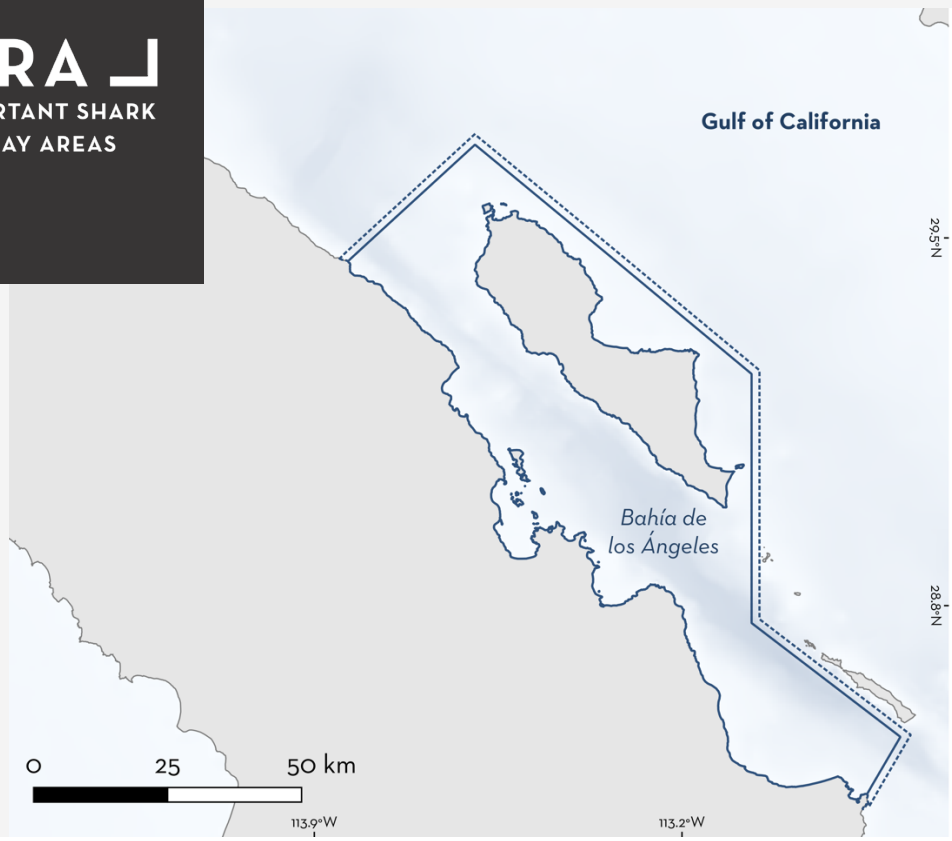
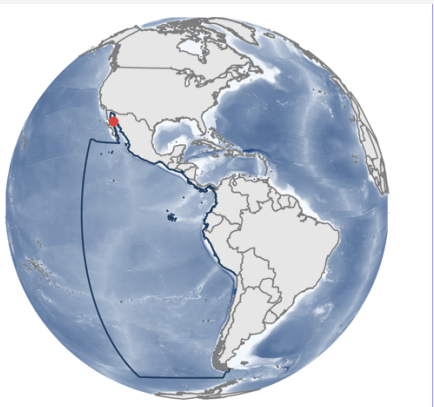
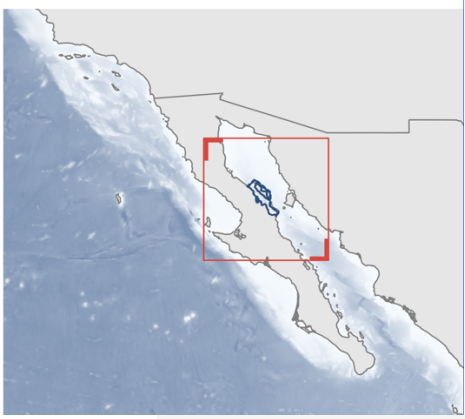
ISRA
IMPORTANT SHARK AND RAY AREAS







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

BAHÍA DE LOS ÁNGELES ISRA

Central and South American Pacific Region

MEXICO

0–1,928 metres

4,205 km²

SUMMARY

Bahía de los Ángeles is located in the Gulf of California Midriff Island region on the eastern coast of the Baja California peninsula, Mexico. The area includes a shallow main bay of <40 m depth with around 17 islands, and the Ballenas and Salsipuedes channels, which have irregular bathymetry with depths >1,000 m. Habitats include other inlets, wetlands, mangroves, and sandy and rocky benthos. The area has high primary productivity due to water exchange between the bay and the channels that allow the mixing of cold, nutrient-rich water with the warmer waters within the bay. Within this area there are: **threatened species** (e.g., Blacktip Shark *Carcharhinus limbatus*); **range-restricted species** (e.g., California Butterfly Ray *Gymnura marmorata*); **reproductive areas** (e.g., Pacific Angelshark *Squatina californica*); **feeding areas** (Whale Shark *Rhincodon typus*); areas important for **movement** (Whale Shark); and **undefined aggregations** (e.g., Haller's Round Ray *Urobatis halleri*)

CRITERIA

Criterion A – Vulnerability; Criterion B – Range Restricted;
Sub-criterion C1 – Reproductive Areas; Sub-criterion C2 – Feeding Areas
Sub-criterion C4 – Movement; Sub-criterion C5 – Undefined Aggregations

DESCRIPTION OF HABITAT

Bahía de los Ángeles is located in the Midriff Island region of the Gulf of California on the eastern coast of the Baja California peninsula, Mexico. Situated within the Gulf of California Large Marine Ecosystem (LME), the area extends from Punta La Asamblea in the north to Punta San Francisquito in the south (Montero-Quintana et al. 2020). It is characterised by an array of estuaries, mangroves, wetlands, bays, and coves including: Bahía de los Ángeles, which is the main bay, Ensenada Tecolote, Guadalupe Bay, Ensenada Alcatraz, La Mona, Ensenada La Gringa, Ensenada El Quemado, Ensenada El Pescador, Ensenada El Alacrán, los Choros, Las Ánimas Bay, San Rafael Bay, and San Francisquito Bay (CONANP 2014). The main bay has a length of 16 km, width of 6.4 km, and depths ~20 m that extend to ~180 m in areas that connect with the waters of the Ballenas Channel, another region in the Midriff Island Region (Delgadillo-Hinojoasa et al. 2006).

This area includes an array of small islands (17) and one of the biggest islands in all the Gulf of California: Angel de la Guarda. The physical oceanographic dynamics of the area depend mainly on physical processes occurring in the Ballenas Channel (Amador-Buenrostro 1991; Martínez Fuentes et al. 2022). The wind controls the water circulation and the oceanography of the bay, and there is a system of dominant winds with seasonal variation (Amador-Buenrostro 1991; Martínez Fuentes et al. 2022).

Since 2007, this area was declared a Natural Protected Area in Mexico, the Biosphere Reserve Zona Marina Bahía de los Angeles, Canales de Ballenas y de Salsipuedes (DOF 2007a). In addition, it is within an Ecologically or Biologically Significant Marine Area (EBSA), the Midriff Islands Region (CBD 2016). This area also includes two Key Biodiversity Areas, the Archipiélago Bahía de los Angeles and Isla Ángel de la Guarda (KBA 2022a, 2022b). It also includes one Wetland of International Importance (Ramsar site), Corredor Costero La Asamblea-San Francisquito (Ramsar 2022).

This Important Shark and Ray Area is delineated from inshore and surface waters (0 m) to a depth of 1,928 m based on the maximum global depth of Qualifying Species.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Four Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ regularly occur in the area. These are the Critically Endangered Scalloped Hammerhead (Rigby et al. 2019), Endangered Whale Shark (Pierce & Norman 2016), and Vulnerable Silky Shark (Rigby et al. 2021b) and Blacktip Shark (Rigby et al. 2021a).

In addition, Whale Shark is listed as 'Threatened' by Mexican official national policy for wildlife and the landing of Devil Rays is prohibited (DOF 2007b, 2010).

CRITERION B – RANGE RESTRICTED

Bahía de los Ángeles holds the regular presence of California Butterfly Ray, Shovelnose Guitarfish, Spotted Round Ray, and Banded Guitarfish as resident range-restricted species. California Butterfly Ray is restricted to Gulf of California LME. Shovelnose Guitarfish and Spotted Round Ray occur in

the Gulf of California LME and only marginally in the Pacific Central-American Coastal LME. Banded Guitarfish is restricted to the California Current LME and Gulf of California LME.

California Butterfly Ray is commonly caught in artisanal fisheries operating within the area, mostly during the boreal summer (Smith et al. 2009, Moreno-Báez 2010, CONANP 2014). Recent monitoring data from Baited Remote Underwater Video Stations (BRUVS) in the area between 2021–2023 confirm that this species occurs in the region and is associated with sandy bottoms in regions outside the main bay of Bahía de los Ángeles and around Ángel de la Guarda Island (Luz Saldaña-Ruiz unpubl. data. 2022).

Bat Ray is commonly caught in artisanal fisheries operating in the area year-round (Smith et al. 2009, Moreno-Báez 2010, CONANP 2014). From 1998–1999, this species represented 5.5% of total shark landings in the area (Smith et al. 2009).

Shovelnose Guitarfish was reported as one of the main species in the landings from this area from 1998–1999, with catches year-round, representing 26% of total shark landings (Smith et al. 2009, CONANP 2014, Moreno-Báez 2010). This species is the most important in artisanal shark fisheries along the Gulf of California (Saldaña-Ruiz et al. 2016, Medina-Trujillo 2021) and recent data collected through local ecological knowledge and BRUVS monitoring confirm its regular presence and its importance as one of the main species in landings (Emiliano García unpubl. data 2022).

Recent data from BRUVS monitoring between 2021–2023 shows that Spotted Round Ray is regularly present within the area, mostly associated with sandy bottoms within the main bay of Bahía de los Ángeles and around Angel de la Guarda Island (Luz Saldaña-Ruiz unpubl. data 2022).

Banded Guitarfish was reported in landings from fisheries operating within the area, mostly during spring, representing up to 3% of total shark catches (CONANP 2014; Smith et al. 2009). Recent monitoring with BRUVS confirms its presence in the area, especially in Punta El Pescador, south of the main bay of Bahía de los Ángeles. This species is associated with sandy bottoms and macroalgae (Luz Saldaña-Ruiz unpubl. data 2022).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Bahía de los Ángeles is an important reproductive area for three shark species. The presence of neonate Blacktip Sharks in landings, from May to August, suggests that the areas very close to the shore of El Barril and San Francisquito serve as a nursery for this species (Bizzarro et al. 2007; Salomón-Aguilar 2009; Smith et al. 2009). The presence of neonates was reported from 1998–1999 but recent data show that this species is still landed, suggesting that this process is still occurring (Morales-Portillo 2020).

Neonate Scalloped Hammerheads were commonly caught during summer, in San Francisquito and El Barril from 1998–1999, suggesting that this is a nursery for the species (Salomón-Aguilar 2009). Currently, this species is among the seven most important shark species in landings (Morales-Portillo 2020).

Neonates recorded in landings from December to January over two years (1998 and 1999) suggest that this area is a nursery for the Pacific Angelshark (Villavicencio-Garayzar 1996; Smith et al. 2009). Currently, this is the most important shark species in landings, suggesting the reproductive process is still occurring in the area (Morales-Portillo 2020).

SUB-CRITERION C2 – FEEDING AREAS

Bahia de los Angeles is an important feeding area for one shark species. A seasonal feeding aggregation of Whale Shark occurs from May to December each year, showing spatial and temporal predictability over recurrent and consecutive observations (Ramírez-Macías et al. 2012; Peregrín-Tovar 2014; Nates López 2015; Jaramillo-Gil 2020; Montero-Quintana et al. 2020; Jaramillo-Gil et al. 2022). This area is a critical foraging habitat for this species due to the presence of patches of high copepods abundance (*Acartia* spp., the main prey sought by Whale Sharks), especially during November, which coincides with the highest abundance of animals (Lavaniegos et al. 2012; Cortés-Espinoza 2019). The aggregation in the area is mainly composed of juvenile males (with an average of 5.7 m total length [TL]) (Jaramillo-Gil 2020).

SUB-CRITERION C4 – MOVEMENT

Bahía de los Ángeles is an important area for the movement of juvenile Whale Sharks. These animals aggregate each year from May to December (Ramírez-Macías et al. 2012). Acoustic telemetry has shown that individuals have a high residency to areas near an estuary within the southern part of the bay: La Mona, but also move to northern areas in the bay, to an area called La Gringa (Nates-López 2015). Individuals tagged with satellite transmitters have revealed that this area has connectivity with other aggregation sites in La Paz Bay, Baja California Sur, and Boca de Camichín, Nayarit (Ramírez-Macías et al. 2012, 2017; Abraham Vásquez pers. comm. 2022). Some individuals move from La Paz to Bahia de los Ángeles and vice versa (Mayorga-Martínez 2012; Ramírez-Macías et al. 2012; Nates-López 2015; Ramírez-Macías et al. 2017).

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Bahía de los Ángeles is an important area for the aggregation of one shark and one ray species.

Silky Shark has been reported as one of the main species in landings from the fishing camp of El Barril in the southern part of the area, where fishers directly target aggregations during summer (Villavicencio-Garayzar 2000; Emiliano-García pers. obs. 2022). Fishers capture aggregating animals with sizes ranging from 120 to 226 cm TL but with catches dominated by juveniles between 155–245 cm TL. From 2007–2017, this was one of the main species in landings from artisanal fisheries, with most catches reported for August when the seasonal fishing ban for sharks, that was decreed in 2012, is lifted (Morales-Portillo 2020). It still unknown how individuals are using this area.

Haller's Round Ray has been identified in ongoing BRUVS monitoring from 2021–2023, but the reason behind its presence in the area remains unknown. This the most abundant shark species based on this monitoring and is associated with all type of habitats and present in all locations sampled, including the main bay of Bahía de los Ángeles, Angel de la Guarda Island, and San Rafael Bay, with more than ten individuals recorded in a single video frame (Luz Saldaña-Ruiz unpubl. data 2022).

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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												
Carcharhinus falciformis	Silky Shark	VU	0–500	X						X		
Carcharhinus limbatus	Blacktip Shark	VU	0–140	X		X						
Rhincodon typus	Whale Shark	EN	0–1,928	X			X		X			
Sphyrna lewini	Scalloped Hammerhead	CR	0–1,043	X		X						
Squatina californica	Pacific Angelshark	NT	1–205			X						
RAYS												
Gymnura marmorata	California Butterfly Ray	NT	1–95		X							
Pseudobatos productus	Shovelnose Guitarfish	NT	1–190		X							
Urobatis halleri	Haller's Round Ray	LC	15–91							X		
Urobatis maculatus	Spotted Round Ray	LC	0–30		X							
Zapteryx exasperata	Banded Guitarfish	DD	0–200		X							

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Alopias pelagicus	Pelagic Thresher	EN
Carcharhinus altimus	Bignose Shark	NT
Carcharhinus cerdale	Pacific Smalltail Shark	CR
Carcharhinus obscurus	Dusky Shark	EN
Ginglymostoma unami	Pacific Nurse Shark	EN
Heterodontus mexicanus	Mexican Hornshark	LC
Isurus oxyrinchus	Shortfin Mako	EN
Mustelus californicus	Grey Smoothhound	LC
Mustelus henlei	Brown Smoothhound	LC
Mustelus lunulatus	Sicklefin Smoothhound	LC
Prionace glauca	Blue Shark	NT
Rhizoprionodon longurio	Pacific Sharpnose Shark	VU
Sphyrna zygaena	Smooth Hammerhead	VU
RAYS		
Hypanus dipterurus	Diamond Stingray	VU
Mobula birostris	Oceanic Giant Manta	EN
Mobular mobular	Spinetail Devil Ray	EN
Mobula munkiana	Munk's Pygmy Devil Ray	VU
Mobula thurstoni	Bentfin Devil Ray	EN
Myliobatis californicus	Bat Ray	LC
Myliobatis longirostris	Longnose Eagle Ray	VU
Narcine entemedor	Cortez Numbfish	VU
Pseudobatos buthi	Spadenose Guitarfish	VU
Urobatis concentricus	Bullseye Round Ray	LC
Rhinoptera steindachneri	Pacific Cownose Ray	NT
Rostroraja velezi	Raptail Skate	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 important for reproductive and aggregation purposes.

Pacific Sharpnose Shark catches of mature females with near-term embryos from 1998–1999 in San Francisquito Bay, indicate that this is a parturition area from late spring to early summer (Bizzarro et al. 2007; Salomón-Aguilar 2009). Currently, this is still one of the main species in landings from the area (Morales-Portillo 2020). Further information is required to understand the regular presence of gravid females and pupping.

The presence of aggregations of Spinetail Devil Ray, Munk's Pygmy Devil Ray, and Bentfin Devil Ray have been reported within this area from artisanal landings from 1998–1999 during summer, when fishing for these species was allowed in Mexico (Smith et al. 2009; CONANP 2014). Recent monitoring with drones has confirmed the presence of the species aggregations in surface waters, mostly near the La Mona estuary between June and September (Ricardo Domínguez, CICESE, pers. comm. 2022). However, it is still unknown why these aggregations occur in the area and more evidence is needed to confirm their regular presence.

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