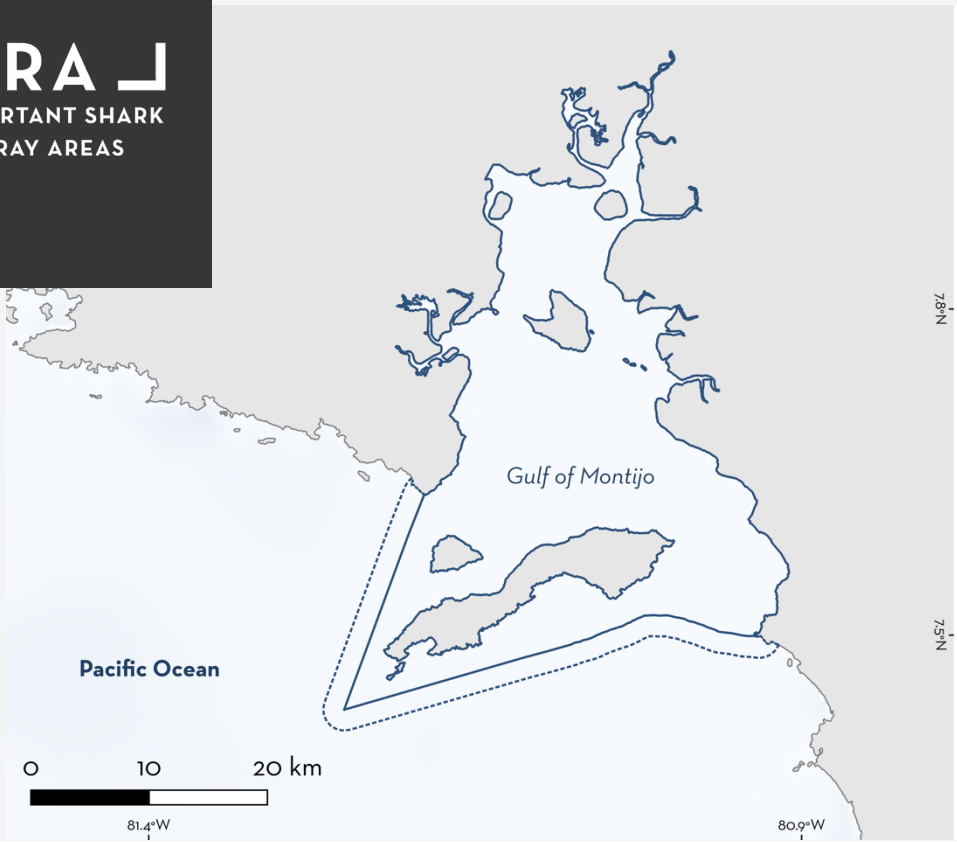
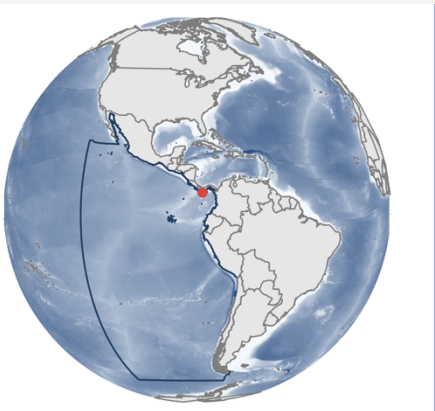
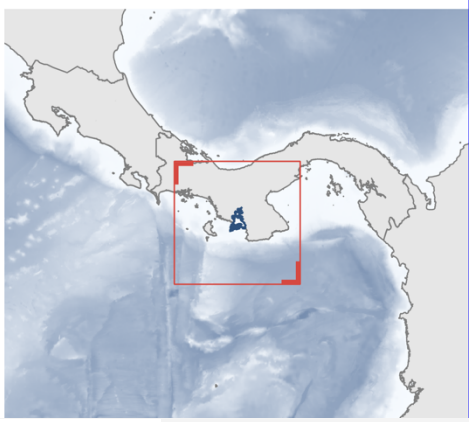
ISRA
IMPORTANT SHARK AND RAY AREAS







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

GULF OF MONTIJO ISRA

Central and South American Pacific Region

PANAMA

0–50 metres

868.3 km²

SUMMARY

The Gulf of Montijo is located within Veraguas Province on the Pacific coast of Panama. It is considered a Wetland of International Importance (a Ramsar site) and is included in Panama's protected areas system. The Gulf of Montijo is a complex shallow gulf (generally <10 m depth) with significant wetlands, several rivers, deltas, rocky shores, mudflats, and several species of mangroves. The area contains ~190 km² of mangrove forest, considered one of the most important in Panama for its size (the fourth largest mangrove area in the country) and productivity. Within this area there are: **threatened species** (e.g., Largetooth Sawfish *Pristis pristis*) and **reproductive areas** (e.g., Scalloped Bonnethead *Sphyrna corona*).

CRITERIA

Criterion A – Vulnerability; Sub-criterion C1 – Reproductive Areas

DESCRIPTION OF HABITAT

The Gulf of Montijo is located within Veraguas Province on the Pacific coast of Panama. It is situated within the Pacific Central-American Coastal Large Marine Ecosystem. The Gulf of Montijo is a Wetland of International Importance (a Ramsar site) and is included in Panama's protected areas system as the Golfo de Montijo Área de Recursos Manejados (Area of Managed Resources). It comprises a complex of coastal wetlands with deltas, rocky shores, mudflats, several species of mangroves, and around 45 rivers and over 1,000 streams. The area is generally shallow, mostly at depths of <10 m but contains some deeper channels and basins to 30 m (Navionics 2022). The area contains ~190 km^2 of mangrove forest, considered one of the most important in Panama for its size (the fourth largest mangrove area in Panama) and productivity. The area includes notable large islands, particularly Isla Leones which sits in the middle of the gulf and Isla Cébaco at the entrance to the gulf.

This Important Shark and Ray Area is delineated from surface and inshore waters (0 m) to a depth of 50 m based on the bathymetry and outer edge depth contour of the area (Navionics 2022).

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. Threatened sharks comprise two Critically Endangered species; threatened rays comprise one Critically Endangered species (IUCN 2022).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

The Gulf of Montijo is an important reproductive area for three shark species.

Recent evidence indicates that the Gulf of Montijo is a nursery area for Scalloped Hammerhead. In a study analysing artisanal fishery landings during 2013–2014, this species represented 87% of sharks landed (n = 1,104) in this area (Rodríguez Arriatti 2014). Neonates and young-of-the-year dominated the catch (99% of records) and there was a clear increase in mean size throughout the sampling period from 47 cm total length (TL) in April, 50 cm TL in June, 54 cm TL in July, 55 cm TL in August, and 63 cm TL in November (Rodríguez Arriatti 2014). The smallest recorded individual was 40 cm TL (Rodríguez Arriatti 2014). In another study also carried out in 2013–2014 (March 2013 to January 2014), Scalloped Hammerheads represented 84% of sharks captured (n = 440) by small-scale fisheries operating in the area (Vega et al. 2023). Size ranged between 34–103 cm TL, with a mean of 54.6 cm TL. Reported size-at-birth of Scalloped Hammerhead in the Eastern Pacific includes 47–55 cm TL for Ecuador (Estupiñán-Montaña et al. 2021), although sizes captured in the Gulf of Montijo suggest a smaller size-at-birth locally.

Based on the size ranges of catches of Scalloped Bonnethead, the area is considered a nursery ground for this small species of hammerhead. Information comes from the monitoring of artisanal fisheries during 2013–2014 (Rodríguez Arriatti 2014; Vega et al. 2023). The minimum, maximum, and mean size of Scalloped Bonnethead were: 29.3, 77.5, 61.7 cm TL (n = 19; Vega et al. 2023). Additionally, 33 individuals of Scalloped Bonnethead were caught in another monitoring study with a minimum size of 28 cm TL (Rodríguez Arriatti 2014). Reported size-at-birth is 28 cm TL in the Eastern Pacific (Gilbert 1967) and 22–23 cm TL in Colombia (Orozco Guarín et al. 2015).

There are several contemporary records (since the year 2000) of Largetooth Sawfish in the Gulf of Montijo with the largest clustering of records in Panama (n = 11 records from eight sites; López-Angarita et al. 2021). Largetooth Sawfish regularly occur in the area, with contemporary records from the years 2004, 2005, 2007, 2009, and 2015 (López-Angarita et al. 2021). These records originate from interviews with local fishers who were able to provide location-specific details of where sawfish were caught. Largetooth Sawfish is the only sawfish species occurring in the Eastern Pacific, is distinctive from other shark and ray species, and recognisable based on its elongated, tooth-studded rostrum.

Outside of the Eastern Pacific, it has been documented that Largetooth Sawfish spend the first 4–5 years in freshwater environments before moving to estuarine and coastal marine waters (except for the unique but depleted Lake Nicaragua population where individuals may have spent their whole life-cycle in freshwater; Thorson 1976, 1982; Thorburn et al. 2007). Apart from Lake Nicaragua, pupping is generally thought to occur around estuaries and river mouths (Kyne et al. 2021).

Despite the lack of further detail on the size classes of contemporary Largetooth Sawfish records in the area (i.e., if these were neonates, juveniles, or adults), several factors infer that the Gulf of Montijo is a reproductive area for the species: (1) the largest clustering of contemporary records anywhere in Panama; (2) known life-cycle; (3) known habitat preferences with extensive areas of core mangrove and riverine habitat in the area; and (4) documentation of contemporary records across multiple years. Largetooth Sawfish are locally extinct from much of the Eastern Pacific (Kyne et al. 2013; López-Angarita et al. 2021; Yan et al. 2021), therefore the temporal and spatial scale of contemporary records in the Gulf of Montijo is regionally, if not globally, significant.

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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												
Sphyrna corona	Scalloped Bonnethead	CR	0–100	X		X						
Sphyrna lewini	Scalloped Hammerhead	CR	0–1,043	X		X						
RAYS												
Pristis pristis	Largetooth Sawfish	CR	0–60	X		X						

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Alopias pelagicus	Pelagic Thresher	EN
Carcharhinus cerdale	Pacific Smalltail Shark	CR
Carcharhinus leucas	Bull Shark	VU
Carcharhinus limbatus	Blacktip Shark	VU
Mustelus henlei	Brown Smoothhound	LC
Mustelus lunulatus	Sicklefin Smoothhound	LC
Rhizoprionodon longurio	Pacific Sharpnose Shark	VU
Sphyrna media	Scoophead Shark	CR
Sphyrna tiburo	Bonnethead Shark	EN

IUCN Red List categories: *CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient.*

There are additional indications that the Gulf of Montijo might be a reproductive area for the Pacific Smalltail Shark. Small individuals of this species have been captured in the Gulf of Montijo over multiple years and the area has been considered a possible nursery area (Rodríguez Arriatti 2011, 2014). Monitoring of artisanal fisheries have included 33 individuals with a maximum size of 65 cm TL (Rodríguez Arriatti 2014; Y.N. Rodríguez Arriatti unpubl. data 2022) and four individuals with sizes between 39.5 and 99 cm TL (Vega et al. 2023). Reported size-at-birth of Pacific Smalltail Shark is >30 cm TL (based on the size of near-term embryos; Castro 2011). While this information supports the regular occurrence of juveniles of this poorly-known species in the area, further information is required to understand the function of the Gulf of Montijo as a reproductive area.

The small hammerhead species, Scoophead Shark and Bonnethead Shark also possibly utilise the area for reproductive areas. This is suggested by the small size of individuals recorded during monitoring (Vega et al. 2023). However, further information is required on the presence of neonates in the area or on other aspects of reproductive activity to support this sub-criterion. For Scoophead Shark, the minimum, maximum, and mean size were: 39.8, 81.0, and 60.7 cm TL (n = 9; Vega et al. 2023). Reported size-at-birth is 23 cm TL with samples primarily from the Eastern Pacific (Gilbert 1967). For Bonnethead Shark, the minimum, maximum, and mean size were: 32.5, 80.0, and 52.0 cm TL (n = 24; Vega et al. 2023). Reported size-at-birth is 22–30 cm TL (Lombardi-Carlson et al. 2003) and 23–24 cm TL (Ulrich et al. 2007), both from the Western Atlantic.

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