

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 SAN MIGUEL AND TUIRA RIVER ISRA

Central and South American Pacific Region

SUMMARY

Gulf of San Miguel and Tuira River is located in Darién Province in the eastern region of Panama. The area includes Punta Patiño, a Wetland of International Importance (Ramsar site). The area has significant expanses of intact habitat, such as a complex system of rivers, deltas, mudflats, and extensive mangrove forest. Rivers include the Tuira River and several tributaries (Sabanas, Chucunaque, Tupisa, Chico, and Balsas rivers), and the Tuquesa River, a tributary of the Chucunaque River. These rivers are narrow, highly turbid, remote, and in largely pristine condition. Most areas are shallow waters of <10 m depth including in the rivers and tributaries. Within this area there are: **threatened species** and **reproductive areas** (Largetooth Sawfish *Pristis pristis*).

CRITERIA

Criterion A - Vulnerability; Sub-criterion C1 - Reproductive Areas

—	—
PANAMA	—
—	—
0-40 metres	—
—	—
1,153.3 km²	—
—	—





DESCRIPTION OF HABITAT

Gulf of San Miguel and Tuira River is located in Darién Province in the extreme eastern region of Panama, bordering Colombia. The area overlaps with the Pacific Central-American Coastal Large Marine Ecosystem and includes Punta Patiño, a Wetland of International Importance (Ramsar site). It is a complex system of rivers, deltas, mudflats, and extensive mangrove forest. Mangrove diversity includes Red Mangrove *Rhizophora mangle*, Black Mangrove *Avicennia germinans*, White Mangrove *Laguncularia racemosa*, and Tea Mangrove *Pelliciera rhizophorae*. The San Miguel watershed is the largest in Panama (14,877 km²) and the area includes the Tuira River and several tributaries (Sabanas, Chucunaque, Tupisa, Chico, and Balsas rivers), and the Tuquesa River, a tributary of the Chucunaque River. These rivers are narrow, highly turbid, remote, and in largely pristine condition. Most areas in the rivers and tributaries are shallow waters of <10 m depth with deeper channels to 40 m (Navionics 2022).

This Important Shark and Ray Area is delineated from inshore and surface waters (0 m) to a depth of 40 m based on the bathymetry of the area (Navionics 2022).

ISRA CRITERIA

CRITERION A - VULNERABILITY

One Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ regularly occurs in the area. This is the Critically Endangered Largetooth Sawfish (Kyne et al. 2013).

SUB-CRITERION C1 - REPRODUCTIVE AREAS

Gulf of San Miguel and Tuira River is an important reproductive area for one ray species. Darién Province is considered an important nursery area for Largetooth Sawfish (Kyne et al. 2014) and has been identified as a bright spot for this Critically Endangered species in the Eastern Pacific (López-Angarita et al. 2021). There are several contemporary records (since the year 2000) of Largetooth Sawfish in the Gulf of San Miguel and Tuira River with one of the largest clustering of records in Panama (n = 10 records from six sites; López-Angarita et al. 2021). Largetooth Sawfish regularly occur in the area, with contemporary records from the years 2005, 2009, 2013, 2015, and 2022 (López-Angarita et al. 2021; Instagram 2022).

Records from 2005–2015 mostly originate from interviews with local fishers who were able to provide location-specific details of where sawfish were caught. Largetooth Sawfish is the only sawfish species occurring in the Eastern Pacific, is distinctive from other shark and ray species, and is recognisable based on its elongated, tooth-studded rostrum. In addition to these interview results, one record is from a rostrum collected from the Tuira River in 2015 (López-Angarita et al. 2021). The rostra length was 45 cm (López-Angarita et al. 2021) and using published rostra to total length (TL) relationships (Whitty et al. 2014), this individual would have ranged 167–214 cm TL and hence been a juvenile given these sizes are below known size-at-maturity (see Kyne et al. 2021).

The most recent record is a small individual captured and released on 06 August 2022 in the Tuira River, Chepigana (Instagram 2022). From the video footage of the release, this individual was estimated to be ~80 cm TL. This falls within the published size-at-birth for the species: 76 cm TL (Lake Nicaragua, Western Atlantic; Astorqui 1967); 73–80 cm TL (Lake Nicaragua, Western Atlantic; Thorson 1976; and 72–90 cm TL (Australia, Indo-West Pacific; Peverell 2009).

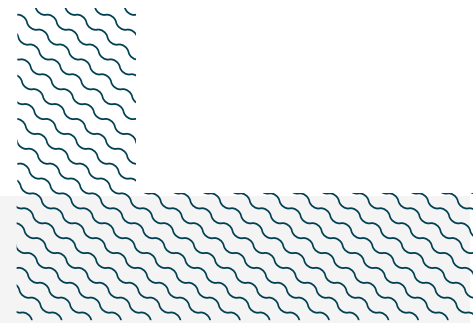


While the limited number of captures indicates low densities of the species, the 2022 capture of a neonate/young-of-the-year sized individual provides evidence that the species is still breeding in the area with the Gulf of San Miguel and Tuira River functioning as a nursery area.

Outside of the Eastern Pacific, it has been documented that Largemouth Sawfish spend the first 4-5 years in freshwater environments before moving to estuarine and coastal marine waters (except for the unique but depleted Lake Nicaragua population where individuals may have spent their whole life-cycle in freshwater; Thorson 1976, 1982; Thorburn et al. 2007). Apart from Lake Nicaragua, pupping is generally thought to occur around estuaries and river mouths (Kyne et al. 2021).

Despite the lack of further detail on the size classes of most contemporary Largemouth Sawfish records in the area (i.e., if these were neonates, juveniles, or adults), several factors infer that the Gulf of San Miguel and Tuira River is a reproductive area for the species: (1) one of the largest clustering of contemporary records anywhere in Panama; (2) known life-cycle; (3) known habitat preferences with extensive areas of core mangrove and riverine habitat in the area; (4) documentation of contemporary records across multiple years; and (5) the recent 2022 capture of a neonate/young-of-the-year.

Largemouth Sawfish are locally extinct from much of the Eastern Pacific (Kyne et al. 2013; López-Angarita et al. 2021; Yan et al. 2021), therefore the temporal and spatial scale of contemporary records in the Gulf of San Miguel and Tuira River is regionally, if not globally, significant.



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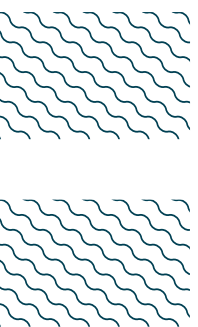
QUALIFYING SPECIES

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	
RAYS													
<i>Pristis pristis</i>	Largetooth Sawfish	CR	0-60	X		X							

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Galeocerdo cuvier</i>	Tiger Shark	NT
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CR

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





REFERENCES

- Astorqui I. 1967.** Investigaciones de un Jesuita en aguas de Nicaragua. 5. Nuestro pez sierra. *Revista Conservadora* 16: 71-75.
- Instagram. 2022.** Instagram post by pargos_activos on 07 August 2022. Available at: <https://www.instagram.com/reel/Cg8EfrBN4OP/?igshid=YmMyMTA2M2Y%3> Accessed September 2022.
- Kyne PM, Carlson J, Smith K. 2013.** *Pristis pristis* (errata version published in 2019). *The IUCN Red List of Threatened Species* 2013: e.T18584848A141788242. <https://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T18584848A141788242.en>
- Kyne PM, McDavitt MT, Graham RT. 2014.** Eastern Pacific Ocean. In: Harrison LR, Dulvy NK, eds. *Sawfish: a global strategy for conservation*. Vancouver: IUCN Species Survival Commission's Shark Specialist Group, 72-75.
- Kyne PM, Oetinger M, Grant MI, Feutry P. 2021.** Life history of the Critically Endangered Largetooth Sawfish: a compilation of data for population assessment and demographic modelling. *Endangered Species Research* 44: 79-88. <https://doi.org/10.3354/esr01090>
- 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>
- Navionics. 2022.** Navionics webapp, Available at: <https://webapp.navionics.com/> Accessed September 2022.
- Peeverell SC. 2009.** Sawfish (Pristidae) of the Gulf of Carpentaria, Queensland, Australia. Unpublished Master's Thesis, James Cook University, Townsville.
- Thorburn DC, Morgan DL, Rowland AJ, Gill HS. 2007.** Freshwater sawfish *Pristis microdon* Latham, 1794 (Chondrichthyes: Pristidae) in the Kimberley region of Western Australia. *Zootaxa* 1471: 27-41. <https://doi.org/10.11646/zootaxa.1471.1.3>
- Thorson TB. 1976.** Observations on the reproduction of the sawfish, *Pristis perotteti*, in Lake Nicaragua, with recommendations for its conservation. In: Thorson TB, ed. *Investigations of the ichthyofauna of Nicaraguan lakes*. Lincoln: University of Nebraska, 641-650.
- Thorson TB. 1982.** Life history implications of a tagging study of largetooth sawfish, *Pristis perotteti*, in the Lake Nicaragua-Río San Juan System. *Environmental Biology of Fishes* 7: 207-228.
- Whitty JM, Phillips NM, Thorburn DC, Simpfendorfer CA, Field A, Peeverell SC, Morgan DL. 2013.** Utility of rostra in identification of Australian sawfishes (Chondrichthyes: Pristidae). *Aquatic Conservation: Marine and Freshwater Ecosystems* 24: 791-804. <https://doi.org/10.1002/aqc.2398>
- Yan HF, Kyne PM, Jabado RW, Leeney RH, Davidson LNK, Derrick DH, Finucci B, Freckleton RP, Fordham SV, Dulvy NK. 2021.** Overfishing and habitat loss drives range contraction of iconic marine fishes to near extinction. *Science Advances* 7: eabb6026. <https://www.science.org/doi/10.1126/sciadv.abb6026>