

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 CALIFORNIA-REVILLAGIGEDO-CLIPPERTON MIGRATION CORRIDOR ISRA

Central and South American Pacific Region

SUMMARY

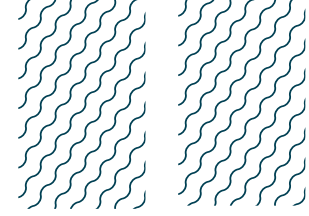
The Gulf of California-Revillagigedo-Clipperton Migration Corridor, also known as the Mexican Migravía, includes areas near the entrance of the Gulf of California (Cabo Pulmo, Banderas Bay, and Islas Mariás), Revillagigedo Archipelago, Clipperton Atoll, and Areas Beyond National Jurisdiction (ABNJ). The area has a variety of marine habitats and ecosystems, such as deep ocean basins, continental slopes and platforms, coastal and oceanic islands, mangrove estuaries, and coral and rocky reefs. The area also includes one Ecologically or Biologically Significant Marine Area, four protected areas, and four Key Biodiversity Areas. Within this area there are: **threatened species** (e.g., Silky Shark *Carcharhinus falciformis*); and areas important for **movement** (e.g., Tiger Shark *Galeocerdo cuvier*).

CRITERIA

Criterion A - Vulnerability; Sub-criterion C4 - Movement

—	—
MEXICO	—
FRANCE	—
ABNJ	—
—	—
0-1,928 metres	—
—	—
252,225 km²	—
—	—





DESCRIPTION OF HABITAT

The Gulf of California-Revillagigedo-Clipperton Migration Corridor, known also as the Mexican Migravía, includes areas near the entrance of the Gulf of California (Cabo Pulmo, Banderas Bay, and Islas Marías) and Revillagigedo Archipelago in Mexico, Clipperton Atoll (an overseas French territory), and Areas Beyond National Jurisdiction (ABNJ). This area spans three different marine regions: Gulf of California, Transitional Mexican Pacific, and Eastern Tropical Pacific. As such, the area encompasses a variety of marine habitats, including deep ocean basins, continental slopes and platforms, coastal and oceanic islands, mangrove estuaries, and coral and rocky reefs.

The Gulf of California is a semi-enclosed sea, 1,000 km long and 150 km wide (at its widest section), with great latitudinal and oceanographic variability, marked seasonality with strong temperature changes, tidal mixing, complex bathymetry, and diverse geomorphology (Lluch-Cota et al. 2007). The Transitional Mexican Pacific has a varied and complex bathymetry, from shallow coastal estuaries to deep trenches (Carter et al. 2020), and coastal and oceanic volcanic islands (e.g., Revillagigedo Archipelago). This region is subject to the influence of the California Current with cold, low salinity, and high nutrient waters (McGowan et al. 1998), and the Coastal Costa Rica Current with warm, low salinity, and low nutrient waters (Páez-Osuna et al. 2016). One of the strongest and most important phenomena that occurs in this region is the occurrence of tropical cyclones that affect this region from June to October (Martinez-Sanchez et al. 2014). The Eastern Tropical Pacific includes Clipperton Atoll, located 900 km south of Socorro Island in the Revillagigedo Archipelago. It is the only coral atoll in the Eastern Tropical Pacific with 3.7 km² of coral reef surrounding the island, which constitutes the largest coral reef in the region (Glynn et al. 1996). The atoll has warm and stable surface water temperatures throughout the year with an average of 27.9°C and has biogeographical significance due to its extreme isolation (Glynn et al. 1996).

This area includes four protected areas, three in Mexico: National Park Revillagigedo Archipelago, National Park Isla Isabel, and Biosphere Reserve Islas Marías (CONANP 2005, 2019, 2022), and one in French territory, Aire Marine Protégée dans les Eaux Territoriales de l'Île de Clipperton (MEEM 2016). It also includes one Ecologically or Biologically Significant Marine Area, Clipperton Atoll (SCBD 2020). In addition, the area overlaps with four Key Biodiversity Areas, Clipperton Marine, Isla Isabel, Islas Marías, and Islas Revillagigedo (KBA 2022a, 2022b, 2022c, 2022d).

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 depth of Qualifying Species.

ISRA CRITERIA

CRITERION A - VULNERABILITY

Seven 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 three Vulnerable species; threatened rays comprise one Endangered species (IUCN 2022).

In addition, Whale Shark is listed as Threatened in the Official Mexican Standard NOM-059-SEMARNAT-2010 for wildlife protection, while Oceanic Manta Ray is categorised under Special Protection (DOF 2010).

SUB-CRITERION C4 - MOVEMENT

The Gulf of California-Revillagigedo-Clipperton Migration Corridor is important for the movement of seven shark and one ray species.

Silky Sharks perform long-distance movements from Revillagigedo to the Gulf of California, mainland Mexico, and other islands or seamounts in the region (Ketchum et al. 2020). Based on satellite telemetry, two sharks tagged at Revillagigedo moved to southwestern offshore areas within the corridor, ~500 km from Clipperton Atoll, while another moved to areas near the entrance of the Gulf of California and to Islas Mariás (Ketchum et al. 2020). In addition, movements between Revillagigedo and Cabo Pulmo have been confirmed based on acoustic telemetry (Lara-Lizardi 2018).

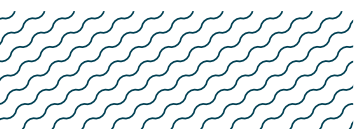
Galápagos Sharks are seasonally resident in Revillagigedo but carry out long-distance movements based on acoustic telemetry (Ketchum et al. 2020). One shark tagged at Revillagigedo was later detected at Clipperton Atoll, and finally recorded at Darwin Island, Galápagos, 3,000 km south from the tagging location (Lara-Lizardi 2018; Ketchum et al. 2020). In addition, genetic analysis revealed the presence of hybrid Galápagos Shark x Dusky Shark at Cabo Pulmo (Gulf of California), Clipperton Atoll, and the Galápagos Archipelago (Pazmiño et al. 2019). This hybridization may occur during the large movements reported for Galápagos Shark, which seems to move from the Gulf of California or Revillagigedo towards Galápagos, using Clipperton Atoll as a stepping-stone (Pazmiño et al. 2019).

Tiger Sharks are common at Revillagigedo Archipelago and seasonally resident (July–November) at sites in Socorro and San Benedicto islands. This species performs medium- to long-distance migrations along the corridor based on acoustic and satellite telemetry (Ketchum et al. 2020). Inter-island movements from San Benedicto to Clarion Island (415 km apart) have been reported. In addition, the migration from San Benedicto to Cabo Pulmo and a return migration to Socorro, covering a total distance of 1,014 km roundtrip, confirms the connectivity between Revillagigedo and the southern Gulf of California (Ketchum et al. 2020).

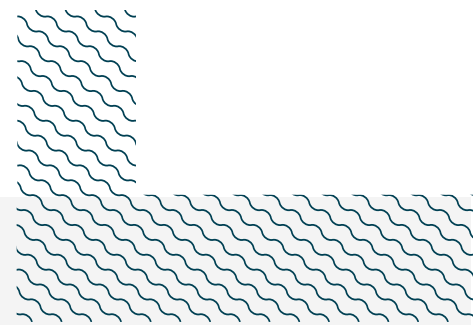
Whale Sharks have shown a migratory pattern depending on life stage, with juveniles moving within coastal areas in the Gulf of California and adults in coastal and oceanic waters, according to satellite telemetry (Eckert & Stewart 2001; Ramírez-Macías et al. 2017). One adult female tagged in the southern Gulf of California moved to Revillagigedo Archipelago, while another moved from Revillagigedo to areas near Islas Mariás and San Blás, Mexico (Ketchum et al. 2020).

Scalloped Hammerheads show high residency at specific seamounts like Espíritu Santo, and islands along the corridor, from where they move to offshore areas (Klimley & Nelson 1984; Klimley 1993). Acoustic telemetry revealed that this species was highly resident to Roca Partida and San Benedicto islands in the Revillagigedo Archipelago, where they refuge in shallower water near the islands and then move to nearby seamounts to feed (Aldana-Moreno 2020; Aldana et al. 2020). One Scalloped Hammerhead tagged with a satellite transmitter, moved from Revillagigedo Archipelago to southwest offshore areas, following a ridge towards a couple of seamounts with a clear directional path until it reached near the Bernoulli Seamount (Ketchum et al. 2020).

Other species of sharks move from Cabo Pulmo to Revillagigedo Archipelago such as the Dusky Shark (Ketchum et al. 2020) and one individual of Whitenose Shark (Lara-Lizardi et al. 2017). These movements further support the connectivity between the Gulf of California and the Revillagigedo Archipelago already identified for other shark species (Ketchum et al. 2020). As with the Galápagos Shark, the presence of a hybrid individual with Dusky Shark in Clipperton and the southern Gulf of California, suggest movements between both locations.



Based on acoustic telemetry, five Oceanic Manta Ray showed movements between Revillagigedo Archipelago and Bahía Banderas, near the entrance of the Gulf of California, with one making two round trips between both areas. In addition, based on photo-identification, two individuals moved between Revillagigedo Archipelago and the southern Gulf of California (Kumli & Rubin 2011). Other studies have reported movements of Oceanic Manta Ray between Revillagigedo Archipelago, Cabo Pulmo, and Bahía Banderas, based on acoustic telemetry (Preciado-González 2021).



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Suggested citation

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QUALIFYING SPECIES

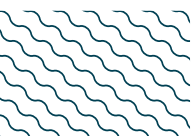
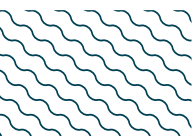
Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met								
				A	B	C1	C2	C3	C4	C5	D1	D2
SHARKS												
<i>Carcharhinus falciformis</i>	Silky Shark	VU	0-500	X					X			
<i>Carcharhinus galapagensis</i>	Galápagos Shark	VU	0-285	X					X			
<i>Carcharhinus obscurus</i>	Dusky Shark	VU	0-500	X					X			
<i>Galeocerdo cuvier</i>	Tiger Shark	NT	0-1,136						X			
<i>Nasolamia velox</i>	Whitenose Shark	EN	0-192	X					X			
<i>Rhincodon typus</i>	Whale Shark	EN	0-1,928	X					X			
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CR	0-1,043	X					X			
RAYS												
<i>Mobula birostris</i>	Oceanic Manta Ray	EN	0-1,000	X					X			

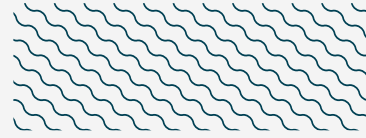
SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Apristurus brunneus</i>	Brown Catshark	DD
<i>Alopias pelagicus</i>	Pelagic Thresher	EN
<i>Alopias superciliosus</i>	Bigeye Thresher	VU
<i>Alopias vulpinus</i>	Common Thresher	VU
<i>Apristurus nasutus</i>	Largenose Catshark	LC
<i>Carcharhinus albimarginatus</i>	Silvertip Shark	VU
<i>Carcharhinus altimus</i>	Bignose Shark	NT
<i>Carcharhinus brachyurus</i>	Copper Shark	VU
<i>Carcharhinus leucas</i>	Bull Shark	VU
<i>Carcharhinus limbatus</i>	Blacktip Shark	VU
<i>Carcharhinus longimanus</i>	Oceanic Whitetip Shark	CR
<i>Cephalurus cephalus</i>	Lollipop Catshark	LC
<i>Echinorhinus cookei</i>	Prickly Shark	DD
<i>Galeorhinus galeus</i>	Tope Shark	CR
<i>Ginglymostoma unami</i>	Pacific Nurse Shark	EN
<i>Isurus oxyrinchus</i>	Shortfin Mako	EN
<i>Mustelus lunulatus</i>	Sicklefin Smoothhound	LC
<i>Negaprion brevirostris</i>	Lemon Shark	VU
<i>Prionace glauca</i>	Blue Shark	NT
<i>Rhizoprionodon longurio</i>	Pacific Sharpnose Shark	VU
<i>Somniosus pacificus</i>	Pacific Sleeper Shark	NT
<i>Sphyrna mokarran</i>	Great Hammerhead	CR
<i>Sphyrna zygaena</i>	Smooth Hammerhead	VU
<i>Triaenodon obesus</i>	Whitetip Reef Shark	VU
RAYS		
<i>Bathyraja abyssicola</i>	Deepsea Skate	DD
<i>Diplobatis ommata</i>	Pacific Dwarf Numbfish	LC
<i>Gymnura crebripunctata</i>	Mazatlán Butterfly Ray	NT
<i>Gymnura marmorata</i>	California Butterfly Ray	NT
<i>Hypanus dipterus</i>	Diamond Stingray	VU

<i>Hypanus longus</i>	Longtail Stingray	VU
<i>Mobula mobular</i>	Spinetail Devil Ray	EN
<i>Mobula munkiana</i>	Munk's Pygmy Devil Ray	VU
<i>Mobula tarapacana</i>	Sicklefin Devil Ray	EN
<i>Mobula thurstoni</i>	Bentfin Devil Ray	EN
<i>Narcine entemedor</i>	Cortez Numbfish	LC
<i>Pseudobatos glaucostigmus</i>	Grey-spotted Guitarfish	VU
<i>Pteroplatytrygon violacea</i>	Pelagic Stingray	LC
<i>Urotrygon aspidura</i>	Spinytail Round Ray	NT
<i>Urotrygon chilensis</i>	Blotched Round Ray	NT
<i>Urotrygon rogersi</i>	Rogers' Round Ray	NT
<i>Zapteryx xyster</i>	Southern Banded Guitarfish	VU
CHIMAERAS		
<i>Hydrolagus melanophasma</i>	Eastern Pacific Ghostshark	LC
<i>Hydrolagus trolli</i>	Abyssal Ghostshark	LC

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





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