SHARK NEWS

Newsletter
of the IUCN SSC Shark
Specialist Group
#4 | January 2022

IUCN SSC
Shark Specialist Group

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.

Photo by Michael Scholl | Save Our Seas Foundation

Photo by Tanya Houppermans

Covers: Late-day light breaks through the surface of the water and Silky Sharks (*Carcharhinus falciformis*) dance among the last rays of sun in the Jardines de la Reina (Gardens of the Queen) National Park off Cuba.

Cover photos by Tanya Houppermans | blueelementsimaging.com

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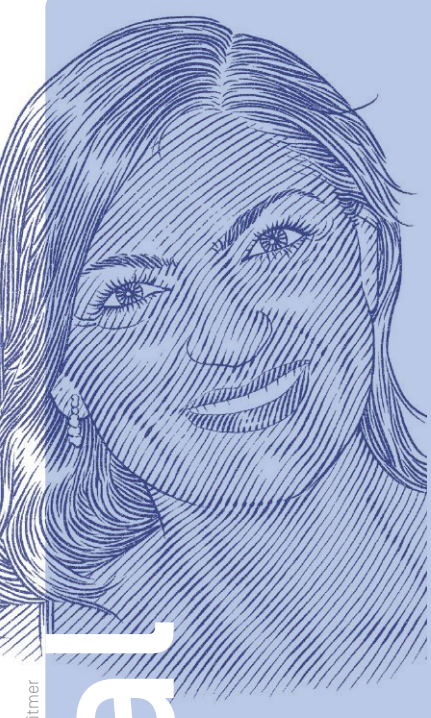


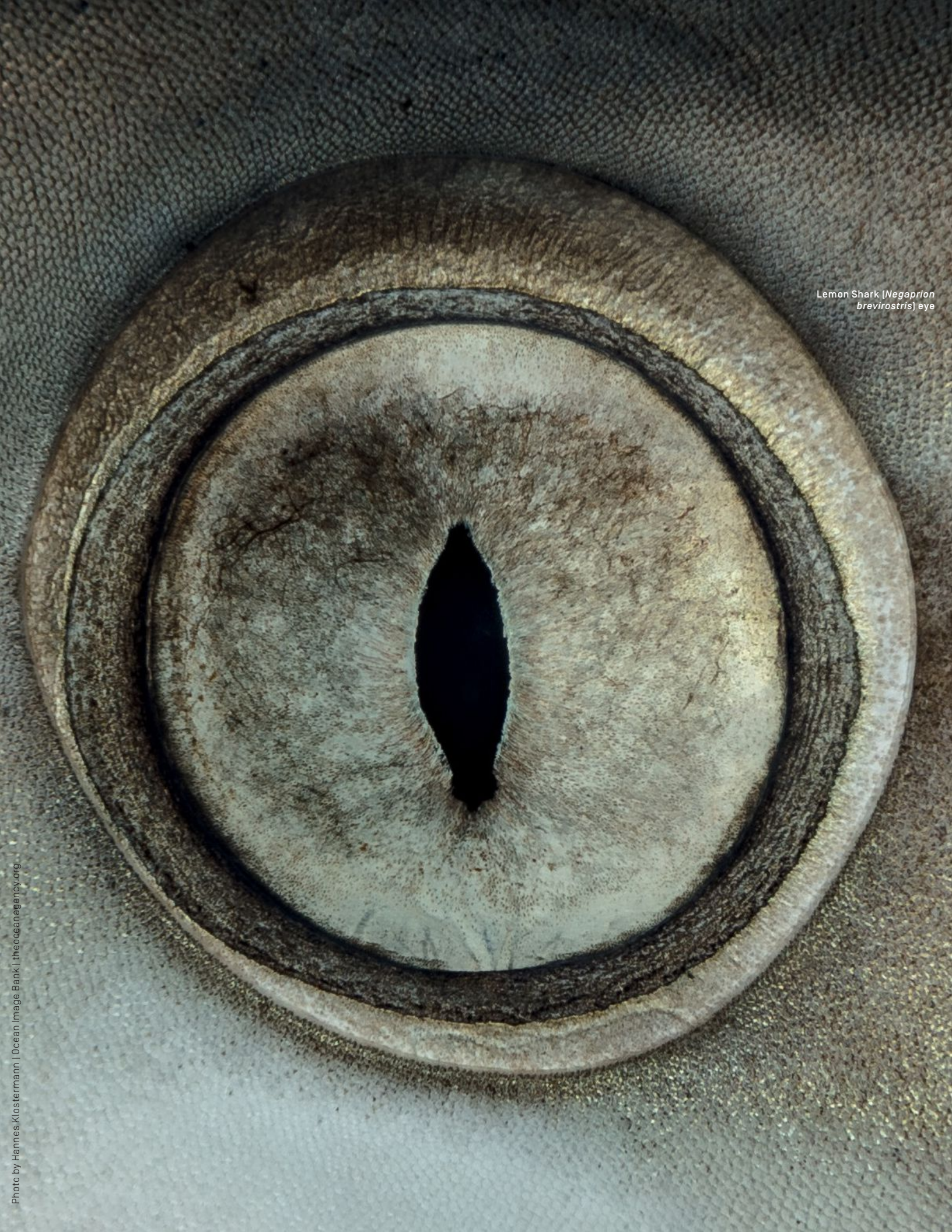
Artwork by Keith Witmer

Editorial

A note from the Chair Rima Jabado

Dear readers,

As we slowly move into a third year under the shadow of a pandemic that refuses to dissipate, our families, work, morale, and priorities have, without a doubt, been impacted. But having said goodbye to 2021, I welcome the new year with a spirit of hope and renewed optimism for what's to come. From a professional perspective, it's often the stories shared through the IUCN SSC Shark Specialist Group network and increasingly Shark News that keep me optimistic and appreciative of all the work that is being done for the conservation of sharks, rays, and chimaeras around the world. So, I want to start the year by thanking all our members for their passion, commitment, and everything they do as well as Michael and Peter Scholl for continuing to make Shark News a reality. This issue includes stories of hope but also stories that should be sounding alarm bells. Legislative amendments in Bangladesh to protect 23 shark and ray species highlight how important it is for organizations like the Wildlife Conservation Society to work on the ground and engage with governments. These commitments to protect species are often only possible when national-level data are available on species diversity and interactions with fisheries. So it's great to see projects being completed or taking off in places like Sri Lanka, Iran, and Angola, where only a few years ago, little to no information was available on sharks and rays. In Sri Lanka, there are now data suggesting declines in the numbers of Mantas and Devil Rays landed, which can support ongoing discussions with the government on conservation measures for these species. Through trawl surveys in Iran, a Critically Endangered butterfly ray thought to be Possibly Extinct across its known range was rediscovered, bringing hope for its conservation. In Angola, work has begun with local communities to understand the utilization of sharks and rays and the impact of artisanal fisheries on landed species. Working with communities and the public can bridge knowledge gaps for scientists while fostering awareness of conservation issues. We have a great story from questionnaire-based surveys on public attitudes to sharks and how culture and history can shape attitudes around the world. Our feature story on freshwater sharks and rays allows us to delve into the little-known world of this unique group of animals. It highlights their plight from human activities, particularly urban development, and the importance of undertaking research and raising their profile. This species group requires immediate attention, and I hope we can work more on freshwater species over the next few years, particularly the South American Freshwater Stingrays, many of which are listed on Appendix III of the Convention on the International Trade in Endangered Species of Flora and Fauna (CITES). With the next CITES Conference of Parties less than a year away, we wanted to share information on its rules of procedure and our role as the IUCN SSC Shark Specialist Group when engaging with such international treaties. We also focus on how art can contribute to improving our understanding of sharks, rays, and chimaeras from the fantastic illustrations drawn by Marc Dando that showcase the beauty and diversity of this group. We recognize the importance of having identification materials to improve data collection in fisheries and trade and inspire future generations to learn about these species through the development of species brochures in Chile. But we understand that capacity building is not only about sharing technical knowledge. It can be inspiring students to care and learn more or engaging with women in small-island states to empower them and teach them about marine conservation and the value of species conservation by teaching them how to swim. Finally, in November 2021, scientists working on rhino rays from around the world were brought together for an online symposium. The success of this event in terms of networking and data sharing was astounding and showed that we can continue working together remotely. October 2022 will see the next edition of the Sharks International conference in Valencia, Spain. We hope this will be an opportunity for many of us to meet in person once again and will be bringing you updates on this event over the next few issues. →Rima



Lemon Shark (*Negaprion brevirostris*) eye

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

Artwork by Keith Witmer

Blending science and art through illustration

Hear about Marc Dando's career as a wildlife illustrator and how he's been drawn into the world of sharks and rays.

Written by Chelsea Stein

"Sharks were like a magnet that I didn't see. They kept drawing me closer to where I've ended up... if you look back, it all fell into place at the right time."

Marc Dando has created hundreds of science-based shark graphics and illustrations over his career, illuminating research and showcasing species specifics for various books and infographics. He has co-authored reference and guidebooks like Sharks of the World (2005), Sharks of the World: A Complte Guide (2021) and multiple editions of A Pocket Guide to Sharks of the World – all of which identify, illustrate and describe every known shark species.

But Marc's work hasn't always been focused on sharks. He's been creating art and illustrating since the age of 16, and his career has evolved over time as he has found a way to blend science and art through illustration.

"I've always been able to draw but never realized it was anything like a talent," he said. "As I've gotten older, I've been lucky to be surrounded by a lot of inspirational people – for me, it wasn't a considered and planned career path."

"When I left university, I had a degree in Zoology but didn't have a passion for sharks at that time," he continued. "So, I went into graphics and did all the usual studio-like work of menus, brochures and packaging."

Many of Marc's friends were also working in graphics and design, and eventually, he started up his own business. He says it was through chance meetings and conversations that he was drawn to the world of sharks, rays, and chimaeras.

Alongside the graphics work, Marc worked on detailed illustrations for commercial printers in his free time, one of which introduced him to natural history publisher Christopher Helm. From this meeting, Marc went on to work on his first book called Sealife: A Complete Guide for Marine Environment (1996). The book covered more than 600 species inhabiting the world's oceans – everything from seabirds to otters to polar bears.

"I ended up writing a chapter for the book and produced the majority of the illustrations," Marc said. "And from then on, that was the path that led me to sharks."

From there, Marc and a colleague were planning to produce a book specifically on the world of dolphins. "As it turned out, we tried pitching the world of dolphins book to a publisher, and they

Ornate Sleeper-Ray
(Electrolux addisoni)

Artwork by Marc Dando

actually suggested a book on sharks instead," Marc said.

He soon met Sarah Fowler, founding member of the IUCN SSC Shark Specialist Group and founding trustee of The Shark Trust, and Jeremy Stafford-Deitsch, underwater photographer and author, at a conference that inspired him to seriously consider the shark-specific book idea. "These steps I've never really planned ahead, it just evolved."

Today, Marc and his wife, Julie, tag-team their freelance operation called Wild Nature Press, publishing natural history books under Princeton University Press. Over the last 25–30 years, Marc's graphic design and illustrations, paired with Julie's layout expertise, have helped make a difference for marine animal awareness and conservation, including sharks and rays.

"One of my greatest pleasures is when somebody tells me that they have read and enjoyed our books," Marc said.

To ensure his artwork is scientifically accurate, Marc's creative process includes collaborating with experts in their field. When illustrating sharks, he uses a combination of numerous reference photos of the species – from different angles and varying lighting – and studying preserved specimens, as fresh subjects always aren't practical or easy to come by, in addition to reading published descriptions.

"It is great to work with people like Rima Jabado and Dave Ebert, for example, who hand me lots of photos and information that I can really get stuck into. When you're working to identify (ID) species, a good illustration is essential."

"Illustrations can show the finite details; you're drawing the reader's eye to certain features which might not be possible in photos," he continued. "I think illustrations and photography can harmonize quite well as photos can show colour, and illustrations can more clearly show shape and specific features to ID species."

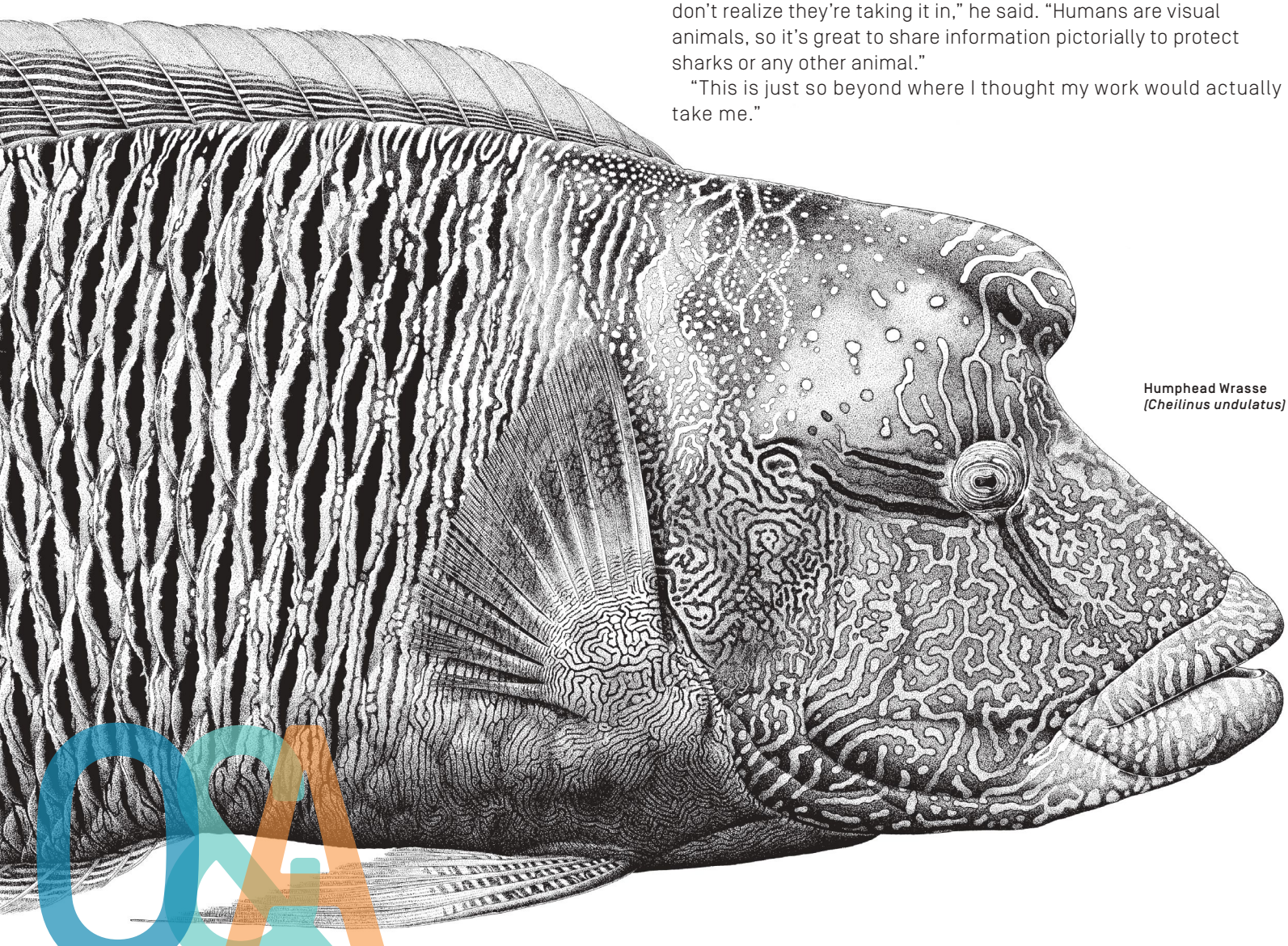
When starting an illustration, "Firstly, a pencil version is drawn and checked by specialists; it is then scanned so that I can use this as a basis to paint digitally," Marc said. "I don't use any generic Photoshop patterned paintbrushes; I just use a standard brush setting on my Wacom tablet, much as I would do if I painted by hand."

"I love detail; all my drawings are individually done," he continued. "I'll initially produce a flat colour version (not 3D) to get the patternation correct next, and again send for comment. From there, I add shading and final tweaks."

Marc's scientifically-sound artwork is in demand from organizations like The Shark Trust, Wildlife Conservation Society, Save Our Seas Foundation, World Wildlife Fund and various governmental agencies and groups. His work has also been used to illustrate materials for implementing the Convention on Migratory Species (CMS) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) – including supporting the IUCN SSC Shark Specialist Group's communications, like the chimaera illustrations in Sharks News Issue 03.

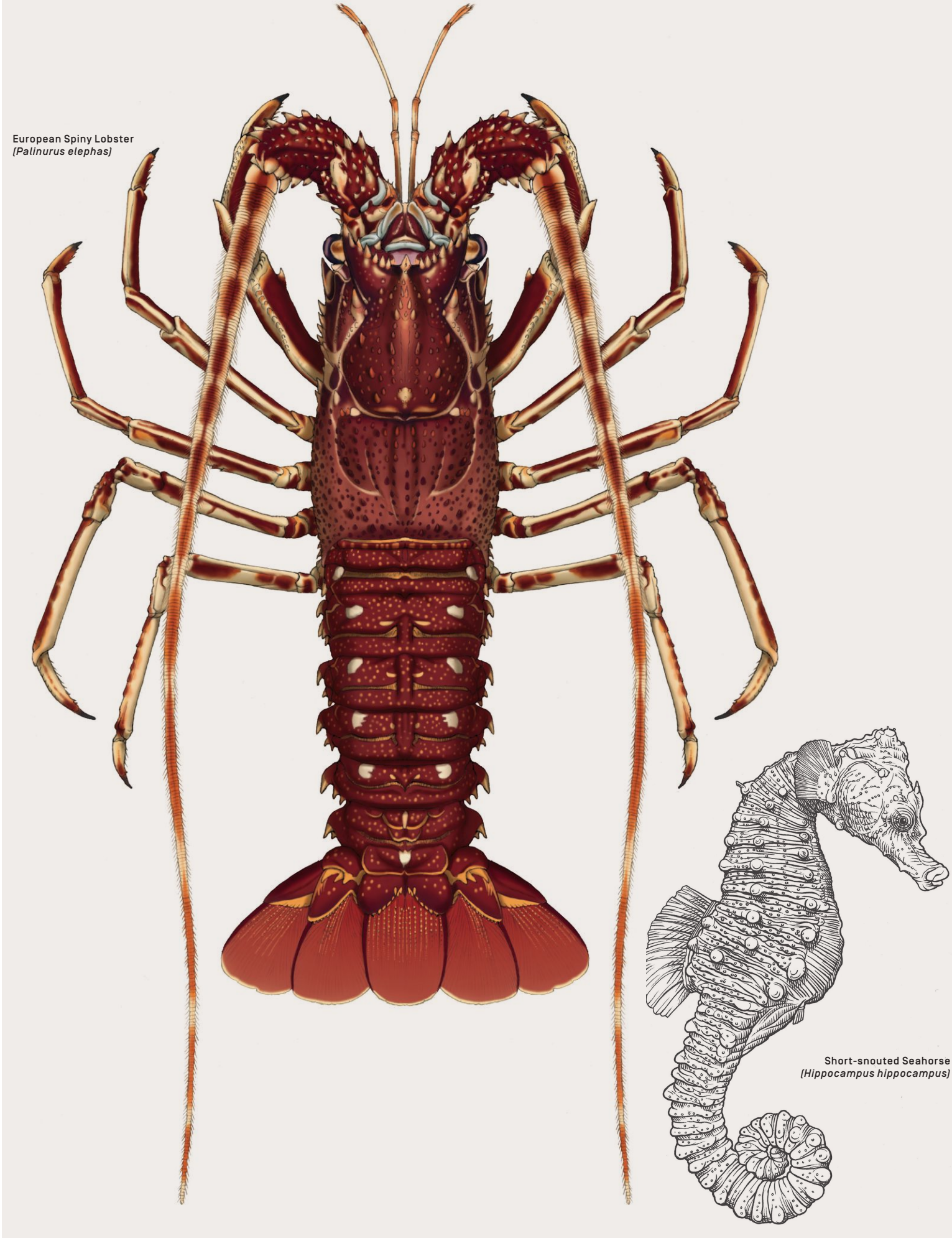
"Science-based illustration is a wonderful way to make people look closer at things and give researchers and organizations the ability to get across their information in ways that most people don't realize they're taking it in," he said. "Humans are visual animals, so it's great to share information pictorially to protect sharks or any other animal."

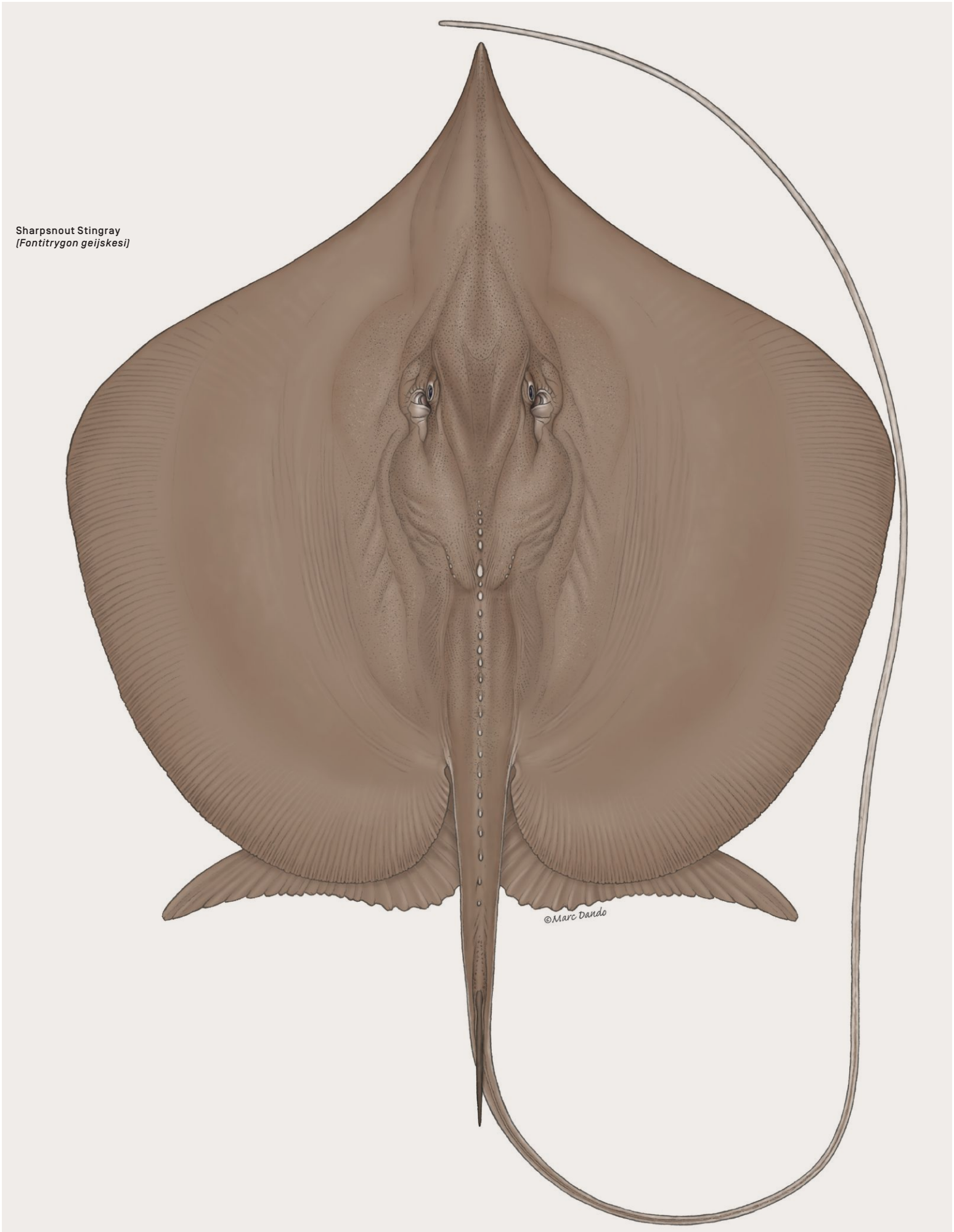
"This is just so beyond where I thought my work would actually take me."



Humphead Wrasse
(Cheilinus undulatus)

Artwork by Marc Dando


European Spiny Lobster
(Palinurus elephas)
Short-snouted Seahorse
(Hippocampus hippocampus)
Artwork by Marc Dando



Sharpsnout Stingray
(Fontitrygon geijskesi)

Blue Whale
(Balaenoptera musculus)

Q&A

Artwork by Marc Dando

Puffadder Shyshark
(Haploblepharus edwardsii)

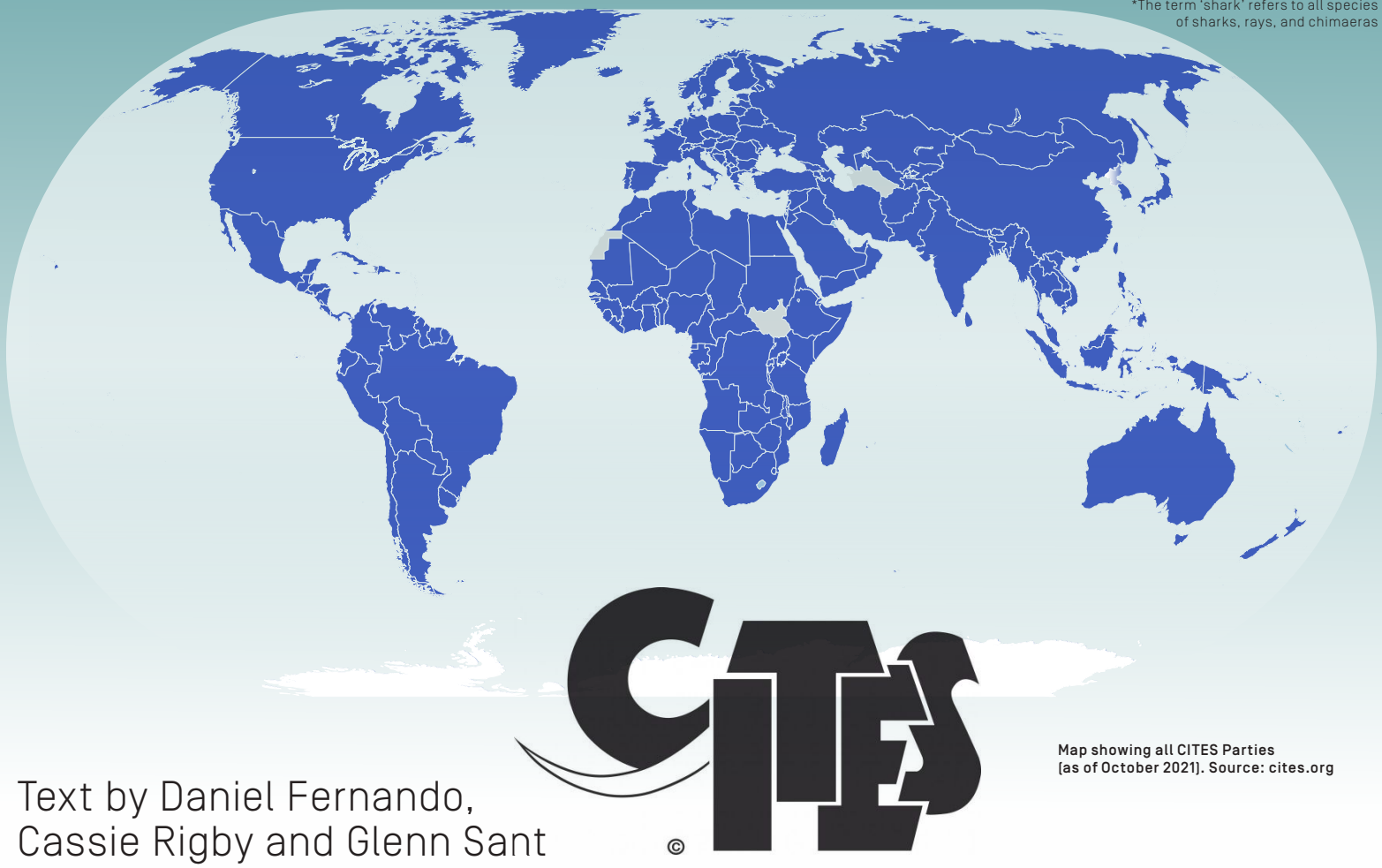
Tiger Catshark
(Halaelurus natalensis)

Q&A

Artwork by Marc Dando

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and Sharks*

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



Map showing all CITES Parties (as of October 2021). Source: cites.org

Text by Daniel Fernando, Cassie Rigby and Glenn Sant

Reviewed by the CITES Secretariat

What is CITES?

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international multilateral treaty that **helps regulate international trade of wild animal and plant species to ensure that international trade does not threaten their survival.** It came into force on 1st July 1975. As of November 2021, there are 184 Parties (183 countries and the European Union) signatory to the Convention. CITES has three Appendices with over 38,700 species of animals and plants listed across them.

The Management Authority (MA) is a designated national institution or agency that has the mandate to issue CITES documents, including import and export (or re-export) permits, Introduction from the Sea (IFS) certificates, pre-Convention (and other) certificates, and the annual reports and statistics. The MA is also responsible for communication with national Scientific Authorities and enforcement agencies, for the development and implementation of regulations to implement the Convention, and for communication with the CITES Secretariat and other Parties.

The Scientific Authority (SA) is designated by the MA and could be a government agency, scientific institution, university, committee, or even an individual. It is responsible for developing non-detriment findings (NDFs) to determine if trade in the species or its products is sustainable. The SA is also responsible for providing advice to the MA, as required or requested (e.g., for the development of species listing proposals or to review proposals submitted by other Parties). It is common for a CITES Party to designate multiple SAs, each dealing with a particular group of species. For sharks, this responsibility often falls to the national fisheries agency. (Some fisheries nations have an MA and/or SA specifically for marine species, in addition to the MA/SA dealing with terrestrials).

What are the CITES Appendices?

Appendix I is intended for species that are threatened with extinction. Commercial trade of wild-caught specimens of Appendix I listed species is prohibited and permits may only be issued under certain conditions, such as for scientific research. Trade in Appendix I species for reasons such as scientific research requires both export and import permits, and a non-detriment finding (NDF) from the Scientific Authority of the exporting and importing country. The five known species of sawfishes (family Pristidae) are the only CITES-listed shark species on Appendix I.

Appendix II is intended for species not necessarily threatened with extinction but where trade [commercial or non-commercial] must be regulated and controlled to avoid utilization incompatible with their survival or species that were included because they could not be easily distinguished from species that merit Appendix II listing (see look-alike species explanation). Appendix II ensures that any listed species can only be traded if they are legally and sustainably harvested. An export permit should only be issued by the national Management Authority once the specimen is demonstrated to be legally acquired and a positive NDF is produced by the Scientific Authority of the exporting country. Some countries impose stricter domestic measures requiring import permits for Appendix II species in addition to valid export permits. Appendix II is where the largest number of species are listed, including most CITES-listed sharks.

Appendix III includes species that a particular Party wishes to regulate within its own jurisdiction to prevent overexploitation. A species can be included on Appendix III at any point, unilaterally by a Party, and all other CITES Parties are obligated to assist in regulating the trade of that species from the requested country. Trade is permitted only with an export permit and certificate of origin from the state of the Party that listed the species. Several species of the South American Freshwater Stingrays (family Potamotrygonidae) are listed on Appendix III.

Species can be proposed for listing on **three Appendices.** There are currently **~1,082** species on Appendix I, **~37,420 species** on Appendix II, and **~211 species** on Appendix III.

How are species listed on CITES?

At meetings of the CITES Conference of the Parties (CoP), which usually take place every three years, proposals are submitted by Parties to amend Appendices (add species, move them from one Appendix to another, or remove them) based on specific listing criteria (Resolution Conf. 9.24 (Rev. CoP17)). These proposals are agreed on by consensus or by voting, the latter requiring a two-thirds majority of the Parties present at a CoP for adoption. Once adopted, a listing comes into force 90 days later unless an extended implementation period is agreed by the CoP. This enables Parties to have time to introduce new regulatory mechanisms and conduct training to support implementation.

Reservations

A Party may choose to submit a reservation within 90 days of the adoption of a species listing, thereby exempting them from their obligations for that species as required by Parties. They are treated, in effect, as non-Parties for those species when trade occurs which still requires the production of equivalent documentation when trading with CITES Parties. Reservations have been used by Parties requiring additional time for implementation, after which they often remove their reservation.

Split-listings

It is possible for a specific population of a species to be proposed for inclusion in the Appendices with other populations of that species remaining unaffected, an action referred to as split-listing. Proposals to amend Appendices I or II can be made for the inclusion of just a discrete part of the species throughout its range, such as for a sub-population. This is discouraged as it presents implementation and control issues where both listed and non-listed specimens of a species are entering international trade with only some requiring to be accompanied by CITES documentation.

Over the years, reservations have been submitted for a number of shark proposals. However, split-listing has not yet been used for any sharks.

Look-alike species

Species whose specimens in trade look like those of species listed for conservation reasons may also be proposed for inclusion in the Convention. For example, some sharks have been included as look-alike species as their fins, or gill plates, are indistinguishable from those frequently encountered in trade and were deemed to be of conservation concern and in need of regulation under Appendix II. For example, the Longfin Mako (*Isurus paucus*) was listed based on it being a look-alike for the Shortfin Mako (*I. oxyrinchus*).

How does CITES work?

CITES is a legally binding convention and while it does not take the place of national laws (and cannot supersede national law), it provides a framework that each Party must implement through national legislation. It works by subjecting trade in specimens of CITES-listed species to conditions around the Appendix within which they are included. Where trade is allowed, it must be controlled through the issuing of permits/certificates for export, import, re-export and introduction from the sea. Parties to the Convention must designate National Authorities (Management Authority and Scientific Authority; there can be more than one MA or SA) to administer the requirements of the Convention including the issuing of certificates/permits and advising on the effects of trade on a species.

Permitting

To enable trade, CITES permits are issued by the MA and often require advice from the SA. An Appendix II export permit requires a legal acquisition finding (LAF) by the MA and a positive NDF from the SA. Where a living specimen is involved, it needs to be handled to minimize the risk of injury, damage to health, or cruel treatment. CITES permits include security stamps to validate each permit and must be signed by an authorised national official. Parties are obligated to provide annual trade data (issued permits), which are made available online in the CITES Trade Database: trade.cites.org.

Types of permits and certificates used under normal procedures

• **Export Permit (Appendix I and II)** • **Import Permit (Appendix I)** • **IIntroduction from the Sea Certificate (App.I and II)**	Issued by the Management Authority upon advice from the Scientific Authority
• **Export Permit (Appendix III)** • **Import Permit (Appendix I, II and III)** • **Certificate of origin (Appendix III)**	Issued by the Management Authority-No advice from the Scientific Authority required

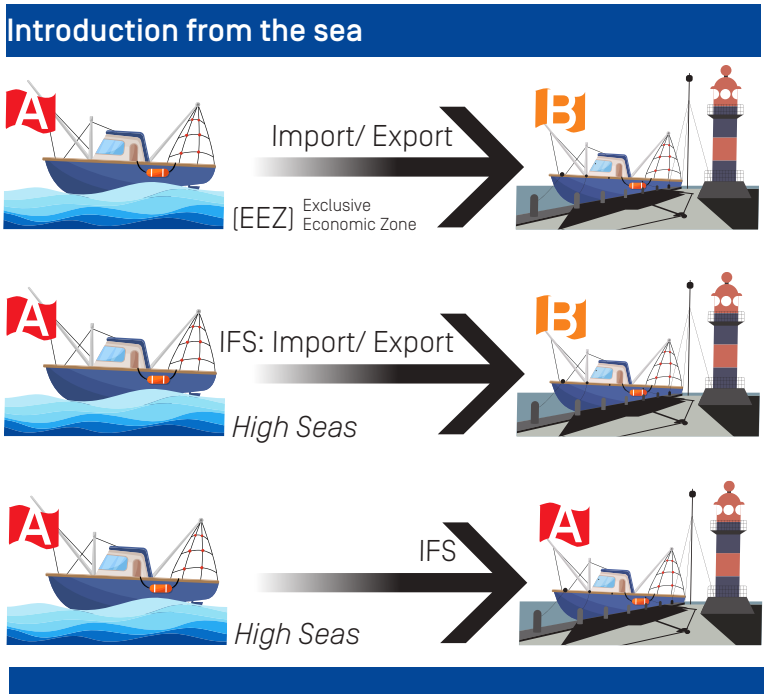
Non-detriment findings

A positive CITES non-detriment finding (NDFs) and an LAF is essential before CITES trade can take place. The NDF determines whether an export would be detrimental to the survival of that species and ensures that trade would maintain the species throughout its range at a level consistent with its role in the ecosystem within which it occurs, and well above the level at which the species might become eligible for inclusion in Appendix I (threatened with extinction). An NDF is developed by the Scientific Authority and provides the scientific justification for advising on levels of export. Parties are encouraged to maintain written records of this science-based rationale (see Resolution Conf. 16.7 (Rev. CoP17) on Non-detriment findings).

A Party is not obliged to publicize their NDFs but many have shared their shark NDFs on the **Shark and Ray Portal at:** *cites.org/eng/prog/shark/resource_Parties_stakeholders*. They are also encouraged to do so through the Shark Resolution and share information on traceability systems. The Parties have adopted guidance on traceability and noted the importance of considering its use with shark products. Evidence of chain of custody is fundamental in demonstrating legality of products.

Introduction from the sea

Introduction from the sea (IFS) refers to transportation into a State of specimens of any species which were taken in the marine environment, not under the jurisdiction of any State (i.e., species captured in the high seas; see Resolution Conf. 14.6 (Rev. CoP16)). The MA is responsible for issuing an IFS certificate where a vessel from a State lands listed specimens it catches on the high seas into its own port (from the figure below a vessel from State "A" landing specimens in port "A"). This is subject to the State being satisfied that the specimen has been acquired legally[1] and the SA providing a positive NDF. Where specimens are taken by a vessel of a State on the high seas and landed in the port of a different State (from the figure below a vessel from State "A" landing in a port of State "B") the export (State "A") and import (State "B" for Appendix I or where a State requires import permits for Appendix II) permits are required to be issued following a determination that the specimen has been legally acquired and there is a positive NDF. In the case of living specimens, the MA should also be satisfied that the animal will be handled in such a way as to minimize injury, damage to health etc., and in the case of Appendix I species, also suitably equipped to house and care for the species.



Exemptions

Exemptions for international trade in a CITES-listed species may be allowed by Parties without NDFs or IFS certificates. These include:

- specimens that were acquired prior to the CITES listing of that species, referred to as pre-Convention specimens (Resolution Conf. 13.6 (Rev. CoP18));
- personal or household effects (Resolution Conf. 13.7 (Rev. CoP17));
- animals bred in captivity or plants artificially propagated (Resolution Conf. 10.16 (Rev.) and Resolution Conf. 11.11 (Rev. CoP18));
- specimens for scientific research (Resolution Conf. 11.15 (Rev. CoP18));
- specimens in transit (Resolution Conf. 9.7 (Rev. CoP15)); and
- specimens within travelling collections or exhibitions (Resolution Conf. 12.3 (Rev. CoP18)).

Despite these exemptions, all trade still requires a permit or certificate issued by the respective CITES Management Authority.

Trading with a non-CITES Party

If a CITES-listed specimen is exported from a country that is not a Party to CITES, the country that is Party may accept equivalent documentation to the CITES export and import requirements.

Compliance and the Review of Significant Trade (RST)

The CITES Convention has several compliance mechanisms that encourage Parties to implement the requirements of the Convention. The Secretariat may be informed of an infraction by a Party, or through the Review of Significant Trade (RST). The RST process is similar to an audit and is where the trade of a particular Party or a particular Appendix-II listed species is analyzed to determine if it might be detrimental to the survival of the species. Infractions also include negligence with respect to the issuance of permits, poor enforcement, or failing to produce annual reports.

In the event of an infraction, the Secretariat will notify all Parties, while providing the concerned Party with time to respond to allegations. The Secretariat will also provide technical assistance for the concerned Party to help resolve the matter and prevent future infractions. If a Party does not respond favorably, several actions may be taken, including:

- Mandatory confirmation of all permits by the Secretariat;
- Suspension of cooperation from the Secretariat;
- A formal warning;
- A visit by the Secretariat to verify capacity;
- Recommendations to all Parties to suspend CITES-related trade with the offending Party; and
- Dictation of corrective measures to be taken by the offending Party before the Secretariat will resume cooperation or recommend resumption of trade.

Certain CITES Parties may also choose to impose bilateral sanctions based on their own national legislation to aid in the implementation of CITES listings. None of the Appendix-II listed sharks have yet been subject to RST.

[1] From the IFS Resolution, States should take into account whether or not the specimen was or will be acquired and landed:

i) in a manner consistent with applicable measures under international law for the conservation and management of living marine resources, including those of any other treaty, convention or agreement with conservation and management measures for the marine species in question; and
ii) through any illegal, unreported or unregulated (IUU) fishing activity;
cites.org/sites/default/files/document/E-Res-14-06-R16.pdf

CITES and Scientific Research

Recognizing the importance of enabling scientific research to promote conservation, there are provisions in place to facilitate the export and import of CITES-listed species for research purposes.

Registered Scientific Institutions

Scientific Institutions may be registered by the relevant MA, upon advice of the SA (Resolution Conf. 11.15 (Rev. CoP18)). These institutions must fulfil certain criteria, including maintaining clear records of their collections and enabling access to qualified individuals including for instance those from other institutions. However, once registered, these institutions may exchange animal (non-live) and plant specimens or samples without permits, for research purposes ("non-commercial loan, donation or exchange"). All materials are only required to carry a label that is issued or approved by the national MA. For a full list of registered institutions, visit: *cites.org/eng/common/reg/e_si.html*

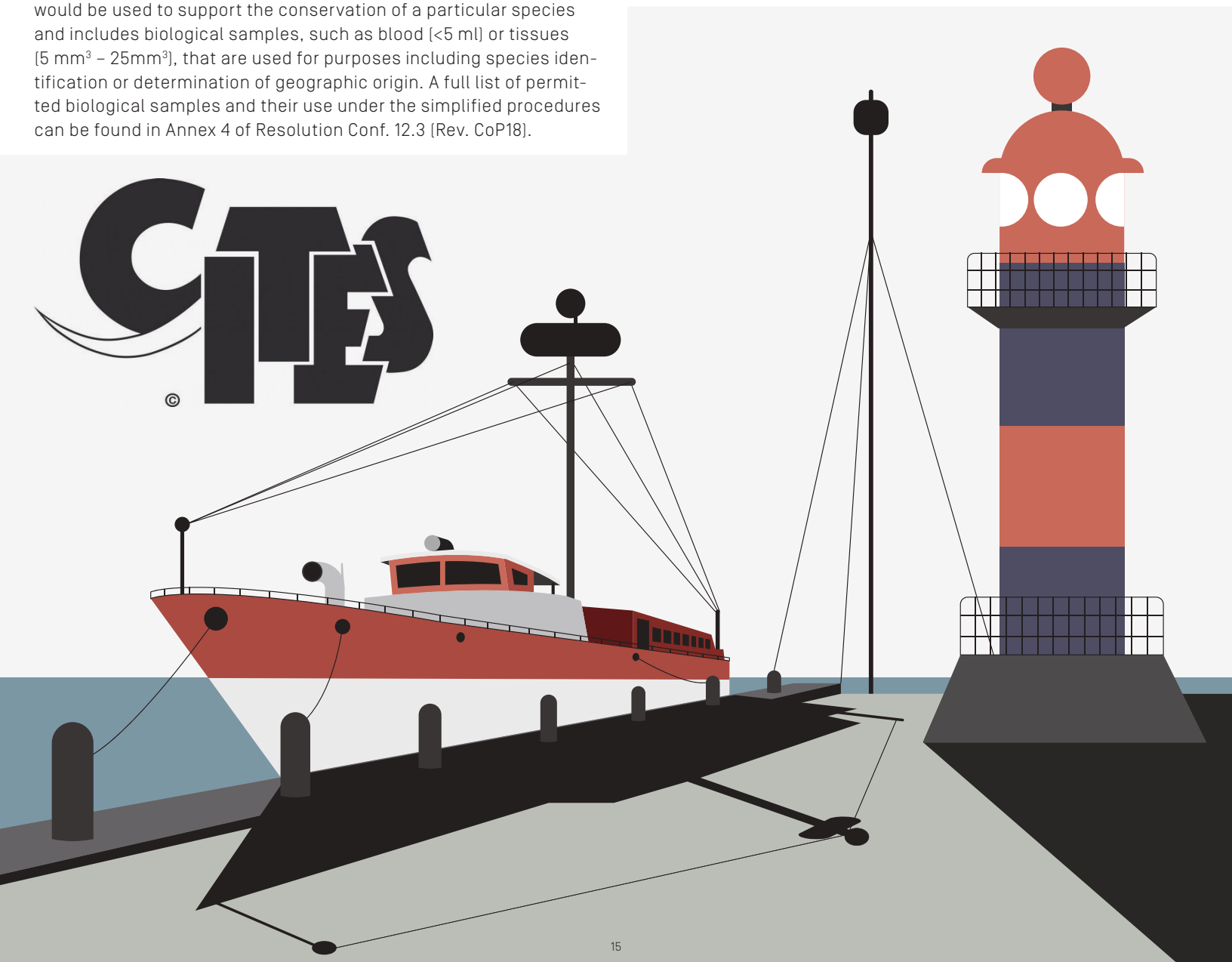
Simplified Procedures

Parties may also use simplified procedures to issue permits and certificates to facilitate and expedite trade that will have a negligible impact, or none, on the conservation of the species concerned. This would be used to support the conservation of a particular species and includes biological samples, such as blood (<5 ml) or tissues (5 mm^3 – 25mm^3), that are used for purposes including species identification or determination of geographic origin. A full list of permitted biological samples and their use under the simplified procedures can be found in Annex 4 of Resolution Conf. 12.3 (Rev. CoP18).

Further reading regarding the relevance of CITES to sharks

The information above specifically refers to the implementation of CITES listings for shark species and the guidance provided through Resolutions of the Parties in fulfilling and interpreting certain obligations around implementation. Further specific consideration has been given to the conservation and management of sharks by the Parties through Resolution Conf. 12.6 (Rev. CoP18) (the current version which has been repeatedly updated since it was first adopted in 1994 at CITES CoP 9 with useful recommendations regarding sharks). While Resolutions of the Parties have a life beyond the next CITES CoP, specific activities agreed at a CoP for sharks to occur before the next CoP are called Decisions and focus on current needs such as convening specific reviews, workshops and needs for improving implementation of listings (current Decisions regarding sharks).

The CITES website has a Shark and Ray Portal dedicated to CITES related information on sharks at: *cites.org/eng/prog/shark/resource_Parties_stakeholders*. It includes which species are listed and when, NDFs, CITES Resolution and current Decisions, publications relevant to CITES sharks, and identification materials. Further information on each CITES listed shark, such as the CITES proposals, CITES Party quotas, and Convention on the Conservation of Migratory Species of Wild Animals (CMS) listings are available at: *speciesplus.net*.



Which species are listed on CITES?

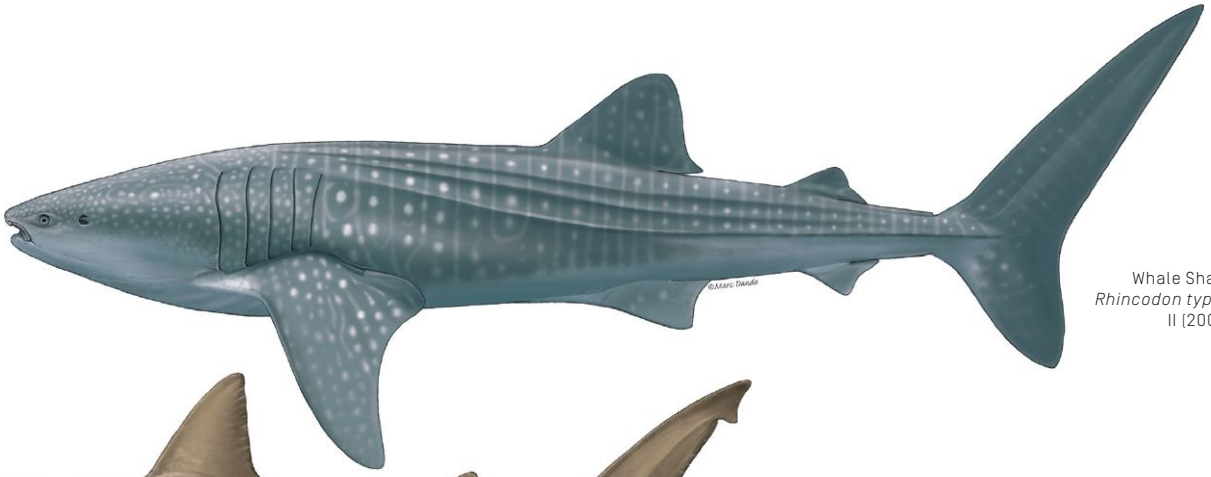
There are currently five species of sawfishes (family Pristidae) listed on Appendix I, 39 species listed on Appendix II (see footnotes), and the family Potamotrygonidae on Appendix III. The following table only provides information on species listed on Appendix I and II. Species listed on Appendix III are currently undergoing taxonomic revisions and the listed family includes both undescribed species and newly described species. In the table, rather than providing species by taxonomic classification, these are ordered by the year in which they were listed. Some common and scientific names of CITES-listed sharks are different than what appears on the Convention text. Common names are those used in the IUCN Red List of Threatened Species assessments: *iucnredlist.org*

Order	Family	Common Name	Scientific Name	CITES App	Year Listed
Lamniformes	Cetorhinidae	Basking Shark	*Cetorhinus maximus*	II	2003
Orectolobiformes	Rhincodontidae	Whale Shark	*Rhincodon typus*	II	2003
Lamniformes	Lamnidae	White Shark	*Carcharodon carcharias*	II	2005
Rhinopristiformes	Pristidae	Narrow Sawfish	*Anoxypristis cuspidata*	I	2007
		Dwarf Sawfish	*Pristis clavata*	I	2007
		Smalltooth Sawfish	*Pristis pectinata*	I	2007
		Largetooth Sawfish	*Pristis pristis**	I	2007
		Green Sawfish	*Pristis zijsron*	I	2007
Carcharhiniformes	Sphyrnidae	Scalloped Hammerhead Shark	*Sphyrna lewini*	II	2013†
		Great Hammerhead Shark	*Sphyrna mokarran*	II	2013†
		Smooth Hammerhead Shark	*Sphyrna zygaena*	II	2013†
Myliobatiformes	Mobulidae	Reef Manta Ray	*Mobula alfredi**	II	2013†
		Giant Manta Ray	*Mobula birostris**	II	2013†
Carcharhiniformes	Carcharhinidae	Oceanic Whitetip Shark	*Carcharhinus longimanus*	II	2013†
Lamniformes	Lamnidae	Porbeagle Shark	*Lamna nasus*	II	2013†
Myliobatiformes	Mobulidae	Longhorned Pygmy Devilray	*Mobula eregoodoo**	II	2016†
		Atlantic Devilray	Mobula hypostoma	II	2016†
		Shortfin Devilray	*Mobula kuhlii*	II	2016†
		Spinetail Devilray	*Mobula mobular**	II	2016†
		Pygmy Devilray	*Mobula munkiana*	II	2016†
		Sicklefin Devilray	*Mobula tarapacana*	II	2016†
		Bentfin Devilray	*Mobula thurstoni*	II	2016†
Carcharhiniformes	Carcharhinidae	Silky Shark	*Carcharhinus falciformis*	II	2016†
Lamniformes	Alopiidae	Pelagic Thresher	*Alopias pelagicus*	II	2016†
		Bigeye Thresher	*Alopias superciliosus*	II	2016†
		Common Thresher	*Alopias vulpinus*	II	2016†
Myliobatiformes	Potamotrygonidae**	Freshwater Stingrays		III	2017
Lamniformes	Lamnidae	Shortfin Mako	*Isurus oxyrinchus*	II	2019
		Longfin Mako	*Isurus paucus*	II	2019
Rhinopristiformes	Glaucostegidae	Blackchin Guitarfish	*Glaucostegus cemiculus*	II	2019
		Sharpnose Guitarfish	*Glaucostegus granulatus*	II	2019
		Halavi Guitarfish	*Glaucostegus halavi*	II	2019
		Widenose Guitarfish	*Glaucostegus obtusus*	II	2019
		Clubnose Guitarfish	*Glaucostegus thouin*	II	2019
		Giant Guitarfish	*Glaucostegus typus*	II	2019
Rhinopristiformes	Rhinidae	Bowmouth Guitarfish	*Rhina ancylostoma*	II	2019
		Bottlenose Wedgefish	*Rhynchobatus australiae*	II	2019
		Clown Wedgefish	*Rhynchobatus cooki*	II	2019
		Whitespotted Wedgefish	*Rhynchobatus djiddensis*	II	2019
		Taiwanese Wedgefish	*Rhynchobatus immaculatus*	II	2019
		Smoothnose Wedgefish	*Rhynchobatus laevis*	II	2019
		African Wedgefish	*Rhynchobatus luebberti*	II	2019
		Eyebrow Wedgefish	*Rhynchobatus palpebratus*	II	2019
		Broadnose Wedgefish	*Rhynchobatus springeri*	II	2019
		False Shark Ray	*Rhynchorhina mauritaniensis*	II	2019

* Refers to a taxonomical change or update since the species was listed on the Convention text. For example, the name *Pristis microdon* still appears on the Convention text but is now considered a synonym of *Pristis pristis* (i.e., the same) and is therefore not included in this table; *Manta alfredi* and *Manta birostris* are now *Mobula alfredi* and *Mobula birostris*. Mobula japanica is a synonym of *Mobula mobular*; *Mobula eregoodootenke* is now known as *Mobula eregoodoo*; and *Mobula rochebrunei* is believed to be an invalid species and therefore not provided in this table. See details on CITES nomenclature in Resolution Conf. 12.11 (Rev. CoP18) on Standard nomenclature.

** Listing countries are Brazil and Colombia

† A delayed implementation period of 18, 12, or 6 months was provided to enable capacity building and the updating of any national regulations.



Whale Shark
Rhincodon typus
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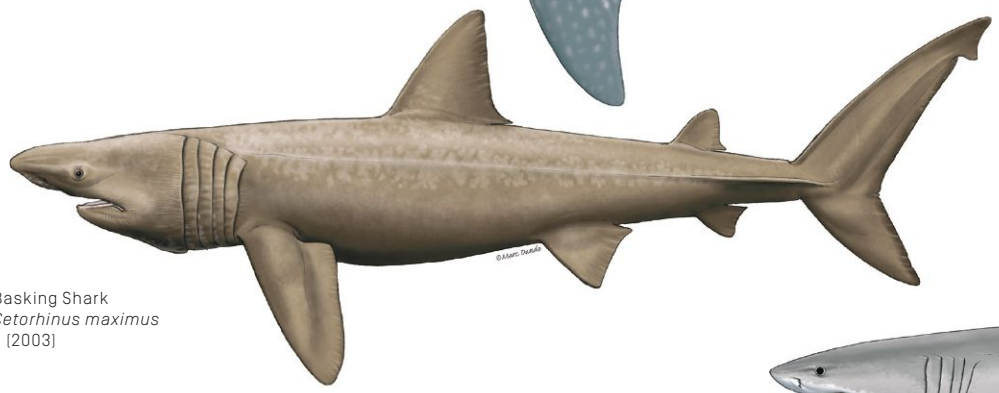

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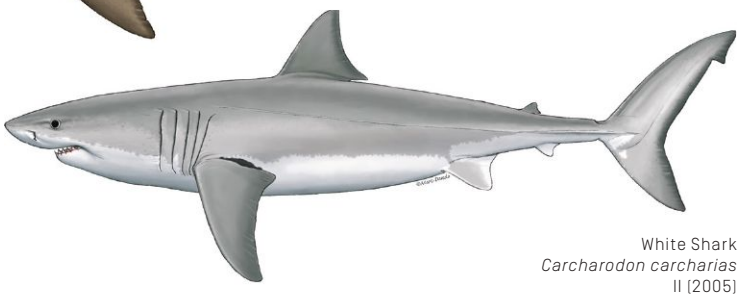

White Shark
Carcharodon carcharias
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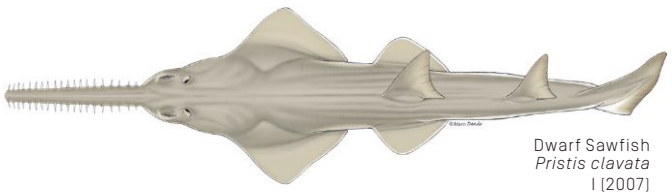

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Pristis clavata
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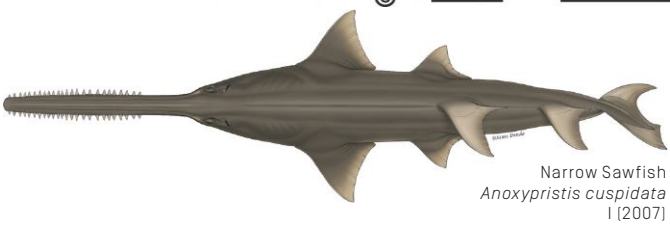

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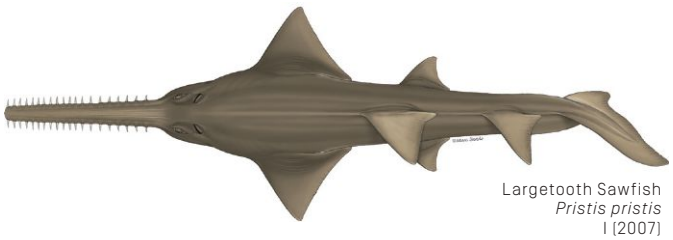

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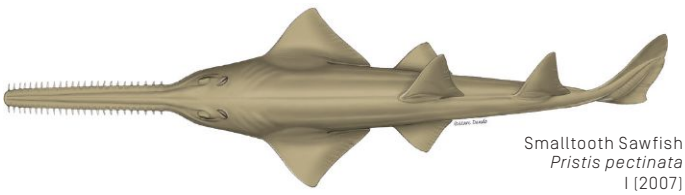

Smalltooth Sawfish
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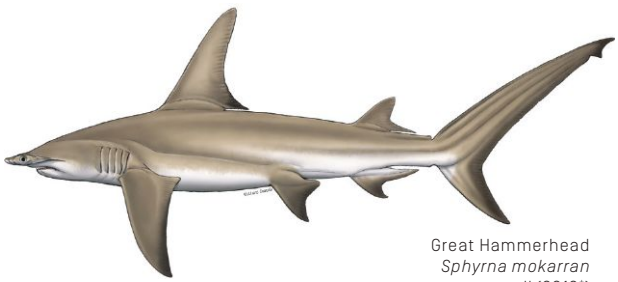

Great Hammerhead
Sphyrna mokarran
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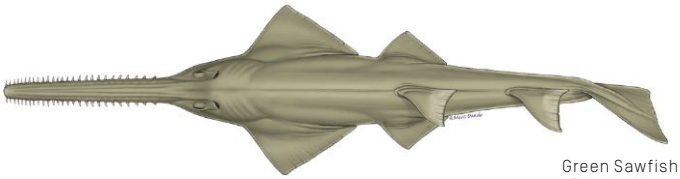

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Pristis zijsron
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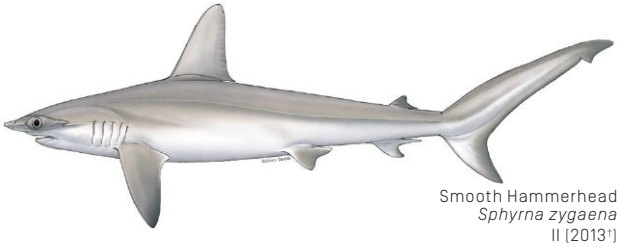

Smooth Hammerhead
Sphyrna zygaena
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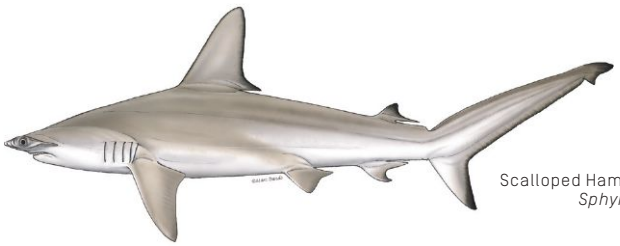


Scalloped Hammerhead
Sphyrna lewini
II (2013†)

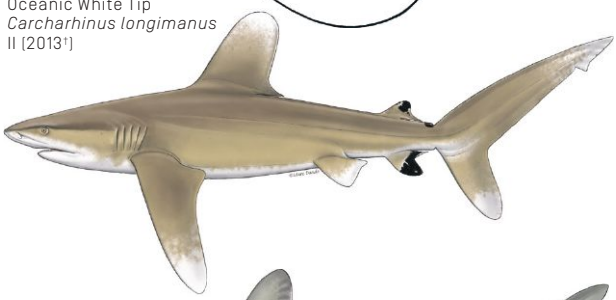
Artwork by © Marc Dando

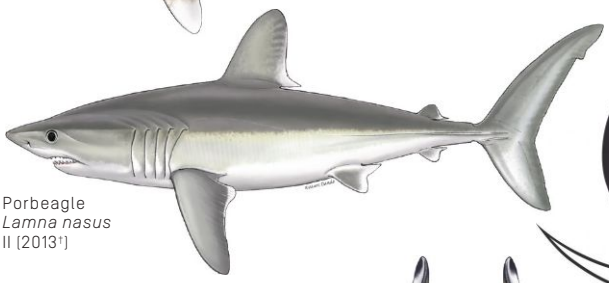
Reef Manta Ray
Mobula alfredi
II (2013†)

Giant Manta Ray
Mobula birostris
II (2013†)

Oceanic White Tip
Carcharhinus longimanus
II (2013†)

Pygmy Devilray
Mobula eregoodoo
II (2016†)





Porbeagle
Lamna nasus
II (2013†)

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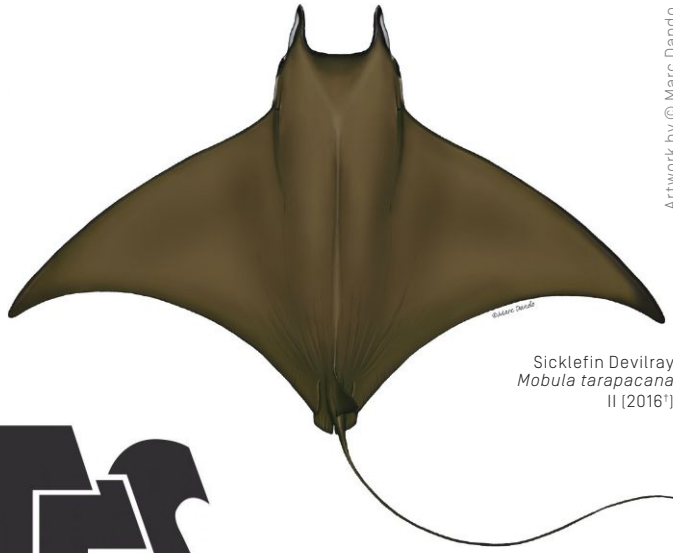
Atlantic Devilray
Mobula hypostoma
II (2016†)

Munk's Devilray
Mobula munkiana
II (2016†)

Spinetail Devilray
Mobula mobular
II (2016†)

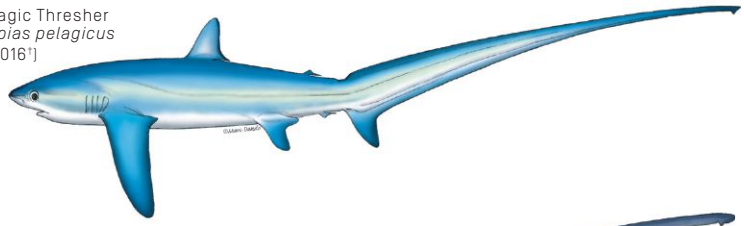
Bentfin Devilray
Mobula thurstoni
II (2016†)

Shortfin Devilray
Mobula kuhlii
II (2016†)

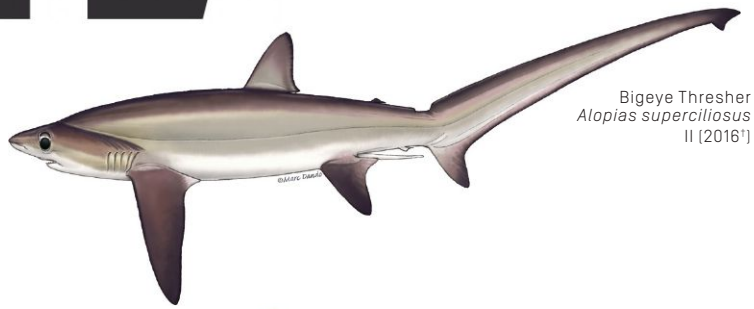


Sicklefin Devilray
Mobula tarapacana
II (2016†)

CITES ©



Pelagic Thresher
Alopias pelagicus
II (2016†)



Bigeye Thresher
Alopias superciliosus
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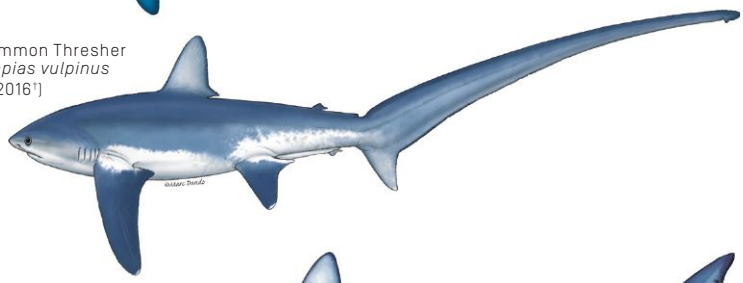

Common Thresher
Alopias vulpinus
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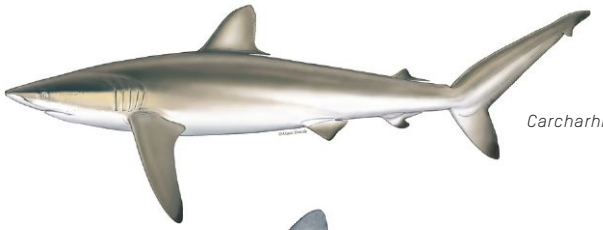

Silky Shark
Carcharhinus falciformis
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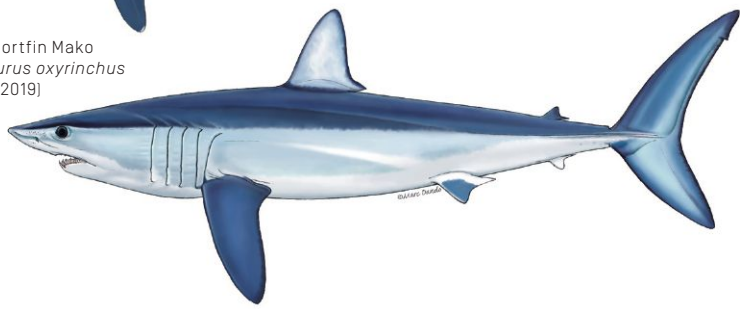

Shortfin Mako
Isurus oxyrinchus
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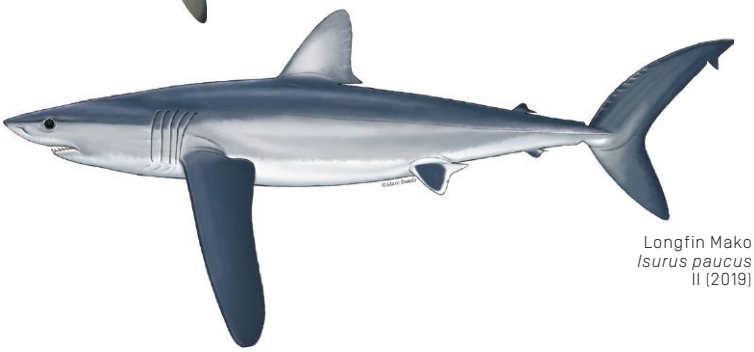

Longfin Mako
Isurus paucus
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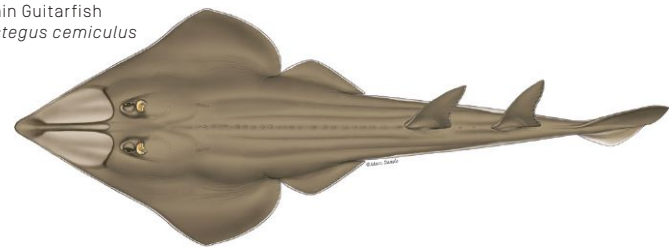

Blackchin Guitarfish
Glaucostegus cemiculus
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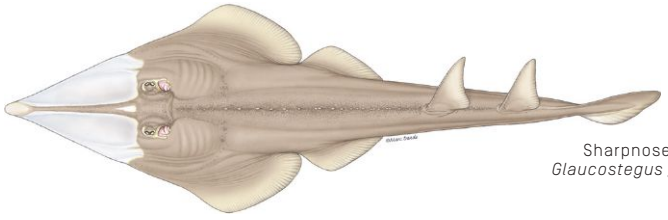

Sharpnose Guitarfish
Glaucostegus granulatus
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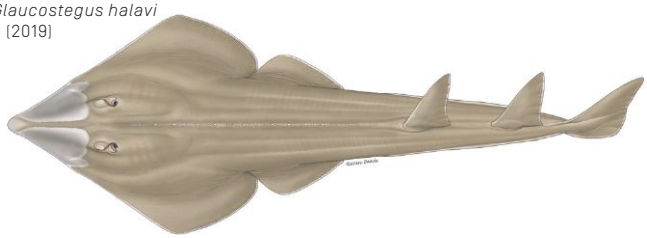

Halavi Guitarfish
Glaucostegus halavi
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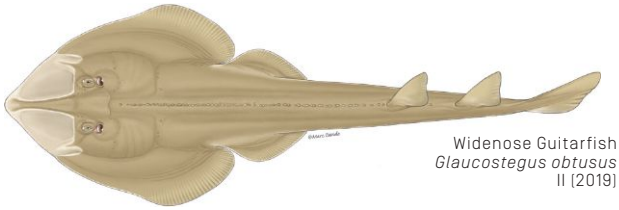

Widenose Guitarfish
Glaucostegus obtusus
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Giant Guitarfish
Glaucostegus typus
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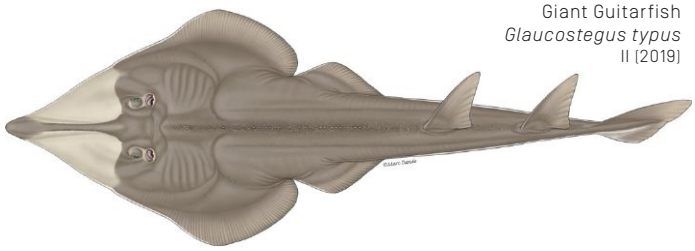

Clubnose Guitarfish
Glaucostegus thouin
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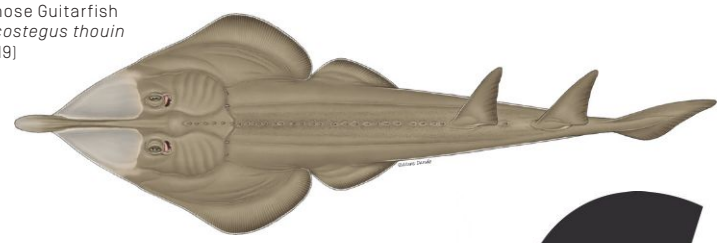

Bowmouth Guitarfish
Rhina ancylostoma
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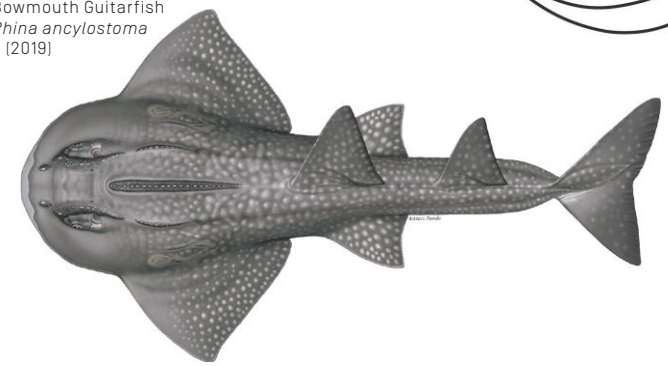

Bottlenose Wedgefish
Rhynchobatus australiae
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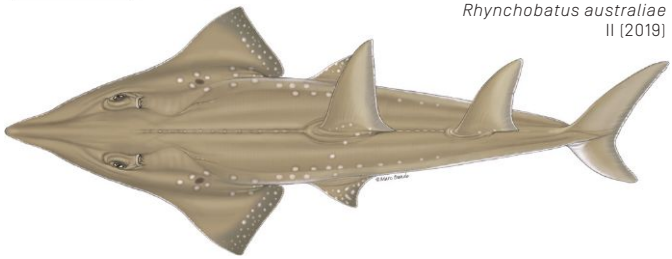

Clown Wedgefish
Rhynchobatus cooki
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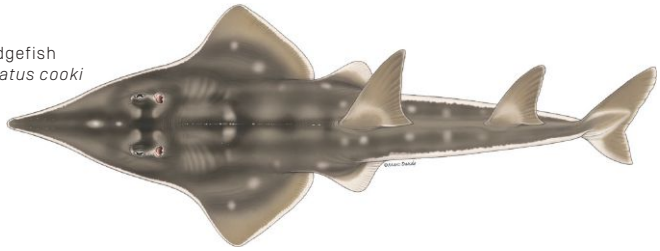

Whitespotted Wedgefish
Rhynchobatus djiddensis
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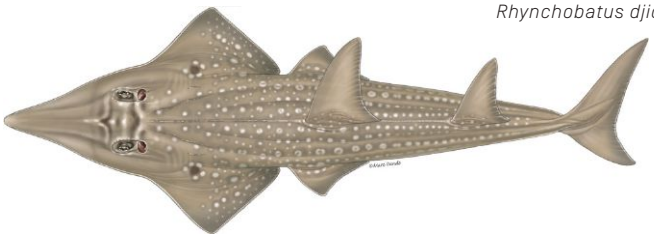

Taiwanese Wedgefish
Rhynchobatus immaculatus
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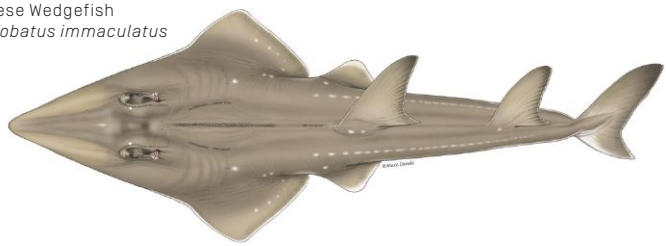

Smoothnose Wedgefish
Rhynchobatus laevis
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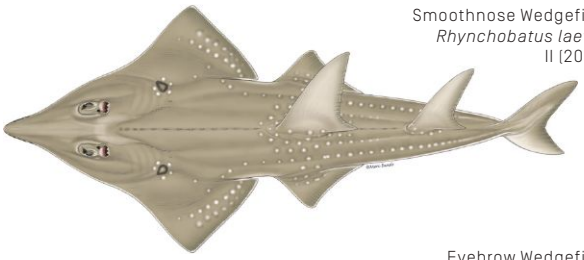

African Wedgefish
Rhynchobatus luebberti
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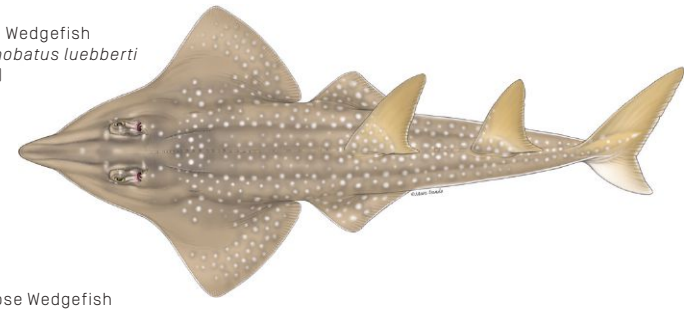

Eyebrow Wedgefish
Rhynchobatus palpebratus
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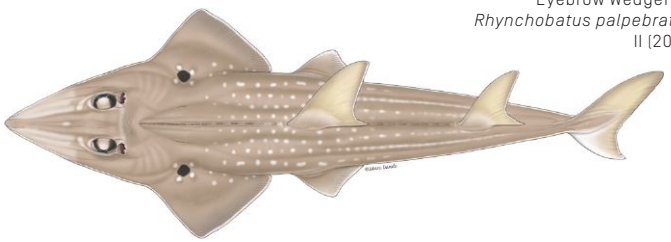

Broadnose Wedgefish
Rhynchobatus springeri
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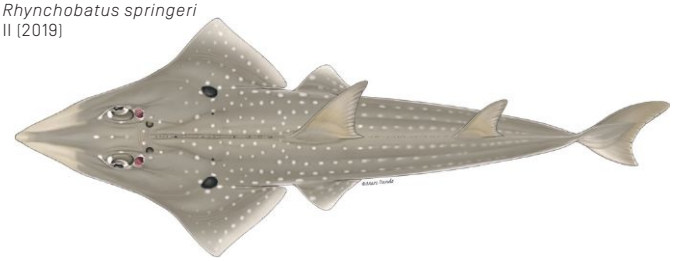
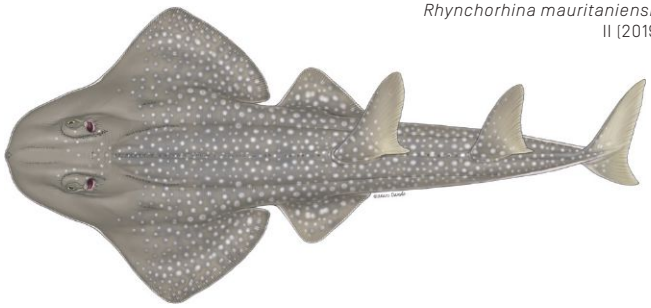


False Shark Ray
Rhynchorhina mauritaniensis
II (2019)



Artwork by © Marc Dando

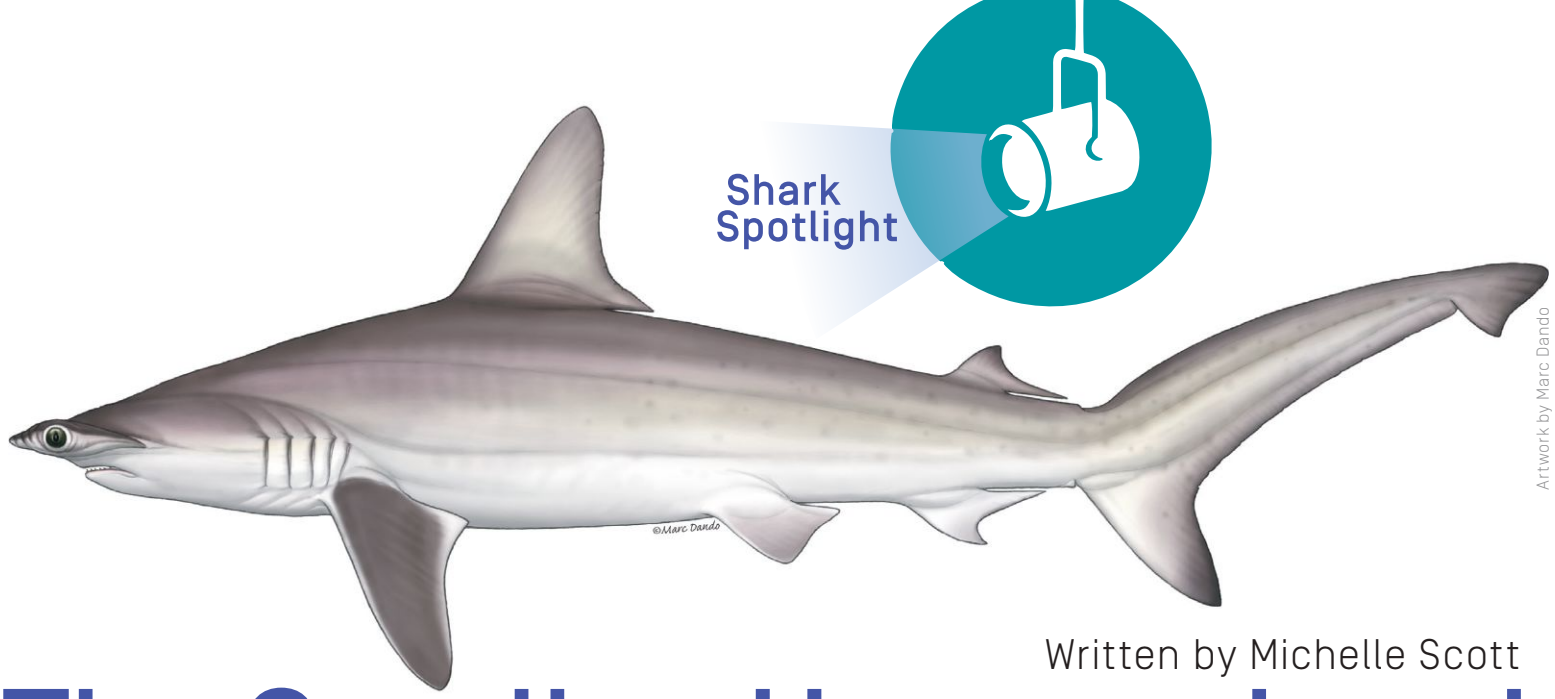
The role of the IUCN SSC Shark Specialist Group at CITES

Cassie Rigby
IUCN SSC Shark Specialist Group | Oceania Regional Group | Member
Red List Authority Coordinator | Assess Working Group | Chair

The government of Panama will host the 19th Meeting of the Conference of the Parties to CITES (CoP 19) in Panama City in November 2022. Over the last decade, these meetings have been critical in advancing the conservation of sharks and rays. Countries have submitted proposals for listing a number of shark and ray species on the Appendices of the Convention and it is likely that new listings will be proposed in 2022. With this in mind, it is important to remember the role of the IUCN SSC Shark Specialist Group (SSG) in reviewing proposals for listing, providing advice to Parties, and during participation at these meetings.

The International Union for Conservation of Nature (IUCN) has intergovernmental observer (IGO) status at CITES meetings. IUCN members are not permitted to vote on decisions, only Parties can vote. The main role of IUCN, and therefore the SSG, is to provide scientific and technical information to assist Parties in fulfilling their responsibilities under the Convention. We can facilitate information and draw from relevant experience from across our network and provide the diverse perspectives of our members to bear on complex issues at global, regional, and national levels. This information is provided through commenting on or reviewing on-line documents, contributing to working groups and committees, and when requested by Parties, one-on-one discussions. The IUCN is viewed as a provider of scientific advice on species. All contributions must be knowledge-based, not advocacy-based.

More specifically, the SSG contributes to CITES through commenting on CITES listing proposals, attendance at the CITES CoP, Standing Committee (SC), and Animal Committee (AC) meetings, as well as involvement in relevant working groups that progress CITES work between the CoP and ACs. In all these contributions, the SSG has the role of the honest broker. That is, to provide and evaluate relevant scientific information and policy options in an impartial manner to inform the Parties decision-making on CITES listing proposals and implementation. The IUCN is respected for providing credible, unbiased knowledge and technical advice and as the SSG is part of the IUCN, we cannot advocate for a particular position or policy. The SSG must adhere to the Guidelines for SSC Members on Engaging in CITES.



Artwork by Marc Dando

Written by Michelle Scott

The Carolina Hammerhead

Taxonomy

The Order Carcharhiniformes includes 295 species from 51 genera and nine families: Carcharhinidae (requiem sharks), Hemigaleidae (weasel sharks), Leptochariidae (barbeled houndshark), Proscylliidae (finback catsharks), Pseudotriakidae (false catsharks), Pentanchidae and Scyliorhinidae (catsharks), Sphyrnidae (hammerhead sharks) and Triakidae (houndsharks). This order contains some of the most well-recognized shark species, including the Tiger Shark (*Galeocerdo cuvier*) and the Bull Shark (*Carcharhinus leucas*), as well as the Hammerhead Sharks (family Sphyrnidae).

The Carolina Hammerhead (*Sphyrna gilberti*), a sister species of the Scalloped Hammerhead (*S. lewini*), is named after the former curator of the Florida Museum of Natural History, Dr Carter Gilbert. In 1967, Dr Gilbert caught what he believed was an anomalous Scalloped Hammerhead with fewer vertebrae than previously recorded. But it wasn't until 2013 that it was confirmed to be a different species through genetic analysis and morphological data.

Morphology

The Carolina Hammerhead is a cryptic species, morphologically similar to the Scalloped Hammerhead, but genetically distinct. *Sphyrna gilberti* can be differentiated from other species within the taxonomic group by having a cephalofoil with median indentation, the presence of an inner narial groove, straight rear margins on the pelvic fins, and 91 or fewer precaudal vertebrae. The maximum size of this species is unknown, but it is recorded to a total length (TL) of at least 69 cm (TL). Neonates have also been sampled, and the size at birth is reported at around 39 cm (TL).

Distribution and habitat

The Carolina Hammerhead is presumably a rare species and is thought to have a more restricted distribution than its congener, the Scalloped Hammerhead. However, its full distribution and depth range are unknown since *S. gilberti* is co-distributed with its sister species *S. lewini* compounding the difficulties in establishing distribution ranges. This is also likely due to the misidentification of *S. gilberti* as *S. lewini* in fisheries monitoring programs. With the exception of three individuals captured off southern Brazil, Carolina Hammerheads are only known from specimens collected off the east coast of the USA from North Carolina to Florida in the western Atlantic. This species may be migratory, similar to other members of the genus *Sphyrna* and is thought to be a coastal neritic and possibly semi-oceanic pelagic shark.

Conservation measures and IUCN Red List status

The Carolina Hammerhead has been assessed as Data Deficient on the IUCN Red List of Threatened Species. Considering they occur in similar habitats, Carolina Hammerheads may be susceptible to similar fishing pressures as the Scalloped Hammerhead. This includes capture in longlines, gillnets, trammel nets, and trawls. Hammerhead sharks of all species are utilized for their fins, liver oil, skin, cartilage and jaws.

The similarity between the Carolina and Scalloped Hammerheads causes difficulty when establishing management actions for both species. Not only due to the distributional overlap but also because there is evidence of hybridization. The effects of hybridization provide a challenge in establishing conservation measures when a species is threatened because of the complexities in confirming causes of declines (whether they are natural or anthropogenic). If hybridization reduces fitness, then this could threaten the Carolina Hammerhead population through wasted reproductive efforts.

Carolina Hammerheads are not currently considered in management plans, and more data are needed regarding habitat use, distribution, and relative abundance of the species. The similarity between the *S. gilberti* and *S. lewini* means that the Carolina Hammerheads have been included in previous assessments of Scalloped Hammerhead populations. Future decisions regarding the conservation status of the Carolina Hammerhead will not only have to consider the presence and status of Scalloped Hammerheads but should also consider the potential consequences of continued hybridization between these species.

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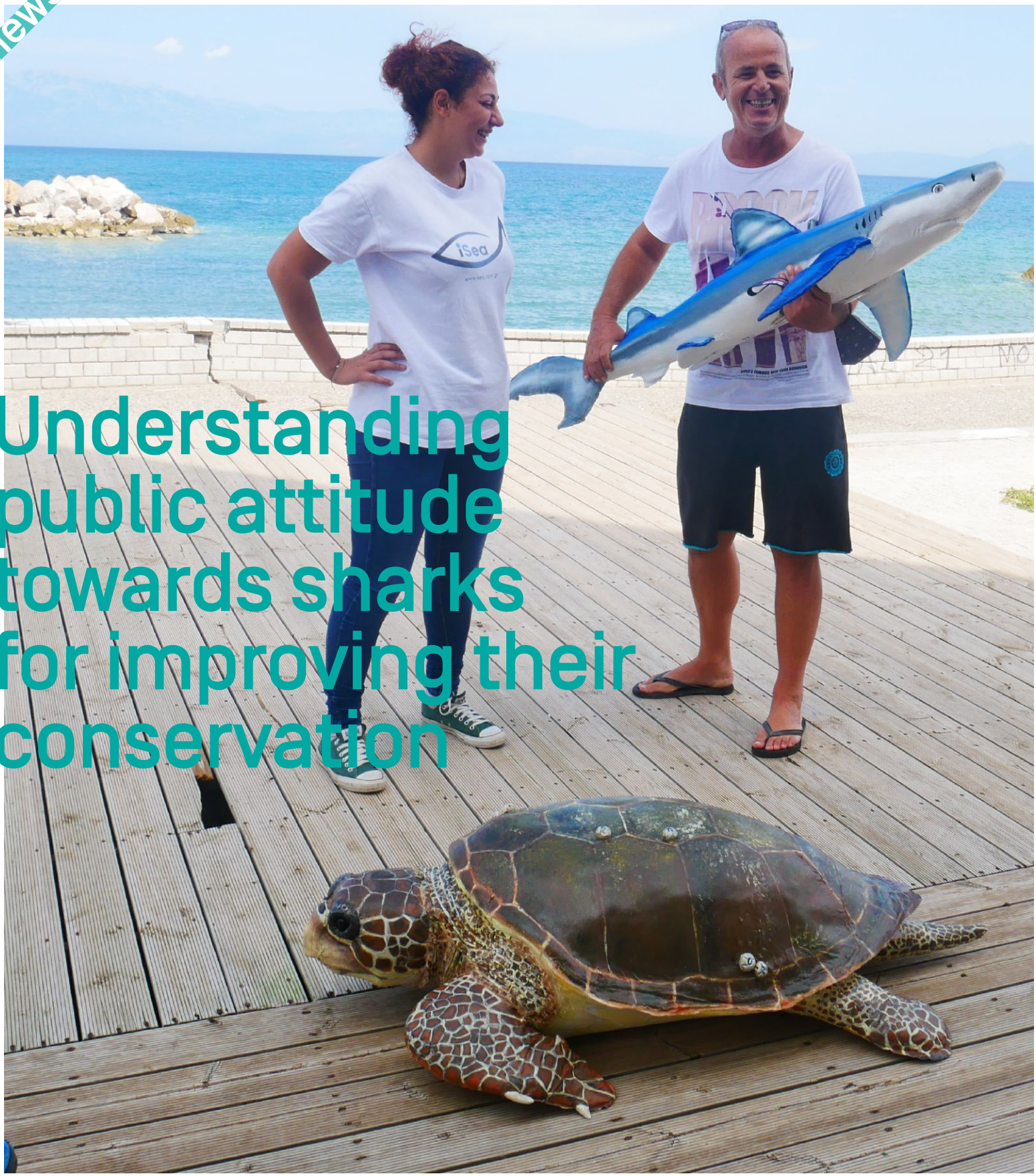

Photo by © iSea

Understanding public attitude towards sharks for improving their conservation

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Sharks possess a unique value as top predators, being therefore irreplaceable elements of marine ecosystems. Unfortunately, contemporary narratives widely presented in popular mainstream media have attached an utterly negative connotation to sharks, propagating an unsubstantiated and fabricated image of them as implacable and voracious predators. Recently a lot of attention has been devoted to understanding the public perception towards sharks to promote their conservation.

New collaborative research led by iSea and the University of Padova, recently published in Marine Policy, assesses the public's current attitude towards sharks on a global scale and explores the importance of factors like culture, history, or educational level in shaping these attitudes.

A questionnaire-based survey was developed utilizing the scale of Kellert for assessing attitudes of respondents towards sharks. The questionnaire consisted of four parts facilitating the quantification of the results and investigating the relations between different factors and attitudes. The questionnaire was translated into 20 languages (i.e., Albanian, Arabic, Bengali, Chinese, Croatian, Dutch, English, French, German, Greek, Hebrew, Indonesian, Italian, Japanese, Mandarin, Portuguese, Russian, Slovenian, Spanish, and Turkish), to overcome linguistic barriers that would limit our potential sampling. Although the selected languages cover most European, American, Middle Eastern, Eastern Asian, and Southeastern Asian countries, there is a lack of African languages. However, English, French, Portuguese, Spanish, and/or Arabic are official languages in most of these countries, and many nationals speak more than one language. All the language versions of the questionnaire were uploaded in an online platform that allowed only one response by IP address, thus limiting repetitive answers. The survey was disseminated through social media, almost exclusively through Facebook and Twitter, mass media, and through several countries' national and local press.

This massive work resulted in 13,800 questionnaires from 137 countries, with 25 countries presenting more than 100 answers each, representing 92% of the filled questionnaires. A generally positive attitude towards sharks emerged, with 90% of respondents agreeing that «Sharks are important for the functioning of marine ecosystems». This positive attitude was highly influenced by the respondents' knowledge and their participation in marine conservation projects. On the other hand, about 60% of respondents with low knowledge on the topic agreed that «Sharks are dangerous for humans».

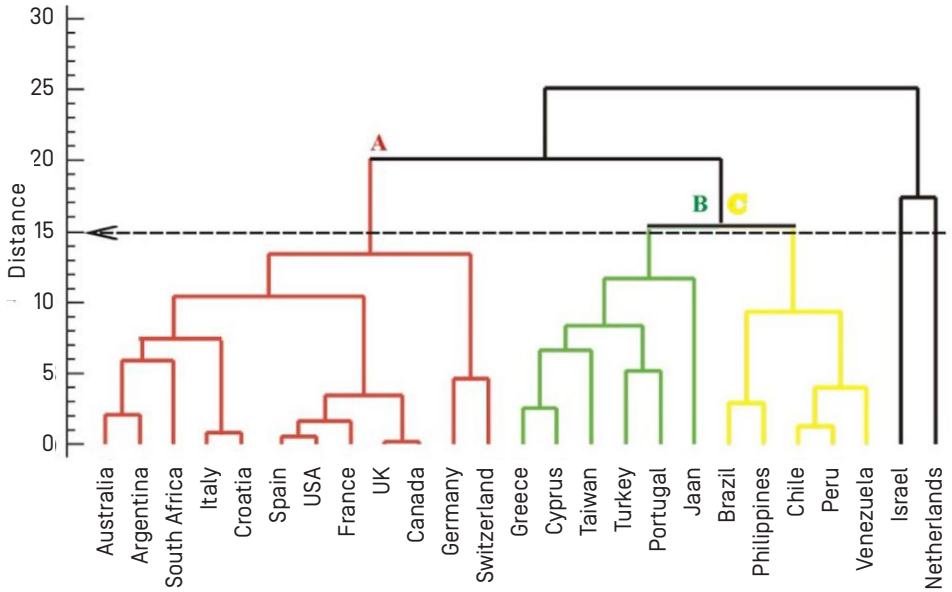
Three groups of countries were significantly formed from the applied cluster analysis. Group A consisted of several different countries at distant locations from each other. In contrast, Group B consisted of the countries along the edge of the Mediterranean Sea (Greece, Cyprus, Turkey) in addition to Portugal, Japan, and Taiwan, and Group C by South American countries (Brazil, Chile, Peru and Venezuela) in addition to the Philippines. Interestingly, shark attacks emerged as an essential factor for clustering. Countries with high numbers of shark attacks exhibit a highly positive attitude towards sharks, potentially because their citizens are more aware of the issue and the importance of sharks for marine ecosystems.

Shark conservationists must invest in the production of materials (including documentaries) that will increase the knowledge of the public about sharks and uplift their image. At the same time, they should work closely with journalists and professionals of mass and social media for ensuring that accurate information reaches the general public, avoiding the dissemination of new misconceptions.

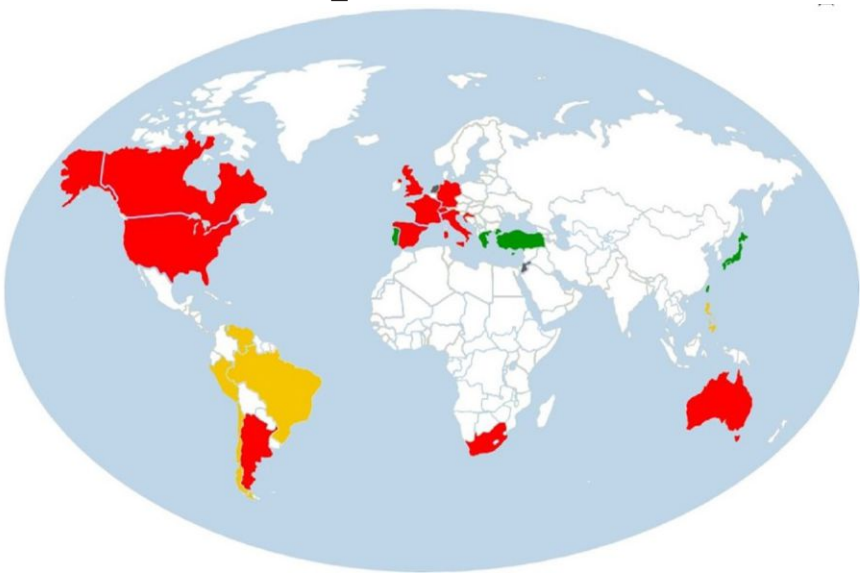
This work has been partially funded by the Oceans Past Platform (COST Action IS1403) and the Department of Animal Production, Fisheries & Aquaculture at the University of Patras, Greece and the Department of Biology at the University of Padova, Italy.

Photo by © iSea

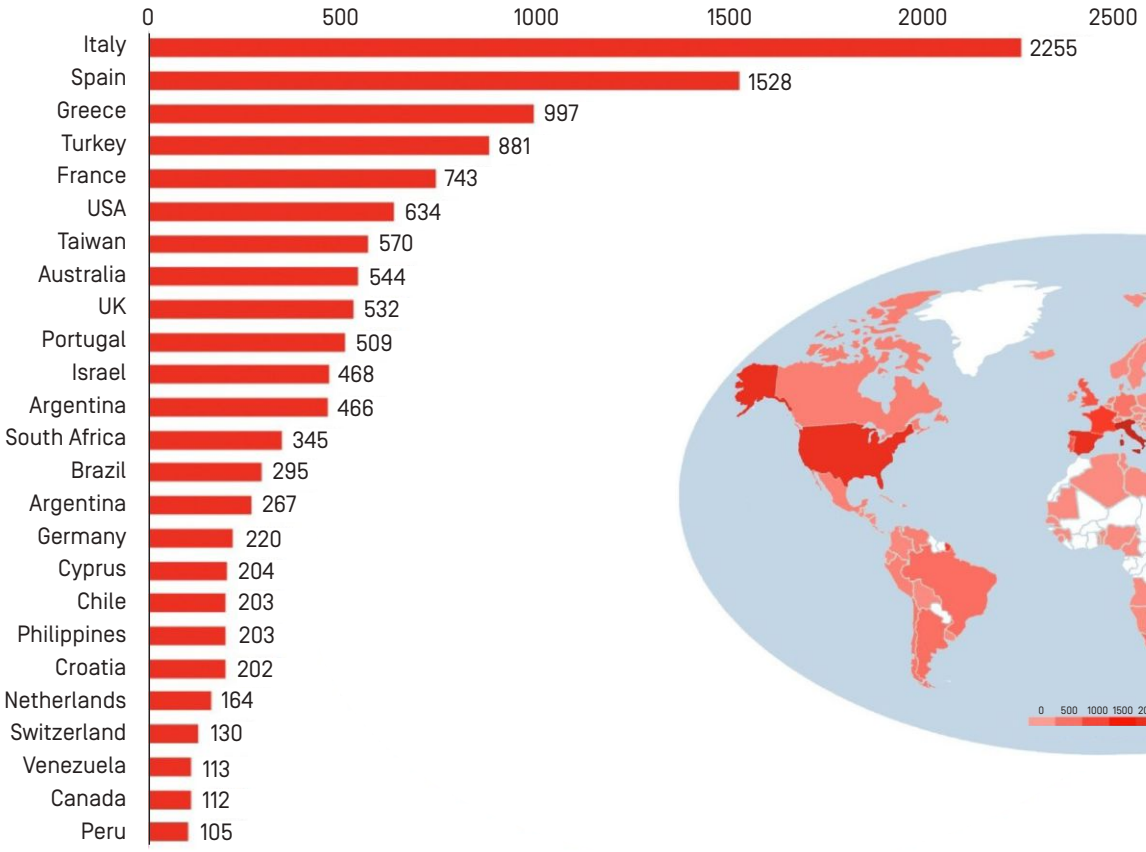
Fishers after workshops in Greece for the safe handling and releasing of sharks and rays in the context of the project Alliance for Survival II



↗ Cluster analysis (Euclidean distances with complete linkage) on a matrix compri-£sing the sum of the scores for the 5 levels consisted each of the 13 statements for the countries with more than 100 participants (25 countries). Group A is represented in red, B in green and C in yellow.



↘ Map of the distribution of the responses, colours represent the number per country; bars represent the number of responses for the top 25 countries.



Environmental awareness event in a primary school in Cyprus in the context of the LIFE ELIFE project

Photos by © Marine and Environmental Research Lab

Sharks International 2022 is coming to Europe

The fourth edition of the quadrennial conference is taking place in October 2022 in Valencia and stands on the shoulders of hugely successful previous events in Brazil (2018), South Africa (2014), and Australia (2010). In association with the European Elasmobranch Association and hosted by The Shark Trust, Submon, and Lamna, the world's largest international shark conference will bring together a strong community of people from around the globe with interest in sharks, rays, and chimaeras, all in the name of addressing the challenges of chondrichthyan conservation. The conference is funded by The Save Our Seas Foundation and will be based out of L'Oceanogràfic, the largest aquarium in Europe, and streamed live across the world.

At its heart, the conference will be focused on working collaboratively to address the challenges of chondrichthyan conservation during the United Nations Decade of Ocean Science for Sustainable Development (2021-2030). SI2022 will explore three essential tools in relation to conservation:

- **Research**
- **Communication**
- **Advocacy**

SI2022 is different from previous years. Working across multiple time zones, the hybrid event will feature an in-person conference (October 20–22) and significant digital content on the SI2022 online portal, including professional development workshops from February 2022. Located in the avant-garde architectural complex of the City of Arts and Sciences, L'Oceanogràfic offers a stunning location on the Mediterranean Sea. As Sharks International's first European destination, València is sure to impress!

Leading up to the physical conference, there will be five days (October 10–14) of digital content across various formats and subjects, fostering collaboration between the shark community across the diverse field of chondrichthyan conservation. However, the conversation starts much sooner than October 2022! The SI2022 portal is already bringing together the shark research, communication, and advocacy communities to explore what's happening with sharks, rays, and chimaeras globally. Over three hundred people have already signed up to the SI2022 online portal, where they have been shaping the conference through community discussion.

As time goes on, the portal will also be hosting online sessions, including prospective presentation workshops, practical skills videos, and keynote speaker podcasts. Following these sessions, structured forum discussions and polls will enable the community to have their say, fostering inter-sector communication between the shark community across the world while helping develop an event that addresses the questions that really need answering.

If you are interested in sharks, rays, and chimaeras and want to be a part of the 300+ member community currently shaping SI2022, sign up to the portal at *si2022.org* and consider attending the event. Join this year to be automatically entitled to a 10% discount when tickets become available. Whether it's in Valencia or online, SI2022 allows you to be part of the conversation going on inside the world's largest international shark (ray and chimaera) conference.

SHARKS INTERNATIONAL
VALENCIA 2022

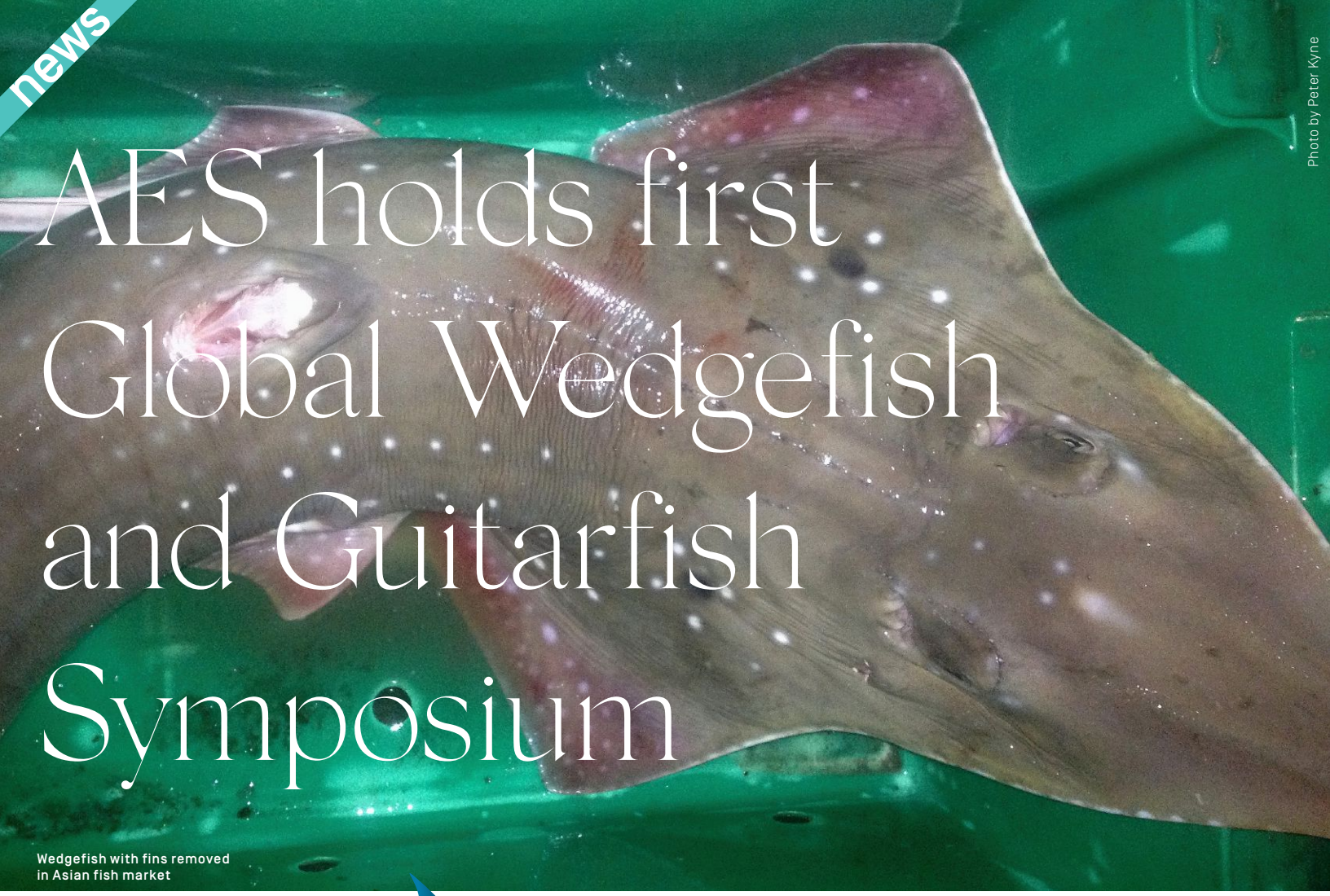


Photo by Peter Kyne

AES holds first Global Wedgefish and Guitarfish Symposium

Wedgefish with fins removed in Asian fish market

Peter M. Kyne
Charles Darwin University | Senior Research Fellow

David A. Ebert
IUCN SSC Shark Specialist Group (SSG) | North America Regional Group | Member
American Elasmobranch Society | President
Pacific Shark Research Center | Director
South African Institute for Aquatic Biodiversity | Honorary
Marine Fishes Curator, Chondrichthyes
Moss Landing Marine Laboratories | Research Faculty

and Paula Carlson
IUCN SSC Shark Specialist Group (SSG) | North America Regional Group | Member & Aquarium Working Group | Co-Chair
Dallas World Aquarium | Director of Husbandry

The inaugural American Elasmobranch Society (AES) Global Wedgefish and Guitarfish Symposium was held virtually over two days in November 2021. The Symposium aimed to bring together the global community of people interested in understanding, managing, and conserving one of the most threatened groups of animals on earth.

The majority of cartilaginous fishes of the Order Rhinopristiformes ('rhino rays') are considered threatened with extinction according to the IUCN Red List of Threatened Species. Critically Endangered, Endangered, and Vulnerable species represent 72% of the fauna. The Symposium focused on the non-sawfish rhino rays, namely the wedgefishes (90% of species are threatened), giant guitarfishes (100% threatened), guitarfishes (66% threatened), and banjo rays (38% threatened).

Presenters from 18 different countries gave 27 presentations, providing a truly global symposium. A complete list of presentations is provided in the table below. The Symposium had 280 people registered from 37 countries. The ten countries with the most registered people were the United States (84), Australia (31), Brazil (24), Peru (12), United Kingdom (12), South Africa (11), India (9), Thailand (8), Singapore (7), and Sri Lanka (7).

Presenters highlighted the status and ecology of rhino rays, catch and bycatch levels, extensive trade in their products, livelihood values, the resolution of taxonomic issues, the role of genetic tools such as environmental DNA (eDNA), the role of aquaria in communicating status and challenges to the broader community, and conservation challenges at national and global scales.

Indeed, the challenges facing rhino rays are immense and require a strong commitment from funders and governments to facilitate research and conservation outcomes. Some key ongoing research needs to inform management and conservation include: (1) foundational taxonomy and life history research; (2) population structure studies; (3) catch and trade monitoring and population trends; and (4) captive breeding.

The Symposium was supported by the American Elasmobranch Society, Save Our Seas Foundation, Pacific Shark Research Center (Moss Landing Marine Laboratories), Dallas World Aquarium, Charles Darwin University, and the Georgia Aquarium. We thank Rachel Aitchison, Bryan Huerta, Tonya Wiley, and Josh Moyer for assistance with the Symposium.

Rachel M. Aitchison	Revision of Southwestern Indian Ocean *Rhinobatos* (Rhinopristiformes: Rhinobatidae)
Rhett Bennett	Western Indian Ocean wedgefishes (Rhinidae): Ecological knowledge, fisheries and management
Aletta E. Bester-van der Merwe	Towards a molecular assessment of *Rhynchobatus* species from the South West Indian Ocean region
Paula B. Carlson	Creating connections: Engaging zoo and aquarium visitors in the conservation of wedgefish and guitarfish
Christina Choy P. P.	Unravelling the wedgefish (Rhinidae) and giant guitarfish (Glaucostegidae) trade in Singapore
Brooke M. D'Alberto	Population productivity of shovelnose rays: Inferring the potential for recovery
Ryan Daly	Long-term catch trends and risk assessment of the Critically Endangered Whitespotted Wedgefish *(Rhynchobatus djiddensis)* from South Africa
David A. Ebert	Playing for time: Guitar- and violin sharks, is this the last dance?
Daniel Fernando	Management gaps for rhino rays in Sri Lanka
Beth Firchau	AZA SAFE: Working smarter and harder together for sharks and rays
Sarah Fowler	Implementing CITES listings for the rhino rays: Wedgefish, guitarfish, and sawfish
Jim Gelsleichter	Hormonal and nutritional changes in plasma of captive Bowmouth Guitarfish through sexual maturity and reproductive events
Adriana Gonzalez-Pestana	The Pacific Guitarfish *Pseudobatos planiceps* (Rhinobatidae), a review with a focus on Peru
Jolene Hanna & Jen Hazeres	Bowmouth Guitarfish – An evolution of species management from local to international a pplications within the aquarium and zoo industry
Alifa Bintha Haque	High fishing pressure and trade driving rhino rays towards extinction - a case study from the Bay of Bengal, Bangladesh
Rima W. Jabado	Rhino rays – uncovering the drivers behind their exploitation in data-poor areas
Gareth L. Jordaan	Movement patterns and growth rate of the Whitespotted Wedgefish *Rhynchobatus djiddensis* in southern Africa based on tag-recapture data
Peter M. Kyne	The global state of wedgefishes and guitarfishes
Guido Leurs	The status of guitarfishes within two large intertidal areas in West Africa
Mariana F. Martins	Conservation challenges and perspectives for the Brazilian Guitarfish
Matt McDavitt	A novel luxury dish made from wedgefish rostra
Muhammad Moazzam	Managing the unmanaged fisheries of guitarfish and wedgefishes in Pakistan
Nicole M. Phillips	Rapid assessment environmental DNA surveys to define the contemporary distributions of wedgefishes, giant guitarfishes, and guitarfishes
Stan Shea	"King of shark fins" not quite sharks... so what is in my shark fin soup? – A rapid survey on the availability of shark-like batoid fins in Hong Kong, SAR and Guangzhou, China retail markets
Benaya M. Simeon	Revealing wedgefish and giant guitarfish fishery from the core of the Indo-Pacific
Michaela van Staden	From the west side to the east side: Population connectivity and genetic diversity of two southern African endemic *Acroteriobatus* species
Stephanie K Venables	A multi-technique approach to understanding wedgefish ecology in the Bazaruto Seascape, Mozambique

American Elasmobranch Society AES

Photo by Jake Wilton | Ocean Image Bank | theoceanagency.org

Wedgefish on Ningaloo Reef, Australia

Empowering Women through Ocean Opportunities

Training local women as swim instructors empowers them to help their community

Photo by Alicia Warner

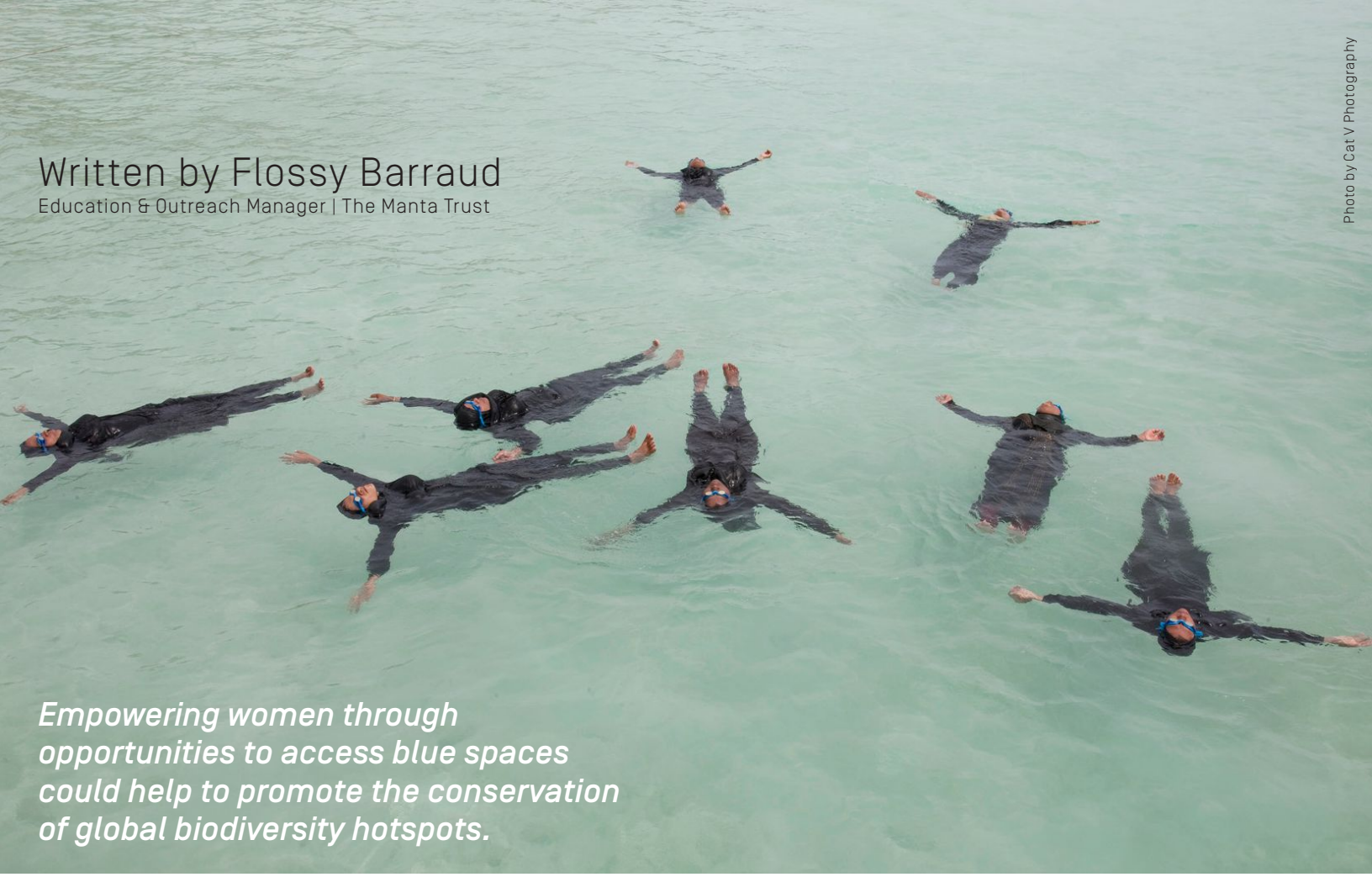


Photo by Cat V Photography

Written by Flossy Barraud
Education & Outreach Manager | The Manta Trust

Empowering women through opportunities to access blue spaces could help to promote the conservation of global biodiversity hotspots.

The Manta Trust works with Affiliate Projects in over 20 countries worldwide to conserve Manta and Devil Rays and the vast ocean habitats they rely upon through research, education, and collaboration. Through our collaborative experiences, we have learned that coastal communities must be empowered to act as custodians of their natural environments to sustainably protect the biodiversity that sharks and rays depend upon. This is especially true in ocean-dependent countries, including Pacific and Indian Ocean island nations, where people are highly dependent on the ocean for food, livelihoods, coastal protection, as well as their culture. Ocean-dependent nations often have ownership over vast ocean areas and global biodiversity hotspots; their citizens play a disproportionately large role in ocean conservation worldwide. We believe it is critical that people living in these countries are connected to and knowledgeable about ocean conservation to develop sustainably and conserve their large ocean areas and the resources they depend upon.

Women and the water

Our founding project is the Maldivian Manta Ray Project. During our sixteen years in the Maldives, we've observed that many Maldivian women and girls cannot swim, and most have never snorkelled, surfed, fished or explored their local ocean environment in the way that boys and men do. Our research shows that girls are 50% more likely than boys to have never snorkelled, and three times more likely to feel unconfident swimming in the sea. The Maldives is 99.3% ocean; most people live metres from the sea. Learning to swim is imperative not only for safety but for enabling access to the dominant environment and core recreation and economic space (50% of working Maldivians are employed in fisheries and tourism sectors). Hamda Ibrahim, a secondary school marine science teacher, highlights local concerns surrounding this:

"As Maldivians, we all should know how to swim, but that is not the reality. Most of us are scared to go to the sea and do not possess the basic skills of swimming... As a teacher, I always think in terms of how this would help my students' learning, and for my students, I would say that their learning is very much limited because they don't know how to swim."

Very few Maldivians work in environmental fields; we, and other NGOs and government organisations, find it challenging to find Maldivian applicants for job positions. Most young people are not aware that these kinds of careers exist or that they could pursue them.

Accessing blue spaces

Since 2015, we have taught hundreds of children and women to swim and snorkel and witness the reefs or megafauna their country is famous for, for the first time. By teaching children to swim and snorkel in the Maldives, we have seen them become passionate conservation advocates that strive to make changes in their communities. When mothers learn, they instil their love for the ocean in their children, and a cycle of change begins. Girls that we teach have organised environmental clubs and events on their islands and pursued conservation careers. Emotional connection to nature and personal experience of an environment are two variables frequently shown to improve pro-environmental behaviour in environmental education studies (Borja et al 2020); I have witnessed this first-hand.

Teaching girls and women
to swim in the Maldives

Photo by Simon Hilbourne | Manta Trust

A widespread issue

This gender disparity in ocean interaction exists not only in the Maldives but also in several other Small Island Developing States (SIDS) and tropical nations that are highly dependent on their oceans for food, livelihoods, coastal protection, and economies. SIDS citizens often play a disproportionately large role in ocean conservation. We believe that connecting people to the ocean is essential for successfully conserving these globally essential areas. Numerous organisations have identified this disparity and begun learn-to-swim and snorkel programmes, with incredible results for the small groups of people involved. From these programmes, we know that learning to swim, snorkel, or surf has helped communities fight poverty in Mozambique, empowered women to become conservationists in the Maldives, improved well-being and challenged social and gender barriers in Cuba, Iran, and Sri Lanka, and enabled women to access jobs in tourism and conservation sectors in Timor-Leste and Melanesia.

Trialling solutions

Although this work is highly impactful, it is not widescale or synthesised enough. Imagine what could happen if up to half of the ocean-dependent states' populations physically connected (or re-connected) to the marine environment? The outcomes could be astounding. Project Drawdown (Hawken 2017) estimates that educating women, together with family planning, is the fifth most powerful solution for reducing emissions and mitigating the climate crisis: *"Education also shores up resilience and equips girls and women to face the impacts of climate change. They can be more effective stewards of food, soil, trees, and water, even as nature's cycles change."* Research shows that women excel as leaders in conservation programmes and effectively pass knowledge onto younger generations but are often overlooked and have fewer educational opportunities than men. Recognising the influential role of women in their families and communities, and enabling women to contribute further in these realms by empowering them through opportunities to access the ocean, can enhance marine stewardship. Positive impacts of women learning to swim range from improved engagement of indigenous people in conservation and growth of bottom-up conservation initiatives to improving gender equality in regions where this is critical and improving livelihood opportunities in eco-tourism and small-scale fisheries sectors. Empowering women to access these livelihoods could even help mitigate poverty in some of the lowest-income regions in the world.

The Manta Trust and the University of Plymouth seek support for an ambitious, widescale project to investigate this inequality and develop scientifically grounded strategies for facilitating women's ocean engagement in different cultures and contexts. This project could impact community conservation mindsets and action, food security, livelihood access, well-being and safety, and gender equality. We are keen to connect with collaborators in each case study region, which will likely include the Maldives, Mozambique, Timor-Leste, Fiji, Indonesia, São Tomé and Príncipe, Barbados and more.

This is a phased, three-year project, including:

Initial research: interviews, surveys, securing collaborations with stakeholders in ocean-dependent countries (year 1).

Community-based research and pilots: visiting up to five ocean-dependent countries (determined using Selig et al. (2018) dependency rankings) to research causes of, and solutions to this issue in different communities, assess 'what works' by visiting swimming training projects and run small-scale pilot programmes which will be incorporated into the final strategy (year 1 & 2).

Saanee - who is now pursuing a marine conservation career - snorkels with Manta Rays for the first time

Photo by Kaitlyn Zerr | Manta Trust

Training local women as swim instructors empowers them to help their community

Photo by Alicia Warner

Photo by Soneva Fushi

Female Maldivian swimming instructors teach others to swim

Pilot swimming instructor training programme (year 1) and subsequent effectiveness research (year 2 & 3). It involves training 26 Maldivian women as swimming instructors and supporting them to teach over 10,400 people (2% of the population) from their 13 island communities to swim and engage with the ocean by 2025.
Outcome: Writing and disseminating a strategy for empowering women through ocean opportunities will outline tried and tested initiatives for different cultures and contexts. This can be applied by other organisations, government and community groups and used to secure funding to upscale such initiatives (year 3).

Our education strategy

The Manta Trusts' educational vision is for people worldwide to be knowledgeable about mobulids and passionate about protecting ocean habitats. We aim to achieve this through developing strategies to improve:

Education - People around the world are knowledgeable about mobulid rays and blue issues; and
Connection - People around the world have a personal relationship with nature, particularly the oceans. This is one of the most effective ways to inspire pro-environmental behaviour change (Borja et al 2020).

This project will expand our educational endeavours to achieve equality in ocean swimming and exploration for women and girls, especially in tropical and ocean-dependent nations. Over time, this will come full circle, as empowered women can better protect the valuable local ecosystems that both they and species like sharks and rays depend upon.

Activity
Connect women to the ocean through swim and snorkel training and swim instructor training.

→

Output
Women drive positive change in their communities by empowering others.

→

Outcome
A society where women swimming is the norm. Improved conservation, gender equality, livelihood opportunities.

Long-term aims

The Manta Trust will use the data collected during this study to assess the effectiveness of training local women as swimming instructors and similar initiatives for:

- Empowering women to act as agents of change in their communities.
- Increasing women's access to ocean-based livelihoods.
- Increasing the number of girls and women that can swim in a region.
- Impacting community conservation mindsets or initiatives.

In the long-term, we will work with partners in the Maldives and worldwide to upscale initiatives that were effective during the pilot testing, such as training local women as swimming instructors. We will disseminate our strategy to organisations to develop similar women's empowerment initiatives in their localities and use the data we collect to provide evidence of the ocean connection gender disparity and best practices for addressing it in different contexts.

Get Involved

It all comes down to this: unless people connect with the ocean and are inspired to care, we will never effectively protect the environment. When the ocean is your backyard, being able to access it is imperative. We believe that this project could change thousands of people's lives, and marine conservation, for the better.

The Manta Trust is seeking financial support for this part-funded project. If you are interested in collaborating with us, please get in touch with Flossy: flossy.barraud@mantatrust.org.
Video overview: vimeo.com/577542410/a7cde70108

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Female Maldivian swimming instructors teach others to swim

Photo by Soneva Fushi

A step towards contextualizing the conservation of non-marine elasmo-branchs within the global freshwater biodiversity crisis

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Me'ira Mizrahi and Rachel Mather
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Photo by Michael Grant

Headwaters of Kikori River, Papua New Guinea

In 1995, Compagno and Cook wrote an article for *Shark News* entitled – Freshwater elasmobranchs: a questionable future. Today, the future for non-marine elasmobranchs (sharks and rays) remains uncertain. Their populations are almost certainly in significantly more trouble than we can presently appreciate. Humans have had drastic impacts on freshwater environments globally through a prolonged history of resource extraction, waste disposal, and modification of riverine environments. Consequently, we are presently in the midst of a 'global freshwater biodiversity crisis' (e.g. Tickner et al. 2020). However, a paucity of information is available on the general biology and population trends of non-marine elasmobranchs. We do not have sufficient information to properly appraise the conservation status of non-marine elasmobranchs in the context of other freshwater vertebrate taxa that are declining at alarming rates. While we know that some non-marine elasmobranch species are highly threatened with extinction (e.g. sawfishes, family Pristidae), the majority remain poorly studied (Grant et al. 2019). There is an increasingly urgent need to gather information on the biology (particularly life history), population status, and local uses and values of non-marine elasmobranchs to inform species- and region-specific conservation requirements to safeguard this unique group into the future.

"Unfortunately, freshwater elasmobranchs are not well known biologically, and have been little studied in terms of fisheries management and conservation. Although freshwater elasmobranchs were known for the past few centuries, their dire plight has only been recognised in the past three decades. Only a handful of researchers... have paid much attention to their problems."
Compagno and Cook (1995) Shark News, Vol 3 pp 4.

What are non-marine elasmobranchs?

Non-marine elasmobranchs fall into two broad life strategies. The obligate freshwater species spend the entirety of their life history in freshwater. Freshwater obligates are dominated by the neotropical stingrays (Potamotrygonidae, these species will not be covered in this article) of South America, which make up 38 of the world's 45 freshwater elasmobranch species. The remaining seven species are stingrays (Dasyatidae) scattered throughout major drainages of the Indo-Pacific and West Africa. Meanwhile, the euryhaline generalist species spend only part of their life history in freshwater. There are ten species of euryhaline generalist, including four whaler sharks (Carcharhinidae), five stingrays, and the Largetooth Sawfish *Pristis pristis*. With the probable exception of the river sharks (*Glyphis* spp.), which do not readily penetrate into freshwater, euryhaline generalist species appear to have the osmoregulatory capacity to complete their life history in freshwater, although adult size classes likely require the greater spatial attributes of estuaries and inshore marine environments. There are three known examples of full-time freshwater populations within the euryhaline generalists: Bennett's Stingray *Hemitrygon bennetti* in the Pearl River, China; Atlantic Stingray *Hypanus sabinus* in Lake Jesup, Florida, USA; and *P. pristis* in Lake Nicaragua, Nicaragua. Additionally, estuarine generalists occur in lower riverine environments, although these species cannot tolerate freshwater and will not be discussed here (see Grant et al. 2019 for further information on estuarine generalist species and complete species lists for freshwater obligates and euryhaline generalists).

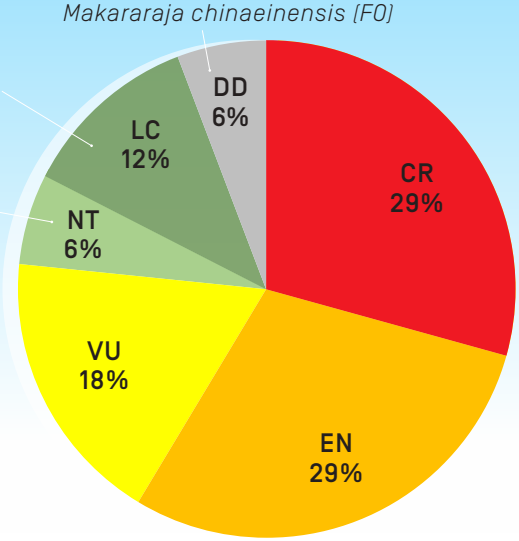
Conservation status

During the Global Shark Trends Project, all non-marine elasmobranch species, excluding the potamotrygonids (ongoing assessments), were reassessed on the IUCN Red List of Threatened Species. From these recent assessments, 76% of non-marine elasmobranch species are listed as threatened with extinction. Considering all chondrichthyan species (37.5% threatened with extinction, Dulvy et al. 2021), non-marine elasmobranchs are threatened with extinction at twice the rate of their marine counterparts. Furthermore, most freshwater obligate species (not considering Potamotrygonidae) are presently facing an elevated extinction threat, listed as Critically Endangered or Endangered on the IUCN Red List. While the Chindwin Cowtail Ray *Makararaja chindwinensis* remains Data Deficient, this species is likely to fall into a threatened category should sufficient data become available for assessment.

Present conservation status of African and Indo-Pacific non-marine elasmobranchs.

A common trait of non-marine elasmobranchs is that they are either locally extinct or highly threatened in regions of dense human populations. The only exception is Florida, USA, and northern Australia, where species protections and management appear to effectively maintain populations (although *P. pristis* remains Critically Endangered in Australia, Kyne et al. 2021). There is little refuge from human pressures for species occurring outside of these regions, and any existing species protections appear to be ineffective in stabilizing ongoing population declines. The greatest

76% of non-marine elasmobranchs* are threatened with extinction



Hypanus sabinus (EG)
Urogymnus guttatus (EG)
Hypanus guttatus (EG)
Carcharhinus leucas (EG)
Glyphis garricki (EG)
Glyphis glyphis (EG)

Fontitrygon garouaensis (FO)
Fontitrygon ukpam (FO)
Glyphis gangeticus (EG)
Hemitrygon bennetti† (EG)
Pristis pristis (EG)
Fluvitrygon kittipongi (FO)
Fluvitrygon oxyrhynchus (FO)
Fluvitrygon signifer (FO)
Hemitrygon laosensis (FO)
Urogymnus polylepsis (EG)

*Excluding neotropical stingrays (Potamotrygonidae)
†Only closed freshwater population, population declines are estimated to be 80–90% over last 20 years
FO, Freshwater obligate; EG, Euryhaline generalist
CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient

Photo by Michael Grant

Kikori River Delta, Papua New Guinea

Photo by Wildlife Conservation Society, Myanmar

Me'ira Mizrahi conducting livelihood interviews with coastal fishers in Myanmar

extinction risks occur for obligate freshwater species, inherently confined to their local river basins. These species are unable to relocate when habitats become degraded from human uses. While it is not expected that euryhaline species would readily relocate to neighbouring rivers when unfavourable conditions are encountered, they have an increased capacity to relocate within river basins, including lower estuarine reaches.

Threats – and the global freshwater biodiversity crisis

A lack of information on tropical riverine environments and their species is not restricted to elasmobranchs. Marine environments receive a disproportionately more considerable amount of conservation research and attention than freshwater environments for teleost fish (Darwall et al. 2011; He et al. 2021). Teleost fishes have remarkable diversity in freshwater environments, with over half of all described teleost species occurring in freshwater (Fricke et al. 2021). There is significant concern for the status of freshwater vertebrate species globally, with population declines estimated to be far more severe than observed for marine or terrestrial taxa (WWF 2018). The most significant population declines, including several extinctions, have occurred for freshwater megafauna (>30 kg body mass), with declines of 88% occurring from 1970–2012 (He et al. 2019). Recently, there have been numerous publications highlighting the dire state of freshwater environments, the declining population status of species that use them, and concern for the future (e.g. Collen et al. 2014; Dudgeon 2019; Harper et al. 2021; He et al. 2021; He et al. 2019; Reid et al. 2019; Sills et al. 2018; Su et al. 2021; Tickner et al. 2020; Vörösmarty et al. 2010; WWF 2018). The major pressures of fisheries (Ainsworth et al. 2021; Funge-Smith 2018), ornamental harvest (Reid et al. 2013), invasive species (Vilizzi et al. 2019), pollution (Tuholske et al. 2021), barriers to water flow (Grill et al. 2019), vegetation and land repurposing (Gardner et al. 2018), climate change (Lennox et al. 2019), mining-related resource extraction (Maus et al. 2020), and general human reliance's of riverine systems (Fedele et al. 2021) are all contributing factors, often occurring in tandem. Unfortunately, elasmobranchs are rarely mentioned in these publications, likely due to the persistent absence of data availability on their biology, fisheries interactions, and population trends.

Many freshwater environment threats are not present, or not as severe, in marine environments where most of our understanding of elasmobranch conservation biology comes from. This limits our ability to properly assess the threat level that non-marine elasmobranchs are exposed to in riverine environments. For example, land clearing within river basins for agriculture and development is widespread throughout the range of all non-marine elasmobranchs. Land clearing leads to increased terrigenous runoff and higher quantities of suspended sediments and dissolved carbon and nitrogen, which carry subsequent eutrophication risks. To the best of our knowledge, there is presently no published information on how deteriorating water quality may affect non-marine elasmobranch populations. While many freshwater fish species have physiological adaptions to deal with periods of poor water quality (e.g. aestivation, 'air-gulping', or short seasonal life cycles), similar adaptations are not observed in elasmobranchs. Non-marine elasmobranchs species are mainly found in the main channel of major tropical river basins, where environmental fluctuations are likely to be less severe, suggesting less tolerance than teleost fishes that additionally inhabit creeks, ponds, and other microhabitats. Like their marine counterparts, it is expected that non-marine elasmobranchs have 'slow' life histories. Non-marine elasmobranchs likely take several years to complete their life cycle. An inability to withstand periods of water quality degradation due to human causes may profoundly impact their populations. Continued water quality deterioration of freshwater environments due to unpredictable and sporadic rainfall regimes is also forecasted with climate change (Lennox et al. 2019).

There are very little data on the reproductive movements of non-marine elasmobranchs. It is unclear what effect barriers to water flow, such as dams, have on populations aside from the apparent risk of population fragmentation. For example, recruitment of *P. pristis* into freshwater nursery environments is highly dependent on river flow (Lear et al. 2019), although relationships between hydrological factors for other non-marine elasmobranch species remain unclear. Throughout the 1900s, dams were widely constructed for reservoir or hydroelectric purposes, with a rather nonchalant attitude to their potential ecological impacts on freshwater environments. While the true effects of the world's dams on non-marine elasmobranchs may never be completely understood, there are few populations of non-marine elasmobranchs occurring beyond dam infrastructure (e.g. *H. bennetti,* Pearl River; Mekong Stingray *Hemitrygon laosensis,* Mekong River).

Fisheries likely present the greatest threat to non-marine elasmobranchs. The threat of fisheries encompasses both targeted and incidental capture and harvest for the ornamental trade. Inland fisheries are characterized as being small-scale (inclusive of artisanal, cultural, and subsistence fisheries), and often harness multiple gear types, spanning various net, hook, trap, spear, and electro-fishing methods. One of the most significant challenges to monitoring non-marine elasmobranch populations is the lack of data feedback mechanisms in small-scale fisheries of low-income developing nations. In Papua New Guinea for example, only high-value teleost species are typically sold to commercial buyers (where trade data are presumably recorded), while less valued catch inclusive of river sharks and sawfish are retained for consumption or sale at local markets. Similarly, in fish markets along the Mekong River, declines of *H. laosensis* are inferred from sporadic market composition surveys, although long term time-series market data are lacking. For many small-scale fish markets in low income developing nations, unless there is a concerted research effort ongoing at the time, catch quantities are generally not recorded, limiting our ability to understand long-term population trends. Furthermore, available catch in small-scale fishery market hubs is quickly sold and transported elsewhere or consumed due to a lack of storage capacity along the market chain (i.e. refrigeration or availability of ice). This can also limit time for observation even when research effort is present (e.g. Haque et al. 2021).

Harvest of ray species for the ornamental trade is an additional and unique fisheries threat in non-marine environments. In recent Red List assessments, all three *Fluvitrygon* species, *H. laosensis,* and the Giant Freshwater Whipray *Urogymnus polylepis,* were noted to occur in the ornamental industry. Compagno (2005) made brief observations of an aquaculture venture sponsored by the Thai government during the 1990s, although this venture was later ceased. In the Kapuas River, West Kalimantan, Indonesia, local fishers were reported to target the White Edge Whipray *Fluvitrygon signifier* and the Marbled Whipray *Fluvitrygon oxyrhynchus* for the ornamental trade. These species are small-bodied (max disc width ~38 cm) and possess aesthetic colourations. There is presently no published information on the ornamental trade of Indo-Pacific freshwater ray species outside of anecdotal comments in Red List assessments, and it is poorly understood if the trade is domestic or international. Research is required to quantify the ornamental trade and inform whether the Convention on International Trade in Endangered Species (CITES) protections are possibly required to prevent the detrimental harvest of wild populations for international ornamental trade demand.

Michael Grant measuring a juvenile Largetooth Sawfish *Pristis pristis* in Papua New Guinea

Photo by Mathew Young

A cause for hope?

Numerous recent non-marine elasmobranch species rediscoveries provide hope, though underline the lack of recent research attention non-marine elasmobranchs have received. In Papua New Guinea, the first adult Speartooth Shark *Glyphis glyphis* was recorded by a small-scale fisher in coastal waters close to the mouth of the Fly River. The northern river shark *Glyphis garricki* was observed in these same surveys. These river shark observations were the first accounts of river sharks in Papua New Guinea since the 1970s (White et al. 2015). Subsequent targeted surveys found that fishers commonly catch river sharks in lower riverine environments throughout southern Papua New Guinea (Grant et al. 2021). Grant et al. (2021) also observed the freshwater whipray *Urogymnus dalyensis* in the Bamu and Kikori Rivers during surveys conducted in 2018. The only previous account of this species in Papua New Guinea was in the early 1980s in Lake Murray, Fly River. The three *Fluvitrygon* species have also had significant range extensions since their previous respective IUCN Red List assessments. Once thought to be a cryptic group of species with small, fragmented ranges, Iqbal et al. (2017; 2018a; 2018b) have found these species to occur in the freshwaters of most major river basins along the Sunda Shelf, southeast Asia. Similarly, a recent study compiling records of the giant freshwater whipray indicates that this species also occurs widely throughout rivers and coastal areas of the Sunda Shelf (Iqbal et al. 2020). While many of these studies highlighted provided little information on species biology or local population status, they collectively highlight that non-marine elasmobranchs persist in developing Indo-Pacific nations. Further efforts are now required to understand population trends and monitor populations into the future.

Rediscovery of the Freshwater Whipray *Urogymnus dalyensis* in Papua New Guinea

Photo by Mathew Young

Small-scale fishers retrieving a gillnet in Kikori River, Papua New Guinea

Photo by Darcy Roeger

Local ecological knowledge; a tool to fill knowledge gaps?

In the early 2000s, it was widely recognized that sawfishes had declined drastically throughout the global tropics. However, the severity, timing, and spatial scope of declines or local extinctions were poorly understood. Since the development of the Global Sawfish Conservation Initiative (Harrison and Dulvy 2014), local ecological knowledge surveys (inclusive of traditional or cultural ecological knowledge surveys) have played an instrumental role in filling some of these data gaps, particularly in low income developing nations with prominent small-scale fisheries and a scarcity of historic time-series fisheries data.

The application of social sciences to draw on knowledge held by local resource users is an effective yet often undervalued approach to gather information on threatened species. Local resource users can have valuable insights on key factors related to population assessment, such as understanding local population trends over time, inclusive of relative abundances and current and historical distributions. Together, these provide inferences about historical population baselines, from which contemporary survey data or present local ecological knowledge can be measured against. Local resource users can also provide insights on the timing and impact of anthropological or environmental disturbances that have led to population declines. They are also likely to have information on ecological aspects of local populations, including spawning times, litter size, seasonal movements, or habitats of particular importance (e.g. nursery areas). However, perhaps the most significant value of engaging local resource users is the opportunity to understand the local uses and values of the threatened species being studied. Understanding how a threatened species fits into the local culture is vital to the development and implementation of conservation initiatives that are likely to be culturally ethical, and in turn, are likely to achieve higher rates of engagement and participation. In many low-income developing nations, a lack of management means that local support can most effectively win compliance. Therefore, conservation initiatives that centre on building local buy-in rather than top-down enforcement are likely to have better outcomes.

A notable caveat to using local ecological knowledge surveys is whether the threatened species being studied is easily identifiable and unlikely to be confused with other taxa. Aside from river sharks, the non-marine elasmobranch species of Africa and the Indo-Pacific have morphological attributes that generally make species easily discernable. For example, *U. polylepis* and the Thorny Whipray *Fontitrygon ukpam* attain considerably large sizes; *F. signifier* and *F. oxyrhynchus* have characteristic colourations; while *M. chindwinensis, H. bennetti,* and the Smooth Stingray *Fontitrygon garouensis* have non-marine ranges that do not overlap with other species. While considerations about which species are likely to be encountered by local resource users must be made before the commencement of local ecological knowledge surveys, there is certainly great potential for this technique to be widely applied to a range of species across multiple regions to inform local population status.

A trait of non-marine elasmobranchs in Africa and the Indo-Pacific is that they are primarily restricted to remote locations where human population densities are low, making them costly and logistically challenging to survey. In addition, communities in these areas often face other more locally pressing issues, such as food security and civil conflict. This creates further challenges to developing conservation initiatives, as threatened species conservation issues are less of a priority to local communities and governments. For example, local communities in Myanmar's Rakhine state are characterised as having high levels of fisheries dependence (inshore and inland) and are subject to ongoing civil conflict. In the past five years, data from local resource users has been used to monitor the sales and trade of elasmobranch species to develop locally appropriate conservation initiatives such as outreach campaigns and an inshore fisheries co-management area. These actions were achieved through a combination of market and landing site surveys, participatory mapping exercises, household interviews, and social media data retrieval. This example highlights how social science based research methods have been effective in supporting both conservation and fisheries management initiatives in an otherwise culturally and logistically challenging region. In developing conservation initiatives for non-marine elasmobranchs, there is great potential for increased incorporation of social sciences in future conservation efforts for nations that are challenging to conduct traditional approaches to fisheries monitoring.

In summary, due to the range of historic and ongoing threats and globally increasing human reliance on various freshwater environment services, non-marine elasmobranchs possibly face the greatest conservation challenges of any ecological group of chondrichthyans. Considering that most species are already highly threatened, the future plight of non-marine elasmobranchs is concerning, to say the least. A concerted effort to gather information on species biology and population trends is urgently required to inform future conservation planning. This can be enhanced by working respectively and inclusively with local communities who harness these resources for their livelihoods, to build a stronger knowledge base, and create local buy-in for conservation initiatives.

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Chindwin Cowtail Ray
Makararaja chindwinensis

Photo by Wildlife Conservation Society, Myanmar

The Chindwin Cowtail Ray *Makararaja chindwinensis* is among the rarest chondrichthyan species globally. It is a small-bodied (39 cm max observed disc width) ray found only in the Chindwin River tributary of the Ayeyarwady River Basin in Myanmar. Described in 2007 from a single specimen (Roberts, 2007), there was only one subsequent observation in 2012 (M. Mizrahi unpublished data). Myanmar supports one of the world's largest inland fisheries (24.46 $kg^{-1}capita^{-1}yr^{-1}$, Funge-Smith et al. 2021), and several fisheries monitoring research projects have not reported any elasmobranch catch from inland fisheries. Fishers in Myanmar use an extensive variety of fishing gears (encompassing net, hook, and trap methods), and present widespread use of small mesh sizes (0.5-5.0 cm) indicating that large-sized fish species stocks have likely been overexploited. While the Bull Shark *Carcharhinus leucas* is still reported from the Ayeyarwady Delta, the Ganges River Shark *Glyphis gangeticus* has not been observed in Myanmar since 1896, while the Largetooth Sawfish *Pristis pristis* is presumed to be locally extinct. There is an urgent need for targeted *M. chindwinensis* surveys in Myanmar to gather information for population assessment.

Palm oil plantation, Sumatra

Photo by Wahyu Putro A | Antara Foto | File Photo via REUTERS

Omo Falls, Sirebi River, Papua New Guinea

Photo by Darcy Roeger

Key literature on *M. chindwinensis*

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Michael Grant conducting local knowledge surveys in Papua New Guinea

Photo by Darcy Roeger

Key literature on the broad conservation concern of freshwater environments. Additionally, key literature on each major freshwater threat is provided. The goal of this table is to provide a starting baseline for those not familiar with freshwater literature

Topic	Key global perspective literature
Disparate research attention of freshwater environments	Darwall, W.R.T. et al. (2011). Implications of bias in conservation research and investment for freshwater species. Conservation Letters, 4:474–482. DOI: 10.1111/j.1755-263X.2011.00202.x He, F. et al. (2021). More exposure opportunities for promoting freshwater conservation. Aquatic Conservation: Marine and Freshwater Ecosystems, 1–10. DOI: 10.1002/aqc.3725
Freshwater biodiversity crisis	Collen, B. et al. (2014). Global patterns of freshwater species diversity, threat and endemism. Global Ecology and Biogeography, 23:40–51. DOI: 10.1111/geb.12096 WWF (2018). Living Planet Report - 2018: Aiming Higher. Grooten, M. and Almond, R.E.A. (Eds). WWF, Gland, Switzerland. Dudgeon, D. (2019). Multiple threats imperil freshwater biodiversity in the Anthropocene. Current Biology, 29:R960–R967. DOI: 10.1016/j.cub.2019.08.002 He, F. et al. (2019). The global decline of freshwater megafauna. Global Change Biology, 25(11):3883–3892. DOI: 10.1111/gcb.14753 Reid, A.J. et al. (2019). Emerging threats and persistent conservation challenges for freshwater biodiversity. Biological Reviews, 94:849–873. DOI: 10.1111/brv.12480 Tickner, D. et al. (2020). Bending the Curve of Global Freshwater Biodiversity Loss: An Emergency Recovery Plan. BioScience, 70(4):330–342. DOI: 10.1093/biosci/biaa002 Harper, M. et al. (2021). Twenty-five essential research questions to inform the protection and restoration of freshwater biodiversity. Aquatic Conservation: Marine and Freshwater Ecosystems, 31:2632–2653. DOI: 10.1002/aqc.3634 Su, G. et al. (2021). Human impacts on global freshwater fish biodiversity. Science, 371:835–838. DOI: 10.1126/science.abd3369
Major threats	
Fisheries	Funge-Smith, S.J. (2018). Review of the state of world fishery resources: inland fisheries. FAO Fisheries and Aquaculture Circular, No. C942 Rev.3, Rome, FAO, 397 pp. WEB: fao.org/publications/card/en/c/CA0388EN/ Ainsworth, R. et al. (2021). A review of major river basins and large lakes relevant to inland fisheries. FAO Fisheries and Aquaculture Circular, No. 1170. Rome, FAO, 325 pp. DOI: 10.4060/cb2827en
Ornamental harvest	Reid, G.M. et al. (2013). Global challenges in freshwater-fish conservation related to public aquariums and the aquarium industry. International Zoo Yearbook, 47:6–45. DOI: 10.1111/izy.12020
Invasive species	Vilizzi, L. et al. (2019). A global review and meta-analysis of applications of the freshwater Fish Invasiveness Screening Kit. Reviews in Fish Biology and Fisheries, 29:529–568. DOI: 10.1007/s11160-019-09562-2
Pollution	Tuholske, C. et al. (2021). Mapping global inputs and impacts from of human sewage in coastal ecosystems. PLOS ONE, 16:e0258898. DOI: 10.1371/journal.pone.0258898
Barriers to water flow	Grill, G. et al. (2019). Mapping the world's free-flowing rivers. Nature, 569:215–221 DOI: 10.1038/s41586-019-1111-9
Land clearing and repurposing	Ramsar Convention on Wetlands (2018). Global Wetland Outlook: State of the World's Wetlands and Their Services to People. Gland, Switzerland: Ramsar Convention Secretariat. WEB: medwet.org/wp-content/uploads/2018/09/ramsar_gwo_english_web.pdf
Climate change	Lennox, R.J. et al. (2019). Toward a better understanding of freshwater fish responses to an increasingly drought-stricken world. Reviews in Fish Biology and Fisheries, 29:71–92. DOI: 10.1007/s11160-018-09545-9
Mining related resource extraction	Maus, V. et al. (2020). A global-scale data set of mining areas. Scientific Data, 7:289 DOI: 10.1038/s41597-020-00624-w
General human reliance's of riverine systems	Fedele, G. et al. (2021). Nature-dependent people: Mapping human direct use of nature for basic needs across the tropics. Global Environmental Change:102368. DOI: 10.1016/j.gloenvcha.2021.102368

Elasmobranchs of Angola: Assessing impacts of small-scale fisheries on sharks and rays

Tissue sampling of a Spineback Guitarfish (*Rhinobatos irvinei*)

Photo by Antonio Mukanda

Region Update: Africa

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Elasmobranch data from Angola remains limited, although studies have been undertaken in northwestern Africa. As a response to the increased demand in shark fins in Asian countries, a severe decline in West African shark and ray populations has occurred since the 1970s, through the establishment of a Gambian export market followed by the rest of the Sub-Regional Fisheries Commission area (Cabo Verde, The Gambia, Guinea, Guinea Bissau, Mauritania, Senegal and Sierra Leone). Still, such data are unavailable for Angola with an absence of fisheries monitoring for over 30 years due to Angola's post-colonial civil war (1975–2002). Furthermore, the civil war led to an increase in fishing effort due to large-scale displacements from rural to urban and coastal zones with the opportunity to engage in fishing as a means of work, and the establishment of foreign and unsustainable fishing fleets, due to the socio-economic instability at the time.

Located along the coast of southwest Africa, the Angolan coast lies within the highly productive Benguela Current Large Marine Ecosystem (BCLME), with a strong upwelling zone supporting extensive commercial industrial and small-scale fishing sectors. Small-scale fisheries are recognized as an important source of mortality for marine megafauna, including sharks and rays targeted or caught as bycatch in large numbers in coastal waters.

Angolan small-scale fishers catch a wide array of species, from small pelagic shoaling to demersal fish, sharks, rays and large pelagic predators. Still, due to the lack of capacity in the country, the difficultly in monitoring scattered locations and the non-requirement for Angolan fisheries to report on levels of bycatch, there is a significant gap in our understanding of catch quantities, species composition and fishery impact on elasmobranch populations.

These fisheries are likely unsustainable with some of the species observed during pilot landing site surveys categorized as Endangered or Critically Endangered according to the IUCN Red List of Threatened Species. As a response to the scarce information in Angola regarding elasmobranchs' species composition, abundance and distribution, and the impact of fisheries on their abundance and diversity, the Angola Elasmo Project was developed.

Angola Elasmo Project

The Angola Elasmo Project aims to increase knowledge of sharks and rays in Angola. Its goal is to provide baseline information and long-term scientific data to fill the gap on species-specific information and understand elasmobranch biodiversity. These data will

be essential for adequate monitoring of threatened populations and effective management plans for West African waters.

The main objectives of this research project are (1) to identify and characterize the small-scale fisheries operating along the coast by collecting information on gear characteristics, catch locations, and fishery targets; (2) collect biological data on shark and ray species landings (morphological identification, barcoding, size composition, sex ratios) to assess the abundance and diversity of the species landed; (3) identify and characterize the elasmobranchs product trade system in Angola; (4) and increase awareness of threats to elasmobranchs at a local and regional level through capacity building and public involvement.

Increasing awareness of threats to elasmobranchs through capacity building and public involvement is crucial in achieving positive conservation outcomes. Due to the lack of knowledge of the status of local populations, there is an urgent need, not only for international awareness, but an immediate direct communication and educational bridge between the project and the Angolan public. This will be achieved through engagement with the local academic community, capacity building and public involvement by undertaking workshops at the local and regional scales including in schools and fishery communities.

At present, this research project is being conducted in the area of Namibe, southern Angola.

Funding: This work was supported by the Save Our Seas Foundation and the Swiss Shark Foundation (Hai-Stiftung).

Follow our work on: instagram.com/angola.elasmoproject/

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Photo by Ana Lucia Furtado Soares

Small scale fishers, on a chata boat type, on the way to collect fish from larger boats

Photos by Ana Lucia Furtado Soares

Landing site, with fish drying stalls (left) and dried sharks ready for sale (right side)

Small scale purse seiners on the coast of Namibe

A Manta Ray in the Maldives

Photo by Guy Stevens | Manta Trust

Devils in Distress: not just another fish in the ocean

Region Update: Indian Ocean

Written by Daniel Fernando

Blue Resources Trust |
Co-Founder and Director of the Fisheries and Policy Programme
IUCN SSC Shark Specialist Group (SSG) |
Regional Vice-Chair | Indian Ocean

Manta and Devils Rays are some of the most iconic and charismatic fish in our ocean. And despite their name, they are completely harmless. They use their devil-like "horns" on the top of their head (cephalic fins) to channel water into their mouth, which then passes over mesh-like structures called gill plates. These are specialised filters that capture the tiny, shrimp-like organisms called krill, their primary food source. Unfortunately, these gill plates are prized in East Asian markets, where they are marketed as a pseudo-remedy, claimed to cure a wide range of ailments. There is no scientific proof to support such claims. In fact, studies have shown that gill plates accumulate high proportions of heavy metals, including arsenic, making them harmful if consumed in large quantities.

Like other rays and their shark cousins, the Manta and Devil Rays form part of a unique group of fishes with extremely slow life cycles. The largest of this family, Manta Rays, are estimated to live for at least 40 years, take 15 years to reach maturity, and give birth to a single pup every three to seven years. This life cycle has far more in common with our fully protected elephants on land and is in stark contrast to other fish like tuna that spawn hundreds of thousands or millions of eggs multiple times a year. Slow life cycles mean that any external pressures result in rapid population declines.

With support from the Tokyo Cement Group, Linnaeus University, Save Our Seas Foundation, Shark Conservation Fund, Marine Conservation and Action Fund of the New England Aquarium, and Ocean Park Conservation Foundation Hong Kong, a nine-year study undertaken by Blue Resources Trust has revealed a very worrying trend for Manta and Devil Rays in Sri Lanka.

Manta and Devil Rays ("Ali maduwa" and "Anga Maduwa" in Sinhala and "Aanai thirukkai" and "Koppu/Kombu thirukkai" in Tamil) are being captured in extremely large numbers by both coastal and offshore fishing vessels, mainly in gillnets. This is a very indiscriminate form of fishing that results in the capture of not only the target species (tuna, sailfish etc.) but any other marine animal that gets entangled in the net, including turtles, cetaceans, other sharks and rays, and of course the Manta and Devil Rays. At the 38 landing sites surveyed, we estimated that annual captures exceeded 100,000 individuals in the early 2010s. Considering there are over 50,000 registered vessels in the country and only 10 of 21 national harbours and 28 of 883 smaller landing sites were surveyed, the actual number of Manta

and Devil Rays captured each year is likely to be far higher. This makes Sri Lanka the largest known Manta and Devil Ray fishery in the world.

Since 2010, we have observed a decline in landings, despite the number of fishing vessels increasing. This, combined with the animals becoming slightly smaller in size, are clear indications of both overfishing and declining populations across the Indian Ocean. And finally, analysis of the most frequently captured species of this group suggests that it is being captured at rates far higher than its reproductive potential.

All this means that the populations of Manta and Devil Rays across the Indian Ocean may be on the brink of collapse without immediate management intervention. Given that these species are fully protected under the Convention on the Conservation of Migratory Species of Wild Animals (CMS) since 2014 (and Sri Lanka has been a Party to CMS since 1990), and they are considered a species that should be released if captured by either industrial and artisanal fleets under the Indian Ocean Tuna Commission (IOTC) from January 2022 (Sri Lanka is a member to IOTC since 1994), it is imperative that Sri Lanka take actions to protect these species. A combination of awareness campaigns, guidelines to encourage live release, and support to transition into more sustainable fishing techniques will be necessary.

Proactive management of all sharks and rays is necessary as these taxa are simply not like other fish in the ocean. Losing them would impact our marine biodiversity and threaten the livelihoods of fishing communities across the island.

The publication this article is based on:
Fernando D, Stewart JD. 2021. High bycatch rates of manta and devil rays in the “small-scale” artisanal fisheries of Sri Lanka. PeerJ 9:e11994 doi.org/10.7717/peerj.11994

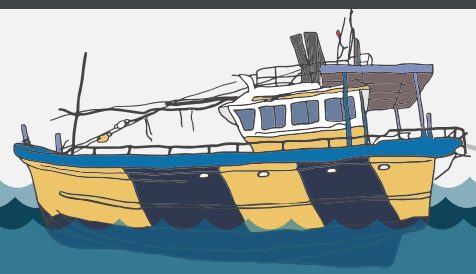
Manta gill plates marketed as a pseudo-remedy

A pile of Devil Rays. Without effective management, fisheries for such species are highly unsustainable.

Photos by Daniel Fernando | Blue Resources Trust

DEVILS IN DISTRESS

THE PLIGHT OF MANTA AND DEVIL RAYS IN SRI LANKA



Longhorned Pygmy Devil Ray *Mobula eregoodoo*

Shortfin Pygmy Devil Ray *Mobula kuhlii*

Sicklefin Devil Ray *Mobula tarapacana*

Spinetail Devil Ray *Mobula mobular*

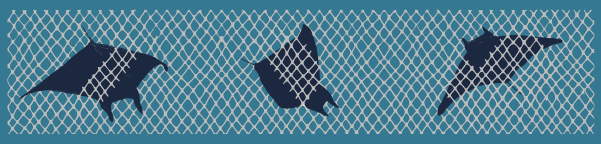
DEVIL RAYS are called *Anga maduwa* in Sinhala and *Koppu/Kombu thirukkai* in Tamil

Bentfin Devil Ray *Mobula thurstoni*

Oceanic Manta Ray *Mobula birostris*

MANTA RAYS are called *Ali maduwa* in Sinhala and *Aanai thirukkai* in Tamil

Coastal and offshore vessels capture these species across the northern indian ocean using GILLNETS.



DECLINING BODY SIZE (1-2% per year) in three species suggest they may be experiencing UNSUSTAINABLE LEVELS OF CAPTURE.

2005 ---------- 2010 ---------- 2015 ---------- 2020

Total catch of manta + devil rays in the early 2010s likely exceeded 100,000 individuals PER YEAR, however annual landings have since DRASTICALLY DECLINED.

Estimates of Spinetail Devil Ray mortality suggest that the species is being HEAVILY OVERFISHED.

Manta and devil rays have SLOW REPRODUCTIVE CYCLES and even low to moderate levels of bycatch can have major impacts.

BLUE RESOURCES TRUST has conducted 1,346 SURVEYS between 2011–2020.

Total annual captures of manta and devil rays by SRI LANKAN ARTISANAL FISHING FLEETS exceed

estimated annual capture in all GLOBAL, LARGE INDUSTRIAL PURSE SEINE FISHERIES combined.

Prior to 2010, manta and devil rays were often released at sea due to lack of demand, but as the GILL PLATE TRADE expanded, they were increasingly brought back to shore.

RECOMMENDATIONS:

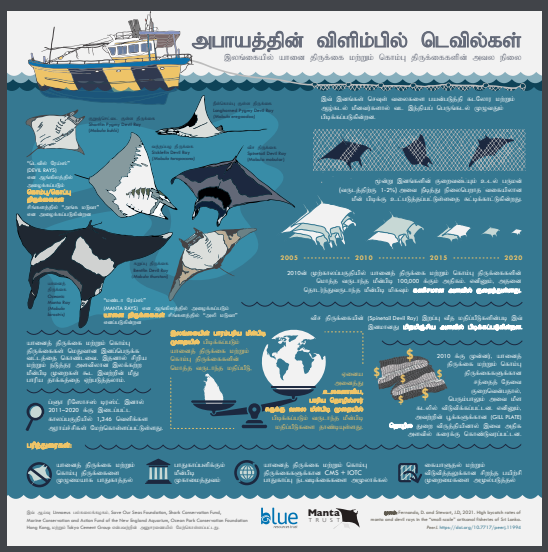
- Fully protect manta and devil rays
- Proactive fisheries management
- Implement CMS + IOTC manta and devil ray conservation measures
- Implement best handling and release practices

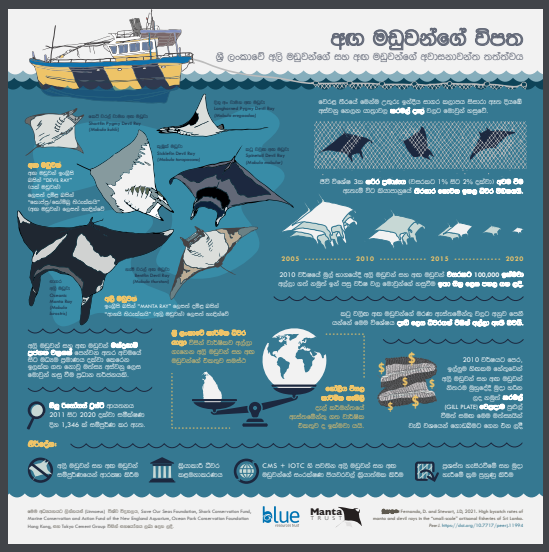
This study was supported by Linnaeus University, Save Our Seas Foundation, Shark Conservation Fund, Marine Conservation and Action Fund of the New England Aquarium, Ocean Park Conservation Foundation Hong Kong, and the Tokyo Cement Group.

blue resources trust

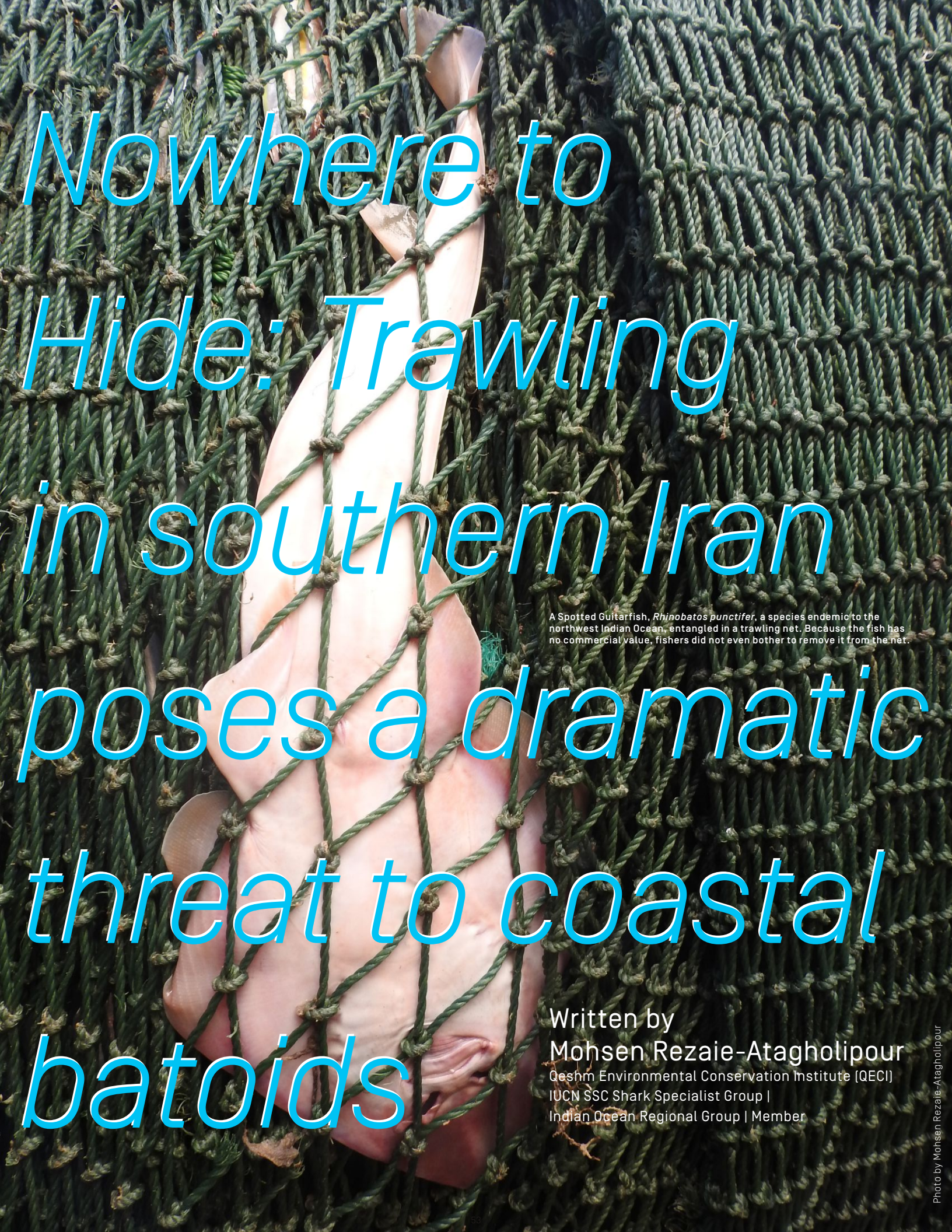
Manta TRUST

Source: Fernando, D. and Stewart, J.D, 2021. High bycatch rates of manta and devil rays in the "small-scale" artisanal fisheries of Sri Lanka. *PeerJ.* https://doi.org/10.7717/peerj.11994





Nowhere to Hide: Trawling in southern Iran poses a dramatic threat to coastal batoids



A Spotted Guitarfish, *Rhinobatos punctifer*, a species endemic to the northwest Indian Ocean, entangled in a trawling net. Because the fish has no commercial value, fishers did not even bother to remove it from the net.

Written by
Mohsen Rezaie-Atagholipour
Qeshm Environmental Conservation Institute (QECI)
IUCN SSC Shark Specialist Group |
Indian Ocean Regional Group | Member

Photo by Mohsen Rezaie-Atagholipour

A shrimp bottom-trawl net emerging out from the coastal waters of Bushehr Province at the northern part of the Iranian Persian Gulf.

Catch of a one-hour fishing effort of a traditional shrimp trawler (dhow) in the coastal waters of Bushehr Province.

Photos by Mohsen Rezaie-Atagholipour

Region Update: Indian Ocean

“Fishers were trying to untie the trawl net’s sac to empty its catch on the deck. It was an extremely hot afternoon in September 2019 in the Persian Gulf, the world’s warmest sea with air temperature that can easily reach 40 degrees or more. But nobody on that shrimp trawler cared about heat exhaustion. Everybody had their own hopes and fears. Fishers hoped to see a catch full of shrimps, and we, a couple of marine biologists, hoped to see the fewest possible number of bycaught rays. However, we all got completely frustrated when the catch was emptying on the deck. About a quarter of a ton of rays, mostly dasyatid and gymnurid rays, comprised over 90% of the catch. What’s more, several small teleost fishes, a couple of sea snakes, and just a handful of penaeid shrimps hardly equaling three kilograms. When we were sorting the rays to examine them, their dead bodies covered almost half of the deck’s surface. We all tried to keep our hopes up and reassured each other that it wouldn’t happen again. Everybody said it is just one abnormal haul, and that rays wouldn’t regularly comprise such a big proportion of a trawl haul. Now, however, after over two years working on that trawler and several others, all those optimistic predictions have been gone in vain.”

Artisanal fishers widely use trawl nets along southern Iranian waters. There are two shrimp trawling seasons in the country. The first is during the second half of the summer, when Iranian coastal waters of Bushehr Province at the northern Persian Gulf are open to penaeid shrimps trawl fishing, mostly Green Tiger Shrimps, *Penaeus semisulcatus* (Niamaimandi et al. 2007). The second one is during the first half of autumn, when artisanal trawlers look for Banana Shrimps, *Penaeus merguiensis*, and other penaeid shrimps along coastal waters of Hormozgan Province in the eastern Persian Gulf and the Strait of Hormuz (Momeni et al. 2018). However, illegal shrimp trawl fishing starts several months before the fishing seasons (Daliri et al. 2015). In the Gulf of Oman, illegal trawling is a year-round problem, and even, unfortunately, happens in very sensitive and productive ecosystems like mangrove channels. These seriously affect threatened marine megafauna that may accidentally be entrapped in the trawl nets, including almost all coastal batoid elasmobranchs (Vossoughi and Vosoughi 1999; MRA unpublished data).

Therefore, when our team at the Qeshm Environmental Conservation Institute (QECI), an Iranian non-governmental marine conservancy, planned the first chondrichthyan research and conservation program in Iran, we all agreed that the first important step was to survey trawl fisheries. Back then, however, we had no idea that our data would show each year, from August to December, about 500 shrimp trawlers catching at least 8,000 tons of rays from the Persian Gulf, roughly equal to over 10 million individuals. We also had no idea that more than half of all observed bycaught ray species (15 from 29 species) would be classified as threatened by the IUCN Red List of Threatened Species. In a million years, we also never thought that the Tentacled Butterfly Ray, *Gymnura tentaculata*, a species last time recorded in 1986 and believed to be possibly extinct, would comprise about 15% of rays bycaught by Iranian trawlers (Rezaie-Atagholipour et al. 2021). But now, after two years, we have seen all this, which led QECI’s team to develop some actions aiming to drastically reduce bycatch mortality and bring ray populations out from the last strongholds. These include advocating for bycatch excluder devices, building and deploying anti-trawl artificial reefs seeking to protect against illegal trawling, and conducting safe-release training programs for fishers.

Acknowledgements

The project described above would have never started without several sponsors’ kind and timely support. We are indebted to Dr Rima Jabado, Chair of the IUCN SSC Shark Specialist Group and lead scientist of Elasmo Project, who has been perfectly advising QECI’s team in all project stages. We also thank the Iranian Fisheries Science Research Institute and the Shahid Bahonar University of Kerman for all of their support. The field surveys were funded by the Prince Bernhard Nature Fund and Marine Conservation Action Fund (Anderson Cabot Center for Ocean Life in New England Aquarium). Idea Wild has also supported the project by providing equipment. A Future For Nature Award dedicated to M. R-A also supported QECI in developing conservation measures for reducing ray bycatch in Iranian trawling fisheries. The Iranian National Environment Fund and Iran Department of Environment also supported a pilot project aiming to build and deploy some anti-trawl artificial reefs for preventing illegal trawling in a mangrove wetland in the Gulf of Oman, where one of the most important habitats for the recently rediscovered Critically Endangered Tentacled Butterfly Ray is located.

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Vossoughi GH, Vosoughi A (1999) Study of batoid fishes in northern part of Hormoz Strait, with emphasis on some species new to the Persian Gulf and Sea of Oman. Indian Journal of Fisheries 46(3): 301–306

Dead bycaught rays, mostly *Maculabatis* spp., sorted on the deck to be examined by QECI's biologists. These were caught by a regular shrimp trawler (dhow) during an hour set in the coastal waters of Bushehr Province.

A dead bycaught female Tentacled Butterfly Ray, *Gymnura tentaculata*, a species last seen in 1986 and believed to be possibly extinct,. But during our shrimp trawl surveys in 2019 and 2020, this Critically Endangered species comprised 15% of demersal trawling ray bycatch in southern Iran.

Photos by Mohsen Rezaie-Atagholipour

Photo by Abdolnour Malahi

Mohsen Rezaie-Atagholipour, QECI's founder and lead scientist, measuring a dead bycaught electric ray, *Torpedo* spp., on a shrimp trawler (dhow) in the Strait of Hormuz, eastern Persian Gulf.

A two-meter dead bycaught female Bowmouth Guitarfish, *Rhina ancylostoma*, was observed in a trawl catch from the Gulf of Oman.

Photos by Mohsen Rezaie-Atagholipour

50 kg dead female Leopard Whipray, *Himantura leoparda*, entangled in a trawling net. Because the fish has no commercial value, fishers discard it at sea.

Ocean Guardians – Protecting threatened sharks and rays in Bangladesh through public engagement

Region Update: Indian Ocean

Written by Nadim Parves

Wildlife Conservation Society Bangladesh

Elisabeth Fahrni Mansur

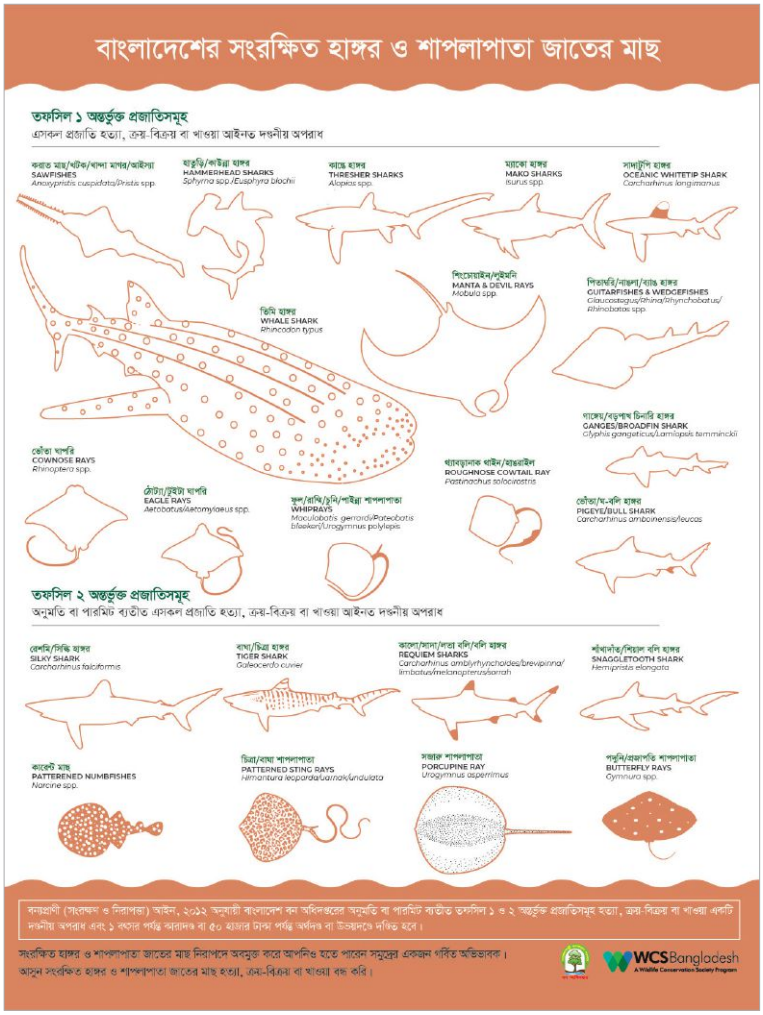
Wildlife Conservation Society Bangladesh
IUCN SSC Shark Specialist Group |
Regional Vice-Chair | Indian Ocean

More than one hundred shark and ray species are confirmed or suspected to occur in Bangladesh's rivers, estuaries, mangrove channels, shallow nearshore waters, and a deep submarine canyon. These habitats support numerous species at high risk of near-term extinction, including sawfishes, giant freshwater whiprays, rhino rays, hammerhead sharks, and devil rays.

Market demand drives fishers in Bangladesh to intentionally catch sharks and rays and retain those caught unintentionally. Highly valued fins, mobulid gill plates, and skins are exported, while shark and ray meat is consumed locally. Two-thirds of the shark and more than 85% of ray species known or suspected to occur in Bangladesh are threatened with extinction. International trade of 28 of these species is prohibited (sawfish species) or regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Since 2016, the Wildlife Conservation Society (WCS) has been studying shark and ray diversity, distribution, catches, and the gears that catch them in Bangladesh. Our studies are informed by at-sea surveys, small-scale fishers' citizen science networks, and data collectors at fish landing sites scattered along the coast. We also investigate the international and domestic trade of protected species, support improved legal protection and compliance with CITES, and build capacity to monitor and enforce laws and rules governing their exploitation and trade. The overall aim of our work is to reverse declines in threatened species through science-based, community-informed fisheries management and multi-agency enforcement of trade regulations.

The Government of Bangladesh has demonstrated its commitment to strengthening international trade regulations by cosponsoring proposals to list Mako (*Isurus* spp.) and Silky (*Carcharhinus falciformis*) sharks, *Mobula* Rays, giant guitarfish (family Glaucostegidae), and wedgefish (family Rhinidae) in CITES Appendix II. In September 2021, the Government took their commitment to shark and ray conservation one step further by updating the list of species and genera protected under the Wildlife (Conservation and Security) Act, 2012. The new list, facilitated by WCS with support from the IUCN SSC Shark Specialist Group, incorporates new information on species occurrence and aligns the act with current CITES Appendix listings. The amended list stipulates the strict protection of eight genera and 23 species, while permitting the sustainable exploitation and trade of one genus and 29 species if non-detrimental to local populations.



The poster on the amended list of sharks and rays protected under the Bangladesh Wildlife Act is supported by a user-friendly identification guide for fishers, fish traders, and law enforcement officers with a mandate for combatting the illegal trade of sharks and rays.

All photos and artwork by WCS Bangladesh

PROTECTED SHARKS & RAYS OF BANGLADESH

SCHEDULE I SPECIES

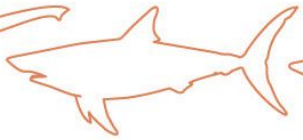
KILLING AND TRADING OF SCHEDULE I LISTED SPECIES IS A PUNISHABLE OFFENCE.

করাত মাছ/খটক/খান্দা মাগর/আইস্যা
SAWFISHES
Anoxypristis cuspidata/Pristis spp.

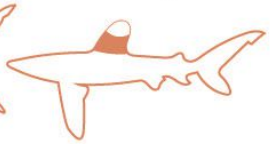
হাতুড়ি/কাউন্না হাঙ্গর
HAMMERHEAD SHARKS
Sphyrna spp./Eusphyra blochii

কান্তে হাঙ্গর
THRESHER SHARKS
Alopias spp.

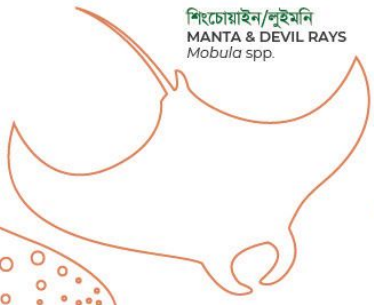
ম্যাকো হাঙ্গর
MAKO SHARKS
Isurus spp.



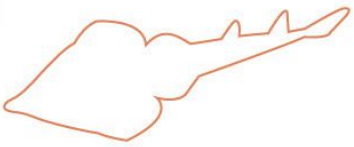
সাদাটুপি হাঙ্গর
OCEANIC WHITETIP SHARK
Carcharhinus longimanus



শিংচোয়াইন/লুইমনি
MANTA & DEVIL RAYS
Mobula spp.

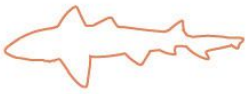


পিতাম্বরি/নাঙলা/ব্যাঙ হাঙ্গর
GUITARFISHES & WEDGEFISHES
Glaucostegus/Rhina/Rhynchobatus/ Rhinobatos spp.

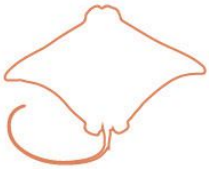


তিমি হাঙ্গর
WHALE SHARK
Rhincodon typus

গাঙ্গেয়/বড়পাখ চিনারি হাঙ্গর
GANGES/BROADFIN SHARK
Glyphis gangeticus/Lamiopsis temminckii



ভোঁতা ঘাপরি
COWNOSE RAYS
Rhinoptera spp.

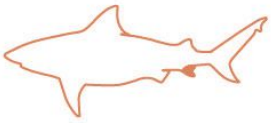


ঠোটা/টুইটা ঘাপরি
EAGLE RAYS
Aetobatus/Aetomylaeus spp.

ফুল/রাম্মি/চুনি/পাইন্না শাপলাপাতা
WHIPRAYS
Maculabatis gerrardi/Pateobatis bleekeri/Urogymnus polylepis

থ্যাবড়ানাক থাইন/হাঙরাইল
ROUGHNOSE COWTAIL RAY
Pastinachus solocirostris

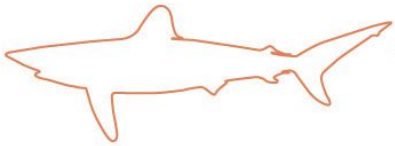
ভোঁতা/ঘ-বলি হাঙ্গর
PIGEYE/BULL SHARK
Carcharhinus amboinensis/leucas



SCHEDULE II SPECIES

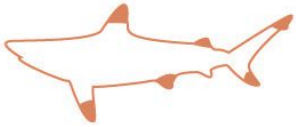
KILLING AND TRADING OF SCHEDULE II LISTED SPECIES WITHOUT A PERMIT IS A PUNISHABLE OFFENCE.

রেশমি/সিল্কি হাঙ্গর
SILKY SHARK
Carcharhinus falciformis



বাঘা/চিত্রা হাঙ্গর
TIGER SHARK
Galeocerdo cuvier

কালো/সাদা/লতা বলি/বলি হাঙ্গর
REQUIEM SHARKS
Carcharhinus amblyrhynchoides/brevipinna/ limbatus/melanopterus/sorrah

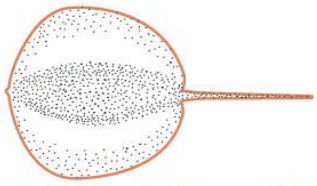


শাঁখাদাঁত/শিয়াল বলি হাঙ্গর
SNAGGLETOOTH SHARK
Hemipristis elongata

কারেন্ট মাছ
PATTERENED NUMBFISHES
Narcine spp.

চিত্রা/বাঘা শাপলাপাতা
PATTERNED STING RAYS
Himantura leopardа/uarnak/undulata

সজারু শাপলাপাতা
PORCUPINE RAY
Urogymnus asperrimus



পদুনি/প্রজাপতি শাপলাপাতা
BUTTERFLY RAYS
Gymnura spp.

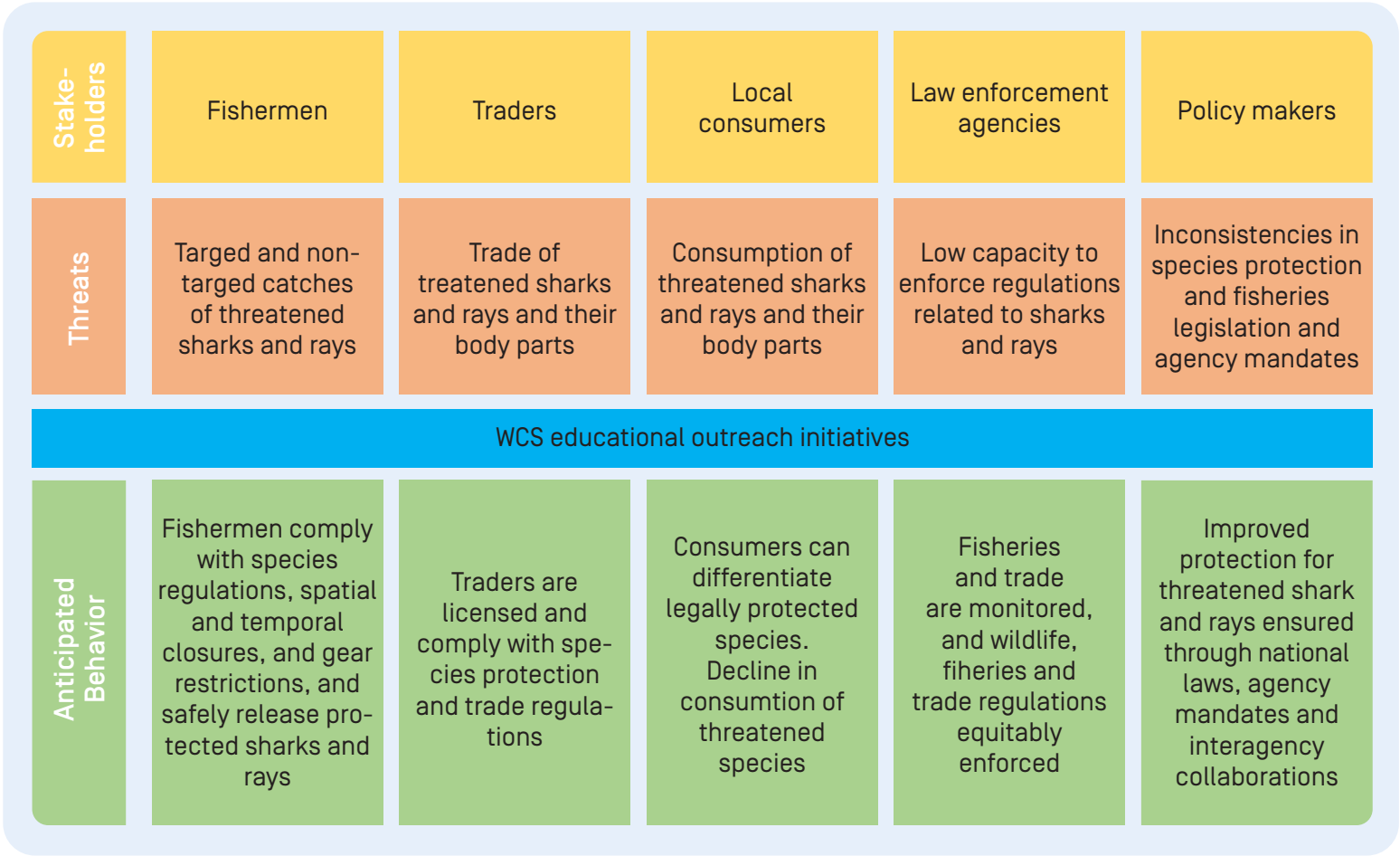
According to the Wildlife (Conservation and Security) Act 2012, killing or trading any wild animal listed in Schedule I or II without a permit from the Forest Department is an offence punishable with imprisonment of up to one year and a fine of 50 thousand Taka or both.

BE AN OCEAN GUARDIAN. RELEASE PROTECTED SHARKS AND RAYS AT SEA.
DO NOT SELL, BUY OR EAT ANY OF THEIR PARTS.

WCS Bangladesh
A Wildlife Conservation Society Program

Putting policy into action is key to the conservation management of sharks and rays in Bangladesh. To achieve compliance with national laws and international conventions, and reduce mortalities, consumption, and trade of threatened species, WCS developed the 'Ocean Guardians' initiative.

This initiative aims to bring about measurable changes in the knowledge, attitudes, and behaviour of fishers, traders, processors, consumers, and law enforcement officers about shark and ray conservation, as well as other marine megafauna, including cetaceans and marine turtles. We train and motivate fishers to recognize and safely release threatened species through interactive educational outreach and training programs, supported by richly illustrated media materials produced in Bengali language and tailored to our target audience. We also train law enforcement officers to identify protected species from their carcasses and body parts. The 'Ocean Guardians' initiative instils pride in ocean stakeholders about their role in promoting a healthy ocean for healthy people.



WCS-Bangladesh Theory of Change aims to improve the protection of threatened sharks and rays in Bangladesh by reducing mortalities, implementing trade regulations, and reducing domestic consumption.

Getting the word out

Key messages communicated through our 'Ocean Guardians' initiative are (1) Bangladesh supports a large diversity of sharks and rays that sustain a healthy ocean and healthy people, (2) Demand for their products puts many shark and ray species at risk of extinction because they grow and reproduce slowly and too many are killed, and (3) Killing protected sharks and rays and trading their parts is a punishable offence.

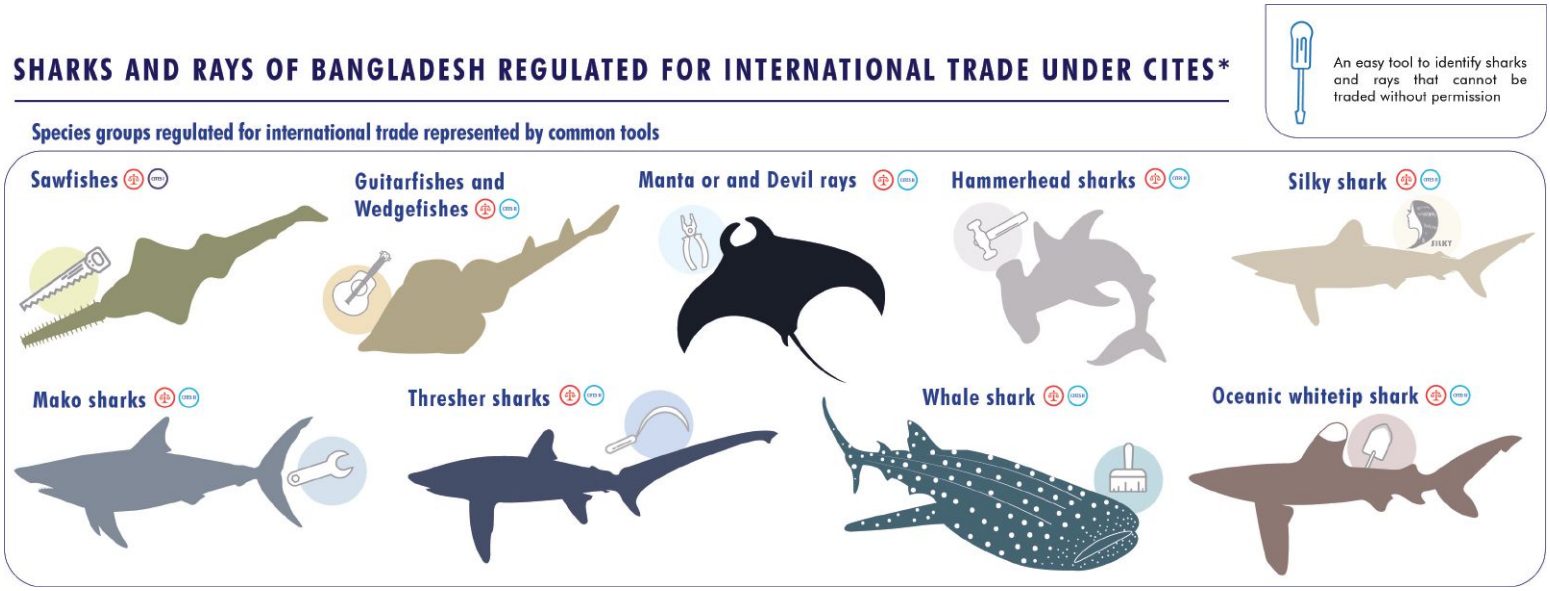
We use illustrations and easy-to-recognize symbols to make key messages accessible for low literacy audiences and increase knowledge retention. For example, to familiarize law enforcement officers, traders, fishers, and consumers with strictly protected species groups, we use everyday objects representing their characteristic features, such as a saw for sawfishes, a hammer for hammerheads, and a sickle for threshers.

For the 'Ocean Guardians' initiative to reach target audiences, particularly in remote fishing communities, we developed mobile exhibitions, radio programs, documentary films, training workshops, and user-friendly species identification guides and compliance tools.

Educational outreach events

Our mobile exhibitions can be easily transported and set up in local cyclone shelters, schools, government offices, or temporary tents. Attractive displays combine life-size animal models and informative panels with captivating photographs and fascinating facts. Interactive games and discovery towers maximize retention while assessing knowledge in a fun way.

Trained interpreters guide visitors through the exhibition, explain the games, and engage visitors in informal discussions. Interpreters are a vital part of successful educational outreach activities. They promote active participation and provide us with an opportunity to understand local attitudes and practices. Inspired by their experience, several of these interns are now pursuing marine conservation careers, and WCS has hired several of these interns as full staff.



In WCS training, we gamify the identification of legally regulated species. Examples of symbols used to easily recognize strictly protected sharks and rays include pliers for mobulid rays, a guitar for rhino rays, and a paintbrush for filter-feeding whale sharks.

Species identification training and tools

WCS has trained over 100 government officials to enforce laws and rules on shark and ray exploitation and trade on identifying and monitoring protected species. Quizzes and games enhance interactions, and participants have been overwhelmingly appreciative of our interactive, hands-on approach.

Increasing our reach

In collaboration with community radio stations, WCS produced radio program episodes in popular formats and regional dialects highlighting efforts to protect threatened sharks and rays. Using local radio programs, our conservation messages have reached as many as 1.8 million people across the coastal belt of Bangladesh.

Short documentary films highlight efforts by the Government of Bangladesh to improve the protection of threatened sharks and rays. These short films are shown at educational outreach and training programs, providing a visual context of the conservation challenges that are generally unfamiliar to urban consumers and policymakers.

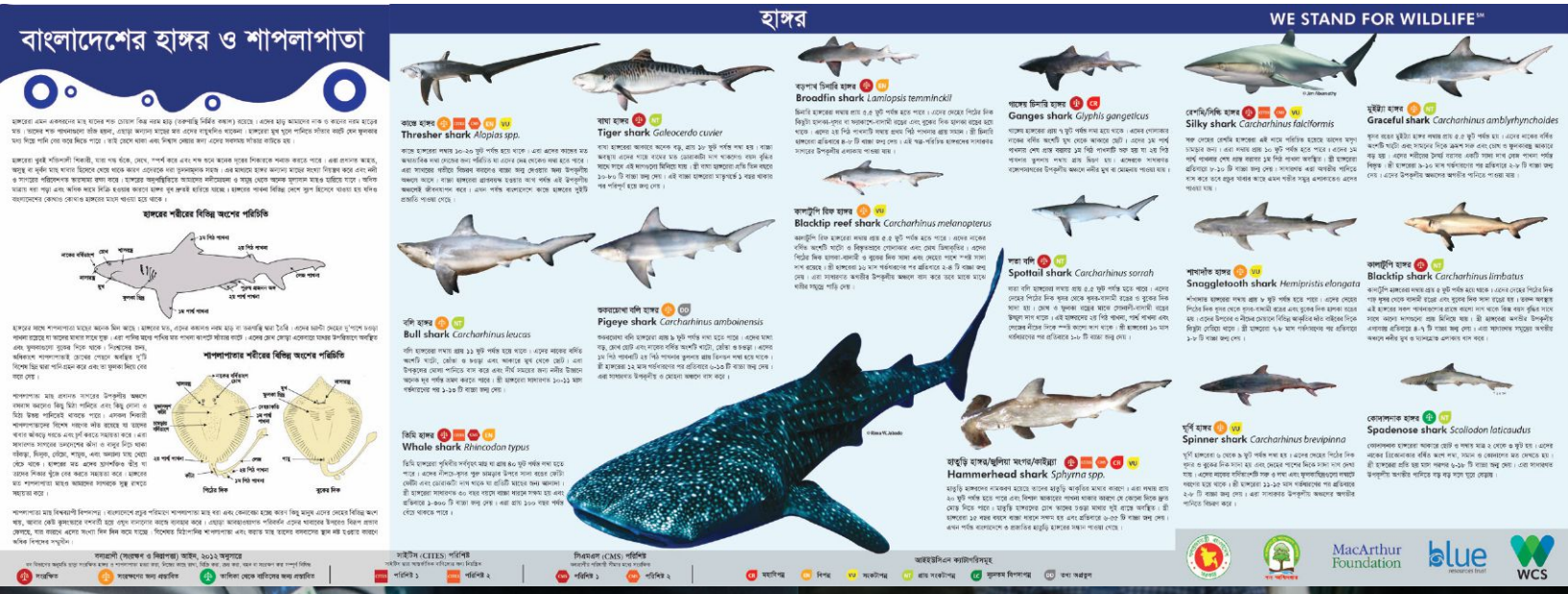
A wide range of printed materials developed by WCS introduce the protected sharks and rays of Bangladesh, including a brochure printed on water-resistant paper (top), stickers motivating fishers to release protected species safely , and an identification guide for protected sharks and rays from their carcasses and commonly traded parts (bottom).

Listen, learn, and engage

Bringing about positive changes in species conservation requires long-term engagement, accountability, and trust. Our efforts to build constituencies for shark and ray conservation benefit from nearly two decades of experience in freshwater and marine wildlife conservation in Bangladesh. We rigorously assess the effectiveness of our shark and ray conservation efforts and integrate analyses and insights into our future work. Long-term engagement with our target audiences has been significant for building enduring relationships. Our willingness to listen and learn without making false promises nurtures trust. Together with local fishing communities, fish traders, field-level law enforcement officers, and senior officials from fisheries, wildlife, and law enforcement agencies, WCS is making a positive difference in understanding and saving threatened sharks and rays in Bangladesh.

Further reading

- Changing Fishery Practice in the World's Largest Mangrove Forest (medium.com/wcs-marine-conservation-program/changing-fishery-practice-in-the-worlds-largest-mangrove-forest-7d5714c397f9)
- Ocean Guardians Pave the Way to Save Threatened Sharks and Rays in Bangladesh (medium.com/wcs-marine-conservation-program/ocean-guardians-pave-the-way-to-save-threatened-sharks-and-rays-in-bangladesh-10fc79acfbad)
- Rivers for Life: Proceedings of the International Symposium on River Biodiversity: Ganges-Brahmaputra-Meghna River System (iucn-csg.org/wp-content/uploads/2010/03/Final-IUCN-Publication-Jan-7-2015-1.pdf – pages 17-24)

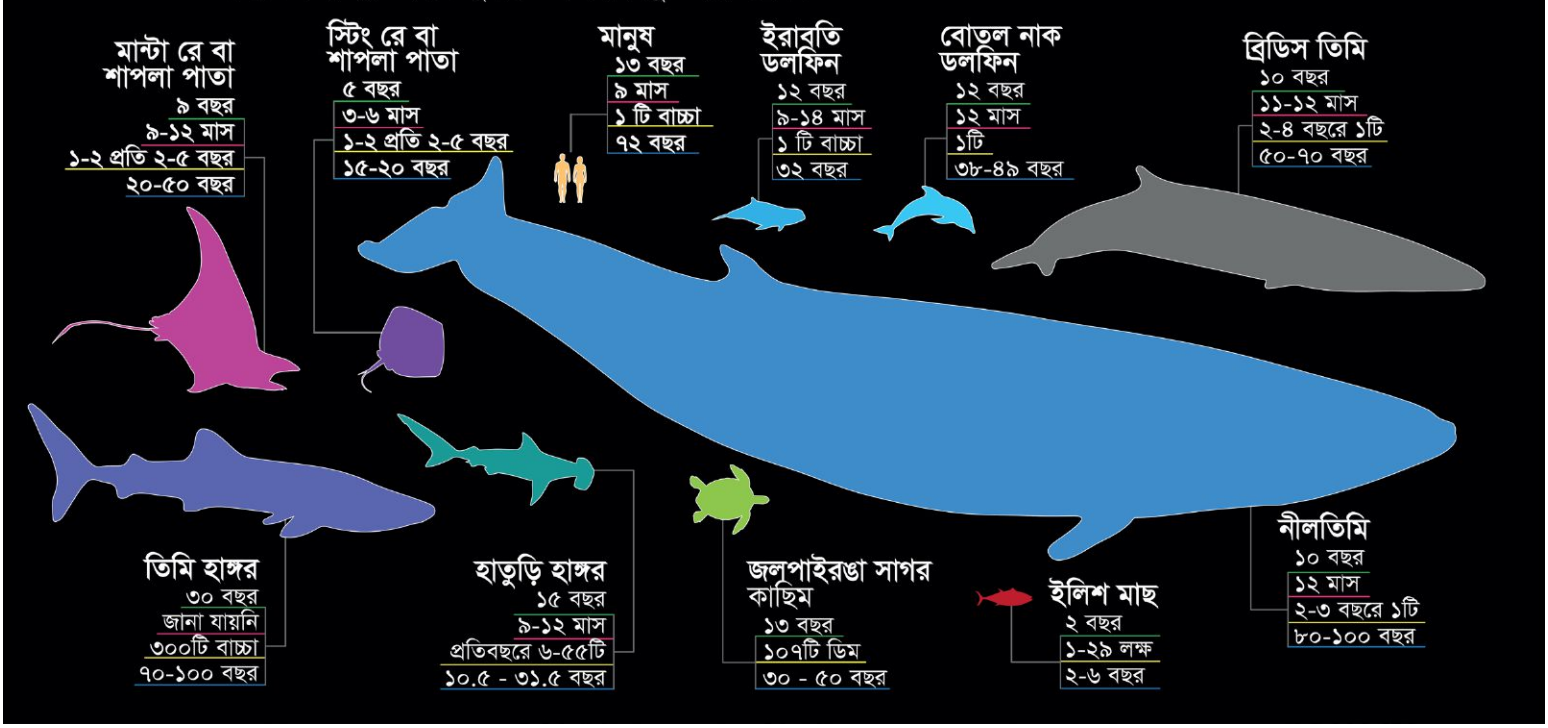


Life-size models of sharks and rays give the audience close-up views of characteristic features (top), interactive discovery towers allow visitors to touch shark and ray body parts and learn about their functions (middle), and richly illustrated information panels depict key facts (bottom).

WCS

সামুদ্রিক মহাকায় প্রাণীরা আস্তে আস্তে বড় হয়, অল্প পরিমাণে বাচ্চা উৎপাদন করে এবং লম্বা সময় ধরে বেঁচে থাকে।

সামুদ্রিক মহাকায় প্রাণীরা অন্যান্য প্রাণীদের তুলনায় দেরীতে **প্রজননক্ষম** হয়, এদের **গর্ভকালীন** সময়টা লম্বা এবং অনেক অল্প **বাচ্চা** জন্ম দিয়ে থাকে। সামুদ্রিক মহাকায় প্রাণীদের **আয়ুষ্কালে** বেশ তারতম্য থাকলেও তা মাছেদের আয়ুষ্কালের তুলনায় বেশি। এ থেকে এটাই বোঝা যায় যে, প্রাকৃতিক ভাবেই এদের সংখ্যা অনেক কম এবং যদি খুব বেশি পরিমাণে সাগর থেকে আহরণ করা হয় তাহলে খুব দ্রুতই এরা বিলুপ্ত হয়ে যাবে।



About sharks in the Algerian sea

Region Update: Mediterranean

Written by Farid Hemida

IUCN SSC Shark Specialist Group | Mediterranean Regional Group | Member

École Nationale Supérieure des Sciences de la Mer et de l'Aménagement du Littoral (ENSSMAL) | Algiers, Algeria

Mare Nostrum, cradle of biodiversity

The Mediterranean is a semi-enclosed sea that, contracry to what we may think, hosts great biodiversity, especially for fish and mammals: dolphin, pilot whale, monk seal, killer whale, sperm whale, whales (fin whale, minke whale). Cartilaginous fish or Chondrichthyes, essentially sharks and rays, angel sharks and chimaeras, can be found in seas around the world. They are of great economic importance being fished regularly, in large quantities and easily marketed. In Algeria, they are eaten regularly in restaurants under the name of dogfish, rays, or torpedoes. A visit to the fish outlets in this country highlights the diversity of this group; many anglers wear white shark teeth on necklaces, and many keep tail fins as trophies in their barracks.

Photos by Farid Hemida

Sharks, ancestral inhabitants of the Algerian sea

Sharks, incredible animals haunting the collective imagination, are also appreciated for the quality of their flesh and are used for basic and applied research (chemistry, pharmacology, medicine). In the Algerian basin, large pelagic and solitary species have always been observed and captured occasionally to regularly: Great White Shark, Blue Shark, Basking Shark, Smalltooth Sand Tiger, Shortfin Mako, Thresher Shark, Hammerhead Shark, or requiem sharks. The new Mediterranean Sea, a wildlife annexe to the Atlantic, has been sheltering them for nearly 5 million years.

These animals are classified in the group of Selachians or elasmobranchs, subcategory of Chondrichthyans which count more than 1200 species in the world and 85 species in the Mediterranean basin: 51 species of sharks, 34 rays and angel sharks and only one chimaera. The geographical origins reveal a significant Atlantic influence (52 species) and little endemism. Their qualitative and quantitative distribution is more important in the western part than in the eastern part of the coast.

Dr Dieuzeide, from the Bou Ismail research centre, Algeria (ex Castiglione, central region of the Algerian coast), established in 1953 the list of all Algerian marine fish. He reported, at the time, the capture of a White Shark in the Jijel region and the specimen is in the collection of the Museum of Natural History in Paris. Long before that, many researchers published their work relating to the group of cartilaginous fishes.

Since 1996, as part of research on Chondrichthyans of the Algerian coast, various surveys carried out in the main fish markets, and fishing sites (shelters and ports) on the coast showed more than 30 species of sharks. All the species are traditionally found on the stalls of our markets and very appreciated by the consumers.

Passageway between the northern and southern sectors of the Atlantic and the rest of the Mediterranean, the Algerian coast is bound to enrich itself with new species of sharks, even with immigrants from the Red Sea. Sustained exploitation of the environment by humans with increasingly efficient fishing methods leads to a greater abundance of pelagic species that were previously unknown or infrequent. Climate change further impacts their distribution and behaviour.

A fish viction of its bad reputation

About three of the 400 species of sharks are believed to be dangerous. Number one is the Bull Shark, *Carcharhinus leucas*, which can leave the marine environment to enter rivers; then comes the Tiger Shark *Galeocerdo cuvier*, and finally the White Shark, *Carcharodon carcharias*. The first two are still not present in the Algerian waters or even in the Mediterranean. High concentrations of seals or birds attract these predators. This kind of concentration does not take place on the Algerian coast. Sharks are fragile predators: the particular length of their reproductive cycle with different modalities (viviparous for most species, which brings them closer to mammals, oviparous for the rest), late sexual maturity and low fecundity make them sensitive to fishing pressure.

Like all predators, they can be dangerous and unpredictable. Still, annual statistics indicate that the most dangerous animals for humans are in order, well after small invertebrates (mosquitoes, flies, worms and snails), snakes, crocodiles, hippopotamus, elephants, wolves, then the shark, responsible for ten deaths per year. On the contrary, the real predator is the human being: he is responsible for the disappearance of about 800,000 tons of sharks per year in the world, or nearly 25 million individuals, according to figures from the Food and Agriculture Organization of the United Nations (FAO).

Updated observations

The largest fish in the world, the Whale Shark, which feeds on plankton, is completely harmless despite the enormous size it can reach (20 meters long and weighing 34 tons). If it is found in the tropical regions of the Atlantic, Pacific and Indian Oceans, the Mediterranean seems too small to host it, while it is home to the Basking Shark, the second largest fish (12m, for more than 6 tons). This species is regularly observed in spring and summer when it approaches the coast. Unfortunately, during this period, they are caught frequently by various fishing gears; one can often see individuals exposed, cut into several sections to facilitate their handling. Other sharks are also fished in abundance and regularly by longliners, trawlers or sport fishing. In Algeria, our calculation of

the production of this fish is around 10,000 tons per year, an estimate that could be revised upwards.

In 1998, the species best represented in terms of biomass were classified in this order:

1 Thresher Shark: *Alopias vulpinus*
2 Bluntnose Sixgill Shark: *Hexanchus griseus*
3 Tope Shark: *Galeorhinus galeus*
4 Blue Shark: *Prionace glauca*

In 2019, the species regularly present in the catches and in terms of biomass are classified in the following order:

1 Bluntnose Sixgill Shark: *Hexanchus griseus*
2 Blue Shark: *Prionace glauca*
3 Thresher Shark: *Alopias vulpinus*
4 Tope Shark: *Galeorhinus galeus*

The results from our surveys on sharks clearly reflect a shift in the importance of these resources. The Bluntnose Sixgill Shark, a deep-sea fish that reaches more than 5 meters in length and weighs 500 kg, is not yet affected by anthropogenic and environmental disturbances but remains the most targeted by fishing today.

The hammerhead shark, very abundant in the 1980s, has disappeared. Caught in great numbers between 1990 and 2005, coastal sharks went from six species to two species, which are rarely caught nowadays.

Reports are published on the web, thanks to the widespread use of the telephone and other means of communication. One has the impression that the strandings are new; that the sightings of sharks, turtles, whales, sperm whales correspond to an invasion of aliens, life forms that have left their natural environment to occupy that of Algerian bathers! In truth, this has been happening all the time, for a long time and in all regions of the world's ocean. The Algerian media have always announced strandings of dolphins, whales, sperm whales, sharks and turtles at different points of the Algerian coast. The information went unnoticed, because these media were not widely read. Social networks have allowed the average citizen to collect information, disseminate it and consult it in real time; Algeria has become a small village where everything is said, where everything is known. What was a miscellaneous, banal, esoteric event has become an extraordinary, new event, a scoop.

For example, in 2008, a Great White Shark was captured by a trawler of Ghazaouet, about 200m from the coast. The video is still available on the net. Very recently, in 2018, another swimming individual was filmed by fishermen near the coast of Sidi Ouchaa, in the western region. In other regions, Algiers, Ain Benian, Boumerdes, many documents concern the Blue Shark.

The case of the blue shark

Climate change, human pressure, pollution, multiplication of dams all around the Mediterranean tend to create a system whose energy resources are in excess of needs, which favours the development of opportunistic cosmopolitan species, considered to be scarce and which find conditions that suit them and encourage them to settle down when their competitors disappear. This is the case of the Blue Shark, which was last on the list in 1998 and today occupies neighbouring ecological niches, deserted by other species.

There is no sudden invasion of sharks in Algeria; fishermen have always observed, caught and marketed them. There is an increase in the number of Blue Sharks. Individuals of this species behave differently; they usually swim offshore in the water column with a preference for the epipelagic layer. Observations of specimens near beaches may reflect a tendency to change biotope in pursuit of the usual food consisting of crustaceans and squids that have moved. Some videos have shown cases of pregnant females containing a large number of fetuses ready for birth. For parturition, these females were probably trying to access a suitable place, shallower, with better environmental conditions than offshore.

The individuals spotted near the beaches seemed most of the time shocked, in agony: with uncoordinated swimming, hesitant movements and uncertain orientation. They end up running aground or are caught by the swimmers, this being impossible in the normal state given the vitality of the animal, its strength, its flexibility that allows it to fall back in all directions.

Many reports are 'fake news': very recent videos made at the edge of beaches pass off dolphins, sunfish as sharks in order to create a buzz; it is easy to be misled in the presence of a sunfish swimming on the surface, with its large dorsal fin out of the water. Divers, fishermen, swimmers, in marine areas, have never, until now, mentioned any incidents or attempts of aggression by sharks.

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A propos des requins en mer algérienne

Mare Nostrum, berceau de la biodiversité

La Méditerranée est une mer semi fermée qui, contrairement à ce que l'on peut penser, recèle une grande biodiversité notamment pour les poissons et les mammifères : dauphin, globicéphale, phoque-moine, orque, cachalot, et baleines (rorqual commun, petit rorqual). Les poissons cartilagineux ou Chondrichtyens sont essentiellement les requins et les raies, les anges de mer et les chimères; on les retrouve dans toutes les mers du globe. Ils ont une grande importance économique étant pêchés régulièrement, en grandes quantités et facilement commercialisés. En Algérie on les consomme régulièrement dans les restaurants sous l'appellation de chien de mer, raies, ou torpilles. La visite des points de vente de poisson dans ce pays, met en évidence la diversité de ce groupe ; beaucoup de pêcheurs portent des dents de requin blanc en collier et beaucoup gardent des nageoires caudales comme trophées dans leurs baraquements.

Les requins, occupants ancestraux de la mer algérienne

Les requins, animaux spectacles qui hantent l'imaginaire collectif sont appréciés pour la qualité de leur chair et utilisés pour la recherche fondamentale et appliquée (chimie, pharmacologie, médecine). Dans le bassin algérien, les grandes espèces pélagiques et solitaires ont été de tous temps observées et capturées occasionnellement ou régulièrement: le grand requin blanc, le requin bleu, le requin pèlerin, le requin féroce, le requin renard, le requin marteau, le requin mako, les requins de récif ou requins requiem. La Méditerranée nouvelle, annexe faunistique de l'Atlantique, les abrite depuis près de 5 millions d'années.

Ces animaux sont classés dans le groupe des Sélaciens ou Élasmobranches, sous-catégorie des Chondrichthyens qui comptent plus de 1200 espèces dans le monde et 85 dans le bassin méditerranéen : 51 sont des requins, 34 des raies et anges de mer et une seule chimère. Les origines géographiques de ces espèces sont différentes et variées mais révèlent une importante influence atlantique (52 espèces) et peu d'endémisme. Leur répartition qualitative et quantitative est plus importante dans le bassin occidental que dans le bassin oriental.

Le Dr Dieuzeide du centre de recherche de Castiglione (Bou Ismail) a établi en 1953 la liste de tous les poissons marins d'Algérie. Il a signalé à l'époque, la capture d'un requin blanc, dans la région de Jijel et l'exemplaire se trouve dans la collection du Musée d'Histoire Naturelle de Paris. Bien avant cela, de nombreux chercheurs ont publié leurs travaux relatifs au groupe des poissons cartilagineux.

Depuis 1996, dans le cadre de recherches sur les Sélaciens de la côte algérienne, diverses enquêtes sont menées dans les principaux marchés au poisson et sites de pêche (abris et ports) du littoral. À partir des observations réalisées sur toute la côte algérienne, nous avons pu comptabiliser plus de 30 variétés de requins. Toutes ces espèces sont traditionnellement retrouvées sur les étals de nos marchés et sont très appréciées du consommateur.

Zone de passage obligée entre les secteurs nord et sud de l'Atlantique et le reste de la Méditerranée, la côte algérienne est amenée à s'enrichir de nouvelles espèces de requins. Elle accueille également les immigrants qui viennent de la Mer Rouge. Une exploitation soutenue du milieu par l'homme avec des méthodes de pêche de plus en plus performantes entraine une plus grande abondance d'espèces pélagiques autrefois inconnues ou peu fréquentes. Le dérèglement climatique perceptible provoque des changements de répartition et de comportements.

Un poisson victime de sa mauvaise réputation

Sur les 400 espèces de requins, seules trois sont jugées dangereuses. On attribue la première place au requin bouledogue, *Carcharhinus leucas*, qui peut quitter le milieu marin pour pénétrer dans les rivières ; puis vient le requin tigre, *Galeocerdo cuvier,* et ensuite le requin blanc, *Carcharodon carcharias.* Les deux premiers ne sont toujours pas présents en Méditerranée.

Ces prédateurs sont attirés par les zones à forte concentration de phoques ou d'oiseaux, leurs proies préférées. Ce phénomène de concentration n'a pas lieu au niveau de la côte algérienne. Et même si c'était le cas, la prudence recommanderait de ne pas envahir un terrain qui ne nous appartient pas.

Les requins sont des prédateurs relativement fragiles: la longueur particulière de leur cycle de reproduction aux modalités différentes (vivipare pour une bonne partie des espèces, ce qui les rapproche des mammifères, ovipare pour le reste), une maturité sexuelle atteinte tardivement et une faible fécondité en font des espèces sensibles à la pression de pêche.

Comme tout prédateur, ils sont dangereux et imprévisibles mais les statistiques mondiales montrent que les animaux les plus dangereux pour l'homme sont, dans l'ordre, bien après les petits invertébrés (moustiques, mouches, vers, escargots), le serpent, le crocodile, l'hippopotame, l'éléphant, le loup puis le requin, responsable de 10 décès par an. En réalité, le vrai prédateur est l'être humain: il est responsable de la disparition d'environ 800 000 tonnes de requins par an dans le monde, soit près de 25 millions d'individus, selon les chiffres de l'Organisation des Nations Unies pour l'Alimentation et l'Agriculture (FAO).

Nouvelles observations

Le plus grand poisson du monde, le requin baleine, qui se nourrit de plancton est totalement inoffensif malgré la taille énorme qu'il peut atteindre (20 mètres de longueur pour un poids de 34 tonnes). Si on le trouve dans les régions tropicales de l'Atlantique, du Pacifique et de l'océan Indien, la Méditerranée semble trop petite pour l'accueillir, alors qu'elle abrite le requin pèlerin, deuxième poisson par la taille (12m, pour plus de 6 tonnes). Ce dernier, planctonophage, se rapproche des côtes au printemps et en été. Il est régulièrement pêché en Algérie par divers engins de pêche et on peut voir souvent les individus exposés, découpés en plusieurs tronçons pour faciliter leur manipulation. D'autres squales sont également capturés en abondance et de manière régulière par les espadonniers, les chalutiers, ou la pêche sportive. Dans les eaux algériennes j'estime que la production de ce poisson tourne autour de cent mille tonnes/an, estimation qui pourrait être revue à la hausse.

En 1998, les espèces les mieux représentées en biomasse et régulièrement présentes dans les captures se classaient dans cet ordre:

1 Le requin renard: *Alopias vulpinus*
2 Le requin griset: *Hexanchus griseus*
3 Le requin milandre: *Galeorhinus galeus*
4 Le requin bleu: *Prionace glauca*

En 2019, les espèces les mieux représentées en biomasse et régulièrement présentes dans les captures se retrouvent dans cet ordre:

1 Le requin griset: *Hexanchus griseus*
2 Le requin bleu: *Prionace glauca*
3 Le requin renard: *Alopias vulpinus*
4 Le requin milandre: *Galeorhinus galeus*

Les résultats de nos enquêtes concernant les squales, reflètent clairement une inversion dans l'importance de ces ressources. Le requin griset, qui atteint facilement les 5 mètres de longueur et un poids de 500 kg, est un poisson de grand fond. Il ne semble pas affecté par les perturbations anthropiques et environnementales et reste en 2019, le plus ciblé par la pêche. Le requin marteau, très abondant dans les années 1980, a disparu. Les requins de récifs, très présents entre 1990 et 2005, sont passés de 6 espèces à 2 espèces dont les représentants sont rarement capturés.

Des signalements sont publiés sur le web, grâce à la banalisation du téléphone et des moyens de communication. On a ainsi l'impression que les échouements sont nouveaux; que les observations de requins, de tortues, de baleines, de cachalots correspondent à une invasion d'aliens, des formes de vie qui ont quitté leur milieu naturel pour occuper celui des baigneurs algériens! En vérité cela se passe tout le temps, depuis longtemps et dans toutes les régions de l'océan mondial. Les médias algériens ont depuis toujours annoncé des échouements de dauphins, de baleines, de cachalots, de requins et de tortues sur différents points de la côte algérienne. L'information passait inaperçue, du fait que ces médias n'étaient pas très lus. Les réseaux sociaux ont permis au citoyen lambda de recueillir l'information, de la diffuser et de la consulter en temps réel; l'Algérie est devenue un petit village où tout se dit, où tout se sait. Ce qui était un fait divers, banal, ésotérique est devenu un événement extraordinaire, nouveau, un scoop. Par exemple, en 2008, un requin blanc a été capturé par un chalutier de Ghazaouet, à environ 200m de la côte. La vidéo est toujours disponible sur le Net. Très récemment, en 2018, un autre individu nageant a été filmé par des pêcheurs près de la côte de Sidi Ouchaa, dans la région ouest. Dans les autres régions, Alger, Ain Benian, Boumerdes, de nombreux documents concernent le requin bleu.

Le cas du requin bleu

Le changement climatique, la pression anthropique, la pollution, la multiplication des barrages sur tout le pourtour méditerranéen, tendent à créer un système dont les ressources énergétiques sont excédentaires par rapport aux besoins ; ce qui favorise le développement d'espèces cosmopolites opportunistes, considérées comme peu abondantes et qui trouvent des conditions qui leur conviennent et les incite à s'installer, quand leurs compétiteurs disparaissent. C'est le cas du requin bleu *(Prionace glauca)* qui était dernier de la liste en 1998 et qui occupe aujourd'hui les niches écologiques voisines, désertées par les autres espèces.

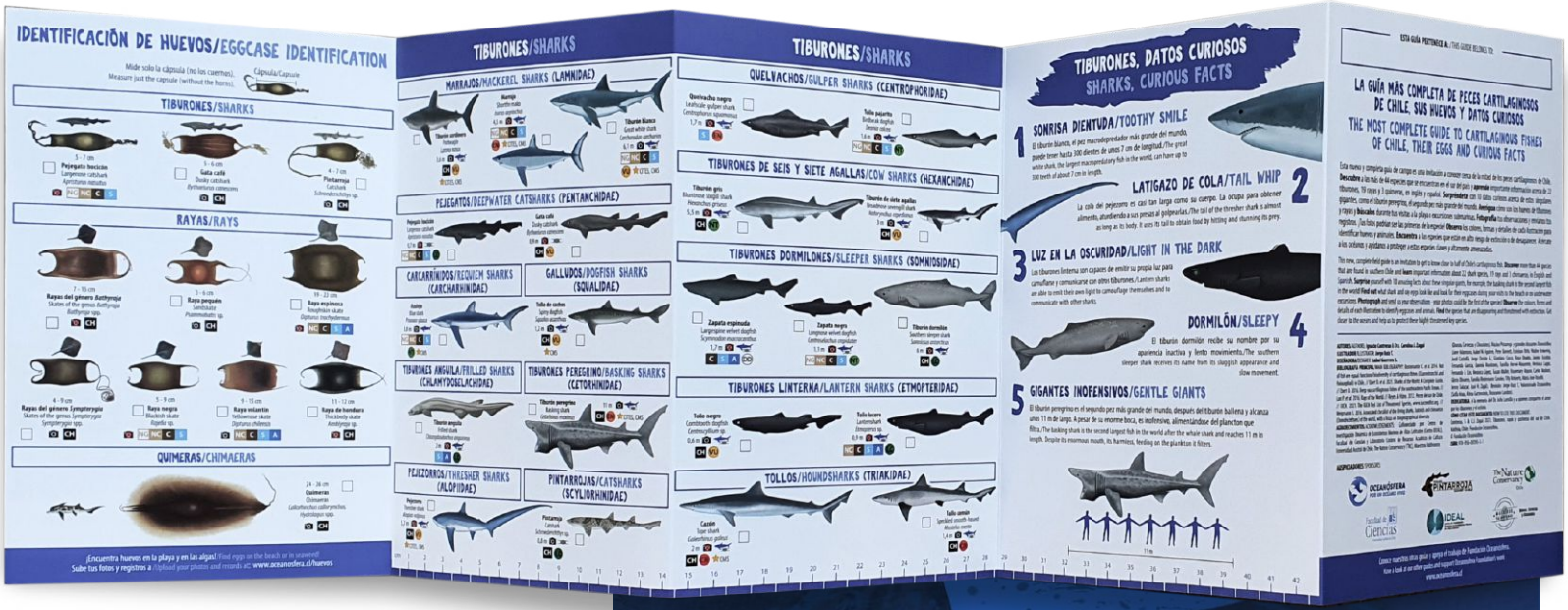
Il n'y a pas d'invasion subite des requins en Algérie; les pêcheurs les ont toujours observés, capturés et commercialisés. Il y a une augmentation de l'effectif du peau bleue. Les individus de cette espèce se comportent différemment; ils nagent habituellement au large, dans la colonne d'eau avec une préférence pour la couche épipélagique. Les observations de spécimens à proximité des plages peuvent traduire une tendance au changement de biotope, à la poursuite de la nourriture habituelle constituée de crustacés et de calmars qui s'est déplacée. Certaines vidéos ont montré des cas de femelles prégnantes, contenant un grand nombre de fœtus prêts à la naissance. Ces femelles tentaient peut-être d'accéder à un endroit approprié, moins profond, présentant des conditions environnementales plus intéressantes qu'au large, pour la mise-bas en d'autres termes pour la parturition.

Les individus repérés à proximité des plages semblaient la plupart du temps, choqués, traumatisés à l'agonie: nage non coordonnée, hésitante, orientation incertaine. Ils finissent par s'échouer ou sont capturés à la main par les baigneurs, ce qui relève de l'impossible dans l'état normal vues la vitalité de l'animal, sa force, sa souplesse qui lui permet de replier facilement son corps dans tous les sens. Beaucoup de signalements sont des 'fake news': des vidéos très récentes réalisées au bord des plages font passer des dauphins, des poissons-lunes pour des requins afin créer le buzz; il est facile d'être induit en erreur en présence d'un poisson-lune nageant en surface, avec sa grande nageoire dorsale hors de l'eau. Les plongeurs, pêcheurs, nageurs, dans les régions à vocation marine, n'ont jamais, jusqu'à présent, mentionné d'incidents ou de velléités d'agression de la part des chiens de mer.

Isurus oxyrhincus **capturé au large de Annaba, observé à la pêcherie d'Alger**

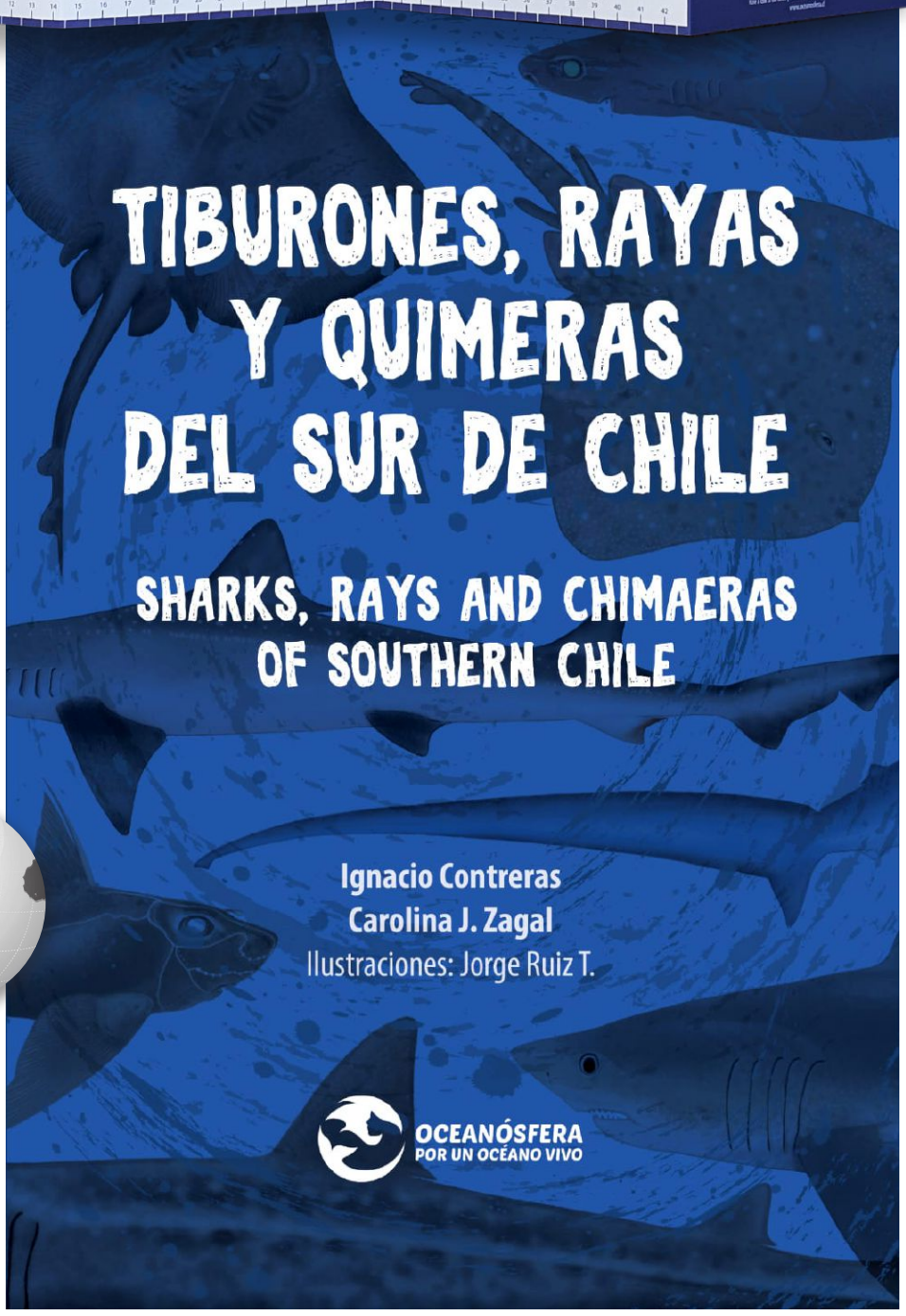
Cetorhinus maximus, **capturé au large d'Alger, observé à la pêcherie d'Alger**

Hexanchus griseus, **capturé au large de Boumerdes (région centre), observé à la pêcherie d'Alger**



What Sharks, Rays and Chimaeras Live in Chile's Waters? More species than you might think.

Region Update: South America



Cartilaginous fish are mostly represented by sharks starring in movies and the media as fearsome, blood-thirsty predators lurking in warm waters and exotic locations, waiting for their next victim. In reality, they can be found in all five of the Earth's oceans and are made up of a diversity of creatures. With their flexible cartilaginous skeletons, all keenly adapted to different environments, Chondrichthyes are made up of flattened rays, skates and sawfish, deep-sea chimaeras, and various sharks. Most people living in the southern tip of South America are unaware that these fascinating animals inhabit their Pacific coast and know relatively little about them. This is due mainly to the lack of information and educational resources readily accessible to communities living in the area. Oceanosfera, a Chilean non-profit foundation, has recently published a guide to "Sharks, Rays and Chimaeras of Southern Chile" to highlight more than 44 species from the southern coast of South America. "Most Chileans don't know much about our marine fauna, and even less so when it comes to our sharks, rays and chimaeras. A 10-year-old child probably knows all about the African Lion, but is unaware that the fastest shark in the ocean swims in Chilean waters", says Ignacio Conteras, author of the guide and director of Núcleo Pintarroja, a shark-oriented environmental and scientific non-governmental organization based in Chile.

This new field guide is an invitation to get to know close to half of Chile's cartilaginous fish and learn important information, in English and Spanish, about 22 shark, as well as 19 ray, three chimaera species and their egg cases. The publication is the first comprehensive, fully illustrated guide to cartilaginous fish of Chile. Every beautifully illustrated species is accompanied by information on its conservation status (IUCN Red List of Threatened Species version 2021-1), international protection, distribution in Chile, endemism, sightings, reproduction, and maximum size. This information is summarised in an attractive, practical, lightweight brochure design.

"During our marine education activities, participants have always been fascinated by sharks while also being scared of them. We hope that through education and new shark-related educational resources, we can change the perception people have of sharks so they may be inspired to help protect them," says Dr Carolina J. Zagal, president of Oceanosfera Foundation and co-author of the guide.

For the first time in Chile, a section on egg case identification is included, with 15 different egg case types of oviparous species. Users are encouraged to upload their photos and records to Oceanosfera's website (oceanosfera.cl/huevos). "Most people will never have a chance to see these mysterious animals up close. Egg cases give us information about egglaying species in our waters, like where they live and when they reproduce. Visitors often see shark and ray eggs on the beach or in seaweed and don't know what they are. We have found that users have been eager to find egg cases, upload their records and find out which species they belong to. This section of our website is still at a pilot stage, and we hope to secure funding to develop it further," says Dr Zagal.

The field guide also dedicates two pages to share some curious facts about sharks, rays, and chimaeras found in Chilean waters.

Here are five of the ten contenders.

Electrifying

"The Apron Ray and Chilean Torpedo have developed a strange way of obtaining their food or defending themselves: they have electric organs that can electrocute or stun their prey or predators."

Hidden pollution

"The Yellownose Skate, as well as other cartilaginous fish can accumulate pollutants such as pesticides in their body."

A powerful elephantfish

"Besides its funny name, the *Plownose Chimaera* or Elephantfish has a strong and venomous serrated spine on its back that it uses to defend itself."

Light in the dark

"Lantern Sharks can emit their own light to camouflage themselves and to communicate with other sharks."

Gentle giants

"The Basking Shark is the second-largest fish in the world after the Whale Shark and reaches 11 m in length. Despite its enormous mouth, it's harmless, feeding on the plankton it filters."

"Decades of overfishing have driven many species of sharks and rays to be threatened with extinction. Scary shark movies such as Jaws have seriously impeded conservation efforts that ensure these organisms, which have an important ecological role in marine ecosystems, don't become extinct. Educating and communicating about these highly threatened species and the support of local communities is key to their conservation," Ignacio concludes.

"Sharks, rays and Chimaeras of southern Chile" is available to download for free at en.oceanosfera.cl/recursos-1. A complimentary poster and childrens' activity book (in Spanish) are also available.

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Oceanosfera's social media @oceanosfera (Instagram & Facebook), @oceanosferaCL (Twitter).
Nucleo Pintarroja's social media @nucleopintarroja (Instagram & Facebook).

RAYAS Y QUIMERAS, DATOS CURIOSOS
RAYS AND CHIMAERAS, CURIOUS FACTS

1 ELECTRIZANTES/ELECTRIFYING

La tembladera y el torpedo han desarrollado una extraña forma de obtener su alimento o defenderse, tienen órganos eléctricos que pueden electrocutar o aturdir a sus presas o depredadores./The apron ray and Chil… have developed a strange way of obtaining their food or defendinc… have electric organs that can electrocute or stun their prey or p…

La raya volar… acumular co… yellownose …

3 VOLADOR SUBMARINO/UNI…

La raya águila tiene este nombre porque el mo… asemeja a un águila volando./The Chilean eagl… movement of its large fins resembles an eagle fl…

ETERNA…

La raya esp… puede rep… grow, it m…

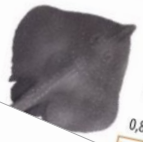
5 UN GALLO PODERO…

Pese a su divertido nombre, el pe… fuerte espina aserrada sobre su es… erse./Besides its funny name, the… fish has a strong and venomous … uses to defend itself.

RAYAS/RAYS

RAYAS DE HOCICO DURO/HARDNOSE SKATES (RAJIDAE)

Raya espinosa
Roughskin skate
Dipturus trachydermus
2,6 m
NC C S A
EN E



Raya negra
Blackish skate
Rajella sp.
0,8 m
NG NC C S

RAYAS ÁGUILA/EAGLE RAYS (MYLIOBATIDAE)

TEMBLADERAS/… (NARCIN…

Raya águila
Chilean eagle ray
Myliobatis chilensis
2 m
NG NC C S VU

QUIMER…

PEJEGALLOS/PLOWNOSE CHIMAERA… (CALLORHINCHIDAE)

Pejegallo
Plownose chimaera
Callorhinchus callorynchus
1,6 m
CH VU

TIBURONES, DATOS CURIOSOS
SHARKS, CURIOUS FACTS

1 SONRISA DIENTUDA/TOOTHY SMILE

El tiburón blanco, el pez macrodepredador más grande del mundo, puede tener hasta 300 dientes de unos 7 cm de longitud./The great white shark, the largest macropredatory fish in the world, can have up to 300 teeth of about 7 cm in length.

2 LATIGAZO DE COLA/TAIL WHIP

La cola del pejezorro es casi tan larga como su cuerpo. La ocupa para obtener alimento, aturdiendo a sus presas al golpearlas./The tail of the thresher shark is almost as long as its body. It uses its tail to obtain food by hitting and stunning its prey.

3 LUZ EN LA OSCURIDAD/LIGHT IN THE DARK

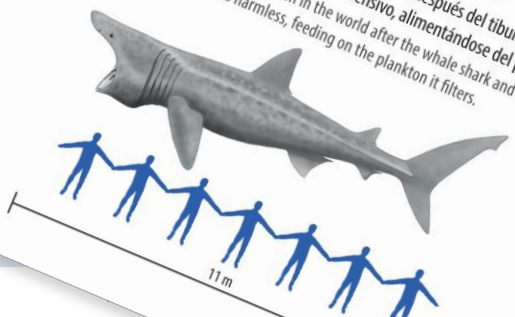
Los tiburones linterna son capaces de emitir su propia luz para camuflarse y comunicarse con otros tiburones./Lantern sharks are able to emit their own light to camouflage themselves and to communicate with other sharks.

4 DORMILÓN/SLEEPY

El tiburón dormilón recibe su nombre por su apariencia inactiva y lento movimiento./The southern sleeper shark receives its name from its sluggish appearance and slow movement.

5 GIGANTES INOFENSIVOS/GENTLE GIANTS

El tiburón peregrino es el segundo pez más grande del mundo, después del tiburón ballena y alcanza unos 11 m de largo. A pesar de su enorme boca, es inofensivo, alimentándose del plancton que filtra./The basking shark is the second largest fish in the world after the whale shark and reaches 11 m in length. Despite its enormous mouth, its harmless, feeding on the plankton it filters.



Español

¿Qué tiburones, rayas y quimeras viven en aguas chilenas? Más de los que podrías imaginar.

Los peces cartilaginosos son típicamente representados por los tiburones, protagonizando películas y la prensa como depredadores temibles y sedientos de sangre, merodeando en aguas tropicales y lugares exóticos, esperando a su próxima víctima. En realidad, los condrictios se pueden encontrar en los cinco océanos del planeta, y forman un grupo diverso de criaturas. Con su esqueleto cartilaginoso y flexible, adaptado a todo tipo de ambientes, a este grupo de peces lo componen aplanadas rayas, quimeras de aguas profundas y una gran diversidad de tiburones. La mayoría de las personas que viven en el sur de Sudamérica no saben que estos fascinantes animales habitan las costas del Pacífico, y conocen muy poco sobre ellos. Esto se debe más que nada a la falta de información y recursos educativos que se encuentren al alcance de las comunidades en el área. Oceanósfera, una fundación Chilena sin fines de lucro, recientemente ha publicado la guía "Tiburones, Rayas y Quimeras del sur de Chile", para descubrir las más de 44 especies de la costa austral de Sudamérica. "En general en Chile no se conoce mucho sobre nuestra fauna marina, y aún menos sobre los tiburones, rayas y quimeras del país. Un niño o una niña de 10 años probablemente sepa todo acerca de los leones de África, pero desconoce que en Chile nada el tiburón más rápido del océano", comenta Ignacio Contreras, autor de la guía y director de Núcleo Pintarroja, ONG ambiental y científica enfocada en los tiburones, rayas y quimeras de Chile.

Esta nueva guía de campo es una invitación a conocer cerca de la mitad de los peces cartilaginosos de Chile y aprender información importante sobre 22 especies de tiburones, 19 rayas y 3 quimeras, así como acerca de sus huevos, en idioma Español e Inglés. Esta publicación es la primera guía exhaustiva y completamente ilustrada de los peces cartilaginosos de Chile. Cada hermosa ilustración es acompañada por información sobre el estado de conservación (la Lista Roja de la UICN, en su versión 2021-1), protección internacional, distribución en Chile, endemismo, avistamientos, reproducción y talla máxima. Toda esta información se resume en un atractivo diseño en formato políptico, que resulta liviano, práctico y fácil de usar.

"Durante nuestras actividades de educación marina, las y los participantes siempre han sentido fascinación, y al mismo tiempo terror, por los tiburones. Esperamos que a través de la educación y nuevos recursos de aprendizaje sobre estas especies podamos cambiar la percepción que la gente tiene sobre ellas, y así se inspiren para ayudar a protegerlas", comenta la Dra. Carolina J. Zagal, presidenta de Oceanósfera y co-autora de la guía.

Por primera vez en Chile, se incluye en la guía una sección para la identificación de huevos, con 15 tipos distintos de cápsulas ovígeras de especies ovíparas. Se incentiva a las y los usuarios a subir sus fotografías y registros a la página web de Oceanósfera (www.oceanosfera.cl/huevos). "La mayor parte de la gente nunca tendrá la oportunidad de ver a estos misteriosos animales muy de cerca. Las cápsulas ovígeras nos entregan valiosa información sobre las especies ovíparas de nuestras costas, como dónde viven y cuándo se reproducen. Muchas veces las y los visitantes de las playas ven huevos de tiburones y rayas en la arena o las algas, y no saben lo que son. Hemos visto que las y los usuarios han sido muy entusiastas en encontrar cápsulas ovígeras, subir sus registros y averiguar de qué especies se tratan. Esta sección de nuestra página aún se encuentra en una etapa piloto y esperamos conseguir financiamiento para desarrollarla aún más", añade la Dra. Zagal.

La guía de campo dedica también dos páginas para compartir algunos datos curiosos sobre tiburones, rayas y quimeras que se encuentran en aguas chilenas.

Estos son cinco de los diez contendientes.

Electrizantes

"La tembladera y el torpedo han desarrollado una extraña forma de obtener su alimento o defenderse, tienen órganos eléctricos que pueden electrocutar o aturdir a sus presas o depredadores."

Contaminación oculta

"La raya volantín, al igual que otros peces cartilaginosos, puede acumular contaminantes como los pesticidas en su cuerpo."

Un gallo poderoso

"Pese a su divertido nombre, el pejegallo tiene una venenosa y fuerte espina aserrada sobre su espalda, que utiliza para defenderse."

Luz en la oscuridad

"Los tiburones linterna son capaces de emitir su propia luz para camuflarse y comunicarse con otros tiburones."

Gigantes inofensivos

"El tiburón peregrino es el segundo pez más grande del mundo, después del tiburón ballena y alcanza unos 11 m de largo. A pesar de su enorme boca, es inofensivo, alimentándose del plancton que filtra."

"Décadas de sobrepesca han llevado a muchas especies de tiburones y rayas a estar amenazadas de extinción. Además, el miedo infundido por películas como Tiburón dificulta los esfuerzos de conservación para que estos organismos, que cumplen un importante rol ecológico en los océanos, no desaparezcan. Educar y comunicar acerca de estas vulnerables especies, junto con el apoyo de las comunidades locales, es fundamental para su protección", concluye Ignacio.

"Tiburones, rayas y quimeras del sur de Chile" se encuentra disponible para descarga gratuita en oceanosfera.cl/recursos-1. Un poster y cuadernillo de actividades para niñas y niños, complementarios a la guía, también están disponibles.

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Redes sociales de Oceanósfera @oceanosfera (Instagram & Facebook), @oceanosferaCL (Twitter).
Redes sociales de Núcleo Pintarroja @nucleopintarroja (Instagram & Facebook).

TIBURONES, RAYAS Y QUIMERAS DEL SUR DE CHILE

Ministerio Secretaría General de Gobierno
Gobierno de Chile

Fondo de Fortalecimiento de las Organizaciones de Interés Público

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www.oceanosfera.cl

OCEANÓSFERA
POR UN OCÉANO VIVO

TIBURONES, RAYAS Y QUIMERAS DEL SUR DE CHILE
GUÍA COMPLETA DE CAMPO DE LOS PECES CARTILAGINOSOS DE CHILE, SUS HUEVOS Y DATOS CURIOSOS
COMPLETE GUIDE TO CARTILAGINOUS FISHES OF CHILE, THEIR EGGS AND CURIOUS FACTS

Esta nueva y completa guía de campo es una invitación a conocer cerca de la mitad de los peces cartilaginosos de Chile. **Descubre** a las más de 44 especies que se encuentran en el sur del país y **aprende** importante información acerca de 22 tiburones, 19 rayas y 3 quimeras, en inglés y español. **Sorpréndete** con 10 datos curiosos acerca de estos singulares gigantes, como el tiburón peregrino, el segundo pez más grande del mundo. **Averigua** cómo son los huevos de tiburones y rayas y **búscalos** durante tus visitas a la playa o excursiones submarinas. **Fotografía** tus observaciones y envíanos tus registros. ¡Tus fotos podrían ser las primeras de la especie! **Observa** los colores, formas y detalles de cada ilustración para identificar huevos y animales. **Encuentra** a las especies que están en alto riesgo de extinción o de desaparecer. Acércate a los océanos y ayúdanos a proteger a estas especies claves y altamente amenazadas.

This new, complete field guide is an invitation to get to know close to half of Chile's cartilaginous fish. **Discover** more than 44 species that are found in southern Chile and **learn** important information about 22 shark species, 19 rays and 3 chimaeras, in English and Spanish. **Surprise** yourself with 10 amazing facts about these singular giants, for example, the basking shark is the second largest fish in the world! **Find out** what shark and ray eggs look like and look for their eggcases during your visits to the beach or on underwater excursions. **Photograph** and send us your observations - your photos could be the first of the species! **Observe** the colours, forms and details of each illustration to identify eggcases and animals. **Find** the species that are disappearing and threatened with extinction. Get closer to the oceans and help us to protect these highly threatened key species.

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Have a look at our other guides and support Oceanosfera Foundation's work
www.oceanosfera.cl

ELASMulheres: a Brazilian symposium on Elasmobranchs promoted by, but not exclusively to, women

Chondrichthyan research has been increasing lately in Brazil, especially due to constant threats to their conservation. However, there is a lack of women in leading positions, such as teachers, professors, and advisors, who could encourage and support an academic environment that is more receptive to young women in chondrichthyan research. Due to the COVID-19 pandemic, two of the largest Brazilian events allowing researchers to meet and communicate their results have not occurred since June 2018 (Sharks International / Meeting of the Brazilian Society for the Study of Elasmobranchs - SBEEL) and January 2019 (Brazilian Meeting of Ichthyology - EBI).

Region Update: South America

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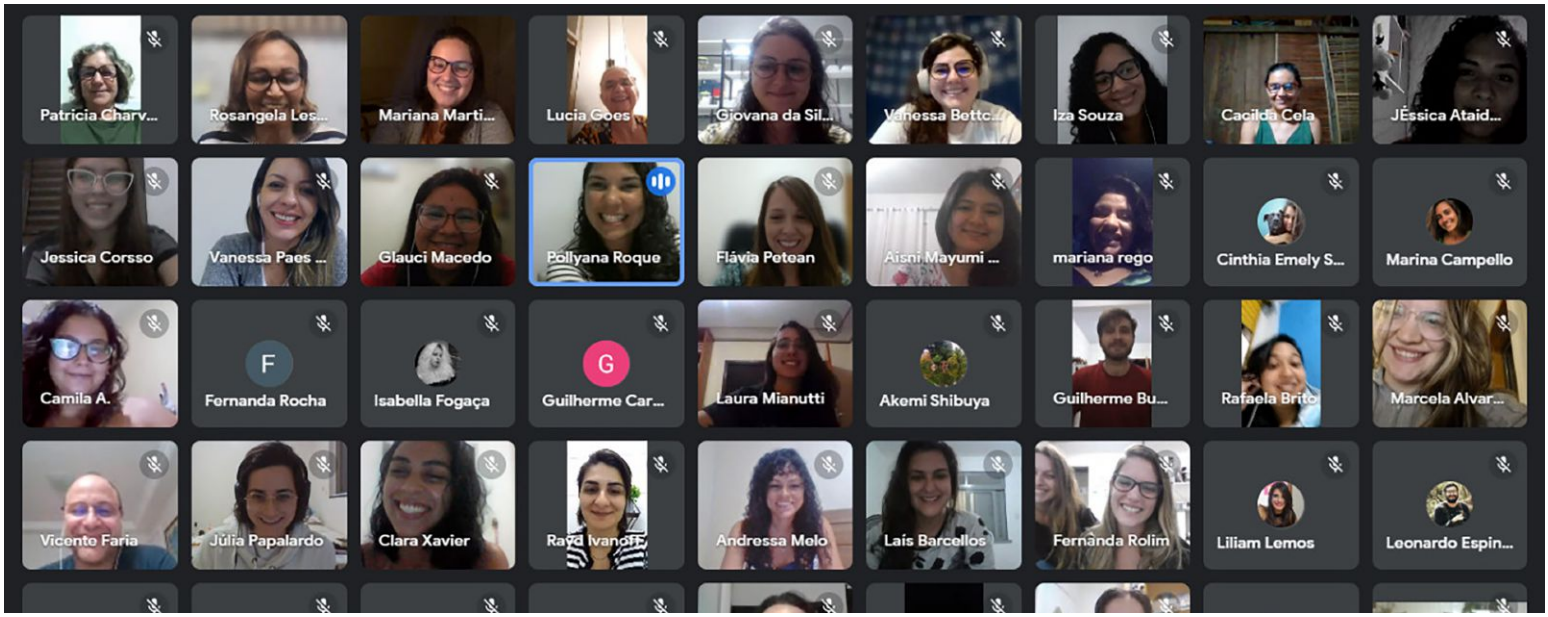


Therefore, ten early-career women researchers from Brazil gathered to organize an online free symposium from November 9 to 13, 2020. In addition to their ten talks within the main research areas of Ecology, Evolution, and Physiology, four other renowned Brazilian women researchers were also invited for their incredible contribution to elasmobranch research in Brazil. This first symposium was called ELASMulheres as a way of playing with the words "ELAS" (THEY, female) and "Mulheres" (Women) in Portuguese, besides the word "ELASM"obranchs. It lasted five days and was transmitted live on Ictiomulheres YouTube channel (the collective organization of Brazilian women researching fishes). During that week, each presentation day had 339, 180, 168, 125, and 124 unique viewers, respectively, which after a year of their publication reached 719, 368, 334, 306, and 399 views, adding up to more than 2000 views.

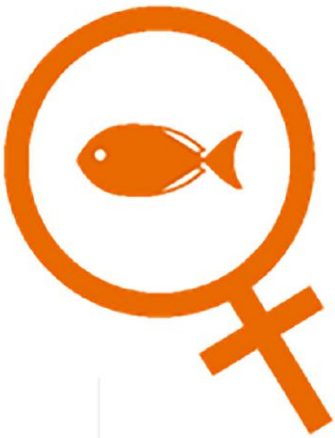
The average age of viewers was 18-24 years old (20.3%), 25-34 (71.3%), and 35-44 (8.4%), with a higher proportion of women than men (76.6% vs 23.4%). Since the goal of the event was to promote and discuss the research being done by women, all presenters were women. However, people from all genders were welcomed to watch and engage in discussions, since science should be inclusive and diverse - a scenario that did not meet our expected proportion of viewers.

With the great success of its first edition, the II ELASMulheres took place from November 6 to 14, 2021 with significant changes: there were four workshops of 4 hours each, an illustration workshop of 5 hours, five round-tables composed of 13 speakers, and 54 oral talks. Attendants submitted abstracts revised by the Organizing Committee, then gave 5-minute talks, and were evaluated by a Scientific Committee. For those interested in reading the program and the Abstracts' Book, both are available at the symposium's website: *elasmulheres.weebly.com*. Besides, to attend the symposium in 2021, participants had to pay a small fee entirely used to support women doing Elasmobranch research in Brazil: the three best Undergraduate and three best Graduate/Professional oral talks were awarded. The resources provided by the awards will be used to support science-related costs, such as field trips, scientific conferences, or any material necessary to perform their studies. Furthermore, some professors financially supported the symposium, allowing the purchase of four "Sharks of the World" books randomly donated to participants.

Within the 209 participants and viewers of II ELASMulheres that answered the questionnaire on the profile of attendants, we noticed the participation of people from 18-24 years old increased to 44.5%. Besides, most people identified themselves as cis-women (79.1%), 18.41% as cis-men, and 0.99% as fluid gender. As for how participants identify themselves, 71.64% answered they are white, 9.45% black, 2.49% brown, and 0.5% Indigenous. One of the advantages of online events is to allow scientists to conciliate their work with childcare since some activities are recorded for later viewing with 8.91% of attendants confirming having children. People can also decide not to turn their cameras and microphones on. Finally, the profile analysis showed us that most participants were Undergraduate students (40.1%), followed by those with a Master's degree (18.8%), Bachelor's degree (13.9%), and PhD (5.9%), depicting how the II ELASMuheres reached a public that maybe could not engage in other in-person scientific events (EBI and SBEEL) due to conferences' fees, travel costs, and other academic activities, since this symposium activities were at night and during weekdays. Besides, representatives of only five Brazilian states did not attend the II ELASMulheres: Mato Grosso do Sul, Piauí, Rondônia, Roraima, and Tocantins, showing once more the symposium almost reached its goal of diversity and inclusion by allowing the attendance of people from all regions of the country.

Despite the great diversity of presenters and attendants, we will not settle until equity and diversity are completely accomplished. Even though we put our efforts into emphasizing that presenters could be of any gender, as long as they had at least one woman as co-author, only six men gave talks (11.1%). Additionally, we also disclosed that people from all genders could assist the symposium - it was presented mainly by women but not to be attended exclusively by women. However, the percentage of men attending each activity of II ELASMulheres was 10%. Until today, most conferences and talks are given by men, and it has never kept women away from attending and participating in those. So why is the opposite not true? We want to investigate and understand the low attendance of men in events promoted by women and how we can change this scenario, especially in chondrichthyan research.

Finally, among other events regarding elasmobranchs in Brazil, we would like to emphasize the originality of the II ELASMulheres since it was the first Brazilian event on Chondrichthyes in which (a) 100% of conference abstracts had at least one woman as a co-author; (b) 100% of round-tables and workshops were led exclusively by women; (c) there were representatives from all Brazilian regions discussing a great variety of research areas; (d) attendants could present their results in an online format and receive awards; and (d) the collective organization of Brazilian women researching fishes coordinated.



Talk of M.Sc. Laís Barcellos (Universidade Federal de Pernambuco) at the round-table "Actions for Elasmobranchs' Conservation in Brazil" displaying the most important current Instagram pages that promote scientific communication on fishes and elasmobranchs in Brazil.

Upcoming IUCN Red List assessments and re-assessments

Dr Rima Jabado
IUCN SSC Shark Specialist Group | Chair

The SSG is currently undertaking assessments of 23 shark, ray, and chimaera species. This request for information pertains to the below species only. Unless new information becomes available that might impact the conservation status of a species, we will not be reassessing other species at this time.

Common name	Scientific name	Authority	Type of assessment	Contact
Family Arhynchobatidae				
Western Blue Skate	*Notoraja hesperindica*	Weigmann, Séret & Stehmann, 2021	New	Samm Sherman
Dark-mouth Skate	*Bathyraja arctowskii*	Dollo, L. (1904)	New	Brit Finucci
Family Chimaeridae				
Stubby Chimaera	*Chimaera compacta*	Iglésias, Kemper, & Naylor, 2021	New	Brit Finucci
Family Etmopteridae				
Barrie's Lanternshark	*Etmopterus brosei*	Ebert, Leslie & Weigmann, 2021	New	Brit Finucci
Family Glaucostegidae				
Sharpnose Guitarfish	*Glaucostegus granulatus*	(Cuvier, 1829)	Re-assessment	Rima Jabado
Bangladeshi Guitarfish	*Glaucostegus younholeei*	Habib & Islam 2021	New	Rima Jabado
Family Rajidae				
Blonde Skate	*Raja brachyura*	LaFont, 1871	Re-assessment	Fabrizio Serena & Sophy Phillips
Thornback Skate	*Raja clavata*	(Linnaeus, 1758)	Re-assessment	Fabrizio Serena & Sophy Phillips
Smalleyed Skate	*Raja microocellata*	Montagu, 1818	Re-assessment	Fabrizio Serena & Sophy Phillips
Spotted Skate	*Raja montagui*	Fowler, 1910	Re-assessment	Fabrizio Serena & Sophy Phillips
Undulate Skate	*Raja undulata*	Lacepède, 1802	Re-assessment	Fabrizio Serena & Sophy Phillips
White Skate	*Rostroraja alba*	(Lacepède, 1803)	Re-assessment	Fabrizio Serena & Sophy Phillips
Family Rhinidae				
Japanese Wedgefish	*Rhynchobatus mononoke*	Koeda, Itou, Yamada, & Motomura 2020	New	Rima Jabado
Family Rhinobatidae				
Malagasy Blue-spotted Guitarfish	*Acroteriobatus andysabini*	Weigmann, Ebert & Seret 2021	New	Rima Jabado
Socotra Blue-spotted Guitarfish	*Acroteriobatus stehmanni*	Weigmann, Ebert & Seret 2021	New	Rima Jabado
Blue-spotted Guitarfish	*Acroteriobatus leucospilus*	(Norman, 1926)	Re-assessment	Rima Jabado
Zanzibar Guitarfish	*Acroteriobatus zanzibarensis*	(Norman, 1926)	Re-assessment	Rima Jabado
Family Rhinochimaeridae				
	Harriotta chaetirhampha	Tanaka, S. (1909)	New	Brit Finucci
Family Squalidae				
Southern Dogfish	*Squalus probatovi*	Myagkov & Kondyurin, 1986	New	Brit Finucci
Shirai's Spurdog	*Squalus shiraii*	Viana & De Carvalho, 2020	New	Brit Finucci
Family Somniosidae				
Taiwan Sleeper Shark	*Somniosus cheni*	Hsu, Lin & Joung, 2020	New	Brit Finucci
Family Torpedinidae				
Leopard Torpedo	*Torpedo panthera*	Olfers, 1831	New	Samm Sherman
Family Triakidae				
Andaman Smoothhound	*Mustelus andamanensis*	White, Arunrugstichai & Naylor, 2021	New	Samm Sherman

We would like to check if you have information pertaining to the taxonomy, biology, distribution, degree of exposure to threatening processes, levels of fishing effort, and species population trends. We understand species-specific data are lacking for most species, so we aim to infer or suspect population changes from the best available information on levels of fishing pressure.

We would also appreciate any details on the fisheries that interact with the species in the above list; time-series of population data, general catch and effort trends, data on how individual species ranges overlap with fisheries (this includes both quantitative and qualitative data).

If you have any information that can contribute to these assessments and are interested in being involved, we would like to hear from you. Based on the information you have for each species, please only contact the lead person as mentioned in the table.

- Dr Rima Jabado | rimajabado@iucnssg.com
- Dr Brit Finucci | brit.finucci@niwa.co.nz
- Dr Samm Sherman | samm_sherman@sfu.ca
- Dr Fabrizio Serena | fabrizio50serena@gmail.com
- Dr Sophy Phillips | sophy.phillips@cefas.co.uk

Please submit any information you have as soon as possible. Completed assessments will be sent for review by early March 2022.

Your level of involvement can range from contributing information to being closely involved as an assessor. To be considered as an Assessor, we will ask you to complete the online IUCN Red List training course Modules 1-4 at Online IUCN Red List Training (see details below). If you are interested in being involved in IUCN Red List assessments or would like more information on the assessment process or online training courses, please contact Dr Cassie Rigby, the SSG Red List Authority Coordinator and Assess Working Group Chair at CassandraRigby@IUCNSSG.com.

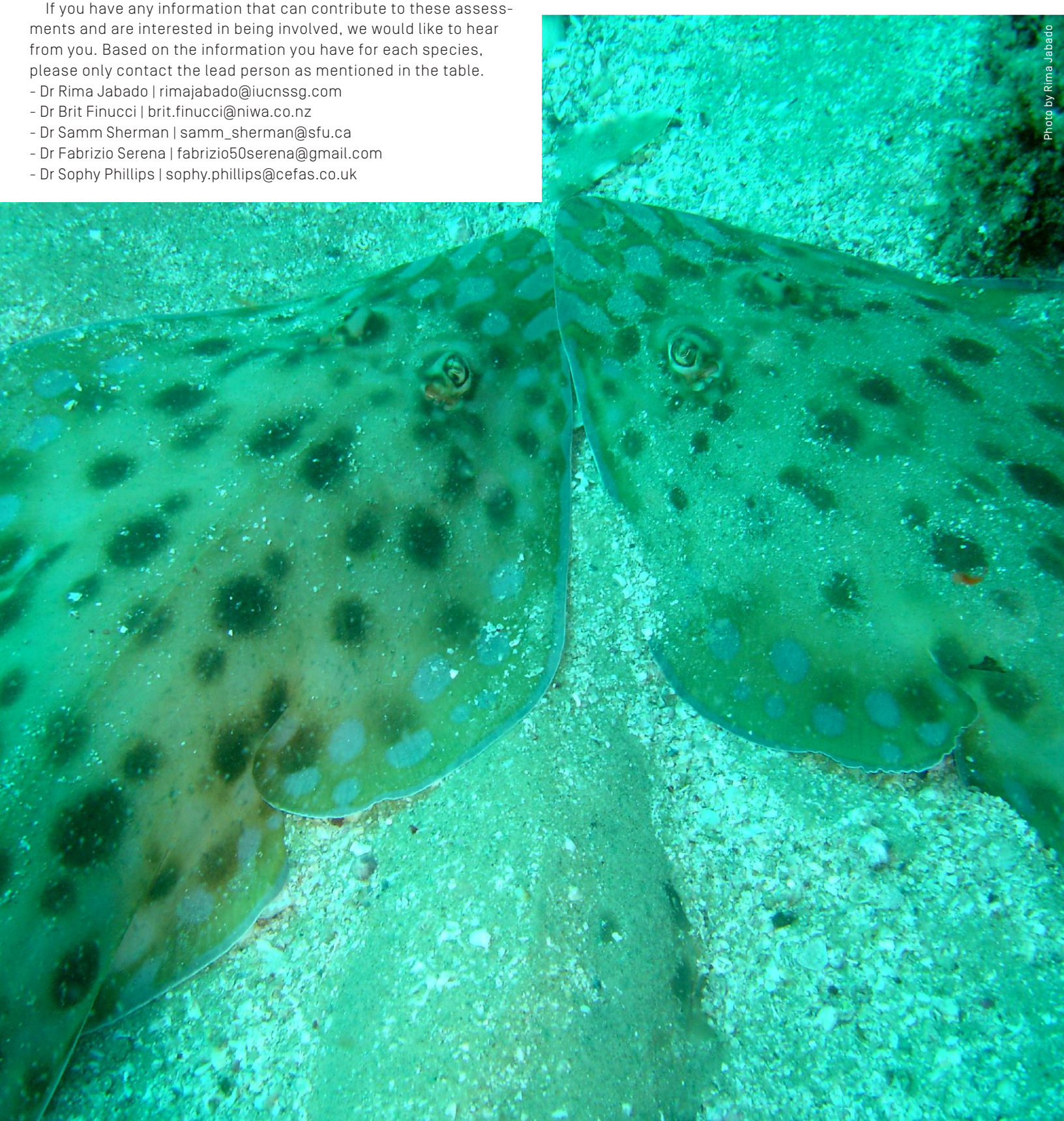


Photo by Rima Jabado

Funding Opportunities 2022

PADI AWARE Foundation Mission Hub Community Grant Program

The PADI AWARE Foundation™'s Mission Hub Community Grant Program is a cornerstone initiative to accelerate participation, education and advocacy for ocean protection. The program will provide direct financial resources to PADI Mission Hubs and community-based non-profits to address key ocean threats like climate change, marine debris, marine habitat loss and marine species protection.

Grants will be awarded to ocean protection initiatives and projects that directly advance the PADI Blueprint for Ocean Action, in direct support of the United Nations Decade of Science for Sustainable Development. Project proposals should focus on the following areas:

- Marine Debris
- Vulnerable Species Protection
- Coral Reefs
- Climate Change
- Marine Protected Areas

PADI AWARE Foundation is open to funding non-profit ocean conservation related organizations and/or PADI Dive Centers. The Foundation will not consider applications from individuals, government agencies, or non-PADI dive centers. Non-profit ocean conservation organizations must have an annual budget of less than 1 million USD. PADI AWARE Foundation is also limited by U.S. Governmental regulations and sanctions. The PADI AWARE Foundation is interested in funding projects up to $10,000 USD.

Funding Cycle (0222)

Application Window Opens:
April 1, 2022
Final Deadline for Applications:
April 22, 2022
Notifications sent by:
May 31, 2022
Funding Agreements Due:
June 15, 2022
Funding Disbursed by:
June 30, 2022

Funding Cycle (0322)

Application Window Opens:
October 1, 2022
Final Deadline for Applications:
October 22, 2022
Notifications:
November 30, 2022
Funding Agreements Due:
December 15, 2022
Funding Disbursed by:
December 31, 2022

More information: padi.com/aware/community-grants

PADI AWARE FOUNDATION™

The Rapid Ocean Conservation (ROC) Grants

The Rapid Ocean Conservation (ROC) Grants Program is a project of the Waitt Foundation. ROC Grants provide small grants with a quick turnaround time for solutions to emerging conservation issues and ocean protection. This complements the Waitt Foundation's existing major grants program and is responsive to conservation opportunities, supports higher-risk ideas at a low financial cost, and engages with small, local NGOs on a global scale.

Eligibility
Focus – Project must support sustainable fishing and/or Marine Protected Areas. Funds cannot be used for event sponsorships.

Project Duration – 6 months

Experience – Applicant must possess commensurate level of experience and expertise with respect to the proposed project.

Affiliation – Applicant must maintain affiliation with an academic institution or NGO for the duration of the grant project.

ROC Grants should constitute the sole or primary source of funding for the proposed project, not serve as complementary funding for larger, more costly projects.

Evaluation Criteria
Funding Urgency – How quickly the project needs to begin for maximum effectiveness.

Conservation Impact – Magnitude of ecological, socioeconomic, and policy benefit.

Scale of Impact – Geographic area and likeliness of applicability/replication elsewhere.

Feasibility of Implementation – Based on socioeconomic and public policy context.

Organizational Capacity – Adequate human capital size and expertise to execute project.

Funding
Proposals for grants up to 20,000 USD will be reviewed on a monthly rolling basis. Project funds will be distributed within 2 weeks of funding decisions.

Granting Cycle
Proposals are reviewed monthly on a rolling basis, although some applications may take additional time to evaluate. There are no deadlines for submitting an application.

Program Focus
Grants will fund projects related to the Waitt Foundation's mission of supporting sustainable fishing and marine protected areas (MPAs). This includes subthemes of:

- Scientific Research – Includes natural science or social science projects.
- Policy – Includes opportunistic projects around unique public policy windows, such as preparation of policy analysis and support of experts' efforts to inform decision makers on upcoming government actions.
- Management – Includes enforcement and infrastructure support.
- Communications – Includes raising public awareness and engaging stakeholders, including advertising by a 501(c)3 group around a public policy moment.

More information: waittfoundation.org/copy-of-roc-grants

WAITT FOUNDATION

Upcoming Meetings 2022

All meetings are subject to change due to the impacts of the coronavirus (SARS-CoV-2 | COVID-19) situation that varies in location and time. Please visit the respective websites and communication from the organising host organisation for more information.

Oceania Chondrichthyan Society (OCS)
Virtual Conference 2022
March 30 – 31, 2022
Virtual
oceaniasharks.org.au/ocs-virtual-conference-2022

We are pleased to introduce our plenary speaker for the OCS virtual conference, Juney Ward. Juney works for the Secretariat of the Pacific Regional Environment Programme (SPREP) as the Ecosystem and Biodiversity Officer. Before taking on her current role, she was previously the Shark and Ray Conservation Officer where she worked to support SPREP member countries to strengthen shark and ray conservation and management measures through the establishment of sanctuaries and/or protected areas and implementation of obligations under CITES and CMS.
Juney will be presenting on shark and ray conservation in the South Pacific, as well as the Shark and Ray Action Plan developed by SPREP.
Please submit your abstracts by January 21, 2022 to ocsnewsletters@gmail.com
Each presentation will be 10 minutes with 5 minutes for questions.

37th Annual Scientific Meeting American Elasmobranch Society (AES)
July 27 – 31, 2022
(Dates subject to change)
Spokane, WA, USA
elasmo.org
asih.org/meetings

The American Elasmobranch Society is a non-profit organization that seeks to advance the scientific study of living and fossil sharks, skates, rays, and chimaeras, and the promotion of education, conservation, and wise utilization of natural resources. The Society holds annual meetings and presents research reports of interest to professionals and students of elasmobranch biology. Those meetings are held in conjunction with annual meetings of the American Society of Ichthyologists and Herpetologists each year at rotating North American venues.

5th International Marine ProtectedAreas Congress (IMPAC5)
September 1 – 8, 2022
Vancouver, Canada
impac5.ca

International Marine Protected Areas Congresses (IMPAC) are an opportunity for the global community of marine conservation managers and practitioners to exchange knowledge, experience and best practices to strengthen the conservation of marine biodiversity and to protect the natural and cultural heritage of the ocean.

IMPAC5 will be jointly hosted by the Host First Nations — Musqueam Indian Band, Squamish Nation, and Tsleil-waututh Nation — together with the Province of British Columbia, the Government of Canada, the Canadian Parks and Wilderness Society (CPAWS) and the International Union for the Conservation of Nature (IUCN).

IMPAC5 is an opportunity to bring together Indigenous peoples and cultures from around the world to embrace a collaborative approach and learn from Indigenous leadership in ocean conservation.

Join thousands of marine protected area professionals from around the world to chart a course towards protecting 30% of the ocean by 2030. Learn about traditional marine protection practices and innovative sustainability initiatives from local and international indigenous experts.

Sharks International Conference 2022 (SI2022)
October 10 – 14, 2022
(online virtual conference)
October 20 – 22, 2022 (physical in-person conference)
Valencia, Spain
si2022.org

SI2022 is a hybrid event in October 2022 that will bring together a strong community of people from across the world interested in sharks and rays, all in the name of addressing the challenge of elasmobranch conservation in this Decade of Ocean Science. In association with the European Elasmobranch Association (EEA) and hosted by the Shark Trust, Submon, and Lamna, the event will include five online days (October 10-14th) featuring enhanced digital content on key themes in shark conservation, leading up to a three-day physical conference in Valencia (October 20th-22nd). The conference is funded by the Save our Seas Foundation and will be based out of L'Oceanogràfic, the largest aquarium in Europe, and streamed live across the world. If you are interested in sharks and rays and want to be a part of the 300+ member community currently shaping SI2022, sign up to the portal at si2022.org. Join this year to be automatically entitled to a 10% discount when tickets become available.

IUCNSSG.org
facebook.com/IUCNShark
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linkedin.com/company/IUCNShark
youtube.com/user/IUCNSSG
vimeo.com/IUCNShark

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