

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

## NUSA PENIDA ISRA

### Asia Region

### SUMMARY

Nusa Penida is located on the southwest coast of the island of Nusa Penida, situated between Bali and Lombok in Indonesia. The area is characterised by sloping and flat coral reefs, reef walls, sandy bays, and mangrove areas. It is influenced by the Indonesian Throughflow, which connects the Pacific to the Indian Ocean and results in highly productive coastal waters. The area overlaps with the Nusa Penida Marine Protected Area. Within this area there are: **threatened species, reproductive areas, feeding areas, and undefined aggregations** (Reef Manta Ray *Mobula alfredi*).

### CRITERIA

**Criterion A - Vulnerability; Sub-criterion C1 - Reproductive Areas; Sub-criterion C2 - Feeding Areas; Sub-criterion C5 - Undefined Aggregations**

## INDONESIA

0-100 metres

36.11 km<sup>2</sup>





## DESCRIPTION OF HABITAT

Nusa Penida is located on the southwest coast of Nusa Penida Island near the island of Bali in Indonesia. The area is situated in the Lombok Strait, which is a unique oceanographic region that is heavily influenced by the Indonesian Throughflow (ITF) current (Murray & Arief 1988). The ITF brings warm and nutrient-rich waters from the Pacific to the Indian Ocean (Tillinger 2011; Ayers et al. 2014). Deepwater upwelling in the south of Bali further contributes nutrient-rich waters to this area (Ningsih et al. 2013). The ITF also influences the habitats found around Nusa Penida Island. The area, located on the more sheltered southern coast, has mostly gentle slopes with patchy coral coverage, and it is often subjected to swell-induced surges (Turak & Devantier 2013; Gotama et al. 2023). The area is characterised by a range of habitats including sloping and flat coral reefs, reef walls, sandy bays, and mangroves. The main survey sites within the area are Manta Point in the southeast of the area and Manta Bay in the northwest, which are ~10 km apart from each other.

The area sits within the Nusa Penida Marine Protected Area (Sanjaya 2019).

This Important Shark and Ray Area is benthopelagic and extends from inshore and surface waters (0 m) to 100 m, based on the occurrence of the Qualifying Species in the area.

## 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 C1 – REPRODUCTIVE AREAS

Nusa Penida is an important reproductive area for one ray species.

In-water surveys by researchers (n = 1,146 dive surveys) and citizen science reports from 2012–2023 have identified 814 Reef Manta Rays in Nusa Penida, using photo-identification (Marine Megafauna Foundation unpubl. data 2024). Observers also recorded behaviour and maturity indicators on the surveys. In a subset of surveys from 2012–2018, more than half (53%) of the 243 identified females were sexually mature based on the presence of mating scars, obvious and large pregnancy bulges, or recorded courtship behaviour (Germanov et al. 2019a). Further surveys from 2012–2022 showed a continuation of a similar level of pregnancies (43%) and that pregnant Reef Manta Rays were seen annually (Marine Megafauna Foundation unpubl. data 2024). Courtship behaviour was regularly observed throughout the year, peaking in May (Germanov et al. 2019a). Pregnant Reef Manta Rays and courtship behaviours were mostly recorded at Manta Point in the southeast of the area. By contrast, more juveniles were seen in Manta Bay ~10 km northwest of Manta Point, with immature males making up 39% of sightings there (Germanov et al. 2019a). Among these, four individuals had an estimated size of 150 cm disc width (DW), which is within the size range of neonates (130–150 cm DW; Marshall et al. 2022) and several additional individuals were determined to be neonates based on visible umbilical scars (Marine Megafauna Foundation unpubl. data 2024). Two out of 21 individuals measured using photogrammetry in Manta Bay were <200 cm DW (Marine Megafauna Foundation unpubl. data 2024) and were young-of-the-year, based on fast initial growth rates for this species (Nozu et al. 2017; Murakumo et al. 2020). These observations show that the area is important for courtship, mating, and gestation, and for neonates and young-of-the-year Reef Manta Rays.

## SUB-CRITERION C2 – FEEDING AREAS

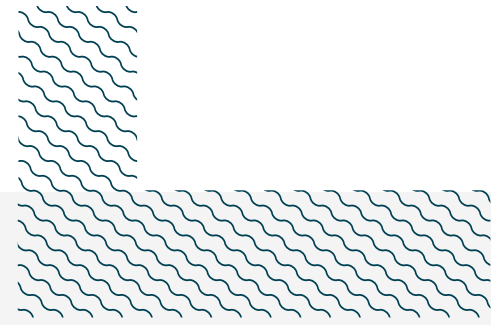
Nusa Penida is an important feeding area for one ray species.

The same surveys from 2012-2023 recorded feeding as the main behaviour for 72% of 3,508 total sightings at Manta Bay (Marine Megafauna Foundation unpubl. data 2024). Most feeding events were characterised by surface ram feeding and near-surface barrel-rolling. Feeding has been observed year-round each year from 2012-2023. Smaller individuals (mean = 253 cm DW; measured with photogrammetry) were observed feeding in Manta Bay, while larger individuals were mainly encountered at Manta Point, an identified cleaning station. This difference shows potential size segregation, with smaller, younger Reef Manta Rays preferring Manta Bay to feed, while larger, mature individuals mostly use this area to clean and socialise at Manta Point. Manta Bay is the most reliable feeding site in the region, with currents concentrating zooplankton in the bay (Germanov et al. 2019b). Feeding behaviour was also recorded elsewhere within this area, but at a low percentage of <5% of total sightings (Germanov et al. 2019a).

## SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Nusa Penida is an important area for undefined aggregations of one ray species.

The same in-water surveys from 2012-2023 showed that Reef Manta Rays regularly visit cleaning stations within this area. Cleaning was recorded in 2,432 encounters (26.7% of the total) in Manta Point and Manta Bay. Manta Point had the highest proportion of cleaning behaviour (41% of 5,435 encounters). Cleaning behaviour was seen year-round throughout the study period (Germanov et al. 2019a) and usually involved 2-3 Reef Manta Rays, and up to 10 individuals, hovering around a site. These sites are also important for social interactions and may facilitate courtship and mating (Deakos et al. 2011; Stevens 2016).



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## **Acknowledgments**

Janis Argeswara (Marine Megafauna Foundation; Yayasan Megafauna Laut), Lisa-Marie Auditore (Marine Megafauna Foundation), Stephanie Venables (Marine Megafauna Foundation), Serena Stean (Indo Ocean Project), Pascal Sebastian (Indo Ocean Project), 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 2024 ISRA Region 9 - Asia workshop for their contributions to this process.

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

This project was funded by the Shark Conservation Fund, a philanthropic collaborative pooling expertise and resources to meet the threats facing the world's sharks and rays. The Shark Conservation Fund is a project of Rockefeller Philanthropy Advisors.

## **Suggested citation**

**IUCN SSC Shark Specialist Group. 2024.** Nusa Penida ISRA Factsheet. Dubai: IUCN SSC Shark Specialist Group.

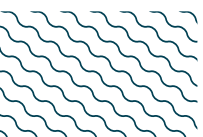
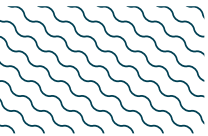
## QUALIFYING SPECIES

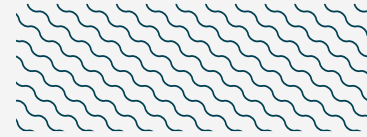
Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met									
				A	B	C1	C2	C3	C4	C5	D1	D2	
RAYS													
<i>Mobula alfredi</i>	Reef Manta Ray	VU	0-711	X		X	X			X			

## SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
<b>SHARKS</b>		
<i>Chiloscyllium punctatum</i>	Grey Carpetshark	NT
<i>Hemipristis elongata</i>	Snaggletooth Shark	EN
<i>Orectolobus leptolineatus</i>	Indonesian Wobbegong	NT
<b>RAYS</b>		
<i>Aetobatus ocellatus</i>	Spotted Eagle Ray	EN
<i>Neotrygon caeruleopunctata</i>	Bluespotted Maskray	LC

*IUCN Red List of Threatened Species Categories are available by searching species names at [www.iucnredlist.org](http://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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