

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 TEHUANTEPEC ISRA

Central and South American Pacific Region

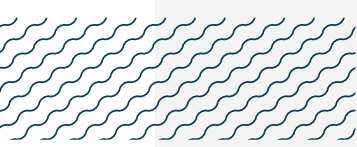
SUMMARY

Gulf of Tehuantepec is located between Salina Cruz and Puerto Madero, Mexico. This area is characterised by a narrow continental shelf in the east, which widens towards the west of the area, extending ~40-80 km from the shore. Due to the presence of high-speed winds ('tehuanos'), seasonal upwellings generate high productivity within the area. This area encompasses coastal lagoons, wetlands, mangroves, estuaries, sandy beaches, and river mouths. Within this area there are: **threatened species** (e.g., Whitesnout Guitarfish *Pseudobatos leucorhynchus*); **range-restricted species** (e.g., Southern Banded Guitarfish *Zapteryx xyster*); **reproductive areas** (e.g., Scalloped Hammerhead *Sphyrna lewini*); **feeding areas** (e.g., Blotched Round Ray *Urotrygon chilensis*); and the area sustains a **high diversity of sharks** (24 species).

CRITERIA

Criterion A - Vulnerability; Criterion B - Range Restricted;
Sub-criterion C1 - Reproductive Areas; Sub-criterion C2 - Feeding Areas;
Sub-criterion D2 - Diversity

—	—
MEXICO	—
—	—
0-200 metres	—
—	—
35,405.6 km²	—
—	—





DESCRIPTION OF HABITAT

Gulf of Tehuantepec is located in the southern part of the Mexican Pacific, between Salina Cruz, Oaxaca and Puerto Madero, Chiapas. Situated in the Pacific Central-American Large Marine Ecosystem (LME), this area is characterised by a narrow continental shelf in the eastern part of the area, which widens in the western part, extending between ~40–80 km from the shore (Lluch-Cota et al. 1997; Carranza-Edwards et al. 1998). Due to the presence of high-speed winds ('tehuanos') from November to May, increased mixing changes the structure of the water column and produces upwellings that generate high-productivity (Trasviña et al. 1995; Trasviña & Barton 1997). The rainy season extends from May to October and during these months many coastal lagoons and rivers discharge freshwater, especially in the eastern part of the area (Tapia-García et al. 2007). Habitats include coastal lagoons, wetlands, mangroves, estuaries, volcanic sandy beaches, and river mouths. This area includes one protected area, Reserva de la Biósfera La Encrucijada (CONANP 1999), which is also a Wetland of International Importance (a Ramsar site; Ramsar 2022a). In addition, there are three other Ramsar sites (Manchón-Guamuchal, Sistema Estuarino Boca del Cielo, and Sistema Estuarino Puerto Arista [Ramsar 2022b, 2022c, 2022d]), and four Key Biodiversity Areas (Istmo de Tehuantepec-Mar Muerto, La Encrucijada, Manchón-Guamuchal, and Playa Linda-Río Suchiate [KBA 2022a, 2022b, 2022c, 2022d]).

This Important Shark and Ray Area is delineated from inshore and surface waters to a depth of 200 m based on the maximum depth at which the Qualifying Species are caught in the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Fifteen Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ regularly occur in this area. Threatened sharks comprise one Critically Endangered species, two Endangered species, and five Vulnerable species; threatened rays comprise seven Vulnerable species (IUCN 2022).

CRITERION B – RANGE RESTRICTED

Gulf of Tehuantepec holds the regular presence of seven ray species as resident range-restricted species: California Butterfly Ray, Vermiculate Numbfish, Spinytail Round Ray, Munda Round Ray, Cimar Round Ray, Dwarf Round Ray, and Southern Banded Guitarfish. California Butterfly Ray is restricted to the Gulf of California LME and California Current LME. Vermiculate Numbfish is primarily restricted to the Gulf of California LME and Pacific Central-American Coastal LME although its range marginally extends into the California Current LME; while Pacific Chupare, Spinytail Round Ray, Munda Round Ray, Cimar Round Ray, Dwarf Round Ray, and Southern Banded Guitarfish are restricted to the Pacific Central-American Coastal LME (the Pacific Chupare also occurs in the Galápagos Islands which sit outside LMEs).

These species were caught in experimental bottom trawls and as monitored bycatch in shrimp fisheries between 2003–2007, 2009–2012, 2017–2019, confirming their regular presence within the area. All species were found year-round in the area, except for Spinytail Round Ray that was not reported for the boreal summer (Torres-Huerta 2012, Montes-Sánchez 2019, Torres-Huerta et al. 2019a, 2019b).



SUB-CRITERION C₁ – REPRODUCTIVE AREAS

Gulf of Tehuantepec is an important reproductive area for two shark and 10 ray species.

Female Silky Sharks with near-term embryos and neonates with umbilical scars have been reported in this area, mostly during the rainy season (May–September), suggesting that this is a pupping site for this species. In addition, the high proportion of neonates and young-of-the-year in landings from artisanal fisheries over multiple years, reported by several studies, supports the presence of a nursery area (Ruiz Alvarado 2000; Castillo-Géniz et al. 2002; Galván-Tirado et al. 2015; Alejo-Plata et al. 2016; Alatorre-Alba et al. 2021).

Neonate and juvenile Scalloped Hammerhead reported in catches across several years near the Mexico-Guatemala border, suggest the presence of a nursery area. Catches of Scalloped Hammerhead measuring <60 cm total length (TL), close to the reported size-at-birth (31–57 cm TL; Ebert et al. 2021), are regularly observed in this area, mostly from July to September (Ruiz Alvarado 2000; Campuzano-Caballero 2002; Hinojosa-Álvarez 2007; Bejarano-Álvarez et al. 2010; Morales-Pacheco et al. 2016).

Pregnant females and neonates (based on size) of seven ray species were reported in independent-fisheries surveys using bottom trawls in this area between 2009–2010, mostly during the autumn, suggesting the presence of pupping and nursery areas as well as areas important for gestation (Torrest-Huerta 2012).

Neonate California Butterfly Rays (n = 11) measured between 13–29 cm disc width (DW) (Torrest-Huerta 2012), similar to the reported size-at-birth of 21–26 cm DW (Last et al. 2016).

Neonate Longtail Stingrays (n = 42) measured between 33–48 cm DW (Torrest-Huerta 2012), similar to the reported size-at-birth of ~40 cm DW (Last et al. 2016).

Neonate Vermiculate Numbfish (n = 31) measured between 8–9 cm TL (Torrest-Huerta 2012), similar to the reported size-at-birth of ~6 cm TL (Last et al. 2016). In addition, juveniles between 11–27 cm TL (n = 135) were reported from the area.

Neonate Pacific Cownose Rays (n = 18) measured between 12–40 cm DW (Torrest-Huerta 2012), similar to the reported size-at-birth of 39–43 cm DW (Last et al. 2016). Juveniles (n = 32) between 41–64 cm DW were also reported.

Pregnant Cimar Round Rays, and males with semen in the claspers, are recorded year-round (Torrest-Huerta 2012).

Pregnant Rogers' Round Rays with embryos as large as 8.9 cm DW were reported. Although the size-at-birth for this species is unknown, individuals measuring 7–11 cm DW (n = 12) were determined to be neonates as this is a similar size to the largest embryo.

Neonate Whitesnout Guitarfish (n = 27) measured between 12–18 cm TL (Torrest-Huerta 2012), similar to the reported size-at-birth of ~19 cm TL (Last et al. 2016), supporting the presence of a nursery area. In addition, juveniles between 20–38 cm TL (n = 125) were reported. Recent data show that these species still occur regularly in this area, suggesting the persistent use of this nursery area (Montes-Sánchez 2019).

Pregnant Blotched Round Rays with embryos at different stages of development were reported year-round within this area as bycatch in shrimp trawlers between 2011–2012. This suggests that this area is important for Blotched Round Ray gestation. The presence of terminal embryos (12–14 cm TL) were also found, suggesting that this area could also serve for parturition from December–March

and July–August. In addition, the presence of neonates between 2009–2012 ranging in size 10–14.5 cm TL suggests that this area could function as a nursery (Guzmán-Castellanos 2015; Vázquez-Robles 2015).

Pregnant Dwarf Round Rays were reported as bycatch in shrimp trawlers during 2009–2010. The presence of near-term embryos and neonates between 8.3–9.4 cm TL (reported size-at-birth is ~6 cm TL; Last et al. 2016), suggests that this is a pupping area from May to August (Guzmán-Castellanos 2006). Between 2017–2019, 2,100 individuals were reported as bycatch in the same fishery, suggesting that this area still functions as a pupping area (Montes-Sánchez 2019).

A mating area for Southern Banded Guitarfish, between February and April, has been reported in this area, with adult females and males found at 28–33 m depth. The highest abundance of adults was recorded during those months as well as the maximum size of oocytes in non-pregnant females. In addition, a parturition season has been reported between April and May, due to the presence of pregnant females with near-term embryos and neonates in depths between 21–27 m (Torres-Huerta et al. 2019a). Neonates sampled measured between 15.2–17.5 cm TL, which is similar to the reported size-at-birth (~18 cm TL; Last et al. 2016).

SUB-CRITERION C2 – FEEDING AREAS

Gulf of Tehuantepec is an important feeding area for one shark and one ray species.

Based on stomach content analysis from 2004–2006, Scalloped Hammerhead (76% of stomachs full) feed mostly on bony fishes (Frigate Tuna *Auxis thazard*, Black Skipjack *Euthynnus lineatus*), squids (Whip-lash Squid *Mastigoteuthis dentata*), and crustaceans (Whiteleg Shrimp *Litopenaeus vannamei*) (Aguilar-Castro 2010). This is still one of the most caught sharks within this area (Morales-Pacheco et al. 2016), suggesting that these sharks still use this area for feeding.

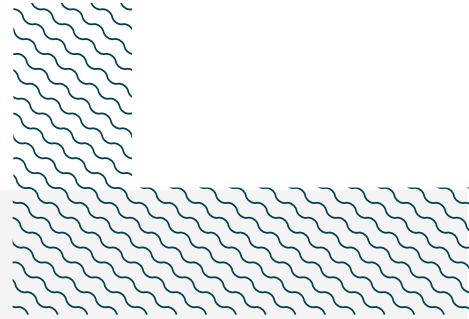
Based on stomach content analysis during 2007, Blotched Round Ray feed mostly on lumbrinerid polychaetes (*Ninoe* sp.), onuphid polychaetes, and mysid amphipods. Seventy four percent of the stomachs analysed were full (Guzmán-Castellanos 2010).

SUB-CRITERION D2 – DIVERSITY

Gulf of Tehuantepec sustains a high diversity of Qualifying Species (24). This exceeds the regional diversity threshold (17 species) for the Central and South Pacific American region.

All Qualifying Species are regularly encountered in independent fishery samplings and in landings from local fisheries with fishery zones within this area (Castillo-Géniz et al. 2002; Soriano-Velásquez et al. 2003; Torres-Huerta 2012; Morales-Pacheco et al. 2016; Montes-Sánchez 2019; Torres-Huerta et al. 2019b; Alatorre-Alba et al. 2021).





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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												
<i>Alopias pelagicus</i>	Pelagic Thresher	EN	0-300	X								X
<i>Carcharhinus falciformis</i>	Silky Shark	VU	0-500	X		X						
<i>Carcharhinus leucas</i>	Bull Shark	VU	0-164	X								
<i>Carcharhinus limbatus</i>	Blacktip Shark	VU	0-140	X								
<i>Nasolamia velox</i>	Whitenose Shark	EN	0-192	X								
<i>Rhizoprionodon longurio</i>	Pacific Sharpnose Shark	VU	0-100	X								
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CR	0-1,043	X		X	X					
<i>Sphyrna zygaena</i>	Smooth Hammerhead	VU	1-200	X								
RAYS												
<i>Aetobatus laticeps</i>	Pacific Eagle Ray	VU	0-60	X								X
<i>Gymnura marmorata</i>	California Butterfly Ray	NT	1-95		X	X						

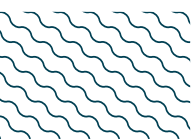
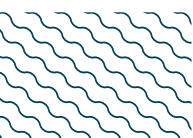
Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met														
				A	B	C1	C2	C3	C4	C5	D1	D2						
<i>Hypanus longus</i>	Longtail Stingray	VU	0-118	X		X												
<i>Narcine entemedor</i>	Cortez Numbfish	VU	0-100	X														
<i>Narcine vermiculatus</i>	Vermiculate Numbfish	LC	0-100		X	X												
<i>Pseudobatos glaucostigmus</i>	Grey-spotted Guitarfish	VU	0-110	X														
<i>Pseudobatos leucorhynchus</i>	Whitesnout Guitarfish	VU	0-50	X		X												
<i>Rostroraja equatorialis</i>	Equatorial Skate	VU	20-200	X														
<i>Rhinoptera steindachneri</i>	Pacific Cownose Ray	NT	0-65			X												
<i>Urotrygon aspidura</i>	Spinytail Round Ray	NT	5-100		X													
<i>Urotrygon chilensis</i>	Blotched Round Ray	NT	1-60			X	X											
<i>Urotrygon cimar</i>	Cimar Round Ray	NT	1-85		X	X												
<i>Urotrygon munda</i>	Munda Round Ray	NT	5-50		X													
<i>Urotrygon nana</i>	Dwarf Round Ray	NT	2-15		X	X												
<i>Urotrygon rogersi</i>	Rogers' Round Ray	NT	2-235			X												
<i>Zapteryx xyster</i>	Southern Banded Guitarfish	VU	1-150	X	X	X												

X

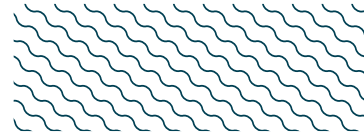
SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Alopias superciliosus</i>	Bigeye Thresher	VU
<i>Carcharhinus longimanus</i>	Oceanic Whitetip Shark	CR
<i>Carcharhinus obscurus</i>	Dusky Shark	EN
<i>Galeocerdo cuvier</i>	Tiger Shark	NT
<i>Ginglymostoma unami</i>	Pacific Nurse Shark	EN
<i>Isurus oxyrinchus</i>	Shortfin Mako	EN
<i>Mustelus dorsalis</i>	Sharptooth Smoothhound	LC
<i>Mustelus lunulatus</i>	Sicklefin Smoothhound	LC
<i>Nasolamia velox</i>	Whitenose Shark	EN
<i>Prionace glauca</i>	Blue Shark	NT
<i>Rhincodon typus</i>	Whale Shark	EN
<i>Sphyrna media</i>	Scoophead Shark	CR
<i>Sphyrna mokarran</i>	Great Hammerhead	CR
RAYS		
<i>Gymnura crebripunctata</i>	Mazatlán Butterfly Ray	NT
<i>Hypanus dipterurus</i>	Diamond Stingray	VU
<i>Mobula munkiana</i>	Munk's Pygmy Devil Ray	VU
<i>Mobula thurstoni</i>	Bentfin Devil Ray	EN
<i>Styracura pacifica</i>	Pacific Chupare	VU
<i>Urobatis halleri</i>	Haller's Round Ray	LC

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



SUPPORTING INFORMATION



There are additional indications that this area is important for reproductive purposes. Neonate Whitenose Shark (n = 18) were reported in landings from artisanal fisheries caught in this area between 1996–2001. Sizes ranged between 45–60 cm TL, which are similar to the reported size-at-birth of ~53 cm TL (Ebert et al. 2021). This potentially supports the presence of a nursery area (Domínguez-Arellano 2003). However, there are no contemporary data confirming that this nursery persists.

Stomach content analysis (61% of stomachs full) of Pacific Sharpnose Shark during 2005 revealed that the diet of this species is dominated by the Bignose Conger *Rhynchoconger nitens* (56% Index of Relative Importance [IRI]), followed by scombrids, crustaceans, and batoids (Alderete-Macal 2007). This species is one of the most caught shark species in artisanal fisheries within this area (Alatorre-Alba et al. 2021), suggesting that this area still serves for feeding.

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