SHARK NEWS

Newsletter
of the IUCN SSC Shark
Specialist Group

#08 | July 2023

IUCN SSC
Shark Specialist Group

Photo by Michael Scholl | Save Our Seas Foundation

Our Vision

A world where sharks, rays, and chimaeras are valued and managed sustainably.

Our Mission

To secure the conservation, management and, where necessary, the recovery of the world's sharks, rays, and chimaeras by mobilizing technical and scientific expertise to provide the knowledge that enables action.

Photos by Brooke Pyke | brookepykephotography.com

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A note from the Chair Rima Jabado

Dear readers,

When we developed our quadrennium strategy in 2020 and included the update to the Global Report on the Status of Sharks, Rays, and Chimaeras (a.k.a. Fowler report), I admittedly didn't realize how much work it would entail! It's been a long and time-consuming process, one I am learning so much from and one I could not have taken forward without support from Alex, our SSG Program Officer, and all the contributors! For those who do not know, this work is coming together quickly now, and we hope to have it published by early 2024. We made significant progress during our meeting on the sideline of Sharks International in Valencia; however, many of our members from the Indian Ocean and Asia regional groups could not join us. So instead, we went to Kuala Lumpur (Malaysia) and brought everyone together to work on country summaries for those regions. Sharing ideas and knowledge and interacting with members in person was incredible. But we have also held mini online regional workshops so members can work simultaneously on their sections. I am so grateful to those who have made the time to join us and our funders who have made the in-person meetings possible. Our feature story is the second of a series of fact sheets on human impacts on sharks and rays. Developed in collaboration with the Secretariat for the Convention on the Conservation of Migratory Species of Wild Animals (CMS), this issue relates to habitat loss and degradation, the second most important threat to this species group after fisheries. This is particularly relevant to coastal and intertidal habitats around the world, where large expanses of mangrove forests, seagrass beds, and coral reefs have been degraded or have disappeared. Many of us spend time on beaches, but how many of us have actually considered how sharks and rays use intertidal habitats? A new study highlights their importance to a wide range of species and adds weight to why these habitats should be preserved in light of growing pressure from coastal development and climate change. This is also reinforced by the story of the Maugean Skate – a species that has not received enough attention but is facing a high risk of extinction, not from fisheries, but from the loss of suitable habitat. For some species, we know less, and from China, we have an update from a project investigating the movement of Blue Sharks in the Tropical Central and Western Pacific. This wide-ranging species is extensively captured in pelagic fisheries, so understanding the habitats it uses can support conservation. We have some positive news from Iran – the Tentacled Butterfly Ray was rediscovered! Thought to be possibly extinct, surveys onboard trawl vessels have shown that the species persists in at least one area. Türkiye highlights the importance of citizen science approaches with aggregations of several threatened species recorded in one bay. In Thailand, work has been ongoing to develop identification materials to support implementing their national plan of action. Our regular Q&A contributor Chelsea Stein introduces us to two more SSG early career scientists, this time from North America and Libya. Their work showcases the wide scope of research needed to improve our understanding of shark and ray fisheries and species ecology in regions with vastly different levels of knowledge. With the Important Shark and Ray Areas (ISRA) project, we continue to put sharks, rays, and chimaeras on the map around the world, region by region. We provide an update on our first completed region – the Central and South American Pacific. The eAtlas was launched earlier this year, and the compendium showcased here will be one of many as each region is completed. Our Mediterranean and Black Seas workshop was held in May, and we hope to also have all this information online in August. The number of contributors to the ISRA project is growing, with the Western Indian Ocean coming up next. As always, none of this would be possible without the support of SSG members and shark-lovers worldwide who contribute to Shark News and all our projects – I never cease to be amazed by their passion and willingness to share their knowledge and time. And, of course, I continue to be extremely grateful to Michael and Peter Scholl, who make this newsletter a reality.

↦ Rima

Photo by Brooke Pyke | brookepykephotography.com

Working with colleagues at Florida International University and the American Shark Conservancy, Brendan takes a blood sample from an adult silky shark off Jupiter, Florida.

Photo by Cassandra Scott

Early-career scientists within the SSG

In this Q&A series, get to know members across the group's nine regions.

With 237 members from 83 countries and territories, the IUCN SSC Shark Specialist Group is one of the largest specialist groups within the IUCN Species Survival Commission. Across the group's nine regions, many early career scientists are pursuing exciting work on shark, ray, and chimaera research, policy, and conservation.

In this Q&A series, we'll showcase some of these members, sharing their roles within the SSG and their ongoing work.

- Brendan Talwar, postdoctoral scholar at the Scripps Institution of Oceanography at the University of California San Diego and The Nature Conservancy, SSG North America Region
- Sara Al Mabruk, founder of the Marine Biology in Libya Society, SSG Mediterranean Region, Angel Shark Project: Libya

What type of research do you focus on?

Brendan: I am broadly interested in supporting conservation and management efforts, which has led me to study fisheries ecology. My specific research interests include movement, life history, capture-related behaviour and mortality, foraging ecology, and policy.

Sara: I focus on the distribution of sharks and rays in Libyan waters and do some genetic research in collaboration with other scientists. Our research aims to understand better the population structure and connectivity of these species in the region, which can inform conservation efforts and management strategies. Additionally, we hope to identify potential new species and genetic diversity within our study populations.

Shark News: What project(s) are you currently working on

Brendan: I recently finished my PhD at Florida International University while based at the Cape Eleuthera Institute in the eastern Bahamas. I am wrapping up a handful of ongoing projects from my time there, mostly focused on the movements, abundance, behaviour, and diet of open-ocean sharks. After graduating, I moved to San Diego, California, for a postdoc at Scripps and The Nature Conservancy. This year, I will attempt to develop a conceptual model of Silky Shark life history in the eastern Pacific using any information I can get my hands on!

Sara: Angel Shark Project in Libya aims to promote reporting of angel shark catches and identification in Libya and highlights the importance of Libya as a hot spot for these species in the Mediterranean Sea. It is part of the network of Angel Shark projects underway across the region.

As a member of the IUCN SSC Shark Specialist Group, what is your role?

Brendan: I first participated in a regional workshop that we hosted in Eleuthera, Bahamas, a few years back. Afterwards, I collaborated with the other workshop participants to write a regional review paper focused on catches, extinction risk, and management of sharks and rays in the wider Caribbean. Most recently, I have contributed to the updated global report (Fowler et al. 2005 update).

Sara: As a member of this group, I have been involved in some assessments but would like to be more involved in developing and implementing conservation strategies and management plans for endangered and threatened shark and ray species. I would also like to support in evaluating the conservation status of specific shark and ray species in Libyan waters.

What excites you about sharks, rays, and/or chimaeras?

Brendan: Career-wise, I am very motivated to reduce wasteful mortality. But the most exciting moments for me are always in the water. Nothing is better than hopping into the blue on top of a bit of structure and finding a group of silky sharks as excited as I am to spend time together.

Sara: Shark and ray research is an intriguing field, especially since it has not received as much attention in Libya as it should.

What is your favourite shark, ray, or chimaera species? And why?

Brendan: My favourite is the Silky Shark (*Carcharhinus falciformis*)! They are cute, fearless, excitable, friendly, beautiful, and usually somewhere warm.

Sara: My favourites are the Blue Shark (*Prionace glauca*) and Angelshark (*Squatina squatina*), and Smooth Butterfly Ray (*Gymnura micrura*). Both the Angelshark and Smooth Butterfly Ray are interesting and unique species with fascinating adaptations that allow them to survive in their environments. Their gentle nature and graceful movements may also make them appealing to many people and me.

What do you think is the biggest challenge for shark conservation vs the biggest opportunity?

Brendan: The biggest challenges are reducing fisheries mortality to sustainable levels and recovering already depleted species. The biggest opportunities involve sustainable use - whether that is responsible fishing, ecotourism, or otherwise.

Sara: The biggest challenge for shark conservation is the overfishing and illegal fishing of sharks for their fins, considered a delicacy in some parts of the world. This practice, known as shark finning, is often done by cutting off the shark's fins and discarding the rest of the body, leading to millions of sharks' deaths each year. The demand for shark fins and other shark products is still high, particularly in Asia, despite efforts to ban the trade in some countries.
On the other hand, the biggest opportunity for shark conservation is the growing awareness and concern among the public and policymakers about the importance of sharks in marine ecosystems. Sharks play a crucial role in maintaining the health and balance of ocean ecosystems, and their decline could have far-reaching consequences. Several countries and international organizations have taken steps to protect sharks by implementing conservation measures such as banning shark finning, establishing marine protected areas, and limiting shark fishing.
Additionally, technological advancements and scientific research have provided new tools and methods to study and track sharks, which can help improve conservation efforts. For example, acoustic telemetry and satellite tagging allow researchers to track the movements of sharks and better understand their behaviour and habitat use, which can inform conservation policies and management strategies.
Overall, while shark conservation challenges are significant, there are also opportunities to protect and conserve these important predators through continued efforts to raise awareness and implement effective conservation measures.

What's something you're looking forward to this year?

Brendan: I always look forward to reconnecting with incredible friends at the American Elasmobranch Society meeting, which is coming up in July. Although folks are scattered across the country and world, the annual meeting brings everyone together.

Sara: Looking forward to focusing on implementing new conservation policies and initiatives aimed at protecting threatened species and their habitats in Libyan waters, supporting the growing movement towards sustainable fishing practices and reducing bycatch. This is important because many shark and ray species are caught as bycatch, which can contribute to population declines.
Dedicate more efforts towards public education and outreach to raise awareness about the importance of shark and ray conservation and promote sustainable fishing practices. This can help to change attitudes towards these often-misunderstood species and encourage greater conservation efforts.

What's one fun fact about you?

Brendan: I have started to spend way too much money on seeing live music, but after living on an island for so long, I think it is fair to make up for lost time!

Sara: I had always thought I wanted to become a medical doctor or a journalist, but unexpectedly, I developed a passion for marine biology and fell in love with the ocean.

How can we keep up with your work?

Brendan: You can keep up with my Silky Shark research through the Save Our Seas blog. I also keep an updated list of publications on my website: talwarbrendan.wixsite.com/btalwar/publications.

Sara: You can keep up with my work on my organization's website: mb.org.ly, or follow us on Twitter: @MarineLibya.

Q&A

Brendan teaches students from the Deep Creek Middle School in south Eleuthera, The Bahamas about shark anatomy and ecology before dissecting a shark found on a local beach.

Photo by Cape Eleuthera Island School

Brendan and colleagues from the Cape Eleuthera Institute, Florida State University, and University of Florida next to a bait-arm attached to an OceanX submersible just prior to the final (and successful!) attempt to tag a Bluntnose Sixgill Shark at depth.

Photo by Cape Eleuthera Island School

Q&A

Q&A

Photos by Sara Al Mabruk | Founder of the Marine Biology in Libya Society | Angel Shark Project: Libya

Photos provided by Sara Al Mabruk

Sharks* and the International Commission for the Conservation of Atlantic Tunas (ICCAT)

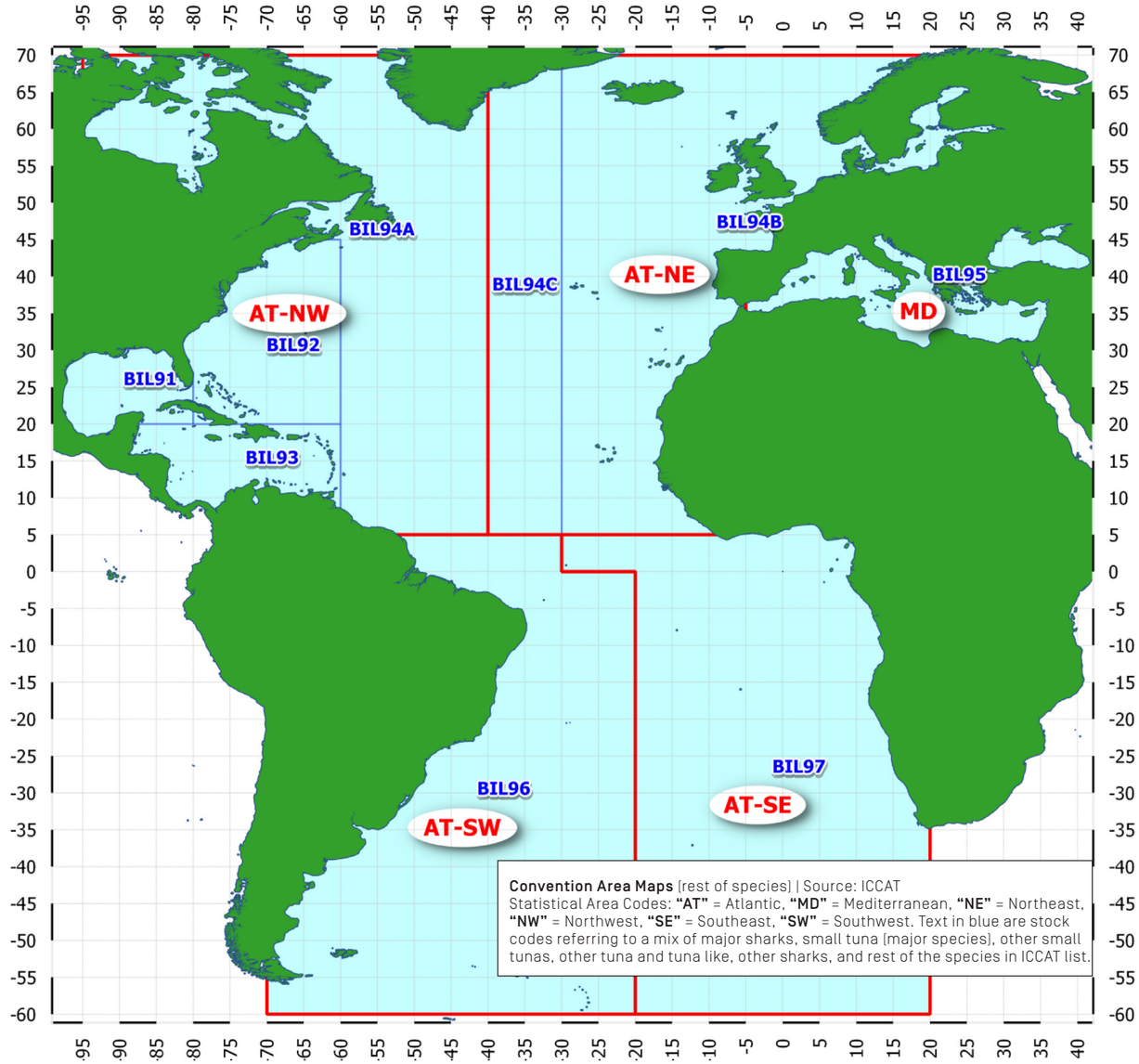
*The term 'shark' refers to all species of sharks, rays, and chimaeras

Written by Alexandra Morata
IUCN SSC Shark Specialist Group | Programme Officer

Reviewed by Ali Hood
Shark Trust | Director of Conservation
IUCN SSC Shark Specialist Group | Northern Europe regional member

What is ICCAT?

The International Commission for the Conservation of Atlantic Tunas (ICCAT) is an intergovernmental fishery organisation, responsible for the conservation of tuna and tuna-like species in the Atlantic Ocean and adjacent seas. It was originally signed in 1966 during the Conference of Plenipotentiaries of the United Nations (UN).

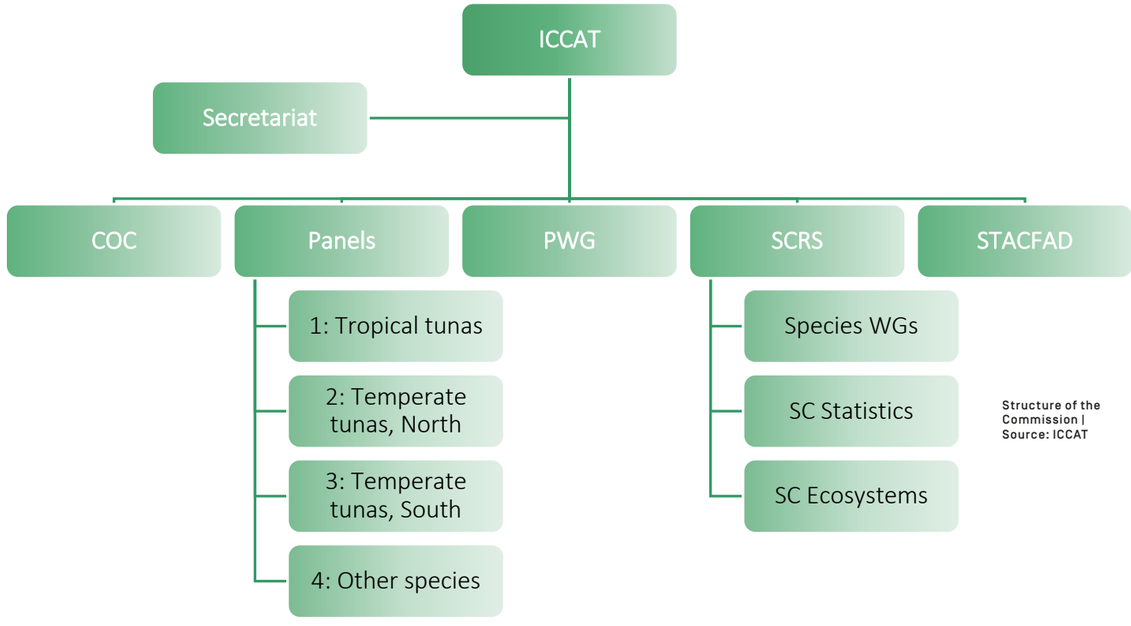


Convention Area Maps (rest of species) | Source: ICCAT
Statistical Area Codes: **"AT"** = Atlantic, **"MD"** = Mediterranean, **"NE"** = Northeast, **"NW"** = Northwest, **"SE"** = Southeast, **"SW"** = Southwest. Text in blue are stock codes referring to a mix of major sharks, small tuna (major species), other small tunas, other tuna and tuna like, other sharks, and rest of the species in ICCAT list.

After a brief initial period of biennial meetings, ICCAT now meets annually. In accordance with the Convention, the Commission holds a Regular meeting every other year and a Special meeting in alternate years. During the Regular meeting the Commission elects their next Chairman, first and second Vice-Chairman; amend the Rules of Procedure, Resolutions, etc. with Contracting Parties; and submits a report on all matters associated with the objectives of the Convention to Contracting Parties. Based on Article III (3) of ICCAT's Basic Texts: "Except as may otherwise be provided in this Convention, decisions of the Commission shall be taken by majority of the Contracting Parties, each Contracting Party having one vote. Two-thirds of the Contracting Parties shall constitute a quorum."

To carry out the Convention's objectives of conserving tuna and tuna-like species, the Commission, with support from Contracting Parties, conducts a series of activities. These include consolidating statistical information on conditions and trends of tuna fishery resources; analysing the impact of existing conservation management measures on tuna and tuna-like populations; recommend studies and investigations to Contracting Parties; publish reports based on their findings; etc.

Structure of ICCAT



Structure of the Commission | Source: ICCAT

The **Executive Secretariat** is responsible for the administration and coordination of the Commission. There are five Committees (including Panels) that report back to the Secretariat. **The Standing Committee on Finance and Administration (STACFAD)** is responsible for organising the time and place of Commission meetings, and budgets within the Commission. **Panels** are established to review species or group of species or geographic areas and host regular meetings alongside the Regular meeting of the Convention to prepare for the Regular meeting. Furthermore, Contracting Parties may be part of several Panels. The **Standing Committee on Research and Statistics (SCRS)** develops and recommend policies and procedures to support ICCAT's objectives; plus is further divided into **Species Working Groups (WGs), SC Statistics,** and **SC Ecosystems.** The **Conservation and Management Measures Compliance Committee (COC)** ensures compliance with ICCAT's objectives. The **Permanent Working Group for the Improvement of ICCAT Statistics and Conservation Measures (PWG)** suggests improvements to ICCAT's Recommendations and Resolutions based on reviews on their impact on tuna and tuna-like fishery resource information.

Contracting Parties

Contracting Parties are countries that have signed onto the Convention. They are obliged to support the enforcement of the Convention through providing upon request, scientific, statistical, etc. information to the Commission; and–on voluntary basis–provide access to companies and individual fishers.

Table: List of the 52 Contracting Parties of ICCAT and Panels they are part of.

Country	Year	1: Tropical Tunas	2: Tropical Tunas, North	3: Tropical Tunas, South	4: Other Species
Albania	2008		x		
Algeria	2001		x		x
Angola	1976	x			x
Barbados	2000				
Belize	2005	x	x	x	x
Brazil	1969	x	x	x	x
Cabo Verde	1979	x			x
Canada	1968	x	x		x
China, People's Rep. of	1996	x	x	x	x
Côte d'Ivoire	1972	x			x
Curaçao	2014	x			
Egypt	2007		x		x
El Salvador	2014	x			
Equatorial Guinea	1987	x			x
European Union	1997	x	x	x	x
France (S-Pierre et Miquelon)	1968	x	x		x
Gabon	1977	x			x
Gambia, The	2019				x
Ghana	1968	x			
Grenada, Rep. of	2017				
Guatemala	2004	x			x
Guinea	1991	x			x
Guinea Bissau, Rep. of	2016	x			x
Honduras	2001	x			x
Iceland	2002		x		
Japan	1967	x	x	x	x
Korea, Rep. of	1970	x	x	x	x
Liberia	2014	x			x
Libya	1995	x	x		x
Mauritania	2008	x	x		x
Mexico	2002	x	x		x
Morocco	1969	x	x		x
Namibia	1999	x	x	x	x
Nicaragua	2004	x			
Nigeria	2007	x			x
Norway	2004		x		x
Panama	1998	x	x	x	x
Philippines	2004	x		x	
Russia	1977	x	x		
São Tomé e Principe	1983	x			x
Senegal	2004	x	x		x
Sierra Leone	2008	x			x
South Africa	1967	x		x	x
St Vincentand the Grenadines	2006	x	x		x
Syria	2005		x		
Trinidad & Tobago	1999	x			x
Tunisia	1997		x		x
Türkiye	2003		x	x	
UK and Northern Ireland	2020	x	x	x	x
United States	1967	x	x	x	x
Uruguay	1983	x		x	x
Venezuela	1983	x	x		x

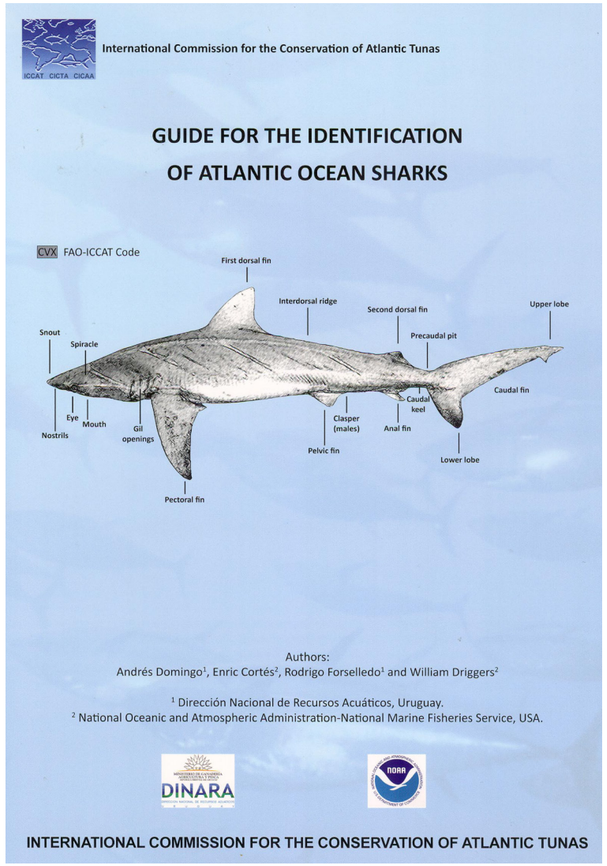
Non-Contracting Parties who operate within the Convention area can also voluntarily contribute and comply with ICCAT's conservation management Recommendations and Resolutions as a **Cooperator** (also known as Cooperating non-Contracting Parties), those with this status are renewed annually. Current Cooperators include Bolivia, Chinese Taipei, Suriname, Guyana, and Costa Rica. Collectively, Contracting Parties, Cooperators, and Fishing Entities within the Convention Area are called CPCs.
Additinally, during the Regular meeting, the Commission may approve **Observers**–non-Members and and/or non-contracting–to attend. Observers, authorized by the Chairman, may participate in the meeting discussions but do not have the right to vote.

Which shark species are covered by ICCAT?

Currently, 27 shark species are covered by ICCAT's conservation management Recommendations and Resolutions.
Since being listed some species have had their taxonomy updated–hereafter all species names reflect the most updated name as listed on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species™.

Table: List of sharks included in ICCAT's Compendium of Management Recommendations and Resolutions.

Order	Family	Scientific Name	Common Name
Carcharhiniformes	Carcharhinidae	*Carcharhinus falciformis*	Silky Shark
Carcharhiniformes	Carcharhinidae	*Carcharhinus galapagensis*	Galapagos Shark
Carcharhiniformes	Carcharhinidae	*Carcharhinus longimanus*	Oceanic Whitetip Shark
Carcharhiniformes	Carcharhinidae	*Prionace glauca*	Blue Shark
Carcharhiniformes	Sphyrnidae	*Sphyrna corona*	Scalloped Bonnethead
Carcharhiniformes	Sphyrnidae	*Sphyrna gilberti*	Carolina Hammerhead
Carcharhiniformes	Sphyrnidae	*Sphyrna lewini*	Scalloped Hammerhead
Carcharhiniformes	Sphyrnidae	*Sphyrna media*	Scoophead Shark
Carcharhiniformes	Sphyrnidae	*Sphyrna mokarran*	Great Hammerhead
Carcharhiniformes	Sphyrnidae	*Sphyrna tudes*	Smalleye Hammerhead
Carcharhiniformes	Sphyrnidae	*Sphyrna zygaena*	Smooth Hammerhead
Lamniformes	Alopiidae	*Alopias superciliosus*	Bigeye Thresher
Lamniformes	Alopiidae	*Alopias vulpinus*	Common Thresher
Lamniformes	Cetorhinidae	*Cetorhinus maximus*	Basking Shark
Lamniformes	Lamnidae	*Carcharodon carcharias*	White Shark
Lamniformes	Lamnidae	*Isurus oxyrinchus*	Shortfin Mako
Lamniformes	Lamnidae	*Isurus paucus*	Longfin Mako
Lamniformes	Lamnidae	*Lamna nasus*	Porbeagle
Lamniformes	Pseudocarchariidae	*Pseudocarcharias kamoharai*	Crocodile Shark
Myliobatiformes	Dasyatidae	*Pteroplatytrygon violacea*	Pelagic Stingray
Myliobatiformes	Mobulidae	*Mobula alfredi*	Reef Manta Ray
Myliobatiformes	Mobulidae	*Mobula birostris*	Oceanic Manta Ray
Myliobatiformes	Mobulidae	*Mobula hypostoma*	Atlantic Pygmy Devil Ray
Myliobatiformes	Mobulidae	*Mobula mobular*	Spinetail Devil Ray



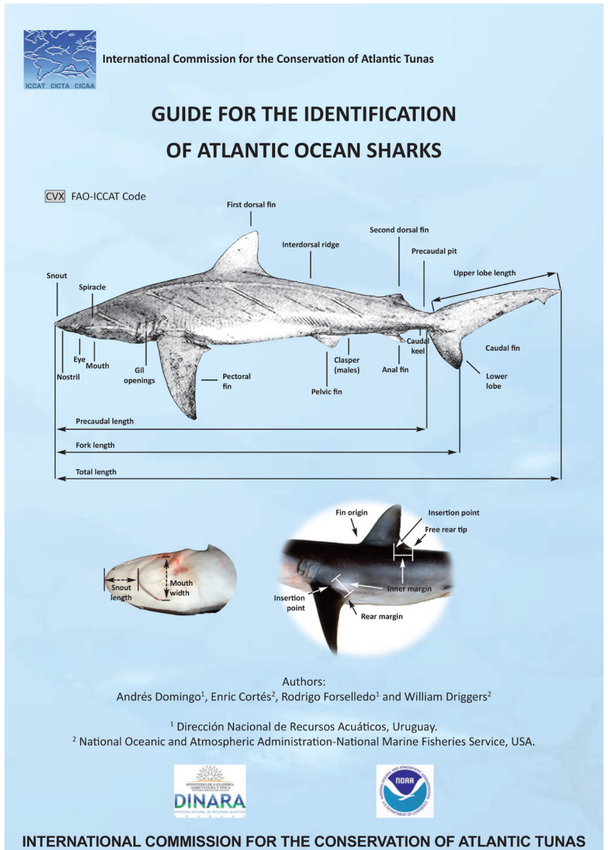
Compendium of the Management Recommendations and Resolutions

Resolutions and Recommendations are non-binding and binding regulations, respectively, addressed to CPCs. The first shark-targeted measure is the Resolution by ICCAT on cooperation with the Food and Agriculture Organization of the United Nations (FAO) with regard to a study on the status of stocks and by-catches of shark species (95–02), developed in 1995. Since then, several measures have been adopted. There are currently two active Resolutions and 17 Recommendations that specifically cover sharks. A summary of the information contained in each active resolution is provided. Resolutions are structured as (xx–yy), where "xx" refers to the year it was implemented, and "yy" the order it was listed that year.

After the annual meeting of the Commission, all Resolutions and Recommendations agreed on come into effect six months after the date of notification. However, if an objection is raised by one-fourth or more of all Contracting Parties within the six months period, then the recommendation is extended by an additional 60 days. After the extension, the measures come into effect for all Parties that did not object.

The complete Compendium of the Management Recommendations and Resolutions of ICCAT can be downloaded here. The following is a table that lists each of these along with a short summary of the content of those that are still active.

To support fishers with the identification of shark species occurring within the Convention Area, ICCAT has provided identification guides for some of the species interacting with fishers in the Atlantic Ocean: Sharks 1 and Sharks 2.



Resolution/ Recommendation	Title	Entered into force	Status
[95–02]	**Resolution** by ICCAT on cooperation with the Food and Agriculture Organization of the United Nations (FAO) with regard to study the status of stocks and by-catches of shark species	21 December 1995	Active
[01–11]	**Resolution** by ICCAT on Atlantic sharks		Replaced by [03–10]
[03–10]	**Resolution** by ICCAT on the shark fishery	19 December 2003	Active
[04–10]	**Recommendation** by ICCAT concerning the conservation of sharks caught in association with fisheries managed by ICCAT	13 June 2005	Active
[05–05]	**Recommendation** by ICCAT to Amend Recommendation 04-10 Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT		Replaced by [14–06]
[06–10]	Supplementary **Recommendation** by ICCAT Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT		Replaced by [14–06]
[07–06]	Supplemental **Recommendation** by ICCAT concerning sharks	4 June 2008	Active
[08–07]	**Recommendation** by ICCAT on the Conservation of Bigeye Thresher Sharks (*Alopias superciliosus*) Caught in Association with Fisheries Managed by ICCAT		Replaced by [09–07]
[08–08]	**Resolution** by ICCAT on Porbeagle Shark (*Lamna nasus*)		Replaced by [15–06]
[09–07]	**Recommendation** by ICCAT on the conservation of thresher sharks caught in association with fisheries in the ICCAT Convention area	1 June 2010	Active
[10–06]	**Recommendation** by ICCAT on Atlantic shortfin mako sharks caught in association with ICCAT fisheries	14 June 2011	Active
[10–07]	**Recommendation** by ICCAT on the conservation of oceanic whitetip shark caught in association with fisheries in the ICCAT Convention area	14 June 2011	Active
[10–08]	**Recommendation** by ICCAT on hammerhead sharks (family Sphyrnidae) caught in association with fisheries managed by ICCAT	14 June 2011	Active
[11–08]	**Recommendation** by ICCAT on the conservation of silky sharks caught in association with ICCAT fisheries	7 June 2012	Active
[12–05]	**Recommendation** by ICCAT on Compliance with Existing Measures on Shark Conservation and Management		Replaced by [18–06]
[13–10]	**Recommendation** on biological sampling of prohibited shark species by scientific observers	10 June 2014	Active
[14–06]	**Recommendation** by ICCAT on shortfin mako caught in association with ICCAT fisheries	3 June 2015	Active
[15–06]	**Recommendation** by ICCAT on porbeagle caught in association with ICCAT fisheries	4 June 2016	Active
[16–12]	**Recommendation** by ICCAT on Management Measures for the Conservation of Atlantic Blue Shark Caught in Association with ICCAT Fisheries		Replaced by [19–07]
[16–13]	**Recommendation** by ICCAT on Improvement of Compliance Review of Conservation and Management Measures regarding Sharks Caught in Association with ICCAT Fisheries		Replaced by [18–06]
[17–08]	**Recommendation** by ICCAT on the conservation of North Atlantic stock of shortfin mako caught in association with ICCAT fisheries		Replaced by [21–09]
[18–06]	**Recommendation** by ICCAT to replace Recommendation 16-13 on improvement of compliance review of conservation and management measures regarding sharks caught in association with ICCAT fisheries	21 June 2019	Active
[19–01]	**Recommendation** by ICCAT on fishes considered to be tuna and tuna-like species or oceanic, pelagic, and highly migratory elasmobranchs	20 June 2020	Active

Resolution/ Recommendation	Title	Entered into force	Status
[19–07]	**Recommendation** by ICCAT amending the recommendation 16-12 on management measures for the conservation of the North Atlantic blue shark caught in association with ICCAT fisheries	20 June 2020	Active
[19–08]	**Recommendation** by ICCAT on management measures for the conservation of South Atlantic blue shark caught in association with ICCAT fisheries	20 June 2020	Active
[21–09]	**Recommendation** by ICCAT on the conservation of the North Atlantic stock of shortfin mako caught in association with ICCAT fisheries	17 June 2022	Active
[21–10]	**Recommendation** by ICCAT amending Recommendation 19-07 amending the recommendation 16-12 on management measures for the conservation of the North Atlantic blue shark caught in association with ICCAT fisheries	17 June 2022	Active
[21–11]	**Recommendation** by ICCAT amending recommendation 19-08 on management measures for the conservation of South Atlantic blue shark caught in association with ICCAT fisheries	17 June 2022	Active
[22–11]	**Recommendation** by ICCAT on the conservation of the South Atlantic stock of shortfin mako caught in association with ICCAT fisheries		In effect by June 2023

[95–02]: Resolution by on cooperation with the Food and Agriculture Organization of the United Nations (FAO) with regard to study on the status of stocks and by-catches of shark species

This Resolution focuses on collecting biological and statistical information regarding shark bycatch within the Convention area, in alignment with Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Resolution: Status of International Trade in Shark Species (Resolution Conf. 9.17).

[03–10]: Resolution by ICCAT on the shark fishery

Encourages all CPCs to provide all available data pertaining to shark catches, effort by gear type, landings, and trade of shark products to the Commission, as well as implement FAO's International Plan of Action (IPOA) for the Conservation Management of Sharks.

[04–10]: Recommendation by ICCAT concerning the conservation of sharks caught in association with fisheries managed by ICCAT

Species specified in [04–10]:

Blue Shark (*P. glauca*)

Shortfin Mako (*I. oxyrinchus*)

Recommends all CPCs to: provide Task I and Task II data on sharks as per ICCAT data reporting procedures (see below information on Tasks); vessels fully utilize their shark catches; onboard shark fins to be <5% of total onboard shark weight; bans the retention, transhipment, and landing of fins in contravention of this Recommendation; if possible, release sharks caught as bycatch alive and unharmed, especially juveniles; identify selective gears and shark nursery areas.

Additionally, the Commission committed to providing support to CPCs in data collection and the. SCRS was mandated to assess and reassess Shortfin Mako and Blue Shark stocks, respectively.

Task I catch statistics:
Nominal annual catch of tuna, tuna-like species, and sharks, by region, gear, flag and species, and where possible, by EEZ and High Seas. Catches should be reported in kilograms, round (live) weight.

Task I fleet characteristics:
Number of fishing vessels by size classes, gear and flag.

Task II catch and effort statistics:
Catch and effort statistics by area, gear, flag, species and by month.

Task II size data:
Actual size frequencies of fish sampled by area, gear, flag, species and by month and by sex if possible.

Full utilization:
Retention by the fishing vessel of all parts of the shark except head, guts, and skins, to the point of first landing

[07–06]: Supplemental Recommendation by ICCAT concerning sharks

Species specified in [07–06]:

Porbeagle (*L. nasus*)

Shortfin Mako (*I. oxyrinchus*)

Enforces CPCs to provide Task I and Task II data on shark-targeted activities; reduce overall fishing and research biological and statistical data on Porbeagles and North Atlantic Shortfin Makos; consider area and time closures, or other conservation methods.Furthermore, the SCRS was mandated to conduct a stock assessment on Porbeagles and suggest management advice accordingly.

[09–07]: Recommendation by ICCAT on the conservation of thresher sharks caught in association with fisheries in the ICCAT Convention Area

Species specified in [09–07]:

Bigeye Thresher (*A. superciliosus*)

Common Thresher (*A. vulpinus*)

Prohibits the retention, transhipment, landing, storage, selling parts of or whole Bigeye Thresher Sharks (except Mexican small-scale fisheries with an allowance of up to 110 individuals). Plus, if possible, release of Bigeye Threshers alive and unharmed; strongly discourages targeting while encouraging research on thresher sharks.

[10–06]: Recommendation by ICCAT on Atlantic shortfin mako sharks caught in association with ICCAT fisheries

Species specified in [10–06]:

Shortfin Mako (*I. oxyrinchus*)

CPCs that do not report Task I data for Shortfin Makos are prohibited from retaining them until submitted to SCRWS.
The SCRS is to also conduct a stock assessment for Shortfin Makos and develop an identification guide to share among CPCs.

[10–07]: Recommendation by ICCAT on the conservation of oceanic whitetip shark caught in association with fisheries in the ICCAT Convention Area

Species specified in [10–07]:

Oceanic Whitetip Shark (*C. longimanus*)

Prohibits the retention, transhipment, landing, storage, selling parts of or whole Oceanic Whitetips.
Plus, CPCs are to record the number of dead or alive Oceanic Whitetips discarded or released.

[10–08]: Recommendation by ICCAT on hammerhead sharks (family Sphyrnidae) caught in association with fisheries managed by ICCAT

Species specified in [10–08]:

Scalloped Bonnethead (*S. corona*)
Carolina Hammerhead (*S. gilberti*)
Scalloped Hammerhead (*S. lewini*)
Scoophead Shark (*S. media*)
Great Hammerhead (*S. mokarran*)
Smalleye Hammerhead (*S. tudes*)
Smooth Hammerhead (*S. zygaena*)

Prohibits the of retention, transhipment, landing, storage, selling parts of or whole hammerheads (Sphyrnidae family) excluding Bonnethead Shark (*S. tiburo*); and encourages release of hammerheads alive, if possible. However, hammerheads caught for local consumption are exempted from this Recommendation if Task I (and preferably Task II as well) data are reported. Plus, CPCs are to record the number of dead or alive hammerheads discarded or released; collect biological and statistical data on hammerheads; and support capacity building efforts for this Recommendation.

[11–08]: Recommendation by ICCAT on the conservation of silky sharks caught in association with ICCAT fisheries

Species specified in [11–08]:

Silky Shark (*C. falciformis*)

Prohibits the retention, transhipment, landing, storage, selling parts of or whole Silky Sharks. However, Silky Sharks caught for local consumption are exempted from this Recommendation, if Task I (and preferably Task II as well) data are reported. Plus, if the CPC's domestic law requires that all dead fish to be landed then the prohibition does not apply, but fishers are banned from selling dead Silky Sharks commercially. CPCs are to record the number of dead or alive Silky Sharks discarded or released, as well as release individuals caught as bycatch, alive, if possible.

The SCRS are to improve data collection plans submitted by CPCs, evaluate reported Silky Shark mortalities and suggest management measures accordingly.

[13–10]: Recommendation on biological sampling of prohibited shark species by scientific observers

Certain shark species prohibited to be retained onboard in other Recommendations, may have biological samples collected by scientific observers/authorised individuals under the following conditions: sharks were dead at haul back; it is for research approved by the SCRS; samples are retained until the port of landing or transhipment; and the authorised chartering CPC and flag state CPC must accompany all samples until landed or transhipped, and cannot be marketed or sold. Furthermore, the results of the research project are to be shared with the SCRS for review.

[14–06]: Recommendation by ICCAT on shortfin mako caught in association with ICCAT fisheries

Species specified in [14–06]:

Shortfin Mako (*I. oxyrinchus*)

Requires CPCs to improve reporting system for Task I and II data on Shortfin Makos; to report actions taken domestically towards their conservation; conduct research on Shortfin Mako's biology and ecology.
Moreover, the SCRS is to prepare a stock assessment for Shortfin Makos.

[15–06]: Recommendation by ICCAT on porbeagle caught in association with ICCAT fisheries

Species specified in [15–06]:

Porbeagle (*L. nasus*)

Requires CPCs to release Porbeagles alive and unharmed to the extent possible; collect Task I and II data; provide the number of Porbeagles discarded or released and their status (dead or alive). Additionally, encourages CPCs to monitor and research Porbeagle's biology and ecology.

[18–06]: Recommendation by ICCAT to replace Recommendation 16–13 on improvement of compliance review of conservation and management measures regarding sharks caught in association with ICCAT fisheries

Requires CPCs to submit details regarding their compliance to ICCAT's shark conservation measures along with their Annual Reports in a Shark Implementation Check Sheet (available for download here); unless there have been no changes from the previous year and is noted in the Annual Report or vessels flying their flag are unlikely to catch sharks. Additionally, only updates are to be submitted after the first submission.

[19–01]: Recommendation by ICCAT on fishes considered to be tuna and tuna–like species or oceanic, pelagic, and highly migratory elasmobranchs

Species specified in [19–01]:

Silky Shark (*C. falciformis*)
Galapagos Shark (*C. galapagensis*)
Oceanic Whitetip Shark (*C. longimanus*)
Blue Shark (*P. glauca*)
Scalloped Hammerhead (*S. lewini*)
Great Hammerhead (*S. mokarran*)
Smooth Hammerhead (*S. zygaena*)
Bigeye Thresher (*A. superciliosus*)
Common Thresher (*A. vulpinus*)
Basking Shark (*C. maximus*)
White Shark (*C. carcharias*)
Shortfin Mako (*I. oxyrinchus*)
Longfin Mako (*I. paucus*)
Porbeagle (*L. nasus*)
Crocodile Shark (*P. kamoharai*)
Pelagic Stingray (*P. violacea*)
Reef Manta Ray (*M. alfredi*)
Oceanic Manta Ray (*M. birostris*)
Atlantic Pygmy Devil Ray (*M. hypostoma*)
Spinetail Devil Ray (*M. mobular*)
Sicklefin Devil Ray (*M. tarapacana*)
Bentfin Devil Ray (*M. thurstoni*)
Whale Shark (*R. typus*)

From 20 June 2020 onwards, the term "elasmobranchs that are oceanic, pelagic, and highly migratory" refers to the species mentioned above

[19–07]: Recommendation by ICCAT amending the recommendation 16–12 on management measures for the conservation of the North Atlantic blue shark caught in association with ICCAT fisheries

Species specified in [19–07]:

North Atlantic Blue Shark (*P. glauca*)

Established a total annual catch (TAC) of 39,102 t (32,578 t, 4,010 t, and 1,644 t for EU, Japan, and Morocco, respectively) for North Atlantic Blue Sharks. Any CPC vessel catching North Atlantic Blue Sharks are to provide Task I and II data, as well as fill in the Shark Implementation Check Sheet for Blue Sharks. Furthermore, it encourages CPCs to conduct research on the biology and ecology of North Atlantic Blue Sharks to support SCRS's stock assessment.

[19–08]: Recommendation by ICCAT on management measures for the conservation of South Atlantic blue shark caught in association with ICCAT fisheries

Species specified in [19–08]:

South Atlantic Blue Shark (*P. glauca*)

Established a total annual catch (TAC) of 28,923 t for South Atlantic Blue Sharks. Any CPC vessel catching South Atlantic Blue Sharks are to provide Task I and II data, as well as fill in the shark implementation check sheet for Blue Sharks. Furthermore, it encourages CPCs to conduct research on the biology and ecology of South Atlantic Blue Sharks to support SCRS's stock assessment.

[21–09]: Recommendation by ICCAT on the conservation of the North Atlantic stock of shortfin mako caught in association with ICCAT fisheries

Species specified in [21–09]:

Shortfin Mako (*I. oxyrinchus*)

Rebuilding Programme

CPCs implement the rebuilding programme for North Atlantic Shortfin Makos starting 2022, by prohibiting the retention, transhipment, landing, storage, selling parts of or whole of Shortfin Makos in 2022–2023. Overall fishing mortality of North Atlantic Shortfin Makos cannot exceed 250 tonnes. However, Shortfin Makos may be retained by individual CPCs based on SCRS' Retention Allowance. Plus, requires the shark to be dead at haul back with an observer or functioning electronic monitoring system (EMS) onboard. If the Retention Allowance is exceeded, the CPC's allowance is reduced the following year equal to the exceeded number.

Safe handling and release

CPCs are required to implement safe handling and release procedures for Shortfin Makos, to the extent possible.

General recommendations for all fisheries:

- If operationally safe to do so, stop the vessel or substantially reduce its speed.
- When entangled (in netting, fishing line, etc.), if safe to do so, carefully cut the net/line free from the animal and release to the sea as quickly as possible with no entanglements attached.
- Where feasible, and while keeping the shark in the water, try to measure the length of the shark.
- To prevent bites, place an object, such as a fish or big stick/wooden pole, in the jaw.
- If, for whatever reason, a shark must be brought on the deck then minimise the time it takes to return it to the water to increase sur vival and reduce risks to the crew.

Longline fisheries specific safe-handling practices:

- Bring the shark as close to the vessel as possible without putting too much tension on the branch line to avoid that a released hook or branch line break could shoot hook, weights and other parts toward the vessels and crew at high speed.
- Secure the far side of the longline mainline to the boat to prevent any remaining gear in the water from pulling on the line and the animal.
- If hooked, and the hook is visible in the body or mouth, use a dehooking device or long-handled bolt cutter to remove the hook barb, and then remove the hook.
- If it is not possible to remove the hook or the hook cannot be seen, cut the line of the trace (or snood, leader) as close to the hook as possible (ideally leaving as little line and/or leader material as possible and no weights attached to the animal).

Purse seine fisheries specific safe-handling practices:

- If in purse seine net: Scan the net as far ahead as possible to spot the sharks early to react quickly. Avoid lifting them up in the net towards the power block. Reduce vessel speed to slacken the tension of the net and allow the entangled animal to be removed from the net. If necessary, use clippers to cut the net.
- If in brail or on deck: Use a purpose-built large-mesh cargo net or canvas sling or similar device. If the vessel layout allows, these sharks could also be released by emptying the brail directly on a hopper and release ramp held up at an angle that connects to an opening on the top deck railing, without need to be lifted or handled by the crew.

DO NOT (all fisheries):

- To the greatest extent practicable, do not lift sharks from the water using the branch line, especially if hooked unless it is necessary to lift sharks for species identification.
- Lift sharks using thin wires or cables, or by the tail alone.
- Strike a shark against any surface to remove the animal from the line.
- Attempt to dislodge a hook that is deeply ingested and not visible.
- Try to remove a hook by pulling sharply on the branch line.
- Cut the tail or any other body part.
- Cut or punch holes through the shark.
- Gaff or kick a shark, or insert hands into the gill slits.
- Expose the shark to the sun for extended periods.
- Wrap your fingers, hands or arms in the line when bringing a shark or ray to the boat (may result in serious injury).

Useful tools for safe handling and release:

- Gloves (shark skin is rough; ensures safe handling of shark and protects crew's hands from bites)
- Towel or cloth (a towel or cloth soaked in seawater can be placed on the eyes of the shark; used to calm sharks down)
- Dehooking devices (e.g., pig tail de-hooker, bolt or plier cutters)
- Shark harness or stretcher (if needed)
- Tail rope (to secure a hooked shark if it needs to be removed from the water)
- Saltwater hose (If anticipated that it may require more than five minutes to release a shark, then place a hose into its mouth so seawater is moderately flowing into it. Make sure deck pump has been running several minutes before placing it in a shark's mouth)
- Measuring device (e.g., mark a pole, leader and float, or a measuring tape)
- Data sheet for recording all catch.
- Tagging gear (if applicable)

Reporting
Additionally, CPCs are to fill the Shark Implementation Check Sheet reporting how this Recommendation is being implemented. CPCs are also required to record the number of Shortfin Makos caught, landed, discarded, and released monthly. CPCs that recorded catching over one tonne of *I. oxyrinchus* between 2018–2020, and have artisanal and/or small-scale fisheries, are to provide their discard and release estimation methods, Task I and II data to the SCRS.

Biological sampling and observer coverage
CPCs are encouraged to increase observer coverage on longline vessels that may interact with Shortfin Makos. Additionally, biological samples may be collected, provided it complies with Recommendation by ICCAT on biological sampling of prohibited shark species by scientific observers (Rec. 13-10).

Scientific and research activities
Along with biological and ecological information, CPCs are encouraged to investigate at vessel and post-release mortality. Furthermore, the SCRS will launch a pilot project on the effectiveness of using mini data loggers on longlines; review reported landings, discards and releases; explore mitigation measures; and write a stock assessment for Shortfin Makos.

[21–10]: Recommendation by ICCAT amending Recommendation 19–07 amending the recommendation 16–12 on management measures for the conservation of the North Atlantic blue shark caught in association with ICCAT fisheries

Species specified in [21–10]:

North Atlantic Blue Shark (*P. glauca*)

Amended Recommendation 19–07 to allow the European Union (EU) to transfer 32.58 tonnes from is catch limit in 2022 to the United Kingdom (UK).

[21–11]: Recommendation by ICCAT amending recommendation 19–08 on management measures for the conservation of South Atlantic blue shark caught in association with ICCAT fisheries

Species specified in [21–11]:

South Atlantic Blue Shark (*P. glauca*)

Amended Recommendation 19–08 to permit revision of the annual TAC based on the advice of the SCRS by 2022 and at latest 2023, instead of the previous 2021 deadline.

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Photo by Hannes Klostermann | Ocean Image Bank | theoceanagency.org

Castello's Apron Numbfish

Discopyge castelloi

Alexandra Morata

IUCN SSC Shark Specialist Group | Programme Officer

Shark Spotlight

In: Menni et al. 2008. *Discopyge castelloi* sp. nov. holotype.

Taxonomy

The order Torpediniformes includes 68 valid species from 15 genera and five families: Platyrhinidae (fanrays), Narkidae (sleeper rays), Narcinidae (numbfish), Hypnidae (coffin ray), and Torpedinidae (torpedo rays).

Discopyge castelloi Menni, Rincón & García, 2008, commonly known as the Castello's Apron Numbfish, belongs to the family Narcinidae and is one of two species in the *Discopyge* genus. The name is derived from the name "H. P. Castello", who had suggested to the authors that it may be a new species.

Morphology

Castello's Apron Numbfish is light brown or olive green in colour, with a white underside. It reaches a maximum size of 31 cm total length (TL). Castello's Apron Numbfish appears similar to the Apron Numbfish (*D. tschudii*), the only other *Discopyge* species, both of which occur in southwest Argentinian waters. The distinct features that Castello's Apron Numbfish have is their long, 'heart-shaped' disk; shorter and more posterior pelvic fins compared to the Apron Numbfish; and an angular caudal fin. Furthermore, *D. castelloi* is morphologically similar to *Benthobatis* spp. but differs in its small but visible eyes, which are as large as its spiracles, in addition to its relatively greater number of exposed teeth.

Distribution and Range

Castello's Apron Numbfish is presently known from along the inner continental shelf of Argentina (at depths between 35–56 m), from Necochea, Buenos Aires, to Camarones, Chubut. However, given the rare records from coastal trawlers from the Argentinian fleet, the species may be occupying lower depths.

Conservation measures and IUCN Red List status

Castello's Apron Numbfish was assessed as Data Deficient (DD) on the IUCN Red List of Threatened Species™ because of the limited information on its ecology and the potential impact of fishing on its populations. Coastal trawlers occasionally catch *D. castelloi*; however, given the rarity of catches, it is unclear how these fisheries might be impacting numbfish.

Currently, due to its DD status, there are no management measures or species-specific protections in place for this species

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Photo: The Ocean Agency | Ocean Image Bank

The Impacts of Habitat Degradation and Loss on Sharks and Rays

Dr. Simon J. Pierce

A mangrove and seagrass-lined bay in Raja Ampat, Indonesia

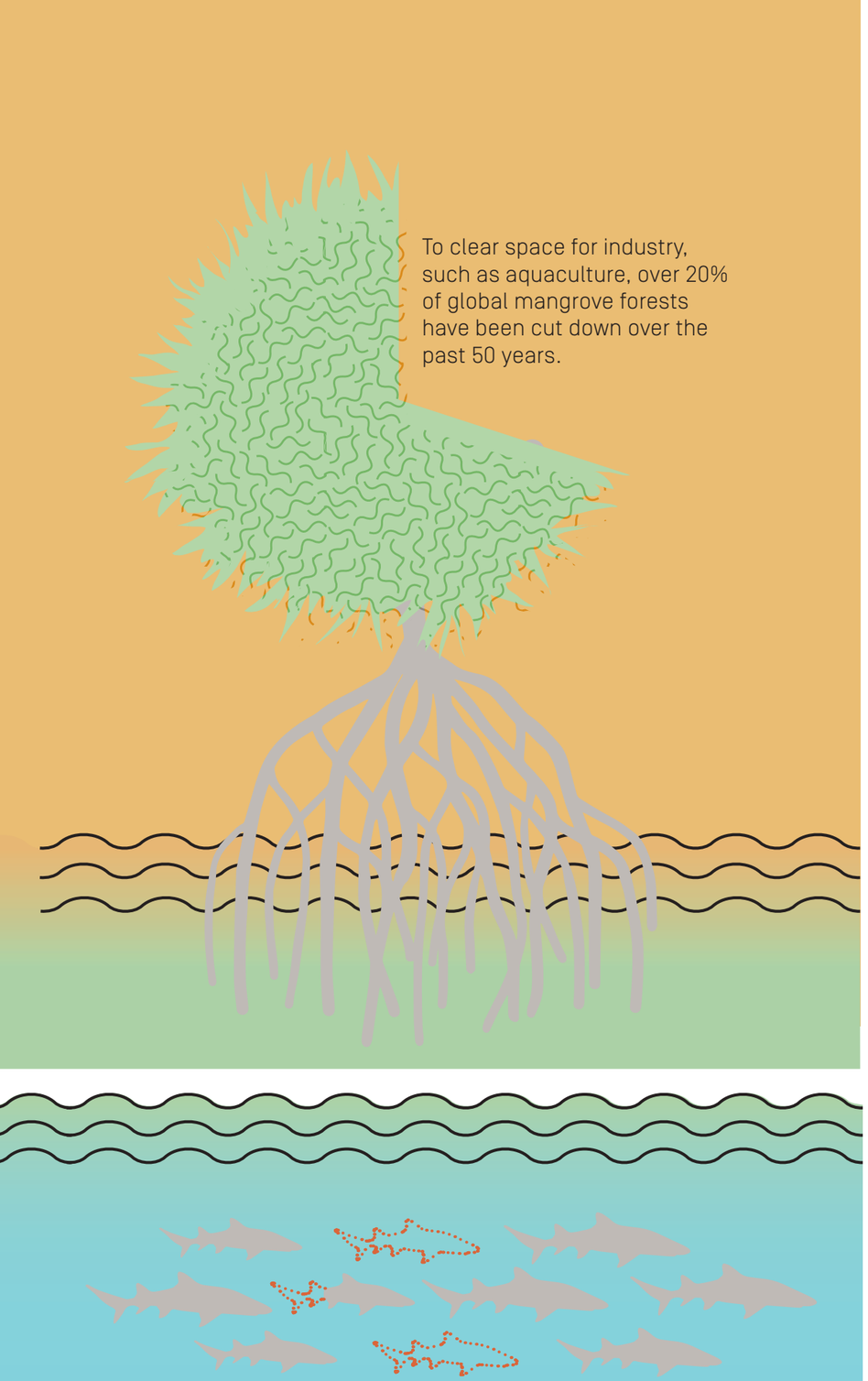
Habitat Degradation and Loss: ‘The elimination or alteration of the conditions necessary for animals and plants to survive.’

Sharks, rays, and their relatives live throughout the world's marine and freshwater systems, from the Arctic Ocean to the Zambezi River in Africa. Most are virtually unknown to us, with some living down to 3,000 m (1.86 miles) beneath the surface – many of the 1,250+ species have never even been seen alive in their natural habitats. Others, though, are much more familiar. People have been using coastal seas and freshwater areas for millennia and have a long history of interactions with the sharks and rays that also depend on these habitats to provide sheltered nursery grounds, feeding areas, and reproductive sites.

Habitat degradation and loss can occur through many human-driven processes such as mangrove deforestation, dam construction, or nets uprooting coral and seagrass communities. These damaged ecosystems become less resilient to change, and their reduced productivity means they can support fewer species and a lower abundance of life. As our populations continue to increase over the next century, and industry activities steadily move into deeper waters, it is vital that we understand how human-induced changes have, and will, affect sharks and rays.

This fact sheet provides an overview of how habitat modification can disrupt the lives of sharks and their relatives, particularly those listed on the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and the Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU), and how we can get better at sharing space with these amazing fishes.

Eagle Ray in seagrass (*Thalassia testudinum*),
Quintana Roo, Mexico
Ben Jones | Ocean Image Bank



To clear space for industry, such as aquaculture, over 20% of global mangrove forests have been cut down over the past 50 years.

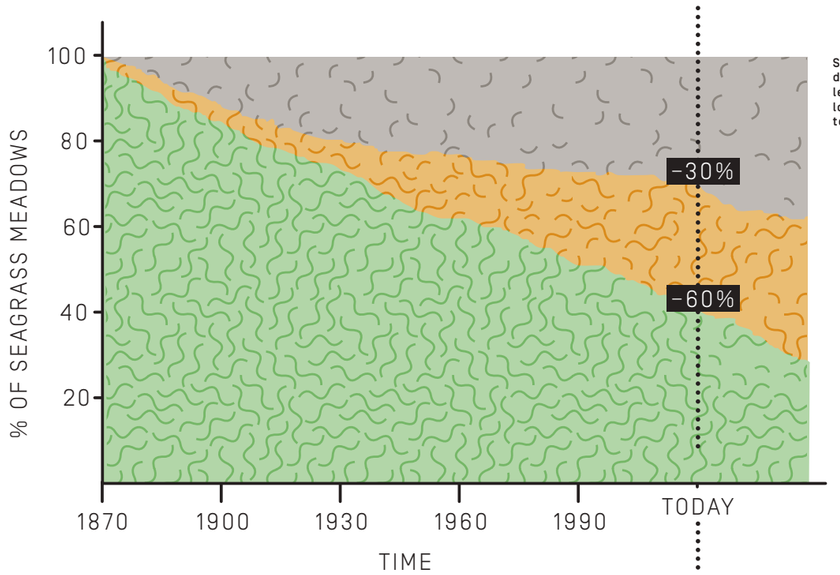
Construction of a large resort complex in the 1990s, involving substantial dredging and mangrove clearance, led to a 23% decline in the first-year survival of Lemon Shark pups.

Mangrove Forests and Seagrass Meadows

Many ocean-dwelling sharks and rays rely on shallow bays and estuaries as nurseries for their pups. These are among the most productive environments on the planet, providing a seafood buffet for these trainee predators. Critically, mangroves and shallow bays also provide the small pups with a refuge from larger hunters. These coastal areas are also great places for people to live and work. To clear space for industry, such as aquaculture, agriculture, plantations, and coastal development, as well as exploitation for timber and fuel wood, an estimated 20% (3.6 million hectares) of global mangrove forests have been cut down between 1980 and 2005. Siltation from degraded rivers and dredging chokes shallow seagrass beds, leading to an almost 30% global loss of seagrass meadows from the 1870s to the present.

These human impacts can tip the delicate balance that young sharks face: to find food, while not becoming food themselves. Lemon Sharks (*Negaprion brevirostris*) in the Bimini Islands, Bahamas, are probably the world's best-studied shark population. Construction of a large resort complex in the 1990s, involving substantial dredging and mangrove clearance, led to a 23% decline in the first-year survival of Lemon Shark pups. The loss of mangroves reduced the escape routes for these small sharks, while the siltation of seagrass beds simultaneously meant there were fewer fish for them to hunt.

Built structures can also affect sharks and rays, both directly and indirectly. The southeast Florida coast in the USA is a nursery area for young Giant Manta Rays (*Mobula* cf. *birostris*). The number of people living in Florida has increased rapidly, 262% from 1960 to 2008, with three quarter of residents living along the coast. To accommodate leisure and commercial access to the ocean, the construction of piers and marinas has increased boat traffic and fishing pressure. Recent surveys found that 46% of these small manta rays bear wounds, most from propeller strikes and fishing gear entanglement. Manta rays typically have just a single pup every 4–5 years, so reduced survival of these baby rays can quickly lead to a population crash.



Siltation from degraded rivers and dredging chokes shallow seagrass beds, leading to an almost 30% worldwide loss of seagrass meadows from the 1870s to the present.

Rivers and Lakes

About 5% of all shark and ray species live in, or regularly enter tropical rivers and lakes. Many of these are rays, including the Largetooth Sawfish (*Pristis pristis*) and the beautifully patterned South American freshwater stingrays (family Potamotrygonidae). Some sharks also use rivers, particularly River Sharks (*Glyphis* spp.) and Bull Sharks (*Carcharhinus leucas*), who often spend the first few years of life in freshwater.

Freshwater provides us with a critical resource for drinking, bathing, transport, agriculture, fisheries, and energy generation. While some freshwater systems are enormous, such as the Amazon and the Ganges rivers, human pressures can still have an outsized impact on the fish that live there. Flow controls have been imposed on many large rivers to provide safe and predictable access for people; this affects freshwater rays and sharks, who rely on seasonal rainfall and the natural flooding cycle to move within and between rivers.

As an example, the Fitzroy River in northwestern Australia is an important nursery area for Largetooth Sawfish. Adults give birth near the river mouth, and the young pups then swim 300–400 km up the river during floods, finding a safe home in the isolated pools that form in the upper river during the dry season. In an unfortunate comparative study, dam construction in the nearby Ord River has led to the ecological extinction of this Critically Endangered species. Reduced access to suitable riverine nursery areas is a key limiting factor for the five species of sawfishes (family Pristidae), which are now believed to be extinct in 55 countries where they were historically found.

Similarly, the Ganges Shark (*Glyphis gangeticus*) lives in the large rivers that meander down from Asia to the Indian Ocean. The Ganges river basin, which the species is named for, is home to more than 400 million people. The dense human population creates chronic threats, such as fishing pressure and pollution, which – along with the large dams in the river – have led to the extinction of the Ganges Shark in its namesake habitat. In other large rivers that once provided suitable habitat, such as the Indus River in Pakistan, there are four large dams and 22 barrages, with more proposed. The adult population of the Ganges Shark is now estimated to be in the low hundreds, scattered across a historical distribution that extends from Borneo to the Arabian Sea, with habitat loss isolating them from one another and making it harder to find a mate.

Pallam village surrounded by mangroves in East Godavaridistrict | Srikanth Mannepuri | Ocean Image Bank

Freshwater Stingray in the Peruvian Amazon region | Anton Sorokin

Seabeds and Coral Reefs

The relative accessibility of freshwater and coastal marine environments, and the obvious human impact on these habitats, means these areas have been a natural focus of shark and ray research. Other impacts can be tougher for us to see during day-to-day life, but research is helping to make their importance clear.

A good example is bottom trawl fishing which is, by far, the largest source of physical disturbance to the marine environment. Aside from actually catching sharks, rays, and ghost sharks (chimaeras), these weighted nets can literally flatten whole ecosystems when dragged across reefs, deep-sea corals, or sponge beds. Many sharks, such as catsharks (*Apristurus* spp.), have sticky eggs that they attach to deepwater corals and sponges while the embryo can develop safely inside. The devastation of these habitats, which can take decades or more to recover, even if not disturbed again, multiplies the population loss of susceptible shark and ray species. Demersal species, such as Angelsharks (*Squatina squatina*), can be particularly affected by the impacts of bottom trawling on their habitat and prey, with this Critically Endangered species now locally common only in the Canary Islands, where trawl fishing has been banned since 1986. Habitat loss and degradation compound the overfishing risk for 73 threatened shark and ray species.

Tropical coral reefs and reef flats have also been hard-hit by both direct and indirect human impacts. Many species rely on these productive ecosystems, including reef specialists like the walking sharks. Some of these little sharks, such as Michael's Epaulette Shark (*Hemiscyllium michaeli*) from Papua New Guinea, are restricted to a relatively small part of this biodiverse coast. Degradation of their reef flat habitat by road construction, and land conversion for palm oil – both of which increase sedimentation, smothering their shallow reef habitat – have affected about 20% of the species' range over just the past 10 years. In Tanzania, which has severely depleted reef shark populations, passive acoustic monitoring of dynamite fishing on coral reefs has detected over 1,000 blasts per month until official enforcement targeted this illegal method in 2017–2018. Climate change, and associated coral bleaching events, are creating chronic stress on reef ecosystems. There was progressive loss amounting to 14% of the coral from the world's coral reefs between 2009–2018, which is more than all the coral currently living on Australia's coral reefs. Human pressures on coral reefs across the world are reducing both the quantity and quality of habitat available. Even for widespread reef shark species, this can lead to the decline and fragmentation of their populations.

Blacktip Reef Sharks (*Carcharhinus melanopterus*) on coral reef flat in French Polynesia
Hannes Klostermann | Ocean Image Bank

Looking forward

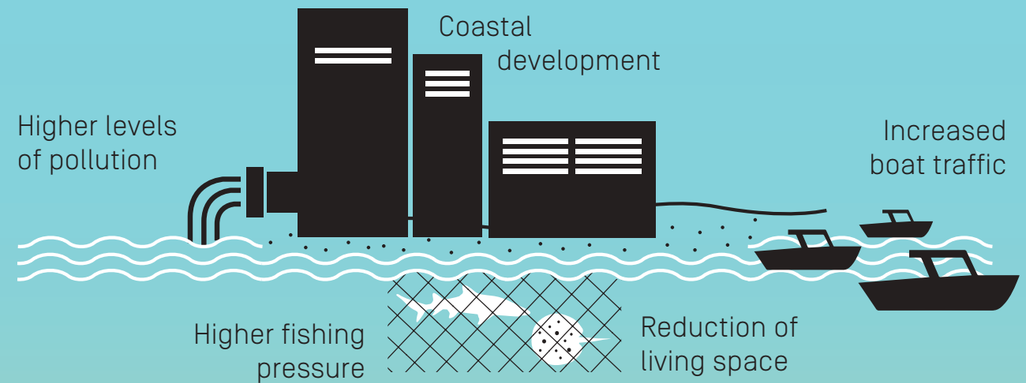
Habitat degradation and loss can, in a frighteningly short amount of time, permanently reduce the available space that sharks and their relatives have to live in. That is particularly tough to deal with for habitat specialists, such as freshwater rays and sharks, and those that have a naturally small distribution. Dietary specialists, such as the Bonnethead Shark (*Sphyrna tiburo*), which has recently been identified as the first omnivorous shark – seagrass makes up an estimated 62% of its juvenile diet, by gut content mass, and up to 40% in adult sharks – may also be at elevated risk.

The species whose range overlaps with dense human populations are disproportionately likely to be threatened. Some are now Critically Endangered, facing a high risk of global extinction. Individual records of Angelsharks in the Mediterranean Sea, sawfishes outside Australia and the USA, or any Ganges Shark occurrence, for example, are often now noteworthy enough for scientists to publish them – a recognized identifier of ecological extinction. For these species, they will clearly be helped by specific measures such as safeguarding natural river flows, fulfilling the CMS mandate to prevent obstacles to the migration of listed species.

Habitat loss is highly correlated with other human pressures. Coastal development is associated with higher levels of pollution, more fishing pressure, and increased boat traffic. Floodplain conversion to agricultural land generally leads to increased siltation, along with pesticide and fertilizer runoff, which in turn affects coral reefs, that are themselves simultaneously impacted by overfishing and climate change. Rather than trying to separate out and address all these issues separately, a recent initiative by the IUCN SSC Shark Specialist Group seeks to identify the world's most 'Important Shark and Ray Areas - ISRAs'. Management and conservation efforts can then focus on the specific areas that are most important to the life cycle of sharks and their relatives, including the most threatened species and those listed on CMS, to maximize the positive impact of protection and restoration.

For all the ocean wildlife that use human- modified areas during part of their lifecycle, which includes most of the world's sharks and rays, preserving and restoring their habitats will speed their recovery from overfishing, and improve their resilience to other challenges. Everyone benefits from healthy oceans, and that means we need to provide space for other animals to thrive alongside people.

Habitat degradation and loss can permanently reduce the available space that sharks and their relatives have to live in. That is particularly tough to deal with for habitat specialists, such as freshwater rays and sharks, and those that have a naturally small distribution.



Habitat loss is highly correlated with other human pressures. Coastal development is associated with higher levels of pollution, more fishing pressure, and increased boat traffic.

Further reading

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Where Land Meets Sea: The Intertidal as an Important Habitat for Sharks and Rays

Guido Leurs

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IUCN SSC Shark Specialist Group | Africa regional member

In a new scientific study, researchers from the University of Groningen and the Royal Netherlands Institute for Sea Research (NIOZ) concluded that intertidal areas are more important for sharks and rays than previously thought. This research was published in February in the scientific journal *Fish and Fisheries*. The researchers found that intertidal areas – previously mainly studied for their importance to (migratory) shorebirds – provide important feeding and nursery habitats for a range of threatened shark and ray species. The study highlighted that it is, therefore, even more important to protect these vulnerable and highly dynamic coastal areas on a global scale, not only for their ecological importance to migratory shorebirds.

Intertidal flats and biodiversity

Intertidal areas are highly dynamic areas continuously influenced by the change of tide. Intertidal habitats (e.g., mudflats, intertidal reef flats) are exposed at low tide and are submerged by water again during high tide. Intertidal areas are known for their ecological richness, with a high richness and abundance of species. The areas are rich in benthic organisms such as bivalves, polychaetes, crustaceans, and fish. This, in turn, attracts large numbers of migratory shorebirds for which, for example, the Wadden Sea (Netherlands, Germany, Denmark) and the Banc d'Arguin (Mauritania) are well known. These birds use intertidal areas as stopover sites to refuel during their long migration or to stay during the boreal winter period. So far, the ecology of intertidal areas worldwide has mainly been studied from the perspective of these shorebirds, whereas these habitats are accessible to marine species when submerged. What happens on these intertidal flats during the high tide phase is less well understood. However, this new review on the intertidal habitat use of sharks and rays shows that these habitats may have an important role for elasmobranchs and vice versa.

Food and safety

The endless cycle of high and low tides in intertidal areas makes it a challenging environment for large marine animals such as sharks and rays. The study shows that intertidal areas are primarily used by small shark and ray species, as well as the early life stages of larger species such as hammerhead and requiem sharks. These species most likely use the intertidal zone as a refuge area to hide from larger conspecifics or other predatory species and to feed on the rich microbenthic communities in the substratum. However, this is not without risk: sharks and rays using these intertidal habitats during high tide risk being stranded once the tide retreats. Small species and young animals are more mobile than adult conspecifics and can move more easily between intertidal and subtidal waters. According to this study, the ecological role of sharks and rays in intertidal areas is currently underestimated. For example, rays can considerably change the intertidal landscape through their bioturbating and digging behaviour in search of potential prey. The 'ray pits' resulting from this behaviour provide microhabitats for benthic species during low tide and, therefore, also likely serve a role in birds' feeding behaviour. In addition, the researchers hypothesize that sharks and rays may be looking for the same prey species as the migratory waders and, therefore, indirectly interact through common food sources. During high tide, intertidal flats are accessible to rays feeding on bivalves, polychaetes and crust-

Link to paper: onlinelibrary.wiley.com/doi/10.1111/faf.12735

A tropical intertidal flat during the tidal change from low to high tide. These areas are essential for species like this neonate Blackchin Guitarfish (*Glaucostegus cemiculus*) | Photo by Rijksuniversiteit Groningen.

ceans. In contrast, during low tide, these same prey species are accessible to the migratory waders. The researchers continue to study these interactions and how these interactions may be influenced by the removal of sharks and rays from intertidal areas.

Threats

Currently, one-third of all shark and ray species are threatened with extinction globally; however, this number may be higher for species using intertidal areas. Of all 88 species confirmed in the study to use intertidal habitats, more than half are currently listed as threatened on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species™. The researchers describe that this is likely caused by overexploitation of these species. As some species may use the intertidal area only during certain life stages, others use these areas during their entire life cycle. These species are therefore exposed to both coastal fisheries occurring within these highly productive areas and industrial fisheries operating in deeper waters just outside these coastal areas. Additionally, intertidal areas are disappearing, which is a big problem for species that use these areas. According to a recent estimate, 16% of intertidal habitat globally has disappeared since 1984. As sharks and rays likely play an essential ecological role in these intertidal areas and these areas in the lifecycle of threatened shark and ray species, the study highlights the need for better protection of these important coastal areas. The researchers highlight that this is important not only for well-studied species, like shorebirds, but also to other predatory guilds like sharks, rays, and other fish species. As intertidal areas are often of great importance to local (fishing) communities for their cultural and economic values, collaboration with all stakeholders to safeguard the ecological integrity of these areas is essential.

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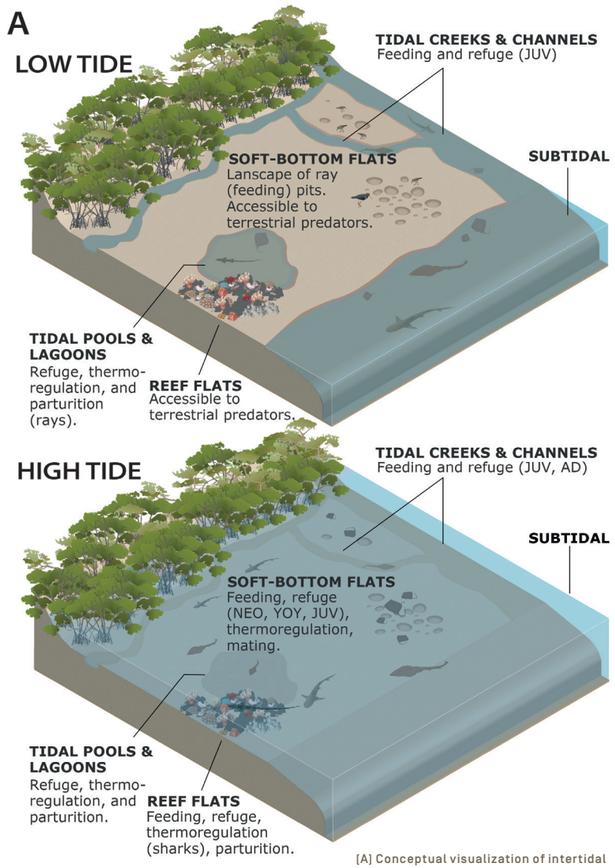
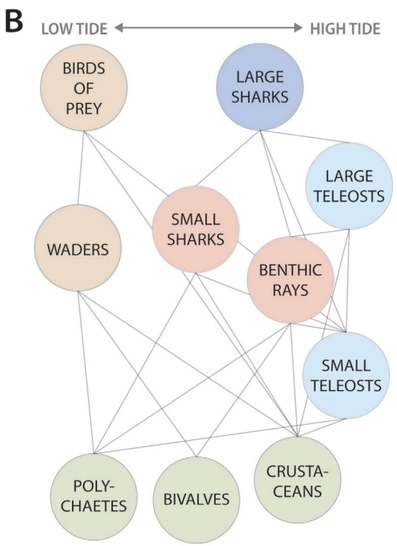
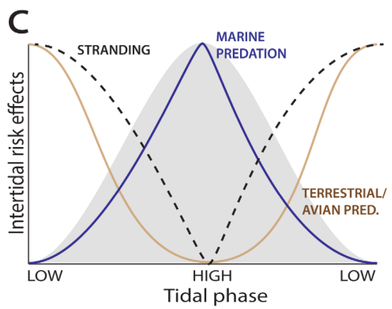


(A) Conceptual visualization of intertidal habitat use by elasmobranchs for both tidal phases, low tide (top) and high tide (bottom). (NEO = neonates, YOY = young-of-the-year, JUV = juveniles, AD = adults).





(B) Simplified intertidal food web consisting of intertidal prey species (green), low-tide predators (brown) and marine predators (elasmobranch meso-predators in red, elasmobranch top-predators in dark blue and teleosts in light blue).

(C) The risk-effects induced by intertidal predators, and the risk effect of stranding for marine predators. | In: Leurs et al. 2023

An imprint of a stingray as observed during low tide. Stingrays feed on intertidal flats during high tide, but their feeding activity is still visible during low tide. When stingrays occur in high densities, they can change the landscape of intertidal areas completely. | Photo by Rijksuniversiteit Groningen

Southern Stingray, St. Lucia

When Management Works: Conservation Success and Challenges for Sharks and Rays in Western Atlantic

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Photo by Gregory Piper | Ocean Image Bank | theoceanagency.org

Summary

One-third of all sharks and rays are threatened with extinction, and the paths to recovery remain challenging. We took advantage of a large-scale "Before–After Control–Impact" comparison to document successful recoveries in nine wide-ranging coastal shark species following the implementation of the United States (US) Fishery Management Plan for Sharks of the Atlantic Ocean. Through the analysis of the International Union for Conservation of Nature (IUCN) Red List of Threatened Species™ status of 26 wide-ranging coastal sharks and rays, and comparing the Northwest to the Southwest Atlantic, we show that extinction risk increased with fishing pressure but was offset by a proxy for the strength of management (National Plan of Action for Sharks). Well-enforced governance and science-based effective limits on fishing have prevented population collapses and reduced extinction risk for many species in the Northwestern Atlantic.

Background

The extent and degree of the global impact of fisheries on marine biodiversity remain poorly understood and highly contentious, with population declines going undetected, despite ongoing threats. Much of our understanding is heavily biased toward the most commercially important targeted fisheries, and thus usually well-studied (data-rich) in the developed world. We lack evidence of declines that we suspect are happening for several species that remain data-limited, hampering effective conservation and management, and making these species' populations susceptible to overexploitation.

The depletion of sharks and rays throughout most of the oceans is representative of the dire status of many other data-poor stocks in countries with low capacity or political will for fisheries management. Most of the species in the class chondrichthyes (1,250+ sharks, rays, and chimeras) are caught as opportunistic retention of incidental catch of more valuable targeted species. The majority of these are data-poor, with information gaps from life history and ecology to the absence of the most basic abundance data. As a result of this lack of basic data and overfishing, it is estimated that over one-third of all sharks and rays are driven toward a global extinction crisis.

A key question is whether we can halt declines and recover sharks and rays?

We take advantage of this Before–After Control–Impact natural experimental design to make an ecological inference about the effect of fisheries management. We analyzed trends in fishing pressure, fisheries management, and population status for all 26 wide-ranging coastal sharks and rays that occur from North to South in the Western Atlantic Ocean.

We found that populations in the Northwest Atlantic recovered following the implementation of the US Fishery Management Plan for Sharks of the Atlantic Ocean in 1993. This plan was developed in response to the intense expansion of commercial and recreational fisheries in the 1970s to 1980s due to the increased demand for shark meat, fins, and cartilage worldwide and concerns about their effects on shark populations. We showed that declines have been halted in three species, and six species of 11 are clearly rebuilding now. This recovery has been achieved by: (1) a developed regulation system that includes catch reporting requirements, aggregate- and species-specific quotas, catch prohibitions for some species, and a general reduction in the fishing effort (through numbers of vessels, permits, and trips in the US sharks fishery), with additional regulations when needed; associated with a (2) strong enforcement (US Coast Guard and Law Enforcement agencies for fishers in US waters); and a (3) continued and regular monitoring of fisheries.

In a spatial comparison, populations of the same pool of species (26 wide-ranging sharks and rays) collapsed in the Southwest Atlantic due to unrestrained fishing compared to the Northwest Atlantic. Across the Western Atlantic region, we showed that while fishing pressure increased extinction risk, the strength of management engagement is the widely overlooked factor that reduces extinction risk in the assemblage of all 26 wide-ranging coastal sharks and rays. Although the general picture appears better in the Western Central Atlantic than in the Southwest region, this pattern is mainly driven by the recent recovery in managed populations in the United States Gulf of Mexico and possible refuge in large areas of less fished habitat, such as The Bahamas, and the situation is still very concerning in most countries' waters. The spatial differences in the status of the Bonnethead Shark (*Sphyrna tiburo*) are a good example. Outside the good status in the United States (quota management), Mexico (seasonal closure), and The Bahamas (ban on commercial shark fishing 'shark sanctuary'), this species is captured in unregulated targeted fisheries and as retained incidental catch. Further south, this shark is likely subject to heavy unmanaged fishing pressure in most countries and is now very rare in Colombia. By comparison, in the Southwest Atlantic, this species is considered to have collapsed in Brazil, with few recent records. Ultimately, consistent reduction of fishing mortality to sustainable levels is essential to meet both biodiversity and sustainable development goals and targets. Our publication adds context to three challenges that need to be met to improve the status of shark and ray populations. A precautionary approach should be used to set fishing limits until species-specific population data are collected to set precise fishing limits and minimize socioeconomic costs. Nations must work together as many shark and ray species range widely, and successful conservation in one country can be undone by less regulated fishing areas outside those borders. As developed nations bring their fisheries into sustainability and import more fish, they should translate their successes into lessons and capacity building to support the transition to the sustainability of other nations.

Our findings provide hope that bending back the curve of overexploitation of fishes through halting and reversing declines and creating sustainable fisheries is possible even for wide-ranging sharks and rays with slow life histories, but this requires strong governance and management.

Acknowledgement section

Project Principal Investigators: Dr Nathan Pacoureau (Simon Fraser University), Dr John K. Carlson (National Marine Fisheries Service), Dr Holly K. Kindsvater (Virginia Tech), Dr Cassandra L. Rigby (James Cook University), and Dr Nicholas K. Dulvy (Simon Fraser University). This publication was supported by the Shark Conservation Fund, U.S. National Science Foundation, Natural Science and Engineering Research Council Discovery and Accelerator Awards and the Canada Research Chairs Program, and the Save Our Seas Foundation.

Figures

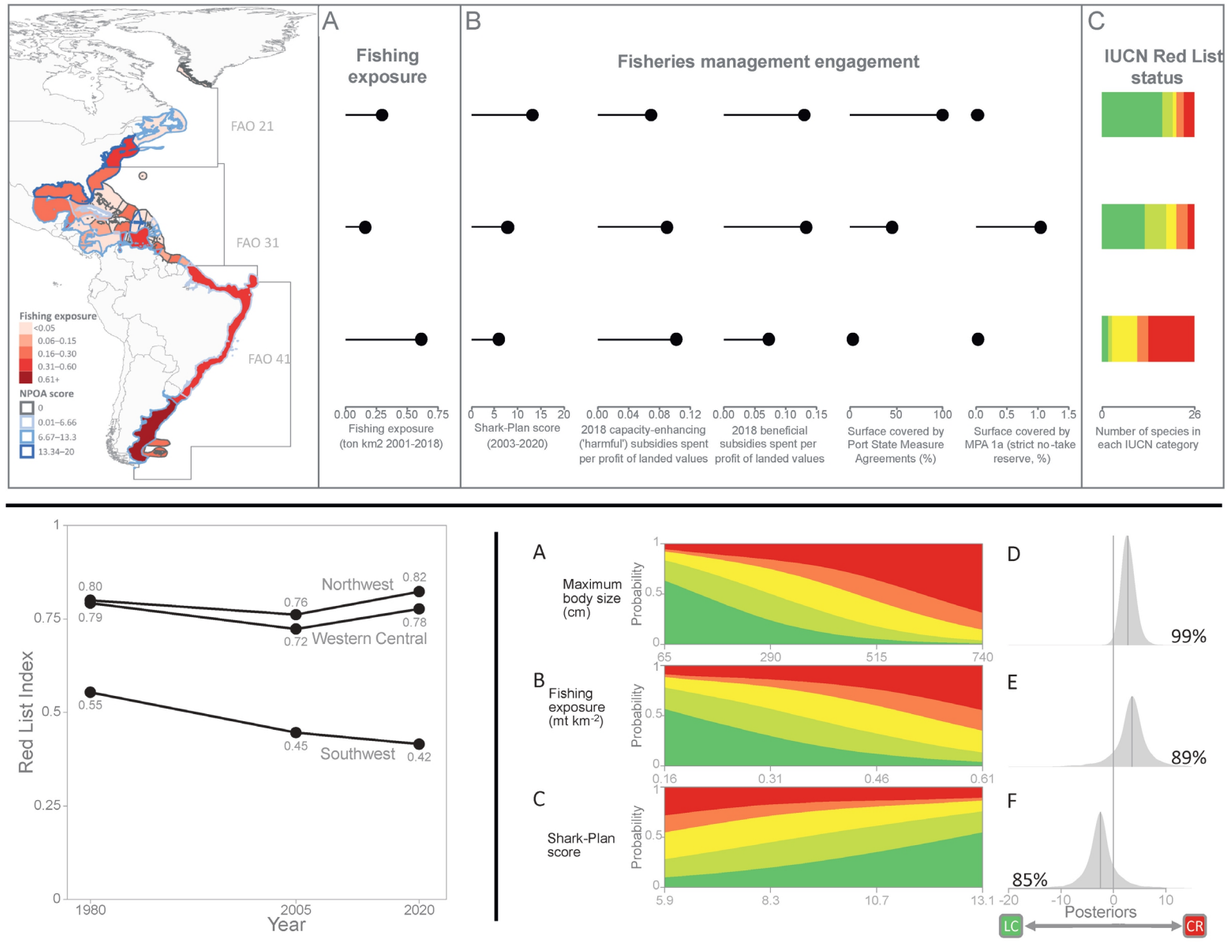

Fig. 1. Regional differences in fishing exposure, management engagement, and the IUCN Red List status of 26 wide-ranging coastal sharks and rays (top panel) and regional Red List Index (bottom left panel) in the Western Atlantic (Food and Agriculture Organization of the United Nations (FAO) major fishing regions). (A) fishing exposure for sharks and rays, (B) fisheries management engagement (National or Regional Plan of Action for Sharks, 'Shark-Plan' score), standardized capacity-enhancing fisheries subsidies, surface covered by Port State Measures Agreement and Marine Protected Areas 1a), and (C) regional IUCN Red List status of all 26 species. Bottom right panel: Regional IUCN extinction risk status of the 26 coastal sharks and rays explained by the combination of (A) intrinsic sensitivity (maximum body size in centimetres), (B) fishing exposure (catch metric tonnes (mt) km−2), and (C) fisheries management (National or Regional Plan of Action for Sharks, "Shark- Plan score") obtained from the Bayesian mixed-effect ordinal logistic model. Posterior distributions are shown on the Right panels (D, E, and F), with the values on the left and right sides of the distributions indicating the posterior probabilities of a negative or positive effect change (as percentages), respectively. IUCN extinction risk status colour ranges from Least Concern (dark green) to Critically Endangered (red).

Lemon Shark eye, The Bahamas

Photo by Hannes Klostermann | Ocean Image Bank | theoceanagency.org

Lemon Shark, The Bahamas

Photo by Hannes Klostermann | Ocean Image Bank | theoceanagency.org

Writing Retreat on the Global Status Report on Sharks, Rays, and Chimaeras

Written by
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IUCN SSC Shark Specialist Group | Program Officer

A roadmap for future policy and research actions for sharks, rays, and chimaeras

The IUCN SSC Shark Specialist Group (SSG) hosted their second Global Report Writing workshop from Saturday, 18th March, to Monday, 20th March, in Kuala Lumpur, Malaysia. This allowed us to gather contributors from IUCN SSC SSG's Asia and Indian Ocean regions. These regions were underrepresented in our first workshop in October 2022, held alongside Sharks International (Valencia, Spain). Twenty-two contributors joined us in person from the SSG regional groups of Asia (n=13), Indian Ocean (n=8), and Oceania (n=2).

The overall aim of the Global Report is to provide the necessary updates in relation to scientific information and advice that will lead to rational and responsible management, funding allocation, and research priorities to ensure the conservation of sharks around the world. This covers all known species of chondrichthyans – Sharks, Rays, and Chimaeras – comprising over 1,250 species.

Currently, the report has 293 contributors from around the world who have volunteered to provide updates from their respective countries or regions.

The next steps are to complete drafting the report and move to reviewing, consolidating and standardising it by the end of 2023, to publish it in 2024.

For more information on the first workshop, read issue #07 of Shark News here.

The Mohamed bin Zayed Species Conservation Fund generously funded this workshop. We thank the funders for providing this opportunity and the report's contributors for their time and efforts.

Workshop participants left to right: Fahmi, Tassapon Krajangdara, Quang Van Vo, Abd Haris Hilmi Ahmad Arshad, Akshay Tanna, Akhilesh Kalli Valappil, Daniel Fernando, Alexandra Morata, Divya Karnad, Jean A. Utzurrum, Alastair Harry, Rima Jabado, Elisabeth Fahrni Mansur, Christine Dudgeon, Hua Hsun Hsu, Zhang Jie, Chen Jiajie, Ahmad Ali. Front row: Ranny R. Yuneni, Serena Adam, Benaya Simeon, Atsuko Yamaguchi

Petronas Towers | Rima Jabado

Workshop Series on the Conservation Planning of Pelagic Sharks and Rays

Written by
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Whale Shark feeding

Photo by Amanda Cotton | Ocean Image Bank | theoceanagency.org

Juvenile Golden Trevally with Manta Ray, Ningaloo Reef, Western Australia

Photo by Lewis Burnett | Ocean Image Bank | theoceanagency.org

In the last two decades, approximately 70% of all pelagic shark and ray populations have declined and are at an elevated risk of extinction. Intervention is urgently needed to reduce mortality and recover their populations. To inform policy and support policymakers and other relevant stakeholders in the decision-making process, the International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Shark Specialist Group (SSG), in collaboration with the IUCN SSC Conservation Planning Specialist Group (CPSG), is working towards the development of a conservation strategy and action plan for pelagic sharks and rays. The work undertaken so far has been supported by the Convention on the Conservation on Migratory Species of Wild Animals (CMS) Secretariat.

Pelagic species:
Defined as species that spend the majority of their life histories beyond the continental shelf and at depths below 200 meters.

A series of online workshops and meetings were organised in late 2022 and early 2023. On November 1, 2022, the first workshop was held. There were two two-hour sessions, the purpose of which was to identify the issues relevant to planning the conservation of pelagic sharks and rays. A total of 30 participants attended the workshops. Sessions began with Rima Jabado, Chair of the IUCN SSC SSG, providing a brief description of the project and its goals, followed by a summary presentation by Nathan Pacoureau on the recent analysis of global pelagic shark and ray trends. The remainder of each session was led by Caroline Lees, Program Officer of the IUCN SSC CPSG, and was devoted to a brainstorming session framed around the questions listed below.

Q1. Which species should be included in the list of pelagic sharks that will be the focus of this planning intervention?

Q2. Are there individual species that require particular urgent attention or have unusual or especially complex needs for which single-species conservation or recovery planning is likely to be required?

Q3. Are there particular sites/areas/regions that stand out for you as especially important for the conservation of this group of species?

Q4. Are there specific habitat types/ecosystems that are themselves under threat, on which one or more of these taxa rely for part or all their life cycle?

Q5. We know that fishing is the primary threat. What kinds of fisheries and/or fishing gear pose a significant threat?

Q6. In your view, what are the main obstacles to effective conservation action for pelagic sharks and rays? Think about political, environmental, socio-cultural, technical, legal and economic obstacles and again, wherever relevant, be region and species specific.

Q7. What are the main conservation strategies you know for addressing the challenges faced by pelagic sharks and rays and those aiming to conserve them? If you can, give examples of what is working and where? And what is not working and where?

Q8. Who are the most important stakeholders in pelagic shark and ray protection and conservation (considering both those who can influence conservation and those impacted by it)?

In both sessions, the most discussed topics were questions one and seven. This highlighted the priority issues to tackle, which included ''which species to consider?'' and identifying what existing actions are working versus not working.
The discussions did not attempt to evaluate or reach an agreement on suggested planning project content or priorities – further workshops are planned to narrow down and agree on possible and impactful actions to recommend to stakeholders. Below is a list of species considered ''pelagic'' sharks and rays based on discussions between workshop participants and the core planning team.

Table: List of all pelagic shark and ray species. Note that the Great Hammerhead is included in this list despite spending most of its life history in coastal waters, as the species is already listed on most international agreements, and there are still some identification issues with other hammerheads.

Order	Family	Scientific name	Common Name	IUCN Red List Category
Carcharhiniformes	Carcharhinidae	*Carcharhinus falciformis*	Silky Shark	VU
Carcharhiniformes	Carcharhinidae	*Carcharhinus galapagensis*	Galapagos Shark	LC
Carcharhiniformes	Carcharhinidae	*Carcharhinus longimanus*	Oceanic Whitetip Shark	CR
Carcharhiniformes	Carcharhinidae	*Prionace glauca*	Blue Shark	NT
Carcharhiniformes	Sphyrnidae	*Sphyrna lewini*	Scalloped Hammerhead	CR
Carcharhiniformes	Sphyrnidae	*Sphyrna mokarran*	Great Hammerhead	CR
Carcharhiniformes	Sphyrnidae	*Sphyrna zygaena*	Smooth Hammerhead	VU
Lamniformes	Alopiidae	*Alopias pelagicus*	Pelagic Thresher	EN
Lamniformes	Alopiidae	*Alopias superciliosus*	Bigeye Thresher	VU
Lamniformes	Alopiidae	*Alopias vulpinus*	Common Thresher	VU
Lamniformes	Cetorhinidae	*Cetorhinus maximus*	Basking Shark	EN
Lamniformes	Lamnidae	*Carcharodon carcharias*	Great White Shark	VU
Lamniformes	Lamnidae	*Isurus oxyrinchus*	Shortfin Mako	EN
Lamniformes	Lamnidae	*Isurus paucus*	Longfin Mako	EN
Lamniformes	Lamnidae	*Lamna ditropis*	Salmon Shark	LC
Lamniformes	Lamnidae	*Lamna nasus*	Porbeagle Shark	VU
Lamniformes	Megachasmidae	*Megachasma pelagios*	Megamouth Shark	LC
Lamniformes	Odontaspididae	*Odontaspis noronhai*	Bigeye Sand Tiger	LC
Lamniformes	Pseudocarchariidae	*Pseudocarcharias kamoharai*	Crocodile Shark	LC
Myliobatiformes	Aetobatidae	*Aetobatus flagellum*	Longhead Eagle Ray	EN
Myliobatiformes	Aetobatidae	*Aetobatus laticeps*	Pacific Eagle Ray	VU
Myliobatiformes	Aetobatidae	*Aetobatus narinari*	Whitespotted Eagle Ray	EN
Myliobatiformes	Aetobatidae	*Aetobatus narutobiei*	Naru Eagle Ray	VU
Myliobatiformes	Aetobatidae	*Aetobatus ocellatus*	Spotted Eagle Ray	VU
Myliobatiformes	Dasyatidae	*Pteroplatytrygon violacea*	Pelagic Stingray	LC
Myliobatiformes	Mobulidae	*Mobula alfredi*	Reef Manta Ray	VU
Myliobatiformes	Mobulidae	*Mobula birostris*	Oceanic Manta Ray	EN
Myliobatiformes	Mobulidae	*Mobula eregoodoo*	Longhorned Pygmy Devil Ray	EN
Myliobatiformes	Mobulidae	*Mobula hypostoma*	West Atlantic Pygmy Devil Ray	EN
Myliobatiformes	Mobulidae	*Mobula kuhlii*	Shortfin Pygmy Devil Ray	EN
Myliobatiformes	Mobulidae	*Mobula mobular*	Spinetail Devil Ray	EN
Myliobatiformes	Mobulidae	*Mobula munkiana*	Munk'sMunk's Pygmy Devil Ray	VU
Myliobatiformes	Mobulidae	*Mobula tarapacana*	Sicklefin Devil Ray	EN
Myliobatiformes	Mobulidae	*Mobula thurstoni*	Bentfin Devil Ray	EN
Orectolobiformes	Rhincodontidae	*Rhincodon typus*	Whale Shark	EN

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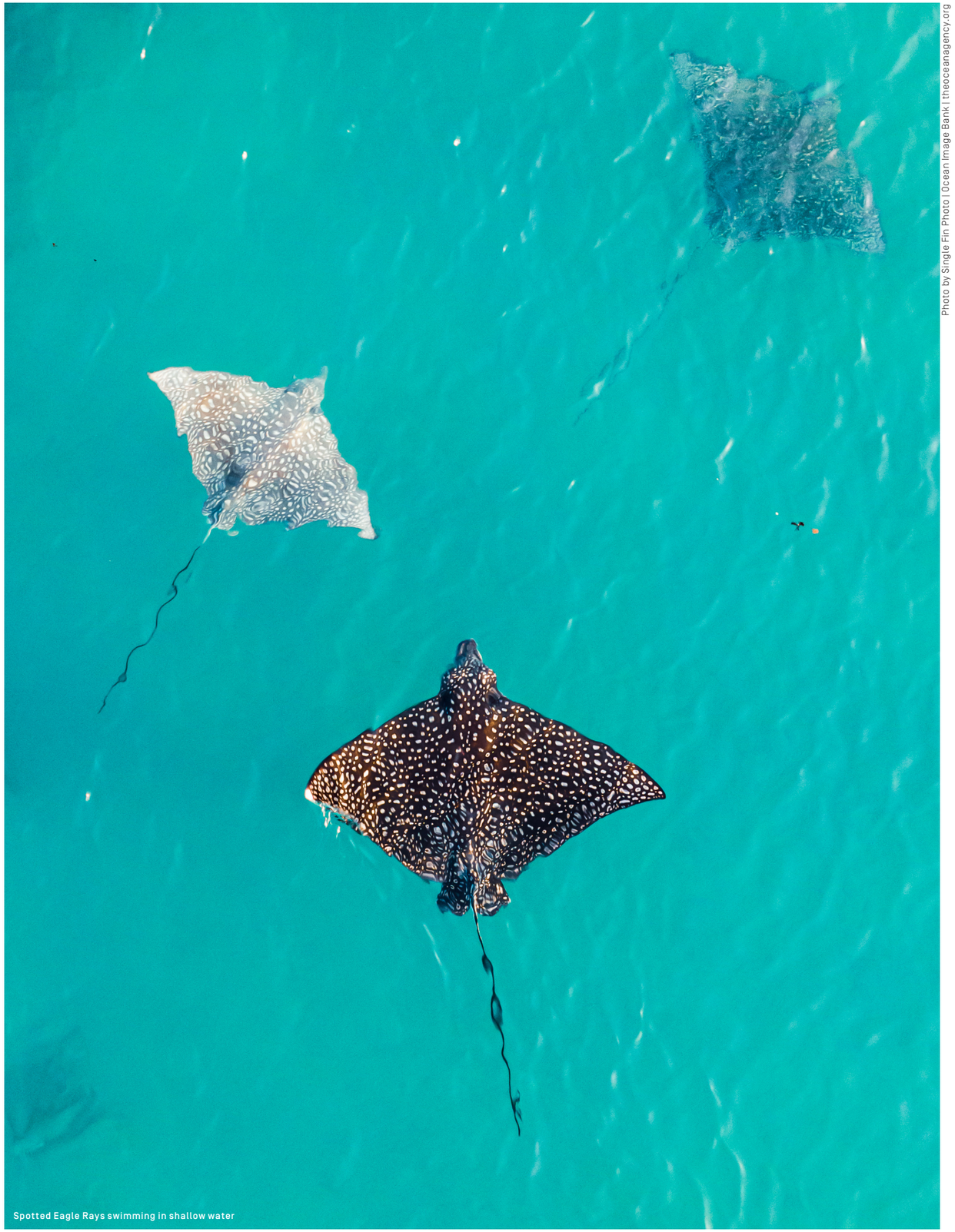


Photo by Single Fin Photo | Ocean Image Bank | theoceanagency.org

Spotted Eagle Rays swimming in shallow water

ISRA
IMPORTANT SHARK
AND RAY AREAS

Photo: Pelayo Salinas

The Important Shark and Ray Areas of the Central and South American Pacific

Ryan Charles
IUCN SSC Shark Specialist Group |
Important Shark and Ray Areas |
Research Assistant

The Important Shark and Ray Areas (ISRA) team recently began their endeavour to put sharks on the map. This innovative approach to place-based conservation takes inspiration from Important Marine Mammal Areas, Key Biodiversity Areas, Ecologically and Biologically Significant Marine Areas, and Important Bird and Biodiversity Areas. The first region to be investigated was the Central and South American Pacific: from the Gulf of California, Mexico, to the south of Chile. The aim was to define Important Shark and Ray Areas: discrete, three-dimensional portions of habitat important for one or more shark, ray, or chimaera species, that are delineated and have the potential to be managed for conservation.

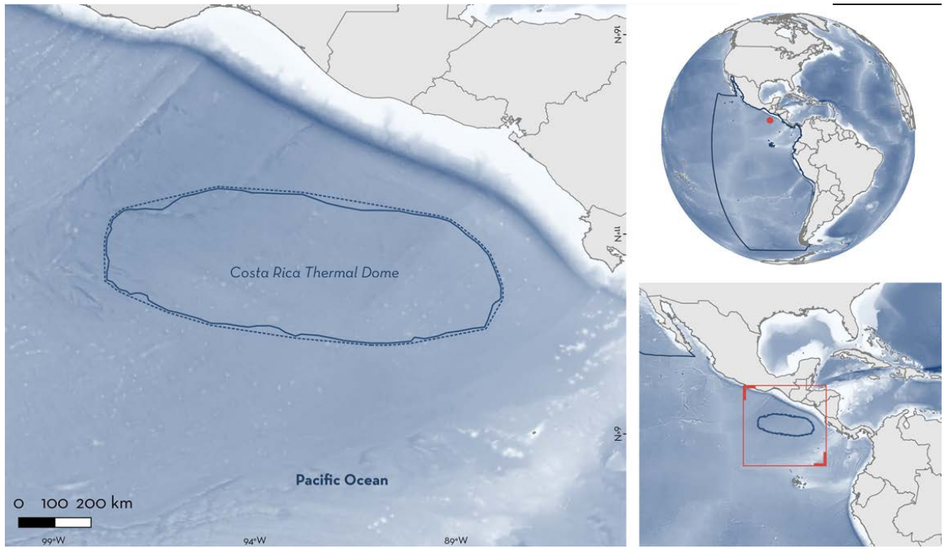
This was successful! Over 80 experts contributed to the process, either in-person or online. The ISRA team hosted a regional expert workshop in Bogotá, Colombia, in October 2022. The workshop aimed to collaborate with and facilitate conversations between the local experts. This allowed for great use and communication of the best available science, including peer-reviewed scientific articles and local ecological knowledge. This information was used to propose areas which may meet the ISRA Criteria with defined spatial boundaries. After reaching a consensus, these candidate ISRA proposals were sent to the ISRA Independent Review Panel for peer review.

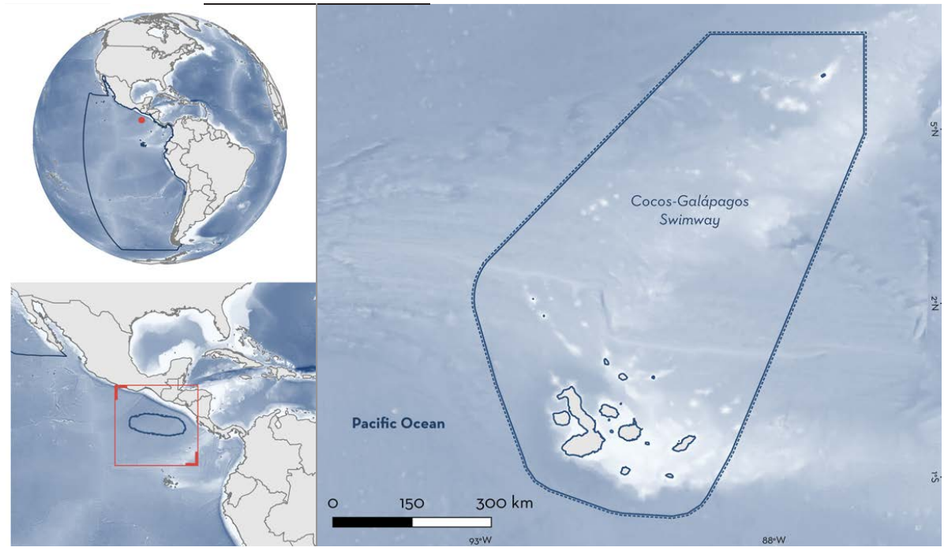
As a result, the very first ISRA were successfully identified: 65 in total! In addition, five areas remained as candidate ISRA (cISRA) as there is an ongoing investigation to ensure additional information can be collected to support their delineation as ISRAs. Also, 11 Areas of Interest (AoIs) were identified for future investigation. All the countries within this region were successfully represented, with at least one ISRA identified in each. Every ISRA is mapped on the ISRA e-Atlas, which was launched at the 5th International Marine Protected Areas Congress (IMPAC5) held in Vancouver, Canada and shared at the Convention on Migratory Species of Wild Animals Sharks Memorandum of Understanding Meeting of Signatories (MOS4) held in Bonn in February. Each area has a unique factsheet which includes a map of the spatial boundaries and details of which ISRA Criteria are met. The associated species and geographic information are also provided.

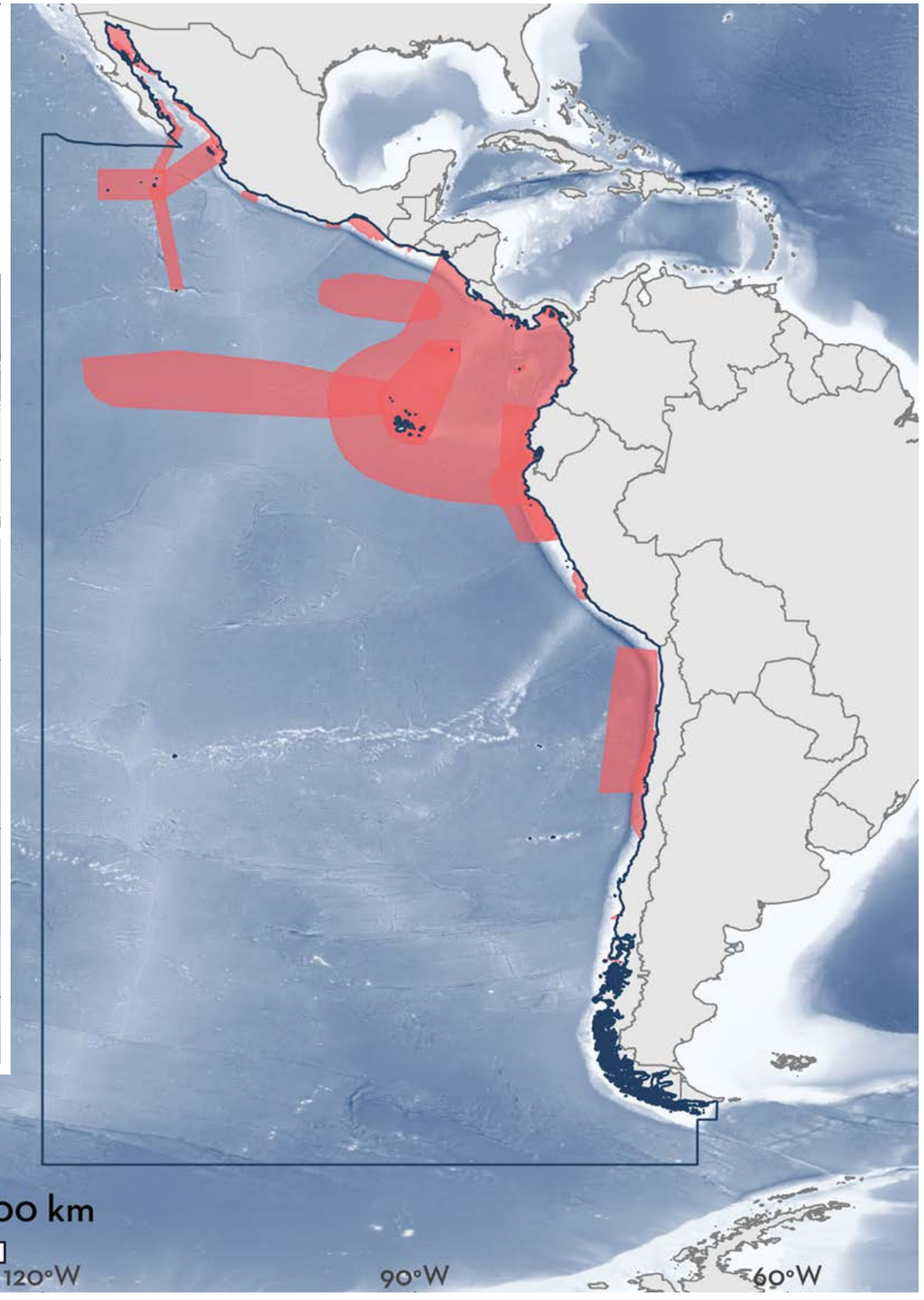
All factsheet summaries can be found in the recently published compendium entitled 'Central and South American Pacific: A Regional Compendium of Important Shark and Ray Areas'. This is free to download from the ISRA website (www.sharkrayareas.org). This serves the purpose of simply sharing the importance of each area with everyone, including scientists, policymakers, and the general public. The size of the areas in this region also varied greatly, as there are small areas (less than 2 square kilometres) to large transboundary areas (over 3 million square kilometres).

At the time of writing, the ISRA team collaborates with local experts in the Mediterranean and Black Seas region. The first proposals are being prepared ahead of an upcoming workshop. The near future holds the delineation of ISRAs for the Mediterranean and Black Seas and then afar!

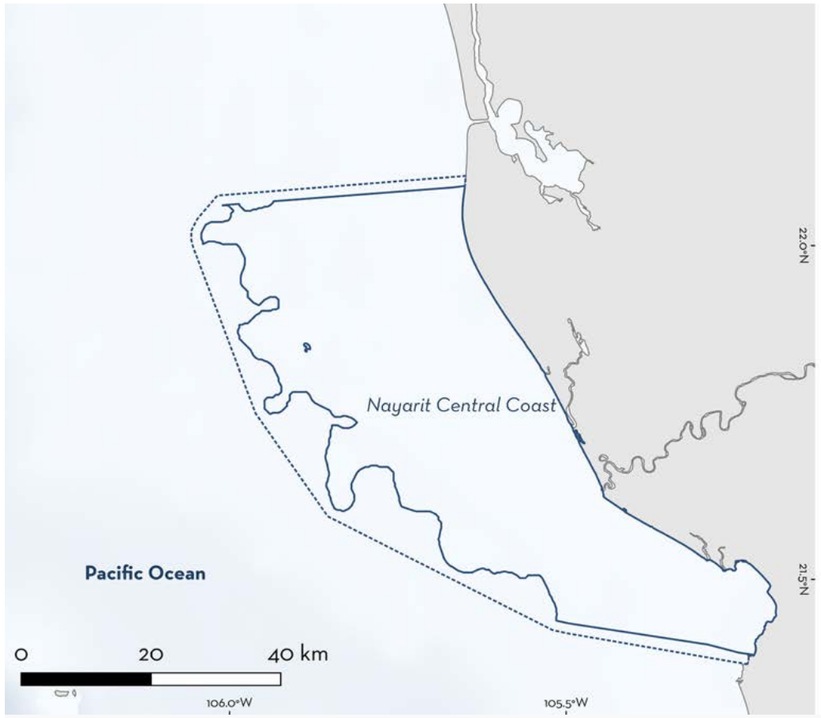
Additional information can be found here: Jabado RW, García-Rodríguez E, Kyne PM, Charles R, Gonzalez Pestana A, Priest MA, Ba1le- Morera A, Notarbartolo di Sciara G. 2023. Central and South American Pacific: A regional compendium of Important Shark and Ray Areas. Dubai: IUCN SSC Shark Specialist Group. doi.org/10.59216/ssg.isra.2023.r12

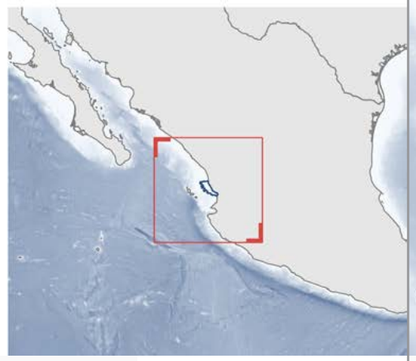


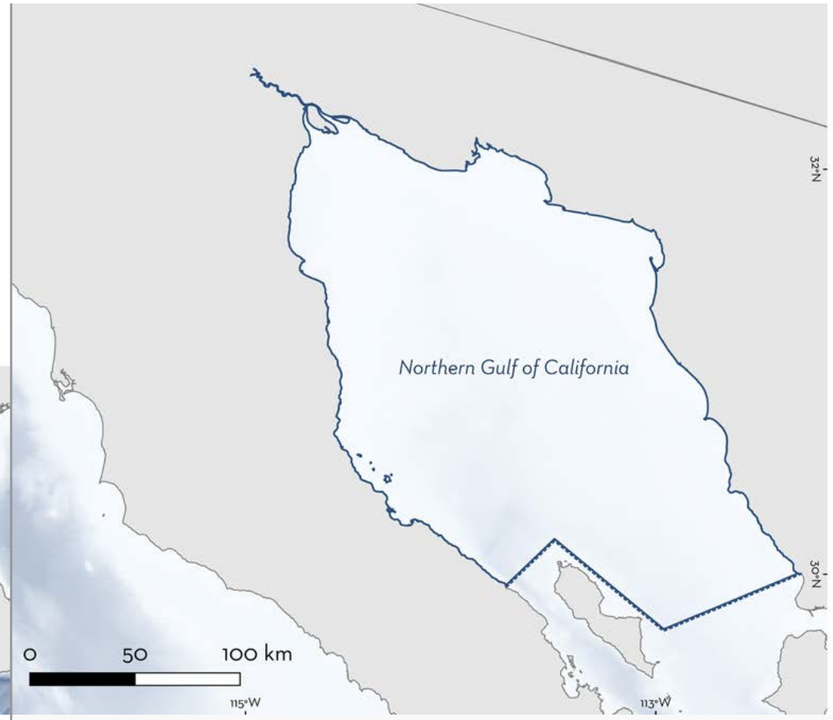




Colored areas on the map represent those described as meeting the ISRA Criteria | ISRA e-Atlas







NAYARIT CENTRAL COAST ISRA

SUMMARY

Nayarit Central Coast is located at the entrance to the Gulf of California, Mexico. It contains remarkable biodiversity due to the variety of environments and geological features such as Isabel Island (an island of volcanic origin), mangroves, estuaries (e.g., Boca de Camichín), and sandy bays (e.g., Matanchen Bay located to the south of the port of San Blas). The area is influenced by three oceanic currents: the temperate water California Current, the warm high salinity Gulf of California Current, and the warm water Mexican Coastal Current. The seasonal changes in current and temperature produces a highly productive area. This area includes a protected area, Ramsar site, and Key Biodiversity Area. Within this area there are: **threatened species** (e.g., Pacific Sharpnose Shark *Rhizoprionodon longurio*); **reproductive areas** (e.g., Scalloped Hammerhead *Sphyrna lewini*); **feeding areas** (e.g., Whale Shark *Rhincodon typus*); and areas important for **movement** (Pacific Sharpnose Shark).

MEXICO

0–200 metres

3,360.6 km²

CRITERIA

Criterion A – Vulnerability; Sub-criterion C1 – Reproductive Areas; Sub-criterion C2 – Feeding Areas; Sub-criterion C4 – Movement

NORTHERN GULF OF CALIFORNIA ISRA

SUMMARY

Northern Gulf of California is located on the Pacific coast of Mexico. Situated at the northern end of the gulf, it extends from the Colorado River Delta in the north to the large islands of Tiburón and Angel de la Guarda in the south. The area overlaps with an Ecologically or Biologically Significant Marine Area and includes one protected area, three Ramsar sites, and three Key Biodiversity Areas. The area has a broad continental platform mostly composed of sandy substrates. The shallow waters are constantly influenced by extreme tides, strong winds, and upwellings to create the most productive region in the entire gulf. Within this area there are: **threatened species** (Whale Shark *Rhincodon typus*); **range-restricted species** (e.g., Peppered Catshark *Galeus piperatus*); **reproductive areas** (e.g., Brown Smoothhound *Mustelus henlei*); **feeding areas** (e.g., Shovelnose Guitarfish *Pseudobatos productus*); and areas important for **movement** (e.g., Whale Shark).

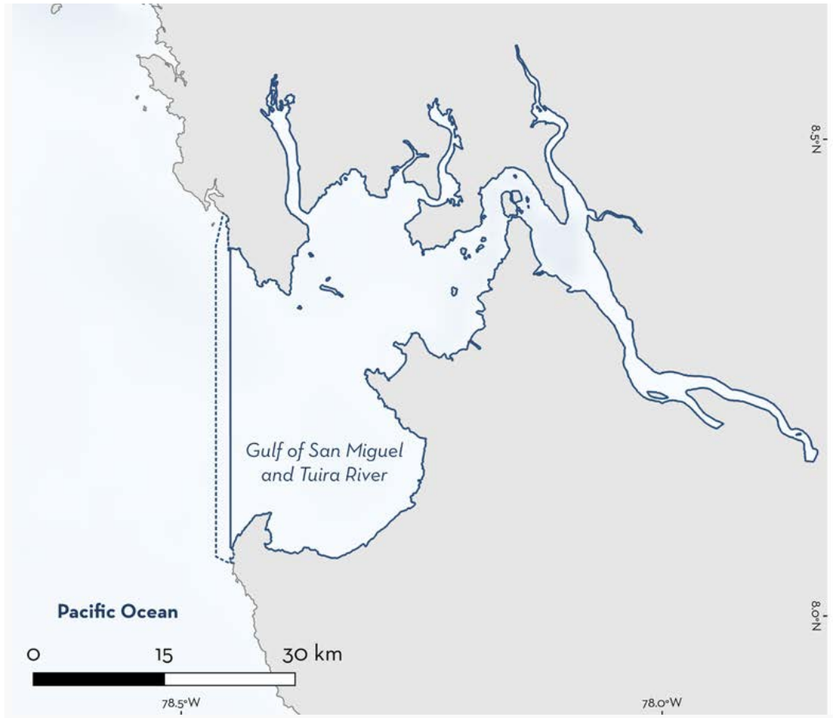
MEXICO

0–281 metres

37,900 km²

CRITERIA

Criterion A – Vulnerability; Criterion B – Range Restricted; Sub-criterion C1 – Reproductive Areas; Sub-criterion C2 – Feeding Areas Sub-criterion C4 – Movement



GULF OF SAN MIGUEL AND TUIRA RIVER ISRA

PANAMA

0–40 metres

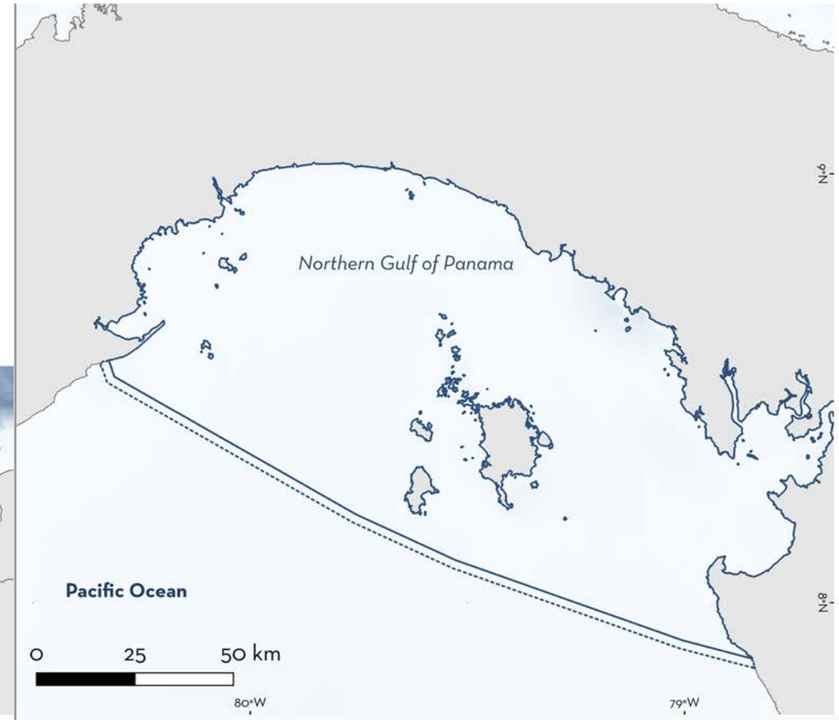
1,153.3 km²

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



NORTHERN GULF OF PANAMA ISRA

PANAMA

0–125 metres

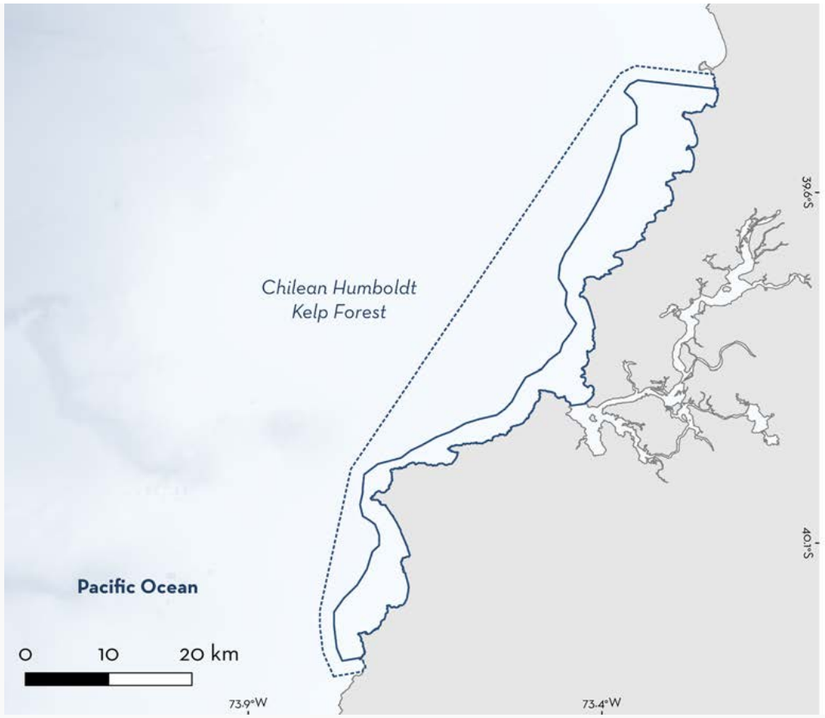
12,721 km²

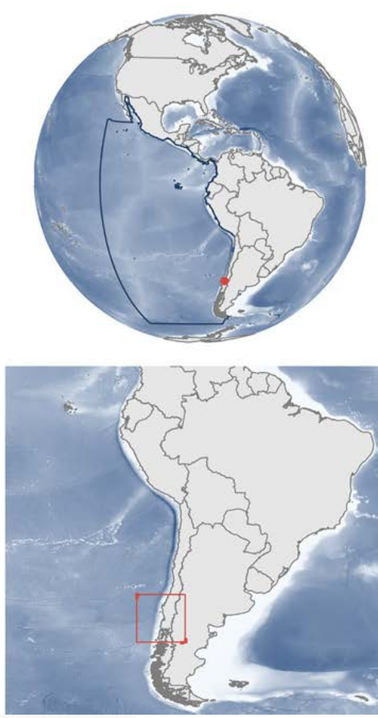
SUMMARY

Northern Gulf of Panama covers waters of the Panama provinces of Panamá Oeste, Darién, and Panamá. It encompasses diverse coastal, shelf, and insular habitats including coral reefs, muddy substrates, rocky shores, rivers, and mangrove ecosystems along with oceanographic features which promote high levels of primary productivity including seasonal upwellings. It includes crucial biological reserves including Wetlands of International Importance, a national mangrove-estuaries protected area, and Las Perlas Archipelago, a cluster of 255 islands, which represents the second largest archipelago in the Eastern Tropical Pacific. Within the area there are: **threatened species** (e.g., Whitesnout Guitarfish *Pseudobatos leucorhynchus*); **range-restricted species** (e.g., Southern Banded Guitarfish *Zapteryx xyster*); **reproductive areas** (e.g., Scalloped Hammerhead *Sphyrna lewini*); **feeding areas** (Whale Shark *Rhincodon typus*); and the area sustains a **high diversity** of sharks (21 species).

CRITERIA

Criterion A – Vulnerability; Criterion B – Range Restricted;
Sub-criterion C1 – Reproductive Areas; Sub-criterion C2 – Feeding Areas
Sub-criterion D2 – Diversity





CHILEAN HUMBOLDT KELP FOREST ISRA

CHILE

0–35 metres

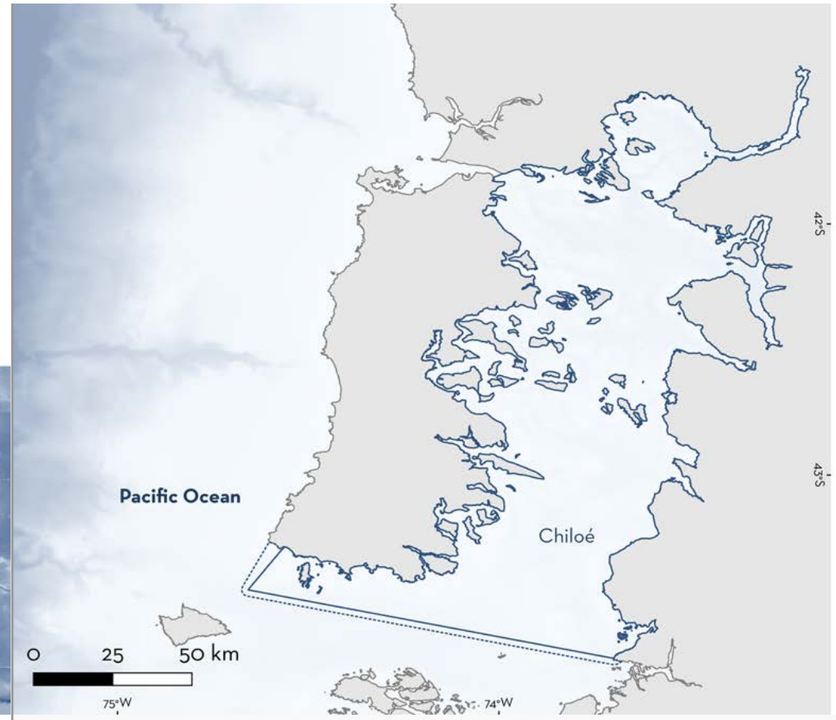
1,345.34 km²

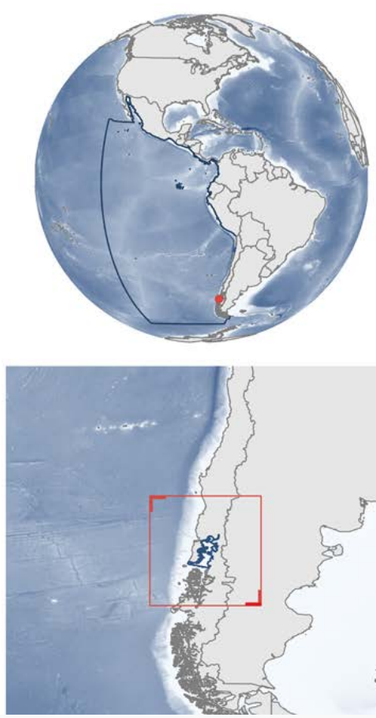
SUMMARY

Chilean Humboldt Kelp Forest is located in the coastal region of Los Rios in south-central Chile, in the Southeast Pacific. Oceanographic conditions allow kelp forests to thrive with cold and nutrient-rich waters drawn to the surface by coastal upwelling. Kelp forests are mainly composed of one range-restricted intertidal or subtidal kelp species *Lessonia trabeculata* in a habitat dominated by large rocks and boulders. This creates structurally complex habitat that sustains high biodiversity. Within this area there are **reproductive areas** (Chilean Catshark *Schroederichthys chilensis*).

CRITERIA

Sub-criterion C1 – Reproductive Areas





CHILOÉ ISRA

CHILE

0–480 metres

15,560 km²

SUMMARY

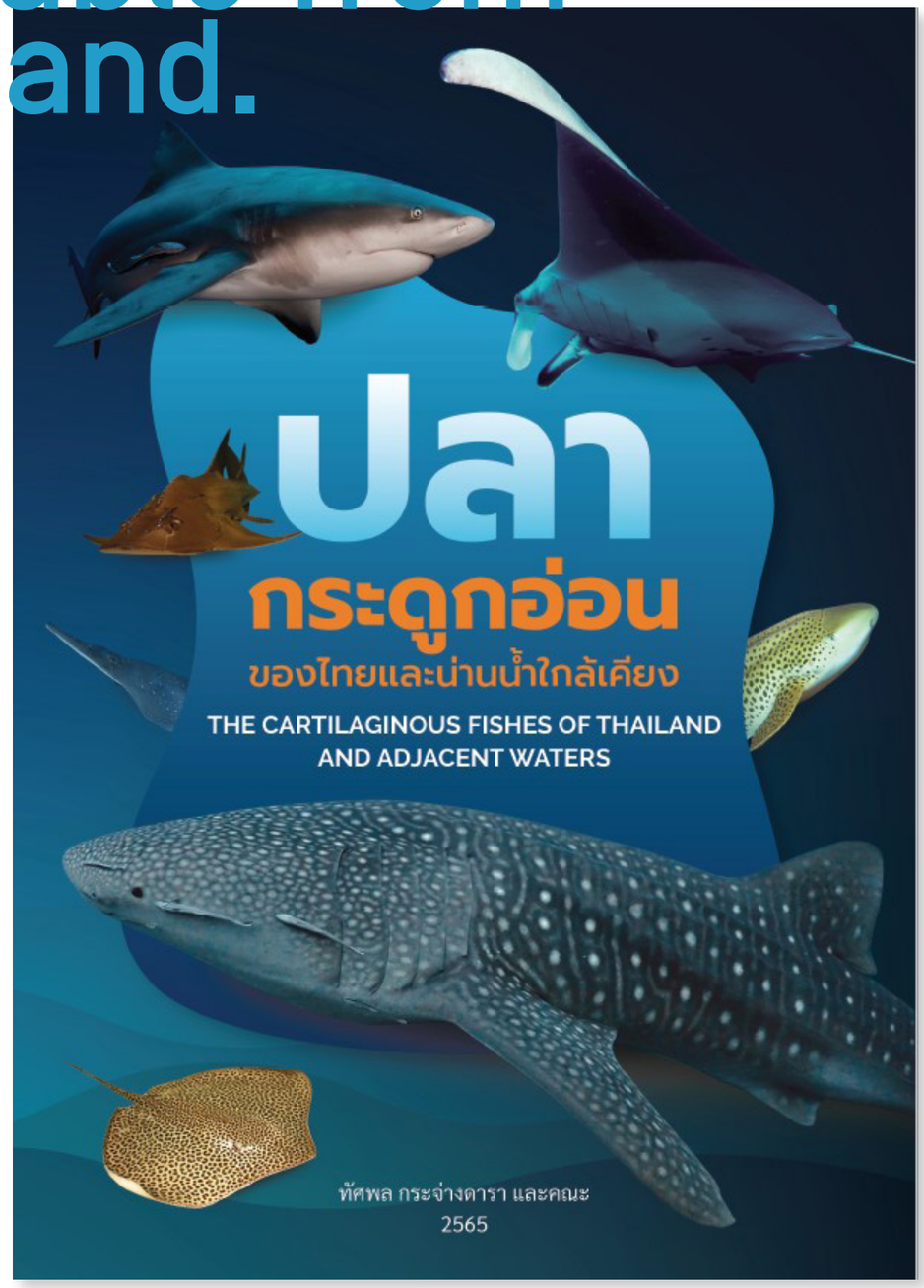
Chiloé is located in the Los Lagos region of southern Chile within the Cold-Temperate South America Province, also known as the Chiloense Ecoregion. This area overlaps with an Ecologically or Biologically Significant Marine Area, the West Wind Drift Convergence. The area has unique environmental features with the West Wind Drift striking the South American continent in a southeast direction and bringing cold waters to the coast. Habitats within the area include an intricate array of inner seas, archipelagos, channels, and fjords, and serve in many aspects like a large estuary with very high levels of primary productivity during the austral summer and autumn. Within this area there are: **threatened species** (e.g., Yellownose Skate *Dipturus chilensis*); **range restricted species** (e.g., Roughskin Skate *Dipturus trachyderma*); **reproductive** and **feeding areas** (Spiny Dogfish *Squalus acanthias*).

CRITERIA

Criterion A – Vulnerability; Criterion B – Range Restricted;
Sub-criterion C1 – Reproductive Areas; Sub-criterion C2 – Feeding Areas

New shark and ray materials are available from Thailand.

Region Update: Asia



Written by
Tassapon Krangdara
Phuket Marine Fisheries Research
and Development Center

IUCN SSC Shark Specialist Group |
Member | Asia Region

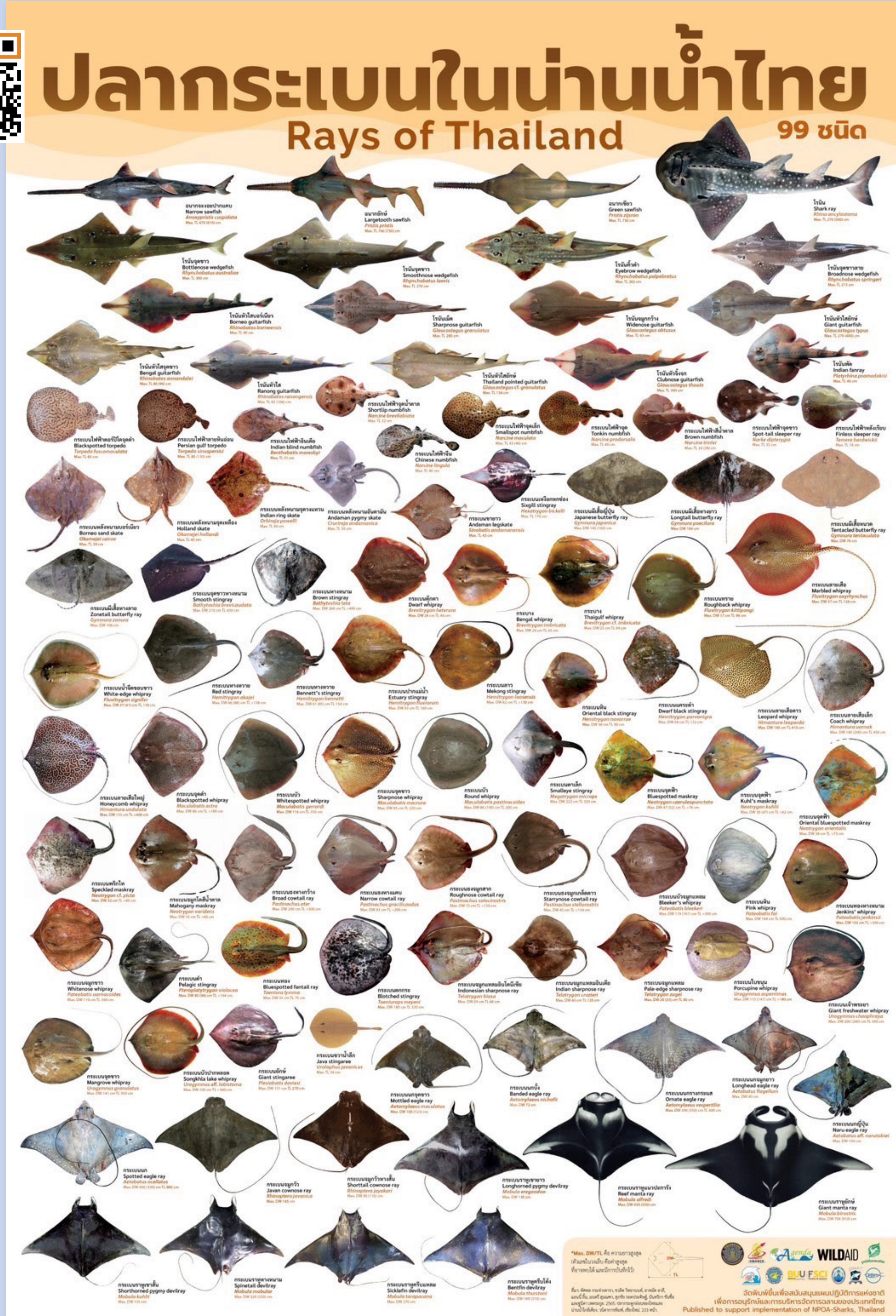
To support the implementation of the Thai National Plan of Action for Sharks [NPOA-Sharks Plan 1], a species identification book and a series of posters on the species diversity of sharks and rays in Thai waters were published in February 2023. All the materials are available for free download.

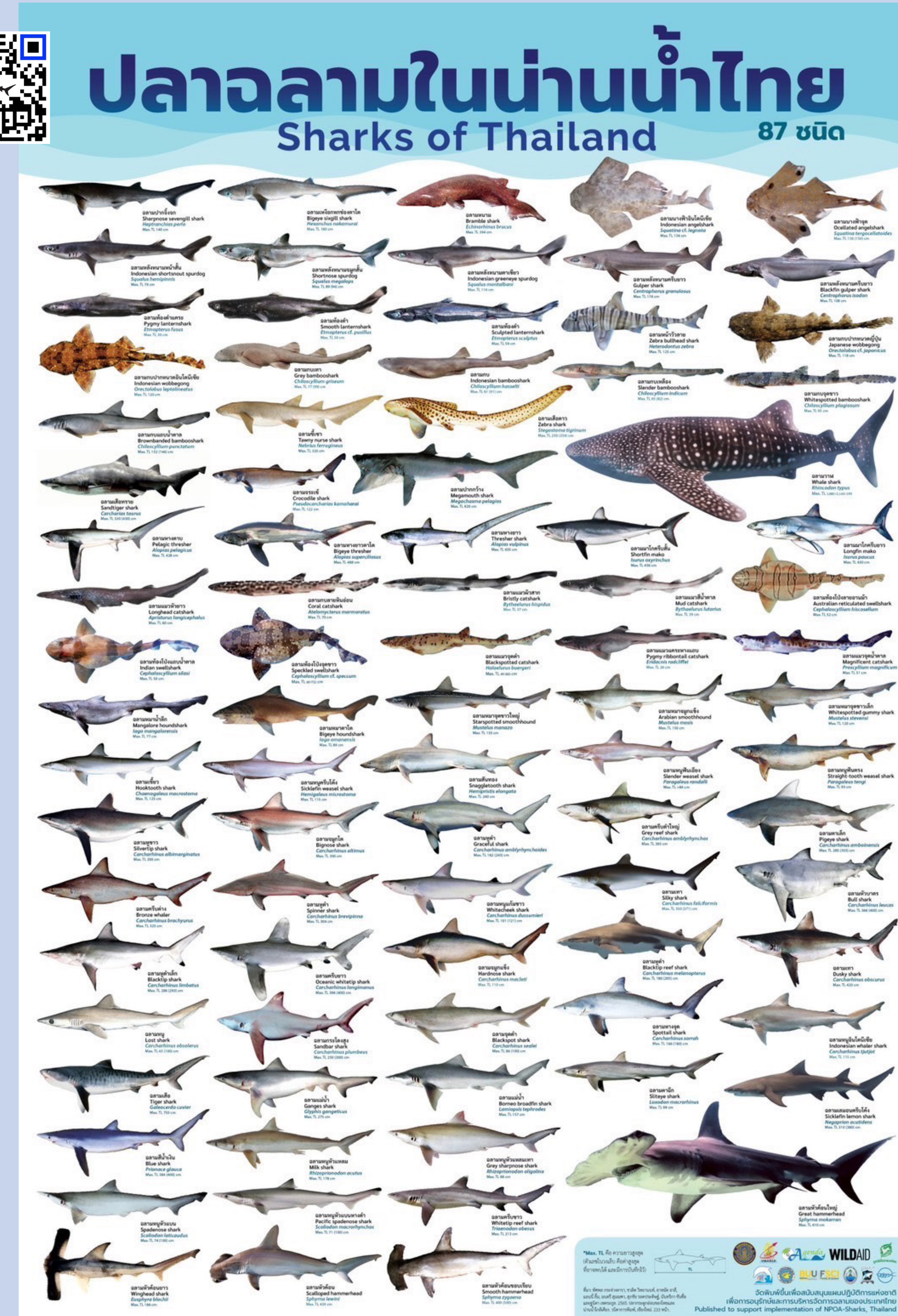
The National Plan of Action for Thailand's Sharks and Rays 2020-2024 is available here: www4.fisheries.go.th/dof_en/view_news/453

Figure 1: Thailand NPOA-Sharks: Plan 1, 2020-2024 | Source: Thailand Department of Fisheries

Figure 2: The cartilaginous fishes of Thailand and QR code for download | Source: Thailand Department of Fisheries

Figure 3: Posters on sharks and rays of Thailand and QR codes for download | Source: Thailand Department of Fisheries


ปลากระเบนในน่านน้ำไทย
Rays of Thailand
99 ชนิด
Narrow sawfish Anoxypristis cuspidata
Largetooth sawfish Pristis pristis
Green sawfish Pristis zijsron
Shark ray Rhina ancylostoma
Bottlenose wedgefish Rhynchobatus australiae
Smoothnose wedgefish Rhynchobatus laevis
Eyebrow wedgefish Rhynchobatus palpebratus
Broadnose wedgefish Rhynchobatus springeri
Borneo guitarfish Rhinobatos borneensis
Sharpnose guitarfish Glaucostegus granulatus
Widenose guitarfish Glaucostegus obtusus
Giant guitarfish Glaucostegus typus
Bengal guitarfish Rhinobatos annandalei
Ranong guitarfish Rhinobatos ranongensis
Thailand pointed guitarfish Glaucostegus cf. granulatus
Clubnose guitarfish Glaucostegus thouin
Indian fanray Platyrhina psomadakisi
Blackspotted torpedo Torpedo fuscomaculata
Persian gulf torpedo Torpedo sinuspersici
Indian blind numbfish Benthobatis moresbyi
Shortlip numbfish Narcine brevilabiata
Chinese numbfish Narcine lingula
Smallspot numbfish Narcine maculata
Tonkin numbfish Narcine prodorsalis
Brown numbfish Narcine timlei
Spot-tail sleeper ray Narke dipterygia
Finless sleeper ray Temera hardwickii
Borneo sand skate Okamejei cairae
Holland skate Okamejei hollandi
Indian ring skate Orbiraja powelli
Andaman pygmy skate Cruriraja andamanica
Andaman legskate Sinobatis andamanensis
Sixgill stingray Hexatrygon bickelli
Japanese butterfly ray Gymnura japonica
Longtail butterfly ray Gymnura poecilura
Tentacled butterfly ray Gymnura tentaculata
Zonetail butterfly ray Gymnura zonura
Smooth stingray Bathytoshia brevicaudata
Brown stingray Bathytoshia lata
Dwarf whipray Brevitrygon heterura
Bengal whipray Brevitrygon imbricata
Thaigulf whipray Brevitrygon cf. imbricata
Roughback whipray Fluvitrygon kittipongi
Marbled whipray Fluvitrygon oxyrhynchus
White-edge whipray Fluvitrygon signifer
Red stingray Hemitrygon akajei
Bennett's stingray Hemitrygon bennetti
Estuary stingray Hemitrygon fluviorum
Mekong stingray Hemitrygon laosensis
Oriental black stingray Hemitrygon navarrae
Dwarf black stingray Hemitrygon parvonigra
Leopard whipray Himantura leoparda
Coach whipray Himantura uarnak
Honeycomb whipray Himantura undulata
Blackspotted whipray Maculabatis astra
Whitespotted whipray Maculabatis gerrardi
Sharpnose whipray Maculabatis macrura
Round whipray Maculabatis pastinacoides
Smalleye stingray Megatrygon microps
Bluespotted maskray Neotrygon caeruleopunctata
Kuhl's maskray Neotrygon kuhlii
Oriental bluespotted maskray Neotrygon orientalis
Speckled maskray Neotrygon cf. picta
Mahogany maskray Neotrygon varidens
Broad cowtail ray Pastinachus ater
Narrow cowtail ray Pastinachus gracilicaudus
Roughnose cowtail ray Pastinachus solocirostris
Starrynose cowtail ray Pastinachus stellurostris
Bleeker's whipray Pateobatis bleekeri
Pink whipray Pateobatis fai
Jenkins' whipray Pateobatis jenkinsii
Whitenose whipray Pateobatis uarnacoides
Pelagic stingray Pteroplatytrygon violacea
Bluespotted fantail ray Taeniura lymma
Blotched stingray Taeniurops meyeni
Indonesian sharpnose ray Telatrygon biasa
Indian sharpnose ray Telatrygon crozieri
Pale-edge sharpnose ray Telatrygon zugei
Porcupine whipray Urogymnus asperrimus
Giant freshwater whipray Urogymnus chaophraya
Mangrove whipray Urogymnus granulatus
Songkhla lake whipray Urogymnus aff. lobistoma
Giant stingaree Plesiobatis daviesi
Java stingaree Urolophus javanicus
Mottled eagle ray Aetomylaeus maculatus
Banded eagle ray Aetomylaeus nichofii
Ornate eagle ray Aetomylaeus vespertilio
Longhead eagle ray Aetobatus flagellum
Naru eagle ray Aetobatus aff. narutobiei
Spotted eagle ray Aetobatus ocellatus
Javan cownose ray Rhinoptera javanica
Shorttail cownose ray Rhinoptera jayakari
Longhorned pygmy devilray Mobula eregoodoo
Reef manta ray Mobula alfredi
Giant manta ray Mobula birostris
Shorthorned pygmy devilray Mobula kuhlii
Spinetail devilray Mobula mobular
Sicklefin devilray Mobula tarapacana
Bentfin devilray Mobula thurstoni
*Max. DW/TL คือ ความยาวสูงสุด (ตัวเลขในวงเล็บ คือค่าสูงสุดที่อาจพบได้ และมีการบันทึกไว้)
WILDAID
BUU FSCI
จัดพิมพ์ขึ้นเพื่อสนับสนุนแผนปฏิบัติการแห่งชาติ
เพื่อการอนุรักษ์และการบริหารจัดการฉลามของประเทศไทย
Published to support implementation of NPOA-Sharks, Thailand


ปลาฉลามในน่านน้ำไทย
Sharks of Thailand
87 ชนิด
Sharpnose sevengill shark Heptranchias perlo
Bigeye sixgill shark Hexanchus nakamurai
Bramble shark Echinorhinus brucus
Indonesian angelshark Squatina cf. legnota
Ocellated angelshark Squatina tergocellatoides
Indonesian shortsnout spurdog Squalus hemipinnis
Shortnose spurdog Squalus megalops
Indonesian greeneye spurdog Squalus montalbani
Gulper shark Centrophorus granulosus
Blackfin gulper shark Centrophorus isodon
Pygmy lanternshark Etmopterus fusus
Smooth lanternshark Etmopterus cf. pusillus
Sculpted lanternshark Etmopterus sculptus
Zebra bullhead shark Heterodontus zebra
Japanese wobbegong Orectolobus cf. japonicus
Indonesian wobbegong Orectolobus leptolineatus
Grey bambooshark Chiloscyllium griseum
Indonesian bambooshark Chiloscyllium hasselti
Slender bambooshark Chiloscyllium indicum
Whitespotted bambooshark Chiloscyllium plagiosum
Brownbanded bambooshark Chiloscyllium punctatum
Tawny nurse shark Nebrius ferrugineus
Zebra shark Stegostoma tigrinum
Whale shark Rhincodon typus
Sandtiger shark Carcharias taurus
Crocodile shark Pseudocarcharias kamoharai
Megamouth shark Megachasma pelagios
Pelagic thresher Alopias pelagicus
Bigeye thresher Alopias superciliosus
Thresher shark Alopias vulpinus
Shortfin mako Isurus oxyrinchus
Longfin mako Isurus paucus
Longhead catshark Apristurus longicephalus
Coral catshark Atelomycterus marmoratus
Bristly catshark Bythaelurus hispidus
Mud catshark Bythaelurus lutarius
Australian reticulated swellshark Cephaloscyllium hiscosellum
Indian swellshark Cephaloscyllium silasi
Speckled swellshark Cephaloscyllium cf. speccum
Blackspotted catshark Halaelurus buergeri
Pygmy ribbontail catshark Eridacnis radcliffei
Magnificent catshark Proscyllium magnificum
Mangalore houndshark Iago mangalorensis
Bigeye houndshark Iago omanensis
Starspotted smoothhound Mustelus manazo
Arabian smoothhound Mustelus mosis
Whitespotted gummy shark Mustelus stevensi
Hooktooth shark Chaenogaleus macrostoma
Sicklefin weasel shark Hemigaleus microstoma
Snaggletooth shark Hemipristis elongata
Slender weasel shark Paragaleus randalli
Straight-tooth weasel shark Paragaleus tengi
Silvertip shark Carcharhinus albimarginatus
Bignose shark Carcharhinus altimus
Graceful shark Carcharhinus amblyrhynchoides
Grey reef shark Carcharhinus amblyrhynchos
Pigeye shark Carcharhinus amboinensis
Bronze whaler Carcharhinus brachyurus
Spinner shark Carcharhinus brevipinna
Whitecheek shark Carcharhinus dussumieri
Silky shark Carcharhinus falciformis
Bull shark Carcharhinus leucas
Blacktip shark Carcharhinus limbatus
Oceanic whitetip shark Carcharhinus longimanus
Hardnose shark Carcharhinus macloti
Blacktip reef shark Carcharhinus melanopterus
Dusky shark Carcharhinus obscurus
Lost shark Carcharhinus obsolerus
Sandbar shark Carcharhinus plumbeus
Blackspot shark Carcharhinus sealei
Spottail shark Carcharhinus sorrah
Indonesian whaler shark Carcharhinus tjutjot
Tiger shark Galeocerdo cuvier
Ganges shark Glyphis gangeticus
Borneo broadfin shark Lamiopsis tephrodes
Sliteye shark Loxodon macrorhinus
Sicklefin lemon shark Negaprion acutidens
Blue shark Prionace glauca
Milk shark Rhizoprionodon acutus
Grey sharpnose shark Rhizoprionodon oligolinx
Great hammerhead Sphyrna mokarran
Spadenose shark Scoliodon laticaudus
Pacific spadenose shark Scoliodon macrorhynchos
Whitetip reef shark Triaenodon obesus
Winghead shark Eusphyra blochii
Scalloped hammerhead Sphyrna lewini
Smooth hammerhead Sphyrna zygaena
*Max. TL คือ ความยาวสูงสุด (ตัวเลขในวงเล็บ คือค่าสูงสุดที่อาจพบได้ และมีการบันทึกไว้)
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Published to support implementation of NPOA-Sharks, Thailand

Blue Shark

Region
Update:
Asia

Chinese Scientists Tag Blue Sharks in the Tropical Central and Western Pacific

Written by Dr Yunkai Li
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College of Marine Sciences, Shanghai Ocean University

Photo by Hannes Klostermann | Ocean Image Bank | theoceanagency.org

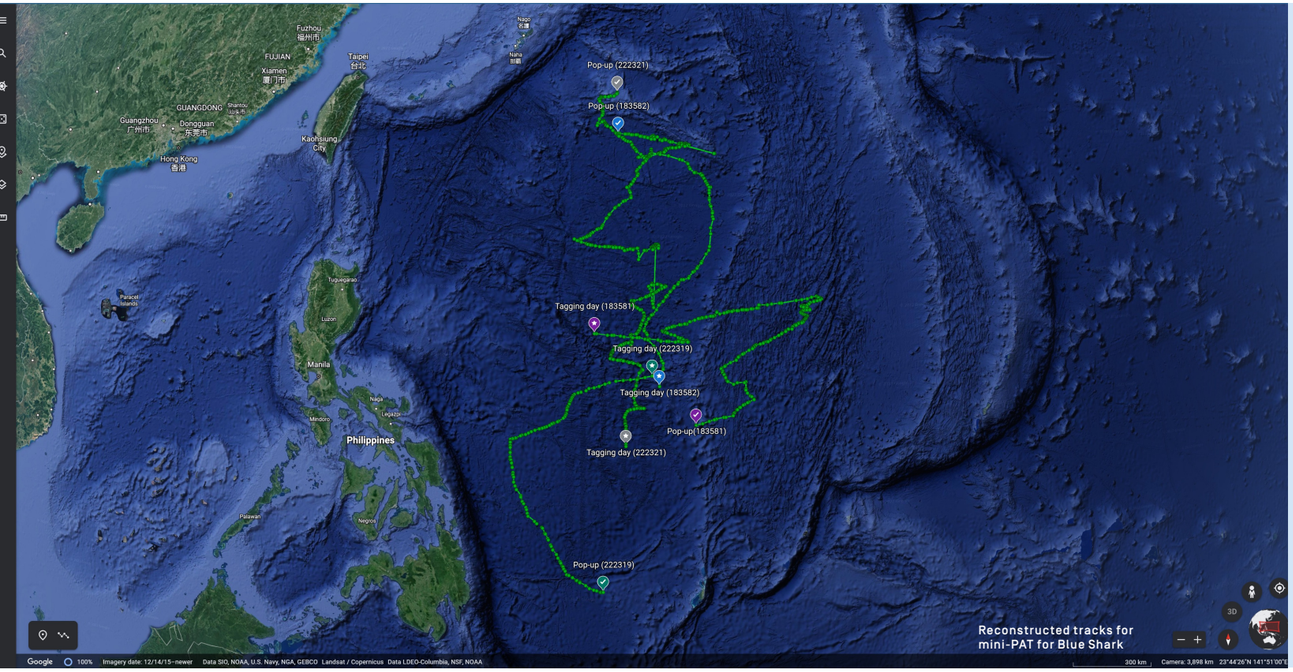
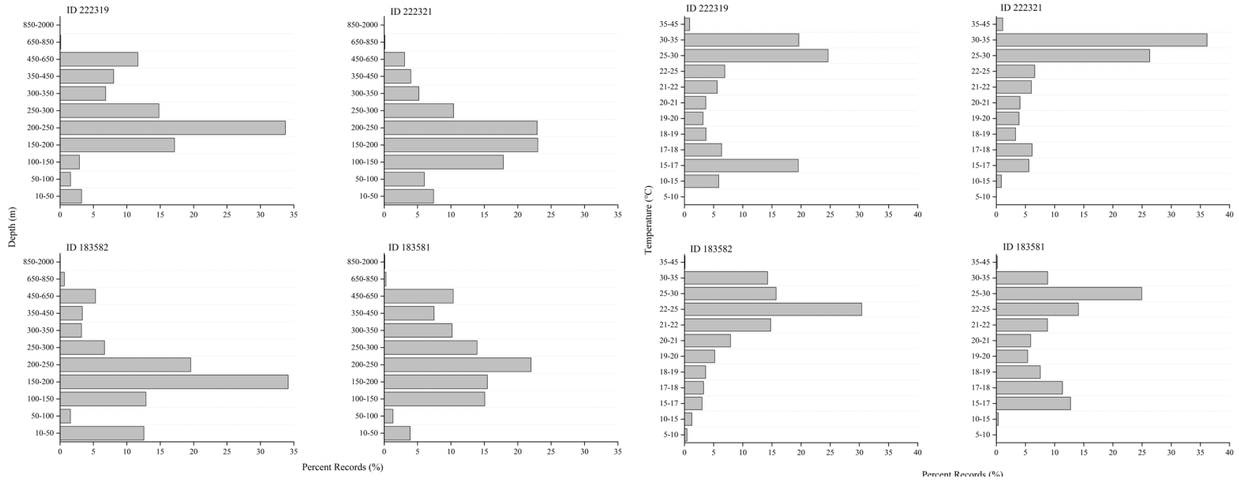


Table 1 Biological data and tag setting of Blue Shark

Sampling date	Species	Total length/ cm	Longitude	Latitude	Sex	ID	Set time/d	Actual receiving
2022.8.24	*Prionace glauca*	200	15.08	131.02	F	222318	30	no signal
2022.8.24	*Prionace glauca*	190	15.08	131.02	M	222319	60	2022.10.24
2022.8.27	*Prionace glauca*	210	12.58	132	F	222321	90	2022.11.26
2022.8.29	*Prionace glauca*	190	14.58	133.08	F	183582	90	2022.10.18
2022.9.7	*Prionace glauca*	190	13.25	136.32	M	183581	60	2022.11.8

Blue Sharks (*Prionace glauca*) are large-bodied, highly migratory species in temperate and subtropical waters. Due to high longline bycatch and mortality rates, their populations have declined globally. Blue Sharks are listed as Near Threatened on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species™ and were listed on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 2022. Satellite tracking can provide valuable information on habitat occupancy, residency times, migration paths, and behavioural data, such as temperature preferences and swimming depth. This information is useful for refining catchability estimates and understanding shark behaviour, which is crucial for conservation efforts. However, little research has been done on the movement of Blue Sharks in the Tropical Central and Western Pacific through satellite tagging studies.

→ **Percent records for depth strata of 4 individuals (left). Percentage of time spent in individual temperature strata diving activities (right).**



With financing and support from the Ministry of Agriculture and Rural Affairs of China, the College of Marine Sciences, Shanghai Ocean University, provided strong technical support for starting and developing China's pelagic fisheries. Recently, Professor Yunkai Li and his team members (Dr Jiangfeng Zhu, Dr Yi Gong, DDrFeng Wu, DDrCheng Zhou and DrDriaojie Dai), scientists who focus on the trophic ecology of oceanic squids and sharks, conducted a survey on the spatiotemporal movement of Blue Sharks in the Tropical Central and Western Pacific. In this survey, five adult Blue Sharks were tagged, and their satellite coordinates were transmitted to better understand their migratory routes and residency patterns and evaluate the post-release mortality from bycatch. This study is significant as it is the first time Chinese scientists have tagged pelagic sharks in this area. The study results have shown a high degree of variation in the migration patterns of these animals. They were found to spend most of their time in waters less than 250 m deep, with a maximum recorded depth of 665 m. The species was found to be thermally sensitive and exhibited a strong preference for warm waters above 22°C in the surface mixed layer. Still, it was also able to tolerate colder waters down to 5.5°C. These findings provide new insights into the movement ecology of Blue Sharks and will make important contributions to the conservation of pelagic sharks in the open ocean.

Photo by Y.L./SHOU.

Researchers from the Shark Research Group at Shanghai Ocean University attaching the satellite tracking tags to or near the dorsal fin of Blue Sharks caught in the Western Pacific.

SHARKS ALWAYS AMAZE US: ON THE REDISCOVERY AND REDESCRIPTION OF THE CRITICALLY ENDANGERED TENTACLED BUTTERFLY RAY

Written by: Mohsen Rezaie-Atagolipour

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Indian Ocean region | Member

Region Update: Indian Ocean

An adult male Tentacled Butterfly Ray

Photo by Mohsen Rezaie-Atagholipour

QECI
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Sustaining Biodiversity in the Persian Gulf

"Sharks always amaze us".

I believe the Shark News magazine is a perfect place to mention this statement, and you can be sure that all readers are entirely on the same page and that nobody blames this taxonomic bias. But after all, we have strong scientific stories for this claim. Right? For instance, in 2018, scientists examined three specimens of a small Whaler Shark collected over eight decades ago from the Western Central Pacific. The specimens most closely resembled the Borneo shark, *C. borneensis*, but also showed some different diagnostic morphological characteristics. Ultimately, scientists concluded that the specimens belonged to a new shark species formally described in 2019 (White et al. 2019). But what amazed shark scientists worldwide was that no modern record was available for the species. In other words, the shark was discovered when it had possibly already gone extinct. Therefore, the scientists named this new species the Lost Shark, *C. obsoletus* (White et al. 2019). One year later, in 2020, the IUCN Red List of Threatened Species categorized the Lost Shark as Critically Endangered-Possibly Extinct (CR-PE) (Dulvy et al. 2020), which means that the species is likely Extinct since it has not been seen for a long time. Still, there is no substantial evidence to confirm this.

However, at that time, the Lost Shark was not the only CR-PE shark or ray species; there were also three others, including the Java Stingaree, *Urolophus javanicus* (Kyne et al. 2021), Red Sea Torpedo, *Torpedo suessii* (Kyne et al. 2017), and Tentacled Butterfly Ray, *Gymnura tentaculata* (Jabado et al. 2017).

When shark scientists were shocked by the news of this newly discovered shark species, my team and I started the first shark and ray-specific survey along southern Iranian waters. We had no idea that one of those four possibly extinct shark species was waiting to be found in Iran's waters and amaze our community again.

On the evening of 24 October 2019, I arrived at Kolahi Port on the Strait of Hormuz. It was my first day surveying shark and ray bycatch from demersal shrimp trawling in national waters. The boat I was going to board was supposed to start working the following day. But another trawler at the port landed its commercially priceless bycatch to sell for fishmeal production – this included rays. I asked the captain if I could examine the accidentally caught rays, and he accepted. I sorted the rays by species and sent photos of each species to double-check them with my great friend and the project's advisor, Dr Rima Jabado. She quickly replied, "Do you have better pictures of *Gymnura*? Are you sure it has a dorsal fin?". I sent her pictures of the dorsal fin and spiracular tentacles, the diagnostic characteristics of the Tentacled Butterfly Ray in the northwestern Indian Ocean. She replied, "Oh wow". This was the first time I ever amazed her – and with the rediscovery of the Tentacled Butterfly Ray could, honestly!

It took one year for us to complete our onboard surveys and provide an insight into the status of the Tentacled Butterfly Ray in Iranian waters, known as the species' last stronghold. Eventually, we, a team of Iranian fisheries scientists, Rima, and the pioneer shark taxonomist Dr David Ebert (also known as the #Lost_Shark_Guy), announced this scientific news in the journal Oryx (see Rezaie-Atagholipour et al. 2021).

However, there were still scientific gaps for the species. The original description of the Tentacled Butterfly Ray by Valenciennes in Müller and Henle (1841) was a brief one-page description without any figures or illustrations. The species was described based on five syntype specimens in the Muséum National d'Histoire Naturelle (MNHN) in France, one of which is missing. My herpetologist friend, Dr Khosrow Rajabizadeh, who was working at MNHN then, did us a favour, took photos from all four available specimens, and examined one in detail. The type of material collected by Polydore Roux in the early 1830s was not in good condition (see Rezaie-Atagholipour et al. ,2023).

Furthermore, none of the 34 specimens of the species available in museums around the world had been examined in detail (Jabado et al. 2021). The extinct butterfly ray was found but not well-described. We, therefore, used fresh dead specimens retrieved from the ray bycatch of shrimp trawling to provide a comprehensive description of this Critically Endangered species, which was eventually published in a topical collection Systematics and Biodiversity of Indian Ocean Sharks, Rays, and Chimaeras (Chondrichthyes) in the journal Marine Biodiversity (see Rezaie-Atagholipour et al. 2023).

We strongly encourage shark scientists, especially those who work in the coastal waters of the northwestern Indian Ocean, to consider this detailed description and keep an eye out for this rare butterfly ray in their national waters. We know living species do not follow our man-made boundaries. Who knows? Maybe Tentacle Butterfly Ray populations are in the waters of the other nations in the region, waiting to be discovered and protected.

The title we used for the short note announcing the rediscovery of the Tentacled Butterfly Ray (Rezaie-Atagholipour et al. 2021) is "Lost and Found". A shark that had been lost and thought to be extinct was found. Now there is just one mission for us: Do our best to never change that promising title to "lost, found, and lost again".

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Photo by Mohsen Rezaie-Atagolipour

A pile of Tentacled Butterfly Rays, the first specimens I encountered in ray bycatch from demersal shrimp trawling on the Strait of Hormuz

Region Update:
Mediterranean

Peaceful Encounters with Eagle Rays

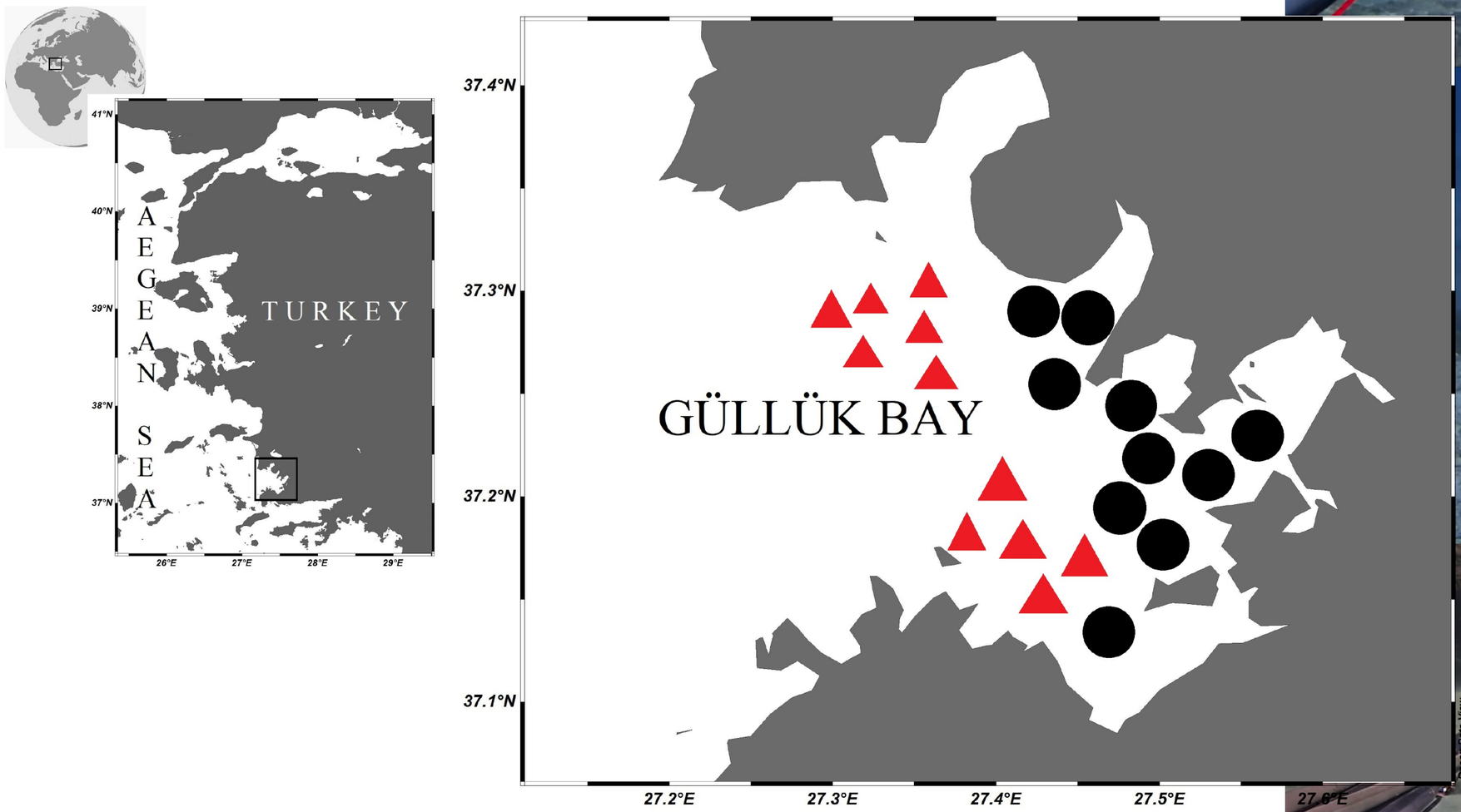
An opportunistic underwater imaging study revealed a potential aggregation site in the southeastern Aegean Sea off Turkey's coast

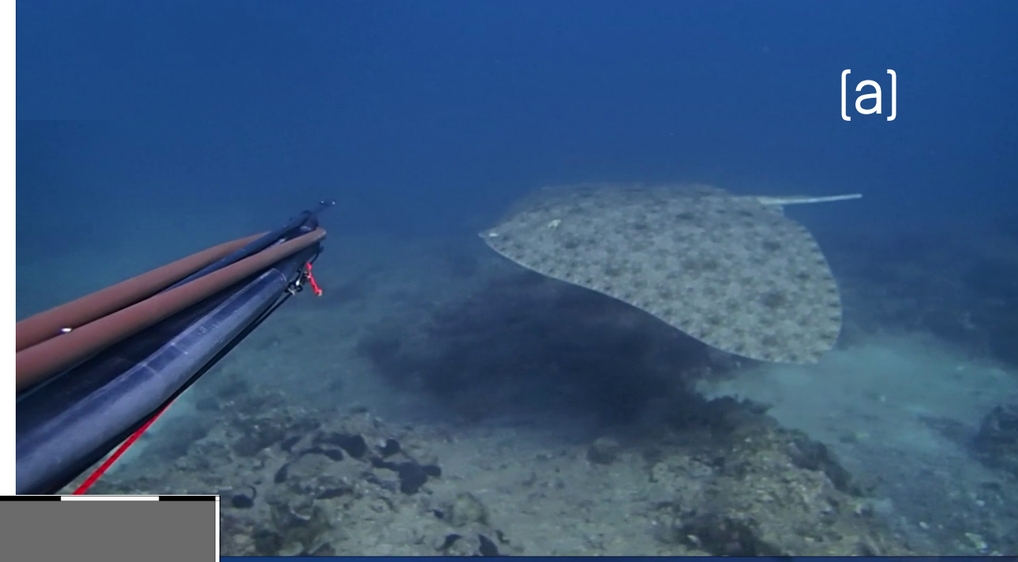
Written by Hakan Kabasakal | IUCN SSC Shark Specialist Group | Mediterranean and Black Sea Region

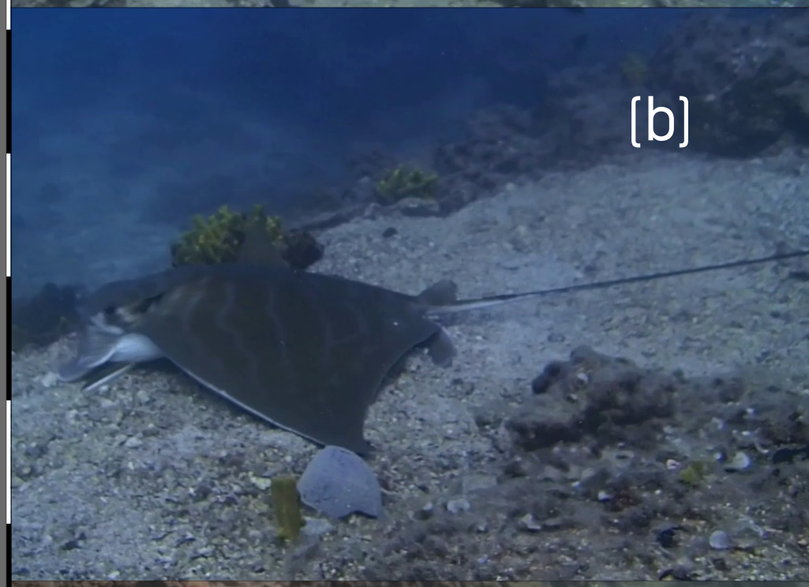
All photos by Ata Bilgili

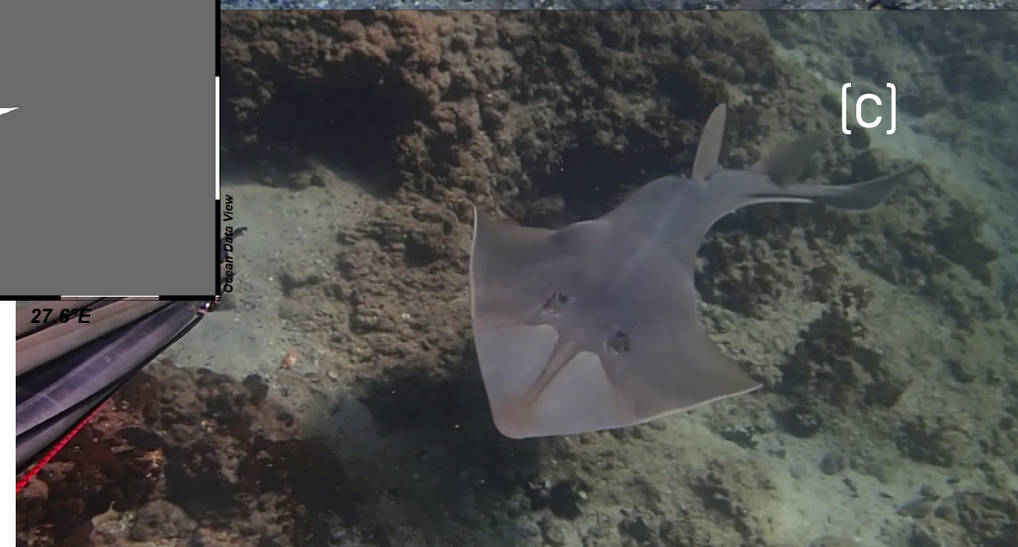
Captured frames from underwater videos of aggregating ray species in Güllük Bay. (a) *Gymnura altavela*, (b) *Aetomylaeus bovinus*, and (c) *Glaucostegus cemiculus*.

Map showing the approximate localities (solid circles) of aggregation sites in Güllük Bay and the aquaculture farms (red triangles).









It has been over ten years since Mr Ata Bilgili, an İstanbul based freediver and spearfisher, mounted an underwater camera to his harpoon. Initially, the diver aspired to document his trophies and create a visual dive log full of stunning adrenaline-pumped moments. Mr Bilgili explained why he put a camera on his harpoon more or less in this manner. But one day, when he shared those images with the author of this article, things changed, and this image hunt started to move towards a different goal.

Overfishing in today's rapidly changing world has driven over one-third of all sharks and rays toward a global extinction crisis. We want to protect sharks and rays because they are the key components of healthy marine ecosystems. The more we learn about their life stories, the more effective management plans we can develop to protect them. We still see the necropsies of dead individuals that have been incidentally caught, washed ashore, or found adrift as a valuable source of information about cartilaginous fishes. However, using non-extractive, non-invasive and cost-effective methods is becoming increasingly common to study rare, sensitive, or threatened species. From this perspective, off-purpose images recorded by spear-mounted cameras used by spearfishers to document their prey can also provide valuable observations and contribute to cartilaginous fish research. The activities of freedivers, especially from the same hunting area throughout the year, over several years, can help us understand the long-term dynamics of cartilaginous fish in the same area. Images recorded by Mr. Bilgili, who has been spearfishing in the same hunting area for at least ten years and almost every month of the year, revealed that some rare and threatened batoid species of the Mediterranean are regularly aggregating in Güllük Bay every summer.

Güllük Bay is a relatively unspoiled marine region on Turkey's southern Aegean coast. Commercially valuable bony fish such as sea bream, yellowtail, and bluefish are seen in shoals in the bay, where a remarkable increase in the number of marine farms has been reported in recent years. Therefore, the fertile waters of the bay inevitably attract the attention of artisanal coastal fishers and spearfishing divers throughout the year.

It has been noted for many years by the fishers of the region that rays such as Spiny Butterfly Ray (*Gymnura altavela*) and Duckbill Eagle Ray (*Aetomylaeus bovinus*) live in the bay and occasionally come close to the shallow shores. Whether this aggregation exhibits a seasonal regularity has remained unanswered until Mr Bilgili realized that the mentioned species in the images he recorded between 2014 and 2022 were specifically aggregating in the summer season. After the images were shared with the article's author and examined in detail chronologically, it was understood that the gathering of rays in the bay peaks in July. Moreover, in addition to Spiny Butterfly Ray and Duckbill Eagle Ray, other rays such as Blackchin Guitarfish (*Glaucostegus cemiculus*), Common Stingray (*Dasyatis pastinaca*), and Marbled Torpedo Ray (*Torpedo marmorata*) were found to be more common in the region in July as well. Nevertheless, the ray species aggregating the most rays in the study area were Spiny Butterfly Ray and Duckbill Eagle Ray. A Poisson distribution analysis (*v*) demonstrated that the probability of aggregations of Spiny Butterfly Rays and Duckbill Eagle Rays in the region in July is 0.17 and 0.27 times higher, respectively, compared to other months of the year. Although mating and birth events were not observed, the fact that pregnant females were seen in the region, especially in July, and only juveniles remained in the bay in the following autumn strengthens the assumption that the aggregation mentioned above may be due to reproduction.

Regarding the observed species, only Blackchin Guitarfish is currently protected according to the Turkish Fisheries Act. Therefore, considering the region as a hot spot for rays, as an urgent measure, at least Spiny Butterfly Ray and Duckbill Eagle Ray, which are considered Critically Endangered, should be added to the list of protected species in Turkish waters. The aggregation site in Güllük Bay should be declared a no-take-zone during mid-spring and summer.

Source reference:

Bilgili, H. & H. Kabasakal (2023): Encounters with threatened batoids from the perspective of a spearfisherman suggesting an aggregation site in southeastern Aegean Sea, Turkey. Regional Studies in Marine Science, 61, 102894. doi.org/10.1016/j.rsma.2023.102894.

Disclaimer:

The spear was pointed at the eagle ray only to allow it to be viewed from a better angle, and no animals were harmed during the dives.

Spiny Butterfly Ray (*Gymnura altavela*)

Photo by Dennis Rabeling

Maugean Skate: Skating Towards Extinction?

↖ The Maugean Skate, *Zearaja maugeana*, is endemic to two estuaries on the west coast of Tasmania →
Photo by David Moreno | Institute of Marine and Antarctic Studies

Colin Simpfendorfer

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Region Update: Indian Ocean

On the remote west coast of Tasmania lie two estuaries. In the south is Bathurst Harbour, located in an almost pristine wilderness visited by few people. Further north is Macquarie Harbour, an estuary adjacent to a world heritage listed wilderness but the site of a range of human uses since before European settlement. Macquarie Harbour has been home to the indigenous Toogee people for millennia. But in the years following European settlement, it was used as a penal colony focused primarily on harvesting lucrative Huon pine and building boats from its hardy timber. Since then, numerous other human pressures have developed, making it a very different place from what it was. One of the world's most unique skates in these two estuaries is the Maugean Skate *Zearaja maugeana*. But the question now is for how much longer it will survive as human pressures mount and its numbers rapidly decline.

When it comes to sharks and rays, the Maugean Skate is special. It was only formally described in 2007, after being first discovered in Bathurst Harbour in 1988. Not only is it the only known estuarine specialist skate, but it is also one of the most range-restricted shark or ray species. The small range means that this is one of the few shark and ray species assessed using Criterion B (restricted range) of the International Union for Conservation of Nature (IUCN) Red List of Threatened Species Categories and Criteria. Currently, the species is listed as Endangered on the Red List and Australia's national threatened species list. Although it is not listed as Critically Endangered, there is increasing concern that the species is in a perilous state. Without significant intervention, it is facing a real risk of extinction – possibly the first shark or ray in modern times as a direct result of human activity.

One person deeply concerned about the status of the species is Dr Leonardo Guida from the Australian Marine Conservation Society. At a recent meeting in Hobart, he tells me that he holds grave fears for the species. "It's a dinosaur that lives in a bathtub – the Maugean Skate has been part of the Australian landscape since the days of T-Rex, and of all of Australia's threatened sharks and rays, it is the one that is most likely to go extinct; if we don't act now, it may disappear on our watch", says Guida. He is not alone in his concerns. The species was recently included in a list of Australia's most threatened species by Australia's Threatened Species Commissioner, signalling concern but also opening pathways for funding to aid conservation. And the Tasmania Department of Nature Resources and Environment, the agency directly responsible for on-the-ground action, is urgently developing a conservation plan to tackle threats and enable population recovery.

To really understand just how bad things have become for Maugean Skate, a conversation with Professor Jayson Semmens and Dr David Moreno from the University of Tasmania's Institute for Marine and Antarctic Studies provides a sobering reality check. Together Semmens and Moreno have been studying the species for over a decade. "When we first started our research in Macquarie Harbour, catching the skates was fairly easy, we could catch dozens in a day", says Semmens, "but now we have to work hard for days at a time just to catch maybe a handful of individuals." And that is despite better knowledge of where the species lives within the harbour and how it moves. So numbers have been falling, and falling relatively quickly.

So how did the Maugean Skate population live in Macquarie Harbour end up in such a poor state? For most sharks or rays, we would normally look first at fishing as the cause of declines. But Moreno, who has probably seen more individuals than any other researcher, is emphatic when he says, "it is all about oxygen. Human activities in and around the Harbour have meant that the oxygen dynamics have changed dramatically, and the skate is suffering as a result." To understand what he means, he first explains the Harbour's geomorphology. It is deep, up to 55 m in places resulting from glacial scouring. But the mouth is shallow and narrow, meaning the water column within the harbour is stratified, with freshwater from several large rivers flowing seaward on the top and marine water on the bottom. The deeper water is naturally lower in oxygen. Still, it would normally be refreshed during periods of low freshwater flow when water from the ocean can penetrate through the mouth and sink into the deeper areas.

Developments since European settlement are the cause of the changing oxygen dynamics. The harbour was used as a port and penal colony in the early years after settlement. To make access to the harbour more reliable, significant changes to the mouth were made. These changes made it more difficult for the ocean water to replenish the deeper waters of the harbour. The discovery of copper, silver, and other valuable metals in the mountains of the catchments of the harbour saw substantial levels of mining waste, high levels of heavy metals, flow down rivers and into the harbour, where it has settled in the sediments in the deeper parts of the harbour. Mining continues to this day, and while the flow of pollutants has decreased substantially, the input of heavy metals continues. While the heavy metals mostly sit in the sediments, it is during periods when the waters of the harbour mix, mostly during strong westerly storm events, that sediments are resuspended, and the metals may affect the diverse life in the harbour, including the skates.

Then, in the early 1900s, the Tasmanian government developed a large hydropower scheme, including on rivers that flow into Macquarie Harbour. This hydropower scheme, which includes 54 major dams, delivers significant environmental benefits to the state. Not only does it power much of Tasmania, but it also exports power to the mainland. However, it also means that the natural flows of rivers have changed as discharges are managed to optimize power generation. As a result, the peaks and troughs of natural flows are much rarer, and the steady flows mean that ocean water has little chance to push through the mouth, replenish the deeper waters, and bring much-needed oxygen.

In the early 2000s, large-scale salmon aquaculture was introduced to the harbour. Atlantic Salmon (*Salmo salar*) production in Tasmania is a major industry, generating nearly a billion Australian dollars in revenue annually. At its peak in 2016, 21,000 tonnes of salmon were held in the harbour. Aquacultures' main impact on skates is through eutrophication, especially in the deeper waters of the harbour. Uneaten salmon feed and organic waste sink to the bottom. This input of nutrients drives primary productivity that consumes oxygen, reducing the naturally low oxygen of deeper waters.

With the skates normally living in the shallower better-oxygenated parts of the harbour, the low-oxygen water in the deeper areas has a relatively small impact. However, the skates are affected when strong westerly storms cause the stratification to break down, and the low oxygen water moves into the shallows. Our understanding of just how badly the skate population can be affected by this type of event can be seen by what happened during two events in 2019 – one a temperature spike, the other a large mixing event. During this period, Semmens and Moreno tracked the movements of more than 25 skates using acoustic telemetry to understand their use of the harbour better. Moreno says, "Within days of these events starting, the skates started to die; in all, we lost almost half of the tagged individuals during this period". Such one-off losses have a devastating effect on the population. But the low oxygen water also caused mortality of embryos in the eggs that the skates lay on the harbour floor, adding to the stress on the population. The results of these events, and the other stressors on the harbour, have been dramatic. "All of the data we have collected shows that the population is not only declining at an alarming rate but there are clear signs of recruitment failure", says Semmens. This last factor has made Semmens and Moreno especially concerned that urgent, rapid action is needed because if few young are being produced, there is a very short window to act to save the species.

On top of those pressures already mentioned, several more cannot be ignored and will further complicate conservation efforts. One is fishing. Both commercial and recreational gillnetting are permitted in the harbour. And while the effect on the population is less than deoxygenation, at a time when the population is in decline, it still has an impact. Another threat is seals that have

A female Maugean Skate (*Zearaja maugeana*) in the tannin-stained waters of Macquarie Harbour, Tasmania.

Photo by Neville Barrett | University of Tasmania, Hobart, Australia

↑ Macquarie Harbour is affected by a range of human pressures, including modifications to the mouth that affect the flow of oxygen-rich ocean water into the estuary

↓ A large hydroelectric scheme that has modified flows of major rivers entering the harbour

↑ The inflow of mining waste high in heavy metals through the King River catchment

↓ A large-scale salmon aquaculture that has increased the nutrient load in harbour waters

been attracted to the harbour for the first time by aquaculture. "The skates are used to being at the top of the food chain in the harbour", reports Moreno, "so the presence of a novel species is exerting new predation pressure that is also affecting the population." Climate change is also piling the pressure. Warmer waters mean greater primary productivity and hence oxygen consumption. Over the last 30 years, the temperature of harbour waters below 10 m has risen between 1.5°C and 2.5°C. This rising temperature increases the deeper waters' eutrophication, exacerbating the deeper water's deoxygenation.

There may be other threats, but as Semmens observes, "Maugean Skate is a poster child for cumulative and synergistic impacts". The level of complexity of the species' pressures in Macquarie Harbour is daunting and not something that most shark and ray scientists are used to dealing with. So, the research that Semmens, Moreno and their team are doing to understand the species, and the pressures it faces, are critical for charting a course towards recovery.

Given the plethora of threats in Macquarie Harbour, you might think, "Thank goodness for Bathurst Harbour." It sits in an almost pristine wilderness and so not subject to the threats faced further north. It turns out that hope is misdirected. Four individual Maugean Skates have been identified in Bathurst Harbour, ever. The last skate sighted was in 1992. Whether the skates persist in Bathurst Harbour has been a key question for assessing and conserving the species. Semmens and his team undertook extensive eDNA surveys in 2021 and 2022 to answer the question. The results were sobering. "We did detect Maugean Skate on one of our surveys, but in such minute amounts, less than one thousandth the level in Macquarie Harbour", reports Semmens. "Such low levels of detection indicate that it is highly unlikely that a viable population persists in Bathurst Harbour." We may never know if a significant natural population existed in Bathurst Harbour. Still, the conservation consequences are clear – the rapidly declining and highly threatened population in Macquarie Harbour must be the focus of recovery efforts.

The lack of a viable population in Bathurst Harbour also has consequences for Red Listing and national threatened species listing because the species is now known to occur only at one location and to have a very restricted range. This may make it eligible for listing as Critically Endangered, and such a status would seem more aligned with the concerns about its future.

With the conservation focus now firmly set on the skates in Macquarie Harbour, conservation advocates are pressing hard for action. "Now is the time to act; we may only have a decade, possibly less, to save this species from extinction, " says Guida. "The Tasmanian government is developing a conservation plan, the Federal government is updating its Conservation Advice, and with our partners at Humane Society International, we've formally nominated the species for 'Critically Endangered' listing under Australia's nature laws". Already the Tasmanian government has started to take action. Regulation of commercial and recreational fishing has increased to reduce its pressure. But the most important changes are probably in managing oxygen levels. To address this, levels of salmon allowed to be stocked in the harbour were reduced a few years ago, but concerns that it had little effect have seen management switch to a nitrogen cap rather than a biomass limit. This change can potentially make a significant difference, but it is too early to see how well it will work. But aquaculture is far from the only pressure on oxygen in the system. Semmens observes that "the approach to managing oxygen to date has been attributional, with stakeholders often pointing the finger at each other. What we really need is an approach where all stakeholders work together in a cooperative way."

One of the big questions is whether a cooperative approach to managing oxygen will be enough to save Maugean Skates. "Oxygen management is essential, but it takes time and cooperation", says Moreno. "So, we think there is also a need for active conservation given the rapid deterioration in the population." And that means considering a captive rescue population, captive breeding, and translocation. These are actions that shark and ray researchers, managers and conservation advocates have limited experience with but will need to learn quickly to implement them in time to make a difference. And reaching out to terrestrial conservation experts who are much more experienced in these approaches will be important.

Tucked away in a remote corner of Tasmania, the looming extinction of one of the world's most unique skates may have gone unnoticed if not for the efforts of local researchers, including Semmens and Moreno. Despite its remoteness, the species has become a victim of myriad compounding and synergistic threats that can only be addressed by collaborative approaches to managing oxygen and other threats from major industries. The question now is whether a plan can be developed and implemented before this species skates into extinction.

Find out more:

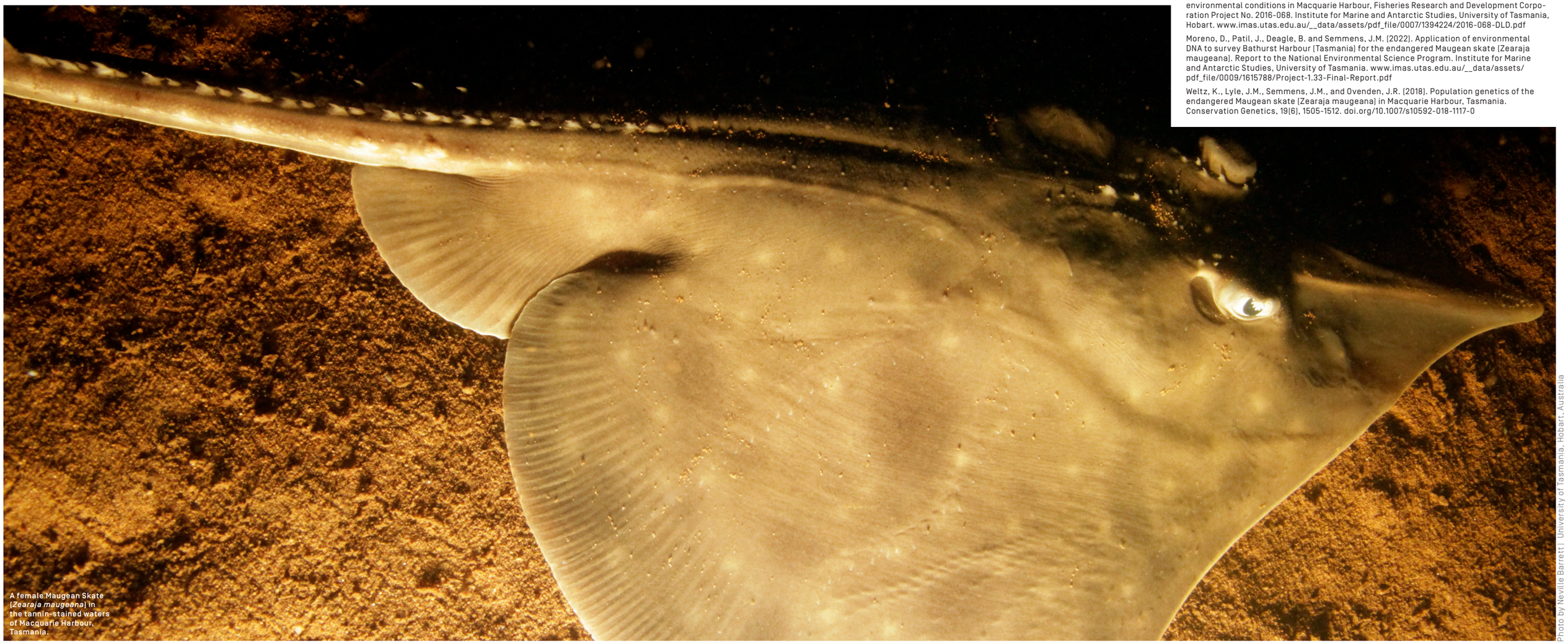
Awruch, C.A., Bell, J.D., Semmens, J.M., and Lyle, J.M. (2021). Life history traits and conservation actions for the Maugean skate (Zearaja maugeana), an endangered species occupying an anthropogenically impacted estuary. Aquatic Conservation: Marine and Freshwater Ecosystems, 31(8), 2178-2192. doi.org/10.1002/aqc.3579

Morash, A.J., Lyle, J.M., Currie, S., Bell, J.D., Stehfest, K.M., and Semmens, J.M. (2020). The endemic and endangered Maugean Skate (Zearaja maugeana) exhibits short-term severe hypoxia tolerance. Conservation Physiology, 8(1), coz105. doi.org/10.1093/conphys/coz105

Moreno, D., Lyle, J.M., Semmens, J.M., Morash, A., Stehfest, K., McAllister, J., Bowen, B., and Barrett, N. (2020). Vulnerability of the endangered Maugean Skate population to degraded environmental conditions in Macquarie Harbour, Fisheries Research and Development Corporation Project No. 2016-068. Institute for Marine and Antarctic Studies, University of Tasmania, Hobart. www.imas.utas.edu.au/__data/assets/pdf_file/0007/1394224/2016-068-DLD.pdf

Moreno, D., Patil, J., Deagle, B. and Semmens, J.M. (2022). Application of environmental DNA to survey Bathurst Harbour (Tasmania) for the endangered Maugean skate (Zearaja maugeana). Report to the National Environmental Science Program. Institute for Marine and Antarctic Studies, University of Tasmania. www.imas.utas.edu.au/__data/assets/pdf_file/0009/1615788/Project-1.33-Final-Report.pdf

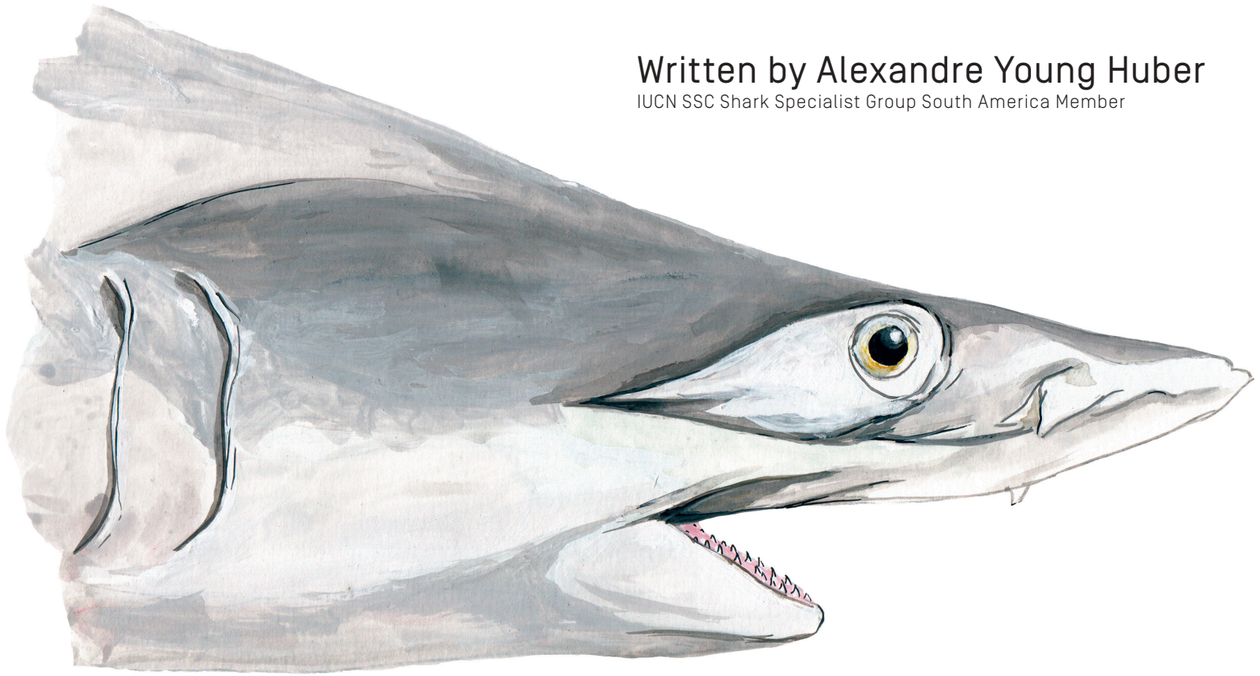
Weltz, K., Lyle, J.M., Semmens, J.M., and Ovenden, J.R. (2018). Population genetics of the endangered Maugean skate (Zearaja maugeana) in Macquarie Harbour, Tasmania. Conservation Genetics, 19(6), 1505-1512. doi.org/10.1007/s10592-018-1117-0



A female Maugean Skate (*Zearaja maugeana*) in the tannin-stained waters of Macquarie Harbour, Tasmania.

Photo by Neville Barrett | University of Tasmania. Hobart, Australia

Art as a Passion



Written by Alexandre Young Huber
IUCN SSC Shark Specialist Group South America Member

Tubarão-Martelo / Cambeva
Sphyrna lewini

"My name is Alexandre Huber, Brazilian, born in the city of Santos/SP, founder of Huber Arte Marinha (2009), which aims to maintain the importance of preserving the Oceans and their creatures and sow the Future Guardians of the Ocean, enchanting children through of the magic of colours and knowledge, and who knows with you?"

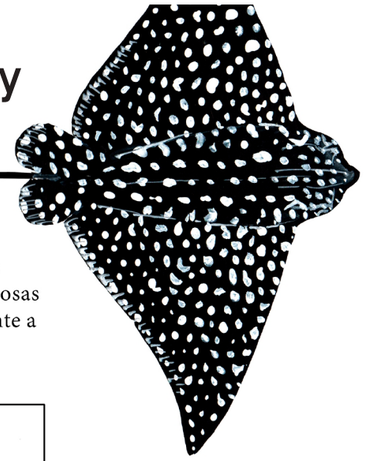
During his career, Huber has already developed more than 2,000 marine artworks in the production of children's books and scientific illustrations.

"Through this, I make myself entirely available to the researchers of this institution that I am very honoured to be a part of. Either to illustrate species from each country through posters or individual artworks to enrich scientific articles. Anatomy, biology, and infographics."

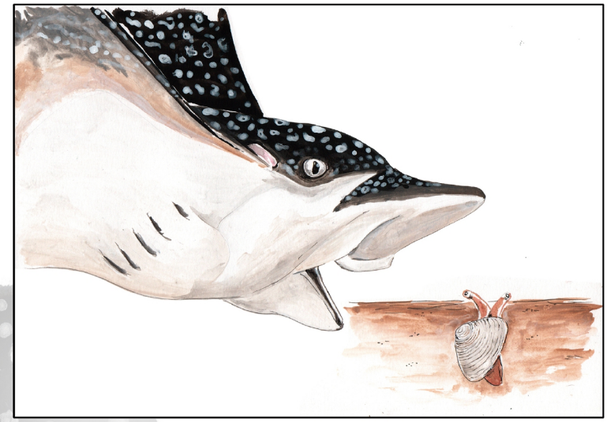
"Marine art is my passion, and it is my way of acting in favour of the oceans and the fascinating marine species that inhabit them; nobody protects what they don't know; a child knows that there is a lot of life in the sea, but knowing the characteristics and curiosities of every marine animal makes you fall in love. I think that's why I acted in the formation of Future Guardians of the Oceans, working with children and facilitating knowledge through art in the learning of young people and university students. I love and dedicate my life to it."

All photos provided by Alexandre Huber as part of Tubarões de Ilha Grande from the state of Rio de Janeiro.

Tooth plate of the Stingray
Aetobatus narinari



Alimentando-se principalmente de moluscos e crustáceos, esmagar e comer presas duras exigiu da raia-chita (*Aetobatus narinari*) muitas adaptações ao longo dos milhares de anos, suas mandíbulas cartilaginosas são reforçadas em relação aos seus parentes e sua dentição é semelhante a um pavimento com placas dentárias fundidas em sua superfície.



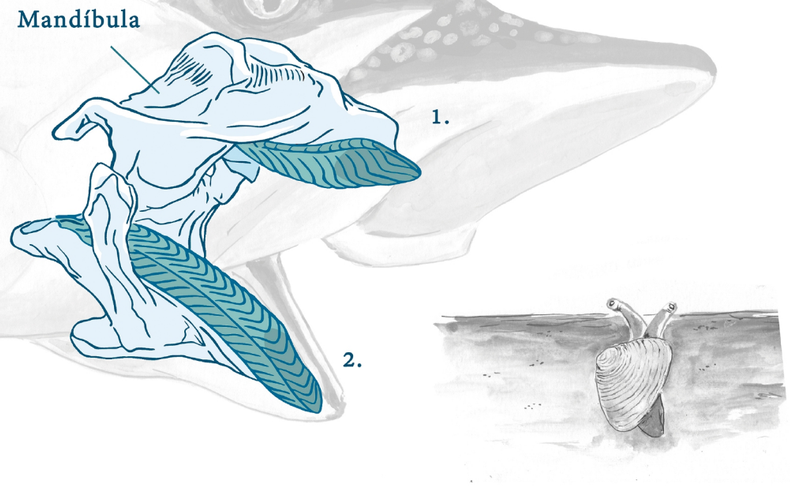
Com seu focinho, desenterram suas presas que acabam trituradas em instantes e através de papilas no céu da boca, conseguem separar as partes moles que engolem das partes duras, cascas e carapaças que cospem.

Placa dentária superior

1.

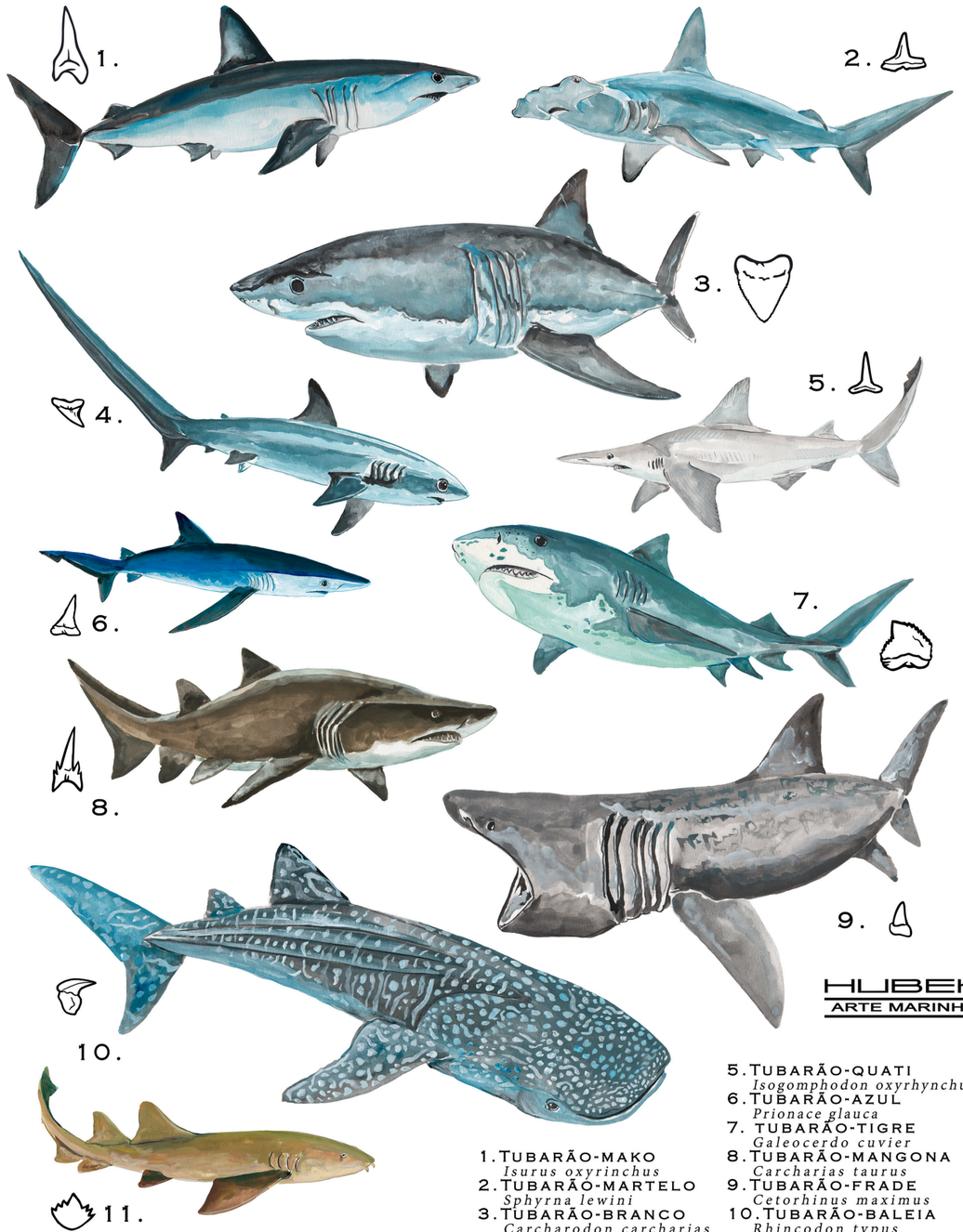
2.

Placa dentária inferior



HUBER
ARTE MARINHA

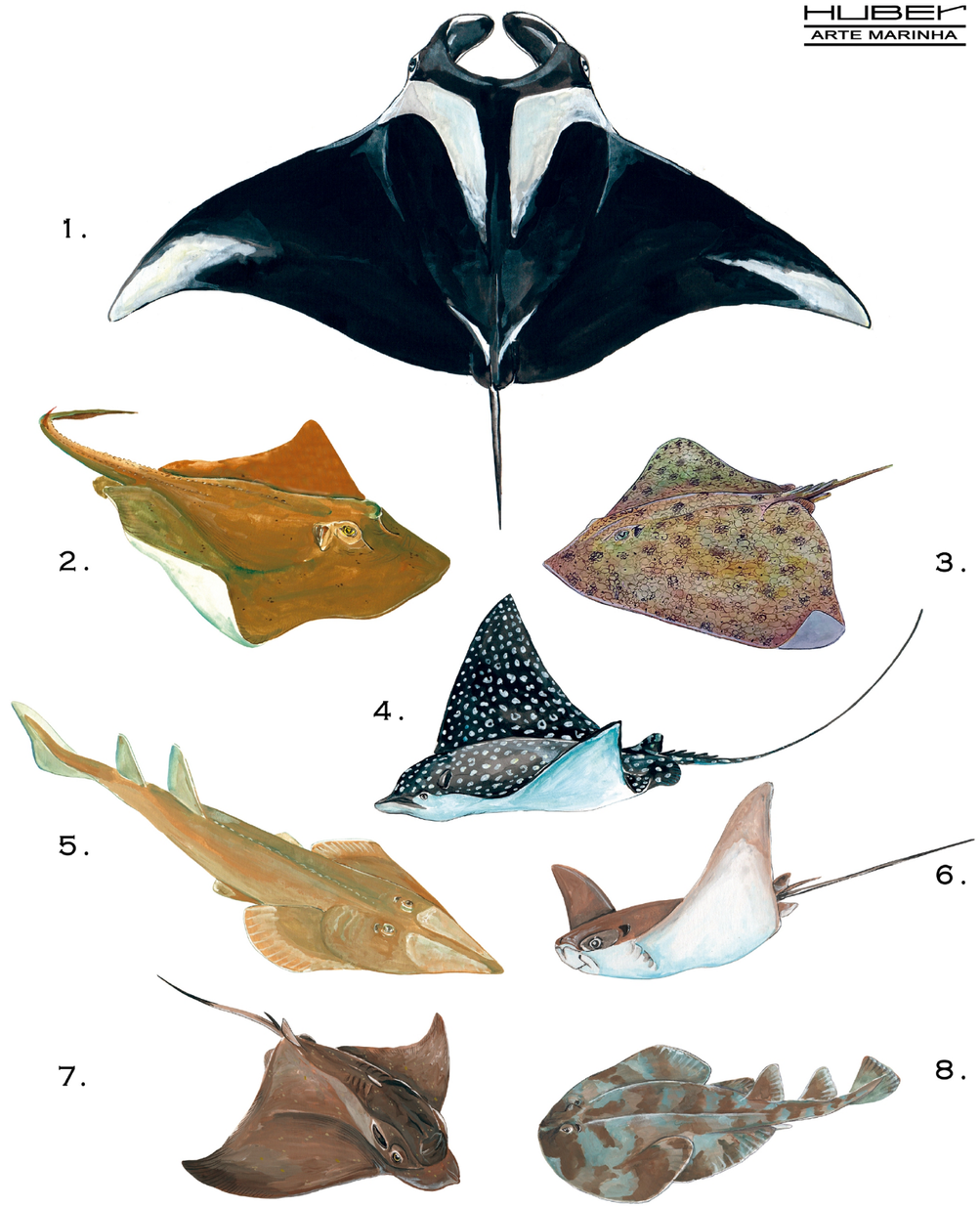
Some Sharks of Brazil



HUBER
ARTE MARINHA

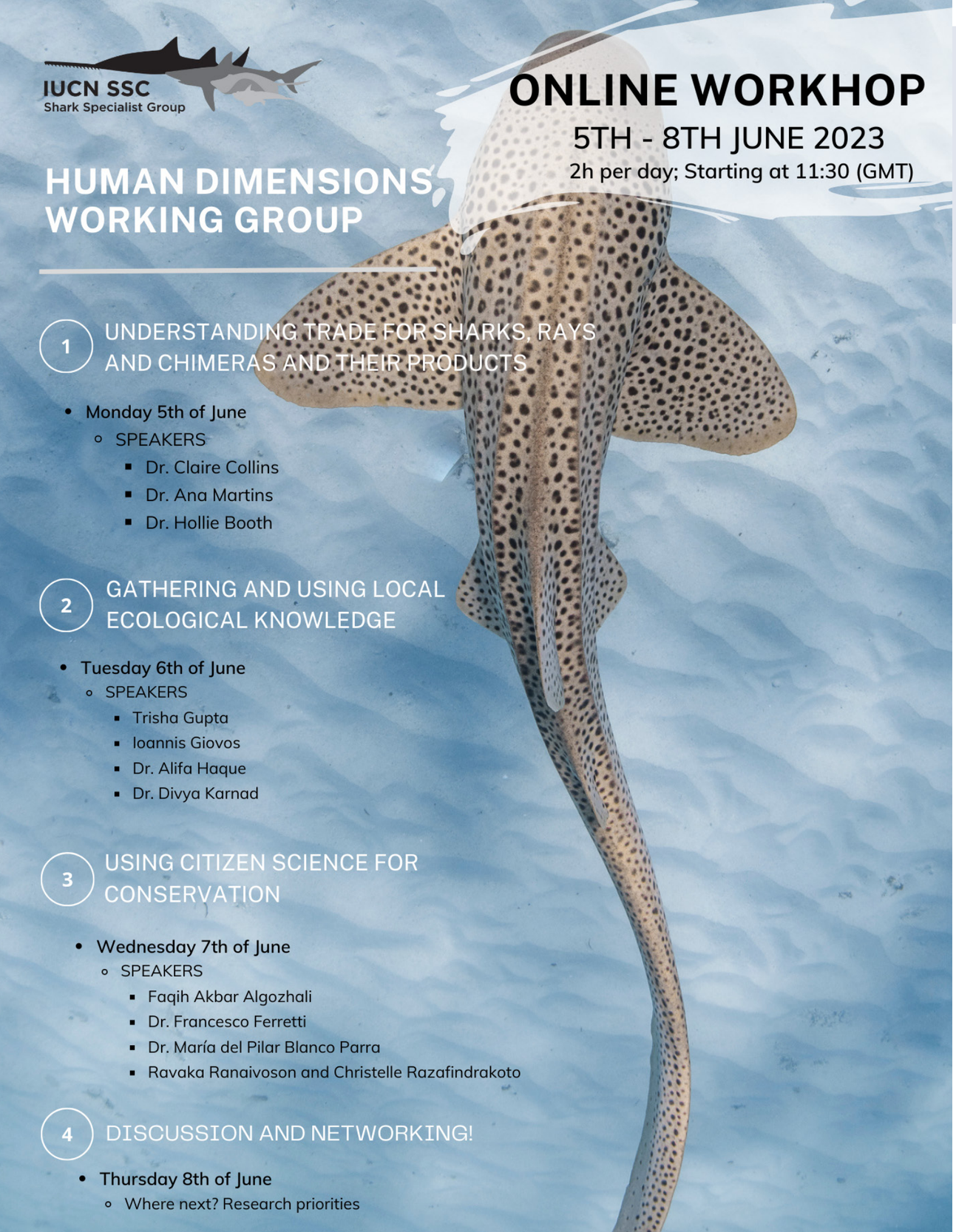
1. TUBARÃO-MAKO
Isurus oxyrinchus
2. TUBARÃO-MARTELO
Sphyrna lewini
3. TUBARÃO-BRANCO
Carcharodon carcharias
4. TUBARÃO-RAPOSA
Alopias supercilious
5. TUBARÃO-QUATI
Isogomphodon oxyrhynchus
6. TUBARÃO-AZUL
Prionace glauca
7. TUBARÃO-TIGRE
Galeocerdo cuvier
8. TUBARÃO-MANGONA
Carcharias taurus
9. TUBARÃO-FRADE
Cetorhinus maximus
10. TUBARÃO-BALEIA
Rhincodon typus
11. TUBARÃO-LIXA
Ginglymostoma cirratum

Some Rays of Brazil



HUBER
ARTE MARINHA

1. RAIA-MANTA
Mobula birostris
2. RAIA-PREGO
Hypanus berthalutzae
3. RAIA-BORBOLETA
Gymnura altavela
4. RAIA-CHITA
Aetobatus narinari
5. RAIA-VIOLA
Pseudobatos horkelii
6. RAIA-TICONHA
Rhinoptera brasiliensis
7. RAIA-SAPO
Myliobatis freminvillei
8. RAIA-ELÉTRICA
Narcine brasiliensis



IUCN SSG Human Dimensions Working Group Online Workshop Dates: June 5 – 8, 2023

If you were not able to attend all the sessions during the workshop, you can find the recordings here. All participants who registered on the Hopin app should be able to access the link. If you have not registered on the Hoping App, the recordings are available on the SSG YouTube channel.

Promoting the effective conservation of sharks, rays, and chimaeras requires attention to human interactions and relationships with these species. The International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Shark Specialist Group's (SSG) Human Dimensions Working Group (HDWG) is committed to supporting shark, ray, and chimaera research and conservation by recognizing the various ways in which humans interact with, have an impact on, and relate to these species. One way we achieve this is through short exposure and training workshops to promote interdisciplinary learning, including cultural beliefs, social attitudes, behavioural change, economics and knowledge about sharks, rays, and chimaeras, for diverse sections of society. As a follow-up to our Crash Course in Human Dimensions of Shark Conservation (held in 2021 and available for viewing here. We ran a 4-day free webinar in June 2023 as part of the workshop series. This is open to SSG and non-SSG members alike.

The following topics were covered:

1) Understanding trade for sharks, rays, and chimaeras and their products;
2) Gathering and using local ecological knowledge; and
3) Using citizen science for conservation.

In addition to the panelists invited to speak at the workshop, participant interactions and discussions were recorded.

Who

The course was coordinated by Dr Divya Karnad (divya.karnad@ashoka.edu.in), Paula Dominguez (paula.reinloring@gmail.com), and Dr Hollie Booth in addition to invited panelists. Please reach out to us if you have any questions.

IUCN SSC
Shark Specialist Group

GCAT TACG GCAT

genes

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DNA Taxonomy, Molecular Phylogeny and Population Genetics of Cartilaginous Fishes

Guest Editors:

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Chinese Academy of Sciences Key Laboratory of Animal Ecology and Conservation Biology, Institute of Zoology, Beijing, China

zhangjie@ioz.ac.cn

Deadline for manuscript submissions:
20 December 2023

Message from the Guest Editors

Dear Colleagues,

During the past decade, the remarkable increase in cartilaginous fish genome sequencing has revolutionized molecular phylogeny and population genetics, with the outcome of stimulating insights into cartilaginous fish conservation biology. The IUCN Red List states that 30% of chondrichthyans are threatened by extinction, and overfishing is considered the main threat to their existence. Genetic approaches play an essential role in shark conservation; there has been some progress, but a great deal of work still lies ahead. Cartilaginous fish genomic sequences can be compared with other Osteichthyes to trace species' evolutionary history and origin as well as phylogenetic relationships. Understanding the heritability of conservation biology requires a more comprehensive assessment of cartilaginous fish genetic variation. This Special Issue of Genes on "DNA Taxonomy, Molecular Phylogeny and Population Genetics of Cartilaginous Fishes" aims to provide an overview of recent developments in this field of research, including critical perspectives on current and upcoming challenges.

Dr. Xiao Chen
Dr. Jie Zhang
Guest Editors

mdpi.com/si/136768

Special Issue

Upcoming Meetings

Please visit the respective websites and communication from the host organisation for more information.

Society for Conservation Biology

International Congress for Conservation Biology (ICCB) 2023
July 23–27, 2023
Kigali, Rwanda
conbio.org/mini-sites/iccb-2023/

Organised annually by the Society for Conservation Biology (SCB), ICCB is the premier global meeting for conservation scientists and professionals, including researchers, students, agency personnel, environmental educators, practitioners, and other conservation stakeholders. Attendees gather for lively discussions and scientific presentations on the nexus between biodiversity conservation and genetics, ecology, biogeography, anthropology, history, psychology, economics, conservation marketing, religion, and more.

SOUTHERN AFRICAN SHARK & RAY SYMPOSIUM

7th Southern African Shark and Ray Symposium (SASRS)
Umhlanga, KwaZulu-Natal, South Africa
October 24–27, 2023
sharkandraysymposium.com

The Southern African Shark & Ray Symposium (SASRS) is a biennial event, which brings together social and natural scientists, practitioners, non-governmental and governmental organizations as well as decision makers. The central purpose of the Symposium is to provide a forum for the discussion and exchange of ideas, experiences and knowledge on issues related to the biology, conservation and management of sharks and rays. Active participation by early career researchers is strongly encouraged, especially from African and West Indian Ocean countries outside of South Africa. This year they will introduce the "New Generation programme", where some of the best science students at schools in KwaZulu-Natal as well as top-performing students from the Universities of Fort Hare, Zululand, Western Cape and Walter Sisulu University will be in attendance.

European Elasmobranch Association

European Elasmobranch Association (EEA) 2023
October 18 – 20, 2023
Brighton, United Kingdom

sharktrust.org/eea2023

The Shark Trust invites you to the EEA 2023 Scienfici Conference in the United Kingdom! The location, Brighton on the South Coast, is a vibrant seaside town with excellent connections to both Heathrow and Gatwick Airports and the Eurotunnel terminus in London. The Shark Trust will only be able to deliver an in-person EEA 2023 if they get enough registered support by mid-July. Otherwise, an online alternative will be organised. Please register your commitment to taking part in the EEA2023 in Brighton by clicking on « Attend EEA2023 » button and adding your name to the waiting list. The Shark Trust will send you a link to complete your registration once a final decision is made in late July.

WHITE SHARKS GLOBAL 2023

White Sharks Global
Port Lincoln, South Australia, Australia
November 12–17, 2023

whitesharksglobal.com

White Sharks Global is an international scientific conference aiming to provide an in-person forum for the White Shark community to meet, share ideas, update information and report on the progress of recent scientific studies. The last White Shark-focused conference was in 2010. A wealth of new studies has been undertaken since, creating a need to share research advancements, and updates on current human impacts and conservation outcomes.
Two days of White Sharks Global will be dedicated to presentations from attendees, following traditional conferences. However, most presentations will be five minute lightning talks, maximising the breadth of research presented within two days. White Sharks Global welcomes abstracts for posters from attendees and encourages those who would like to share results from multiple projects to submit abstracts for both a poster and a presentation.

Funding Opportunities

ASAP!

Asian Species Action Partnership
ASAP Species Rapid Action Fund

speciesonthebrink.org/asap-grants/rapid-action-fund/

Status: Open

During a conservation project, conservation emergencies or a need for unforeseen activities may arise. In such cases, time is of the essence. Fast action can make all the difference to a species' chance of survival. That is why ASAP is offering grants of up to SGD 13,500 to ASAP Partners for urgent and emergency conservation of ASAP species. The fund will provide rapid disbursement of small amounts of funds to address urgent requests from the field for conservation actions. Grants can be used in the following ways:

- To address unforeseen conservation emergencies where urgent action is needed; and
- For the seamless continuation of important current conservation actions. Proposals to support the ongoing costs of a long-term conservation project are not eligible except where there is an unforeseen funding gap, and where the seamless continuation of activities is imperative for the ongoing or long-term conservation of the ASAP species in question.

They invite ASAP Partners to submit proposals to the ASAP Species Rapid Action Fund. Proposals will be reviewed on a rolling basis throughout the year; they can be submitted at any time.

ASAP Species Conservation Grant

speciesonthebrink.org/asap-grants/asap-species-conservation-grants-2023/

Status: Open

ASAP Species are some of the most at risk of extinction on the planet. The ASAP Species Conservation Grant is designed to support ASAP Partners in their efforts to conserve ASAP Species and their habitats.
To be considered for an ASAP Species Conservation Grant, an organisation must be an existing ASAP Partner. ASAP Partners are invited to submit pre-proposals for a maximum of SGD 16,000.
The duration of the ASAP-funded project or project component should be 12 months or less.
The priorities for ASAP Species Conservation Grants are:

- projects within Southeast Asia, but priority conservation actions for ASAP species outside this region will be considered where there is strong justification.
- projects submitted by national organisations and those where the Project Lead is from the country in which the conservation actions take place.
- ASAP Species that are receiving less conservation attention globally than is average for ASAP Species, and to applications making a clear case that the species in question is severely undersupported globally.

Please note that funding for this opportunity is limited and the grant will close once funding is allocated.

ASAP Species Continuation Grant

speciesonthebrink.org/asap-grants/asap-species-continuation-grants-2023/

Status: Open

The ASAP Species Continuation Grant is open to ASAP Partners who have previously received funding from either the ASAP Species Conservation Grant or the ASAP Species Rapid Action Fund. There are two components to the ASAP Species Continuation Grant: funding to enable follow-up conservation activities for ASAP Species and funding to address the organisational needs or priorities of ASAP Partners. Applications must address both components.
Proposals should be submitted in Singapore Dollars for a maximum of SGD 30,000 a year, with activities relating to project implementation and organisational development included in each year of the grant. Up to SGD 20,000 a year can be for project activities, with up to SGD 10,000 a year to support organisational development. Proposals can be for a maximum of three years.

ASAP Partner Networking Grant

speciesonthebrink.org/asap-grants/asap-partner-networking-grant-2023/

Status: Open

The ASAP Partner Networking Grant is designed to facilitate collaboration and networking between ASAP Partners to catalyse conservation action for ASAP Species.
To be eligible:

- All applicants must be ASAP Partner organisations.
- The application must detail how the collaboration will further the conservation of ASAP Species. This can be for a single or multiple ASAP Species.

Proposals should be submitted in Singapore Dollars for a maximum of SGD 13,500. The duration of the ASAP-funded activities should be 6 months or less.

Funding Opportunities

Future Conservationist Award

conservationleadershipprogramme.org/grants/grant-overview/future-conservationist-award/

Deadline for application: October 10, 2022

Each worth $15,000, Future Conservationist Awards are granted to teams of early-career conservationists (i.e., team members have less than five years of professional conservation experience) who are conducting high-priority projects focused on protecting species listed as Data Deficient, Vulnerable, Endangered or Critically Endangered on the IUCN Red List. Projects must take place in an eligible country, be led (or co-led) by a national of one of these countries, involve at least three people and last between three to 12 months.

Conservation Follow-up Award

conservationleadershipprogramme.org/grants/grant-overview/conservation-follow-up-award/

Status: Open

Conservation Follow-Up Awards involve grants of up to $25,000 and are available to teams addressing a conservation issue raised by recommendations in a project previously supported by CLP. Projects should be focused on direct conservation outputs, for example lobbying, awareness raising, education, training and monitoring.
As with the Future Conservationist Award, results and data from Conservation Follow-Up projects should inform national action plans and international priority setting.

Association Française des Parcs Zoologiques (AFdPZ)
The French Association of Zoos – AFdPZ – was created in 1969 and currently includes nearly 100 of the most progressive French zoos and aquariums (including 50 EAZA members), representing over 21 million visitors per year. AFdPZ institutions – wild fauna experts – are dedicated to animal care and nature protection by carrying out their official missions of Conservation, Education and Research as required by National and International laws.

2024 AFdPZ Conservation Fund

afdpz.org/conservation/

To protect a species, the first action must be in-situ conservation (i.e. in the natural environment): identifying threats and seeking solutions that take into account all the needs of the populations sharing the area. This may involve regulation, habitat protection and restoration, education, and access to alternative and sustainable sources of food and income. Unfortunately, for some species, it is difficult to significantly reduce the pressures impacting their survival in the wild. In these cases, ex-situ conservation is necessary to complement the measures taken in the field. AFdPZ supports biodiversity conservation through its in-situ conservation fund. Each year, around 20 conservation programs around the world receive an AFdPZ grant.
To make an initial application for AFdPZ funding, please return the completed application form (in French or English) by November 30, 2023 at 23:59 CET to:
afdpz@afdpz.org

IUCN SSG Sponsors & Supporters

The IUCN SSC Shark Specialist Group is fiscally sponsored by Re:wild, a 501(c)(3) non-profit organization with headquarters in Austin, TX, USA (tax ID: 26-2887967).

DONATE

Sharks and rays need you.
Please donate and help us make a difference.

Sharks and rays are some of the most threatened species in the world, more so than land animals. Populations are declining at alarming rates and 37% of species are already threatened with extinction. With your support we can find solutions and take actions to conserve these incredible animals before it is too late.

The IUCN SSC Shark Specialist Group achievements over the last 30 years have been possible due to the generous support of funders, members, and other volunteers from countless organizations. Our members volunteer their time, effort and expertise to advance our mission and vision.

We would like to express our most sincere gratitude for the generous grants, collaborations, and support to our group, our teams, our projects, and our efforts. We appreciate the support that has been provided over the years and look forward to continuing our journey and endeavors together into the future.

ATLANTIS DUBAI

Shark Conservation Fund

WHITE SHARK

save our seas foundation

Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

صندوق محمد بن زايد للمحافظة على الكائنات الحية
The Mohamed bin Zayed SPECIES CONSERVATION FUND

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