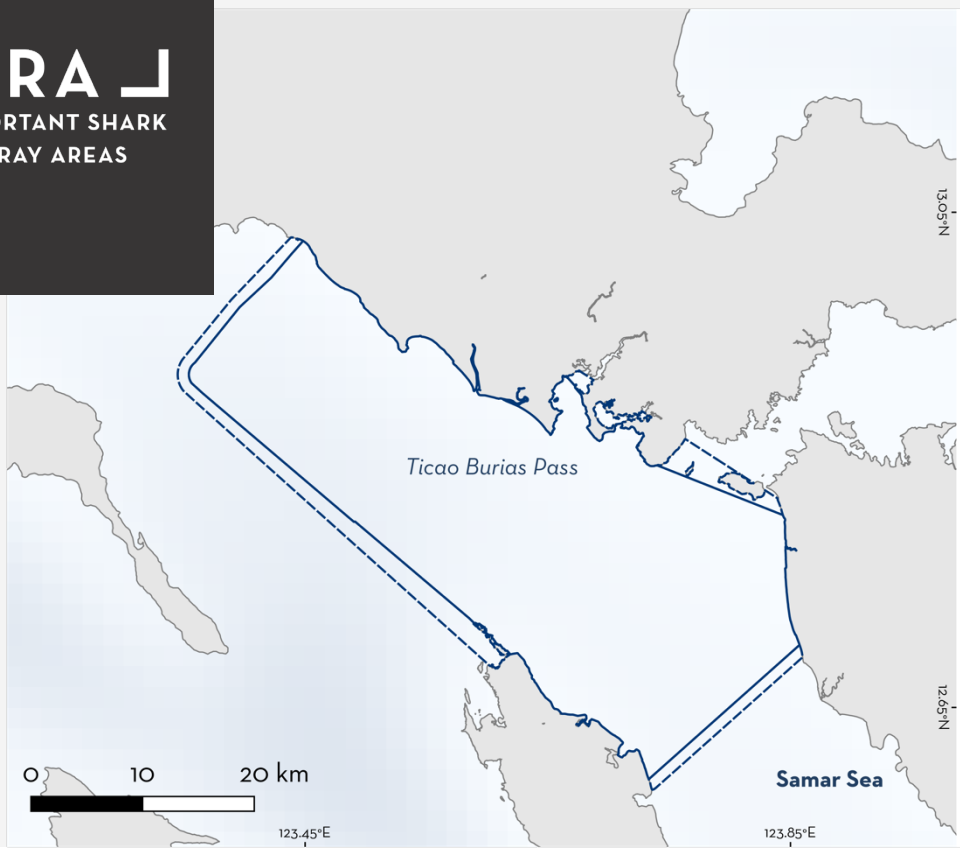
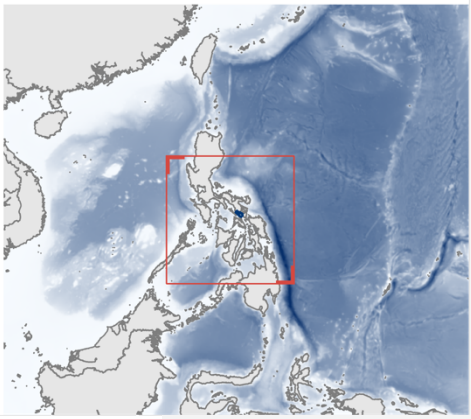
ISRA
IMPORTANT SHARK AND RAY AREAS





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

TICAO BURIAS PASS ISRA

Asia Region

PHILIPPINES

0–50 metres

1,086.96 km²

SUMMARY

Ticao Burias Pass is a narrow waterway located between Ticao and Burias Islands and Sorsogon and Albay provinces in the Bicol of the central Philippines. Water from the Western Pacific enters the area through the San Bernadino Strait. Zooplankton in the area is dominated by nauplii and copepods with a seasonal peak in abundance in February. A site known as Manta Bowl is located in the area which is a submerged reef on the top of a seamount near Ticao Island. This area sits within Sulu-Sulawesi Marine Ecoregion Ecologically or Biologically Significant Marine Area, and one marine protected area, Ticao-Burias Pass Protected Seascape. Within this area there are: **threatened species** (e.g., Whale Shark *Rhincodon typus*); **reproductive areas** (Whale Shark); and **undefined aggregations** (e.g., Reef Manta Ray *Mobula alfredi*).

CRITERIA

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

DESCRIPTION OF HABITAT

Ticao Burias Pass is a narrow waterway located between Ticao and Burias Islands and Sorsogon and Albay provinces in the Bicol region of the central Philippines. Water from the Western Pacific enters the area through the San Bernadino Strait (Han et al. 2009). Diatom blooms appear to dominate the plankton composition in this area between January and August (Calumpong et al. 2013). Zooplankton is dominated by nauplii and copepods with a seasonal peak in abundance in February (Calumpong et al. 2013). In the Ticao Burias Pass, there are two major seasons: the wet season, from June to November; and the dry season, from December to May which results in reduced water output from the rivers into this area (Lapitan-Tandang 2010).

In this area, Manta Bowl (locally known as Bondot Tacdogan) is located. This is a submerged reef on the top of a seamount near Ticao Island. The seamount area is 0.4 km^2 and the reef flat is 0.06 km^2, with a crest at a depth of 20 m that gently slopes down to 50 m and deeper, to a surrounding depth of 200 m. The Manta Bowl area experiences strong tidal currents and both upwelling and downwelling currents. The northernmost part of the seamount has a large concentration of cleaning stations inhabited by the cleaner wrasses *Labroides bicolor*, *L. pictoides*, and *L. dimidiatus*.

This area sits within the Sulu-Sulawesi Marine Ecoregion Ecologically or Biologically Significant Marine Area (EBSA; CBD 2024) and one marine protected area, Ticao-Burias Pass Protected Seascape. Donsol, which sits in the area, is a Municipal Whale Shark Sanctuary.

This Important Shark and Ray Area is benthopelagic and is delineated from the surface (0 m) to 50 m based on the depth range of Qualifying Species in this area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Two Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species regularly occur in the area. These are the Endangered Whale Shark (Pierce & Norman 2016) and the Vulnerable Reef Manta Ray (Marshall et al. 2022).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Ticao Burias Pass is an important reproductive area for one shark species.

In March 2009, two neonate Whale Sharks were recorded in this area, measuring 46 and 64 cm total length (TL), respectively (Aca & Schmidt 2011). In 2020, a free-swimming male neonate Whale Shark (60 cm TL) was also recorded (Miranda et al. 2021). These three sharks fall within or slightly below the species' known size-at-birth (55–64 cm TL; Ebert et al. 2021). Further, within this area, there have been three anecdotal mating and precopulatory behaviour reports (Miranda et al. 2021). This area is globally and regionally significant, considering the few locations worldwide in which reproductive areas have been identified for Whale Sharks and that this is the only area in Southeast Asia were neonates or mating behaviour has been recorded.

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Ticao Burias Pass is an important area for undefined aggregations of one shark and one ray species.

This area has been identified among the 25th largest aggregation sites for Whale Shark globally (Araujo et al. 2022). In Southeast Asia, it is the largest Whale Shark aggregation due to the number of individuals identified and number of individuals per survey (n = 4.15) (excluding Oslob, a provisioning site) (Araujo et al. 2022). Between 2006 and 2020 from November to June, 1,985 surveys were conducted (for 895 days) encountering 6,786 Whale Sharks. During this period, 614 Whale Sharks were photo-identified, representing 49% of the known Whale Shark population in the Philippines, and 68% of them have been resighted in this area seasonally from November to June with a peak from February to May (McCoy et al. 2018; Araujo et al. 2022). During this period, Whale Sharks were consistently sighted monthly between 2006 and 2020. The highest number recorded was in April of 2009 with 118 different individuals, which represents the peak month along the study period (mean = 57; SD = 34.5). The estimated mean residency (± S.E.) of days spent by sharks in this area at each season was 49.8 (± 14.5). Whale Sharks have an estimated aggregation size of 47.1–60.8 individuals at any one time during the season (i.e., November to June) in the coastal waters of Donsol (McCoy et al. 2018).

Whale Sharks have been observed feeding at this area since at least 1999 (Quiros 2007). The main driver of their occurrence appears to be feeding as sightings coincide with periods of higher productivity in the region from December to May (Gordon et al. 2011; Calumpong et al. 2013). Whale Shark abundance peaks one month prior to these plankton communities' highest yearly densities in the area with animals targeting high-density patches of zooplankton (Calumpong et al. 2013). However, further information is needed to determine if this area is used as a feeding ground.

Sightings of devil rays in the Philippines were collated into a national database, using in-water photographs and videos gathered from citizen science and dedicated research efforts. The database covers the period 2004–2020, but mostly 2017–2019 when regular monitoring was undertaken (Rambahiniarison et al. 2023). Seventeen sites with 2,454 sightings and 392 individual Reef Manta Rays were recorded. Ticao Burias Pass represented the largest aggregation of Reef Manta Rays in the Philippines. Overall, 1,710 (70%) sightings and 284 individual (72%) Reef Manta Rays were recorded in this area. This area showed an average resighting rate of 66%, suggesting evidence of long-term philopatric behaviour (Rambahiniarison et al. 2023). Also, this area is one of the most popular manta ray diving sites in the Philippines in which Reef Manta Rays are observed year-around.

Courtship, feeding, and cleaning behaviour has also been observed consisting of multiple animals together (Paylado 2004; Barr & Abelson 2019; Rambahiniarison et al. 2023). Diving surveys, environmental assessment, and autonomous cameras were employed to study Reef Manta Rays behaviour and visitation patterns to a cleaning station at Manta Bowl during 119 surveys between October 2012 (n = 28) and July and December 2014 (n = 91) (Barr & Abelson 2019). A total of 876 manta visits were analysed. The findings suggest a trade-off between cleaning and foraging. Reef Manta Rays tend to visit the cleaning stations when environmental conditions are less favourable for foraging but suitable for effective cleaning, while being absent from the cleaning stations when environmental conditions form plankton aggregations, ideal for efficient feeding (Barr & Abelson 2019). These suggests that these two behaviours (feeding and cleaning) occur in this area. In an expedition in April and May 2004, Reef Manta Rays were usually observed in pairs or in schools feeding against the current, called ram-jet filter feeding, in which one individual acted as the driver or leader while the others followed (Paylado 2004). However, further research is needed to understand the nature of this aggregation.

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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												
Rhincodon typus	Whale Shark	EN	0–1,928	X		X				X		
RAYS												
Mobula alfredi	Reef Manta Ray	VU	0–711	X						X		

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Alopias pelagicus	Pelagic Thresher	EN
Triaenodon obesus	Whitetip Reef Shark	VU
RAYS		
Aetobatus ocellatus	Spotted Eagle Ray	EN
Mobula birostris	Oceanic Manta Ray	EN

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

Aca EQ, Schmidt JV. 2011. Revised size limit for viability in the wild: neonatal and young of the year whale sharks identified in the Philippines. *Asia Life Sciences* 20(2): 361–367.

Araujo G, Agustines A, Bach SS, Cochran JEM, de la Parra-Galván E, de la Parra-Venegas R, Diamant S, Dove A, Fox S, Graham RT, et al. 2022. Improving sightings derived residency estimation for whale shark aggregations: A novel metric applied to a global data set. *Frontiers in Marine Science* 9: 775691. https://doi.org/10.3389/fmars.2022.775691

Barr Y, Abelson A. 2019. Feeding-cleaning trade-off: Manta ray "decision-making" as a conservation tool. *Frontiers in Marine Science* 6: 88. https://doi.org/10.3389/fmars.2019.00088

Calumpong HP, Sienes PM, Santos TR, Padin JI, Sabater ER. 2013. Plankton abundance in Ticao Pass, Masbate, Philippines. *Ecology, Environment and Conservation* 19: 47–51.

Convention on Biological Diversity (CBD). 2024. Sulu-Sulawesi Marine Ecoregion. Ecologically or Biologically Significant Areas (EBSAs). Available at: https://chm.cbd.int/database/record?documentID=237880 Accessed January 2024.

Ebert DA, Dando M, Fowler SL. 2021. *Sharks of the world: A complete guide*. Princeton: Princeton University Press.

Gordon AL, Sprintall J, Ffield A. 2011. Regional oceanography of the Philippine Archipelago. *Oceanography* 24: 14–27. https://doi.org/10.5670/oceanog.2011.01

Han W, Moore AM, Levin J, Zhang B, Arango HG, Curchitser E, Di Lorenzo E, Gordon AL, Lin J. 2009. Seasonal surface ocean circulation and dynamics in the Philippine Archipelago region during 2004-2008. *Dynamics of Atmospheres and Oceans* 47(14): 114–137. https://doi.org/10.1016/j.dynatmoce.2008.10.007

Lapitan-Tandang KJ. 2010. Physico-chemical characteristics of water visited by Whale Sharks in Bicol Region, Philippines. Terminal Report. Camarines Sur: Partido State University.

Marshall A, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Pacoureau N, et al. 2022. *Mobula alfredi* (amended version of 2019 assessment). *The IUCN Red List of Threatened Species* 2022: e.T195459A214395983. https://dx.doi.org/10.2305/IUCN.UK.2022-1.RLTS.T195459A214395983.en

McCoy E, Burce R, David D, Aca EQ, Hardy J, Labaja J, Snow SJ, Ponzo A, Araujo G. 2018. Long-term photo-identification reveals the population dynamics and strong site fidelity of adult Whale Sharks to the coastal waters of Donsol, Philippines. *Frontiers in Marine Science* 5: 271. https://doi.org/10.3389/fmars.2018.00271

Miranda JA, Yates N, Agustines A, Enolva NP, Labaja J, Legaspi C, McCoy E, Ponzo A, Snow S, Araujo G. 2021. Donsol: an important reproductive habitat for the world's largest fish *Rhincodon typus*? *Journal of Fish Biology* 98: 881–885. https://doi.org/10.1111/jfb.14610

Paylado TC. 2004. The Giant Manta Rays (*Manta birostris*, Bancroft 1829) habitat in Bontod-Tacdogan Reef, San Jacinto, Masbate. 8th Zonal R&D Review, DLSU, Taft Ave, Metro Manila.

Pierce SJ, Norman B. 2016. *Rhincodon typus. The IUCN Red List of Threatened Species* 2016: e.T19488A2365291. https://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T19488A2365291.en

Rambahiniarison J, Agustines A, Alexopoulos K, Araujo G, Armstrong AO, Arnold S, Barruga A, Cañete T, Conales S Jr, Delijero K, et al. 2023. Distribution of the reef manta ray *Mobula alfredi* and the oceanic manta ray *Mobula birostris* in the Philippines: a collaborative effort for conservation. *Journal of Fish Biology* 102: 492–503. https://doi.org/10.1111/jfb.15283