Sustainable Shark and Ray Management Plan

2021

North-East Tobago
Man and the Biosphere Area

Guided by

Funded by

Shark Conservation Fund

Facilitated by

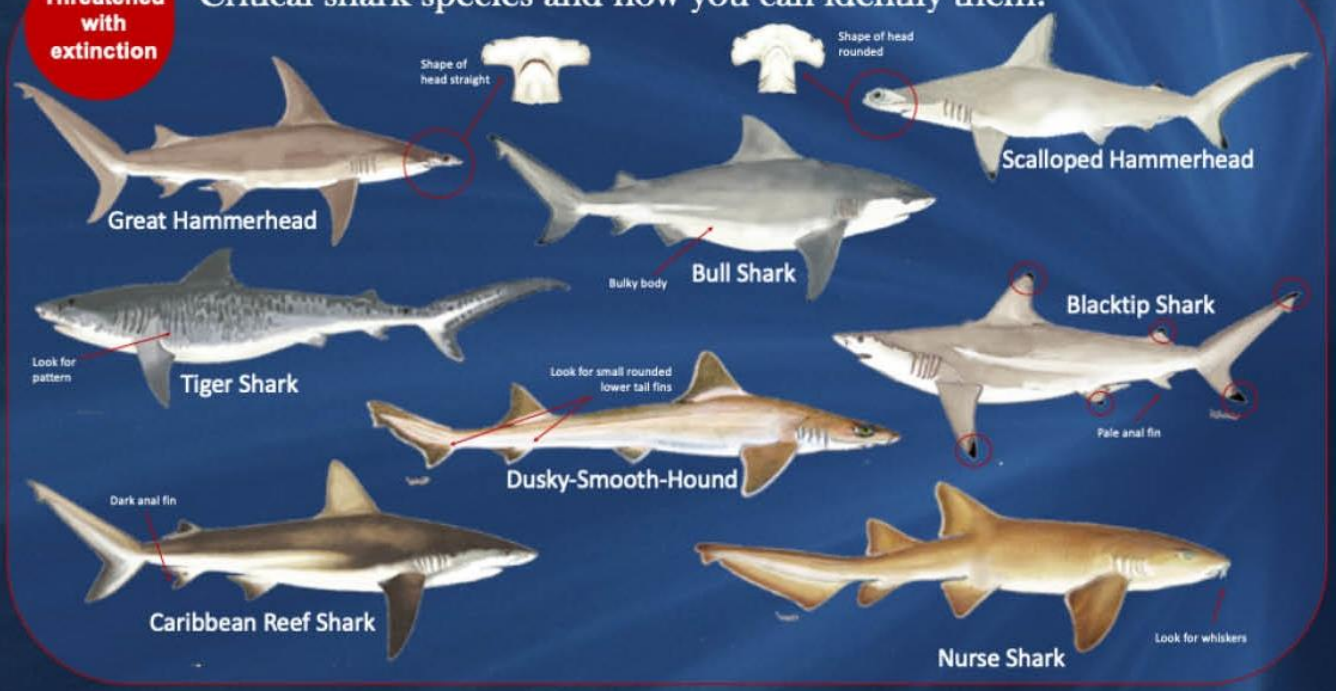
ERIC
Environmental Research Institute Charlotteville, Tobago W.I.

The Kings of our Ocean

Important Sharks of Tobago

Threatened with extinction

Critical shark species and how you can identify them:



Three reasons why sharks are important for Tobago fisherfolk:

1. *Reefs with a healthy shark population have more Snappers, more Groupers and other fish to catch.*

2. *Reefs need sharks to recover from storms and damage like coral bleaching.*

3. ***Sharks make reefs healthy***
Healthy reefs attract visitors like divers, sport fishers and snorkelers. They all spend money in our communities.

Community outreach posters distributed to fishing depots throughout Tobago.

More sharks = healthier reefs = more fish to catch

FUN FACTS

- We are more likely to die from a falling coconut or a mosquito than from a shark.
- A shark can feel the heartbeat of its prey in the water.
- A shark may grow and lose 20.000 teeth in its lifetime!

Shark Conservation Fund

ERIC
Environmental Research Institute Charlotteville, Tobago W.I.

Juvenile hammerhead (top image) and tiger shark (bottom image) captured on ERIC BRUV footage.

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Foreword

This Sustainable Shark and Ray Management Plan (SSRMP) for North-East Tobago (NE Tobago) is a collaborative effort of the Department of Marine Resources and Fisheries (DMRF), the Department of the Environment (DoE), the Division of Health, Wellness and Family Development, and Fisherfolk representatives. The Environmental Research Institute Charlotteville (ERIC) provided technical expertise and facilitated the process. The development of the SSRMP was part of a project funded by the Shark Conservation Fund, a sponsored project of Rockefeller Philanthropy Advisors Inc., implemented in 2020. The project also included training of fisheries officers in shark conservation and identification, fisherfolk engagement, and shark and ray population monitoring. Additionally, shark tissue samples were tested for heavy metals with the support of Florida International University.

While titled "Sustainable Shark and Ray Management Plan for ease of reference, the document at hand shall cover all elasmobranch fishes including selachii (sharks) and batoidea (rays, skates, and sawfishes).

This SSRMP was drafted according to the requirements for fisheries management plans outlined in the proposed Trinidad and Tobago Fisheries Management Bill (2020), which states that "*Separate management plans shall be prepared".*

Table 1. Content requirement of management plans according to draft Fisheries Management Bill (2020)

Required Content of Fisheries Management Plans	Chapter in SSRMP
Introduction outlining the need and rationale for management of the fishery	1. Introduction, 5.2.3. Background Threats
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The ERIC would like to thank all collaborators, reviewers and participants for their valuable contributions.

Message from the Department of the Environment (THA) and UNESCO Man and the Biosphere Focal Point for Trinidad and Tobago

"North East Tobago was formally designated as a UNESCO Man and the Biosphere Reserve on October 28th, 2020. The Biosphere Reserve includes both terrestrial and marine areas boasting some of Tobago's most prized ecological and cultural assets. The fundamental aim of the MAB programme is to use science as basis for improving the relationship between mankind and the environment in a way which supports the socioeconomic wellbeing of humans while at the same time maintaining and improving the integrity of natural and managed ecosystems.

The Sustainable Shark and Ray Management Plan developed for North East Tobago under the technical guidance of the Environmental Research Institute Charlotteville, Tobago is timely, consistent with the aims and objectives of the UNESCO MAB Programme and potentially charts a progressive way forward in terms of how we manage our marine resources and ecosystems not only in Tobago, but nationally.

The plan holds positive implications for the protection of human health, conservation of critical marine species and ecosystems, sustainable tourism and associated livelihoods and the international image of Tobago and the country at large from the perspective of satisfying our international obligations pursuant to multilateral environmental agreements to which the country is party.

Linford Beckles, Director of the Department of the Environment, Tobago House of Assembly, UNESCO MaB Focal Point, Trinidad and Tobago

It is my considered opinion that the plan is rooted in in good science and consistent with the policy frameworks of both the THA and the National Government. Accordingly, it is worthy of executive sanction at the level of the Executive Council and the Cabinet in support of sustainable development."

Message from the Department of Marine Resources and Fisheries (THA)

The Department of Marine Resources and Fisheries (DMRF) of the Division of Food Production, Forestry and Fisheries, Tobago House of Assembly is responsible for the sustainable management of Tobago's Marine Resources from the coastline to a distance of 6 nautical miles offshore. Given its mandate the DMRF recognises the importance of the designation of the NE Tobago as a UNESCO Man and the Biosphere in October 2020.

The vulnerability of species and habitats to a stressor is determined by the intensity and frequency of an impact and the extent to which that impact compromises the ecosystem's ability to withstand or rebound from change. In the North East Tobago UNESCO Man and the Biosphere it is important to understand the compatibility of different human activities with multiple habitat types and species.

The conservation of Sharks and Rays is urgent and critical. Around the world these species play a vital role in different ecosystems and their loss would cause major long-term issues for the environment This Sustainable Shark and Ray Plan Management Plan addresses this current situation. This plan was developed in a partnership between the Department of Marine Resources and Fisheries and the Environmental Research Institute Charlotteville and represents the Environmental Partnership signed by the Tobago House of Assembly and the civil society representatives in 2019.

Garth Ottley, Director, Department of Marine Resources and Fisheries, THA

It is the hope that the Plan be considered in the finalisation of the new Fisheries Management Bill for Trinidad and Tobago in order to meet international obligations.

There is need for greater emphasis to be placed on the marine environment if we wish to maintain its integrity. This will allow for the marine habitats and the biodiversity which supports ecosystems services to continue. To achieve effective conservation outcomes in NE Tobago, the social and economic needs of the people it affects must be taken into account. Community stakeholders should be engaged from the initial planning stages and through the design and management process, since the zone will regulate and modify their behaviour. North East Tobago's Biosphere Reserve is now the largest MAB site in the English –speaking Caribbean Small Island Developing States. The Department of Marine Resources and Fisheries recognises the unique biodiversity, valued environment and the sustainable way of life practiced by persons within this Biosphere.

ABBREVIATIONS

ATDO	**A**ssociation of **T**obago **D**ive **O**perators
BR	**B**iosphere **R**eserve
BRD	**B**y-catch **R**eduction **D**evice
BRUVS	**B**aited **R**emote **U**nderwater **V**ideo **S**tation
CITES	**C**onvention on **I**nternational **T**rade in **E**ndangered **S**pecies of Wild Fauna and Flora
CMS	**C**onvention on the Conservation of **M**igratory **S**pecies of Wild Animals
COFI	FAO **C**ommittee on **Fi**sheries
CPUE	**C**atch **p**er **U**nit of **E**ffort
CR	**C**ritically **E**ndangered
CSO	**C**ivil **S**ociety **O**rganisations
DIQE	**D**ivision of **I**nfrastructure, **Q**uarries and the **E**nvironment
DMRF	**D**epartment of **M**arine **R**esources and **F**isheries
DoE	**D**epartment **o**f the **E**nvironment
DoH	**D**ivision **o**f **H**ealth
DoTCT	**D**epartment **o**f **T**ourism, **C**ulture and **T**ransportation
EDGE	**E**volutionary **D**istinct and **G**lobally **E**ndangered
EEZ	**E**xclusive **E**conomic **Z**one
EN	**En**dangered
ENGO	**E**nvironmental **N**on-**G**overnmental **O**rganisations
EMA	**E**nvironmental **M**anagement **A**uthority
ERIC	**E**nvironmental **R**esearch **I**nstitute **C**harlotteville
ESA	**E**nvironmentally **S**ensitive **A**rea
ESS	**E**nvironmentally **S**ensitive **S**pecies
ET	**E**nvironment **T**obago
FAO	**F**ood and **A**gricultural **O**rganisation of the United Nations
FD	**F**isheries **D**ivision in the Ministry of Agriculture, Land and Fisheries of Trinidad and Tobago
FIU	**F**lorida **I**nternational **U**niversity
FMP	**F**isheries **M**anagement **P**lan
GEF	**G**lobal **E**nvironmental **F**acility
GoRTT	**G**overnment **o**f the **R**epublic of **T**rinidad and **T**obago
IATTC	The **I**nter-**A**merican **T**ropical **T**una **C**ommission
IBA	**I**mportant **B**ird and **B**iodiversity **A**rea
ICCAT	The **I**nternational **C**ommission for the **C**onservation of **A**tlantic **T**unas
IDB	**I**nteramerican **D**evelopment **B**ank
IFPAM	**I**mproved **F**orest and **P**rotected **A**rea **M**anagement
IICA	**I**nteramerican **I**nstitute for **C**ollaboration on **A**griculture
IMA	Trinidad and Tobago's **I**nstitute of **M**arine **A**ffairs
IPOA-Sharks	**I**nternational **P**lans of **A**ction for The Conservation And Management of **Sharks**
IUCN	**I**nternational **U**nion for **C**onservation of **N**ature
IUU	**I**llegal, **U**nreported and **U**nregulated
LME	**L**arge **M**arine **E**coregion
MAB	UNESCO **M**an **a**nd the **B**iosphere Reserve
MALF	**M**inistry of **A**griculture, **L**and and **F**isheries
MEA	**M**illennium **E**cosystem **A**ssessment
MPA	**M**arine **P**rotected **A**rea

MRFR	**M**ain **R**idge **F**orest **R**eserve
NE Tobago	**N**orth-**E**ast **Tobago**
NETMABA	**N**orth-**E**ast **T**obago UNESCO **M**an **a**nd the **B**iosphere **A**rea (local name)
NETMABR	**N**orth-**E**ast **T**obago UNESCO **M**an **a**nd the **B**iosphere **R**eserve (official name)
NETMP	**N**orth-**E**ast **T**obago **M**anagement **P**lan
NETMPA	**NE T**obago **M**arine **P**rotected **A**rea
NETPAMT	**N**orth-**E**ast **T**obago **P**rotected **A**rea **M**anagement **T**rust
NGO	**N**on-**G**overnmental **O**rganisation
NNH	**N**atural **N**ational **H**eritage
NOAA	**N**ational **O**ceanic and **A**tmospheric **A**dministration
NPOA-Sharks	**N**ational **P**lans of **A**ction for The Conservation and Management of **Sharks**
NPASP	**N**ational **P**rotected **A**reas **S**ystems **P**lan
NT	**N**ear **T**hreatened
NTTT	**N**ational **Tr**ust of **T**rinidad and **T**obago
OLDESPESCA	Latin American Organization for Fisheries Development (**O**rganizacion **L**atinoamericana de **Des**arrolo **Pe**squero
PAMP	**P**rotected **A**rea **M**anagement **P**lan
PPA	**P**ilot **P**rotected **A**rea
SIDS	**S**mall **I**sland **D**eveloping **S**tates
SDG	**S**ustainable **D**evelopment **G**oal
SPAW	**S**pecially **P**rotected **A**reas and **W**ildlife Protocol
SRMWG	**S**hark and **R**ay **M**anagement **W**orking **G**roup
SSRMP	**S**ustainable **S**hark and **R**ay **M**anagement **P**lan
THA	**T**obago **H**ouse of **A**ssembly
TTAL	**T**obago **T**ourism **A**gency **L**imited
TVT	**T**urtle **V**illage **T**rust
UNESCO	**U**nited **N**ations **E**ducational, **S**cientific and **C**ultural **O**rganization
UTT	**U**niversity of **T**rinidad and **T**obago
UWI	The **U**niversity of the **W**est **I**ndies
VU	**Vu**lnerable
WECAFC	**We**stern **C**entral **A**tlantic **F**ishery **C**ommission
WG	**W**orking **G**roup
WNBR	**W**orld **N**etwork of **B**iosphere **R**eserve
WWF	**W**orld **W**ildlife **F**und

GLOSSARY

Accession	is the formal commitment of a state or regional economic integration organisation to be legally bound by the terms of a treaty (and/or convention). Accession has the same legal effect as ratification but is not preceded by an act of signature.
By-catch	species that are discarded from the catch and that part of the "catch" is not landed and instead killed as a result of interaction with fishing gear. This may include discards of commercially valuable species because of protective measures or because the animals are not fit for human consumption or discards for the purposes of high grading. and species are not the target species, but are retained because they are commercially valuable (sometimes separately defined as by-product)
Critical habitat	is identified as an ecosystem type of high biodiversity value including habitats of significance to Critically Endangered and/ or Endangered Species; habitats supporting globally significant concentrations of migratory species and/or aggregating species.
Critical life stages	can, depending on the species, include eggs, neonates, juveniles, or adult females
Discards	are the part of a fisher's catch returned to the sea either because it has no commercial value, or because regulations preclude it from being retained.
Ecosystem	is the biotic (living) community and its abiotic (non-living) environment.
Elasmobranch	means the taxonomic subgroup of cartilaginous fishes containing sharks and rays.
Finning	is the practice of removing the fins from a shark and returning the carcass to the sea (either dead or alive).
Fishery independent data	is information gathered independently of the fishing sector (e.g. research survey at sea).
Habitat	means any area in the range of a species, which contains suitable living conditions for that species.
Highly migratory species or stocks	are marine species whose life cycle includes lengthy migrations, usually through the EEZ of two or more countries as well as into international waters.
Illegal, Unreported and Unregulated Fishing	refers to activities that contravene national laws and regulations, the conservation and management measures of a country or national regulatory body.
Longline	is a fishing gear in which short lines carrying hooks are attached to a longer main line at regular intervals. Longlines are laid on the bottom or suspended horizontally with the help of surface floats.
Migration	is the systematic movement of individuals of a stock from one place to another, often related to season. A knowledge of the migration patterns helps in targeting high concentrations of fish and managing shared stocks.
Migratory species	move over national boundaries, and require regional or international cooperation to enable their comprehensive management.

Non-consumptive use	are cases where one person's enjoyment does not prevent others from enjoying the same resource (e.g. the viewing of marine mammals and other wildlife).
Non-Governmental Organisation	is any organization that is neither a part of a national or local government nor a conventional for-profit business.
Non-target species	are those for which the gear is not specifically set, although they may have immediate commercial value and be a desirable component of the catch.
Precautionary approach	is used for the implementation of the precautionary principle and should be guided by: 1) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and 2) an assessment of the risk-weighted consequences of the various options.
Precautionary principle	implies that the lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.
Range state	any state that exercises jurisdiction over any part of the range of that migratory species, or a state, flag vessels of which are engaged outside national jurisdictional limits in taking that migratory species.
Recreational fishing	is the catching and retaining of fish and/or Living Aquatic Resources for consumption or catch and release purposes, not for commercial gain.
Selective gear	is gear allowing fishers to capture few (if any) species other than the target species.
Shark catch	includes targeted, by-catch, commercial, recreational and any other forms of taking sharks.
Stakeholder	means an actor having a stake or interest in a physical resource, ecosystem service, institution, or social system, or someone who is or may be affected by a public policy.
Stock	means the part of a fish population which is under consideration from the point of view of actual or potential utilisation.
Sustainable development	is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.
Sustainable use	is the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

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1. Vision

Sustainable shark and ray populations fulfil their ecological functions in NE Tobago's fragile marine ecosystems thus contributing to the long-term sustainability of fisheries resources and additional socioeconomic benefits for NE Tobago's fisherfolk and communities

2. Mission

Through participatory and cross-sectoral collaboration led by the Department of Marine Resources and Fisheries, NE Tobago's fisheries stakeholders will strive to:

- **monitor, evaluate and communicate the status, consumer risks, ecological and economical value of shark and ray populations;**
- **continually enforce and periodically adjust shark and ray management regulations;**
- **integrate shark and ray management into relevant legislation, rules, regulations, plans and policies; and**
- **receive positive recognition nationally, regionally and internationally for Tobago's efforts in shark management and conservation.**

Nurse shark captured on BRUVS footage

3. Executive Summary

The Sustainable Shark and Ray Management Plan (SSRMP) at hand is meant as a proposal for policy adoption by the Executive Council of the Tobago House of Assembly (THA). Notably, an adoption by the THA will not have legislative character and not allow for enforcement and punitive measures (which is only possible through national legislation).

However, once adopted by the THA, the recommended supportive actions can be implemented by the management authorities and stakeholders, while the restrictive actions can be communicated to and by stakeholders as activities that are highly discouraged and "'not-wanted" in the North East Tobago UNESCO Man and the Biosphere Reserve.

Furthermore, all consulted stakeholders expressed the hope that this SSRMP and its components might inspire changes or be addended to the, currently finalised, Fisheries Management Bill of 2021.

There is justified, increasing global and local concern about the decline of shark and ray populations. The life history of sharks and rays makes them especially vulnerable to threats such as overfishing, and population recovery is slow.

As recent as on 27 January 2021, an article in the globally renown science publication Nature states: *"since 1970, the global abundance of oceanic sharks and rays has declined by 71% owing to an 18-fold increase in relative fishing pressure. This depletion has increased the global extinction risk to the point at which three-quarters of the species comprising this functionally important assemblage are threatened with extinction. Strict prohibitions and precautionary science-based catch limits are urgently needed to avert population collapse*".

Of the 53 shark and ray species documented for North East Tobago, six are critically endangered, 10 endangered, 10 vulnerable and 14 near threatened; 10 are listed in CITES appendix II and 17 are listed as CMS species. These numbers dramatically demonstrate the fragility of NE Tobago's shark and ray populations!

While less is known about the ecological role of rays, the important ecological role of sharks, as upper-level predators, is well researched.

North East Tobago is one of the most vulnerable, but also relatively intact human- and ecosystem in Trinidad and Tobago. This is substantiated by its designation as a UNESCO Man and the Biosphere Reserve in 2020 which includes a 166,000-acre (672km^2) zone. Unfortunately, shark and ray populations in this area have been declining for over two decades.

Notably, the cornerstones of North East Tobago's sustainable blue economic development depend on sharks: artisanal fishing and tourism. As such, the document at hand was specifically created with the purpose to support fisherfolk livelihoods and community prosperity.

The draft Fisheries Management Bill (2020) for Trinidad and Tobago prescribes the precautionary approach for managing fisheries resources when there is data deficiency and a risk of stock depletion; this

is clearly the case for sharks and rays. The bill further recommends adherence to international conventions (e.g., CMS, CITES, SPAW) and the preparation of specific, subsidiary management plans.

Therefore, a Sustainable Shark and Ray Management Plan (SSRMP) was prepared to alert the administrative levels of government on the ecological and economical importance of sharks and rays and to guide stakeholders regarding the management of their populations.

Furthermore, this SSRMP, once accepted and implemented, will be one of the indicators for Tobago and, by extension, Trinidad & Tobago to demonstrate its commitment to the principles of the Man and the Biosphere Programme to the international UNESCO community.

The plan was drafted according to the requirements of the draft Fisheries Management Bill (2020) and reviewed by a broad spectrum of stakeholders; the process was facilitated by the Environmental Research Institute Charlotteville, financed by the Shark Conservation Fund.

It includes descriptions of species richness and conservation status, biology, threats and issues, local and national fishery, stakeholders, research, the legal and management framework, international conventions, heavy metal health considerations, implementation mechanisms and a plan of action.

Notably, while the sample size was quite small, the mercury concentrations in shark meat sampling data clearly demonstrate an inherent health risk associated with its consumption to highly vulnerable groups and specifically pregnant women.

Based on stakeholder consultations and expert advice, the key recommendations are to:

- use a precautionary and co-management approach,
- prevent the development of a targeted shark and ray fishery (until data show that the population can be exploited sustainably),
- increase research, international collaboration, stakeholder capacity and outreach,
- ensure consumer health,
- identify financing mechanisms and
- protect critical habitats.

This draft Sustainable Shark and Ray Management Plan will be submitted to the Executive Council of the Tobago House of Assembly for adoption and subsequently forwarded to national legislators for consideration.

4. Introduction

There is global concern over the increase of shark and ray fishing which results, in conjunction with other threats, in population decline and loss of ecological functionality which in turn negatively impacts specifically vulnerable rural communities in Small Island Developing States such as in Trinidad and Tobago.

Most sharks and rays have slow growth rates, late maturity and low fecundity, resulting in very low resilience to fishing pressure and slow population recovery even after the implementation of management strategies. As such, shark and ray populations can only withstand modest levels of fishing without depletion; the decline is often very rapid and beyond fast recovery.

Unfortunately, globally there is an overwhelming pattern of no-management of shark and ray populations, as it is currently the case in Trinidad and Tobago.

The prevailing view is that it is necessary to sustainably manage shark and ray populations to ensure their conservation and restore ecological functionality, resulting in productive marine habitats that support sustainable and prosperous livelihoods for fisherfolk.

The American Fisheries Society (AFS) recommends that regulatory agencies give shark and ray management high priority because of the naturally slow population growth inherent to most sharks and rays, and their resulting vulnerability to overfishing and stock collapse.

The precautionary approach (as prescribed in the draft Fisheries Management Bill (2020) for Trinidad and Tobago) requires fisheries managers to be cautious when the state of a resource is uncertain, such as when fishery data is insufficient or unreliable. As it is the case for North East (NE) Tobago and indeed the entire country, when faced with such uncertainty, managers will be required by law to ensure that exploitation of a fishery resource is conducted at a level that reliably ensures the stability of the population.

Indicating its significance, the precautionary approach has also been embodied in two important international initiatives: the 1995 United Nations Agreement on Straddling and Highly Migratory Fish Stocks and the 1995 FAO Code of Conduct for Responsible Fisheries.

As such, a precautionary, sustainable shark and ray management plan (SSRMP) is an opportunity for NE Tobago to take the required action before current fisheries target species are even more depleted and fisherfolk are forced to focus on sharks which will only increase the issue at hand.

This SSRMP was specifically drafted for the recently designated NE Tobago UNESCO Man and the Biosphere Reserve (NETMABR) which falls under the management authority of the Tobago House of Assembly. NE Tobago's coastal reefs and open oceans, once famous for their healthy shark and ray populations, experienced a dramatic decline of shark and ray abundance since 1995. This phenomenon was mainly reported by recreational divers and is, unfortunately, not verified by hard data. The decline is mainly attributed to overfishing by smaller vessels, not originating from Tobago, and larger long-liners some of which fish illegally in Trinidad and Tobago's exclusive economic zone (EEZ). However, the area

has been described as a bright spot for shark and ray diversity and potential population recovery by Global Finprint (www.globalfinprint.org), the world's largest reef shark and ray survey (2019).

While the idea of a Marine Protected Area (MPA) in NE Tobago was discussed for more than three decades without resulting in concrete steps forward, the FAO commissioned in 2013 an evaluation of a potential MPA in NE Tobago which recommended an area surrounding NE Tobago. This initial plan was further detailed under the Improved Forest and Protected Area Management Project (2013-2020, FAO) and described as an area from Castara to Belle Garden, extending 11.1. km seawards and titled "Proposed North-East Tobago Marine Protected Area" covering 672.5km^2. This area, which is under the management authority of the Department of Marine Resources and Fisheries (DMRF) of the Tobago House of Assembly (THA), is the marine transition and buffer zone of the NETMABR, which was declared on 28 October 2020.

While the proposed NE Tobago MPA has not been established to date, the THA Act allows for the establishment of policies regarding the management of marine resources, including sharks and rays.

Therefore, the document at hand describes shark and ray management related circumstances in NE Tobago and is envisaged as a guideline for stakeholders regarding the sustainable management of sharks and rays specifically in the NE Tobago UNESCO Man and the Biosphere Reserve.

It is envisaged that this SSRMP be submitted to the Executive Council of the Tobago House of Assembly for adoption and recommendation as preferred practise in the NETMABR; thereafter the THA could forward the SSRMP to national legislators for consideration.

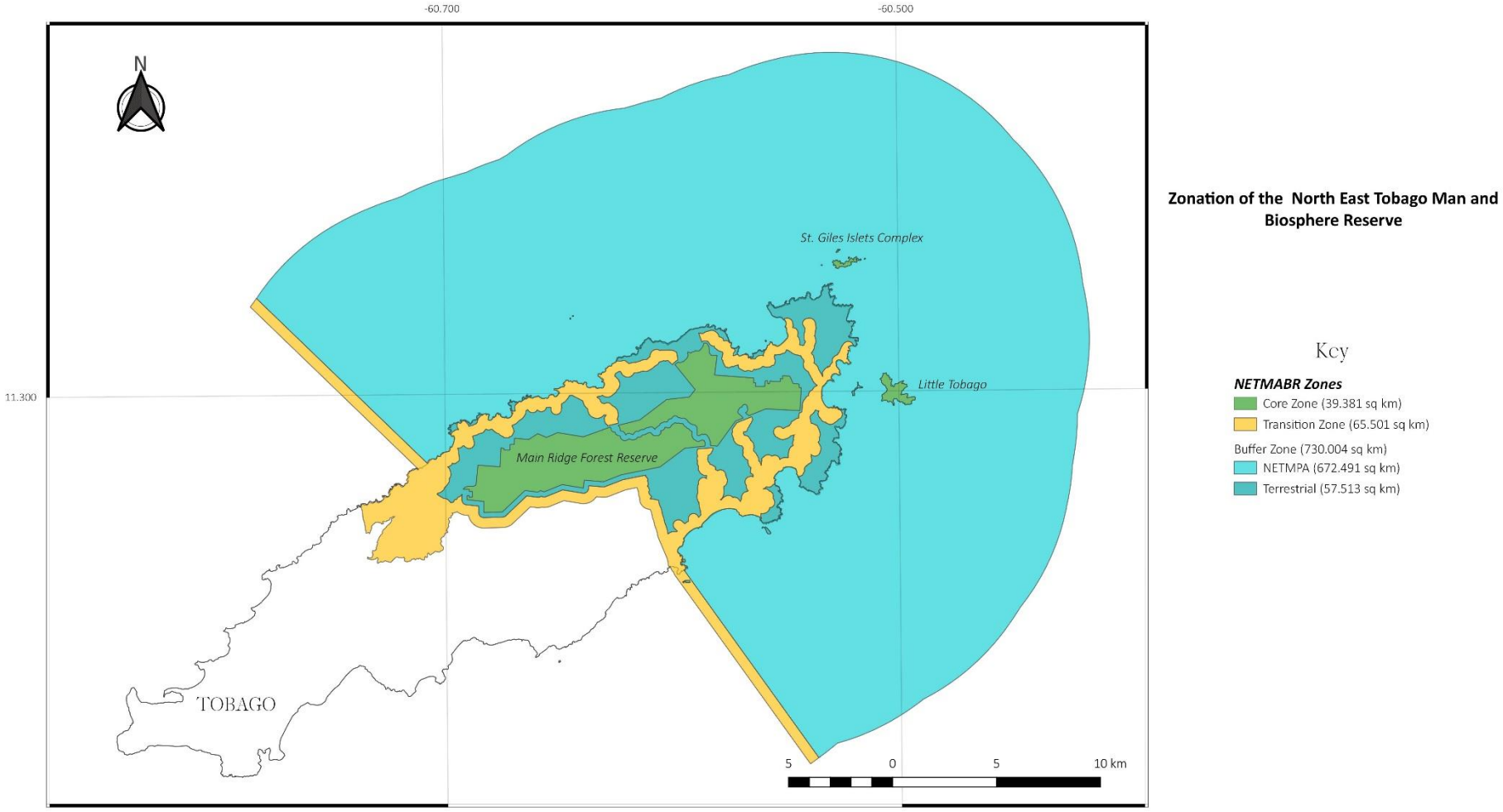


Figure 1: UNESCO NE Tobago Man and the Biosphere Reserve (Map)

5. Background

5.1. NE Tobago Elasmobranch Species and their Conservation Status

The Food and Agriculture Organisation of the United Nations (FAO) Keys for The Living Marine Resources of the Western Central Atlantic identifies 62 elasmobranch species within Trinidad and Tobago's coastal region (Ramjohn 1999; Carpenter 2002).

Out of these, 52 species are documented for NE Tobago and include the groups: sharks and batoids (rays and skates). An update is required to this list as lesser electric rays (*Narcine bancroftii*) were observed by the ERIC, but are not listed by the FAO for occurrences in Tobago's waters (ERIC pers. obs.). Therefore, 53 elasmobranchs species are presently recorded for NE Tobago. This record comprises of: 34 species of sharks, 17 species of rays and 2 species of skates (see Table 2).

Table 2: Elasmobranch species of North East Tobago and their global and regional conservation status (2021)

Subdivision	Species Name	Common Names	IUCN Conservation Status	CITES*	CMS†	SPAW‡
IUCN Red List Key	Critically Endangered	Endangered	Vulnerable			
	Near Threatened	Least Concern	Data Deficient			
SHARKS (SELACHII)	**FAMILY: ALOPIIDAE**					
	Alopias superciliosus§	Bigeye thresher		II	II	-
	Alopias vulpinus§	Thresher shark, Common thresher		II	II	-
	FAMILY: CARCHARHINIDAE					
	Carcharhinus acronotus	Blacknose shark		-	-	-
	Carcharhinus altimus	Bignose shark		-	-	-
	Carcharhinus falciformis§	Silky shark		II	II	III
	Carcharhinus leucas	Bull shark		-	-	-
	Carcharhinus limbatus	Blacktip shark		-	-	-
	Carcharhinus longimanus	Oceanic whitetip shark		II	I	III
	Carcharhinus obscurus	Dusky shark		-	II	-
	Carcharhinus perezi	Caribbean reef shark		-	-	-
	Carcharhinus plumbeus	Sandbar shark		-	-	-
	Carcharhinus porosus	Smalltail shark		-	-	-
	Carcharhinus signatus	Night shark		-	-	-
	Galeocerdo cuvier	Tiger shark		-	-	-
	Negaprion brevirostris	Lemon shark		-	-	-
	Prionace glauca	Blue shark		-	II	-
	Rhizoprionodon lalandii	Brazilian sharpnose shark		-	-	-
	Rhizoprionodon porosus	Caribbean sharpnose shark		-	-	-
	FAMILY: ETMOPTERIDAE					

Subdivision	Species Name	Common Names	IUCN Conservation Status	CITES*	CMS†	SPAW‡
IUCN Red List Key	Critically Endangered	Endangered	Vulnerable			
	Near Threatened	Least Concern	Data Deficient			
	Etmopterus schultzi	Fringefin lanternshark		-	-	-
	Etmopterus virens	Green lanternshark		-	-	-
	FAMILY: GINGLYSTOMATIDAE					
	Ginglymostoma cirratum	Nurse shark		-	-	-
	FAMILY: HEXANCHIDAE					
	Hexanchus nakamurai	Bigeyed sixgill shark		-	-	-
	FAMILY: LAMNIDAE					
	Isurus oxyrinchus§	Shortfin mako		II	II	-
	FAMILY: RHINCODONTIDAE					
	Rhincodon typus§	Whale shark		II	I, II	III
	FAMILY: SOMNIOSIDAE					
	Zameus squamulosus	Velvet dogfish		-	-	-
	FAMILY: SPHYRNIDAE					
	Sphyrna lewini§	Scalloped hammerhead		II	II	III
	Sphyrna media	Squat-headed hammerhead, Scoophead hammerhead		-	-	-
	Sphyrna mokarran§	Great hammerhead		II	II	III
	Sphyrna tiburo	Bonnethead shark		-	-	-
	Sphyrna tudes	Smalleye hammerhead, Golden hammerhead, Curry shark		-	-	-
	FAMILY: SQUALIDAE					
	Squalus cubensis	Cuban dogfish		-	-	-
	Squalus mitsukurii	Shortspine spurdog		-	-	-
	FAMILY: TRIAKIDAE					
	Mustelus canis	Dusky smoothhound		-	-	-
	Mustelus higmani	Smalleye smoothhound		-	-	-
RAYS AND SKATES (BATOIDEA)	**FAMILY: DASYATIDAE**					
	Hypanus americanus	Southern stingray		-	-	-
	Hypanus guttatus	Longnose stingray		-	-	-
	Hypanus say	Bluntnose stingray		-	-	-
	Styracura schmardae	Chupare stingray, Atlantic chupare		-	-	-
	FAMILY: MOBULIDAE					

Subdivision	Species Name	Common Names	IUCN Conservation Status	CITES*	CMS†	SPAW‡
IUCN Red List Key	Critically Endangered	Endangered	Vulnerable			
	Near Threatened	Least Concern	Data Deficient			
	Mobula birostris§	Giant manta ray		II	I, II	III
	Mobula hypostoma	Atlantic devilray		II	I, II	-
	Mobula tarapacana§	Chilean devilray, Sicklefin devilray		II	I, II	-
	FAMILY: MYLIOBATIDAE					
	Aetobatus narinari	Spotted eagle ray		-	-	-
	Myliobatis freminvillei	Bullnose eagle ray		-	-	-
	Myliobatis goodei	Southern eagle ray		-	-	-
	FAMILY: NARCINIDAE					
	Diplobatis pictus	Variegated electric ray, Painted dwarf numbfish		-	-	-
	Narcine bancroftii‖	Caribbean numbfish, Lesser electric ray, Bancroft's electric ray		-	-	-
	FAMILY: RAJIDAE					
	Fenestraja plutonia	Underworld windowskate, Pluto Pygmy Skate		-	-	-
	Gurgesiella atlantica	Atlantic abyssalskate, Atlantic finless skate		-	-	-
	FAMILY: RHINOBATIDAE					
	Pseudobatos percellens	Chola guitarfish, Southern guitarfish		-	-	-
	FAMILY: RHINOPTERIDAE					
	Rhinoptera bonasus	Cownose ray, American cownose ray		-	-	-
	FAMILY: UROTRYGONIDAE					
	Urobatis jamaicensis	Yellow stingray		-	-	-

*CITES – Appendix II: Species not necessarily threatened with extinction, but in which trade must be controlled

†CMS – Appendix I: Endangered migratory species; Appendix II: Migratory species conserved through Agreements

‡SPAW – Appendix III: Exploitation is authorised but regulated to ensure and maintain population

§Species listed in the CMS Sharks MOU.

‖Unpublished – not documented for Tobago in FAO Keys for The Living Marine Resources of the Western Central Atlantic, but presence is documented by the ERIC.

From this list, the oceanic whitetip shark (*Carcharhinus longimanus*), smalltail shark (*Carcharhinus porosus*) and all hammerheads (*Sphyrna* spp.) with the exception of bonnethead shark (*Sphyrna tiburo*) are globally critically endangered. There are no batoids of similar status, however, the giant manta ray (*Mobula birostris*), all devilrays (*Mobula* spp.) and Chola guitarfish (*Pseudobatos percellens*) are endangered while there are six endangered shark species. Below, Table 3 summarises those elasmobranch

species that are of conservation concern by the International Union for Conservation of Nature (IUCN). Interestingly, while the nurse shark (*Ginglymostoma cirratum*) is data deficient globally, the Western Atlantic subpopulation (under which NE Tobago's population falls), is classified as Near Threatened.

Table 3: Summary of North East Tobago's elasmobranch species of global conservation concern, by the IUCN

IUCN Conservation Status	Sharks	Rays	Skates
Critically Endangered	(6) Oceanic whitetip shark Smalltail shark Scalloped hammerhead Squat-headed hammerhead Great hammerhead Smalleye hammerhead	0	0
Endangered	(6) Dusky shark Shortfin mako Whale shark Bonnethead shark Shortspine spurdog Smalleye smoothhound	(4) Giant manta ray Atlantic devilray Chilean devilray Chola guitarfish	0
Vulnerable	(6) Bigeye thresher Thresher shark Silky shark Sandbar shark Night shark Brazilian sharpnose shark	(4) Bullnose eagle ray Southern eagle ray Variegated electric ray Cownose ray	0
Near Threatened	(10) Blacknose shark Bignose shark Bull shark Blacktip shark Caribbean reef shark Tiger shark Lemon shark Blue shark Bigeyed sixgill shark Dusky smooth-hound	(4) Southern stingray Longnose stingray Bluntnose stingray Spotted eagle ray	0

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on the Conservation of Migratory Species of Wild Animals (CMS) are also critical conservation conventions.

Trinidad and Tobago is an accessioned party to the CITES since 1984. No elasmobranch species found in NE Tobago is classified as CITES Appendix I (species that are most endangered); however, eight shark species and three ray species are listed in CITES Appendix II (see Table 4). This category contains threatened species that without control of their trade, are at risk of extinction. For NE Tobago, this

includes thresher sharks (*Alopias* spp.), silky shark (*Carcharhinus falciformis*), oceanic whitetip shark, shortfin mako (*Isurus oxyrinchus*), whale shark (*Rhincodon typus*), scalloped hammerhead (*Sphyrna lewini*), great hammerhead (*Sphyrna mokarran*), and mantas and devilrays (*Mobula* spp.), as seen in Table 1.

Trinidad and Tobago became a state party to the CMS in 2018, agreeing to take necessary action towards the conservation of migratory species and their habitat. Appendix I of the CMS lists species that are highly endangered throughout their range and require Range States to strictly protect them. For NE Tobago, these include oceanic whitetip shark, whale shark, and mantas and devilrays (Table 2).

Appendix II species are those that require international agreements for their conservation and management. From NE Tobago, listed are: thresher sharks, silky shark, dusky shark (*Carcharhinus obscurus*), blue shark (*Prionace glauca*), shortfin mako, scalloped hammerhead and great hammerhead. Whale shark, and mantas and devilrays are also listed in Appendix II (see Table 2).

Table 4: Number of CITES and CMS and SPAW-listed elasmobranchs for North East Tobago

Elasmobranch Groups	CITES Appendix II	CMS*		SPAW
		Appendix I	*Appendix II*	*Annex III*
Sharks	8	2	9	5
Rays	3	3	3	1
Skates	0	0	0	0

*Total number of CMS shark species is 10; total number of CMS ray species is 3.

An important consideration is that the Memorandum of Understanding on the Conservation of Migratory Sharks (CMS Sharks MOU), of which Trinidad and Tobago is a Range State, not a signatory as yet, registers 29 species, of which 16 are rays. Seven shark species and three ray species from this list (see Table 4) are recorded for NE Tobago. Potentially new occurrence data (as in the case for lesser electric ray) in the future, means that closer attention is required for CMS Sharks MOU listed species.

As of the Tenth Meeting of the Contracting Parties to the Protocol concerning Specially Protected Areas and Wildlife (SPAW) in 2019, of which Trinidad and Tobago is a member, ten elasmobranch species have been listed, of which six are recorded in NE Tobago (Table 4). These six species are listed in Annex III of the protocol – species whose exploitation is authorised but must be regulated to ensure and maintain optimal and viable populations. Included in this list are the critically endangered oceanic whitetip shark, scalloped hammerhead and great hammerhead (Table 2).

The International Commission for the Conservation of Atlantic Tunas (ICCAT) is an intergovernmental, regional management organisation "responsible for the management and conservation of tuna and tuna-like species in the Atlantic Ocean and adjacent seas". Trinidad. Sharks are classified by ICCAT as "bycatch species of special importance" as they are often caught as by-catch in the tuna and swordfish fisheries in the high seas. This commission focuses primarily on the following species: blue shark, shortfin mako, oceanic whitetip sharks, hammerhead sharks (with the exception of bonnethead sharks), thresher sharks and silky sharks (porbeagles are not documented for NE Tobago).

Trinidad and Tobago is a member of the Western Central Atlantic Fishery Commission (WECAFC), a regional management organisation of the FAO. The commission established a Working Group (WG) for

the conservation and management of sharks in WECAFC member countries. All shark species are considered by this commission.

A number of elasmobranchs have a documented distribution range limited to the waters between Trinidad and Tobago. This includes (but not limited to) the critically endangered daggernose shark (*Isogomphodon oxyrhynchus*) and the near threatened wingfin stingray (*Fontitrygon geijskesi*). It is not farfetched to assume that these and other elasmobranchs may occasionally migrate north towards NE Tobago due to the proximity of the two islands, once preferred conditions and habitat facilitates this. Some elasmobranchs such as Cuban dogfish (*Squalus cubensis*) are not recorded as a coastal nearshore species according to the FAO, yet NE Tobago fishermen have affirmed landing individuals caught within the 11km around Tobago (pers. comm.).

Some of the common reef species in NE Tobago. From top left, clockwise: southern stingray, requiem shark, lesser electric ray, and nurse shark

5.2. Biology and Ecology of Elasmobranchs

5.2.1. Common Biological Traits

The subclass of Elasmobranchii, comprising of sharks and batoids (rays, skates and sawfish), belongs to the Class Chondrichthyes or cartilaginous fishes. The members of this subclass are important predators, prey and scavengers within marine ecosystems.

Some of the common features of elasmobranchs, apart from their cartilaginous skeleton, include the lack of swim bladders, the presence of gill clefts capable of opening individually on their sides, rigid dorsal fins and small placoid scales.

Elasmobranchs are generally long-lived, late-maturing and slow-growing animals, with ages varying with species. Most species can live between 20-30 years while some such as whale sharks can live up to 100 years. The age at sexual maturity of elasmobranchs is species-dependent. *R. terraenovae* males may reach sexual maturity at 2.4 to 3.5 years, while females may reach maturity between 2.8 and 3.9 years. Larger shark species such as bull sharks (*Carcharhinus leucas*) can reach maturity at 7 to 8 years for males, while dusky sharks may only reach sexual maturity between 19 to 21 years. There is also evidence that sharks within specific age groups in a region may synchronise maturation, resulting in segregation of sharks by reproductive state and size.

Upon reaching sexual maturity, females breed once every or every other year and can have gestation periods of over one year, depending on the species. Elasmobranchs reproduce in one of two ways: oviparity whereby egg cases are laid and left alone, or viviparity in which the shark gives birth to live young.

These life history characteristics and similarities to the population dynamics of whales and sea turtles make sharks and rays especially vulnerable to exploitation as they determine how quickly their population size may recover. For much larger, deep-water and ray species in particular, population growth is extremely slow. Careful and robust approaches to management may be required as the traditional tools used for assessing fish stock and sustainable yield may not be sufficient.

5.2.2. Ecological Role

Sharks likely have an important role as top predators and scavengers in NE Tobago's marine environment. They could help maintain populations at lower trophic levels by removing weak or sick individuals. This could reduce the spread of disease and maintain genetic fitness of fish populations. Regulating the food chain prevents dominance by any single species of mesopredators or herbivores, which encourages diversity.

Additionally, most sharks are opportunistic feeders, meaning they often prey upon wounded, sick or weak individuals, which potentially contributes to maintaining the health of fish populations.

Sharks can act as nutrient vectors. Smaller sharks associated to reefs transfer nutrients across nearby reefs through scraps and defecation. Larger transient sharks can transport nutrients from pelagic to reef-

associated habitats and vice versa. This nutrient cycling is significant in an otherwise nutrient-deficient environment as coral reefs.

Patrolling sharks can alter their prey's spatial range, preventing depletion of habitats and resources for example, overgrazing by herbivorous fishes. This may contribute to averting ecosystem collapses. Deterrence of overgrazing by herbivores means that primary producers such as algae and seagrasses will have the chance to sequester carbon, which is an important role in climate change mediation. Sharks may even play an important role in the control of the invasive red lionfish (*Pterois volitans*), which has already negatively impacted reef biodiversity in many Caribbean islands and threatens to do the same in NE Tobago. In the lionfish's native range, sharks are one of their key predators.

The ecological role of batoids in marine ecosystems is unfortunately less known. While evidence is still scarce, rays are believed to be important bioturbators, displacing high volumes of sediment and affecting the structure of infaunal communities. Isotopic analyses and electronic tagging of the giant manta ray (*Mobula birostris*) dispelled previous reports of the mobulid having a predominant surface zooplankton diet. They instead seem to be a mesopelagic forager.

5.2.3. Threats to NE Tobago Elasmobranchs

Due to some of their life history traits, elasmobranch populations are especially vulnerable to threats. These characteristics include slow-growth and maturation, long gestation periods, low fecundity and intervals of a few years between breeding seasons. Without mediation and management of external threats, the populations of elasmobranchs in NE Tobago, particularly sharks can potentially become functionally extinct, i.e., unable to fulfil their ecological role due to their rarity. The most common threats include:

Overfishing

Sharks are rarely targeted in NE Tobago and mostly caught as by-catch by local, artisanal fisherfolk.

While the local 'bake and shark' has been marketed as a tourist bucket-list activity primarily in Trinidad, this dish is not as widespread in Tobago. However, there is a gradual increase in its inclusion in Tobago's menus and one food outlet in the NETMABR (Castara) specialises in bake and shark (mainly using smaller species such as sharpnose).

However, the global commercial demand for shark meat, fins and liver oil, coupled with weakly regulated management has resulted in overexploitation of this fishery within the EEZ of Trinidad and Tobago, which includes the open ocean that borders the marine area of the NETMABR. To expedite fishing efforts, open ocean long-liners deploy hundreds of hooks targeting tunas, billfishes and sharks. Pelagic species found off NE Tobago such as blue sharks and oceanic whitetips are particularly threatened by this practice. Local populations of black tip sharks and hammerheads have also been severely impacted by this method, employed by small long-line vessels from Trinidad and Venezuela.

Shark fins are not in demand locally, and while a very small number of artisanal fishers and fishmongers in the south west of the island will collect, dry and sell discarded fins from processed sharks to Chinese restaurants on the island, or send to Trinidad for export, this is not routinely practised in North East

Tobago. Particularly favoured are the dorsal and caudal fins of hammerheads due to their length, although the fins from any landed large shark will be saved (ERIC pers. obs.).

Also contributing to the issue of overfishing is illegal, unreported and unregulated (IUU) fishing, where pirates and vessels illegally enter Trinidad and Tobago's waters to fish, competing with local fishers. NE Tobago also faces competition from fishers from Trinidad or South West Tobago targeting all species including sharks.

Bycatch

Non-target species are accidentally caught using different fishing gear types including gillnets (filet nets), banking and trolling (longlines are not used by local, artisanal fisherfolk in NE Tobago). Longlines and gillnets are mostly used by commercial fishers targeting pelagics outside of the NETMABR.

Some artisanal fishers may set gillnets inshore on a smaller scale. It could be several hours before any caught elasmobranch is disentangled but by then, it is most likely dead. The carcass may either be discarded or landed for sale, depending on perceived time of death. These carcasses, as well as those from other larger animals, further attract sharks that scavenge on them.

Sharpnose shark entangled as by-catch in an inshore gillnet (ERIC)

Banking and trolling used by artisanal fishers to target demersal and pelagic fishes respectively, provides the fisher with the opportunity to release any captured elasmobranchs, alive. However, some fishers may choose to land and sell the elasmobranch. Juvenile and sub-adult sharks are especially vulnerable as they tend to stay within the coastal region, where NE Tobago fishers operate.

Other threats

River run-off rich in sediments and nutrients threatens important elasmobranch habitats such as coral reefs, shallow bays with sea grasses (e.g. Kings Bay) and mangroves, and impact particularly on juveniles and reef-associated species such as nurse shark (*Ginglymostoma cirratum*) and Caribbean reef shark (*Carcharhinus perezi*). Juvenile sharks that use mangroves as shelter from larger predators, such as juvenile bull sharks (*Carcharhinus leucas*) or lemon sharks (*Negaprion brevirostris*) are also vulnerable to nutrient pollution. Rising sea temperatures due to climate change coupled with poor water quality caused by nutrient run-off is the main cause for seagrass loss and the bleaching of coral reef ecosystems.

Coastal development can also lead to the degradation of important shark habitat, as well as the mobilisation of legacy pollutants buried in coastal sediments such as mercury, cadmium or lead.

International research shows elevated levels of both inorganic and organic micropollutants in sharks' muscle and liver including heavy metals and dangerous persistent organic pollutants (POPs) to which humans can be exposed when eating contaminated shark seafood.

All plastic pollution ranging in size from micro- to visible plastics threatens elasmobranchs directly from ingestion, and indirectly as it impacts their habitat and prey. Plastic waste is mainly discarded into rivers

flowing through villages in NE Tobago and can find its way into elasmobranchs either from direct ingestion or through their prey who may have already consumed plastic particles. Larger plastic waste such as ropes and fishing line can cause entanglement and serious injury.

Ghost-fishing nets and fish-pots (for smaller species) are a common threat to various marine species; however not common in NE Tobago.

5.3. Current Research on Elasmobranchs in the NETMABR

There are limited NE Tobago-specific published studies assessing the status of elasmobranchs and their fisheries. Elasmobranch research frequently combines Tobago-centric data with those collected in Trinidad to report on findings nationally.

The Environmental Research Institute Charlotteville whose research mandate is NE Tobago-specific, has produced or contributed to various elasmobranch research and monitoring programmes as summarised below.

5.3.1. Status of reef shark and ray assessments

ERIC team preparing a BRUVS for deployment for reef elasmobranch monitoring.

The ERIC contributed to the Global FinPrint's collaborative global assessment of reef sharks and rays by deploying 188 baited remote underwater video stations (BRUVS) between 2016 and 2018 primarily in NE Tobago. This work culminated in the high-impact international publication (to which the ERIC are contributing authors) in the journal, Nature, of *"Global status and conservation potential of reef sharks"*. The study showed that sharks were likely functionally extinct (abundance is too low for fulfilment of their ecological role) in 19% of the reefs sampled and a higher percentage of reefs worldwide. It also identified that shark populations thrive in those countries where effective fisheries management and shark sanctuaries (i.e., all shark fishing is prohibited countrywide) are implemented.

NE Tobago was ranked among those areas where the probability of observing sharks is relatively low. Despite this, shark species diversity was above average for the Western Atlantic region. The research identified Tobago as a potential *brightspot,* where despite the heavy fishing pressure on local populations, there is conservation potential once timely and effective management is enacted.

Another manuscript specifically assessing the NE Tobago data from the 2016-2018 BRUVS deployment is presently under review, while shark and ray monitoring using BRUVS continues.

5.3.2. Citizen-science based observations

The ERIC engaged with dive operators island-wide to submit reports of elasmobranch sightings during their recreational dives since 2015. An analysis of the first year's data was published in the local journal, Living World – *"Citizen-based observations on shark and mobulid species in Tobago, West Indies*". A higher diversity of elasmobranch species was reported for NE Tobago by the dive operators, particularly in Speyside than for any other regions of Tobago. While a markedly higher frequency of reports was made for South West Tobago, this was primarily attributed to nurse sharks. Dive operators continue to submit their sightings, demonstrating the untapped potential of citizen-science to contribute to monitoring efforts that otherwise would not have been economically or logistically feasible.

Shark conservation outreach with fishers, who are important sources of information.

5.3.3. Heavy metal (mercury) contamination

Mercury concentrations in surface ocean waters have almost tripled in the last century. Sharks, due to their size, slow growth and position higher up in the food chain, tend to accumulate high concentrations of mercury. It has been reported that 95% of the total mercury found in sharks is in the toxic form of methyl-mercury. This pollutant is a potent neurotoxicant that poses a threat to both sharks and humans that consume shark products such as meat or shark fin soup.

High levels of mercury in fish are known to greatly affect swimming performance, their ability to eat and overall behaviour. In humans, mercury toxicity usually manifests by affecting the central nervous system and its symptoms can range from a tingling sensation in hands and feet to a complete loss of speech or motor functions. Methyl-mercury is very efficient at crossing the placental barrier and therefore, pregnant women and their babies are the most vulnerable population group to mercury toxicity.

Until 2019, only one study existed on mercury concentrations in shark species in Trinidad and Tobago (Mohammed and Mohammed, 2017). The study focused on scalloped hammerhead (*Sphyrna lewini*) and smalltail sharks (*Carcharhinus porosus*) in the island of Trinidad. Results indicated that mercury levels found in the muscle of these two species were too high for human consumption.

ERIC, in collaboration with Florida International University, decided to carry out a more comprehensive study on mercury concentration of sharks found particularly on NE Tobago. While the results are not published in a peer review journal yet, a scientific article is being currently prepared for submission by Florida International University researchers.

These are, to the best of our knowledge, the first reports for mercury levels on NE Tobago shark species. Thirty-five sharks of at least seven different species were tested for total mercury: *Carcharhinus falciformis, Carcharhinus porosus, Mustelus canis, Mustelus higmani, Rhizoprionodon lalandii, Rhizoprionodon terraenovae, Sphyrna lewinii and Sphyrna mokarran*.

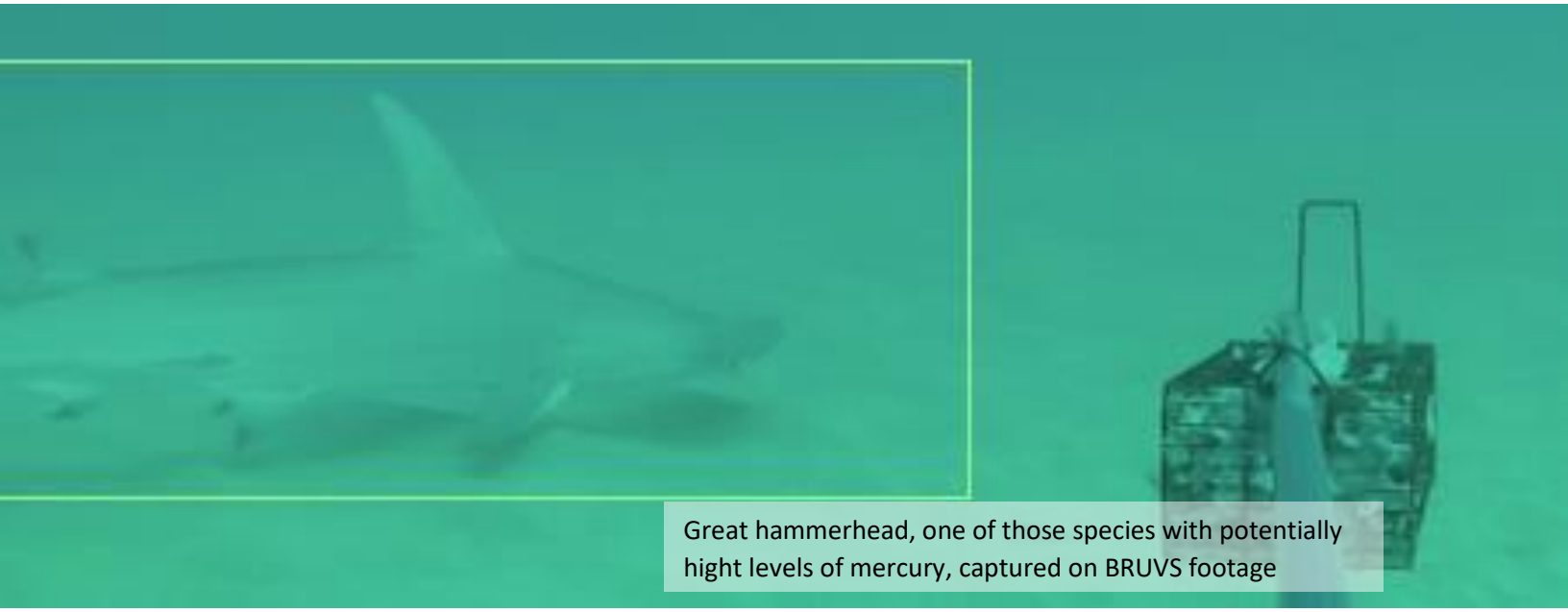
Roughly 70% of the samples in this study presented total mercury concentrations above 0.46 mg/kg of total mercury, the EPA maximum for human consumption (see Figure 2). While individuals of the majority of species were above 0.46 mg/kg and considered a food choice to avoid, it is worth mentioning that hammerheads (*Sphyrna* sp.) and smoothhound sharks (*Mustelus* sp.) had mercury levels significantly above safe consumption limits and should not be consumed even in small quantities.

This study included muscle samples of many juvenile and subadults sharks, which makes it even more striking as the concentration levels exceeded safe consumption levels at both life stages (Figure 3). Less than 10% of all sharks sampled were above the size of sexual maturity and below the acceptable total mercury concentrations. A caveat to note in this study however, is that the sample size per species is still quite small to make a conclusive statement about total mercury levels per species. Despite this, the results highlight the need for increased testing and continued monitoring.

These findings introduce a public health issue towards shark management that should be carefully considered.

While the sample size is quite small, the data clearly demonstrates an inherent risk associated with shark meat consumption.

It is strongly recommended that Public Health managers consider issuing recommendations for consumers that ensure public health safety.



Great hammerhead, one of those species with potentially hight levels of mercury, captured on BRUVS footage

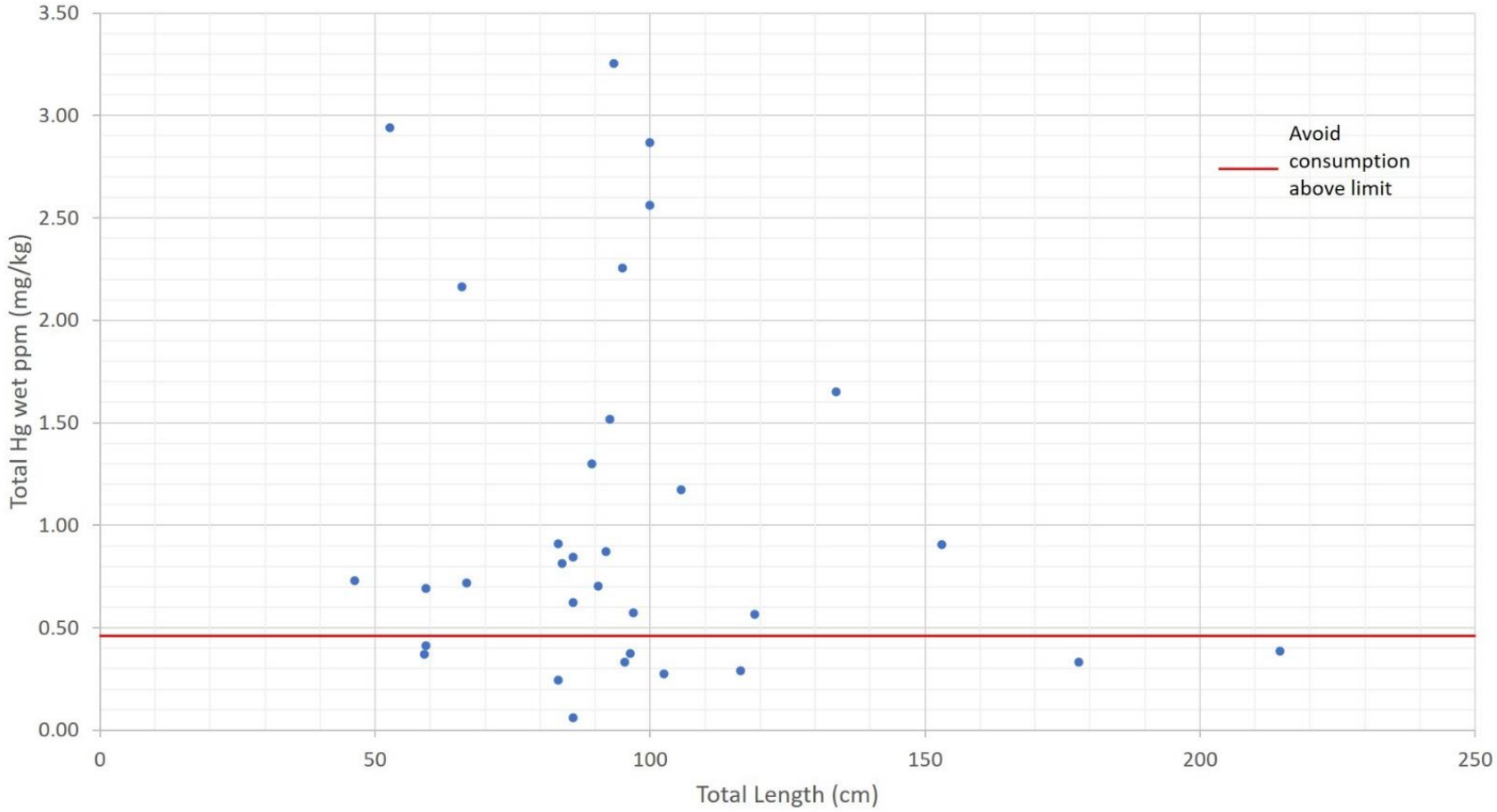


Figure 2. Concentration of total mercury found in shark muscle tissue sampled in Tobago, 2020 (unpublished)

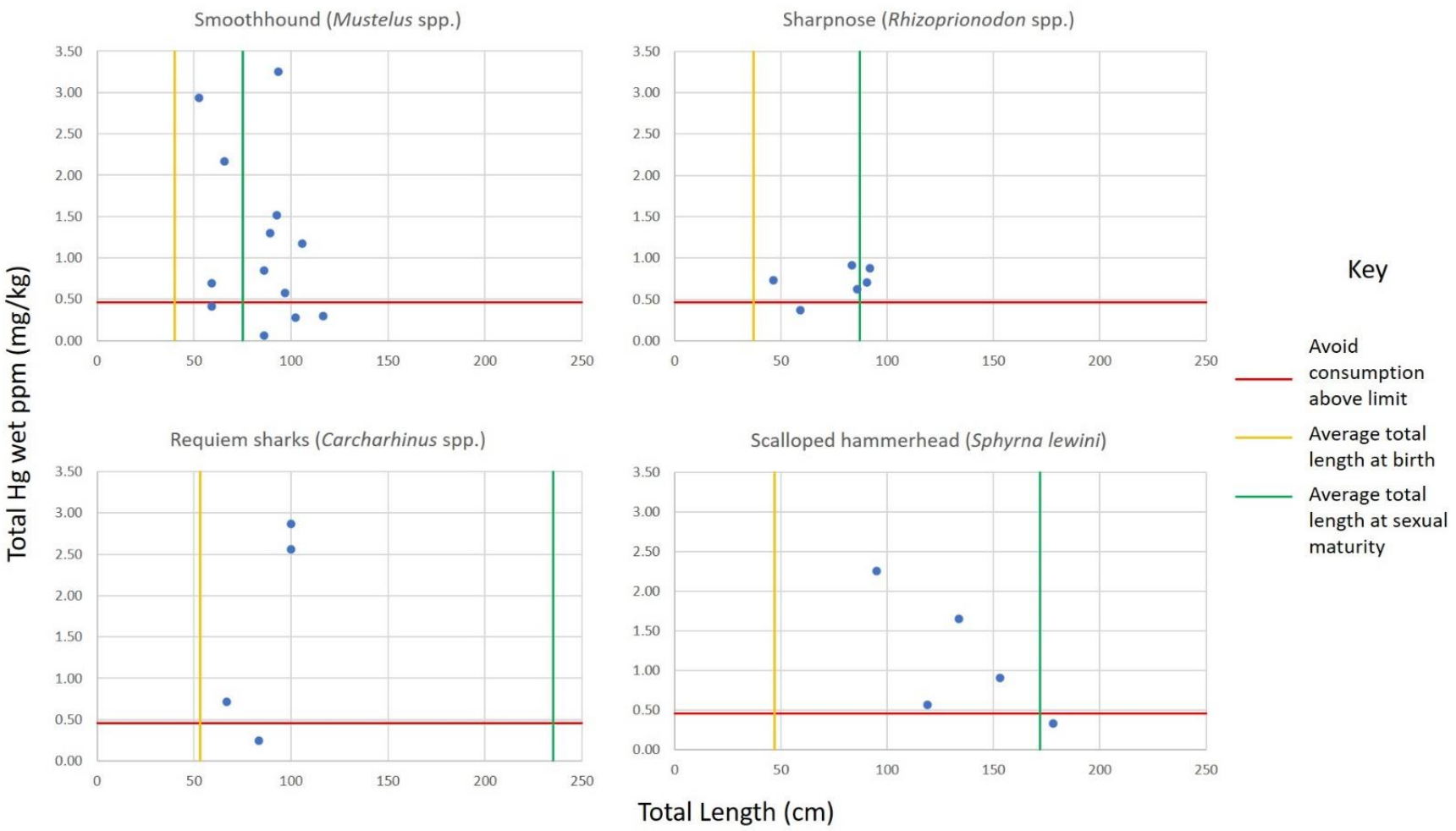


Figure 3: Comparison of total mercury concentration for different genera sampled in 2020 (unpublished).

It should be noted that the average total lengths at birth and at sexual maturity varies with species. For graphical representation, these lines represent the averages for the sampled species within their genera

5.4. Description of Shark Fisheries in NE Tobago

5.4.1. General Description

There is very limited, targeted shark fishing and a significant data deficiency regarding the number, weight, sex and species of sharks caught in the NETMABR.

Catches at landing sites in the NETMABR are dominated by small sharks such as sharpnose (*Rhizoprionodon* spp.), smalleye smoothhound (*Mustelus higmani*), and immature sharks in particular the scalloped hammerhead. The loss of juvenile and subadult individuals on any animal population is a significant cause for concern, as these individuals have not had the opportunity to contribute any offspring for future generations.

Shark bycatch of the pelagic offshore fishery (most of which is outside of the NETMABR) often include bigeye thresher *(Alopias superciliosus*), thresher shark *(Alopias vulpinus*), scalloped hammerhead, great hammerhead shark, tiger shark *(Galeocerdo cuvier),* and shortfin mako. These have all been categorised as overfished by ICCAT/FAO.

Unpublished data collected in 2020 by the ERIC for all landing sites of Tobago indicated the following species to be the most frequently landed and their IUCN conservation status:

1. Dusky smoothhound (*Mustelus canis*) – Near Threatened;
2. Scalloped hammerhead (*Sphyrna lewini*) – Critically Endangered;
3. Caribbean sharpnose shark (*Rhizoprionodon porosus*) – Least Concern;
4. Smalltail shark (*Carcharhinus porosus*) – Critically Endangered;
5. Brazilian sharpnose shark (*Rhizoprionodon lalandii*) – Vulnerable;
6. Silky shark (*Carcharhinus falciformis*) – Vulnerable.

In NE Tobago sharks are landed at all major fishing ports (especially in Charlotteville and Parlatuvier), but show some seasonal variation in quantity and species (pers. obs.). Rays and skates in contrast are not typically extracted in NE Tobago and are very rarely landed. Fishers who observe certain religions, for example the Seventh-Day Adventist avoid handling or consuming shark meat as its flesh is deemed to be ‘unclean’.

It is important to note that trawling does not occur in the NETMABR and gillnets are only occasionally used in coastal waters targeting mackerel schools.

5.4.2. Fishing Area

The artisanal fisherfolk in NE Tobago may spend between a few hours to an entire day out at sea venturing up to 50km from their home port per day depending on ice, fuel availability, preferred fishing spots and target species. However, most of the fishing is conducted within less than 10km from shore. For the context of this document, the elasmobranch fishing area is defined as the marine area of the NETMABR (11km from the shoreline).

Conversations with fishermen in North East Tobago revealed that the north-east sea bed drop off or bank is a major hotspot for large hammerheads.

Hammerhead (background) and sharpnose (foreground) sharks at fish depot, landed by a single fisher.

5.4.3. Fishing Gear and Fleet

There are no boats with home ports in NE Tobago that specifically target sharks or use specific shark fishing gear (e.g. large size of hooks, steel leaders) (possibly with the exception of one fisherman from Belle Garden and one from Castara who occasionally target smaller shark species for local consumption). There have been occurrences of Trinidad or foreign-based vessels that targeted sharks using long-lines in the NETMABR area in the past, specifically hammerhead sharks.

In general, artisanal fisherfolk from NE Tobago use pirogues manned by one to three persons per trip. This vessel is a wooden, fibreglass or fibreglass-coated open boat, 7-9 m in length and propelled by outboard engines usually between 45-75 HP. There are approximately 350 boats with home ports in NE Tobago and 700 boats for the entire island.

The gear used by fishers are dependent on their preferred fishing method. Line methods include: “a-la-vive” (fishing with live bait using hooks and nylon twine line while vessel is stationery), “switchering” / banking (handline with baited hooks deployed while vessel is stationary), and trolling/towing (4-6 lines are towed from bamboo outriggers off vessel). Gillnets are used in bays and secured with one end on shore; there are less than five fisherfolk using this gear. This is the most destructive fishing practice for sharks in Tobago and likely responsible for much of the catch of hammerheads. Nets kill most captured sharks in under 30 minutes, making it impossible to impose species or size regulations on the catch.

The fishing range of larger vessels from Trinidad may extend towards the Atlantic coastline of Tobago. Non-artisanal longliners, non-artisanal multi-gear fleet and recreational vessels are involved in this fishery. These vessels are between 14-23 m in length with diesel engines of about 180-350 HP and are equipped with echo sounders, fish finders, GPS, communication equipment and hydraulic equipment for setting and retrieving gear. The usual crew size is approximately six persons. The principal species targeted by the oceanic pelagic fishery are yellowfin tuna (*Thunnus albacares*), bigeye tuna (*T. obesus*), albacore (*T. alalunga*), blackfin tuna (*T. atlanticus*), swordfish (*Xiphias gladius*), and dolphinfish/mahi mahi

(*Coryphaena hippurus*) with sharks and carite (*Scomberomorus regalis*) being considered as the bycatch. The pelagic longline gear used by this fleet comprises of 300 to 1,000 hooks attached to a main line, 24km to 88km long and set at about 30 to 50m below the surface of the water. There is a high probability this fishery is interacting with CITES listed silky, oceanic whitetip and scalloped hammerhead sharks.

5.4.4. Season

Currently, there are no data regarding the seasonality of shark landings in NE Tobago. Long-term studies are needed to obtain this kind of data, critical to ensure the sustainability of the fishery. Citizen-science based information from the fisherfolk will prove really useful to obtain information.

5.4.5. Market

In NE Tobago fish markets, sharks are regarded as one of the cheapest fish groups, fetching a retailed price of 75% of other fish being retailed, varying between TT$15 to $20 per pound. Most landed sharks in NE Tobago are sold fresh and dressed (gutted, finned, skinned), with major landing sites in Charlotteville and Parlatuvier. Shark finning is not practiced, although fins from landed and processed large sharks may be sold. There is currently no value-added product or processing for landed sharks. Culturally there are still some reservations regarding shark consumption as it is viewed as an 'unclean' species by some religious groups. The advent of a small number of Chinese migratory workers has slightly opened the market.

5.4.6. National Context

The following descriptions summarises the shark fishery on a national-scale, i.e., it encompasses all of Trinidad and Tobago. Much of the descriptions of fishing methods, gear and landings are mostly similar throughout the country and therefore repeated as needed.

Over 30 species of shark are landed by small-scale artisanal and gillnet fisheries in Trinidad and Tobago. A rapid assessment of the shark fishery by the Fisheries Division, indicated 45 species of sharks and 18 species of rays are documented for the country's elasmobranch fishery. Of these, 31 shark species were general occurrences, 15 of which were consistent contributors to the fishery. Trinidad and Tobago capture about 488 tonnes of shark each year, most of which is consumed locally. While these findings do not offer a distinction between the islands of Trinidad and Tobago for comparison, it can be assumed that a very small percentage of this data was obtained from Tobago, as there is no known targeted shark fishery on the island.

Sharks were previously seen as a by-catch fishery but within the last two decades particularly for Trinidad, the 'bake and shark' food sector is now a niche signature market. This trend is now being followed in Tobago as food stalls specialising in 'bake and shark' meals are slowly increasing in numbers, appealing to tourists from Trinidad.

Sharks rank fourth in Trinidad and Tobago's artisanal fisheries estimated landings, primarily as by-catch from gill-nets, and hook and line fisheries. International long liners use Trinidad and Tobago's ports as transhipment points, resulting in the country having been listed among the top 15 suppliers of dried and frozen fins, according to the Hong Kong 2011 Census Trade Statistic.

The Ministry of Agriculture, Land and Fisheries (MALF) reported a reduction in the number of shark species commonly observed in the landings. Some fishers especially on the east coast of Trinidad noticed a reduction in the abundance of hammerheads, tiger shark, blacktip shark (*Carcharhinus limbatus*) and the smalltail shark. In particular, fishers noted that the sawsfish (IUCN threatened species) and the daggernose shark (IUCN critically endangered) are not seen anymore which could mean that these species may now be absent from Trinidad and Tobago's species assemblages. Increasing fishing pressures in Trinidad could impact Tobago's population. Catches at most landing sites are dominated by small sharks such as sharpnose sharks, the smalleye smoothhound, and small (immature) hammerhead sharks, in particular the scalloped hammerhead. Shark by-catch of the pelagic offshore fishery often includes the bigeye thresher shark, thresher shark, scalloped hammerhead, great hammerhead shark, tiger shark, and shortfin mako. These have all been categorised as overfished by ICCAT/FAO.

National Production

The overall trend for artisanal landings according to national fisheries statistics indicates a decline in shark landings since 2004. In 2004, over 1,300 tonnes of shark were landed by artisanal fleet and semi-industrial and industrial trawl fleets. By 2012, landings had decreased to an estimated 508 tonnes from both islands altogether. Local stock assessments are grossly outdated while more recent evaluations for the Atlantic region by the International Commission for the Conservation of Atlantic Tuna (ICCAT) report that pelagic sharks such as makos, hammerheads and requiem sharks are fully to over-exploited.

While data are collected at designated fisheries landing sites from registered fishers, there are a number of access points where sharks are landed by recreational, subsistence and smaller artisanal fishers. These additional landings may account for a very small percentage of caught sharks. However, they represent a neglected and underestimated knowledge gap whose impact on already declining shark populations need further consideration and management.

National Fishing Area

The artisanal fishermen may spend between a few hours to an entire day out at sea venturing between 15km to 50km from their home port per day depending on ice, fuel availability, preferred fishing spots and target species. In contrast, longline vessels can go for up to two weeks out at sea depending on number of crew, fuel, food rations and ice storage onboard. These venture predominantly to the Exclusive Economic Zone boundary of Trinidad and Tobago. For both types of fishing, vessels traverse the waters of both islands with overlapping of fishing areas/grounds for all fleets. With the exception of the trawl fleet, there are no restrictions to the operations of other fleets. The southern coastline of Trinidad is the most productive shark harvesting region.

National Fishing Gear and Fleet

The Fisheries Division (2017) reported 2762 registered fishing vessels for Trinidad and Tobago of which 657 are registered in Tobago (see Table 5). About 18 vessels directly target sharks while most of the other

vessels land sharks as by-catch. Pirogues make up 90% of vessels and each vessel is manned by one to three persons per trip. This is a wooden, fibreglass or fibreglass-coated open boat 7-9 m in length, propelled by outboard engines usually between 45-75 HP. These use gillnets, hook and line and palangue as their main fishing gear. Artisanal gillnets are either multifilament or monofilament nets. The multifilament net is made of cotton, although nylon and other synthetic twines are more common now and is heavier than the monofilament net, which is made of transparent nylon. Line methods include "a-la-vive" (fishing with live bait using hooks and nylon twine line), "switchering" (handline with baited hooks deployed while vessel is stationary), trolling/towing (4-6 lines are towed from bamboo outriggers off vessel) and target kingfish, with other species including shark being caught as by-catch.

Fisheries Division (2017) reported 31 longliners or pelagic longliners being registered. Non-artisanal longliners, non-artisanal multi-gear fleet and recreational vessels are involved in this fishery. These vessels are from 14-23 m in length with diesel engines of about 180-350 HP and are equipped with echo sounders, fish finders, GPS, communication equipment and hydraulic equipment for setting and retrieving gear. The usual crew size is approximately six persons. The principal species targeted by the oceanic pelagic fishery are tunas: yellowfin tuna (*Thunnus albacares*), bigeye tuna (*T. obesus*), albacore (*T. alalunga*), blackfin tuna (*T. atlanticus*), swordfish (*Xiphias gladius*), dolphin fish (*Coryphaena hippurus*) with sharks and carite being considered as the bycatch. The pelagic longline gear used by this fleet comprises 300 to 1 000 hooks attached to a main line 24 km to 88 km long and set at about 30 to 50m below the surface of the water. The fishing areas are off the north and east coasts of Trinidad and range towards the Atlantic coastline of Tobago. Those larger vessels also venture into the Exclusive Economic Zone.

For 2020, approximately 2,700 vessels are registered with 2,100 in Trinidad and 700 boats in Tobago. There are an estimated 5,700 fishers registered with the Fisheries Division as well. Table 5 provides details of this. Artisanal vessels comprises of the pirogues and non-artisanal include the larger longliners. It should be noted that fishers fish the coastal waters for both islands regardless of where the fish would be landed.

Table 5: Registered fishing effort for Trinidad and Tobago

	Artisanal		Non-Artisanal		Total	
	Vessels	Fishers	Vessels	Fishers	Vessels	Fishers
Trinidad	2018	4036	87	348	2105	4384
Tobago	648	1296	9	27	657	1323
TT Total	2666	5332	96	375	2762	5707

Requiem shark (left) and smoothhounds (right) landed at different sites.

6. Legal and Regulatory Framework

The most significant sections are highlighted for ease of reference

6.1. National Legislations and Frameworks

There is no legal or regulatory framework that refers specifically to the UNESCO North East Tobago Man and the Biosphere Reserve to which this SSRMP applies to.
The legal and regulatory framework regarding the management of elasmobranchs is based on current laws and regulations.
The following key legislation has impact on or could be used for the management of sharks and rays in NE Tobago:

- **Fisheries Act Chap. 67:51, Act 39 of 1916 amended by 23 of 1975.**

  This act enables the Minister to make regulations to:

  > (a) prescribing the size of mesh, form, and dimensions of nets or appliances for fishing, and for the manner of using the same;
  >
  > (b) for restricting the size of fish, crabs, shrimps and turtles that may be taken, and prohibiting the sale or exposing for sale of such as are under such size as may be prescribed by the Regulations;
  >
  > (c)I declaring any area to be a prohibited area;
  >
  > (d) prohibiting the killing, harpooning, taking, removing, catching or any other means of taking possession of fish or any variety thereof either absolutely or at such times and within such areas as may be prescribed
  >
  > (e) prohibiting the sale, offering or exposing for sale or the purchase of fish or any variety thereof either absolutely or at such times and within such areas as may be prescribed.

  The Fisheries Act does not specifically refer to elasmobranchs, endangered species (other than marine turtles) or the preparation of area- or species-specific management plans.

  The Fisheries Act Chap. 67:51, Act 39 of 1916 amended by 23 of 1975, is supposed to be replaced by the planned Fisheries Management Bill 2020.

- **Proposed Fisheries Management Bill (2020), currently under final review.**
  At the time of drafting this SSRMP, the Fisheries Management Bill was still under review. Therefore, all comments and relevant sections regarding the draft bill are contained in Appendix 3.

In summary, while sharks and rays are not specifically mentioned, the draft bill provides all necessary tools, instructs and mandates the decision-making parties to sustainably manage shark and ray populations in Trinidad and Tobago.

- **Tobago House of Assembly Act Chap. 25:03, Act 40 of 1996 amended by 17 of 2006**; which puts matters regarding the Environment, Fisheries, State Lands (including a marine area of 11.11km around Tobago) and Marine Parks under the responsibility of the Assembly and notably provides THA with the capacity to declare policy and propose legislation regarding these matters.

- **The Environmental Management Act Chap. 35:05, Act 3 of 2000**; which enables the Environmental Management Authority to designate a species as an Environmentally Sensitive Species with high levels of protection if that throughout all or a part of its range is, or is likely to become, in danger of extinction and whose survival is unlikely (e.g., elasmobranchs listed by IUCN as endangered) if the factors jeopardising it continue to operate; and if that is required to be protected for the purpose of meeting the Government's international obligations under any of the International Conventions Trinidad and Tobago is party to including the Convention on Migratory Species and the SPAW Protocol.

  Under the same Act, the Environmental Management Authority may declare an area (e.g., parts of the UNESCO NE Tobago Man and the Biosphere Reserve) as Environmentally Sensitive Area if the area is (a) the actual or prospective habitat of any environmentally sensitive species; *(b)* required to be protected for the purpose of meeting the Government's international obligations under any of the International Conventions is party to, including the Convention on Migratory Species.

- **Marine Preservation and Enhancement Act Chap. 37:02, Act 1 of 1970 amended by 37 of 1996**; which enables the responsible Minister to designate any portion of the marine areas of Trinidad and Tobago as a restricted area where he considers that special steps are necessary for (a) preserving and enhancing the natural beauty of such areas; (b) the protection of the flora and fauna of such areas (e.g. elasmobranchs listed by IUCN as endangered); (d) the promotion of scientific study and research in respect of such areas.

  Note: The Conservation of Wildlife Act is only related to mammals, birds or reptiles and the eggs, carcase, meat, nest or young thereof.

- **National Plan of Action for the Conservation and Management of Sharks, Trinidad and Tobago** (NPOA, 2017)

  The National Plan of Action for the Conservation and Management of Sharks (NPOA, 2012) is geared towards keeping in line with the International Plan of Action for the Conservation and Management of Sharks (IPOA).

The **IPOA Sharks recommends** *that states adopt a NPOA Sharks if their vessels conduct directed fisheries for sharks or regularly catch sharks in non-directed fisheries*. It is to be noted however, that the CCRF, the IPOA Sharks and NPOA Sharks so derived

Shark catch data with respect to the commercial component in Trinidad and Tobago, show a declining trend and at the same time catches rank fourth in the total estimated landings of the artisanal fishery nationally. The results of a desk study, field observations, a survey conducted by the Fisheries Division between 2014 and 2015 and further interviews in 2017 provide ample evidence that Trinidad and Tobago should endeavour to take conservation and management action.

The following issues were identified on a national level in the draft NPOA (issues applicable to the NETMABR are highlighted):

i) multi-species nature of the fishery,

ii) apparent patchy distribution of species,

iii) landings generally bycatch of more lucrative fisheries,

iv) inability of field data collectors to reliably record landings by species,

v) different life history stages of the same species caught by different fisheries,

vi) different life history stages of the same species caught by the same fishery,

vii) females carrying pups found on same fishing ground as target species of some fisheries,

viii) lack of stock assessments for important coastal species,

ix) need for collaboration with neighbouring states (transboundary issues),

x) shark finning (banned in 2013),

xi) systematic recording of shark catches from all sources,

xii) framework for identification of threatened species,

xiii) inappropriate legal framework,

xiv) public education awareness,

xv) human resource capability for systematic monitoring of sharks,

xvi) post-harvest practices that contribute to waste of sharks caught,

xvii) ecosystem impacts as a consequence of shark fishing (directed fishery),

xviii) further research on shark fisheries biology, age and growth, diet composition and volume of diets contributed by prey species, and

xix) systematic collection of trade data on sharks.

The primary objectives of the NPOA are fully aligned with the objectives outlined in the SSRMP for NE Tobago at hand.

Noteworthy specific strategies and actions (which also informed this SSRMP) of the NPOA include:

1. developing Integrated Fishery Management Plans applying an ecosystems-based approach;
2. establishing shark sanctuaries especially in Tobago's existing and planned MPAs;
3. prohibit the capture and sale of shark and ray species that are IUCN red-listed as threatened, endangered or critically endangered;
4. strengthening stakeholder collaboration; and
5. improving research and monitoring.

- **A Cabinet Note banned the finning of sharks in Trinidad and Tobago in 2014** (Cabinet Minute No. 2009 of July 17, 2014). Unfortunately, the, current 1916 Fisheries Act does not allow for the development of the requisite regulations to implement the ban. However, the scope of the proposed, new Fisheries Management Bill will allow for implementing the ban.

6.2. International Conventions

- **Convention on the Conservation of Migratory Species of Wild Animals (CMS)**

On 01 December 2018, Trinidad and Tobago became a state party to the Convention on the Conservation of Migratory Species of Wild Animals (CMS), agreeing to take necessary action towards the conservation of migratory species and their habitat.

Appendix I of the CMS lists migratory species which are endangered.

Appendix II of the CMS lists migratory species which have an unfavourable conservation status and which require international agreements for their conservation and management, as well as those which have a conservation status which would significantly benefit from the international co-operation that could be achieved by an international agreement.

The following elasmobranchs, for which Trinidad and Tobago is a Range State, occur within the NETMABR are listed in the Appendices:

Table 6: CMS Appendix I (threatened with extinction) and Appendix II (endangered species that need or would benefit from international cooperation) migratory species occurring in the NETMABR

Species Name	Common Name	Appendix I	Appendix II
Alopias superciliosus	Bigeye thresher		●
Alopias vulpinus	Common thresher		●

Species Name	Common Name	Appendix I	Appendix II
Carcharhinus longimanus	Oceanic whitetip shark	●	
Carcharhinus falciformis	Silky shark		●
Carcharhinus obscurus	Dusky shark		●
Prionace glauca	Blue shark		●
Isurus oxyrinchus	Shortfin mako		●
Rhincodon typus	Whale shark	●	●
Sphyrna lewini	Scalloped hammerhead		●
Sphyrna mokarran	Great hammerhead		●
Mobula birostris	Giant manta ray	●	●
Mobula hypostoma	Atlantic devilray	●	●
Mobula tarapacana	Chilean devilray, Sicklefin devilray	●	●

The CMS states inter alia:

Regarding Appendix 1 species:

"*Parties that are Range States of a migratory species listed in Appendix I shall endeavour:*

a) to conserve and, where feasible and appropriate, restore those habitats of the species which are of importance in removing the species from danger of extinction;

b) to prevent, remove, compensate for or minimize, as appropriate, the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species; and

c) to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species, including strictly controlling the introduction of, or controlling or eliminating, already introduced exotic species.

Parties that are Range States of a migratory species listed in Appendix I shall prohibit the taking of animals belonging to such species. Exceptions may be made to this prohibition only if:

a) the taking is for scientific purposes;

b) the taking is for the purpose of enhancing the propagation or survival of the affected species;

c) the taking is to accommodate the needs of traditional subsistence users of such species; or

d) extraordinary circumstances so require;

provided that such exceptions are precise as to content and limited in space and time. Such taking should not operate to the disadvantage of the species."

Regarding Appendix 2 species:

"Parties that are Range States of migratory species listed in Appendix II shall endeavour to conclude AGREEMENTS where these would benefit the species and should give priority to those species in an unfavourable conservation status.

Parties are encouraged to take action with a view to concluding agreements for any population or any geographically separate part of the population of any species or lower taxon of wild animals, members of which periodically cross one or more national jurisdictional boundaries"

According to the Environmentally Sensitive Species Rules and the Environmentally Sensitive Areas Rules of the Environmental Management Act Chap. 35:05, Act 3 of 2000, the Environmental Management Authority may:

- designate a species as an Environmentally Sensitive Species with high levels of protection if that is required for the purpose of meeting the Government's international obligations under any of the International Conventions Trinidad and Tobago is party to.
- declare and area (e.g., parts of the UNESCO NE Tobago Man and the Biosphere Reserve) an Environmentally Sensitive Area if the area is (a) the actual or prospective habitat of any environmentally sensitive species; (b) required to be protected for the purpose of meeting the Government's international obligations under any of the International Conventions is party to.

While species listed under Appendix 1 and 2 of the CMS are currently not protected by any law or regulation of Trinidad and Tobago, it should be given serious consideration to protect these species and ideally their habitats through the Environmental Management Act and through the new Fisheries management Bill 2020 in accordance to the Government's commitment under the CMS.

Furthermore, Trinidad and Tobago is a Range State to the CMS Memorandum of Understanding on Migratory Sharks; however not a signatory yet.

- **Convention on International Trade in Endangered Species (CITES)**

Trinidad and Tobago is an accessioned party to the CITES since 1984. No elasmobranch species found in NE Tobago is classified as CITES Appendix I (species that are most endangered); however, seven shark species and three ray species are listed in CITES Appendix II. This category contains threatened species that without control of their trade, are at risk of extinction. The species recorded for NE Tobago are listed in Table 7 below.

Table 7: Shark and ray species listed in CITES Appendix II, occurring in the NETMABR

Species Name	Common Names
Alopias superciliosus	Bigeye thresher
Alopias vulpinus	Thresher shark, Common thresher

Species Name	Common Names
Carcharhinus falciformis	Silky shark
Carcharhinus longimanus	Oceanic whitetip shark
Isurus oxyrinchus	Shortfin mako
Rhincodon typus	Whale shark
Sphyrna lewini	Scalloped hammerhead
Sphyrna mokarran	Great hammerhead
Mobula birostris	Giant manta ray
Mobula hypostoma	Atlantic devilray
Mobula tarapacana	Chilean devilray, Sicklefin devilray

CITES Article IV relates to the Regulation of Trade in Specimens of Species Included in Appendix II

2. *The export of any specimen of a species included in Appendix II shall require the prior grant and presentation of an export permit. An export permit shall only be granted when the following conditions have been met:*

(a) a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species;

(b) a Management Authority of the State of export is satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora; and

(c) a Management Authority of the State of export is satisfied that any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment.

3. A Scientific Authority in each Party shall monitor both the export permits granted by that State for specimens of species included in Appendix II and the actual exports of such specimens. Whenever a Scientific Authority determines that the export of specimens of any such species should be limited in order to maintain that species throughout its range at a level consistent with its role in the ecosystems in which it occurs and well above the level at which that species might become eligible for inclusion in Appendix I, the Scientific Authority shall advise the appropriate Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of that species.

4. The import of any specimen of a species included in Appendix II shall require the prior presentation of either an export permit or a re-export certificate.

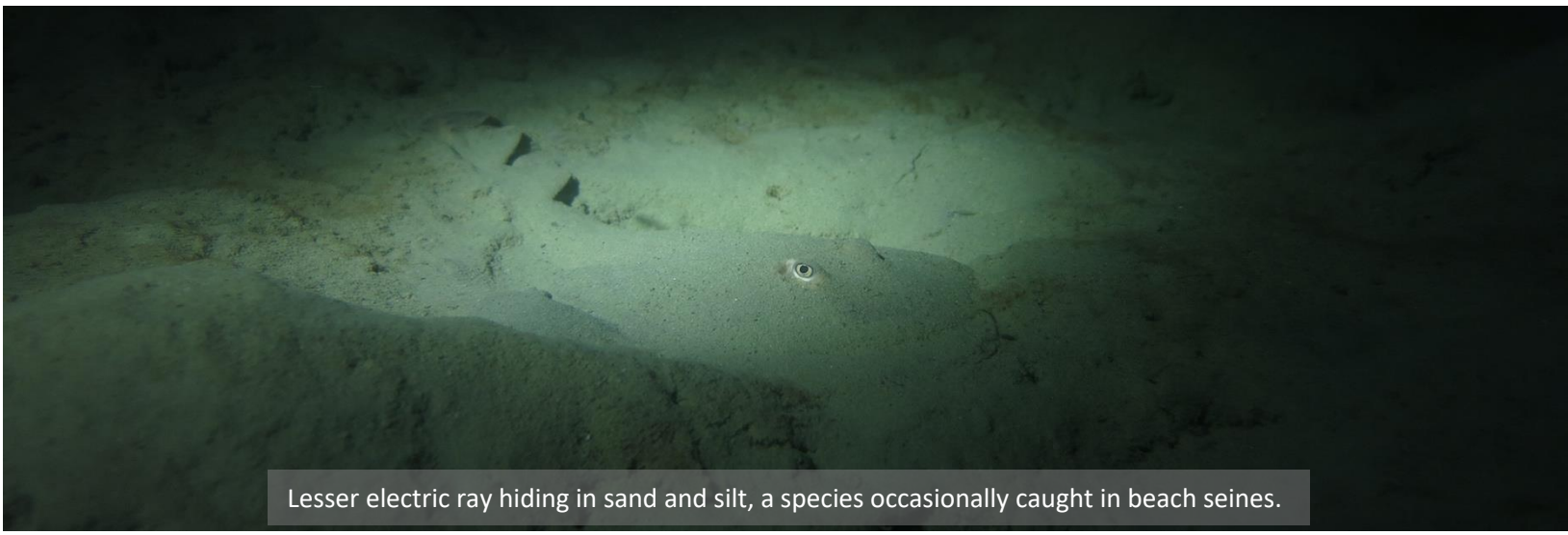
5. The re-export of any specimen of a species included in Appendix II shall require the prior grant and presentation of a re-export certificate. A re-export certificate shall only be granted when the following conditions have been met:

> *(a) a Management Authority of the State of re-export is satisfied that the specimen was imported into that State in accordance with the provisions of the present Convention; and*
> *(b) a Management Authority of the State of re-export is satisfied that any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment.*

6. The introduction from the sea of any specimen of a species included in Appendix II shall require the prior grant of a certificate from a Management Authority of the State of introduction. A certificate shall only be granted when the following conditions have been met:

> *(a) a Scientific Authority of the State of introduction advises that the introduction will not be detrimental to the survival of the species involved; and*
>
> *(b) a Management Authority of the State of introduction is satisfied that any living specimen will be so handled as to minimize the risk of injury, damage to health or cruel treatment.*

7. Certificates referred to in paragraph 6 of this Article may be granted on the advice of a Scientific Authority, in consultation with other national scientific authorities or, when appropriate, international scientific authorities, in respect of periods not exceeding one year for total numbers of specimens to be introduced in such periods.



Lesser electric ray hiding in sand and silt, a species occasionally caught in beach seines.

- **Protocol Concerning Specially Protected Areas and Wildlife To The Convention For The Protection And Development Of The Marine Environment Of The Wider Caribbean Region (SPAW Protocol, species list updated 2019)**

The SPAW Protocol came into effect on June 2000 and is currently endorsed by Trinidad and Tobago. It is dedicated to biodiversity protection and provides a unique legal framework for the conservation of regional biodiversity. The SPAW Protocol is also recognized as a significant tool to attain global agreement's objectives, such as the Convention on Biological Biodiversity (CBD) or the Ramsar Convention. Under the terms of the Protocol, the Contracting Parties must, in accordance with their own legislation, take all measures to protect, conserve and sustainably manage the zones and the animal threatened species.

Annex III of the SPAW Protocol contains the agreed list of species of marine and coastal flora and fauna that may be utilized on a rational and sustainable basis and that require the protection measures indicated in Article 11(1)(c).

The following elasmobranch species, occurring in NE Tobago, are listed in Annex III.

Table 8: Annex III SPAW-listed species found in NE Tobago.

Species Name	Common Names
Carcharhinus longimanus	Oceanic whitetip shark
Carcharhinus falciformis	Silky shark
Rhincodon typus	Whale shark
Sphyrna lewini	Scalloped hammerhead shark
Sphyrna mokarran	Great hammerhead shark
Mobula birostris	Giant manta ray

Article 11(1)(c) states: "*Each Party shall adopt appropriate measures to ensure the protection and recovery of the species of flora and fauna listed in Annex III and may regulate the use of such species in order to ensure and maintain their populations at the highest possible levels. With regard to the species listed in Annex III, each Party shall, in co-operation with other Parties, formulate, adopt and implement plans for the management and use of such species, including:*

i) for species of fauna:

a) the prohibition of all non-selective means of capture, killing, hunting and fishing and of all actions likely to cause local disappearance of a species or serious disturbance of its tranquillity;

b) the institution of closed hunting and fishing seasons and of other measures for maintaining their population;

c) the regulation of the taking, possession, transport or sale of living or dead species, their eggs, parts or products.

- **International Convention for the Conservation of Atlantic Tunas (ICCAT)**

The ICCAT formally entered into force in 1969 with the mandate to conserve tunas and tuna-like species in the Atlantic Ocean and adjacent seas. Trinidad and Tobago became a Contracting Party to the International Commission for the Conservation of Atlantic Tunas on 20 March 1999, which adopted this Convention. This membership requires the country to provide fisheries and statistical data particularly related to the species covered by the Convention and those of interest to ICCAT (including pelagic oceanic sharks) (Table 9Table 1) financial assistance where possible and to adopt management recommendations resulting from its findings.

Table 9: Pelagic oceanic shark species of interest to the ICCAT

Species Name	Common Names
Alopias superciliosus	Bigeye thresher
Alopias vulpinus	Common thresher
Carcharhinus longimanus	Oceanic whitetip shark
Carcharhinus falciformis	Silky shark
Isurus oxyrinchus	Shortfin mako
Prionace glauca	Blue shark
Sphyrna lewini	Scalloped hammerhead shark
Sphyrna mokarran	Great hammerhead shark

In 2020, the ICCAT Secretariat issued the "Compendium of the Management Recommendations and Resolutions adopted by ICCATT for the Conservation of Atlantic Tunas and Tuna-like Species" which includes the following recommendations and resolutions adopted in 2019 as it related to sharks.

Regarding the Resolution by ICCAT on Cooperation with the Food and Agriculture Organization of the United Nations (FAO) with regard to Study on the Status of Stocks and By-Catches of Shark Species (Transmitted to Contracting Parties – December 21, 1995)

1. *That FAO be the focal point in which to initiate a program to collect, on a global scale, the necessary biological data, including stock abundance and the magnitude of by-catch, and trade data on shark species, and to serve a coordination function among regional or sub-regional fisheries management organizations for said activities;*
2. *That the Contracting Parties of ICCAT provide FAO with the information, and financial assistance where possible, to conduct the work required; and*
3. *That international or regional/sub-regional fisheries management organizations cooperate with FAO in providing the necessary information and advice in response to the requests made, including the aforementioned CITES Resolution.*

Regarding the Resolution by ICCAT on the Shark Fishery (Transmitted to Contracting Parties: December 19, 2003)

Each Contracting Party and Cooperating non-Contracting Party, Entity or Fishing Entity take the following actions:

1. *Provide the Working Group of the Sub-Committee on By-catch scheduled to meet in 2004 with the information on their shark catches, effort by gear type, landings and trade of shark products.*
2. *Fully implement a NPOA in accordance with the FAO IPOA for the Conservation and Management of Sharks adopted by FAO.*

Regarding the Recommendation by ICCAT Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT (Entered in force: June 13, 2005)

1. *Contracting Parties, Co-operating non-Contracting Parties, Entities or Fishing Entities (CPCs) shall annually report Task I and Task II data for catches of sharks, in accordance with ICCAT data reporting procedures, including available historical data.*
2. *CPCs shall take the necessary measures to require that their fishermen fully utilize their entire catches of sharks. Full utilization is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.*
3. *CPCs shall require their vessels to not have onboard fins that total more than 5% of the weight of sharks onboard, up to the first point of landing. CPCs that currently do not require fins and carcasses to be offloaded together at the point of first landing shall take the necessary measures to ensure compliance with the 5% ratio through certification, monitoring by an observer, or other appropriate measures.*
4. *The ratio of fin-to-body weight of sharks described in paragraph 3 shall be reviewed by the SCRS and reported back to the Commission in 2005 for revision, if necessary.*
5. *Fishing vessels are prohibited from retaining on board, transshipping or landing any fins harvested in contravention of this Recommendation.*
6. *In fisheries that are not directed at sharks, CPCs shall encourage the release of live sharks, especially juveniles, to the extent possible, that are caught incidentally and are not used for food and/or subsistence.*
7. *In 2005, the SCRS shall review the assessment of shortfin mako sharks (Isurus oxyrinchus) and recommend management alternatives for consideration by the Commission, and reassess blue shark (Prionace glauca) and shortfin mako no later than 2007.*
8. *CPCs shall, where possible, undertake research to identify ways to make fishing gears more selective.*
9. *CPCs shall, where possible, conduct research to identify shark nursery areas.*
10. *The Commission shall consider appropriate assistance to developing CPCs for the collection of data on their shark catches.*
11. *This recommendation applies only to sharks caught in association with fisheries managed by ICCAT.*

Regarding the Supplemental Recommendations by ICCAT Concerning Sharks (Entered into force: June 04, 2008)

1. *Contracting Parties, Cooperating non-Contracting Parties, Entities and Fishing Entities (hereinafter referred to as CPCs), especially those directing fishing activities for sharks, shall submit Task I and II data for sharks, as required by ICCAT data reporting procedures (including estimates of dead discards and size frequencies) in advance of the next SCRS assessment;*
2. *Until such time as sustainable levels of harvest can be determined through peer reviewed stock assessments by SCRS or other organizations, CPCs shall take appropriate measures to reduce fishing mortality in fisheries targeting porbeagle (Lamna nasus) and North Atlantic shortfin mako sharks (Isurus oxyrinchus).*
3. *Notwithstanding paragraph 2, CPCs may conduct scientifically based research that is submitted to SCRS for these species in the Convention area.*
4. *CPCs shall, where possible, implement research on pelagic shark species caught in the Convention area in order to identify potential nursery areas. Based on this research, CPCs shall consider time and area closures and other measures, as appropriate.*
5. *The SCRS shall, as soon as possible but no later than 2009, conduct a stock assessment or a thorough review of available stock assessment information of, and recommend management advice for, porbeagle shark (Lamna nasus).*

Regarding the Recommendation by ICCAT on the Conservation of Thresher Sharks Caught in Association with Fisheries in the ICCAT Convention Area (Entered into force: June 01 2010)

1. *Contracting Parties, and Cooperating non-Contracting Parties, Entities or Fishing Entities (hereafter referred to as CPCs) shall prohibit, retaining onboard, transshipping, landing, storing, selling, or offering for sale any part or whole carcass of bigeye thresher sharks (Alopias superciliosus) in any fishery with exception of a Mexican small-scale coastal fishery with a catch of less than 110 fish.*
2. *CPCs shall require vessels flying their flag to promptly release unharmed, to the extent practicable, bigeye thresher sharks when brought along side for taking on board the vessel.*
3. *CPCs should strongly endeavor to ensure that vessels flying their flag do not undertake a directed fishery for species of thresher sharks of the genus Alopias spp.*
4. *CPCs shall require the collection and submission of Task I and Task II data for Alopias spp other than A. superciliosus in accordance with ICCAT data reporting requirements. The number of discards and releases of A. superciliosus must be recorded with indication of status (dead or alive) and reported to ICCAT in accordance with ICCAT data reporting requirements.*
5. *CPCs shall, where possible, implement research on thresher sharks of the species Alopias spp in the Convention area in order to identify potential nursery areas. Based on this research, CPCs shall consider time and area closures and other measures, as appropriate.*

Regarding the Recommendation by ICCAT on Atlantic Shortfin Mako Sharks Caught in Association with ICCAT Fisheries (Entered into force: June 14, 2011)

1. *CPCs shall include information in their 2012 Annual Reports on actions taken to implement Recommendations 04-10, 05-051, and 07-06, in particular the steps taken to improve their Task I and Task II data collection for direct and incidental catches,*
2. *Actions taken by CPCs, as described in paragraph 1, shall be reviewed annually by ICCAT's Compliance Committee, beginning in 2012;*
3. *CPCs that do not report Task I data for Atlantic shortfin mako sharks, in accordance with SCRS data reporting requirements, shall be prohibited from retaining this species, beginning in 2013 until such data have been received by the ICCAT Secretariat;*
4. *The SCRS shall conduct a stock assessment for shortfin mako sharks in 2012 and advise the Commission on: a) the annual catch levels of shortfin mako that would support MSY; b) other appropriate conservation measures for shortfin mako sharks, taking into account species identification difficulties;*
5. *The SCRS shall complete its shark identification guide and circulate it to CPCs before the 2011 Commission meeting.*

Regarding the Recommendation by ICCAT on the Conservation of Oceanic Whitetip Shark Caught in Association with Fisheries in the ICCAT Convention Area (Entered into force: June 14, 2011)

1. *Contracting Parties, and Cooperating non-Contracting Parties, Entities or Fishing Entities (hereafter referred to as CPCs) shall prohibit retaining onboard, transhipping, landing, storing, selling, or offering for sale any part or whole carcass of oceanic whitetip sharks in any fishery.*
2. *CPCs shall record through their observer programs the number of discards and releases of oceanic whitetip sharks with indication of status (dead or alive) and report it to ICCAT.*

Regarding the Recommendation by ICCAT on Hammerhead Sharks (Family Sphyrnidae) Caught in Association with Fisheries Managed by ICCAT (Entered into force: June 14, 2011)

1. *Contracting Parties, and Cooperating non-Contracting Parties, Entities or Fishing Entities (hereafter referred to as CPCs) shall prohibit retaining onboard, transhipping, landing, storing, selling, or offering for sale any part or whole carcass of hammerhead sharks of the family Sphyrnidae (except for the Sphyrna tiburo), taken in the Convention area in association with ICCAT fisheries.*
2. *CPCs shall require vessels flying their flag, to promptly release unharmed, to the extent practicable, hammerhead sharks when brought alongside the vessel.*
3. *Hammerhead sharks that are caught by developing coastal CPCs for local consumption are exempted from the measures established in paragraphs 1 and 2, provided these CPCs submit Task I and, if possible, Task II data according to the reporting procedures established by the SCRS. If it is not possible to provide catch data by species, they shall be provided at least by genus Sphryna. Developing coastal CPCs exempted from this prohibition pursuant to this paragraph should endeavor not to increase their catches of hammerhead sharks. Such CPCs shall take necessary measures to ensure that hammerhead sharks of the family Sphyrnidae (except of Sphyrna tiburo) will not enter international trade and shall notify the Commission of such measures.*

4. *CPCs shall require that the number of discards and releases of hammerhead sharks are recorded with indication of status (dead or alive) and reported to ICCAT in accordance with ICCAT data reporting requirements.*
5. *CPCs shall, where possible, implement research on hammerhead sharks in the Convention area in order to identify potential nursery areas. Based on this research, CPCs shall consider time and area closures and other measures, as appropriate.*
6. *As appropriate, the Commission and its CPCs should, individually and collectively, engage in capacity building efforts and other cooperative activities to support the effective implementation of this Recommendation, including entering into cooperative arrangements with other appropriate international bodies.*

Regarding the Recommendation by ICCAT on the Conservation of Silky Sharks Caught in Association with ICCAT Fisheries (Entered into force: June 07, 2012)

1. *Contracting Parties, and Cooperating non-Contracting Parties, Entities or Fishing Entities (hereafter referred to as CPCs) shall require fishing vessels flying their flag and operating in ICCAT managed fisheries to release all silky sharks whether dead or alive, and prohibit retaining on board, transhipping, or landing any part or whole carcass of silky shark.*
2. *CPCs shall require vessels flying their flag to promptly release silky sharks unharmed, at the latest before putting the catch into the fish holds, giving due consideration to the safety of crew members. Purse seine vessels engaged in ICCAT fisheries shall endeavour to take additional measures to increase the survival rate of silky sharks incidentally caught.*
3. *CPCs shall record through their observer programs the number of discards and releases of silky sharks with indication of status (dead or alive) and report it to ICCAT.*
4. *Silky sharks that are caught by developing coastal CPCs for local consumption are exempted from the measures established in paragraphs 1 and 2, provided these CPCs submit Task I and, if possible, Task II data according to the reporting procedures established by the SCRS. CPCs that have not reported species-specific shark data shall provide a plan by July 1, 2012, for improving their data collection for sharks on a species-specific level for review by the SCRS and Commission. Developing coastal CPCs exempted from the prohibition pursuant to this paragraph shall not increase their catches of silky sharks. Such CPCs shall take necessary measures to ensure that silky sharks will not enter international trade and shall notify the Commission of such measures.*
5. *Any CPC that does not report Task I data for silky shark, in accordance with SCRS data reporting requirements, shall be subject to the provisions of paragraph 1 until such data have been reported.*
6. *The prohibition on retention in paragraph 1 does not apply to CPCs whose domestic law requires that all dead fish be landed, that the fishermen cannot draw any commercial profit from such fish and that includes a prohibition against silky shark fisheries.*
7. *In their annual reports, CPCs shall inform the Commission of steps taken to implement this Recommendation through domestic law or regulations, including monitoring, control and surveillance measures that support implementation of this recommendation.*

8. *In 2012, the SCRS Sub-Committee on Statistics shall evaluate the data collection improvement plans (referenced in paragraph 4) submitted by CPCs and, as necessary, make recommendations on how shark data collection can be improved.*
9. *In 2013, the SCRS shall evaluate the information provided under paragraphs 3 and 4 and report on the sources of silky shark mortality in ICCAT fisheries, including silky shark discard mortality rates, and provide an analysis and advice regarding the benefits of a range of specific silky shark management options. This measure should be reviewed in 2013 in light of the advice provided by the SCRS in accordance with paragraph 9.*

Regarding the Recommendation by ICCAT on Information Collection and Harmonisation of Data on By-Catch and Discards in ICCAT Fisheries (Entered into force: June 07, 2012)

1. *Notwithstanding other data collection and reporting programs and requirements adopted by ICCAT and noting continued obligations to fulfil those requirements, in particular those of Recommendation 10-101:*
    a. *Contracting Parties and Cooperating non-Contracting Parties, Entities and Fishing Entities (CPCs) shall require the collection of bycatch and discard data in their existing domestic scientific observer programs and logbook programs;*
    b. *CPCs that wish to employ an alternative scientific monitoring approach for vessels <15 meters, as specified in paragraph 1b) of Recommendation 10-101, shall describe their alternative approach as part of the observer program report that is due to the SCRS on July 31, 2012 (as required by paragraph 5 of Recommendation 10-101).*
    c. *For artisanal fisheries that are not subject to ICCAT's minimum standards for scientific observer programs (Recommendation 10-101) or recording of catch requirements (Recommendation 03-13) CPCs shall implement measures to collect bycatch and discard data through alternative means and describe these efforts in their Annual Reports, beginning in 2012. The SCRS shall evaluate these measures in 2013 and provide advice to the Commission on this matter;*
    d. *CPCs shall report the bycatch and discard data collected under paragraphs 1a and b to the Secretariat in the format specified by SCRS, in accordance with existing deadlines for data reporting;*
    e. *CPCs shall report on steps taken to mitigate bycatch and reduce discards, and on any relevant research in this field, as part of their Annual Reports, beginning in 2012;*
2. *CPCs shall provide these data in a manner consistent with their domestic confidentiality requirements.*
3. *Where possible, CPCs shall provide existing identification guides for sharks, seabirds and turtles and marine mammals caught in the Convention Area to the ICCAT Secretariat, and the Secretariat shall request sub-regional RFMOs to provide the Commission with relevant identification guides. The Secretariat shall share these guides with the T-RFMO Technical Working Group on Bycatch, as appropriate.*

4. *The ICCAT Secretariat and SCRS will continue to support the work plan of the T-RFMO Joint Bycatch Technical Working Group.*
5. *This recommendation applies to discards and bycatch of species caught in association with fisheries managed by ICCAT, as reflected in the FAO International Guidelines on Bycatch Management and the Reduction of Discards.*

Regarding the Recommendation on Biological Sampling of Prohibited Shark Species by Scientific Observers (Entered in force: June 10, 2014)

1. *By derogation to ICCAT conservation measures providing for the prohibition of retaining on board certain shark species, the collection of biological samples during commercial fishing operations (e.g. vertebrae, tissue, reproductive tracts, stomachs, skin samples, coil valves, jaws, whole fish or skeletons for taxonomic studies and fauna inventories) by scientific observers or individuals duly permitted by the CPC to collect biological samples is authorised under the following conditions:*
    a. *The biological samples are collected only from animals which are dead at the haulback.*
    b. *The biological samples are taken in the framework of a research project notified to the SCRS and developed taking into consideration the recommended research priorities of the SCRS Shark Group. The research project should include a detailed document that describes the objective of the work, the methodologies to be used, the number and type of samples to be collected, the time-area distribution of the sampling and a chronogram of the activities to be carried out.*
    c. *The biological samples must be kept on board until the port of landing or transhipment.*
    d. *The authorisation of the flag State CPC or, in the case of chartered vessels, of the chartering CPC and the flag State CPC, must accompany all such samples collected according to this Recommendation until the final port of landing. Such samples and other parts of the shark specimens sampled may not be marketed or sold.*
2. *An annual report of the results achieved by the research project should be presented to the Shark Species Group and the SCRS. The SCRS should review and assess this report and provide advice on follow up.*
3. *The sampling campaign can only start once the authorisation by the relevant State has been issued.*

Regarding the Recommendation by ICCAT on Shortfin Mako Caught in Association with ICCAT Fisheries (Entered into force 03 June 2015)

1. *CPCs shall improve their catch reporting systems to ensure the reporting of shortfin mako catch and effort data to ICCAT in full accordance with the ICCAT requirements for provision of Task I and Task II catch, effort and size data.*
2. *CPCs shall include in their annual reports to ICCAT information on the actions they have taken domestically to monitor catches and to conserve and manage shortfin mako sharks.*
3. *CPCs are encouraged to undertake research that would provide information on key biological/ecological parameters, life-history and behavioural traits, as well as on the*

identification of potential mating, pupping and nursery grounds of shortfin mako sharks. Such information shall be made available to the SCRS.

4. *The SCRS shall endeavour to conduct a stock assessment for shortfin mako sharks by 2016, if the available data permit, and shall evaluate and advise the Commission on appropriate management measures.*
5. *This Recommendation replaces and repeals Recommendations 05-05 and 06-10 in their entirety.*

Regarding the Recommendation by ICCAT on Management Measures for the Conservation of South Atlantic Blue Shark Caught in Association with ICCAT Fisheries (Entered into force: 20 June 2020)

1. *Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities whose vessels fish blue shark in association with ICCAT fisheries in the Convention area shall implement management measures to ensure the conservation of the South Atlantic blue shark (Prionace glauca) in line with ICCAT's Convention objective.*

Catch limits for blue shark

2. *An annual Total Allowable Catch (TAC) of 28,923 t for South Atlantic blue shark is established. The Annual TAC may be revised subject to a decision of the Commission based on the updated advice of the SCRS in 2021, or at an earlier stage if enough information is provided by the SCRS.*
3. *On the basis of the stock assessment results, an allocation of the future TAC shall be decided by the Commission by 2021.*

Recording, reporting, and use of the catch information

4. *Each CPC shall ensure that its vessels catching South Atlantic blue shark in association with ICCAT fisheries in the Convention area record their catch in accordance with the requirements set out in the Recommendation by ICCAT Concerning the Recording of Catch by Fishing Vessels in the ICCAT Convention Area (Rec. 03-13).*
5. *CPCs shall implement data collection programmes that ensure the reporting of accurate South Atlantic blue shark catch, effort, size and discard data to ICCAT in full accordance with the ICCAT requirements for provision of Task I and Task II.*
6. *CPCs shall include in their shark implementation check sheet to ICCAT information on the actions they have taken domestically to monitor catches and to conserve and manage South Atlantic blue sharks.*

Scientific research

7. *CPCs are encouraged to undertake scientific research that would provide information on key biological/ecological parameters, life-history, migrations, post-release survivorship and behavioural traits of blue sharks. Such information shall be made available to the SCRS.*
8. *In the light of the results of the next stock assessment of South Atlantic blue shark, the SCRS shall provide, if possible, options of HCR with the associated limit, target and threshold reference points for the management of this species in the ICCAT Convention area.*

- **Western Central Atlantic Fishery Commission (WECAFC)**

WECAFC is the regional fishery body of the FAO for much of the Atlantic region with the aim of promoting effective conservation, management and development of the living marine resources of its designated area. Recognising that several species of elasmobranchs are present within the region, yet the paucity of fisheries-related data on them, a Working Group (WG) for the Conservation and Management of Sharks in the Wider Caribbean Region was established. The WG uses shared data on elasmobranch stocks and the expertise of WECAFC Members on sharks and rays, their fisheries and conservation to develop recommendations towards sustainable management and conservation of shark populations in WECAFC member countries. Trinidad and Tobago as a member is advised to adopt the following recommendations outlined in the WECAFC/XVII/2019/5+6+7 in conformity with Article 6 of the WECAFC Revised Statutes:

1. *WECAFC MEMBERS develop their NPOAs-Sharks in line with the IPOA-Sharks, in support of more effective conservation and management of sharks and rays in general.*
2. *WECAFC MEMBERS prohibit vessels flying their flag from retaining on board, transshipping, landing, trading shark and ray species, consistent with measures adopted, as appropriate, by ICCAT, and/or listed on Annex II of the Cartagena Convention Protocol Concerning Specially Protected Areas and Wildlife (SPAW Protocol) and Appendix I of the Convention on Conservation of Migratory Species (CMS).*
3. *WECAFC MEMBERS ensure that incidental catches of the species covered by paragraph 2 as well as, other sharks and rays caught in association with WECAFC fisheries and are not used for commercial purposes or food and/or subsistence, are promptly released unharmed and alive and without removing the species from the water, to the extent possible, while ensuring safety of the crew. The species, number of specimens and status (alive, dead, uncertain) upon release should be reported.*
4. *WECAFC MEMBERS requests the SAG to liaise with SCRS of ICCAT in view to compiling available guidelines for handling and safe release of prohibited and unwanted sharks and rays caught in association with WECAFC fisheries.*
5. *WECAFC MEMBERS prohibit the removal of shark fins at sea and require that all sharks be landed with their fins naturally attached through the point of first landing of the sharks.*
6. *WECAFC MEMBERS prohibit the retention on board, transhipment, landing and selling of shark fins harvested in contravention of this measure.*
7. *Without prejudice to paragraph 5 of this Recommendation, in order to facilitate on-board storage, shark fins may be partially cut from the body and folded against the carcass, but shall not be removed from the carcass before the first landing.*
8. *WECAFC MEMBERS that are non-contracting parties to ICCAT are strongly encouraged to provide their estimates of landings and of live and dead discards of sharks, caught by vessels flying their flag and all other available data including observer data, annually to WECAFC and ICCAT, as appropriate, to support the stock assessment process. The Members are encouraged to report*

catches of sharks by species, or to the lowest taxonomic level if species identification is not possible.

9. *WECAFC MEMBERS, where possible, undertake research to identify ways to make fishing gears more selective with the aim to reducing by-catches or by-catch mortality of sharks.*
10. *WECAFC MEMBERS, where possible, conduct research on key biological, ecological, economic and trade parameters, life history and behavioural traits, migration patterns, as well as on the identification of potential mating, pupping and nursery grounds of the most common sharks species in the WECAFC area.*
11. *The WECAFC/CITES/OSPESCA/CRFM/CFMC Working Group on Shark Conservation and Management continues to collect, generate and share data and information on shark and rays caught in association with their fisheries, for the bi-annual meeting. The Working Group will include in its workplan the review of the stock status of the main commercially targeted sharks and rays stocks, and report on these matters to the Scientific Advisory Group (SAG).*

7. Management Authority

The Tobago House of Assembly Act grants the THA significant autonomy in the management of its internal affairs within the twin-island state of Trinidad and Tobago, including the management authority over the terrestrial and marine parts of the UNESCO NETMABR.

The THA consists of 10 Divisions, each with various departments. The presiding Division is called: “Office of the Chief Secretary”.

Each Division is headed by a political appointee addressed as Secretary. The highest public servant of each division holds the title of Administrator.

The highest public servant is the Chief Administrator who operates out of the Office of the Chief Secretary and supervises all Administrators in the THA.

The most relevant Divisions with specific management authority regarding the management of elasmobranchs in the UNESCO NETMABR are:

- the Division of Food Production, Forestry and Fisheries, and
- the Division of Infrastructure, Quarries and the Environment which houses the Department of the Environment, which is the appointed Focal Point for MAB for Trinidad and Tobago.

DIVISION OF FOOD PRODUCTION, FORESTRY AND FISHERIES

Mission: To affect the sustainable management of all our natural resources, the skilled development of our human resources and increased use of relevant technology to facilitate trade and a dynamic agro-business sector.

Vision: A Division with the capacity and determination to stimulate every sub- sector served by it to achieve the goal of maximising optimum output and grasping opportunities thereby contributing to a more vibrant Tobago Economy.

Department:

Department of Marine Affairs and Fisheries

This Department is responsible for the sustainable management of Tobago's Marine Resources from the coastline to a distance of 6 nautical miles (11.11km) offshore and implements the Marine Areas (Preservation and Enhancement) Act Chap 37:02. The Department is subdivided into two Units:

1. *Fisheries and Aquaculture Unit:*

The Fisheries and Aquaculture Unit is responsible for the development and management of the fishing industry in Tobago. Its duties involve resolving conflicts in the Fishing Industry, training fishers, processors, vendors, and other stakeholders in the industry, in new equipment and techniques in fishing and fish marketing and safety measures and monitoring the fish resources surrounding the island.

2. *Marine Areas Unit:*

The Marine Areas Unit has responsibility for the marine and coastal resources around Tobago. Some of the duties include developing an integrated coastal zone management plan that would involve methods of including the community members in the management of the marine resources and researching ways and means of reducing pollution and the degradation of the reefs, mangroves, and sea grass beds.

DIVISION OF INFRASTRUCTURE, QUARRIES AND THE ENVIRONMENT

The DIQE manages the policy and planning for the sustainable development of Tobago's infrastructural network, natural resources and space. Its foci therefore are to ensure the delivery of infrastructure and systems that are safe, robust, intelligently designed and environmentally sensitive; to respond to local needs and enhance economic and social growth in Tobago and to promote the sustainable use and preserve the quality of air, land and water resources.

DIQEs core responsibilities are as follows: construction, development and maintenance of the road network and drainage systems; construction and maintenance of public buildings and facilities and environmental management and protection.

In the local context, DIQE acts for and on behalf of the EMA of Trinidad and Tobago in the execution of its regulatory function.

Department:

Department of the Environment

The DoE is charged with implementation of the Environmental Management Act and its Rules. This includes the ESS and ESA rules, which potentially can directly affect Protected National Area management on Tobago.

The DoE is also charged with the protection, preservation and enhancement of Tobago's environment. Moreover, the Department promotes the sustainable use and management of our air, land and water for the benefit of current and future generations.

8. Priority of Issues

There are challenges that must be addressed in the implementation of a shark and ray management plan for the NETMABR in order to bridge the gap between the existing and desired conditions in elasmobranch population stability.

8.1. Regulation

The fishery sector is presently regulated by a 104-year-old legislation (Fisheries Act (1916)), that is expected to be updated in 2021. Unfortunately, neither the current nor the new draft legislations place restrictions on shark capture and sale. In 2014, the Government of Trinidad and Tobago approved a note (Cabinet Minute No. 2009 of July 17, 2014) to implement a national ban on shark finning. By then, Trinidad and Tobago ranked sixth on the list of top exporters of shark fins to Japan. Retail of fins removed from landed sharks and their export are not illegal. Unfortunately, the requisite legislation could not be drafted due to the limited scope of the current legislation.

The proposed, new Fisheries Management Bill provides the framework for modern fisheries management. The specifics of management will be outlined in Fisheries Management Plans and then implemented through the respective regulations, or Orders.

A further major constraint faced by enforcement of any shark fisheries regulations and management for NE Tobago is its under-resourced management authority.

8.2. Capacity for Data Collection

In 2017, the Department of Marine Resources and Fisheries of the Tobago House of Assembly identified a knowledge gap of fisheries data collectors in shark and ray identification as a significant challenge in data collection (pers. comm.). This is primarily due to a lack of human resources available for adequate monitoring, control and surveillance of landing sites. This impedes collection of sufficient landing data to reliably inform sustainable regulations. Even less considered are sharks that were dying or may have died upon capture and discarded at sea. A lack of trust by fishers towards government and law enforcement further challenges any imposition of regulations.

Officers and data collectors trained in shark identification and conservation issues.

As a response, the Environmental Research Institute Charlotteville, with assistance from the Shark Conservation Fund, distributed waterproof shark identification booklets to the Department, conducted training with fisheries officers and over 90 fisherfolk regarding shark identification and placed shark identification posters at all landing sites on the island. In the future, revised, NE Tobago-specific shark identification guides should be produced, including local names, printed and distributed among fisheries stakeholders in a portable, waterproof format and also used as a regular training tool for fisheries enumerators.

8.3. Data Accuracy

Apart from the lack of species distinction in data collection, the accuracy of the data is largely unknown. Measurements are limited to overall length and weight, if collected. Whether this measurement is obtained quantitatively or through estimations is undetermined. The paucity of morphometric data makes verification difficult. There is a need to review data collection and verification methods, and to implement regular training and mentoring sessions to maintain consistency among all enumerators. Moreover, there is a need to emphasize among fisheries officers and fisherfolks the importance of reporting by-catch and at-sea discards in order to fully comprehend the status of NE Tobago shark populations.

8.4. Socio-Economic Condition of Communities

There are seven fishing ports in the NETMABR with approximately 350 artisanal fishing boats. NE Tobago fisherfolk contribute significantly to the economic welfare of the area, are an intrinsic part of the cultural heritage, ensure food security and are as such key stakeholders in the sustainable management of marine resources.

Almost all communities in NE Tobago are reliant on artisanal fisheries as a significant source of income. However, shark landings contribute only marginally to sales. Many fisherfolk, that use fishing as secondary income, typically work part-time as a labourer on the Unemployment Relief Programme, the Community-Based Environmental Protection and Enhancement Programme (CEPEP) or as construction workers in development projects. Some fishers also offer transport and touring services on their vessels to capitalise on the domestic and international tourism industry. The educational level attained by fishermen is generally low. Older fishers (over 60 years old) would have received only primary school education while younger generations had increasing access to secondary school or vocational training education.

These attributes place fishers on the lower end of the income spectrum. To sustain their livelihood and meet their (and their family's) daily needs, they are reliant on a continuous demand of fish throughout the year. As a result, sharks caught in coastal waters, mainly as by-catch, are landed regardless of their size. Fishers are also at a disadvantage at changing their livelihoods due to their limited academic qualification, vocational skills and limited capital. Fishing is a livelihood typically passed from generation to generation, where a common expectation is that the males in a household will become fishers, inheriting their father's boat, gear, techniques and preferred fishing spots.

With this in mind, shark fisheries management regulations must ensure that fishers are not placed at a disadvantage where they are unable to earn some income for their efforts, particularly in circumstances where a landed shark is their lone catch for the day.

8.5. Overfishing and By-catch

While NE Tobago has a relatively high shark diversity despite fishing pressures from both commercial and artisanal vessels, their abundance is quite low. Concerning is the large number of small shark species (around 20) that are occasionally caught within coastal waters as by-catch e.g. sharpnose sharks (*Rhizoprionodon* spp.) and smooth-hound sharks (*Mustelus* spp.).

However, the landing of immature individuals of larger shark species such as hammerheads (Sphyrna spp.) and carcharhinids such as silky sharks (*C. falciformis*), is impacting on recruitment rates that are already challenged by their life history. The paucity of data on shark stocks and the status of rays is a major constraint in the application of sustainable management models and plans.

Management actions require identification of aggregation grounds that can be zoned and regulated. Consideration should be given regarding the replacement of current gear and updating of fishing techniques to decrease bycatch and to present the opportunity to release captured elasmobranchs with minimal damage to both fish and fisher.

8.6. Research & Data Collection Issues

A growing number of studies have focused on the ecological role of sharks as meso- and apex predators, both in oceanic and coral reef ecosystems and the potential ecological and economic consequences of their decline due to direct and indirect fishing pressure. However, studies on the roles of mobulid rays have lagged behind.

Other research projects have been produced by students from local and international universities, with data collected in NE Tobago. These are either analysed based on national or regional context or are unpublished. These studies encompassed topics such as biology, ecology and socio-economics.

Impactful shark studies are expensive and require collaboration, coordination and financing. However, they are necessary to ensure that policies and management decisions are science- and data-driven. Furthermore, some of the species commonly caught are migratory species and also CMS-listed. To inform their management in NE Tobago, knowledge exchange with national-level studies and collaborative regional research are required.

Since 2016, the collaboration between the Department of Marine Resources and Fisheries, the Environmental Research Institute Charlotteville and international universities and researchers has been proven to be a successful model to conduct studies informing elasmobranch management, given the local financial and technical constraints. Furthermore, this model ensures that locals are always involved in the projects and the interests of Tobago are put first.

The potential for incorporating citizen-science research through incentivised engagement of fishers and community volunteers in data collection has not been tapped into as yet and should be utilised.

This collaborative model should be used in the future to address critical research areas such as:

1. diversity and abundance of elasmobranch species;
2. identification and mapping of critical habitats, species distribution and biological productivity;
3. local assessments of the impact of elasmobranch management on ecosystem structure and function, economy and livelihoods;
4. assessments of the impacts of environmental changes, natural variation and climate change on elasmobranch populations and productivity;
5. design / development / application of by-catch reduction devices and techniques; and
6. description of the shark fishery in NE Tobago including:

- the number of vessels or units,
- gear characteristics and the selectivity of the gear,
- seasonal patterns,
- the locality of fishing in relation to the distribution of the stock and other fleets,
- any navigational and technological aids which assist in fishing, and
- other related factors.

8.7. Mercury Bioaccumulation in Shark Meat

Sharks as apex predators are prone to heavy metal bioaccumulation due to their long life span, trophic level and their lipid-rich livers. To date, while there is vast evidence of its negative health effects on bony fish, no adverse effects of mercury and methyl-mercury concentrations are known for sharks. Nonetheless, consistent consumption of shark products above regulatory limits can lead to acute or chronic impacts to human health. Its long-term accumulation can result in degeneration of neurological, muscular and physical processes. It can disrupt endocrinal and reproductive functions.

While sample size in the ERIC and FIU study is relatively small to formulate a decisive conclusion, it already shows that a large percentage of samples produced levels above the regulatory limit recommended by the WHO for safe consumption. Assessment of a larger sample size of frequently landed species is recommended. Consumption safety guidelines produced by health authorities are needed, to inform the consumer of the inherent risks to health from shark meat consumption.

8.8. Stakeholder Conflicts

Currently, there is no noteworthy conflict regarding shark and ray management between various stakeholders within the NETMABR and in Tobago as a whole. This is mainly due to the fact that targeted shark fishing by local fisherfolk is very limited as described above. Nevertheless, illegal, unreported and unregulated fishing by non-local vessels has conflict potential with local fishers, as they compete for the same resources, particularly at aggregation sites.

In the future, potential stakeholder conflicts between fisherfolk, dive tourism operators and conservationists need to be carefully managed through outreach, education, capacity building and data driven management decisions allowing for a sustainable, ecologically functional shark and ray population while considering fisherfolk livelihoods. A further potential conflict may arise between dive operators interested in developing shark and ray dive attractions and stakeholders concerned about safety for bathers. In the past decades, NE Tobago was renowned for diving with hammerhead sharks and manta rays. Unfortunately, shark sightings while SCUBA diving are now a very rare and encounters with manta rays less frequent.

Considering that assessments in Palau, the Maldives, Australia, the Bahamas, St Marteen and Fiji, have found that a shark fishery may generate only a quarter of the annual revenue earned through shark diving tourism, the potential for developing a shark diving industry might be considered including conflict resolution amongst stakeholders.

8.9. Outreach and Awareness


Shark conservation awareness community outreach.

Robust and continuous educational and awareness programmes for stakeholders including governmental agencies, fisherfolk, recreational users, conservationists and the general public are needed to successfully manage elasmobranch populations in the NETMABR. These programmes should increase understanding of conservation needs particularly for those species that are classified as vulnerable to critically endangered by the IUCN and inform the public about the economic and livelihood benefits of ecologically functional shark populations and simultaneously about the health risks associated with shark consumption. Training is also required on use of new gear and hook removal techniques for release of captured elasmobranchs, in keeping with the relevant regulations.

9. Stakeholder Involvement

9.1. Stakeholder Analysis

As described in chapter 7, the local management authority over marine resources, fisheries and the environment is vested in the responsible Divisions and Department of the Tobago House of Assembly.

The North East Tobago Protected Area Management Trust is earmarked to be the institution that implements the NE Tobago UNESCO Man and the Biosphere Reserve Programme (once operational).

The Division of Health (THA) is responsible to ensure the safety of consumers regarding the consumption of shark and ray products.

The Fisheries Division of the Ministry of Agriculture, Land and Fisheries is responsible for implementation and reporting regarding International Agreements and Conventions Trinidad and Tobago is a signatory to.

The Environmental Management Authority is responsible to monitor and, if applicable, change the national conservation status and protection level of sensitive species and areas.

Research and education are undertaken by the University of the West Indies, The University of Trinidad and Tobago, the Institute of Marine Affairs and the Environmental Research Institute Charlotteville, sometimes in conjunction with international academic partner institutions.

The Division of Tourism, Culture and Transportation and the Tobago Tourism Agency Limited as responsible for the development, branding and marketing of tourism products which might involve shark and ray based eco-tourism.

Fisherfolk Associations, community-based organisations and individuals that have a declared interest in the sustainable management of shark and rays in NE Tobago are: the Roxborough Fisherfolk Association, the Moriah Fisherfolk Association, Speyside Eco Marine Park Rangers, Association of Tobago Dive Operators, Environment Tobago, Curtis Antoine, Hollis Walker, Zolani Frank, Rodney Maycock, Kester Leroy, and Frankie Scott.

While the interest of most stakeholders is high, the power currently only resides within the various Divisions and Departments of the THA.

The establishment of the North East Tobago Protected Area Management Trust will open a window of opportunity for co-management agreements between civil society, the private sector and the THA regarding resources within the NE Tobago UNESCO Man and the Biosphere Reserve.

9.2. Stakeholder Participation in Preparing the SSRMP

Throughout 2020, the ERIC conducted shark identification training of Fisheries officers of the DMRF and over 90 fisherfolk throughout Tobago; the training was combined with discussions about the importance of sharks for healthy coastal ecosystems and healthy, exploitable fish stock.

Many points raised by these stakeholders influenced the content of the document at hand.

On 08 December 2020, the ERIC facilitated an in-depth fisherfolk consultation regarding the NETMABR SSRMP with six fishermen from various communities throughout NE Tobago. In summary, the participants agreed with the most significant actions proposed by the plan that would directly impact on them (Appendix 1); none of proposed actions was dismissed.

On 10 February 2021, ERIC facilitated a second key stakeholder meeting with 19 participants from all involved sectors (Appendix 2).

The finalised SSRMP was submitted to the Tobago House of Assembly for consideration in March 2021.

10. Implementation Mechanism

10.1. Management Authority

The Management Authority regarding the implementation of the SSRMP is the Department of Marine Resources and Fisheries (DMRF) within the Tobago House of Assembly.

Recommendations:

The DMRF is encouraged to:

- designate a senior officer as focal point for the implementation of the SSRMP;
- implement the recommendations of the SSRMP under the guidance of a Cross Sectoral Shark and Ray Management Working Group and
- consider establishing a co-management agreement of the marine area of the North East Tobago UNESCO Man and the Biosphere Reserve with the North-East Tobago Protected Area Management Trust (NETPAMT) as described in the Executive Council Note: DIQE (2017), WDT: 4/6/247, of September, 8 2017, once the NETPAMT is fully operational

10.2. Cross Sectoral Shark and Ray Management Working Group

Recommendations:

Establishment of a Cross Sectoral Shark and Ray Management Working Group (SRMWG) which is chaired by the DMRF. This SRMWG should include, but is not limited to, representatives of the following stakeholders:

1. DMRF (1)
2. Two Fisherfolk Associations (2)
3. North East Tobago Protected Area Management Trust (1)
4. Environmental Research Institute Charlotteville (1)
5. Association of Tobago Dive Operators (1)
6. Department of the Environment (1)
7. Department of Health (1)
8. Tobago Tourism Agency Limited (1)

The Shark and Ray Management Working Group should meet once per quarter and facilitate the implementation of the SSRMP.

DMRF shall be responsible for the preparation of a concise annual report on the status of the implementation of the SSRMP

10.3. Financing

Recommendations:

- The DMRF is responsible to seek annual fiscal allocations to execute the implementation of the SSRMP.
- Once a co-management agreement with the NETPAMT is established, the NETPAMT should raise designated funds and contribute to the costs of implementing the SSRMP.

10.4. Communication

Recommendation:

The SRMWG is responsible for consulting with and communicating to stakeholders. Coordinated by DMRF, each member of SRMWG shall use its outreach capacities to inform stakeholders about the benefits and implementation progress of the SSRMP.

Southern sting ray, one of the more commonly found batoid species in NE Tobago.

11. Management Plan of Action

11.1. Scope

The NE Tobago Sustainable Shark and Ray Management Plan shall refer to the marine area of the NE Tobago UNESCO Man and the Biosphere Reserve, 11.1 km (6nm) seawards from south-west off Castara to north-east off Belle Garden.

The Plan shall be revised every three years or when deemed necessary by the SRMPWG.

11.2. Purpose

The main purpose of NE Tobago Sustainable Shark and Ray Management Plan is to

1. addressing the threats that shark and ray populations face with the aim of restoring their functionality in NE Tobago's marine ecosystem for the benefit of stakeholders, especially fisherfolk, tourism and conservation.

2. ensuring that future exploitation of shark species is at sustainable levels and poses no negative impact on consumer health.

11.3. Objectives

The main objectives of the NE Tobago Sustainable Shark and Ray Management Plan are to:

1. implement international conventions, regulations and best practises adapted to local circumstances regarding shark and ray management,

2. enforce and adjust shark and ray management regulations based on the precautionary principle and according to research findings and key stakeholder expert advice,

3. improve data accuracy of sharks and rays catch,

4. improving research on sharks and rays,

5. improving stakeholders' understanding on shark and ray management importance to fisherfolk livelihoods, ecosystem health and tourism,

6. inform consumers of any risks or consequences of consuming sharks and rays,

7. secure financing for the implementation of the SSRMP,

8. communicate the importance and achievements of the implementation of the SSRMP to the wider public, locally, nationally, regionally and internationally (including the establishment of the

requisite linkages between the fisheries administrations in Tobago and in Trinidad for the transfer of data and information to enable such national reporting), and

9. evaluate and if applicable implement low volume – high value tourism products that are related to shark and ray experiences,

11.4. Monitoring, Evaluation and Review

Recommendation

The SRMWG shall review the SSRMP annually against its indicators and time lines and make revisions every three years as deemed necessary by the SRMWG under the leadership of the DMRF.

The revision shall consider:

- any new international and regional conventions or recommendations,
- any new national legislation, policy or regulations,
- latest available research and data, and
- stakeholder and technical expert recommendations.

11.5. SSRMP Action Matrix

Note: the regulatory Actions below are formulated as if the action would be enforceable; this will only be the case when the entire plan or parts thereof are adopted by national legislators and included in the Fisheries Management Bill as a specific Fisheries Management Plan for sharks (as recommended by the NPOA Sharks (2017)). Until then, the Actions may take the form of a policy of the Tobago House of Assembly for the NE Tobago UNESCO MaB Reserve.

Table 10: Proposed Sustainable Shark and Ray Management Plan Actions

Issue	Objective	Action	Priority	Responsibility	Indicator	Due Date	Est. Cost [TTD]	Financing
Overfishing	1, 2	Ban of gear targeted specifically at sharks or rays (e.g. size of hooks, steel/wire leaders of a specific type)	1	DMRF	SSRMP accepted by Executive Council Note	by end of 2021	0	n/a
		Ensure implementation of international conventions that Trinidad and Tobago has committed to (especially CMS, ICCAT and CITES)	1	DMRF	SSRMP accepted by Executive Council Note	by end of 2021	0	n/a
		Lobby for joining regional conventions regarding the sustainable management of elasmobranch populations		DMRF, SRMWG	Documented efforts	by end of 2021	0	n/a
		Ban of fishing by any vessel not registered with DMRF and a home port in Tobago	1	DMRF	SSRMP accepted by Executive Council Note	by end of 2021	0	n/a
		Dead sharks caught as by-catch must be sold locally and may not be traded to Trinidad	1	DMRF	SSRMP accepted by Executive Council Note	by end of 2021	0	n/a
		Ban all non-artisanal, commercial long-line fishing (with the exception of catch and release research purposes)	1	DMRF	SSRMP accepted by Executive Council Note	by end of 2021	0	n/a
		Ban all international fishing vessels	1	DMRF	SSRMP accepted by Executive Council Note	by end of 2021	0	n/a

Issue	Objective	Action	Priority	Responsibility	Indicator	Due Date	Est. Cost [TTD]	Financing
		Any parts of a shark caught as by-catch must be landed and used / sold fully	1	DMRF	SSRMP accepted by Executive Council Note	by end of 2021	0	n/a
		Fisherfolk trained and equipped with hook removers / line cutters	1	DMRF, SRMWG	Training records	by end of 2021	tools & training 20,000	Grant funding
		Ban on unsupervised overnight setting of gill nets / fillet nets	1	DMRF	SSRMP accepted by Executive Council Note	by end of 2021	0	n/a
		Educate fisherfolk on the use / benefits of circle hooks, require the use of circle hooks (except for trolling), make sure circle hooks are available in tackle shops	1	DMRF, SRMWG	Tackle shop survey	by end of 2021	combined with hook remover training	Grant funding
		Make the use of circle hooks and catch and release mandatory at fishing tournaments	1	DMRF	SSRMP accepted by Executive Council Note	by end of 2021	0	n/a
		Prohibit / ban the capture and sale of IUCN red-listed species (threatened, endangered, critically endangered)	1	DMRF, FD	Annex to Fisheries Management Bill	by end of 2021	0	n/a
		Nominate at Marine Game Wardens (MGW) (at least 6)	1	DMRF	MGW operational	by end of 2021	tbd	DMRF
		Prohibit (Declare unwanted) the retention on board, transhipment, landing and selling of shark and ray fins and gills by commercial vessels not registered in Tobago.	1	DMRF	SSRMP accepted by Executive Council Note	by end of 2021	0	n/a
Heavy Metals	1,6	Agreement with laboratory for annual testing of shark samples for heavy metals	1	ERIC	Agreement signed	by end of 2021	0	0

Issue	Objective	Action	Priority	Responsibility	Indicator	Due Date	Est. Cost [TTD]	Financing
		Informing consumers about safe levels of shark meat consumption	1	DMRF, DoH	Publication	annually	0	0
Critical Habitats	1	Determine and protect critical habitats for nurseries, orientation, pupping, feeding, mating etc (e.g. wetland, islets) through collaboration with stakeholders	2	DMRF, SRMWG	Meeting records, research reports; regulations developed for designation and protection; regulations implemented	ongoing	0	n/a
Research	1,2,3,4	Ongoing BRUV shark sampling, min. 100 samples/year	2	ERIC	Annual BRUV report	ongoing	60,000 annually	Grant funding
		Ongoing shark and ray recreational sightings database	2	ERIC	Annual report	ongoing	ERIC in-kind	n/a
		Ongoing shark catch recordings by DMRF officers	1	DMRF/ ERIC	Annual report	ongoing	0	n/a
		Explore additional research collaborations and citizen science approaches to collect and analyse shark and ray data affordably (see chapter 8.6)	2	DMRF/ ERIC	Research agreements, data collected, analysed and findings reported	ongoing	unknown	Grant funding
		Implement fish catch (including sharks) smart phone data collection from fisherfolk with monthly reward lottery, including data storage and analysis	2	DMRF/ ERIC	Annual report	by end of 2021	unknown	Grant funding

Issue	Objective	Action	Priority	Responsibility	Indicator	Due Date	Est. Cost [TTD]	Financing
Capacity Building and Outreach	1,2,3,5,8	Ensure shark ID posters are renewed annually at all NE Tobago fishing ports and schools	3	ERIC	Visual documentation	by end of 2021	5,000	ERIC
		Annual training of DMRF officers in shark and ray identification and implementation of SSRMP	2	ERIC	Report	annually	ERIC in-kind	ERIC
		Social media posts, press releases, interviews regarding benefits and implementation status of SSRMP by members of SRMWG	2	DMRF, SRMWG	Posts, press releases	ongoing	0	n/a
		Create awareness regarding fines for violations of SSRMP regulations (once established by law)	1	DMRF	Report	annually, once legislated	0	n/a
		Active participation in national and international capacity building opportunities by fisherfolk, DMRF officers and members of the SRMWG	2	DMRF, SRMWG	Report	ongoing	unknown	DMRF, grant funding
		Actively seek assistance from local and international institutions for capacity building ad technical expertise	2	DMRF, SRMWG	Report	ongoing	0	n/a
M&E& Revision	1,2	Check achievements of SSRMP indicators annually	2	DMRF, SRMWG	M&E Report	annually	0	n/a
Financing	7	Identification and securing of governmental and non-governmental funding sources for the implementation of the SSRMP and related national obligations to international conventions.	1	DMRF, SRMWG	Proposals	ongoing	0	n/a

Issue	Objective	Action	Priority	Responsibility	Indicator	Due Date	Est. Cost [TTD]	Financing
		Explore the option to establish a shark trust fund that contributes to the implementation of the SSRMP and provides opportunities for innovative sustainable use of marine resources to fisherfolk	3	DMRF, SRMWG	Proposals	ongoing	0	n/a
Management	1,2,3,4,5,6,7,8,9	Establishment of a Cross Sectoral Shark and Ray Management Working Group (SRMWG) to create synergies and reduce conflict	1	DMRF	SRMWG is established and meets quarterly	ongoing	0	n/a
	1,2,3,4,5,6,7,8,9	DMRF establishes co-management agreement with operational NETPAMT	2	DMRF, NETPAMT	Co-management agreement	once NETPAMT is operational	0	n/a
	1,2,3,4,5,6,7,8,9	Improve collaboration between DMRF and FD to facilitate national reporting concerning implementation of regional and international conventions and agreements regarding shark and ray management	1	FD, DMRF	established reporting procedures and communication	ongoing	0	n/a
	2	Lobby for the inclusion of this SSRMP into the proposed Fisheries Management Bill as an annex.	1	DMRF	SSRMP included in new Fisheries Management Bill	by end of 2021	0	n/a

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13. Appendices

Appendix 1: NETMABR SSRMP Fisherfolk Consultation Report

Sustainable Shark Management Plan

Fisherfolk Consultation

Tuesday 8th December, 2020

Blue Waters Inn, Speyside, Tobago

Facilitated by:

Funded by:

Table of Contents

1. Introduction

On 28 October 2020, North-East Tobago was designated as a UNESCO Man and the Biosphere Reserve.

The marine buffer zone of the Biosphere area reaches from Castara to Belle Garden, extending 11.1. km seawards and covering 672.5km^2 is under the management authority of the Department of Marine Resources and Fisheries (DMRF) of the Tobago House of Assembly (THA).

There are seven fishing ports in the area with approximately 300 artisanal fishing boats; NE Tobago fisherfolk contribute significantly to the economic welfare of the area, are an intrinsic part of the cultural heritage, ensure food security and are as such key stakeholders in the sustainable management of marine resources.

Despite a significant decrease in shark abundance over the past decades, the area has been described as a bright spot for shark and ray population recovery by Global Finprint (www.globalfinprint.org), the world's largest reef shark and ray survey (2019).

In 2019, the Environmental Research Institute Charlotteville secured a grant from the Shark Conservation Fund (SCF) to monitor NE Tobago shark and ray population, train fisherfolk and Fisheries Officers and draft a sustainable shark and ray management plan.

A key component of the SCF project was a consultation with six fisherfolk from the entire, discuss with them the shark and ray management objectives and proposed activities and document their feedback.

The document at hand describes this process and its results.

2. Selection of Attendees

During the execution of a related project funded by the Waitt Foundation, ERIC interacted with fishermen across North-East Tobago through several discussions about Sustainably Managed Seas and designing a Marine Protected Area for North East Tobago. Five people were identified among those with whom ERIC staff had met. The persons identified were selected because they offered the most unique contributions, were the most comfortable speaking among strangers and represented or were associated with a group or association of fisherfolk.

3. Attendance

The workshop was attended by fisherfolk from Moriah, Castara, Charlotteville, Roxborough, and Belle Garden, representing two fisherfolk associations, and two core industries - tourism and fisheries. See APPENDIX 1 for the attendance sheet. Additionally, two representatives from ERIC were present, the Director, and an intern.

Absent but invited were the president of the All Tobago Fisherfolk Association and the president of the Association of Tobago Dive Operators. Two fisherfolk from Parlatuvier could not make it due to car issues.

Attendees:

- Hollis Walker, Castara
- Kester Leroy, Moriah (Moriah Fisherfolk Association)
- Curtis Antoine, Charlotteville
- Rodney Maycock, Roxborough (Roxborough Fisherfolk Association)
- Quincy, Zolani Frank, Charlotteville – Speyside
- Frankie Scott, Belle Garden

4. Location and Schedule

The consultation was held on 8 December 2020 at the Blue Waters Inn, Speyside Tobago from 8:30 to 13.00.

The following topics were covered:

- introductions and ice breaker: share a story about your first encounter with a shark
- North East Tobago UNESCO Man and the Biosphere designation
- role of sharks in the ecosystem and shark biology
- importance of sharks as apex predators for health fish stocks
- purpose of shark and ray management plan
- presentation of plan of action of the Sustainable Shark and Ray Management Plan, comments and discussion.

A few participants had car troubles so their arrival was delayed. While waiting for them to arrive the group discussed optimising boat engines to make them more environmentally friendly. This side conversation allowed the group to get to know each other and break the ice. By the time the other participants arrived and the workshop started, everyone was very comfortable voicing their opinions whether or not they were in agreement with everyone else, this healthy and open communication provided a very fruitful discussion.

During the coffee break that allowed participants to decompress and consider all that was discussed some participants took the opportunity to speak directly with the CEO of the ERIC to understand how the UNESCO Man and the Biosphere impacted them.

The discussion went over 12.00 simply because the participants were enjoying chatting with and learning from each other. A very obvious alliance was formed amongst all participants by the end of the workshop.

5. North East Tobago Shark Encounters

During the icebreaker, while describing their first or most memorable encounters with sharks, many fisherfolk were very specific about when and where they encountered sharks of various species. The table below illustrates this information.

Table 1: North East Tobago Shark Sightings Over a Ten-Year Period

Time (year)	Location	Shark Species	Additional comments
Unknown	Sisters	Hammerhead sharks	"On Sisters years ago you could've seen a school of hammerhead or a school of blacktip and maybe one tiger shark but there was also a lot of tunas there. Now no sharks no tunas, so what happened?"
		Blacktip Sharks	
X - 2010	Bad Rock	Unknown	This area was described as having so many sharks that you could stand and count sharks when the water is clear, decades ago.
2012 - 2015	Obea man point	Bull Sharks	The sharks were described as being "giant"
	Market place		
2019	Little Tobago	Whale Shark	None
Present day	Long Rock	Tiger Shark	None
Present day	Iguana Bay	Unknown	Sharks were observed eating other sharks at night

6. UNESCO MAB Designation

The CEO of ERIC announced that the UNESCO Site was declared and explained what this meant and what opportunities and benefits fisherfolk could capitalise on. This was the first time the majority of the participants were learning about this. It seems that despite the extensive media coverage, this great news did not reach the fisherfolk of North East Tobago The CEO elaborated that the designation was not a reward, but rather a tool that could be used for creating a more sustainable economy in North East Tobago.

7. Status of Shark fishing in North East Tobago

The participants were asked if they know of any fisherfolk in their communities who specifically target sharks. The group said there was no one who targets sharks, except one man from Roxborough. This person hunts sharks occasionally but this is only done upon requests from customers which usually include restaurants and hotels. It was mentioned that fisherfolk in Castara catch sharks as by-catch when they go banking.

Many of the fishermen present admitted to hunting sharks when they were younger and indicated that they stopped hunting sharks when they learned about the role sharks played in the ecosystem. *(Hollis, Curtis, Rodney, and Zolani)*

One fisherman, a spear fisher, admitted that he was terrified of sharks after encountering them on dives. Due to this fear he, himself never hunts sharks, but always supported them being hunted as he saw them as a threat. However, he said today was the first time he was learning about the role sharks played in the ocean Specifically, he did not know how often they reproduced and at what age they got to sexual maturity, and so he now understands why hunting them is detrimental to the species. *(Kester)*

Another fisherman suggested that ERIC educates children about sustainable fishing. They said, “fishing is a generational thing, the existing fishermen just don’t care so we need to target the youths.” *(Hollis)*

Meanwhile, now understanding the importance of sharks, two fishermen expressed that they believe fishermen should be trained and placed as the enforcers who ensure that no one hunts sharks. *(Kester and Frankie)*

8. Fisherfolk Thoughts on the Proposed Shark and Ray Management Plan

8.1. Fishing gear specifically targeted towards sharks

Proposed: Ban of gear targeted specifically at sharks

Fisherman consensus: 100% agreed

Condition: sharks can be caught as bycatch

Comments:

- “How migratory are these animals? We should track them,” this was proposed by Hollis and agreed by the others
- Tag and Release method was suggested by Rodney
- Hollis expressed the following sentiments: "We just learned that nobody in North East Tobago is directly targeting sharks so somebody is killing out sharks." The sharks follow the tuna, but the long-liners stop the tuna from coming here, that means they stop the sharks.

8.2. Foreign boats fishing in the UNESCO Site

Proposed: Ban of fishing by any vessel not registered with DMRF and a home port in Tobago

Fisherman consensus: 100% agreed

Condition: this does not apply during fishing tournaments

Comments:

- Spanish people have Trinidad registered boats. They fish in Trinidad waters (outside the UNESCO Site)
- It was suggested that "the fishermen should form a task force to be the enforcers"

8.3. The Sale of shark

Proposed: Sharks caught as by-catch must be sold locally and may not be exported to Trinidad

Fisherman consensus: 100% agreed

Comments:

- The fishermen stated that Tobagonians do not have an appetite for shark, there is no market for this here. However, the CEO explained that the purpose of this point is to prevent creating a system where Tobago fishermen are hired by Trinidadians to catch shark and send them to Trinidad. It was after this explanation that everyone agreed.

8.4. Landing Data

Proposed: Fishermen record and report the amount of shark caught

Fishermen consensus: 100% agreed

Comments: on a trial basis

8.5. Longline Fishing

Proposed: Ban industrial longline fishing in the UNESCO Site

Fishermen consensus: 100% agreed

Comments:

- Some fishermen did not understand the concept of longline fishing and thought it referred to the practice of fishing done here which involved using 20 hooks, in which case they did not agree. However, when the concept of commercial longline fishing was explained, and it was stated that this type of fishing is not currently done in Tobago and that this is to prevent it from being done in the future everyone understood and agreed.

8.6. Hook Removers

Proposed: Every Fishing Boat Should Have a Proper Hook Remover

Fishermen consensus: 100% agreed

Condition: The Government provides a grant for purchase of the equipment and training on utilising it

8.7. Gill Nets

Proposed: Ban on setting of gill nets / fillet nets in the UNESCO Site

Fishermen consensus: 4/6 agreed, 1/6 abstained, 1/6 disagreed

Comments:

- One fisherman in agreement said that a specific length should be given *(Curtis)*
- The fisherman who abstained from voting said he did not believe other fishermen would support this *(Zolani)* this statement was supported by a fisherman who agreed with the proposal *(Frankie)*
- The fisherman who disagreed provided the following alternative suggestions: allow the seasonal use of gill nets, or ban overnight use

8.8. Use of and training in usage of Circle hooks

The facilitator posed the following question to the group, "What can we do to make fishermen buy circle hooks"?

Their suggestions are as follows:

- - ban j hooks
- - educate them and train them to use it
- - make it mandatory that every tackle shop has to have circle hooks

The above statements align with the proposal regarding circle hooks, which was, "educate fisherfolk on the use / benefits of circle hooks, make sure circle hooks are available in tackle shops."

One fisherman (Hollis) explained in detail how to use circle hooks to het the same catch rate as with J – hooks for specific fishing methods

8.9. Circle Hooks in Fishing Tournaments

Proposal: Make the use of barbless circle hooks mandatory for fishing tournaments

Fishermen consensus: 2/6 agreed, 1/6 disagreed, 3 abstained

Comments:

- There was only one professional game fisherman present, and the others remained silent and followed his lead on the matter.

- This fisherman indicated that in tournaments “many guys troll, and circle hooks are not effective for this. Banking and pitching is where circle hooks can be used.” *(Hollis)*
- Pitch fishing is where you have a fake school of bait fish swimming behind the boat to attract the fish, when you see the fish (you desire to catch), you switch out the fake bait fait for an authentic good sized bait fish, then you “pitch the bait” (throw) and let the fish (you desire to catch) swim away with it. You let the fish turn and go, and then reel it it in slowly.
- “A lot of guys don’t know how to use circle hooks properly. You can’t yank it (the line) when the fish latches on because it (the hook) will come out.” *(Hollis)*

8.10. Carrying sharks or part thereof

Proposed: Travelling through the UNESCO Site with parts of shark and gear targeted for sharks is prohibited.

Fishermen consensus: 100% agreed

Comments:

- The purpose of this had to be explained since catching sharks or having shark gear was already banned. It was explained that this is to prevent people from saying that they caught the shark someone else and was just passing through, when in reality the caught the shark here.

9. Fisherfolk Representation

The fishermen were asked to think about who they would like to represent them and their interests at future meetings with governments to create this legislation. Before voting it was asked why the All Tobago Fisherfolk Association (ATFA) was not present at this meeting, as it was felt that they should have been here and should be at future meetings.

The group was informed that ERIC was trying to meet with ATFA for 3 weeks but to no avail. Unfortunately, despite chatting with the President, Vice President, and Representative for Belle Garden ERIC did not get an appointment with ATFA before the date of the Shark Workshop. The fishermen expressed that they were not surprised to learn about our trouble getting in touch with them, but expressed their disappointment with how this was handled by ATFA. It was clarified that the Belle Garden Representative was indeed willing and interested in the discussion but could not make the decision on behalf of the group, and that he was the one who connected us with the Vice President. The fisherman from Belle Garden understood the situation and said that his colleague’s heart was with the fishermen.

Despite all of this, some fishermen present said that ATFA does not speak for them.

In light of ERIC not being able to get a meeting with ATFA and the participants expressing mixed views about the organisation, the participants discussed amongst themselves and nominated the following persons to represent at future meetings regarding sustainable managed seas:

- Gideon King, Moriah, President of the Moriah Fisherfolk Association (he was not present at the meeting but was represented by another fisherman)
- Hollis Walker, Castara
- Rodney Maycock, Roxborough, Public Relations Officer of the Roxborough Fisherfolk Association

10. Non-Shark Related Discussions

10.1. Optimising Boat Engines

The possibility to change outboard engines to cleaner fuels was discussed.

There comments are as follows:

- We need to regularise how boats are built. The guys who are building boats need to get a model so they understand how a boat should be built. The layout of the boat needs to change so there are more dry places to facilitate additional technology, and keep water out of the engine.
- Making alterations to the existing boat engine has a few setbacks. For example, if you tamper with the engine then your warranty becomes void.
- ERIC should write to the boat engine manufacturers and ask them if they can cut some of the cost to help fishermen transition to 4-stroke engines. If ERIC pushes the environmental agenda the manufacturers might bite because this will help them with their company's brand.
- A micro-loan facility should be established for fisherfolk.
- Most boats in North East Tobago are 22, 23, and 28 feet in length.
- The cost of completely retrofitting an existing boat is between $20,000 - $35,000.

10.2. Seine Fishing

While discussing the issues related to shark fishing and the type of gear that needs to be changed, seine nets were brought up. This was the most controversial issue that left the group divided. Everyone understands the impact of these nets on the environment; however, the economic benefits seem to outweigh this. Many lamented the fact that seine fishing was an activity passed down through generations, and something that brings the community together.

10.3. Foreign Vessel in Tobago's Waters

It was mentioned that there is an app you can use to track vessels around Tobago. The ship tracking app is called "Marine Traffic." A couple of the participants knew about this app while others were now learning about it.

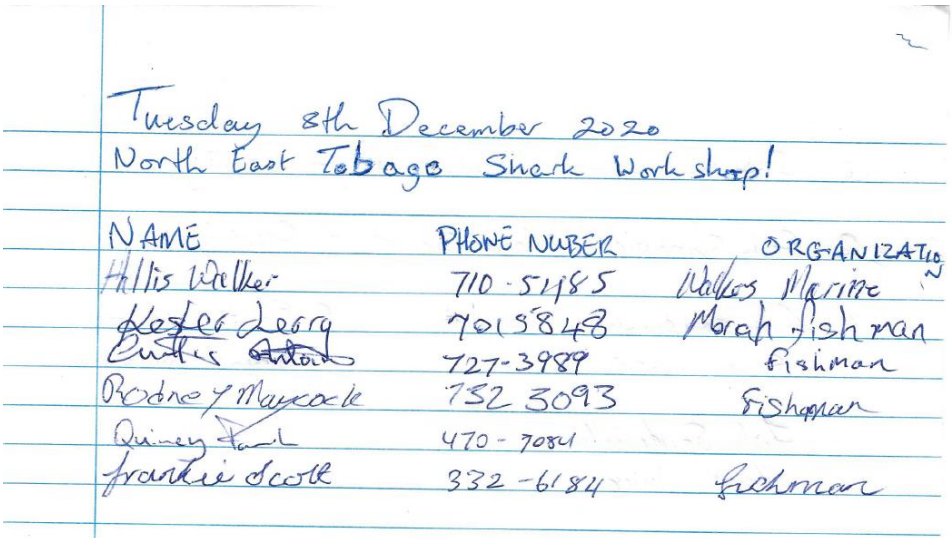
The conversation sprung from discussions about foreign vessels in Tobago's waters and what could be done to alleviate or prepare for these encounters.

11. Conclusion

At the end of the workshop the question on everyone's mind was, "when's the next meeting?" The participants did not know each other, hailed from various communities, practiced different styles of fishing, were various ages, and had various levels of exposure/knowledge. These men, once strangers, left united. They found common ground in that they all wanted to be able to wake up and fish tomorrow. There was consensus on almost all points proposed for the Shark and Ray Management Plan, and where people **disagreed,** they provided suggested alternatives. ERIC created a WhatsApp group called "Sustainable Seas North East Tobago" where they will share weekly updates with fisherfolks and other interested persons on issues related to conservation and sustainable fisheries management.

12. Annexes

Annex 1: Attendance Sheet



Tuesday 8th December 2020
North East Tobago Shark Workshop!

NAME	PHONE NUMBER	ORGANIZATION
Hillis Walker	710-5145	Walkos Marine
Keston Leery	7015848	Marah fishman
Curtis Antoine	727-3989	fishman
Rodney Maycock	752 3093	fishman
Quincy Earl	470-7084	
frankie scott	332-6184	fishman

Annex 2: Photographs from the Workshop

Left to right: Hollis Walker, Curtis Antoine, Frankie Scott, Rodney Maycock, Kester Jerry, and Zolani Frank.

Appendix 2: Proceedings of SSRMP Key Stakeholder Meeting (10 February 2021)

Attendees

Name	Position	Affiliation/ Institute
Bria De Costa	Associate Professional	Fisheries Division (Trinidad)
Chelsea Elvin	Associate Professional	Fisheries Division (Trinidad)
Gillian Stanislaus	Environmental Programme Officer II	Environmental Management Authority
Hollis Walker	Fisherfolk	Walker Marine/ Castara fisherfolk
Kelly Kingon	Assistant Professor	University of Trinidad and Tobago
Kerwin Sampson	Fisheries Officer	Department of Marine Resources and Fisheries
Nalini Rampersad-Ali	Wildlife Section Research Assistant	Forestry Division – Wildlife Section (Trinidad)
Linford Beckles	Director of Environment	Department of Environment
Narendra Ramgulam	Director Tourism Product Development and Destination Management	Tobago Tourism Agency Ltd
Rosemarie Kishore	Senior Research Officer	Institute of Marine Affairs
Farahnaz Solomon	Research Officer	Institute of Marine Affairs
Rodney Maycock	Public Relations Officer/ Fisherfolk	Roxborough Fisherfolk Association
Zaheer Hosein	Instructor	The University of the West Indies
Crystal Edwards	Fisheries Officer	Department of Marine Resources and Fisheries
Avion Williams	Administrative Professional	Tobago House of Assembly
John Edwards	Game Warden	Department of Natural Resources and Forestry
Angela Ramsey	Wildlife Biologist	Department of Natural Resources and Forestry
Ryan S. Mohammed	Director	Environmental Research Institute Charlotteville
Aljoscha Wothke	Director, CEO	Environmental Research Institute Charlotteville

Comments/ Feedback

1. There should be careful re-wording of the second mission (as recommended by Gillian Stanislaus)
2. Regarding heavy metals, care must be taken to ensure that the message does not come across as alarmist. Consideration should be made to widen the scope of the study to nationwide especially since sharks are not sedentary
3. Care must be made in using the Fisheries Management Bill (2020) as not yet approved
4. Include ICCAT and WECAFC Working Group for the Conservation and Management of Sharks in the Wider Caribbean Region to which Trinidad and Tobago is a member state

5. Regarding “Issues”:
    a. Gear selection and restrictions should be addressed as a separate issue
    b. To collect data, assigning data collectors to occasionally accompany fishers to record catch data can be considered
    c. Assistance of honorary game warden programme to assist with enforcement – need to look into the legal process for this
6. Management Plan of Action
    a. Overfishing
        i. Specify the gear that is to be banned (type of hooks and leads);
        ii. Be specific about which conventions or re-word to include “conventions specifically bound to Trinidad and Tobago”. As an addendum to the document, highlight that actions implemented for NE Tobago can have a wide-reaching positive effect for the island;
        iii. Regarding vessels, Maritime has taken over the registration – need to amend;
        iv. Regarding sale of sharks caught as by-catch, specify “dead sharks” to place emphasis on release of live sharks;
        v. Regarding licensing, there is no targeted shark fishing – consider dropping this action altogether;
        vi. Regarding banning of all long-line fishing, more description is needed, add exemption should be made for scientific/ research purposes;
        vii. Regarding shark caught as by-catch, amend to indicate that all parts (head, fins, tail and body) of the shark must be landed (as large sharks are usually broken down by fishers for transport to land);
        viii. Regarding overnight fishing, need to be specific, i.e., all overnight setting vs unsupervised overnight setting, number of persons allowed on the net, mesh size;
        ix. Regarding the circle hooks, does not mattery whether barbed or barbless is used by fishers;
        x. Regarding fishing tournaments, include mandatory ‘catch-and-release’;
        xi. Regarding retention, rewording may be needed as it seems contradictory to the by-catch action
    b. Heavy metals
        i. Regarding annual testing – sample the most commonly landed species??
    c. Capacity Building and Outreach
        i. Regarding the identification booklets, include training of fishers
        ii. Regarding fines, remove action as there are no fines at present
    d. Financing
        i. Regarding identification of funding, include “and securing”.
    e. Management
        i. Regarding transferring management, re-word for considering co-management or shared management instead of transferring management.
        ii. Include additional action, to identify avenues for making some of the actions law

Picture 1: Attendees at SSRMP Key Stakeholder Meeting on 10 February 2021
From left to right: Rodney Maycock, Crystal Edwards, Avion Williams, John Edwards, Angela Ramsey, Lanya Fanovich, Aljoscha Wothke

Picture 2: Virtual Attendees at SSRMP Key Stakeholder Meeting on 10 February 2021

Appendix 3: Reference to the Draft Fisheries Management Bill (2021)

There is no special mention of elasmobranchs in the proposed Fisheries Management Bill (2020).
It is noteworthy that certain articles use the term "'shall"' instead of the previously often used "may" for actions to be undertake by the appointed authority, be it the Minister or a Director in this case.
Furthermore, while there are several specific considerations regarding the protection of endangered species, the term "endangered" is not defined in the Interpretation of the Bill.
However, once adopted the following sections of the Fisheries Management Bill (2020) are noteworthy regarding the sustainable management of sharks and rays in the UNESCO NETMABR:

1. Regarding the Principles of Decision-Making, Article 6:

The Minister, Secretary, Director, or Director – Tobago, as appropriate, when performing functions or exercising powers under this Act, shall accordingly

(a) adopt measures to ensure the long-term sustainability of fisheries resources and promote the objective of their optimum utilisation;

(b) ensure that such measures are based on the best scientific evidence available and are designed to maintain or restore, where appropriate, target stocks at levels capable of producing maximum sustainable yield, as qualified by relevant environmental and economic factors, taking into account fishing patterns, the interdependence of stocks and any generally recommended international minimum standards;

(c) for specific target stocks to which the application of paragraph (b) would not otherwise apply, ensure that measures applied to such stocks are considered appropriate to achieve the purpose of this Act;

(d) apply the precautionary approach in accordance with this Act;

(e) assess the impacts of fishing, other human activities and environmental factors on target stocks, non-target species and species belonging to the same ecosystem or dependent upon or associated with target stocks in accordance with the ecosystem approach to fisheries management;

(f) adopt measures to minimise waste, discards, catch by lost or abandoned gear, pollution originating from fishing vessels, catch of non-target species and impacts on associated or dependent species, in particular endangered species and promote the development and use of selective, environmentally safe and cost-effective fishing gear and techniques;

(g) protect biodiversity in the aquatic environment, including habitats of particular significance for fisheries resources;

(h) take measures to reduce, prevent or eliminate over-fishing and excess fishing capacity and to ensure that levels of fishing effort do not exceed those commensurate with the sustainable use of fisheries resources;

(i) take into account the interests of artisanal, and subsistence fishers and local communities, including ensuring their participation, and consideration of traditional and local knowledge in decision making;

(j) ensure broad participation by Trinidad and Tobago nationals and relevant stakeholders in activities related to the sustainable use of fisheries resources;

(k) promote and facilitate the development and conduct of fisheries-related scientific monitoring and research in the fishery waters, and beyond such waters as permitted by international law or any treaty, convention, or other international agreement to which Trinidad and Tobago is a party, and utilise the best scientific information available in decision-making;

(l) collect and share, as appropriate, and in a timely manner, complete and accurate data concerning fishing activities on, among other things, vessel position, catch of target and non-target species and fishing effort, as well as information from national and international research programmes;

(m) implement conservation and management measures through effective monitoring, control and surveillance and enforcement; and

(n) promote and facilitate inter-agency collaboration for effective implementation of this Act.

2. Regarding the Scope of Management Plans, Article 33

(1) Separate management plans shall be prepared taking into account, among other factors, the following:

(a) the species of fish that are targeted;

(b) the types of fishing gear that are used in the fishery;

(c) the types of vessels that are used in the fishery; or

(d) the geographical areas that are fished.

(2) A management plan may apply to a single target species, or include other associated or dependent species caught in the fishery, or may cover a full ecosystem.

(3) To the extent possible, a management plan shall cover the whole stock unit of the main target fish species, over its entire range of distribution, taking into account its biological characteristics and any migration patterns.

(4) For those stocks of fish that are distributed in areas beyond national jurisdiction, a management plan may also give consideration to the management and conservation measures under relevant Conventions and Agreements.

3. Regarding the Content of Management Plans, Article 34

(1) Subject to section 35, each management plan shall contain elements relating to the particular fishery being managed including but not limited to:

(a) an introduction outlining the need and rationale for management of the fishery;

(b) the scope of the plan, as described in section 33;

(c) assessments of the historical development and the current status of the fishery, including its biological, ecological, social and economic dimensions;

(d) a stakeholder analysis of the fishery and a clear statement on the roles and responsibilities of the different stakeholders in the management process, including any co-management arrangements;

(e) the goals and objectives for the fishery, for each of the biological, ecological, social and economic dimensions, and the relative prioritisation between any conflicting objectives;

(f) the indicators and points of reference to be used in measuring the performance of management in achieving each objective;

(g) the management measures that will be used to achieve the objectives, and protect the resources from over exploitation;

(h) the specifications of any use or access rights to be allowed in the fishery and any terms and conditions to be attached to them;

(i) a decision control rule framework, developed in consultation with the fishery stakeholders, stating which management measures, including any levels of fishing effort, fish catches or other controls, shall be adopted depending on the status of the fishery;

(j) a statement on the current management recommendation for the fishery, as guided by the decision control rule framework, based on the estimated current status of the fishery and allowing for any uncertainties in the assessment and any associated risks for achievement of the fishery goals;

(k) an agreed process and timetable for monitoring the state of the fishery, and evaluating and reviewing the management plan as needed, providing for on-going consultation with the fishery stakeholders; and

(l) an estimated cost of implementation.

(2) The adoption of management measures and decision control rule framework in management plans shall be based on the best available scientific evidence and local knowledge of resource users.

4. Regarding Management Plan Objectives, Article 35

(1) In setting management objectives for each fishery, priority may be given to long-term sustainability of the fisheries resources, as qualified by relevant environmental and socio-economic factors and the impacts of climate, including climate change and variability, on the resources.

(2) Secondary management objectives may be established to provide among other things that:

(a) the economic conditions under which the fishing industry operates promote responsible fisheries;

(b) the interests of fishers, including those engaged in artisanal fisheries, are taken into account;

(c) biodiversity of aquatic habitats and ecosystems is conserved and endangered species are protected;

(d) depleted stocks are allowed to recover or, where appropriate, are actively restored;

(e) adverse environmental impacts on the resources from fishing, including pollution, waste, discards, catch by lost or abandoned fishing gear, catch of non-target species, and impacts on associated or dependent species, are minimised;

(f) climate change adaption and mitigation and disaster risk management are taken into account;

(g) rights and responsibilities of the State arising from international and regional treaties and arrangements are complied with.

5. Regarding a Precautionary Approach, Article 36

(1) The absence of adequate scientific information shall not justify postponing or failing to take conservation and management measures.

(2) The precautionary approach shall be adopted as far as is practicable in the preparation and implementation of management plans in order to protect exploited fish species and to conserve the aquatic environment.

6. Regarding Adoption and Implementation of Management Plans, Article 37

(1) Management plans shall be prepared in consultation with members of the fishing industry and other stakeholders, including any Fishing Association and agencies or Ministries with responsibility for coastal zone management and the environment.

(2) The Director shall submit the final management plans to the Minister for approval.

(3) The Minister may, by Order, approve a management plan and the management plan shall be set out in the Order.

(4) The Director shall be responsible for the implementation of management plans approved by the Minister.

(5) The Director shall cause the contents of each management plan to be publicised, in order to promote the understanding and acceptance of management plans and assist in their implementation.

7. Regarding the Review of Management Plans, Article 38

(1) A management plan shall be reviewed every three years, or for any other period agreed between the Director and the stakeholders referred to in section 37(1).

(2) Notwithstanding subsection (1), the Director shall cause a management plan to be reviewed at any time where such a review is considered necessary by the Minister or the Secretary and-

(a) the review shall be undertaken in consultation with stakeholders; and

8. Regarding Management Plans to conform with Other Agreements, Article 39

The Minister shall ensure that all management plans are in conformity with such international, regional or national agreements governing fish stock assessments or the management of fisheries to which Trinidad and Tobago is a party

9. Regarding Additional Measures, Article 44

(1) The Minister may, by Order, prescribe additional measures as required to achieve the fishery management objectives of a management plan including-

(a) restrictions on the species of fish that may be caught;

(b) size or age limits on fish species that may be caught;

(c) closed seasons;

(d) closed areas;

(e) zones reserved for selected fisheries, particularly artisanal fisheries;

(f) fishing gear restrictions, including diagonal stretched mesh sizes of different fishing gear; and

(g) limitations on the period of fishing gear deployment.

(2) An Order under subsection (1), as far as practicable, shall prescribe measures to

(a) ensure that fishing gear, methods and practices which are not consistent with responsible fishing are phased out or prohibited; and

(b) minimise waste, discards, catch by lost or abandoned fishing gear, catch of non-target species, catch of juvenile and spawning fish and negative impacts on associated or dependent species, in particular endangered species.

10. Regarding Prohibited Fishing Methods and Fishing Related Activities, Article 48

(1) Subject to this Act, the Minister may, by Order, after consultation with the Director and Director-Tobago–

(a) prohibit at all times, or during a specified period, the taking, from any specified area of fishery waters of–

(i) fish or fish included in a specified class of fish; and

(b) prohibit the taking, from any fisheries waters, of fish included in a specified class of fish that–

(i) are smaller or larger than a specified size;

(c) prohibit the taking, from any fisheries waters, of fish, or of fish included in a specified class of fish–

(i) by a specified method or fishing gear;

(d) prohibit the buying, selling, landing, displaying for sale, receiving, possession, transportation or export or import of fish, fish products or of fish included in a specified class of fish;

(e) prohibit a person from having in his possession or in his charge in a vessel, in any area of waters, fishing gear of a specified kind for taking fish;

(2) The Minister may, by Order, after consultation with the Director and Director-Tobago, prohibit the taking of protected or endangered species of fish in accordance with any written law or any treaty, convention, or other international agreement to which Trinidad and Tobago is a party.

11. Regarding Regulations, Article 232

(1) The Minister may make Regulations

(a) to give effect to the provisions of this Act; and

(b) as considered necessary or expedient for the purpose of giving effect to—

(i) international conservation and management measures adopted by regional fisheries management organisations to which Trinidad and Tobago is a member; or

(ii) treaties or arrangements to which Trinidad and Tobago is a party.

(2) Without prejudice to the generality of subsection (1), the Minister may make Regulations in respect of-

(k) measures for the conservation of fish habitats, protection of marine mammals and any threatened or endangered species, including sea birds, turtles, lobsters and conch;

(m) a fishing area, local fisheries management area, or protected areas declared as such under this Act, and prescribing any activities which may be taken in such areas.

Appendix 4: List of Major Relevant Conventions Agreements and Non- Binding Instruments for Fisheries

Cited from: Fisheries Division (2017), National Plan of Action for the Conservation and Management of Sharks of Trinidad and Tobago

The Legal and Regulatory Framework includes the need for compliance to address obligations conferred through membership to and ratification/accession to regional and international Agreements and Conventions

Significant binding Conventions and Agreements

1. United Nations Convention on the Law of the Sea (UNCLOS 1982);
2. Convention of International Trade in Endangered Species (CITES);
3. Convention on Biological Diversity;
4. Convention of the International Commission for the Conservation of Atlantic Tunas (ICCAT);
5. The United Nations Agreement for the Implementation of the Provisions of the United Nations
6. Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (in force as from December 2001 and acceded to by Trinidad and Tobago 13 September 2006);
7. The FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (the Agreement) which became international law in June 2016;
8. The FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas which is currently under consideration for ratification);
9. International Labour Organisation Work in Fishing Convention (under consideration for Ratification);

Significant non-binding Instruments

1. The Food and Agriculture Organisation 1995 Code of Conduct for Responsible Fisheries;
2. The regional Castries St. Lucia Declaration on Illegal Unreported and Unregulated Fishing signed in 2010;
3. The Caribbean Common Fisheries Policy of 2014 (CARICOM/ CARIFORUM); and
4. The Belize Declaration on Caribbean Regional Fisheries Mechanism (CRFM) and the Central America Fisheries and Aquaculture Organisation (OSPESCA) Cooperation for sustainable Development of Fisheries and Aquaculture Resources.
5. FAO Technical Guidelines for small scale fisheries, tenure, recreational fisheries, value chain etc.

Appendix 5: Major Legislation for Regulating the Fisheries Sector in NE Tobago

Cited from: Fisheries Division (2017), National Plan of Action for the Conservation and Management of Sharks of Trinidad and Tobago

1. The primary legislation is The Fisheries Act Chapter 67:51 (Act 39 of 1916**),** and its subsidiary legislation which include the:
    - *Fisheries Regulations (Amendment) 2002*
    - *Fisheries (Conservation of Marine Turtles) Regulations 1994*
    - *The Fisheries (Control of Demersal Trawling) Regulations 2004*
    - *Protection of Turtle and Turtle Eggs (Amendment) Regulations 2011*
    - *Control of Import of Live Fish Act Chapter 67:52*
    - *Fishing Industry Assistance Act*

2. Caribbean Fisheries Training and Development Institute Act, Chapter 39:53, Act 59 of 1975
3. Marking of Ships Act Chapter 50:09
4. Territorial Sea Act Chapter 1:51
5. The Shipping Act 1987 Chapter 50:10
6. Act 24 of 1986 – Archipelagic Waters and EEZ Act
7. Water Pollution Rules; and Noise Pollution Rules; (under the EMACT)
8. Fish and Fisheries Products Regulations 1988
9. Food and Drugs Act, Chap. 30:01
10. The Freedom of Information Act, 1999
11. Animals Act
12. Fishing Industry (Assistance) Act Chapter 85:03