

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

TÉRRABA-SIERPE ISRA

Central and South American Pacific Region

SUMMARY

Térraba-Sierpe is located on the southern Pacific coast of Costa Rica. This productive area includes the Humedal Nacional Térraba-Sierpe, one of the largest wetland systems in Central America, a Forest Reserve, and a Wetland of International Importance (Ramsar site). This area is characterised by important coastal and estuarine habitats. Its productivity is influenced by the rainy season which increases river flow, nutrient input, and primary productivity. Within this area there are: **threatened species** (e.g., Largetooth Sawfish *Pristis pristis*); **range-restricted species** (e.g., Pacific Chupare *Styracura pacifica*); **reproductive areas** (e.g., Brown Smoothhound *Mustelus henlei*); and this area sustains a high **diversity of sharks** (18 species).

CRITERIA

Criterion A - Vulnerability; Criterion B - Range Restricted; Sub-criterion C1 - Reproductive Areas; Sub-criterion D2 - Diversity

— —
COSTA RICA
 — —
0-60 metres
 — —
537.5 km²
 — —





DESCRIPTION OF HABITAT

Térraba-Sierpe is located on the southern Pacific coast of Costa Rica along the coast of Puntarenas. Situated within the Pacific Central-American Coastal Large Marine Ecosystem (LME), the area includes the Humedal Nacional Térraba-Sierpe and a large portion of coastal waters from 0–60 m depth. The Humedal Nacional Térraba-Sierpe, one of the largest wetland systems in Central America (267.8 km²), was designated as a Forest Reserve in 1977 and declared a Wetland of International Importance (Ramsar site) in 1995. The rainy season spans from May to December and contributes up to 4,000 mm of annual rainfall, thus increasing river flow, nutrient input, and primary productivity within this area. The mangroves which characterise this area contribute to its international importance as a wetland (Piedra et al. 2019).

This Important Shark and Ray Area is delineated from surface waters (0 m) to a depth of 60 m based on the maximum depth range of the habitat used by the Qualifying Species.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Fourteen 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, three Endangered species, and three Vulnerable species; threatened rays comprise one Critically Endangered species, and six Vulnerable species (IUCN 2022).

CRITERION B – RANGE RESTRICTED

Térraba-Sierpe holds the regular presence of Chilean Torpedo, Southern Banded Guitarfish, Longtail Stingray, and Pacific Chupare as resident range-restricted species. These species regularly occur in the area as observed from fishery-dependent and independent surveys (Clarke et al. 2011; Espinoza et al. 2013; Clarke et al. 2014; Clarke et al. 2016; Clarke et al. 2018; Azofeifa-Solano et al. 2021; Clarke et al. unpubl. data 2022; Espinoza & Valerio-Vargas, unpubl. data 2022). All these species primarily occur in the Pacific Central-American Coastal LME. Chilean Torpedo and Southern Banded Guitarfish also occur in the Humboldt Current LME. Longtail Stingray occurs in the Pacific Central-American Coastal LME and the Gulf of California LME.

SUB-CRITERION C₁ – REPRODUCTIVE AREAS

Térraba-Sierpe is an important reproductive area for eight shark and five ray species.

Large numbers of neonate and juvenile Scalloped Hammerhead, Brown Smoothhound, and Sicklefin Smoothhound are captured in river mouths and coastal areas within this area according to fishery-independent trawl survey data (2009–2012) and fishery-dependent landing data (2013–2016) (Clarke et al. 2011; Clarke et al. 2014; Clarke et al. 2016; Clarke et al. 2018; Clarke et al. unpubl. data 2022).

Large numbers of neonate and juvenile Pacific Sharpnose Shark, Blacktip Shark, Longtail Stingray, and Whitenose Shark are captured in coastal areas within this area, according to landing data (2013–2016) from fishery-dependent and independent surveys (Clarke et al. 2011; Clarke et al. unpubl. data 2022).



Fishery-independent trawl survey data (2009–2012) indicate that large numbers of neonate and juvenile Rasptail Skate and Southern Banded Guitarfish are captured in coastal areas within this area, and Pacific Guitarfish and Chilean Torpedo are captured in deeper areas (50–60 m) (Clarke et al. 2011; Clarke et al. 2014; Clarke et al. 2016; Clarke et al. 2018; Azofeifa-Solano et al. 2021; Clarke et al. unpubl. data 2022).

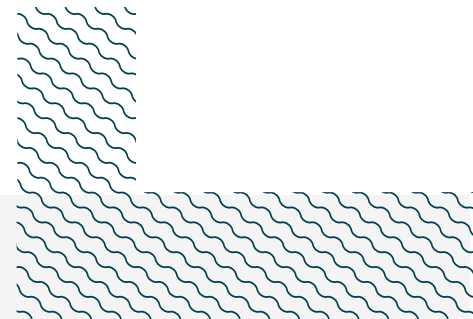
Fishery-independent surveys (2017–2019) and fishery-dependent landing data (2013–2016) indicate that neonate and juvenile Bull Sharks are observed, and presumably use this area as a nursery ground (Clarke et al. unpubl. data 2022; Espinoza & Valerio-Vargas, unpubl. data 2022).

Térraba-Sierpe has also been recognised as a hotspot for Largetooth Sawfish. Fishers were interviewed to gain knowledge about sawfish sightings in the region, with a focus on Costa Rica. They noted that recent sawfish sightings (<5 years) were more common in this area than in other areas of Costa Rica (Valerio-Vargas & Espinoza 2019) with records and photographs of juvenile, sub-adult, and adult Largetooth Sawfish (M. Espinoza pers. comm. 2022). This is supported by local ecological knowledge, capture reports, and museum records of small sawfish captured in several locations within this area (Chicas-Batres 1995; Angulo et al. 2013; Valerio-Vargas & Espinoza 2019).

Despite the relatively low density of captures/sightings, the fact that this area sustains this species at various life stages is particularly significant considering their local extinction from much of the Eastern Pacific (Kyne et al. 2013; López-Angarita et al. 2021).

SUB-CRITERION D2 – DIVERSITY

Térraba-Sierpe sustains a high diversity of Qualifying Species (18 species). This exceeds the regional diversity threshold (17 species) for the Central and South American Pacific region.



Acknowledgments

Mario Espinoza (CIMAR - Universidad de Costa Rica; MigraMar), Elpis J. Chávez (MigraMar), and Ryan Charles (IUCN SSC Shark Specialist Group - ISRA Project) contributed and consolidated information included in this factsheet. We thank the participants of the 2022 ISRA Region 12 - Central and South American Pacific workshop for their contributions to this process.

This factsheet has undergone review by the ISRA Independent Review Panel prior to its publication.

This project was funded by the Shark Conservation Fund, a philanthropic collaborative pooling expertise and resources to meet the threats facing the world's sharks and rays. The Shark Conservation Fund is a project of Rockefeller Philanthropy Advisors.

Suggested citation

IUCN SSC Shark Specialist Group. 2023. Térraba-Sierpe ISRA Factsheet. Dubai: IUCN SSC Shark Specialist Group.



QUALIFYING SPECIES

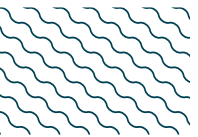
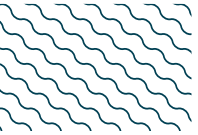
| Scientific Name | Common Name | IUCN Red List Category | Global Depth Range (m) | ISRA Criteria/Sub-criteria Met | | | | | | | | |
|--------------------------------|-------------------------|------------------------|------------------------|--------------------------------|---|----|----|----|----|----|----|----|
| | | | | A | B | C1 | C2 | C3 | C4 | C5 | D1 | D2 |
| SHARKS | | | | | | | | | | | | |
| <i>Carcharhinus leucas</i> | Bull Shark | VU | 0-164 | X | | X | | | | | | X |
| <i>Carcharhinus limbatus</i> | Blacktip Shark | VU | 0-140 | X | | X | | | | | | |
| <i>Ginglymostoma unami</i> | Pacific Nurse Shark | EN | 0-32 | X | | | | | | | | |
| <i>Mustelus henlei</i> | Brown Smoothhound | LC | 1-281 | | | X | | | | | | |
| <i>Mustelus lunulatus</i> | Sicklefin Smoothhound | LC | 9-200 | | | X | | | | | | |
| <i>Nasolamia velox</i> | Whitenose Shark | EN | 0-192 | X | | X | | | | | | |
| <i>Rhincodon typus</i> | Whale Shark | EN | 0-1,928 | X | | | | | | | | |
| <i>Rhizoprionodon longurio</i> | Pacific Sharpnose Shark | VU | 0-100 | X | | X | | | | | | |
| <i>Sphyrna lewini</i> | Scalloped Hammerhead | CR | 0-1,043 | X | | X | | | | | | |
| <i>Squatina californica</i> | Pacific Angelshark | NT | 0-100 | | | X | | | | | | |

| 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 | | |
| RAYS | | | | | | | | | | | | | | |
| <i>Aetobatus laticeps</i> | Pacific Eagle Ray | VU | 0-60 | X | | | | | | | | | | X |
| <i>Hypanus longus</i> | Longtail Stingray | VU | 0-118 | X | X | X | | | | | | | | |
| <i>Pristis pristis</i> | Large-tooth Sawfish | CR | 0-60 | X | | X | | | | | | | | |
| <i>Pseudobatos leucorhynchus</i> | Whitesnout Guitarfish | VU | 0-50 | X | | | | | | | | | | |
| <i>Rostroraja velezi</i> | Rasptail Skate | VU | 30-300 | X | | X | | | | | | | | |
| <i>Styracura pacifica</i> | Pacific Chupare | VU | 0-30 | X | X | | | | | | | | | |
| <i>Tetronarce tremens</i> | Chilean Torpedo | LC | 0-700 | | | X | | | | | | | | |
| <i>Zapteryx xyster</i> | Southern Banded Guitarfish | VU | 1-150 | X | X | X | | | | | | | | |

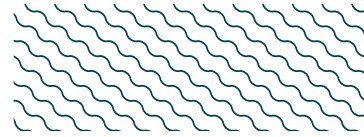
SUPPORTING SPECIES

| Scientific Name | Common Name | IUCN Red List Category |
|---------------------------------|--------------------------|------------------------|
| SHARKS | | |
| <i>Galeocerdo cuvier</i> | Tiger Shark | NT |
| RAYS | | |
| <i>Diplobatis ommata</i> | Pacific Dwarf Numbfish | LC |
| <i>Gymnura marmorata</i> | California Butterfly Ray | NT |
| <i>Rhinoptera steindachneri</i> | Pacific Cownose Ray | NT |
| <i>Urotrygon chilensis</i> | Blotched Round Ray | NT |

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

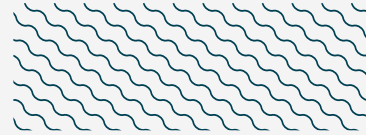


SUPPORTING INFORMATION



There are additional indications that at least 10 shark species use this area for feeding purposes, however, further investigation is required to determine the importance of this area for these species' feeding activity. This information is based on stomach content data for Pacific Guitarfish (confirmed in this region based on analysis of museum specimens), stomach and stable isotope data for Brown Smoothhound, Chilean Torpedo, Rasptail Skate, and Southern Banded Guitarfish (Espinoza et al. 2013; Espinoza et al. 2015), and ongoing studies for Longtail Stingray, Sicklefin Smoothhound, and Scalloped Hammerhead (Espinoza et al. unpubl. data 2022). Furthermore, anecdotal evidence suggests that Bull Shark and Largetooth Sawfish use areas near mangrove habitats for feeding (Jimenez pers. comm. 2022).

This area may also be important for undefined aggregations of Pacific Chupare and Scalloped Hammerhead. Large numbers of Scalloped Hammerhead are caught throughout the year, particularly during the rainy season. For example, landing data from fishery-dependent surveys (2013-2016) show that 54 Scalloped Hammerheads were captured in a single gill net (Clarke et al. unpubl. data 2022). Further investigation is required to confirm whether this was an accumulation of Scalloped Hammerheads caught over the fishing period, or whether it is evidence of an aggregation of individuals. Pacific Chupare aggregate in large numbers in shallow pools within the wetlands of this area. Fishing surveys using cast nets and beach seines have been used to catch them, and there is an ongoing tag-recapture project to monitor their movements (G. Pulido pers. comm. 2022). Although their presence is regular all year-round (G. Pulido pers. comm. 2023), further investigation is required to determine the size of the aggregations, and the regularity and predictability of this behaviour.



REFERENCES

- Angulo A, Garita-Alvarado CA, Bussing WA, López MI. 2013.** Annotated checklist of the freshwater fishes of continental and insular Costa Rica: additions and nomenclatural revisions. *Check List* 9(5): 987-1019. <https://doi.org/10.15560/9.5.987>
- Azofeifa-Solano JC, Clarke TM, Espinoza M, Wehrtmann IS. 2021.** Reproductive cycles of the southern banded guitarfish *Zapteryx xyster* and the Velez ray *Raja velezi* caught as bycatch in a bottom-trawl fishery. *Latin America Journal of Aquatic Research* 49(1): 1-12. <https://doi.org/10.3856/vol49-issue1-fulltext-2558>
- Chicas-Batres F. 1995.** Distribución, diversidad y dinámica poblacional de la ictiofauna comercial de la reserva forestal Térraba-Sierpe, Puntarenas, Costa Rica. Unpublished Master's Thesis, University of Costa Rica.
- Clarke TM, Espinoza M, Wehrtmann IS. 2014.** Reproductive ecology of demersal elasmobranchs from a data-deficient fishery, Pacific of Costa Rica, Central America. *Fisheries Research* 157: 96-105. <https://doi.org/10.1016/j.fishres.2014.04.003>
- Clarke TM, Espinoza M, Ahrens R, Wehrtmann IS. 2016.** Elasmobranch bycatch associated with the shrimp trawl fishery off the Pacific coast of Costa Rica, Central America. *Fishery Bulletin* 114(1): 1-17. <https://doi.org/10.7755/FB.114.1>
- Clarke TM, Espinoza M, Chaves RR, Wehrtmann IS. 2018.** Assessing the vulnerability of demersal elasmobranchs to a data-poor shrimp trawl fishery in Costa Rica, Eastern Tropical Pacific. *Biological Conservation* 217: 321-328.
- Clarke TM, Espinoza M, Villalobos-Rojas F, Wehrtmann IS. 2011.** Summary of demersal elasmobranch studies in the Pacific continental platform of Costa Rica with recommendations for their management and conservation. Technical report. San José: Universidad de Costa Rica.
- Espinoza M, Clarke TM, Villalobos-Rojas F, Wehrtmann IS. 2013.** Diet composition and diel feeding behaviour of the banded guitarfish *Zapteryx xyster* along the Pacific coast of Costa Rica, Central America. *Journal of Fish Biology* 82(1): 286-305. <https://doi.org/10.1111/j.1095-8649.2012.03488.x>
- Espinoza M, Díaz E, Angulo A, Hernández S, Clarke TM. 2018.** Chondrichthyan diversity, conservation status, and management challenges in Costa Rica. *Frontiers in Marine Science* 5: 85. <https://doi.org/10.3389/fmars.2018.00085>
- Espinoza M, Munroe SEM, Clarke TM, Fisk AT, Wehrtmann IS. 2015.** Feeding ecology of common demersal elasmobranch species in the Pacific coast of Costa Rica inferred from stable isotope and stomach content analyses. *Journal of Experimental Marine Biology and Ecology* 470: 12-25. <https://doi.org/10.1016/j.jembe.2015.04.021>
- IUCN. 2022.** The IUCN Red List of Threatened Species. Available at: <https://www.iucnredlist.org/> Accessed December 2022.
- López-Angarita J, Cubillos-M JC, Villate-Moreno M, Del Cid A, Díaz JM, Cooke R, Cagua EF, Tilley A. 2021.** Bright spots for research and conservation of the largetooth sawfish *Pristis pristis* in Colombia and Panamá. *Endangered Species Research* 46: 147-160. <https://doi.org/10.3354/esr01150>
- Piedra JFA, Román AQ, Bolaños CV. 2019.** Cobertura y distribución de las especies de mangle en el Humedal Nacional Térraba-Sierpe, Costa Rica. *Anuário do Instituto de Geociências* 41(1): 120-129.
- Valerio-Vargas J, Espinoza M. 2019.** A beacon of hope: distribution and current status of the largetooth sawfish in Costa Rica. *Endangered Species Research* 40: 231-242. <https://doi.org/10.3354/esr00992>