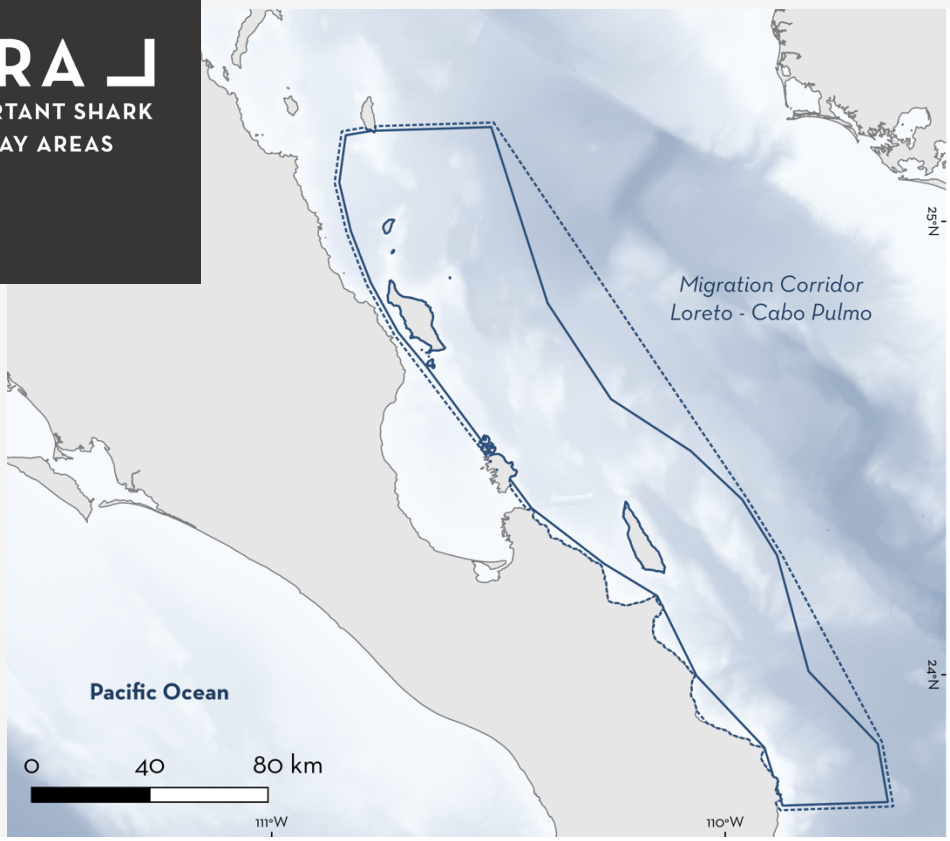
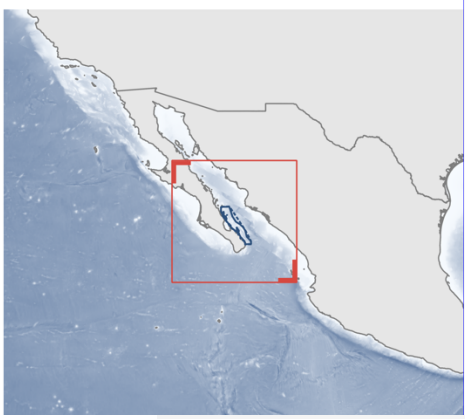
ISRA
IMPORTANT SHARK AND RAY AREAS





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

MIGRATION CORRIDOR LORETO – CABO PULMO ISRA

Central and South American Pacific Region

MEXICO

0–1,928 metres

16,127.8 km²

SUMMARY

The Migration Corridor Loreto-Cabo Pulmo extends 268 km along the south-eastern coast of the Baja California Peninsula, Mexico. This area includes four protected areas, four Key Biodiversity Areas, and two Wetlands of International Importance (Ramsar site). The area is characterised by diverse habitats including seamounts, mangroves, rocky shores, boulders, black corals, algal communities, coral reefs, and rocky reefs. Several islands occur in the area including Espíritu Santo, Cerralvo, San José, San Diego, and Santa Cruz Islands. This area has defined seasonal productivity, which is higher during the boreal spring and summer due to upwellings, wind-driven currents, tidal mixing, and thermohaline circulation. Within this area there are: **threatened species** (e.g., Scalloped Hammerhead *Sphyrna lewini*) and areas important for **movement** (e.g., Blacktip Shark *Carcharhinus limbatus*).

CRITERIA

Criterion A – Vulnerability; Sub-criterion C4 – Movement

DESCRIPTION OF HABITAT

The Migration Corridor Loreto - Cabo Pulmo extends 268 km along the south-eastern coast of the Baja California peninsula, Mexico. Situated within the Gulf of California Large Marine Ecosystem, the area is characterised by a diversity of habitats including seamounts, mangroves, rocky shores, boulders, black corals, algal communities, and coral and rocky reefs, among others (Thomson et al. 2000; Brusca et al. 2005). During the boreal spring and summer (April to November), weak south-easterly winds cause upwellings along the east and west coasts of the Baja California peninsula, which increases productivity. This area has sea surface temperatures ranging between 20–30°C.

The area includes four protected areas: National Park Bahía de Loreto, Protection Area of Flora and Fauna Islas del Golfo de California, Marine Zone from National Park Espíritu Santo Archipelago, and National Park Cabo Pulmo (CONANP 2000, 2006, 2014; DOF 2019). In addition, it includes four Key Biodiversity Areas (Isla Cerralvo, Isla Espíritu Santo, Archipiélago San José, and Archipiélago Loreto [KBA 2022a, 2022b, 2022c, 2022d]) and two Wetlands of International Importance (Ramsar sites: Parque Nacional Bahía de Loreto and Parque Nacional Cabo Pulmo [Ramsar 2022a, 2022b]).

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 range of the 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 Blacktip Shark (Rigby et al. 2021a) and Bull Shark (Rigby et al. 2021b).

SUB-CRITERION C4 – MOVEMENT

The Migration Corridor Loreto - Cabo Pulmo is an important area for the movement of four shark species.

Aggregations of >1,000 Blacktip Shark individuals have been observed in Cabo Pulmo (Ayres et al. 2021). From nine individuals satellite-tagged in Cabo Pulmo, four used this corridor as part of their movement to Loreto (365 km from tagging site), and to areas in the eastern coast of the Gulf of California (up to 900 km from the tagging site) (Ketchum et al. 2020; Ayres 2022). In addition, movements of eight individuals (from 26 acoustically tagged) between Cabo Pulmo and Cerralvo Island (88 km northwards), Las Animas (217 km northwards), and La Reina (125 km northwards) have been reported (Ayres 2022; Ketchum et al. 2023).

Based on acoustic telemetry, movements of Bull Sharks within the corridor have been reported. Sharks moved from Cabo Pulmo to Punta Pescadero (49 km north), Isla Ballena (161 km north), and Punta Lobos (147 km north) (Ketchum et al. 2020; James Ketchum, unpubl. data 2022).

Juvenile Whale Sharks move between aggregation sites in Bahia de Los Angeles and Bahia de La Paz. Feeding activity occurs here, with Bahia de Los Angeles serving as a yearly aggregation site from May to November, and Bahia de La Paz between October–March (up to 129 individuals every year) (Ramírez-Macias et al. 2012; Ketchum et al. 2013; Ramírez-Macías & Saad 2016; Whitehead et al. 2019a,

2019b). Movements between both sites has been reported for many years through satellite and acoustic tagging, and photo-identification: these migrations have been recorded to take less than a one year (Mayorga-Martínez 2012; Nates-López 2015; Ramirez-Macias et al. 2012, 2017). In addition, adults move to oceanic waters in southern parts of the area and in the Pacific coast of the Baja California peninsula (Eckert and Stewart 2001; Ramirez-Macias et al. 2017).

Based on acoustic, conventional and satellite transmitters, movements of Scalloped Hammerhead along the corridor have also been reported. Of the 25 acoustically tagged individuals, one moved from El Bajo Espíritu Santo Seamount (EBES) to Las Animas and the rest remained near the seamount (Aldana-Moreno 2020, Ketchum et al. 2023). One shark tagged with a conventional tag travelled south to La Ribera, 20 km north of Cabo Pulmo (Aldana-Moreno 2020; Ketchum et al. 2023). From three individuals satellite-tagged at EBES, two moved northwards, to Loreto National Park and then returned down to Bay of La Paz (Aldana-Moreno 2020; Ketchum et al. 2023), and one moved north to Loreto National Park and then south to Cabo San Lucas (S. Jorgensen, unpubl. data 2022). In addition, a round trip of up to 3,350 km between La Paz Bay and the central Gulf of California has been recorded for a juvenile satellite tagged Scalloped Hammerhead (Hoyos-Padilla et al. 2014). The movements of this sharks showed habitat changes related to ontogeny, from coastal areas inhabited by juveniles to offshore areas used by sub-adults (Ketchum et al. 2020).

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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 limbatus	Blacktip Shark	VU	0–140	X					X			
Carcharhinus leucas	Bull Shark	VU	0–164	X					X			
Rhincodon typus	Whale Shark	EN	0–1,928	X					X			
Sphyrna lewini	Scalloped Hammerhead	CR	0–1,043	X					X			

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Alopias vulpinus	Common Thresher	VU
Carcharhinus albimarginatus	Silvertip Shark	VU
Carcharhinus cerdale	Pacific Smalltail Shark	CR
Carcharhinus falciformis	Silky Shark	VU
Carcharhinus galapagensis	Galápagos Shark	LC
Carcharhinus longimanus	Oceanic Whitetip Shark	CR
Carcharhinus obscurus	Dusky Shark	EN
Carcharodon carcharias	White Shark	VU
Echinorhinus cookei	Prickly Shark	DD
Ginglymostoma unami	Pacific Nurse Shark	EN
Isurus oxyrhinchus	Shortfin Mako	EN
Mustelus lunulatus	Sicklefin Smoothhound	LC
Nasolamia velox	Whitenose Shark	EN
Negaprion brevirostris	Lemon Shark	VU
Prionace glauca	Blue Shark	NT
Rhizoprionodon longurio	Pacific Sharpnose Shark	VU
Sphyrna zygaena	Smooth Hammerhead	VU
Squatina californica	Pacific Angelshark	NT
Triaenodon obesus	Whitetip Reef Shark	VU
RAYS		
Aetobatus laticeps	Pacific Eagle Ray	VU
Diplobatis ommata	Pacific Dwarf Numbfish	LC
Gymnura marmorata	California Butterfly Ray	NT
Hypanus dipterurus	Diamond Stingray	VU
Hypanus longus	Longtail Stingray	VU
Mobula birostris	Oceanic Manta Ray	EN
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

Myliobatis californica	Bat Ray	LC
Myliobatis longirostris	Longnose Eagle Ray	VU
Narcine entemedor	Cortez Numbfish	VU
Pseudobatos glaucostigmus	Grey-spotted Guitarfish	VU
Pseudobatos leucorhynchus	Whitesnout Guitarfish	VU
Pseudobatos productus	Shovelnose Guitarfish	NT
Rhinoptera steindachneri	Pacific Cownose Ray	NT
Rostroraja velezi	Rasptail Skate	VU
Urobatis concentricus	Bullseye Round Ray	LC
Urobatis halleri	Haller's Round Ray	LC
Urobatis maculatus	Spotted Round Ray	LC
Zapteryx exasperata	Banded Guitarfish	DD

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 the movement of other species, however, more evidence is needed to confirm the regular occurrence and use of this migration corridor.

One satellite tagged juvenile White Shark, showed movements from California, USA to the area during June and July (Weng et al. 2012). In addition, two pregnant females with satellite tags moved through this corridor as part of a two-year migration from Guadalupe Island to the northern Gulf of California, which is believed to be a pupping area (Domeier & Nasby-Lucas 2013).

Movements of juvenile Oceanic Manta Rays, up to 70 km, have been recorded within the area, based on photo-identification, between aggregation sites in La Reina and areas near La Paz Bay. This species is found between August and October in La Reina and annually at Cabo Pulmo (Saad-Navarro et al. 2020; Preciado-González 2021).

Based on satellite tagging of Bentfin Devil Ray, movements within the area from the southern part to San Pedro Martir Island along the eastern coast of Baja California Peninsula have been reported (Don A. Croll pers. comm. 2022).

Based on acoustic and satellite tagging of Munk's Pygmy Devil Ray, a seasonal migratory pattern has been described between Espiritu Santo Archipelago, which is a nursery area (Palacios et al. 2021), and Cabo Pulmo from May to July and between November and December (Marta D. Palacios pers. comm. 2022). Movements connecting San Jose Island and Loreto have also been recorded (Don A. Croll pers. comm. 2022).

Spinetail Devil Rays move within this corridor from nearshore coastal habitats in the southern Gulf of California to offshore neritic or pelagic habitat on the Pacific side, based on satellite-tagged individuals between 2004–2007 (Croll et al. 2012).

Shortfin Makos (n = 93) were tagged with satellite-linked radio-transmitting (SLRT) tags between 2002–2014 and 36 sharks obtained tracks >1 year. From these sharks, three individuals (females <165 cm total length (TL) and male >165 cm TL) migrated from California, USA to locations in the Gulf of California where they moved through this corridor, spending, in some cases, significant amounts of time, with one shark displaying back and forth movements (6–18 months; Nasby-Lucas et al. 2019).

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