are known to come to the cleaning station at the mouth of the channel (Etpison & Colin 2013). During the incoming tide, Reef Manta Rays can often be seen inside the shallow channel. A few female and young Reef Manta Rays can be found year-round at this site (Etpison & Colin 2013). There are individuals that have returned to the area for over 20 years. Between 2013–2024, Reef Manta Rays were observed feeding within the area between November–January (J Alpert pers. obs. 2013–2024). During this period, aggregations can reach 15–25 on the day of the full moon (J Alpert pers. obs. 2013–2024). Reef Manta Rays are seen feeding in dense patches of zooplankton. When the incoming current is strong, they come close to the surface and unfold their cephalic fins to funnel food into their open mouths. They sometimes feed in 'trains', with animals closely following each other (Etpison & Colin 2013). When the current is less strong, they often start somersault feeding to push the zooplankton into their mouths. Courtship behaviour and near-term pregnant Reef Manta Rays are observed within the area every year. Some identified females have been observed pregnant in several years within the area based on distended abdomens (Etpison & Colin 2013). This is the only area in Palau where visually estimated neonate and YOY Reef Manta Rays are seen every season between November–April (Etpison & Colin 2013). Further information is required to understand the function and nature of this aggregation.

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Tova Harel-Bornovski (Micronesia Shark Foundation), Jesse Alpert (Alpert Pictures), and Vanessa Bettcher Brito (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 amblyrhynchos* | Grey Reef Shark | EN | 0–280 | X | | X | | | | X | | |
| *Triaenodon obesus* | Whitetip Reef Shark | VU | 0–330 | X | | | | X | | | | |
| **RAYS** | | | | | | | | | | | | |
| *Mobula alfredi* | Reef Manta Ray | VU | 0–711 | X | | | | | | X | | |

## SUPPORTING SPECIES

| Scientific Name | Common Name | IUCN Red List Category |
|---|---|---|
| **SHARKS** | | |
| *Stegostoma tigrinum* | Indo-Pacific Leopard Shark | EN |
| **RAYS** | | |
| *Pastinachus ater* | Broad Cowtail 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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