

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

MULEGÉ-SANTA ROSALÍA ISRA

Central and South American Pacific Region

SUMMARY

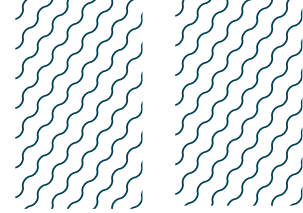
Mulegé-Santa Rosalía is located in the central Gulf of California, Mexico. This area has a very narrow continental shelf with rocky shores, sandy substrates, and mangrove ecosystems. It includes one Key Biodiversity Area and one Marine Protected Area. Within this area there are: **threatened species** (e.g., Spadenose Guitarfish *Pseudobatos buthi*); **range-restricted species** (e.g., Grey Smoothhound *Mustelus californicus*); and **reproductive areas** (e.g., Grey-spotted Guitarfish *Pseudobatos glaucostigmus*).

CRITERIA

Criterion A - Vulnerability; Criterion B - Range Restricted; Sub-criterion C1 - Reproductive Areas

—	—
MEXICO	—
—	—
0-1,500 metres	—
—	—
2,207.1 km²	—
—	—





DESCRIPTION OF HABITAT

Mulegé-Santa Rosalía is located in the central Gulf of California in the Baja California Sur state of Mexico. It represents the transition zone between the northern and southern regions of the gulf and is situated within the Gulf of California Large Marine Ecosystem (LME). It sits to the east of the Guaymas basin and includes many islands, including Tortuga, Santa Inez, Coyote, and San Marcos (Robles & Marinone 1987). Within the area, the continental shelf is very narrow with the slope occurring 10 km from the shore at the widest part of the shelf. This area has a strong seasonality of sea surface temperature ranging between ~16–17°C (February–March) to 31°C (August).

Productivity is the result of the boreal summer upwelling events, due to southeast winds from July to October (Álvarez-Borrego 1983; Álvarez-Borrego & Lara-Lara 1991). However, the effect of winds and upwellings is considered weak because of the significant stratification that occurs in the water column, as well as the entry of warm, nutrient-poor tropical surface water (Álvarez-Borrego 1983; Badan-Dangon et al. 1985; Álvarez-Borrego & Lara-Lara 1991; Santamaría-del-Angel et al. 1999). Mulegé-Santa Rosalía has the only river in this area, the Mulegé River, which discharges into Bahía Concepción. This area overlaps with one Marine Protected Area, the Flora and Fauna Protection Area Islas del Golfo de California (CONANP 2000), and one Key Biodiversity Area, Isla San Marcos (KBA 2022).

This Important Shark and Ray Area is delineated from inshore and surface waters (0 m) to a depth of 1,500 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Three Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ regularly occur in this area. Threatened sharks comprise the Vulnerable Pacific Sharpnose Shark (Pollom et al. 2020a); threatened rays comprise the Vulnerable Spadenose Guitarfish (Rigby & Derrick 2021) and Grey-spotted Guitarfish (Pollom et al. 2020b).

CRITERION B – RANGE RESTRICTED

Mulegé-Santa Rosalía holds the regular presence of Cortez Skate, California Butterfly Ray, Grey Smoothhound, Bat Ray, Spadenose Guitarfish, and Banded Guitarfish as resident range-restricted species. These species are regularly encountered and caught in local fisheries (Bizzarro et al. 2009; Castro-Díaz 2021; Felipe Galván-Magaña unpubl. data 2022). Cortez Skate and Spadenose Guitarfish are endemic to the Gulf of California LME, while California Butterfly Ray, Grey Smoothhound, Bat Ray, and Banded Guitarfish are restricted to the California Current LME and the Gulf of California LME.

Cortez Skate was not reported in the main catch characterisation of artisanal shark fisheries in the area undertaken between 1998–1999 (Bizzarro et al. 2009). However, recent monitoring suggests that fisheries have extend their activities to deeper areas with rays as target species and this species in commonly landed in low numbers (Felipe Galván-Magaña unpubl. data 2022).

California Butterfly Ray was reported as an important species in landings around the area between 1998–1999, especially during the winter (Bizzarro et al. 2007). Recent monitoring data from the area confirms that this species is one of the main species in landings, mostly during the winter and summer (Castro-Díaz 2021; Felipe Galván-Magaña unpubl. data 2022).



Grey Smoothhound is part of the smoothhound complex, which represented ~3% of total shark landings in the area between 1998-1999 with the majority occurring during spring (Bizzarro et al. 2007). Recent data monitoring data from the area confirms that this species is commonly landed (Felipe Galván-Magaña unpubl. data 2022).

Ongoing monitoring of artisanal fisheries in the area indicates that Bat Ray is an important species in landings (Felipe Galván-Magaña unpubl. data 2022).

Shovelnose Guitarfish was reported as one of the most landed species during summer 1998-1999 (Bizzarro et al. 2009), but there is a high chance that these catches were comprised of Spadenose Guitarfish, a species that was recently described from the area (Rutledge 2019). According to recent monitoring in the area, Spadenose Guitarfish is one of the two most landed shark species (Pérez-Durán 2021; Soto-López et al. 2021; Felipe Galván-Magaña unpubl. data 2022).

Banded Guitarfish was reported with regular but low catches between 1998-1999 (Bizzarro et al. 2009) and recent monitoring in the area confirms that the species is still landed in low numbers (Felipe Galván-Magaña unpubl. data 2022).

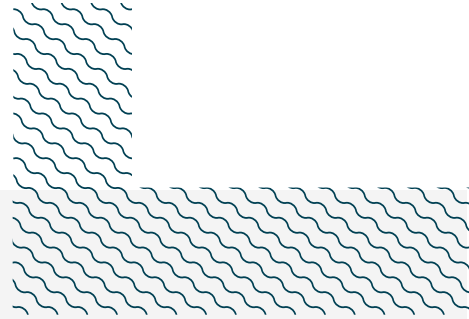
SUB-CRITERION C1 – REPRODUCTIVE AREAS

Mulegé-Santa Rosalía is an important reproductive area for one shark and two ray species.

From 201 Pacific Sharpnose Sharks sampled from artisanal fisheries between 2018-2019, 73% were females, of which 72% were pregnant. Embryos at different stages of development were found year-round suggesting that the complete gestation period occurs within this area. During the month of August, embryos at the first stages of development were found and the largest embryos were reported for April, however, these were not near-term embryos. A shark fishing ban in the Mexican Pacific is in place between May-July, so no samples can be obtained during these months. However, all previous findings suggest that birthing occurs during this period (Chávez-Siles 2021).

California Butterfly Ray was one of the main landed species between 2017-2020, and pregnant females have been identified in this area with embryos at different development stages. This indicated the importance of this area for the gestation of this species. Near-term embryos have been reported during February and November (Felipe Galván-Magaña unpubl. data 2022).

Grey-spotted Guitarfish is the most landed species in artisanal fisheries from this area. From 287 individuals sampled between 2017-2020, 90% were females with 99% of those pregnant. Embryos at different development stages were found between October-August and uterine eggs were recorded year-round, suggesting the occurrence of embryonic diapause. It is likely that the complete gestation cycle occurs in this area. Terminal embryos were found in October, which suggests that females give birth to neonates in this area, but the selectivity of the fishing gears used prevents the confirmation of the presence of these neonates (Martínez-Riveaux 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>Mustelus californicus</i>	Grey Smoothhound	LC	0-281		X							
<i>Rhizoprionodon longurio</i>	Pacific Sharpnose Shark	VU	0-100	X		X						
RAYS												
<i>Beringraja cortezensis</i>	Cortez Skate	LC	15-90		X							
<i>Gymnura marmorata</i>	California Butterfly Ray	NT	1-95		X	X						
<i>Myliobatis californicus</i>	Bat Ray	LC	0-180		X							
<i>Pseudobatos buthi</i>	Spadenose Guitarfish	VU	0-10	X	X							
<i>Pseudobatos glaucostigmus</i>	Grey-spotted Guitarfish	VU	0-110	X		X						
<i>Zapteryx exasperata</i>	Banded Guitarfish	DD	0-200		X							

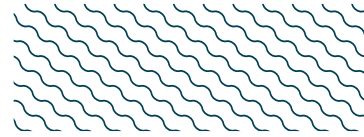
SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Alopias pelagicus</i>	Pelagic Thresher	EN
<i>Carcharhinus cerdale</i>	Pacific Smalltail Shark	CR
<i>Carcharhinus falciformis</i>	Silky Shark	VU
<i>Galeorhinus galeus</i>	Tope Shark	EN
<i>Hexanchus griseus</i>	Bluntnose Sixgill Shark	NT
<i>Isurus oxyrinchus</i>	Shortfin Mako	EN
<i>Mustelus henlei</i>	Brown Smoothhound	LC
<i>Mustelus lunulatus</i>	Sicklefin Smoothhound	LC
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CR
<i>Sphyrna zygaena</i>	Smooth Hammerhead	VU
<i>Squatina californica</i>	Pacific Angelshark	NT
RAYS		
<i>Amblyraja badia</i>	Broad Skate	LC
<i>Beringraja inornata</i>	California Skate	LC
<i>Hypanus dipterus</i>	Diamond Stingray	NT
<i>Hypanus longus</i>	Longtail Stingray	VU
<i>Narcine entemedor</i>	Cortez Numbfish	VU
<i>Pseudobatos productus</i>	Shovelnose Guitarfish	NT
<i>Pteroplatytrygon violacea</i>	Pelagic Stingray	LC
<i>Rhinoptera steindachneri</i>	Pacific Cownose Ray	NT
<i>Rostroraja velezi</i>	Rasptail Skate	VU
<i>Urotrygon rogersi</i>	Rogers' Round Ray	NT

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



SUPPORTING INFORMATION



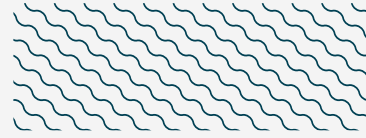
There are additional indications that this area is important for reproductive and feeding purposes. Pregnant female Pelagic Thresher, Brown Smoothhound, Sicklefin Smoothhound, Cortez Numbfish, Spadenose Guitarfish, and Pacific Cownose Ray (with embryos at different development stages) have been observed in landings from artisanal fishing activities within the area, suggesting its importance for the gestation process (Felipe Galván-Magaña unpubl. data 2022).

Pacific Angelshark is also commonly caught in Santa Rosalía (Negroe-Álvarez 2018). Preliminary results from an ongoing study found pregnant females with embryos at different stages of development, suggesting that this is an important area for reproduction (Felipe Galván-Magaña unpubl. data 2022). Additional evidence is needed to confirm the reproductive importance of the area.

Based on stomach content analysis from 57 Smooth Hammerheads caught between 2018–2019, juveniles fed mostly on Humboldt Squid *Dosidicus gigas* (34% Prey-specific Index of Relative Importance [PSIRI]), Sharpnose Squid *Ancistrocheirus lesueurii* (11% PSIRI), Pacific Chub Mackerel *Scomber japonicus* (7% PSIRI), and Californian Anchovy *Engraulis mordax* (4.5% PSIRI). In addition, stable isotope analysis showed that this species feeds in coastal areas (Vázquez-Liñero 2022). More evidence is needed to confirm the feeding importance of the area compared with other areas in the region.

Stomach content analysis from 59 California Butterfly Rays, sampled between 2019–2020, showed that this species feeds on a large array of prey (46 prey items identified). The most important species according to the PSIRI were haemulid fishes (5.41%) and South American Pilchard *Sardinops sagax* (3.95%). Sixty-three percent of the stomachs analysed were full (Castro-Díaz 2021).

Stomach content analysis from 119 Spadenose Guitarfish (42–101 cm total length [TL]), sampled between 2019–2020, revealed that this species feeds mainly on the Pelagic Red Crab *Pleurocondes planipes* (16.6% PSIRI), the stomatopod *Squilla bigelowi* (11.5% PSIRI), and penaeid shrimps (4.5% PSIRI). Of all the stomachs analysed, 56% were full (Pérez-Duran 2021).



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