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Indian Ocean Tuna Commission
Commission des Thons de l'Océan Indien

Pelagic Longline Fishery Impacts on Ecosystems and Interactions

IOTC ROS SFO TR17.3

Category: IOTC fisheries impacts on the ecosystems, interactions
with SSIs and mitigation

IOTC ROS SFO TR17



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This module aims to familiarize Observers with the pelagic longline fishery impacts on ecosystems and interactions, including the:

- Ecological impacts on non-target species;
- Fishery interactions with SSIs (including depredation);
- Possible mechanisms for mitigation of impacts of pelagic longline fishing on species of special interest.



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Ecological Impacts

Main ecological impact on the ecosystem is the **capture and/or entanglement of non-target species**, including the following species:

- a) Dolphin fish, marlins, etc. (hooked)
- b) Sharks & Rays (hooked)
- c) Seabirds (hooked)
- d) Marine turtles (hooked, entangled on the line)
- e) Cetaceans (hooked, entangled on the line, depredation as a result)



Sharks, seabirds and turtles are the most affected species, as the numbers captured by this fishery can be quite high if no mitigation measures are in place and the impact to the population can be serious due to the low reproduction rate of these species. As such, there are several international NGOs that protect these species (e.g., IUCN and BirdLife). Due to the presence of floats, cetaceans can also get entangled on the longline and drown occasionally. Small cetaceans can also get hooked. Sperm whales, killer whales, false killer whales and multiple species of dolphins are also known to depredate pelagic longlines for both the bait and the catch, and they can and do get hooked and entangled as a result of depredation.



Ecological Impacts: Discards and By-product Species

1) Discarded species (e.g., rays and lancet fish).

2) Retained non-target species

- Indo pacific sailfish, blue, black and striped marlins (listed as threatened by the IUCN and included in the list of IOTC SSIs).

The decrease of fishing pressure on these species is encouraged by the IOTC.

- Shark species such as the shortfin mako and the blue shark



Pelagic longline is a selective fishing method when it comes to species size. It is unable to target juvenile tuna species. It is however not exempted from catching non-target species including protected and vulnerable species and has therefore an ecological impact on the population of non-target species that are:

- discarded due to low or no commercial value (e.g., species like the rays and lancet fish);
- retained due to their commercial value (marlins, and certain species of sharks such as shortfin mako and blue shark)

Marlin species including Indo pacific sailfish, blue, black and striped marlins are categorized as threatened on the IUCN species list due to overfishing and are listed as Species of Special Interest to the IOTC. IOTC Res18/05 encourages the decrease of fishing pressure to these species.

Species of sharks such as the Mako and the Blue shark developed a market and some pelagic longline vessels started to target these species. Today, they contribute to a major part of the pelagic longline retained by-catch.

The shark fin market was booming between the late 90s and the mid 2000s and slowly decreased after 2010. This market had an influence on the decline of the shark species. Because shark trunks were not as valuable as the fins, finning and dumping of trunks became common practice mostly on vessels fishing on the high seas.



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Ecological Impacts: Incidentally Affected Species

SHARKS

(species with a retention ban included in the list of IOTC SSI)

- Oceanic white tip sharks and thresher sharks are vulnerable to pelagic longline fisheries since they get hooked on the longline.
- Whale sharks are vulnerable to pelagic longline fishing operations since they can get entangled on the longline.
- Especially exposed where longline fishing grounds and shark hotspot areas overlap (e.g., Maldives for whale sharks)
- Many times not released due to the price that shark fins can obtain in the shark fin market.



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Most species of sharks that are endangered are due to fishing pressure. The IOTC has included it on the list of species of special interest (SSI) sharks with a retention ban, including oceanic white tip sharks, thresher sharks and whale sharks.

These species are particularly vulnerable to pelagic longline fisheries since they dwell near the surface and are classified as threatened on the IUCN species.



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Ecological Impacts: Incidentally Affected Species

SEABIRDS (all included on the list of IOTC SSI)

- Vulnerable to pelagic longline fisheries due to natural feeding behaviour (scavenging at the surface, diving).
- Especially exposed where longline fishing grounds and seabird hotspot areas overlap (e.g., 25° latitude and South is designated hotspot for seabird bycatch).
- Seabirds' strong sense of smell attracts them from many miles around to feed on fishing vessel offal and bait.



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Seabirds are the most exposed incidentally affected species in the longline fishing. They are specially exposed in areas where longline fishing grounds and seabird hotspot areas overlap, for example at 25 degrees of latitude and South. On the late 80s and early 90s up to 200 seabirds were landed each day by longliners operating in these areas.



Ecological Impacts: Incidentally Affected Species

Marine Turtles (all included in the list of IOTC SSI)

- Carnivorous marine turtles are vulnerable to pelagic longline fisheries, since they can get hooked while feeding on bait.
- Other turtles are less vulnerable, but can get entangled in the longline.
- Marine turtles are especially exposed where fishing grounds and turtle migration routes/breeding hotspots overlap.
- No major level of mortalities has been reported when caught. Yet, concerns have been raised related to survival rates of hooked and released sea turtles.



Marine turtles are vulnerable to pelagic longline fisheries. They are specially exposed in areas where longline fishing grounds and turtle migration routes and/or breeding hotspots overlap, for example (e.g., the South African coast, and the Oman EEZ). Turtle by-catch on the pelagic longline fisheries has been reported (mainly in tropical areas), but no major level of mortality has been recorded at when caught. However there are concerns related to the survival rates of hooked and released sea turtles.



Ecological Impacts: Incidentally Affected Species

Cetaceans (all included on the list of IOTC SSIs)


- Toothed whales and small cetaceans are vulnerable due to their depredation behaviour (bait and catches), they can get hooked and entangled on the longline.
- Cetaceans' acute hearing and learning capacities, allow them to recognize the sound of the line being hauled and to remember fishing areas preferred by fisherman. In some cases they follow the fishing vessel and wait for it to set their lines so they can depredate on its catch.
- Baleen whales are less vulnerable, but can get entangled on the longline.



Both large and small cetacean species are vulnerable to pelagic longline fisheries. Toothed whales and small cetaceans are especially vulnerable due to their depredation behaviour, since they can get hooked and/or entangled on the longline while depredating on the bait and/or on the catch. Cetaceans' acute hearing and learning capacities, allows them to recognize the sound of the line being hauled and to remember fishing areas preferred by fisherman. In some cases they follow the fishing vessel and wait for line setting so they can depredate on its catch. Baleen whales are less vulnerable, but can get entangled in the pelagic longlines.




Mitigation Mechanisms to Reduce Pelagic Longline Fishing Impacts on Sharks, Rays & Marlins

Species	Impact	Mitigation
Sharks, rays and marlins 	<ul style="list-style-type: none">• entangled;• hooked.	<ul style="list-style-type: none">• have onboard line cutters and de-hookers in order to facilitate the prompt release of shark species that are prohibited from being retaining on board (white-tip sharks, thresher sharks);• have onboard line cutters and de-hookers in order to facilitate the prompt release of striped marlin, black marlin and blue marlin;• use efficient handling & release methods to increase survival rates.






Mitigation Mechanisms to Reduce Pelagic Longline Fishing Impacts on Seabirds

Species	Impact	Mitigation
Seabirds 	<ul style="list-style-type: none">hooked.	<ul style="list-style-type: none">night setting with minimal deck lighting;bird scaring devices ("tori lines"); andweighted traces.have onboard line cutters and de-hookers in order to facilitate the appropriate handling and prompt release of marine turtles caught or entangled.





Mitigation Mechanisms to Reduce Pelagic Longline Fishing Impacts on Marine Turtles

Species	Impact	Mitigation
Marine turtles 	<ul style="list-style-type: none">• Line entanglement;• hooked.	<ul style="list-style-type: none">• use circle- instead of J or the Japanese hooks;• use fish baits instead of squid;• set gear below turtle-abundant depths;• reduce gear soak time; retrieve in daytime;• avoid hot-spots near breeding colonies; and• use efficient handling & release methods to increase survival rates.






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Mitigation Mechanisms to Reduce Pelagic Longline Fishing Impacts on Cetaceans

Species	Impact	Mitigation
Cetaceans 	<ul style="list-style-type: none">• predation; and as a result• hooked;• entangled in the line.	<ul style="list-style-type: none">• use efficient handling & release methods to increase survival rates• have onboard line cutters and de-hookers in order to facilitate the prompt release of marine mammals caught or entangled.



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ANY QUESTIONS?

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