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IOTC Mitigation Measures

IOTC ROS SFO TR17.6

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

[IOTC ROS SFO TR17]



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REASONS FOR THE ADOPTION OF MITIGATION MEASURES

When protected species or species of special interest (SSIs) are identified by a tRFMO, such as the IOTC, mitigation measures are put in place to reduce any adverse impacts resulting (directly and indirectly) from fishing activities conducted by fishing fleets authorized to operate in the area covered by the Agreement.

CMMs help to minimize degree of loss or harm to PET species and SSIs.



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IOTC Mechanisms to Mitigate Impacts of Purse-seine Fishing on Target Species

- ✓ Prohibition on installing, operating and setting surface or submerged artificial lights (Res. 16/07).
- ✓ Limitation of the number of man-made artificial FADs to be deployed per vessel/year.
- ✓ Requirement to retain on board and land all bigeye, skipjack and yellowfin tuna caught, except fish considered unfit for human consumption (Res. 19/05).



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What is fish unfit for human consumption?

"unfit for human consumption" are fish that:

- *is meshed or crushed in the purse seine; or*
- *is damaged due to depredation; or*
- *has died and spoiled in the net where a gear failure has prevented both the normal retrieval of the net and catch, and efforts to release the fish*

"unfit for human consumption" does not include fish that:

- *is considered undesirable in terms of size, marketability, or species composition; or*
- *is spoiled or contaminated as the result of an act or omission of the crew of the fishing vessel.*



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What is Depredation?

- Depredation is a behaviour of non-natural predation induced by fishing modifying food behaviour and regimes.
- It mainly affects the longline fisheries
 - Generates considerable losses of:
 - Bait by small dolphins, birds
 - Catches by false killer whales, tropical pilot whales, pelagic sharks
 - May take place during:
 - Setting
 - Soaking time
 - Hauling



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Tuna depredated by toothed whales and dolphins (False killer whales, and Pilot whales).



Tuna depredated by sharks (less fish damaged on the line if depredation done by cetaceans)



Tuna depredated by squids



Tuna depredated by Cookie shark



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IOTC Mechanisms to Mitigate Impacts of Purse-seine Fishing on:

1. Non-target species
 2. Habitats
 3. Marine litter
 4. Ghost fishing
- ✓ **Vessels required to use non-entangling designs and materials in the construction of FADs (Res. 19/02).**
 - ✓ **Vessels encouraged to use natural or biodegradable materials in FADs (Res. 19/02).**





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IOTC Mechanisms to Mitigate Impacts of Fishing on Mobulid Rays (Res. 19/03)

- ✓ Prohibition from intentionally setting on *Mobulid* rays if the animal is sighted prior to start of the set.
- ✓ Prohibition from retaining onboard, transshipping, landing, storing, any part or whole carcass of *Mobulid* rays caught in the IOTC Area of Competence.
- ✓ Requirement to promptly release alive and unharmed, to the extent practicable, *Mobulid* rays as soon as they are seen and do it in a manner that will result in the least possible harm to the individual.



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Res. 19/03 - Mitigate Impacts Mobulid Rays (continued)

- ✓ **Surrender mobulid rays caught, whole, to the responsible governmental authorities, or other competent authority, or discard them at the point of landing.**
- ✓ **Mobulid rays surrendered in this manner may not be sold or bartered but may be donated for purposes of domestic human consumption.**
- ✓ **Use proper mitigation, identification, handling and releasing techniques and keep on board all necessary equipment for the release of mobulid rays in accordance with the handling guidelines**





Res. 19/03 – Annex 1 - Mitigate Impacts Mobulid Rays

1. Prohibit the gaffing of rays.
2. Prohibit the lifting of rays by the gill slits or spiracles.
3. Prohibit the punching of holes through the bodies of rays (e.g., to pass a cable through for lifting the ray).
4. Rays too large to be lifted safely by hand shall be, to the extent possible, brailed out of the net using best available method such as those recommended in document IOTC-2012-WPEB08-INF07.
5. Large rays that cannot be released safely before being landed on deck, shall be returned to the water as soon as possible, preferably utilizing a ramp from the deck connecting to an opening on the side of the boat, or if no such ramp is available, lowered with a sling or net.





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IOTC Mechanisms to Mitigate Impacts of Fishing on Whale Sharks (Res. 13/05)

- ✓ **Prohibition from intentionally setting on *Whale sharks* if the animal is sighted prior to start of the set.**
- ✓ **Requirement to promptly release alive and unharmed, to the extent practicable, *Whale sharks* as soon as they are seen and do it in a manner that will result in the least possible harm to the individual.**



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IOTC Mechanisms to Mitigate Impacts of Fishing on Cetaceans Species (Res. 13/04)

- ✓ **Prohibition from intentionally setting on cetaceans if is sighted prior to start of the set.**
- ✓ **Requirement to promptly release alive and unharmed, to the extent practicable, cetaceans as soon as they are seen and do it in a manner that will result in the least possible harm.**



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IOTC Mechanisms to Mitigate Impacts of Fishing on Thresher Sharks (Res. 12/09)

- ✓ **Prohibition from retaining onboard, transshipping, landing, storing, selling or offering for sale any part or whole carcass of *thresher sharks*.**
- ✓ **Requirement to promptly release alive and unharmed, to the extent practicable, *Thresher sharks* as soon as they are seen and do it in a manner that will result in the least possible harm to the individual.**





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IOTC Mechanisms to Mitigate Impacts of Fishing on Shark Species (Res. 13/06; Res. 17/05)

- ✓ Requirement to promptly release alive and unharmed, to the extent practicable, *oceanic whitetip sharks*, as soon as they are seen and do it in a manner that will result in the least possible harm to the individual.
- ✓ Encourage the release of live sharks, mainly juveniles and pregnant sharks that are caught incidentally and are not used for food and/or subsistence.



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IOTC Mechanisms to Mitigate Impacts of Fishing on Turtle Species (Res. 12/04)

- ✓ Requirement to bring aboard, if practicable, any captured marine turtle that is comatose or inactive as soon as possible and foster its recovery, including aiding in its resuscitation, before safely returning it to the water.
- ✓ All longliners to carry line cutters and de-hookers to facilitate the appropriate handling and prompt release of marine turtles caught or entangled.
- ✓ All purse-seiners to the extent practicable, avoid encirclement of marine turtles.
- ✓ All purse-seiners to the extent practicable, release all marine turtles observed entangled in FADs or other fishing gear.



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IOTC Mechanisms to Mitigate Impacts of Fishing on Marlin Species (Res. 18/05)

- ✓ **Prohibition to retain on board, trans-ship, land, any striped, black, blue marlin and Indo-Pacific sailfish specimen smaller than 60 cm Lower Jaw Fork Length.**
- ✓ **Encourage the release of live specimens brought on-board or alongside for taking on board the vessels.**



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IOTC Mechanisms to Mitigate Impacts of Fishing on Seabird Species (Res. 12/06)

Reducing incidental seabird bycatch (South of 25°S)

✓ Longline vessels required to use 2 of the 3 measures:

- ✓ Setting lines at night
- ✓ Bird scaring (or Tori) lines
- ✓ Weighting branch lines





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Seabird Bycatch Mitigation Measures

None of the three best measures work perfectly alone

Must be used in combination

Some fishermen don't like ANY of them!

- Night setting: can affect catch, operational
- Bird scaring lines: entanglement
- Line weights: crew safety? Perception affects catch



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Minimum Seabird Mitigation Requirements IOTC

Bird-scaring lines		Line weighting		Night setting	Meet RFMO Requirements Below 25°S
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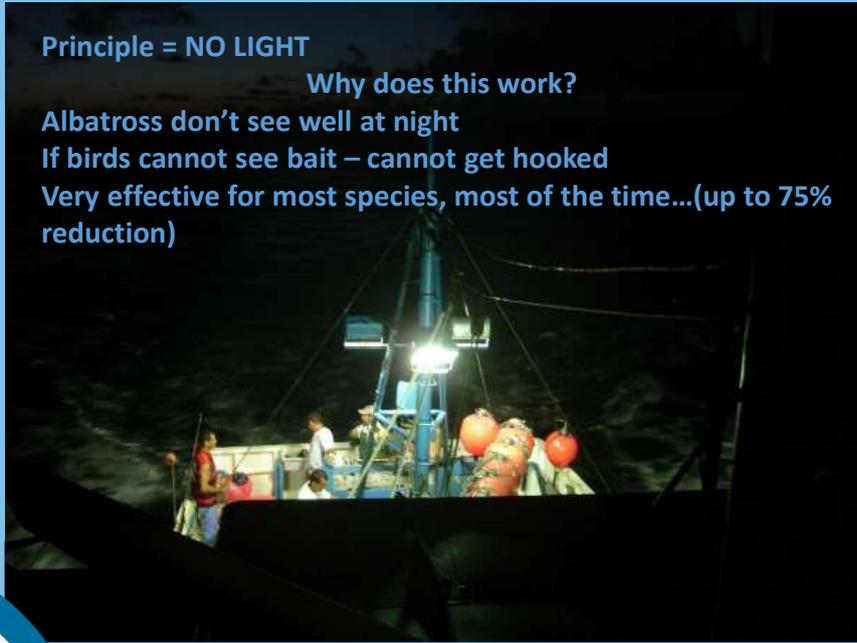
Principle = NO LIGHT

Why does this work?

Albatross don't see well at night

If birds cannot see bait – cannot get hooked

Very effective for most species, most of the time...(up to 75% reduction)



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...and night setting to deploy hooks when birds are less active



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Night Setting with Minimal Deck Lighting

- No setting between nautical dawn and nautical dusk
- Deck lighting to be kept minimal
- **All** hooks must be set in darkness

- Nautical dusk and nautical dawn are defined as set out in the Nautical Almanac tables for relevant latitude, local time and date.
- Minimum deck lighting should not breach minimum standards for safety and navigation.



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Key here is that all hooks must be set between nautical dusk and nautical dawn. If setting runs over past nautical dawn then you cannot say night setting has been used.



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Night Setting

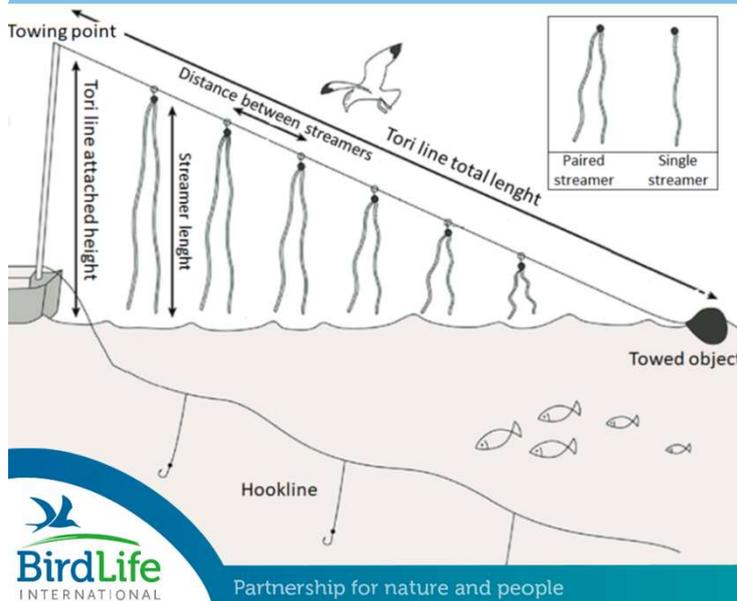
- Seabirds of genus *Procellaria* (white-chinned petrel = very common)
- Have excellent night vision
- Excellent divers
- Swim deep, bring bait to surface
- Get hooked, or albatross try to steal bait → get hooked
- FULL MOON – lots of light, seabirds see bait, get caught



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Bird-scaring Streamer Line (Tori line)



- Applicable for vessels > 35m
- Aerial section 100 m - designed to be in air!
- In-water section 50 m – pull mainline tight, keep it in air
- Total length +150 m



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Image of the area astern of a longline vessel where birds interact with the line being set.

The distance astern birds can access is a function of the vessels speed and the depth birds can access baited hooks. In the southern hemisphere this is assumed to be 10 m to preclude diving petrels. The faster the sink rate of the gear the smaller the distance or box. Most attacks are near the surface and taper off with depth. The objective of mitigations is to reduce the size of the box as best you can with line weighting or other strategies and then defend the access window with a bird scaring line or tori line.



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Bird-scaring Streamer Line (Tori line) (Requirements for vessels > 35m)

- Deploy at least 1 bird-scaring line.
- Aerial extent of bird-scaring lines must be greater than or equal to 100 m.
- Long streamers of sufficient length to reach the sea surface in calm conditions must be used.
- Long streamers must be at intervals of no more than 5m.



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• **Deploy at least 1 bird-scaring line.** Where practical, vessels are encouraged to use a second tori pole and bird scaring line at times of high bird abundance or activity; both tori lines should be deployed simultaneously, one on each side of the line being set.

• Aerial extent of bird-scaring lines **must be greater than or equal to 100 m.**

• **Long streamers** of sufficient length to reach the sea surface in calm conditions **must be used.**

• Long streamers must be at **intervals of no more than 5m.**



Bird-scaring Streamer Line (Tori line) (Requirements for vessels < 35m)



- Deploy at least 1 bird-scaring line
- Aerial extent must be **greater than or equal to 75 m**
- Long and/or short (but **greater than 1 m in length**) streamers must be used and placed at intervals as follows:
 - ✓ Short: intervals of **no more than 2 m**
 - ✓ Long: intervals of **no more than 5 m** for the first 55 m of bird scaring line

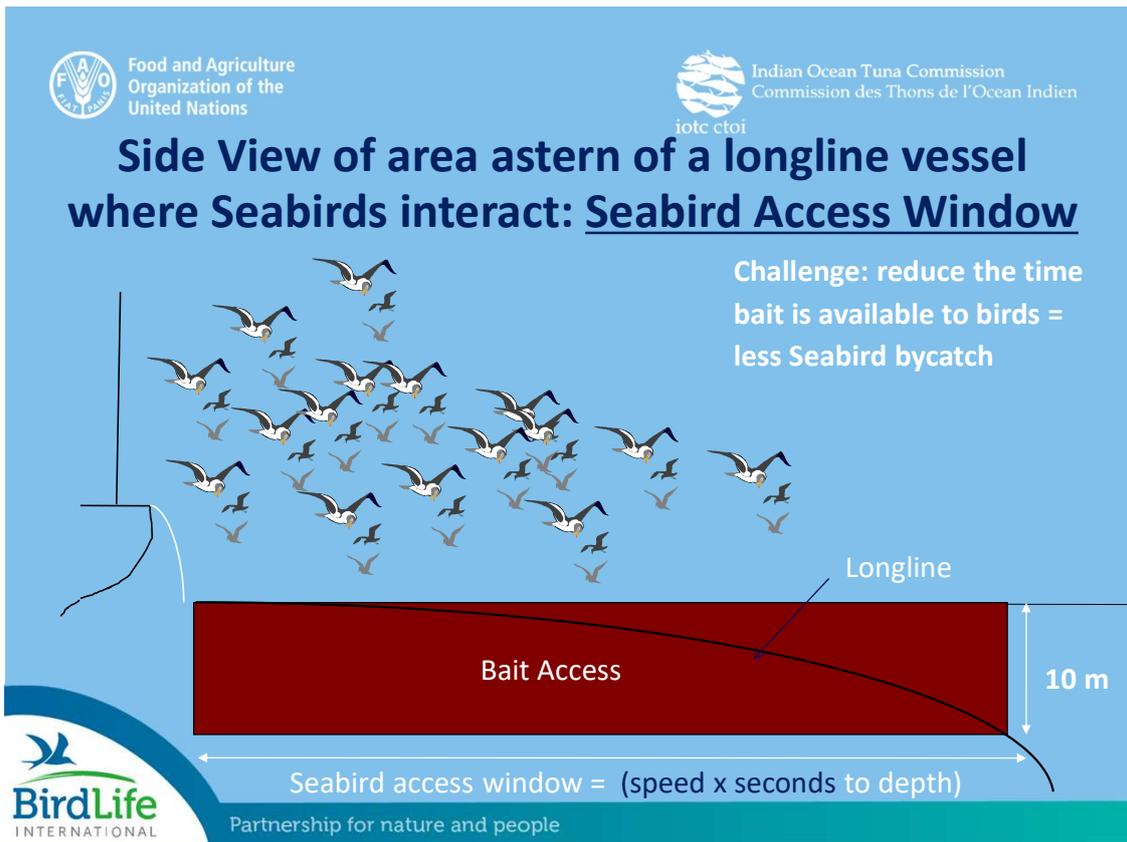


Bird-scaring lines

- Only effective while bait underneath
- Must have a robust pole for attachment
- As ship moves forward during setting – ‘shadow’ of protection moves
- If bait sinks too slowly:
 - not effective at all (remember diving petrels..)
 - increased entanglements

Other problems

Cross-winds/currents/bad weather



The distance astern birds can access baits is a function of the vessels speed and the depth birds can access baited hooks. In the southern hemisphere this is assumed to be 10 m to preclude diving petrels. The faster the sink rate of the gear the smaller the distance or box.

Most attacks are near the surface and taper off with depth

The objective of mitigations is to reduce the size of the box as best you can with line weighting or other strategies and then defend the access window with a bird scaring line or tori line.



Bird-scaring Lines



- Very simple to use
- Inexpensive
- Paired BSLs more effective than single line

Design features

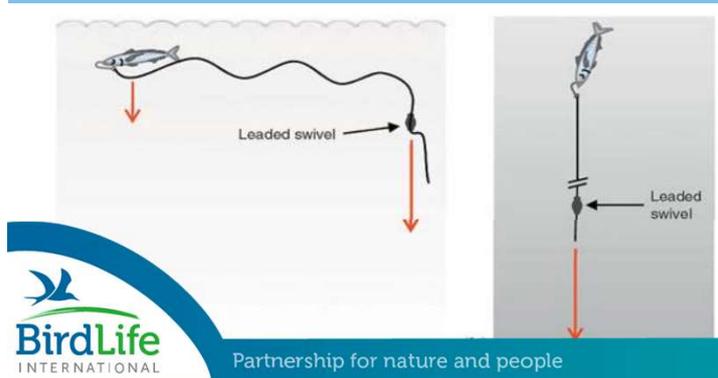
- Visible streamers (bright yellow/orange, contrast with dark sea background)
- Made from strong, non-entangling materials
- Streamers start close to stern



Line Weighting Requirements

Line weights to be deployed on the snood prior to setting

- 45g within 1m of hook, or
- 60g within 3.5m of hook, or
- greater than 98g within 4m of hook



3 methods for adding weight to branchlines

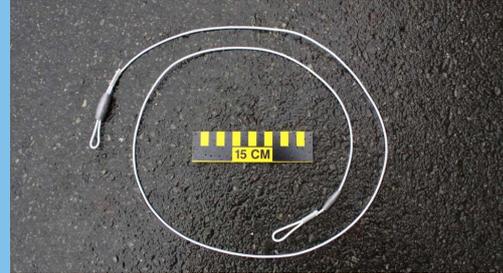
- Weighted swivels
- Yamazaki Double-weight System
- Sliding Leads

Tuna RFMOs require line weights to be deployed on the snood prior to setting. One of the above minimum standard for branchline weighting configurations having to be respected.



Yamazaki Double-weight System

- Japanese fishing master Yamazaki-san invented
- Two lead weights are placed in a branchline: one is fixed while the other can slide freely
- This design spreads mass and reduces the danger of injury to crew members if the weight recoils.



Kazuhiro Yamazaki, a captain on a Japanese tuna vessel won WWF Smart Gear competition 2011, when it presented its invention a double-weight branch line that sinks long line hooks beyond the range of seabirds, such as albatrosses and petrels, and reduces injuries and fatalities to crews caused by rapidly recoiling weights and hooks. The device has proven to be safe and effective at reducing seabird bycatch in pelagic (tuna) longline fisheries. In 2010, over 95,000 branch lines with the Yamazaki double weight system were hauled with no injuries to fishermen, reducing seabird bycatch by 89% more than un-weighted branch lines, with no effect on fish catch rates.

The Yamazaki double-weight configuration consists of two leads placed at either end of a 1 to 1.5 meter section of wire or wire trace. This weighted section is inserted into a branchline 2 meters above the hook. The weight nearest the hook is free to slide along the branchline while the second lead is fixed.

The double weight reduces the danger of weight recoil injury to crew members by spreading the mass of the weights across the wire trace, as two smaller weights are better than one, and by including a sliding weight that dampens the speed at

which the weight recoils. The double weight system is also easier to handle on deck than a single weighted swivel – it is easier to coil and it prevents jackknifing as it is thrown into the water in line setting.



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Weighted Swivels

- Monofilament is like elastic: can stretch
- 'Bite-offs' frequent during hauling
- Traditional leaded swivels → bullets



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The use of leaded swivels to add weight to the branchline as been proved to be quite dangerous, with rebounding lead weight killing several fishermen.



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Sliding Lumo Leads



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It is therefore advisable to use lummo leads, the SafeLead dissipates the energy on the rebound and prevents injury to fishermen, acting against dangerous 'bite-off' events, where large sharks can snap the line.



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