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Tuna pole and line fishery impacts - ecosystems and interactions

IOTC ROS SFO TR17.5

Category: Tuna poling

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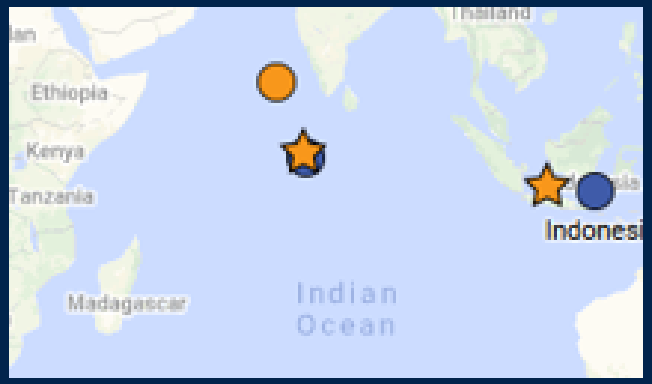
Pole and line fishing impacts - background



- Tuna is caught utilising a one-by-one method, using a barbless hook attached to a line and pole
- The fishing gear is seen as a responsible way of harvesting tuna
- Tuna pole and line operates in many places around the world
- In IOTC only operates on scale in Maldives and Indonesia (also India for local market)
- Skipjack *(Katsuwonus pelamis)* tuna is the main target species in the IOTC
- Can be caught in free schools or with assistance of FADS (mostly anchored, some drifting)
- Low or high fish bycatch rates depending on fishing methods employed

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Variations of Pole and Line fishing in IOTC:

Free school:

- Defined as "free" or "non-associated"
- Caught in open ocean without any structure or man made floating object
- Often located with the assistance of seabirds and other marine wildlife presence
- Very low levels of fish bycatch species

FAD fishing:

- Predominantly Anchored FADs (FADa) objects are utilised to fish in this way
- Defined as "associated" fishing; where other fish species and SSIs are usually present – with much higher bycatch rates

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Ecological impacts of pole and line fishing

- Clear benefits of FADs to the pole-and-line fisheries
- Use is associated with several potential negative impacts

<u>When caught in free-schools or unassociated schools:</u>

- Impact on bycatch is generally low for other fish species
- Maldives: 98 % skipjack tuna, <2 % yellowfin tuna and few bigeye tuna and kawakawa occur when this method is used.
- Few sharks are caught in free schools, but silky sharks are believed to be a SSI for this fishery
- Sea birds such as Lesser and Brown noddies could be caught frequently, but with a high rate of survival
- Seabirds valued in this method of fishing as they potentially indicate location of schooling fish

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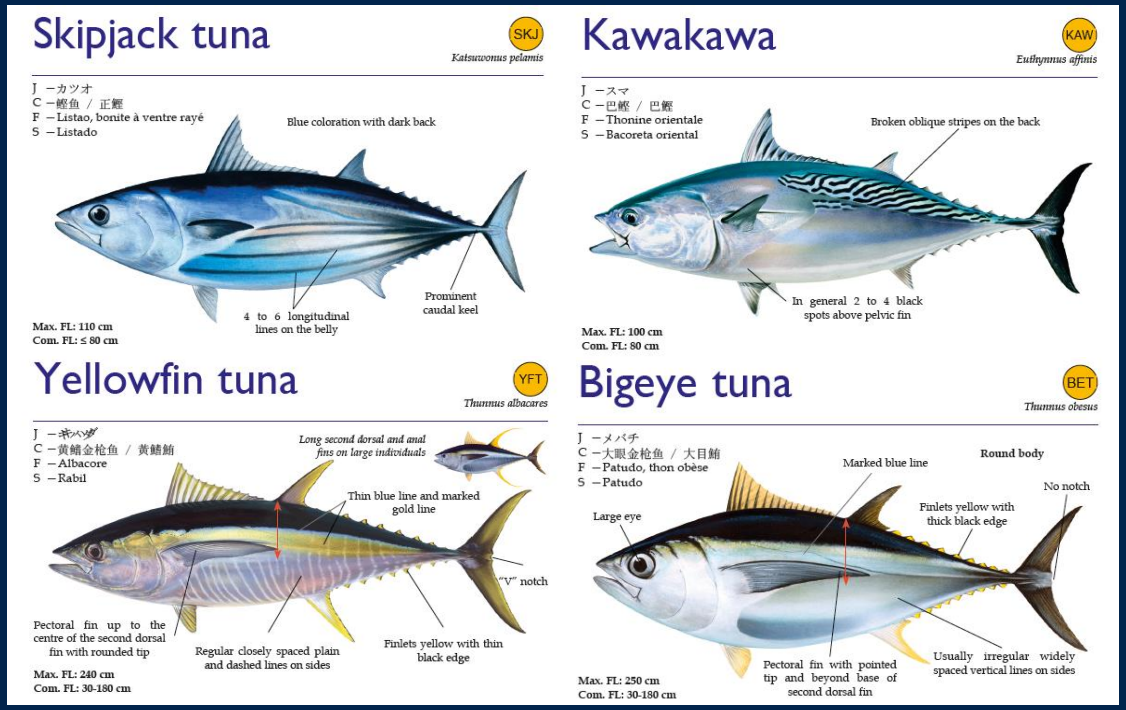
Impacts on tuna stocks

a) catching too many fish that prejudices reproduction (recruitment overfishing);

b) catching too many small fish and reducing the number that reach maturity (growth overfishing);



- IOTC has conservation measures containing size limits for retained tuna

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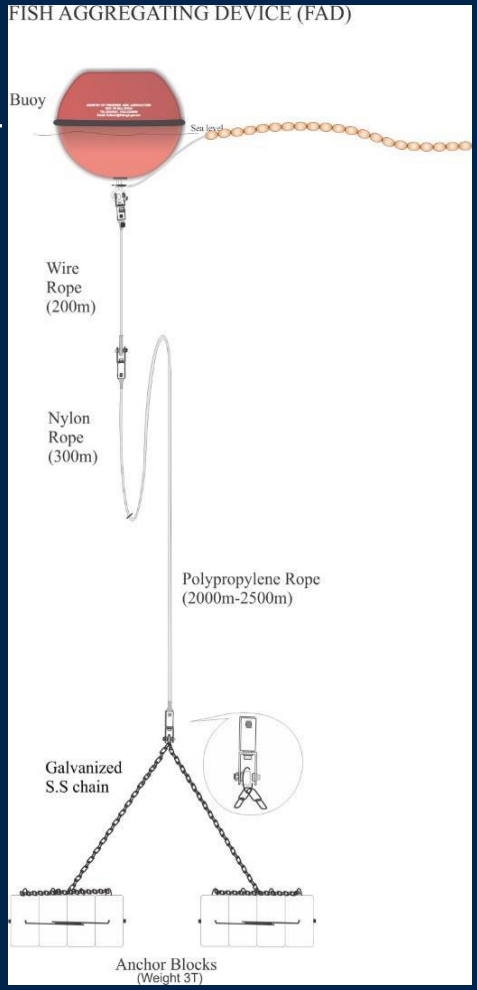
Ecological impact on tuna stocks:

<u>When caught with FADs, natural logs or other floating objects:</u>

- Fish tend to occur in associated schools
- Skipjack tend to be smaller in size and often associated with juvenile yellowfin tuna
- High bycatch rate; approximately half (50%) skip jack and other half predominantly yellowfin tuna and big-eye tuna (2 – 3 %)
- Risk of FAD entanglement for many SSIs such as sea turtles, marine mammals, sharks and other protected species
- Risk of FADs breaking apart and polluting or ghost fishing
- Note: FADa's can be non-entangling by design such as ones issued by Maldives – see right



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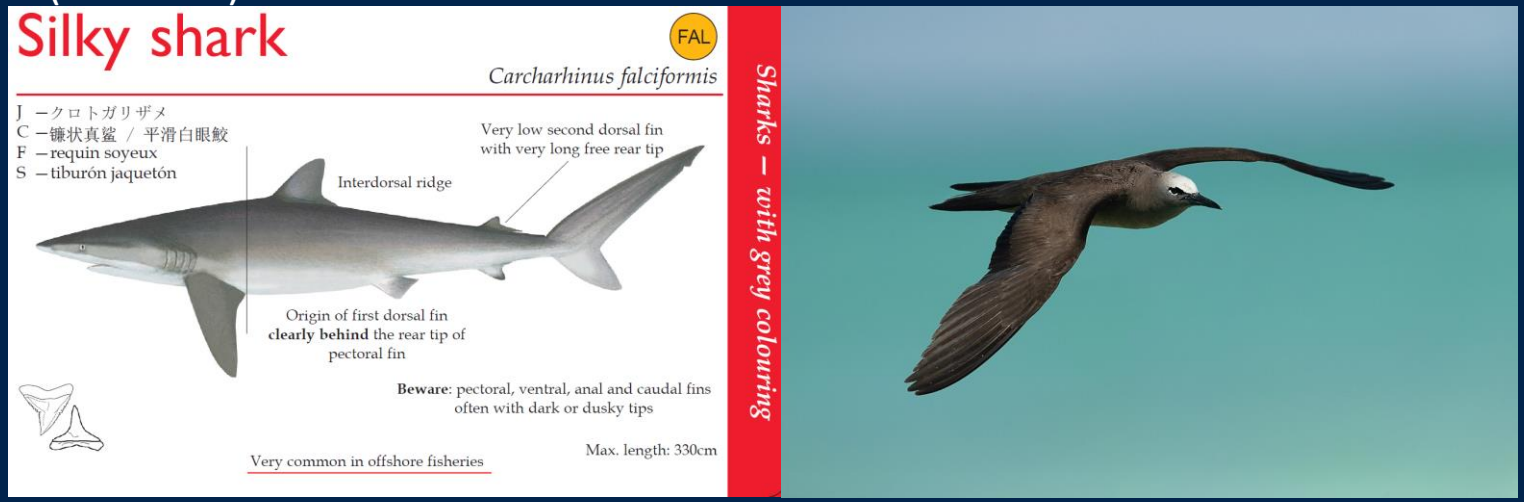
The capture/entanglement of non-target species (bycatch):

a) retained bycatch (by-product)

b) incidentally taken in a fishery and returned to the sea (discarded)

c) incidentally affected by interacting with fishing equipment in the fishery, but not taken (released)



- Note bycatch species are usually caught during bait fishing or unintentionally in FADs
- Bycatch species can include other tunas or fish that associate with the target species
- Note: Seabirds, usually brown / common noddies, have been recorded as caught and released alive by observers during active fishing operation in Maldives

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Damage to marine and coastal habitats and marine litter:

- When FAD structures are lost or abandoned in fragile marine habitats like coral reefs

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Ghost fishing:

- Defined as the accidental capture of marine life by fishing gear lost or discarded at sea that continues to entangle animals
- Ghost fishing catch volumes are hard to estimate, has no economic value and continues to fish for as long as the fishing gear is in tact (potentially 100s of years)

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Resolution 18/04 On BIOFAD Experimental Project

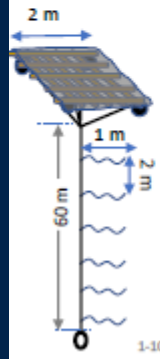
BIODEGRADABLE FADs DEPLOYMENT

PROJECT OBJETIVES

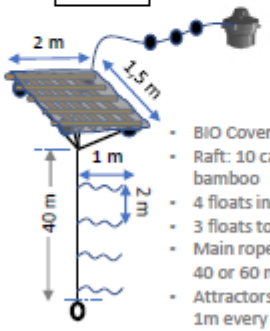
- To test biodegradable materials and prototypes at sea real conditions
- Each vessel will deploy 24 BIOFADs in one year (2 BIOFADs per month and vessel)
- The objective is to assess the feasibility of the prototypes regarding:
  - ✓ One year durability
  - ✓ Degradability in real conditions
  - ✓ Fishing efficiency (aggregation) in comparison to conventional non-entangling FADs

PROTOTYPES & MATERIALS

A.1

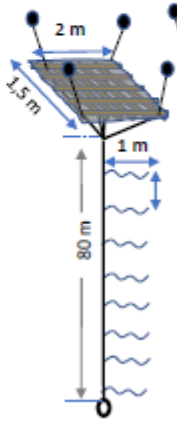


A.2

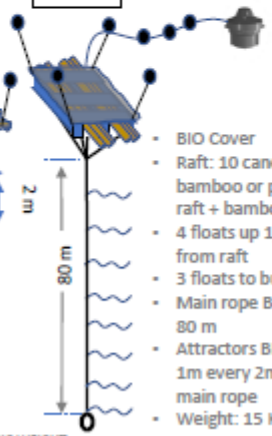


- BIO Cover
- Raft: 10 canes of bamboo
- 4 floats in raft
- 3 floats to buoy
- Main rope BIO: 40 or 60 m
- Attractors BIO: 1m every 2m of main rope
- Weight: 1-10 Kg

B.1

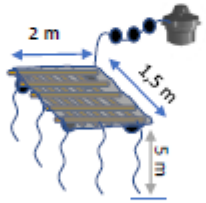


B.2



- BIO Cover
- Raft: 10 canes of bamboo or pallet raft + bamboo
- 4 floats up 1,5 m from raft
- 3 floats to buoy
- Main rope BIO: 80 m
- Attractors BIO: 1m every 2m of main rope
- Weight: 15 Kg

C



- BIO Cover
- 10 canes of bamboo
- 4 floats in raft
- 3 floats to buoy
- Attractor BIO: 8 units of 5m looped rope
- There is not weight

NOT USE at BIOFAD

Metallic frame

Synthetic rope (tail)

Net

Plastic bottle/drum

- Non-entangling and biodegradable solution to standard FADa and FADd
- Stops ghost fishing occurring for many years if FAD breaks loose

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Bait fishing and bait management

Different types of bait:

1) Live bait

a) Wild caught

- Kept alive in tanks on vessel
- Most effective and commonly utilised method in IOTC

b) Farmed bait

- Various fish experimented with, milkfish currently most common species

- Pros – Does not have to be caught at sea – saves energy and time for fishing operation. Protects baitfish natural resources

- Cons – Expensive, needs large infrastructure investment

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Bait fishing and bait management

2) Dried / frozen bait

- Baitfish caught / farmed, frozen and / or dried for use later at sea

- Pros - less resource wastage as survival rate at sea not of importance, useful replacement for live bait when not available
- Cons – Not as effective as live bait

3) Artificial bait

- Mostly experimental in IOTC
- Pros - natural bait fish resource not harvested

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Ecological impacts:

Baitfish can generally reproduce quickly, fishing can still have significant environmental impacts such as:

1) Reduction in the amount of forage available for larger fish
2) overexploitation of some baitfish species, and
3) bycatch of non-target species
    a) retained bycatch (byproduct)
    b) incidentally taken in a fishery and returned to the sea (discarded)
    c) incidentally affected by interacting with fishing equipment in the fishery, but not taken (released)

<u>Note for observers:</u>

Management of bait fisheries as well as the ongoing collection of data on bait fishing activities (species composition, total catch, catch-per-unit-effort) are key components for ensuring this aspect of pole-and-line fisheries is sustainably managed.

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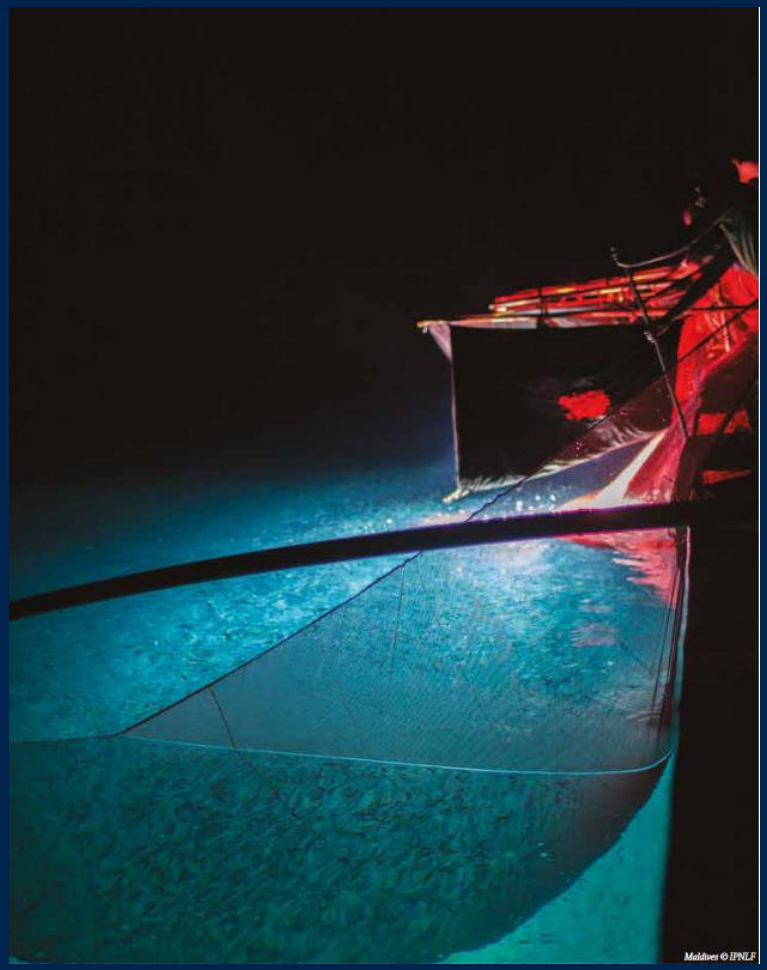
Bait fishing interactions: Maldives

- Fish usually caught under lights during the night with lift nets (below left)
- Also caught with ring nets (small purse seine)
- Other variations of luring, lifting or surrounding bait with netting exists in bait fishing operations around the world
- Various smaller predators and associated species are at risk during these operations, but most should have the potential for release in good condition if recommended handling practices are followed



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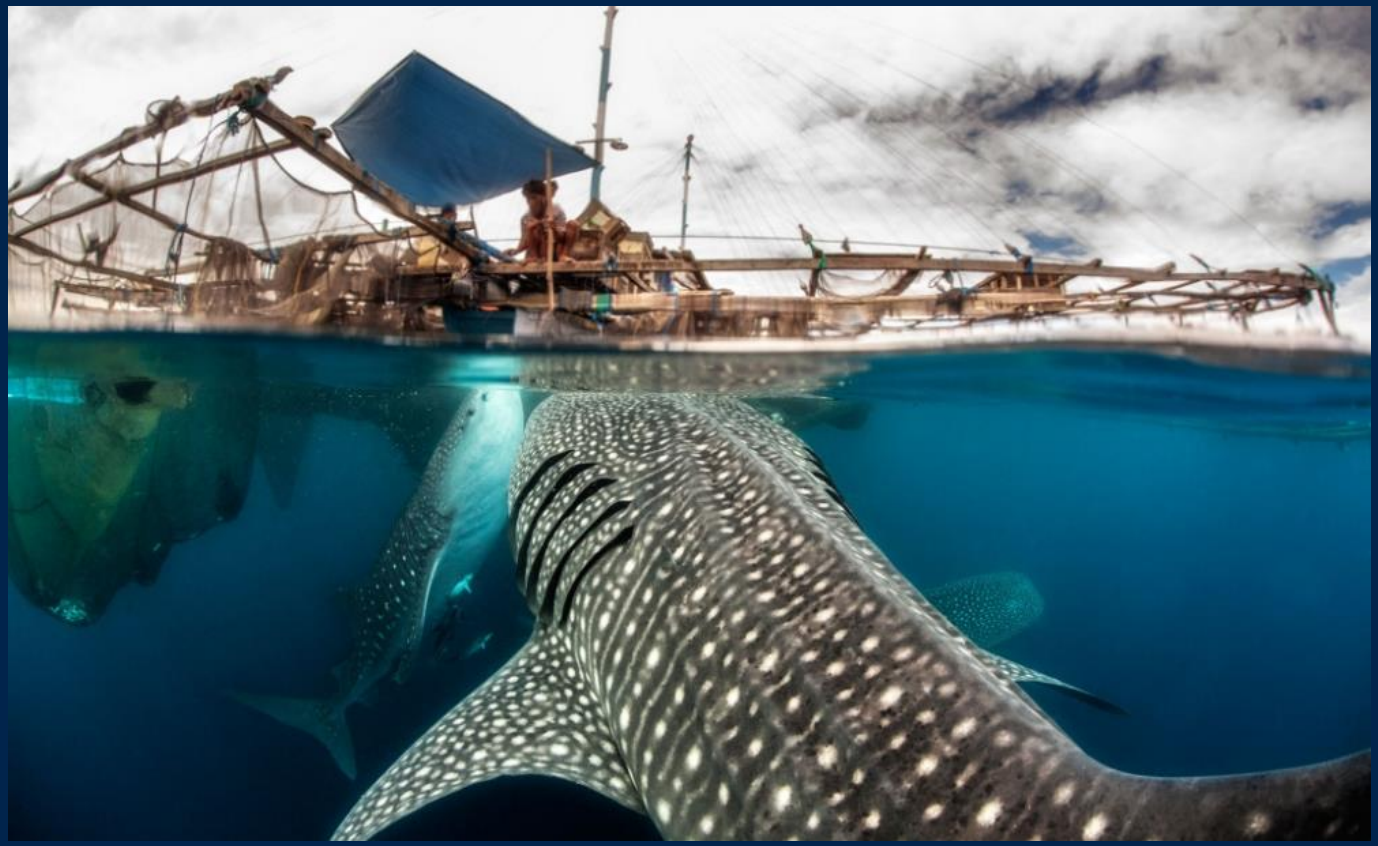
Bait fishing SSI interactions: Bagan - Indonesia



- Net is lifted after baitfish accumulates under structure (like a FAD) with assistance from lights at night
- Large variety of bait species caught
- Potential to release any SSIs alive that may get entangled (on rare occasion)

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Potential bait fishing impacts and mitigation:

SPECIES	IMPACT	MITIGATION
Marine turtles	• encircled/ caught on bait fishing nets.	• turtle should be encouraged to swim out of the net; or • a large dip-net can be used to pick up the turtle from the net; • usage of the proper techniques to handle and release bycatch species such as turtles.
Cetaceans (Marine mammals)	• encircled/ caught on bait fishing nets.	• a side of the net can be lowered to allow the cetacean(s) to escape
Sharks, rays, marlins and other large fish	• encircled / caught on bait fishing nets.	• usage of the proper techniques to handle and release bycatch species such as sharks and others.

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Exercise:

There are conservation and management measures put in place by the IOTC to limit the capture of juvenile tunas, to avoid the capture/entanglement of Species of Special Interest (SSI), to investigate, limit and avoid ecological impacts of FADs and of purse-seine fishing, please consult the most recent version of the Compendium of Active Conservation and Management Measures for the Indian Ocean Tuna Commission (https://www.iotc.org/cmms)

List and comment briefly on all CMMs that you can find that would have an impact both target species and SSIs

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