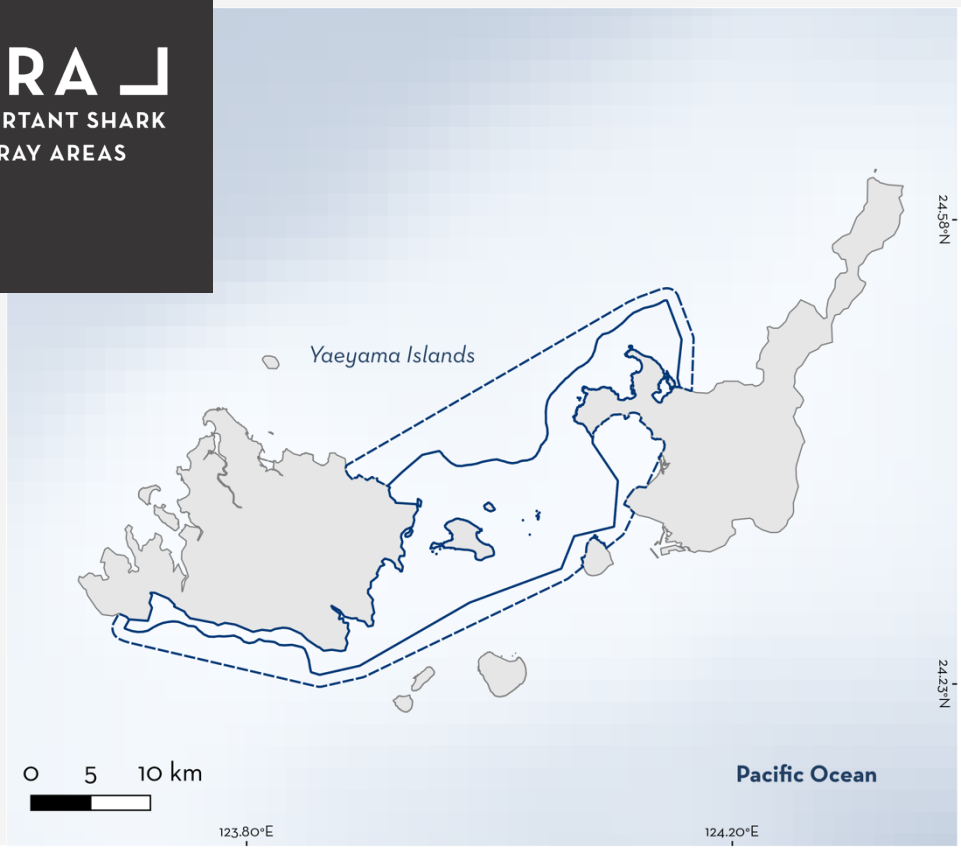
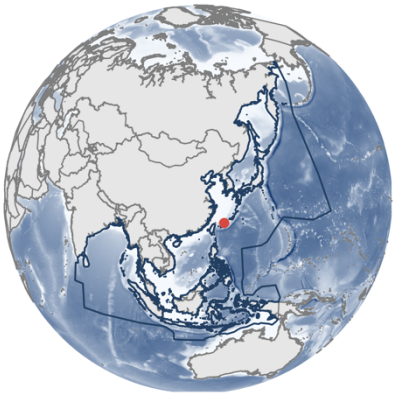
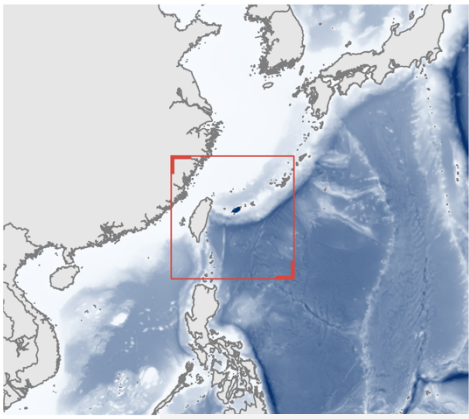
ISRA
IMPORTANT SHARK AND RAY AREAS







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

YAEYAMA ISLANDS ISRA

Asia Region

JAPAN

0–100 metres

289.16 km²

SUMMARY

Yaeyama Islands is located to the southwest of Okinawa, Japan. The area is part of the Ryuku Arc and encompasses the northwest coast of Ishigaki Island, the southeast and south coast of Iriomote, and the island of Kohama. This area is under the influence of the Kuroshio Current that brings warm water northward, allowing the presence of coral reefs at these high latitudes. The area overlaps with one Key Biodiversity Area, one Ecologically or Biologically Significant Marine Area, and one National Park. Within this area there are: **threatened species**, **reproductive areas**, and **undefined aggregations** (Reef Manta Ray *Mobula alfredi*).

CRITERIA

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

DESCRIPTION OF HABITAT

Yaeyama Islands is located to the southwest of Okinawa, Japan. The area is part of the Ryuku Arc, and encompasses the northwest coast of Ishigaki Island, the southeast and south coast of Iriomote, and the island of Kohama (Kashiwagi 2014). The area has a subtropical climate, with moderate air temperatures throughout the year, ranging from a mean maximum of 29°C in July, to a mean minimum of 17.8°C in January (Ruddle 1987). Boreal winters (December–February) are mild, dominated by north-westerly winds that often cause rough seas (Ruddle 1987; JMA 2024). The rainy season, known as Baiu, starts in early May and ends in late June (Okada & Yamazaki 2012). Tropical storms peak during the month of August and tropical cyclones affect the area during autumn (September–November) (Ruddle 1987; JMA 2024).

The area is characterised by developed fringing coral reef and the indented coastline of Ishigaki and Iriomote Island, which are ecologically diverse (Ruddle 1987). The key locations in the area are Kabira Bay, Yonara Channel, and Kanokawa Bay. Kabira Bay, located on the northwest of Ishigaki Island, is comprised of shallow coral reefs encompassing two well-known dive sites called 'Manta City' and 'Manta Scramble' located 300 m apart. 'Manta Scramble' is a wide site with outcrops and 'Manta City' is a smaller reef. Yonara Channel is a sandy substrate channel 25–30m deep, located between Iriomote and Kohama Island with strong current flow (Prime Scuba Ishigaki 2024). Kanokawa Bay on the southwest of Iriomote island has a well-known dive location with big coral blocks.

The area is under the influence of the Kuroshio Current (Ruddle 1987; Matsuda 1989). The Kuroshio Current is one of the western boundary currents of the subtropical North Pacific and is the dominating current in the East China Sea (Ruddle 1987; Zhang et al. 2012). This current is one of the most important routes for poleward heat transport and contributes greatly to the productivity of marine ecosystems along the coastal regions of its route. The Kuroshio Current undergoes significant spatial and temporal variability along its route (Andres et al. 2015; Morioka et al. 2019; Lizarbe Barreto et al. 2021).

Yaeyama Islands overlaps with the Yaeyama Island Key Biodiversity Area (KBA 2024), the Southwest Islands Ecologically or Biologically Significant Marine Area (EBSA; CBD 2024), and the Iriomote Ishigaki National Park (UNEP-WCMC 2024; Ministry of Environment, Government of Japan 2024).

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 100 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. The Reef Manta Ray is assessed as Vulnerable (Marshall et al. 2022).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Yaeyama Islands is an important reproductive area for one ray species.

Reef Manta Rays reproduce in Yaeyama Islands with evidence of courtship and pregnancies available for the period 1987 until 2016 across the archipelago (Kashiwagi 2014; Manta Trust unpubl. data 2024). The reproductive season has been identified in spring and summer (March to August).

Based on 11,111 sightings with photo-identification from 2,209 observation-days between 1987 and 2009, a total of 305 individuals were identified (Kashiwagi 2014). During thisperiod, a total of 424 observed courtship events were recorded in the Yaeyamas (Kashiwagi 2014), and one in February 2021 at Manta City (Manta Trust unpubl. data 2024), supplemented by additional sightings posted on social media. Courtship behaviour has been identified when a female has been closely followed by one or more males forming a 'mating train', performing high speed flips and turns (Stevens et al. 2018). Mating appeared to be seasonal, since fresh mating wounds would be found between March and August but not in autumn (September, October, and November) (Kashiwagi 2014).

A total of 80 pregnancy events from 39 females were detected between 1987 and 2009, with the number of pregnancies per year between zero and 10. Pregnancy was determinate by the presence of extended abdomens by experienced observers. Five pregnancy events occurred in consecutive years, confirming a gestation period of 1 year. The maximum number of pregnancies per individual was seven and the average reproduction frequency was 1 pup every 3.61–3.93 years. Age-at-first-pregnancy was 8–15 years old with sizes of 375–400 cm disc width. The pupping season has been observed to be between April and July, based on 14 pregnancies in which pupping date could be inferred (Kashiwagi 2014).

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Yaeyama Islands is an important area for undefined aggregations of one ray species.

The area holds the largest known aggregation of Reef Manta Rays in Japan that occurs year-round (Ishihara & Homma 1995; Kashiwagi 2014). Reef Manta Rays aggregate around cleaning stations in this area. Based on 11,111 sightings with photo-identification from 2,209 observation-days between 1987 and 2009, a total of 305 individuals have been identified (Kashiwagi 2014). Sightings were recorded form 21 sites around Yaeyama Islands, with 99.4% of the sightings concentrated on three main sites known as Kabira Bay, Yonara Channel, and Kanokawa with 80.5%, 9.7%, and 9.3% of the total sightings, respectively. These three sites represent 68.5%, 17.5%, and 12.5% of survey effort (sighting days), and have an average rate of 5.9, 2.8, and 3.9 sightings per day. Surveys in 2015–2016 recorded a total of 182 sightings in 62 observation days with a total of 83 individuals identified (Manta Trust unpubl. data 2024) confirming the ongoing presence of aggregations at this site.

Aggregations of Reef Manta Rays can be observed regularly and predictably at Kabira Bay and in the Yonara Channel between the months of May to October, with a peak between September and early October (Blue Japan 2024; Viking Scuba Kabira 2024). The area is a well-known location where local dive centres conduct dives regularly for manta ray encounters (O'Malley et al. 2013). In Kabira Bay, Reef Manta Rays can be observed aggregating in groups of up to 14 animals swimming slowly over the two known cleaning stations (Manta City and Manta Scramble) (Prime Scuba Ishigaki 2024; Euro Divers Japan pers. comm. 2012–2024). In Yonara Channel, animals are observed cruising at depth through the channel in groups of up to five individuals (Manta Trust unpubl. data 2024) regularly and predictably with a peak during the months of July to mid-August, associated with high water temperature (Euro Divers Japan pers. comm. 2012-2024). During winter, Reef Manta Rays aggregate around the cleaning stations of Kanokawa.

The multi-decadal observation of Reef Manta Rays at Yaeyama Islands characterises a population with a high and long-term site fidelity, and a representation of all ages with an equal sex ratio (Kashiwagi 2014). Long-term resighting (10 years or more between 1987 and 2009) of 128 individuals showed a mean inter-annual re-sighting rate of 72.0% (77.0% for males and 75.0% for females). Moreover, transient animals, those with sighting records of only one year, represented only 20% of the total identified animals (Kashiwagi 2014).

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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 brevipinna	Spinner Shark	VU
Carcharhinus falciformis	Silky Shark	VU
Carcharodon carcharias	White Shark	VU
Chiloscyllium punctatum	Grey Carpetshark	NT
Galeocerdo cuvier	Tiger Shark	NT
Nebrius ferrugineus	Tawny Nurse Shark	VU
Pristiophorus japanicus	Japanese Sawshark	LC
Rhincodon typus	Whale Shark	EN
Triaenodon obesus	Whitetip Reef Shark	VU
RAYS		
Mobula birostris	Oceanic Manta Ray	EN
Neotrygon orientalis	Oriental Bluespotted Maskray	LC
Taeniurops meyeni	Blotched Fantail 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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