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# Pole & Line Fishery Impacts and Interactions

*IOTC ROS SFO TR17.5*

Category: IOTC fisheries impacts on the ecosystems,  
interactions with species of special interest and mitigation

*IOTC ROS SFO TR17.5*



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Aware of tuna pole and line (tuna and bait) fishery impacts on the ecosystems and interactions



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## Background

- Responsible way of harvesting tuna
- Operates on scale in Maldives and Indonesia (also India for local market)
- Uses FADS (mostly anchored, some drifting)
- Low bycatch rates
- Baitfish monitoring is an important part of Pole and Line observations



Images (IPNLF/ISSF, 2019)



## Variations of Pole and Line fishing in IOTC:

### Free school or “non-associated” fishing

- 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 or “associated” fishing

- Predominantly Anchored FADs (AFADs) utilised
- Higher level of bycatch rates and SSIs





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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

When caught in free-schools or un-associated schools:

- The potential capture of silky sharks
- Sea birds such as Lesser and Brown noddies could be caught frequently, but with a high rate of survival



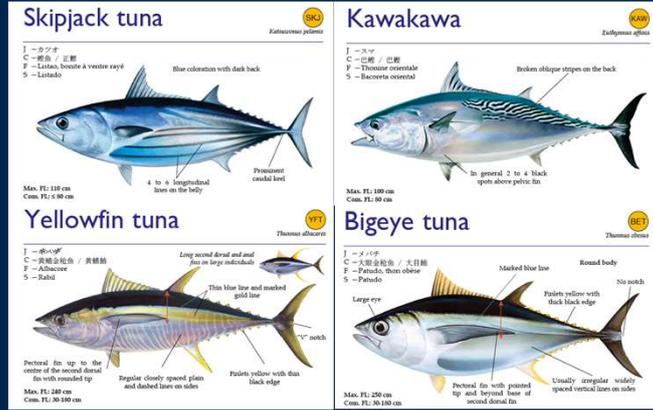
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Image (IPNLF/ISSF, 2019)



## 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

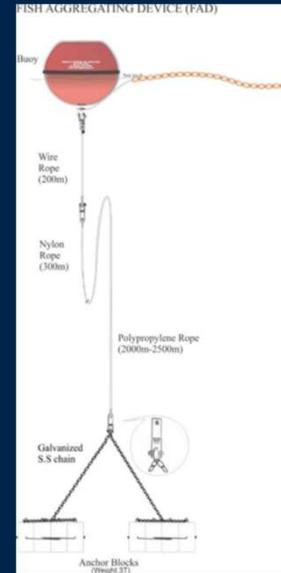
Class activity for sizes?



## Ecological impact on tuna stocks:

### When caught with FADs, natural logs or other floating objects:

- 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
- Risk of FADs breaking apart and polluting or ghost fishing

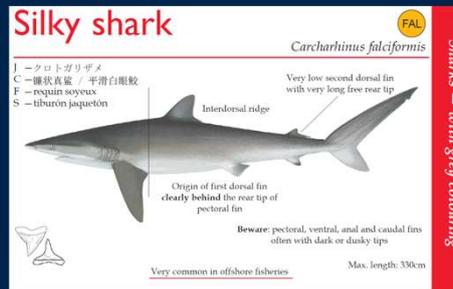


FAD Image (IPNLF/ISSF, 2019)



## 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)



<https://xray-mag.com/content/not-just-fad-saving-reefs-seychelles-islands>



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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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Images © <https://xray-mag.com/content/not-just-fad-saving-reefs-seychelles-islands>



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## Ghost fishing:



- 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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Shark entangled in a FAD (Photo: Fabien Forget) - <http://www.issfguidebooks.org/observer-2-12>

Sea turtle - <https://www.nation.sc/archive/237151/olive-ridley-turtle-found-tangled-in-drifting-fad-in-alphonse-lagoon>



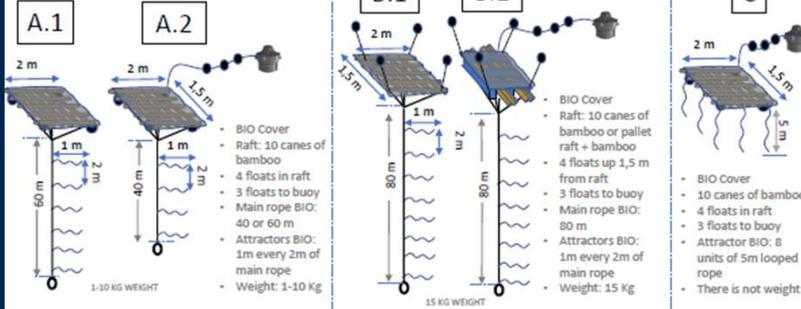
## BIODEGRADABLE FADs DEPLOYMENT

### PROJECT OBJECTIVES

- 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



### NOT USE at BIOFAD

#### Metallic frame



#### Synthetic rope (tail)



#### Net



#### Plastic bottle/drum



### BIOFADs and CONFADs DEPLOYMENT ACTIVITY & IDENTIFICATION





## Bait fishing and bait management

### 1) Live bait

1) wild caught

2) Farmed

- 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



Image (IOTC ROS training manual) - (IPNLF/ISSF, 2019)



## 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



Image Frozen milk fish - [https://www.alibaba.com/product-detail/Frozen-Milkfish-For-Bait\\_60716853560.html](https://www.alibaba.com/product-detail/Frozen-Milkfish-For-Bait_60716853560.html)



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## Ecological impacts:

- 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)



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## Bait fishing interactions:

- Various smaller predators and associated species are at risk during bait fishing operation
- High potential for release in good condition if recommended handling practices are followed



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Lift net fishing operation at night attracting bait / (IPNLF/ISSF, 2019)



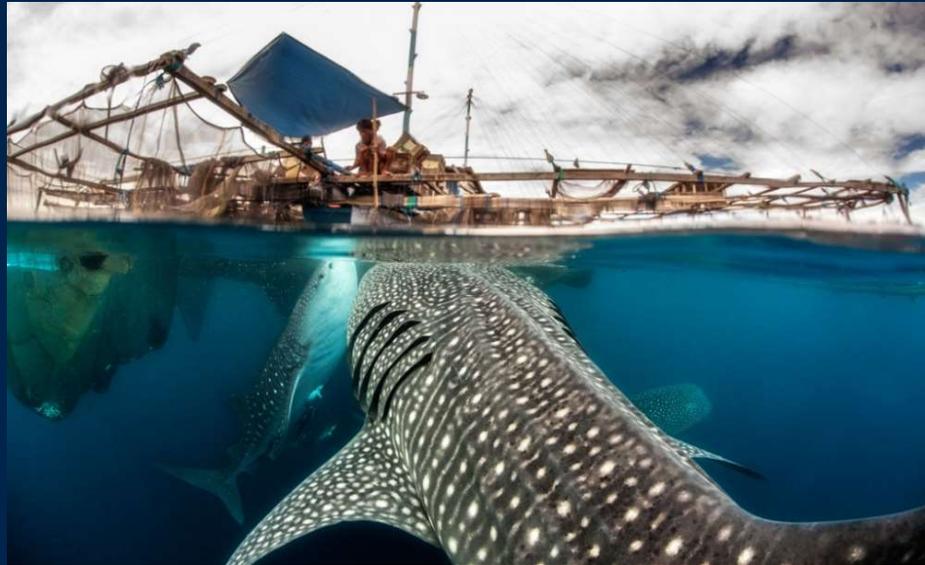
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## Bait fishing SSI interactions:



  
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<https://www.goodnewsfromindonesia.id/2016/09/30/ternyata-indonesia-memiliki-potensi-besar-untuk-ekowisata-hiu-paus>



## Potential bait fishing impacts and mitigation:

SPECIES	IMPACT	MITIGATION
Marine turtles	<ul style="list-style-type: none"><li>• encircled/ caught on bait fishing nets.</li></ul>	<ul style="list-style-type: none"><li>• turtle should be encouraged to swim out of the net; or</li><li>• a large dip-net can be used to pick up the turtle from the net;</li><li>• usage of the proper techniques to handle and release bycatch species such as turtles.</li></ul>
Cetaceans (Marine mammals)	<ul style="list-style-type: none"><li>• encircled/ caught on bait fishing nets.</li></ul>	<ul style="list-style-type: none"><li>• a side of the net can be lowered to allow the cetacean(s) to escape</li></ul>
Sharks, rays, marlins and other large fish	<ul style="list-style-type: none"><li>• encircled / caught on bait fishing nets.</li></ul>	<ul style="list-style-type: none"><li>• usage of the proper techniques to handle and release bycatch species such as sharks and others.</li></ul>



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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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Can separate this slide for potential exercise



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**THANK YOU FOR YOUR  
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