Endangered, threatened, and protected (ETP) species management strategy for the Northern nylon shrimp bottom trawl FIP (Marpesca)

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Table of Contents

1. Introduction

This fishery is the Panama northern nylon shrimp – bottom trawl FIP. All five vessels are flagged to Panama and operate within the country's exclusive economic zone (EEZ). The fishery aims to improve its standard by working towards the following objectives:

- **Sustainable Fish Stocks:** To ensure the catches of shrimp and other primary species across the Panama EEZ do not exceed sustainable levels by 2027.
- **Minimizing Environmental Impacts:** To support the implementation of the ecosystem-based approach to fisheries management by 2027.
- **Effective Management:** To strengthen governance systems in Panama, regional governing bodies (ARAP), and the fishery by 2027.
- Be ready to enter MSC certification and meet the above objectives by 2027.

A key element of meeting the requirements set by the MSC Fisheries Standard (v3.0) is within Principle 2 (Minimising environmental impacts), and more specifically, identifying the impacts and risk associated with endangered, threatened, and protected (ETP) and/or out-of-scope (OOS) species.

The MSC definition of an ETP species is:

a. Species impacted by the UoA that are classified as amphibians, reptiles, birds, or mammals (hereafter known as OOS species).

b. Species impacted by the UoA that are classified as fish or invertebrates and are listed in any of the following:

   - Appendix 1 of the Convention on International Trade in Endangered Species (CITES).
   - Appendix 2 of CITES.
   - Appendix 1 of the Convention on the Conservation of Migratory Species of Wild Animals (CMS).
   - Appendix 2 of CMS.
   - The International Union for Conservation of Nature (IUCN) Red List of Threatened Species and classified globally as "Critically Endangered (Cr)".
   - The IUCN Red List of Threatened Species and classified globally as "Endangered (En)".
   - National ETP legislation.

Under version 3.0 of the Fisheries Standard, there is a decision tree diagram used by assessors when determining if a species should be listed as "in-scope" or "ETP" and this can be found below (Figure 1). The details of this decision tree are too complex to discuss in this report, but more information about species designation can be found in section SA3.1.4 of the MSC Fisheries Standard v3.0.

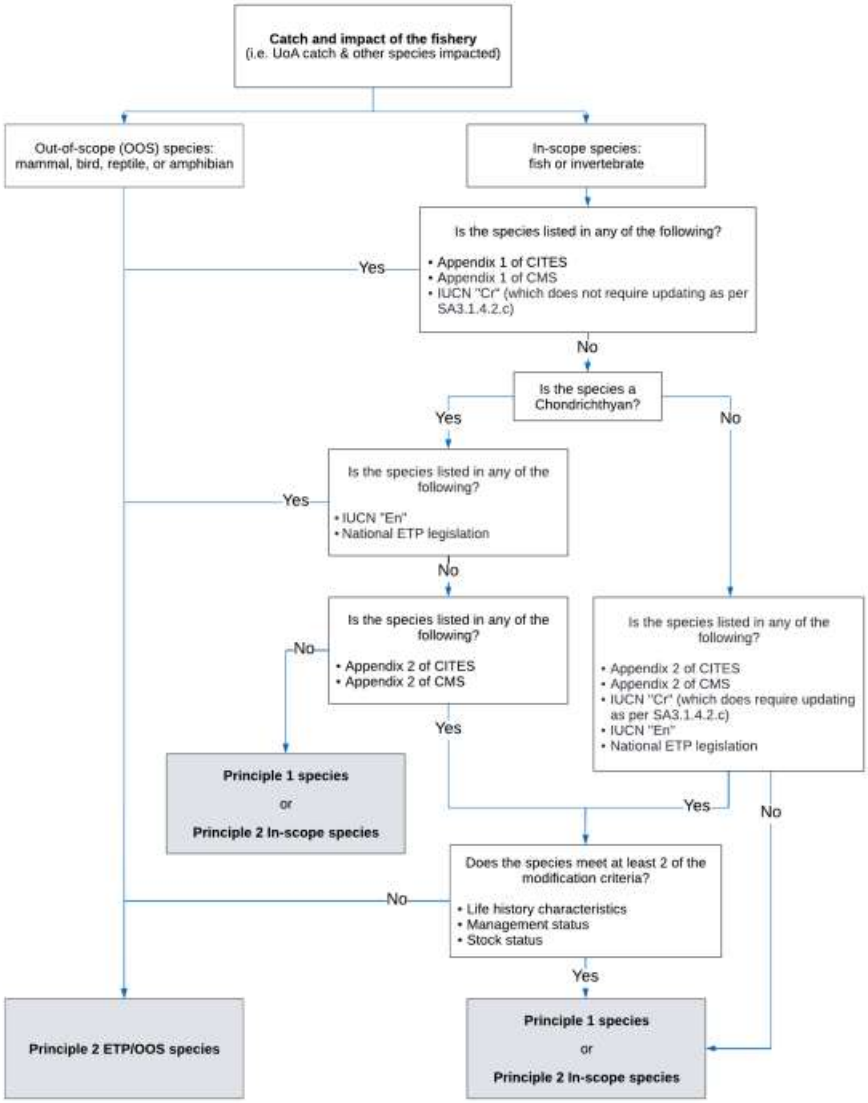

Figure SA3: Decision tree for species categorisation

Figure 1: MSC Fisheries Standard (v3.0) decision tree to determine if a species is "in-scope" or "ETP"

2. ETP species in Panama

Due to the unselective nature of the bottom trawl fishing method, there is a high risk of non-target species bycatch. In Panama, there are a number of ETP sharks, turtles, and OOS cetaceans that could be at risk from the fishing operations due to direct incidental catch when towing the net (Llamas, et al., 2017; Guzman, et al., 2019; Guzman, et al., 2020; Riaz-Torres, et al., 2022). At the time of writing this ETP management strategy, there has been no fishery-specific information made available about the type of species that it interacts with. Therefore, the following section of the report uses ETP species that are expected to be in the operational area of the fishery and could come into contact with the trawl net. The species list has been mostly obtained from a similar bottom trawl FIP operating in the Costa Rican EEZ (Clarke, et al., 2015) as well as other research papers that describe ETP species on the Pacific coast of Panama.

Table 1: ETP species list obtained from examples of ETP species found in the same operational area as the fishery

Common name	***Scientific name***	**MSC designation**	**Rationale**	**Source**
Loggerhead turtle	*Caretta caretta*	ETP	CMS Appendix I	Inter-American Convention for the Protection and Conservation of Turtles (NOAA, 2022)
Green turtle	*Chelonia mydas*	ETP	CMS Appendix I; CITES Appendix I	Inter-American Convention for the Protection and Conservation of Turtles (Blanco, et al., 2012)
Leatherback turtle	*Dermochelys coriacea*	ETP	CMS Appendix I; CITES Appendix I	Inter-American Convention for the Protection and Conservation of Turtles (NOAA, 2022)
Hawksbill turtle	*Eretmochelys imbricata*	ETP	CMS Appendix I	Inter-American Convention for the Protection and Conservation of Turtles (Llamas, et al., 2017)
Kemp's ridley turtle	*Lepidochelys kempii*	ETP	CMS Appendix I	Inter-American Convention for the Protection and Conservation of Turtles (NOAA, 2022)
Olive ridley turtle	*Lepidochelys olivacea*	ETP	CMS Appendix I	Inter-American Convention for the Protection and Conservation of Turtles (Guzman, et al., 2019)
Scalloped hammerhead shark	*Sphyrna lewini*	ETP	CMS Appendix II; CITES Appendix II	(Clarke, et al., 2016)
Silky shark	*Carcharhinus falciformis*	ETP	CMS Appendix II; CITES Appendix II	(Guzman, et al., 2019)
Bull shark	*Carcharhinus leucas*	ETP	CMS Appendix II; CITES Appendix II	(Guzman, et al., 2019)
Tiger shark	*Galeocerdo cuvier*	ETP	CMS Appendix II; CITES Appendix II	(Guzman, et al., 2019)
Smooth hammerhead	*Sphyrna zygaena*	ETP	CMS Appendix II; CITES Appendix II	(Guzman, et al., 2019)
Pelagic thresher shark	*Alopias pelagicus*	ETP	CMS Appendix II; CITES Appendix II	(Guzman, et al., 2019)
Common dolphin	*Delphinus delphin*	ETP	IUCN RedList (VU) CMS Appendix II	(May-Collado, et al., 2005)

Bottlenose dolphin	*Tursiops truncactus*	ETP	IUCN RedList (VU) CMS Appendix II	(May-Collado, et al., 2018)
Spotted dolphin	*Stenella attenuata*	ETP	CMS Appendix II	(Garcia & Dawson, 2003)

Marine turtles

Several studies around the world, in different bottom trawl fisheries have demonstrated the negative impacts that the fishing method has on bycatch species, including ETP species, including turtles (Duarte, et al., 2019). The nets are designed to capture shrimp by trawling along the seafloor, with a large open end, and enclosed back end. As a result, any animal that goes in, cannot escape. For air-breathing individuals like turtles, this can be fatal because it leads to them drowning before the fishing event has finished and the net is brought on board (Gray & Kennelly, 2018; Guzman, et al., 2019).

There is a leatherback turtle (*Dermochelys coriacea*) population that nests on the Panama coastline and means that their interaction with the shrimp bottom trawl fishery is likely. This population is listed as critical according to the IUCN RedList and is featured in both CITES and CMS Appendices.

Green turtles have been tracked moving from their nesting grounds into the Gulf of Panama to feed, so are a common occurrence in the operational areas of the fishery (Blanco, et al., 2012). Green turtles are listed as endangered on the IUCN RedList and is feature in both CITES and CMS Appendices.

Sharks

There are several species of shark that inhabit coastal Panamanian waters, and considering their life history traits, including slow growth, low fecundity, late maturity, and long-life, shark populations in Panama are considered to be vulnerable to fishing mortality (Guzman, et al., 2019).

Scalloped hammerhead shark (*Sphyrna lewini*): A study conducted in Costa Rica on a shrimp bottom trawl fishery, several elasmobranch species were recorded as part of the bycatch, contributing 4564 individuals to the total catch. Of these, four individual scalloped hammerhead sharks were present, and are protected under both CITES appendix II, and CMS Appendix II, and is listed as 'critical' on the IUCN RedList (Clarke, et al., 2016). There were no other ETP sharks or rays reported in this scientific article. To date, there have been no stock assessment or analyses conducted on any hammerhead species.

Despite no other sharks found in the research detailed above, there are a range of other ETP shark species that inhabit the Panamanian EEZ and should be considered to be at risk of bottom trawl fisheries such as the FIP described.

Skates and rays

As with sharks, there are many different skates and ray species that inhabit the Panamanian EEZ, and being benthic-dwelling animals, they are at a high risk from bottom trawling fishing methods. There were no ETP ray species identified in the literature surrounding bottom trawl impacts in Panama coastal waters. However, this will be reevaluated when more data becomes available about the FIP.

Cetaceans

As with the marine turtles and seabirds, cetaceans, including dolphins, porpoise and sea lions are air-breathers and will die from drowning if caught in the trawl net. Attracted to the net for prey, these

animals can get trapped inside, or entangled in the net and are not released until it is brought on board the vessel, by which time the animal has typically died (Gray & Kennelly, 2018).

3. National management strategies for Panama

Turtles

The Aquatic Resources Authority of Panama (ARAP) signed an agreement to the Inter-American Convention for the Protection and Conservation of Turtles, which details the comprehensive management measures in place to reduce the impact that Panama is having on turtles in the coastal state. The convention stresses the responsibilities of fishing activities to reduce the incidental capture, retention, damage, and death of sea turtles during fishing activities, through the appropriate regulation of fishing, including the improvement and implementation of mitigation techniques, such as turtle excluder devices (TEDs). The convention also advocates to restrict human activities that may affect turtles during reproduction, incubation (of eggs), and migration, promote scientific research related to sea turtles and their habitats. The TEDs will be continuously evaluated to manage the effectiveness of the measures on reducing catch mortality and bycatch biomass. The convention asks for scientists collaboration and research on the environmental impact on sea turtles as a result of fishing exploitation across a variety of different marine habitats that sea turtles occupy.

Sharks

Panama banned the capture of sharks for the sole purpose of obtaining and marketing their fins (Finning law no.9, March 2006). As of 2006, shark finning is prohibited in all Panamanian waters. Industrial fishers must land sharks with fins attached naturally Artisanal fishers may land the fins separately, but the weight ratio must be no more than 5% fins to whole weight of sharks. In 2010, a National Plan for the Conservation of Sharks was implemented across Panama to prevent illegal, unreported, and unregulated (IUU) fishing, and was amended in 2017 to include rays in the management initiatives.

Cetaceans

There are no specific management measures in place for cetacean bycatch in bottom trawl fisheries in Panama.

4. Fishery-specific ETP bycatch management strategy

The Panama northern nylon shrimp – bottom trawl fishery complies with the national management measures imposed by the relevant authorities described above. As well as this, the fishery has a demonstrated its commitment to implementing more measures to reduce the risk of interaction with ETP species and improve the post-release survival during incidents that take place. The following section of the strategy will outline the species-specific management strategies in place within the fishery, as well as the generic measures to ensure post-release survival of any ETP bycatch incidents.

Turtles

<u>Turtle Excluder Devices (TEDs)</u>

The FIP implements TEDs on all bottom trawl nets deployed in the operational areas of the fishery. A photo taken during a site visit in 2022 highlights the FIP's commitment to ensuring there is a route to escape and avoid capture in the nets (Figure 2).

Figure 2: Photo of a TED on part of the bottom trawl net used by the FIP taken during a site visit to Panama in 2022

Fishery closure periods:

The fishery has two closures during the year: (i) for 70 days after February, and (ii) for the month of October. These fishery closures are evidence that measures are in place which consider the potential impacts of the UoA on key elements of the ecosystem. Leatherback turtles used the Panamanian coast as nesting sites during between March and July (NOAA, 2022), which is why these closures are implemented after February. Fishery closures have seen to be effective ways to mitigate impacts on vulnerable and ETP species, including sea turtles (Lewison, et al., 2003).

Sharks

Shark finning

Shark finning practices have been outlawed by Panamanian government since 2006, and in 2017 rays were added to this management measure to ensure that no finning takes place on board any vessel operating within the EEZ. All of the vessels within the Panama northern nylon shrimp – bottom trawl FIP are complicit with the requirements from the Panama authority.

In 2022, the FIP implemented a fishery-specific shark finning policy into the management:

"Marpesca is declaring in this public policy to prohibit shark finning aboard all vessels and to demonstrate that this does not currently occur. Marpesca adopts the "fins naturally attached" rule for sharks and any sharks that are retained will be landed whole and reported. Species of sharks that are prohibited from being retained by national law or RFMO regulations, will be released alive to the best of the crew's ability".

Cetaceans

Avoidance

If a pod of dolphins or other small whale is seen near the fishing area, avoid or wait for them to pass before attempting to conduct operations. This is an effective way of making sure that there is reduced possibility that a these animals will become bycatch.

Disentangling Equipment

Have disentangling equipment readily available – somewhere on deck where crew can get it quickly when a whale or dolphin is caught. All disentangling must be done aligned with ISSF protocols and these include:

- Do not enter the water to untangle marine mammals, they are powerful animals and have dehooking and line-cutting equipment ready.
- If whales or dolphins are eating your caught fish, or you catch a marine mammal, consider moving the vessel before deploying another set

For small whales/dolphins (it is unlikely that large whales will interact with the bottom trawl gear)

- Avoid sudden actions, do not use gaffs, and facilitate animal reaching the surface to breathe
- If entangled move vessel close to use a long-handle line cutter and cut as much line as possible.
- Wait for the animal to move away before resuming fishing.
- If hooked move close to vessel but without pulling the line to bring the animal onboard. If superficially hooked use the dehooked if close enough. If you can´t then cut with the long-handled line cutter as close to the hook as possible.

Non species-specific measures

In addition to the species specific strategies mentioned above, the fishery shall:

- Avoid all ETP hotspots and communicate effectively between vessels to tell other fishers where these are.
- Comply with the shark finning policy
- Keep abreast of new science and promote research to further develop best practices for handling and safe release
- Implement observers onboard to conduct third-party records of non-target incidents

- All skippers shall attend and engage in the Skipper Training program being run through the FIP work plan
- Accurately record all ETP interactions including reporting interactions and fate of any releases (e.g. released alive; discarded dead, injuries), and collecting any data requested by scientists (e.g., photographs). Including documenting the inventory and use of equipment for the handling and safe release techniques.
- Collaborate with ARAP to adopt mandatory handling and safe and live release best practices for ETP species.
- Facilitating research that addresses mitigation of ETP species bycatch, and voluntarily adopt best practices when these become known including participating in research programs that reduce mortality of ETP species outside the fishery — for example, ISSF projects.
- Collaborating with other UoA and fleets to estimate overall interaction of ETP species and research on mitigation measure to reduce the cumulative impacts.
- Follow best practices of live release methods to minimise mortality and document their use of all ETP species and support mandatory adoption of these practices by Panama and ARAP.

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