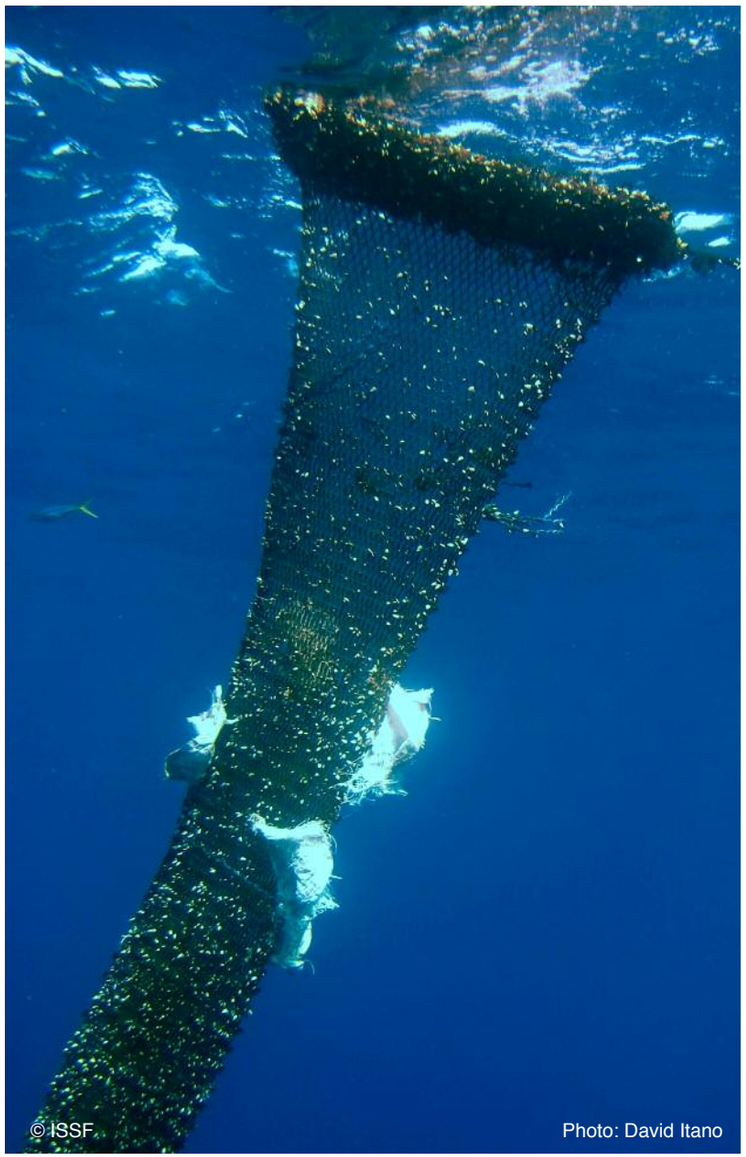
ISSF GUIDE
FOR NON-ENTANGLING FADs

ISSF INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION



Drifting FAD showing netting suspended from the surface float

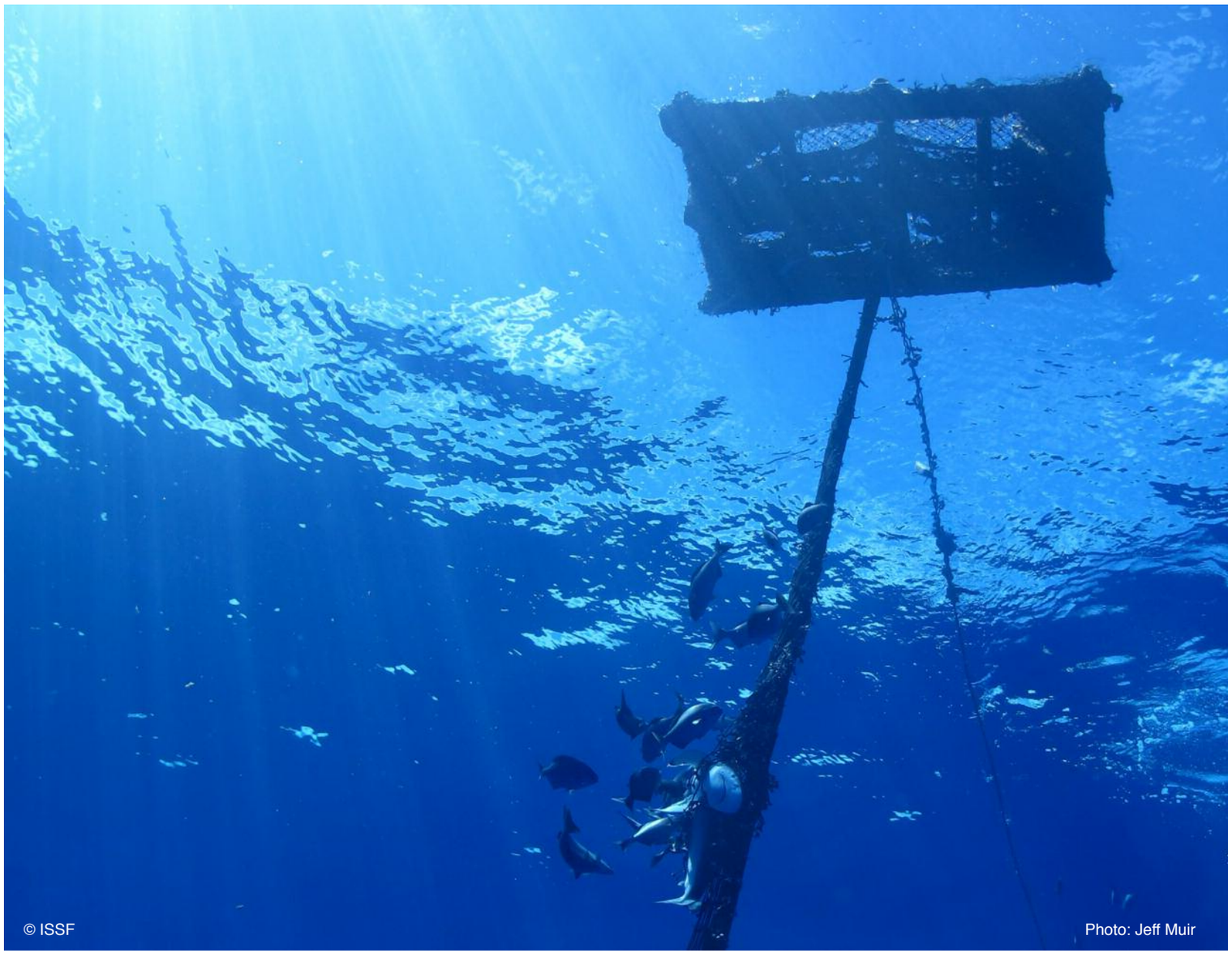
INTRODUCTION

Since ISSF first published its Guide for Non-entangling FADs (fish aggregating devices) in 2012, several tuna fishing fleets have experimented with and adopted the use of the new FAD designs described therein in an effort to reduce shark and/or turtle entanglement. In addition, new research studies on FAD entanglement have been published and tuna regional fisheries management organizations (tRFMOs) have passed recommendations regarding non-entangling FADs. Considering these developments, and based on the findings of a recent workshop organized by ISSF, ISSF is publishing an updated Guide for Non-entangling FADs.

A significant update to ISSF guidance on non-entangling FAD design concerns mesh size in nets and net use in general. Some scientists and fishers previously assumed that using small mesh netting or tying up netting into bundles would potentially eliminate entanglements. Observing these designs in use in fishing operations, however, revealed that while entanglements were less frequent, they were not eliminated. Turtles can easily become entangled in any netting covering the bamboo rafts. Bundles of netting tied up and suspended under a FAD can unravel, and small mesh can tear, creating larger holes in which sharks or turtles have been observed to become entangled. Because our goal is to eliminate the risk of entanglement altogether and any unnecessary mortality, it is clear that previous designs referring to smaller mesh netting are only partial solutions.

Going forward, only FADs constructed with no netting will be considered “non-entangling” with minimal risk of entanglement. Relatively inexpensive and readily available alternatives –ropes suspending into the water and shade cloth or canvas materials used to cover rafts – are reported to work equally well by fleets that have tested these alternative materials. The use of biodegradable materials in construction of FADs to reduce unnecessary pollution in the sea is also endorsed.

In summary, this document presents updated recommendations on FAD designs and materials to consider using for their construction, so as to minimize unwanted by-catch and pollution of the oceans caused by deployments of FADs worldwide in today’s purse seine tuna fisheries.



Netting suspended beneath a drifting FAD tied into a "sausage" can still entangle sharks if they become untied

WHAT IS A FAD?

Many fish species, including tunas, associate with floating objects in the ocean. There are two main types of floating objects; natural (flotsam) and man-made (jetsam). Man-made floating objects specifically constructed to attract fish (and also natural objects that are found by fishermen and modified) are called FADs. They can be anchored or drifting. Drifting FADs (DFADs) are often equipped with a satellite transmitting buoy to enable their relocation. Anchored FADs (AFADs) (called payaos in some regions) are commonly used by artisanal and sport fisheries but also by industrial pole-and-line and purse seine vessels in some regions such as in the western Pacific Ocean and the Maldives Islands in the Indian Ocean. However, the industrial tuna purse seine fleets around the world primarily use DFADs.

SHARK AND TURTLE INTERACTIONS WITH DFADS

Sharks and turtles are among the numerous species of marine life that are often found associated with DFADs. In some instances, turtles become entangled in the netting on the DFAD rafts, and turtles and sharks become entangled in the netting suspended beneath the rafts.

The main shark species that often associate with floating objects are the silky shark (Carcharhinus falciformis) and, to a lesser extent, the oceanic white tip shark (C. longimanus). Sharks can become accidentally entangled in the submerged netting of the DFAD, even when the netting is tied up in bundles (”sausages”) if these begin to unravel or untie (Figure 1.a). Small mesh net can reduce chances of shark entanglement, but after long periods of time at sea the net will start to break down and larger holes appear with greater potential to entangle sharks (Figure 1.b.).

Several turtle species can be found around floating objects depending on area, the most common being the olive ridley sea turtle (Lepidochelys olivacea). While turtles can get trapped in the submerged netting, they can also entangle when they climb on the floating structure (Figure 1.c). The turtle’s claws can easily become ensnared in the mesh panels covering the raft. Covering the raft with netting and putting cloth or tarpaulin on top is not a solution, because when those fabrics degrade the underlying netting becomes exposed. The proportions of turtles that become entangled with DFADs but escape, and those that become permanently entangled, are currently unknown. In the eastern Pacific, only around 1% of DFADs that are set on by purse seiners have turtles entangled, and many of those are released alive.

Figure1.a
Sharks entangled in large mesh netting beneath a DFAD

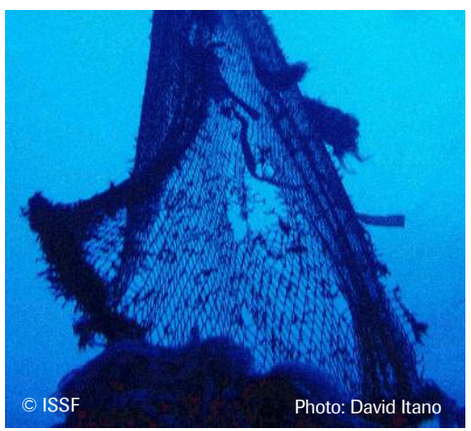


Figure 1.b
Small mesh netting suspended beneath DFADs degrades over time, creating larger holes in the net

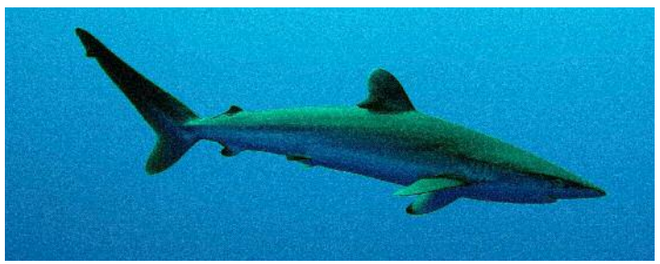
Figure 1.c.
Turtle entangled in large mesh netting adjacent to the raft of a DFAD.

NON-ENTANGLING FAD REGULATIONS

Recently three of the four tRFMOs responsible for the conservation and management of tropical tunas have adopted resolutions that contain regulations and recommendations regarding the use of non-entangling FADs by purse seine fleets.

DOCUMENT	RFMO	WEB LINK
C-13-04	IATTC	https://www.iattc.org/PDFFiles2/Resolutions/C-13-04-FADs.pdf
13/08	IOTC	http://www.iotc.org/cmm/resolution-1308-procedures-fish-aggregating-devices-fads-management-plan-including-more-detailed
Rec. 14-01	ICCAT	https://www.iccat.int/Documents/Recs/compendiopdf-e/2014-01-e.pdf
NA	WCPFC	NA

In addition, in most tuna purse seine fishing regions, observers working under tRFMOs, now record the types and configuration of FADs used by fishers (e.g. FAD size, construction materials, design, entanglement incidents) in specific log sheets. This information is important for scientists to assess the efficiency of different designs in reducing FAD entanglements. The collection and recycling of old FADs by fishers can also help reduce the environmental impact of this gear.



BEST PRACTICE RECOMMENDATIONS

Although the design and development of functional non-entangling FADs should continue by the industry, considering the expertise of fishermen, some suggested guidelines for consideration in the construction of non-entangling FADs are presented below:

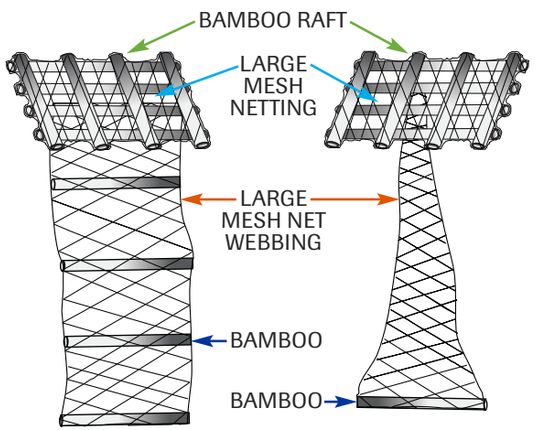
- To reduce entanglement of turtles on the rafts of FADs, the surface structure should not be covered with any netting or meshed materials. If a sub-surface or submerged component is used, it should not be made from netting but from non-meshed materials such as ropes, canvas or cloth sheets.

- A recent trend has developed in which fishers are using plastic or metal frames to build FAD rafts. To reduce the amount of synthetic marine debris being introduced into the oceans the use of natural and/or biodegradable materials such as bamboo, palm leaves, coconut fiber, or sisal among others, should be promoted.

More than two years have passed since fishers began experimenting with and using so-called non-entangling DFADs constructed with netting. Only FADs constructed without netting can eliminate the unintentional entanglement of turtles and sharks and be considered non-entangling. Some skippers report good performance in attracting and catching tuna aggregations at DFADs constructed without any netting.

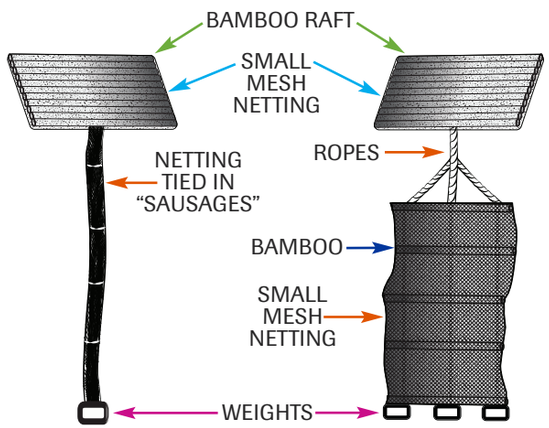
Considering the variety of designs and materials used in construction of FADs worldwide the ISSF Bycatch Steering Committee proposes a ranking of FADs according to the risk of entanglement associated with each design. Starting from highest to lowest risk of entanglement, four categories are described and illustrated examples provided of FAD designs:

HIGHEST ENTANGLEMENT RISK FADs:



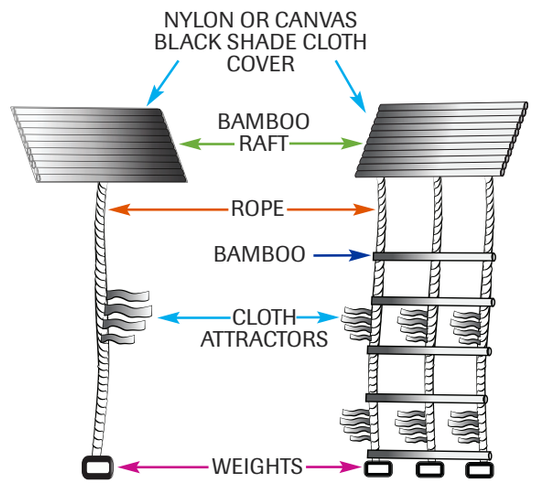
- Constructed with any netting materials, including old purse seine netting, used to cover rafts or suspended beneath in open panels
- These DFADs are known to cause entanglements with turtles and sharks

LOWER ENTANGLEMENT RISK FADs:



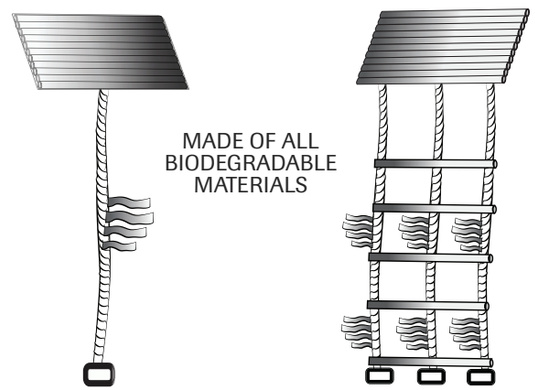
- Only small mesh netting used (e.g. < 2.5 inch (7 cm) stretched mesh)
- Rafts are tightly wrapped with small mesh netting, with no loose netting hanging from it
- The underwater structure is tightly tied into bundles (sausages)
- A single panel can be used instead of bundles, but the panel must be weighted to keep it taut
- The panel should consist of either netting with a stretched mesh of 2.5 inches (7 cm) or less, or a solid sheet (e.g., canvas or nylon)
- Despite using netting, these design elements reduce the risk of entanglement events

NON-ENTANGLING FADS:



- No netting is used in their construction
- The raft is not covered or covered with shade cloth or canvas
- The subsurface structure is made with ropes, canvas or nylon sheets, or other non-entangling materials
- These FADs are expected to have minimum risk of causing entanglement

BIODEGRADABLE NON-ENTANGLING FADS:



- In addition to having minimal risk of entanglement, they are constructed exactly like other non-entangling FADS, but using only natural and/or biodegradable materials, further reducing the environmental impact of DFADs on the oceans

HIGHEST RISK ← → **LOWEST RISK**