BANDERAS BAY ISRA

## Central and South American Pacific Region

SUMMARY

Banderas Bay is located at the entrance of the Gulf of California in Mexico. The area is a transition zone where three oceanic currents merge, namely, the temperate water California Current, the warm Mexican Coastal Current, and the warm high salinity Gulf of California water mass. The area has diverse ecosystems such as rocky reefs, coral communities, extensive sandy beaches, and mangroves. Within the area there are: **threatened species** (e.g., Silky Shark *Carcharhinus falciformis*); **reproductive areas** (e.g., Pacific Eagle Ray *Aetobatus laticeps*); and **feeding areas** (e.g., Oceanic Manta Ray *Mobula birostris*).

CRITERIA

Criterion A – Vulnerability; Sub-criterion C1 – Reproductive Areas; Sub-criterion C2 – Feeding Areas

MEXICO

0–339 metres

761.18 km²

sharkrayareas.org
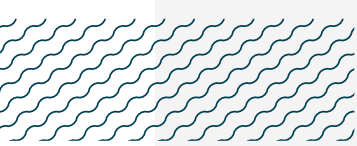
DESCRIPTION OF HABITAT

Banderas Bay is located in the Mexican Pacific, at the southern limit of the Gulf of California along the coast of Jalisco and Nayarit. Situated within the Pacific Central-American Coastal Large Marine Ecosystem, the bay is characterised by a relatively shallow platform in its northern zone. The average depth of the bay is 273 m, but between Marietas Islands and Punta de Mita the area is considerably shallower (<25 m), with submerged sandbanks that restricts the water interchange with the open ocean. In the south of the bay, the benthos slopes steeply, and towards the centre of the bay a deep canyon is found which runs parallel to the coast with depths greater than 1,400 m (Plata & Filonov 2007; Mortera-Gutiérrez et al. 2016). Three marine currents converge in the bay: the temperate water California Current, the warm Mexican Coastal Current, and the warm high salinity Gulf of California water mass.

The first half of the year is influenced by the California Current, characterised by water temperatures of 13–26°C and high primary productivity. The southern shore of the bay is influenced by seasonal upwellings from February to June that provide cooler, saltier water with higher primary productivity (Ambriz-Arreola et al. 2012). In the second half of the year, the bay is influenced by the Mexican Coastal Current derived from the Costa Rica coastal current with warmer waters (28–31 °C) and low productivity, as well as the warm water with high salinity leaving the Gulf of California (Portela et al. 2016). Several rivers, from which the largest are Ameca, Horcones, and Cuale, discharge large amounts of water and sediments into the bay, particularly during the boreal summer rainy season. Habitats include rocky reefs on the north and south shores, coral communities in several areas of the bay, sand flats along the entire coastal margin, and deepwater areas in the central and southern part of the bay.

This Important Shark and Ray Area is delineated from inshore and surface waters (0 m) to 339 m depth based on the depth range of Qualifying Species in 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 the area. These are the Endangered Oceanic Manta Ray (Marshall et al. 2022), the Vulnerable Silky Shark (Rigby et al. 2021), and the Vulnerable Pacific Eagle Ray (Pollom et al. 2021). The Oceanic Manta Ray is also protected by Mexican legislation (DOF 2007, 2010).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Banderas Bay is an important reproductive area for one shark and one ray species.

Recent tagging studies showed evidence that neonate and juvenile Silky Sharks (61–106 cm total length [TL]) use the deepest areas within the bay as a nursery or protection area (Tovar-Ávila et al. 2015, 2017, 2018). Silky Shark size-at-birth is 56–87 cm TL (Ebert et al. 2021). Recaptures suggest that individuals can stay in the area for several months (during autumn) or travel along the coast to other regions outside this area. Though some of the individuals have been caught in surface waters, they showed a preference for the deepest area of the bay, close to the south of the bay where the deep canyon is located (Tovar-Ávila et al. 2015, 2017, 2018).

There are direct observations of the interannual presence (2018–2022) of pregnant Pacific Eagle
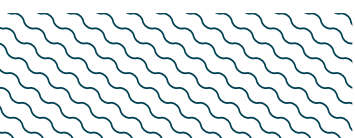
Rays from June to November (Castelo-Corona & Váldez-Tripp 2022). From 2016–2017, individuals between 30–80 cm disc width (DW) were predominant in the shallower waters of the bay, occurring in higher numbers during the boreal spring (April–June; Castelo-Corona 2018). The size-at-birth for Pacific Eagle Rays is unknown but reported sizes correspond to the length of neonates and juveniles of related species (e.g., the similar-sized Spotted Eagle Ray *Aetobatus narinari*; Tagliafico et al. 2012; Bassos-Hull et al. 2014).
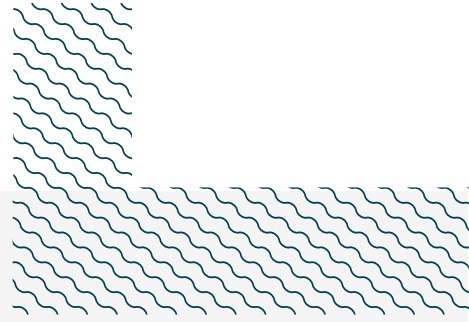
SUB-CRITERION C2 – FEEDING AREAS

Banderas Bay is an important feeding area for two ray species.

From 181 observations of Pacific Eagle Ray between 2015–2018, feeding was the second most common activity (n = 16) observed during behavioural studies carried out (Castelo-Corona 2018). Most feeding studies for the species undertaken along the Sinaloa and Nayarit coasts, showed 100% of Pacific Eagle Ray diet consists of bivalves and gastropods (Castelo-Corona 2018). Preliminary stable isotope analysis results have revealed that this species feeds on benthic species in this area (Alejandra Castelo-Corona unpubl. data 2022).

The southern part of Banderas Bay has been identified as an important aggregation zone for the Oceanic Manta Ray based on targeted research since 2014 (Fonseca-Ponce et al. 2022). Their presence is driven by the opportunity to feed on mesopelagic zooplankton. They typically forage in coastal areas within the bay, based on isotopic values from muscle tissues sampled between 2015–2019 (Fonseca-Ponce 2020; Fonseca-Ponce et al. 2022). Oceanic Manta Rays have also been observed feeding in surface waters in the south-central part of Banderas Bay and are assumed to use the areas close to the surface to recover the heat lost during their dives (Stewart et al. 2019; Fonseca-Ponce et al. 2022).

Suggested citation

IUCN SSC Shark Specialist Group. 2023. Banderas Bay ISRA Factsheet. Dubai: IUCN SSC Shark Specialist Group.

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												
Carcharhinus falciformis	Silky Shark	VU	0–500	X		X						
RAYS												
Aetobatus laticeps	Pacific Eagle Ray	VU	0–60	X		X	X					
Mobula birostris	Oceanic Manta Ray	EN	0–1,000	X			X					

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Carcharhinus limbatus	Blacktip Shark	VU
Ginglymostoma unami	Pacific Nurse Shark	EN
Negaprion brevirostris	Lemon Shark	VU
Rhizoprionodon longurio	Pacific Sharpnose Shark	VU
Sphyrna lewini	Scalloped Hammerhead	CR
RAYS		
Gymnura crebripunctata	Mazatlán Butterfly Ray	NT
Gymnura marmorata	California Butterfly Ray	NT
Hypanus dipterurus	Diamond Stingray	VU
Mobula mobular	Spinetail Devil Ray	EN
Mobula munkiana	Munk's Pygmy Devil Ray	VU
Mobula tarapacana	Sicklefin Devil Ray	EN
Mobula thurstoni	Bentfin Devil Ray	EN
Narcine entemedor	Cortez Numbfish	VU
Pseudobatos glaucostigmus	Grey-spotted Guitarfish	VU
Pteroplatytrygon violacea	Pelagic Stingray	LC
Rhinoptera steindachneri	Pacific Cownose Ray	NT
Urotrygon aspidura	Spinytail Round Ray	NT
Urotrygon chilensis	Blotched Round Ray	NT
Urotrygon rogersi	Rogers' Round Ray	NT
Zapteryx xyster	Southern Banded Guitarfish	VU

IUCN Red List categories: *CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient*
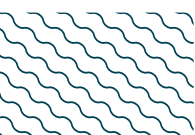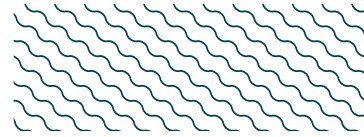
There are additional indications that this area is also important for reproductive and feeding purposes. The deepest areas of Banderas Bay might provide an excellent feeding opportunity for neonate and juvenile Silky Sharks. These life-stages are often recorded alongside a high abundance of fish gathered due to biological productivity and large quantities of ichthyoplankton (INAPESCA unpubl. data 2022).

Courtship behaviour amongst Oceanic Manta Rays has been recorded using drones in May 2021 and February 2022, on the southern coast of Banderas Bay (Iliana Fonseca-Ponce unpubl. data 2022), however, more information is needed to confirm that this species uses the area to mate and to confirm that it occurs regularly.

It has also been suggested that Oceanic Manta Rays in Banderas Bay spend a large part of the day at the surface to recover the energy lost while feeding in mesopelagic waters. Therefore, the southern part of the bay could be a resting area for this species (Fonseca-Ponce et al. 2022).

Banderas Bay seems to be an important area for resting of Pacific Eagle Ray. Based on underwater visual census surveys, individuals rest on the bottom in shallow waters. This is an unusual behaviour as they are active swimmers (Alejandra Castelo-Corona unpubl. data 2022).
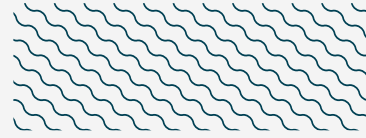
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