

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

COCOS ISLAND AND SEAMOUNTS ISRA

Central and South American Pacific Region

SUMMARY

Cocos Island and Seamounts is an oceanic area located within the Exclusive Economic Zone of Costa Rica. The area includes the connection of Cocos Island and seamounts found along the Cocos Ridge: Las Gemelas and West Cocos. It is characterised by diverse habitats comprising a complex benthic morphology with soft and hard substrates, rich benthic habitats in deep waters, and extensive coral reefs and coral communities at shallow depths. Islets and rocky pinnacles around the island promote highly productive habitats by increasing vertical nutrient-rich fluxes and material retention. Within this area there are: **threatened species** (e.g., Reef Manta Ray *Mobula alfredi*); **reproductive areas** (e.g., Silvertip Shark *Carcharhinus albimarginatus*); **resting areas** (Whitetip Reef Shark *Triaenodon obesus*); areas important for **movement** (e.g., Whale Shark *Rhincodon typus*); **undefined aggregations** (e.g., Scalloped Hammerhead *Sphyrna lewini*); and **distinctive attributes** (e.g., Galapagos Shark *Carcharhinus galapagensis*).

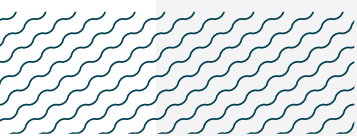
CRITERIA

Criterion A - Vulnerability; Sub-criterion C1 - Reproductive Areas; Sub-criterion C3 - Resting Areas; Sub-criterion C4 - Movement; Sub-criterion C5 - Undefined Aggregations; Sub-criterion D1 - Distinctiveness

COSTA RICA

0-1,043 metres

23,430 km²





DESCRIPTION OF HABITAT

Cocos Island and Seamounts is an oceanic area located within the Exclusive Economic Zone of Costa Rica. The area includes the waters connecting Cocos Island (a small island located ~550 km offshore) and three seamounts (Las Gemelas [which includes two seamounts] and West Cocos) found along the Cocos Ridge. Situated adjacent to the Pacific Central-American Coastal Large Marine Ecosystem, Cocos Island has a wide variety of coastal habitats that are characterised by a complex benthic morphology, with soft and hard substrates, rich benthic habitats in deep waters, and extensive coral reefs and coral communities at shallow depths (Guzmán 1992; Lizano 2001). Islets and rocky pinnacles around the island promote highly productive habitats by increasing vertical nutrient-rich fluxes and material retention (Acuña-González 2008; López-Garro 2016; Cambra 2021a). Las Gemelas and West Cocos seamounts (depth of seamount summits: 172-198 m) are the three shallowest seamounts within the Cocos Ridge and are located at ~50 and ~140 km, respectively, from mainland Cocos Island (Guzmán 1992).

The area is influenced by a marked seasonality with variation in environmental parameters attributed to the southern oscillation of the Intertropical Convergence Zone which determines the degree of influence of the North Equatorial Countercurrent, the main west-east current near the equator. During the rainy season (July to November), the effect of the North Equatorial Countercurrent is enhanced, thus increasing ocean productivity and currents, while reducing water temperature (Acuña-González 2008).

This Important Shark and Ray Area is delineated from surface waters (0 m) to a depth of 1,043 m based on the maximum depth range of the habitat used by the Qualifying Species.

ISRA CRITERIA

CRITERION A - VULNERABILITY

Eight 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, one Endangered species, and four Vulnerable species; threatened rays comprise one Endangered species and two Vulnerable species (IUCN 2022).

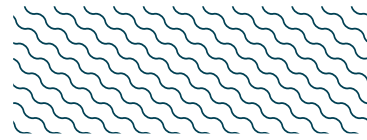
SUB-CRITERION C1 - REPRODUCTIVE AREAS

Cocos Island and Seamounts is an important reproductive area for four shark species. Most observations are from Cocos Island inshore waters, but also from pinnacles and islets offshore.

Mating events of Whitetip Reef Sharks in Cocos Island are regularly recorded and confirmed during shallow water diving activities (UnderseaHunter tour-operators pers. comm. 2018).

The presence of Silvertip Shark, Blacktip Shark, Whitetip Reef Shark, and Scalloped Hammerhead neonates have been visually determined based on size from recordings of an ongoing Baited Remote Underwater Video Surveys (BRUVS) study which began in 2016 (Zanella et al. 2012; Zanella et al. 2016; UnderseaHunter tour-operators pers. comm. 2018; Espinoza et al. 2020; Cambra et al. 2021b).





SUB-CRITERION C3 – RESTING AREAS

Cocos Island and Seamounts is an important resting area for Whitetip Reef Sharks (Zanella et al. 2012; Lopez-Garro et al. 2020). Resting behaviour is regularly observed year-round around rock formations in shallow waters within large bays such as Weifer Bay and Chatham Bay. These observations are mainly from park rangers, tour-operators, and divers around popular diving sites such as Manuelita, Roca Sucia, and Alcyon (Tour-operator pers. comm. 2022).

SUB-CRITERION C4 – MOVEMENT

Cocos Island and Seamounts is an important area for the movement of seven shark and two ray species. These species migrate between Cocos Island, surrounding seamounts, and other oceanic islands in the Eastern Tropical Pacific (Bessudo et al. 2011; Peñaherrera-Palma et al. 2018; Nalesso et al. 2019; Chavez et al. 2020; Zanella et al. unpubl. data 2022; Arauz et al. unpubl. data 2022).

Whale Sharks use Cocos Island and surrounding seamounts as a stopover between oceanic islands as part of their migratory route within the Eastern Tropical Pacific. Thirty Whale Sharks were tagged and tracked between 2007 and 2012 using satellites, which displayed movement patterns around six locations specifically within this area (Guzman et al. 2022).

For Scalloped Hammerheads, 69 individuals were tagged at Malpelo Island, Colombia, during March 2006–2008. Five individuals travelled 627 km to Cocos Island, and one travelled 710 km further to the Galápagos, one month later (Bessudo et al. 2011). Also, between 2005–2013, 84 individuals were tagged with acoustic transmitters, and their residency index indicated a strong association with Cocos Island (Nalesso et al. 2019). The use of Cocos Island as a part of a migration route within this region is suggested by the research into adult Scalloped Hammerheads which move from Cocos Island to mangrove coastal areas of Costa Rica and Guatemala (Elizondo-Sancho et al. 2022)

There are seven other migratory shark species for which movement data has been recorded since 2005 using acoustic and satellite tracking: Silky Shark, Blacktip Shark, Galápagos Shark, Oceanic Manta Ray, Tiger Shark, Reef Manta Ray, and Silvertip Shark. Preliminary results suggest these species are regular migrants from other oceanic islands, though there is high residency to the Cocos Island and Seamounts area (Zanella et al. unpubl. data 2022; Arauz et al. unpubl. data 2022). These species migrate between Cocos Island, surrounding seamounts, and other oceanic islands in the Eastern Tropical Pacific (Bessudo et al. 2011; Peñaherrera-Palma et al. 2018; Nalesso et al. 2019; Chavez et al. 2020; Zanella et al. unpubl. data 2022; Arauz et al. unpubl. data 2022). Acoustic receivers indicate connectivity between the main surrounding seamounts around Cocos Island such as Las Gemelas, for sharks such as Scalloped Hammerhead (M. Espinoza unpubl. data 2022).

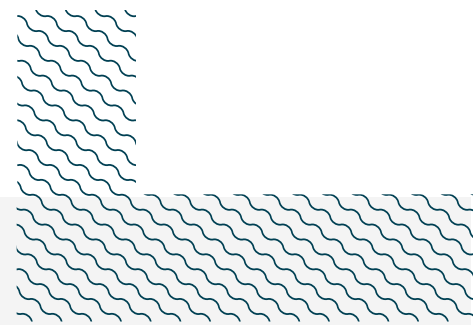
SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Cocos Island and Seamounts is an important area for aggregations of one shark species. Scalloped Hammerheads aggregate in large numbers (>80 individuals) (Sibaja-Cordero 2008; Friedlander et al. 2012; White et al. 2015; Nalesso et al. 2019; Espinoza et al. 2020). This behaviour has been regularly documented by tour operators over the past 30 years (UnderseaHunter tour-operators pers. comm. 2018). Aggregations have also been observed during ongoing BRUVS research since 2017 (Espinoza et al. 2020; Espinoza et al. unpubl. data 2022). At Cocos Island, Scalloped Hammerheads aggregate during the daytime around four areas in particular: Manuelita, Roca Sucia, Alcyone, and Punta Maria. This activity has been observed during recent BRUVS at the Las Gemelas and West Cocos seamounts (Espinoza et al. unpubl. data 2022). The function of these aggregations remains unknown.



SUB-CRITERION D1 – DISTINCTIVENESS

Cocos Island and Seamounts is an important area where three shark species show distinct behaviours. Scalloped Hammerhead, Blacktip Shark, and Galápagos Shark utilise permanent cleaning stations around the island (Nalesso et al. 2019). There are at least three well-defined cleaning stations in this area, located at Alcyone, Manuelita, and Roca Sucia. Sharks swim through static schools of barberfish *Johnrandallia nigrirostris* which feed on their ectoparasites (White et al. 2015). This behaviour has been documented for more than 30 years, particularly for Scalloped Hammerheads (UnderseaHunter tour-operators pers. comm. 2018) and from BRUVS (430 deployments) around these cleaning stations (Espinoza et al. 2020; Espinoza et al. unpubl. data 2022).



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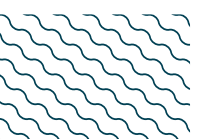
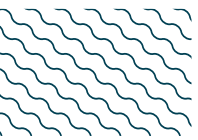
QUALIFYING SPECIES

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
SHARKS											
<i>Carcharhinus albimarginatus</i>	Silvertip Shark	VU	0-800	X		X			X		
<i>Carcharhinus falciformis</i>	Silky Shark	VU	0-500	X					X		
<i>Carcharhinus galapagensis</i>	Galápagos Shark	LC	0-285						X		X
<i>Carcharhinus limbatus</i>	Blacktip Shark	VU	0-140	X		X			X		X
<i>Galeocerdo cuvier</i>	Tiger Shark	NT	0-1,136						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			X	X	X
<i>Triaenodon obesus</i>	Whitetip Reef Shark	VU	0-330	X		X		X			
RAYS											
<i>Mobula alfredi</i>	Reef Manta Ray	VU	0-432	X					X		
<i>Mobula birostris</i>	Oceanic Manta Ray	EN	0-1,000	X					X		

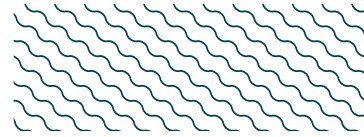
SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Alopias pelagicus</i>	Pelagic Thresher	EN
<i>Alopias superciliosus</i>	Bigeye Thresher	VU
<i>Carcharhinus melanopterus</i>	Blacktip Reef Shark	VU
<i>Echinorhinus cookei</i>	Prickly Shark	DD
<i>Odontaspis ferox</i>	Smalltooth Sand Tiger	VU
RAYS		
<i>Aetobatus laticeps</i>	Pacific Eagle Ray	VU
<i>Mobula tarapacana</i>	Sicklefin Devil Ray	EN
<i>Mobula thurstoni</i>	Bentfin Devil Ray	EN
<i>Rhinoptera steindachneri</i>	Pacific Cownose Ray	NT
<i>Taeniurops meyeri</i>	Blotched Fantail Ray	VU
<i>Tetronarce tremens</i>	Chilean Torpedo	LC

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



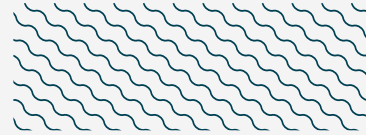
SUPPORTING INFORMATION



There are additional indications that this area is important for reproductive purposes. Scalloped Hammerheads might be mating in this area with one observation of the full mating sequence of an individual observed in a high current zone. This is usually observed in open waters (Salinas de León et al. 2017). Further investigation is required to determine the regularity and predictability of this behaviour.

A Tiger Shark neonate was detected in the area using BRUVS (Cambra et al. 2021b), however, further investigation is required to determine the use of this area by this species as a nursery, and the regularity and predictability of its occurrence.





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