Non-Entangling & Biodegradable FADs GUIDE

BEST PRACTICES for fishers, RFMOs, governments & vessel owners

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ISSF INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION

This is the third version of the Non-Entangling & Biodegradable FADs guide, which ISSF first published in 2012 and updated in 2015.

Contents

INTRODUCTION

The purpose of this version of the guide is to update the content in relation to (i) recent research related to the impact of FAD[1] structures on the ecosystem, and (ii) new regional fisheries management organization (RFMO) measures requiring the use of specific designs for FAD structures. This revised version of the 2015 guide (ISSF 2015) is designed to update the content and clarify frequently-asked questions by stakeholders.

The first version of the guide (ISSF 2012) was intended to urge action given the startling results of scientific research on the use of FADs that uncovered significant previously unobserved shark mortality through entanglement in FADs, and the quantification of ghost fishing:

- A field study in the Indian Ocean showed high mortality of sharks due to their entanglement in FADs built with netting of large mesh size (Filmalter et al., 2013).
- In other oceans, large mesh size nets were also used in FADs and the same species of sharks were associated with them (Murua et al., 2017).
- Qualitative and quantitative information from ISSF skippers workshops worldwide showed that entanglement was occurring in traditional FADs (using typically large mesh size) (Murua et al., 2017).
- Quantification of entanglements is difficult at FADs (Filmalter et al., 2013) and there are large knowledge gaps related to ghost fishing impacts in marine megafauna (Stelfox et al., 2016).

In addition:

- The numbers of FADs at sea have been increasing in recent decades (Scott and Lopez, 2014).
- Shark populations continue to decline worldwide due to cumulative human impacts (Lewison et al., 2014).

Since the first guide, several tuna fishing fleets adopted the use of Lower Entanglement Risk (LERFAD) or Non-entangling FAD (NEFAD) designs in an effort to reduce shark and/or turtle entanglement. Today, all tuna regional fisheries management organizations (tRFMOs) have passed measures requiring the use of LERFADs or NEFADs, and some have strengthened their first technical criteria of how a LERFAD or NEFAD should be constructed.

Increasing awareness of the impact that lost or abandoned FADs can have on the marine ecosystem underscored the need to update the ISSF Guide on Non-entangling and Biodegradable FADs.

Considering new research and based on the findings of recent workshops held by ISSF, ISSF is publishing this updated Guide for Non-entangling and Biodegradable FADs.

1 Fish Aggregating Device: they are constructed to aggregate fish and can be anchored or drifting. The industrial tuna purse seine fishery around the world primarily fish on Drifting FADs (DFADs). Most of them are equipped with satellite transmitting buoys for their relocation.

Photo by Fabien Forget © 2014

Main Impacts
of FAD structure on marine ecosystems

There are two major impacts caused by FAD structures:
Shark and turtle entanglements, and marine pollution.

1. Shark & Turtle Entanglement

One of the issues with shark and turtle entanglement is that it is very difficult to observe these events because FADs remain at sea for months but are only visited once or twice in their lifetime. And, even when they are visited, the submerged structure is not always observed. In addition, sharks that get entangled do not remain entangled for more than a couple of days before their bodies fall off and sink. As a result, most entanglements go unobserved. This source of mortality is called "ghost-fishing."

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Sharks and turtles are among the numerous species of marine life that are often found associated with Drifting FADs (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. Small-mesh net will reduce the chances of shark entanglement, but after long periods of time at sea the net will start to break down and larger holes will appear, thus increasing the potential to entangle sharks.

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. 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 lasting 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.

2. Marine Pollution

FADs are deployed in specific areas so that they drift towards productive fishing zones. However, oceanic currents are difficult to predict and therefore the resulting FAD trajectories are not always well controlled. As a result, FADs can drift away from the fishing zone and end up being abandoned by the vessel. In many cases, FADs sink or end up beaching in sensitive areas such as coral reefs. A recent study estimated that 10% of the deployed FADs end up stranded (Maufroy et al. 2015).

The impacts associated with lost and abandoned FAD structures are ghost fishing, damages to coastal areas, and marine pollution due to plastic components used to build FAD structures. Globally, FAD structures have evolved towards more sophisticated and deeper structures 60-80 meters deep. Naturally, the impacts of these deep FADs are greater compared to those 5-20 meters deep used in the past.

While DFADs have traditionally been constructed with natural bamboos, many DFADs are made today using petroleum-derived products such as plastic, PVC, and nylon nets, as well as metals. Eventually, petroleum-derived materials break up and contribute to ocean pollution as macro- and micro-plastics.

ISSF is working on several projects to find new FAD structures made of materials of natural origin to reduce the impact caused by beaching and sinking of FADs.

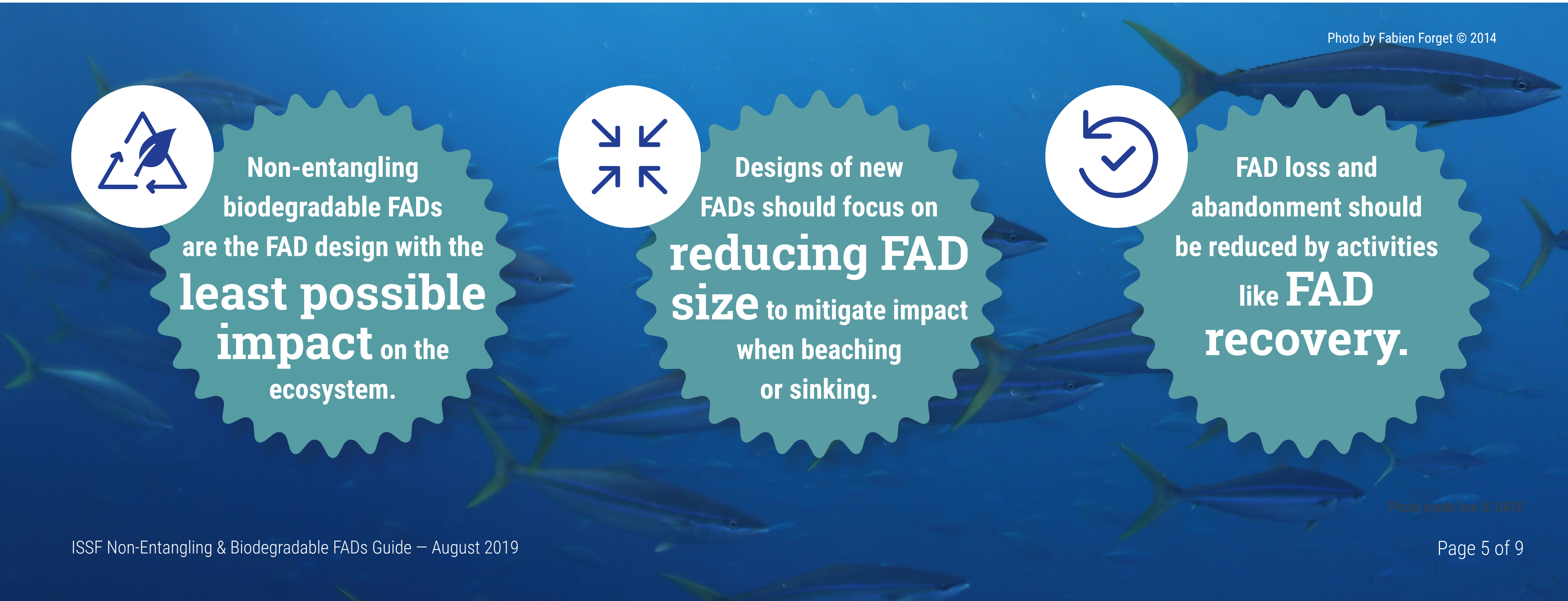
FADs sink or end up beaching in sensitive areas such as coral reefs.

Best Practice Recommendations

Taking into account new research and lessons learned at ISSF workshops (Moreno et al. 2016; 2018), guidelines for construction of non-entangling and biodegradable FADs are presented below.

ISSF recognizes the important role of industry in the design and development of functional non-entangling and biodegradable FADs, and encourages this innovation and testing to continue so that NE and biodegradable FAD designs continue to evolve.

Non-Entangling Biodegradable FADs



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Non-entangling biodegradable FADs are the FAD design with the **least possible impact** on the ecosystem.

Designs of new FADs should focus on **reducing FAD size** to mitigate impact when beaching or sinking.

FAD loss and abandonment should be reduced by activities like **FAD recovery.**

Non-Entangling Biodegradable FADs

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Raft

The surface structure should not be covered with netting or meshed materials (to reduce entanglement of turtles).

Bio-degradable

Construct with bamboo, balsa wood or other natural materials that degrade without causing impact on the ecosystem.

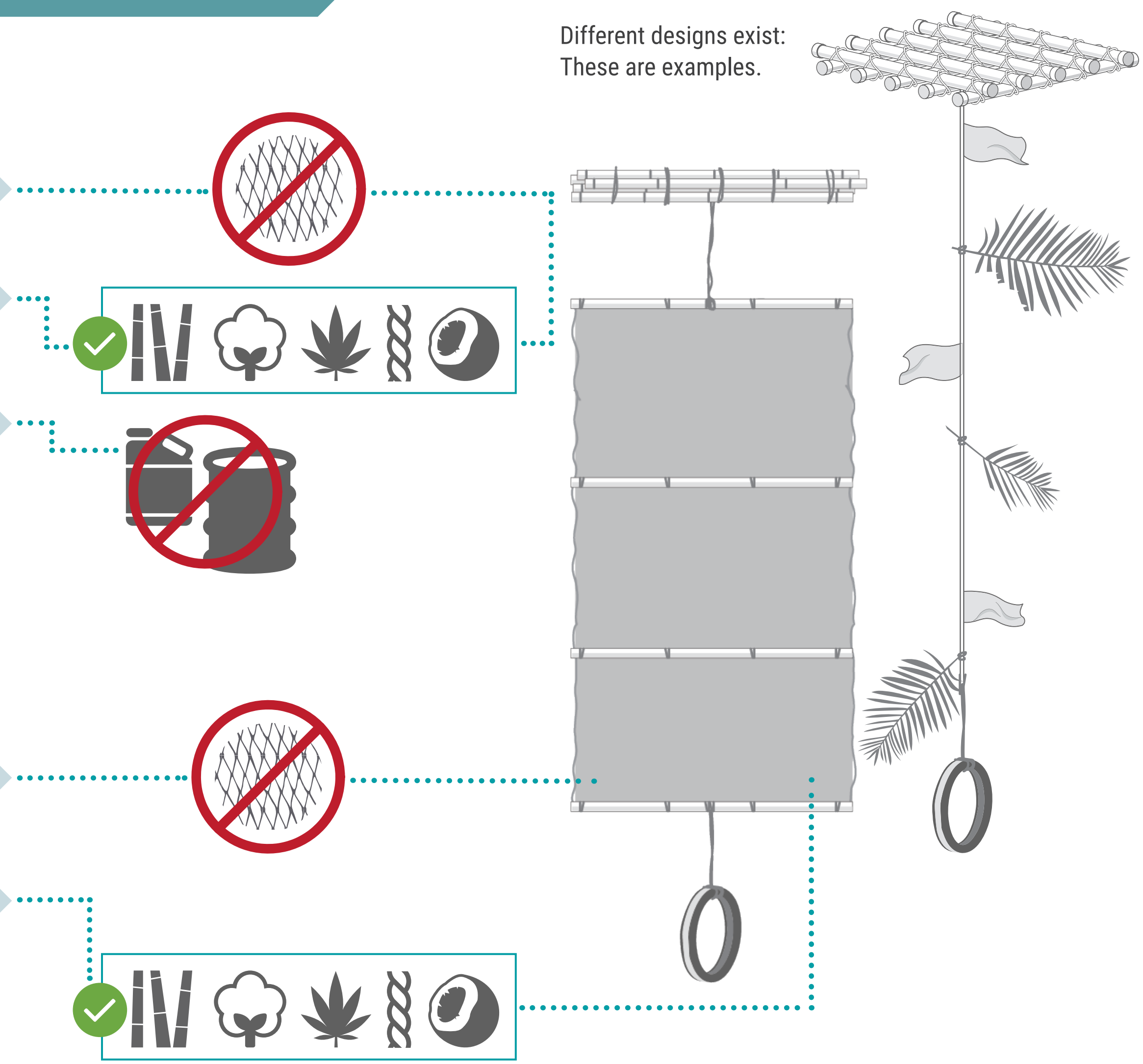
Use of plastic buoys and containers for flotation should be reduced as much as possible; for instance, reduce the weight and volume of the FAD structure.

Tail

Only FADs constructed without netting can completely eliminate the entanglement of turtles, sharks and finfish species.

Bio-degradable

Use only natural and/or biodegradable materials—cotton ropes and canvas, manila hemp, sisal, coconut fiber—so that they degrade without causing ecosystem impact.



Three Categories of FADs — low to high entanglement risk

Considering the variety of designs and materials used worldwide to construct FADs, the ISSF Bycatch Steering Committee ranks FADs according to the risk of entanglement related to how the nets are used.

From lowest to highest to risk, three categories are described. These designs are examples; the important elements are the net type and its configuration.

NON-Entangling FADs

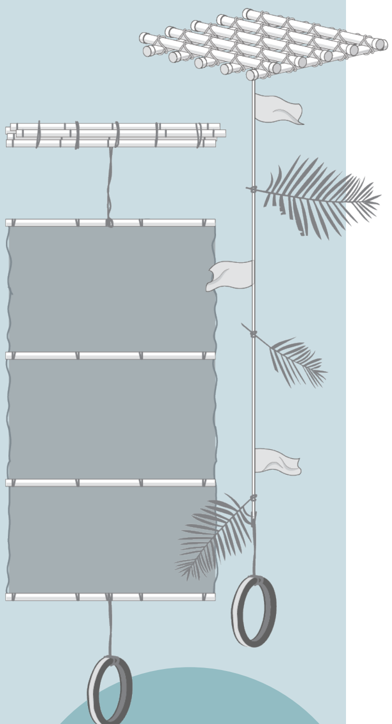
RAFT

- Do not cover with netting.
- If covered, cover with canvas, tarpaulin, shade cloth, or non-entangling materials.

TAIL

- Subsurface structure is made with ropes, canvas or nylon sheets, or other non-entangling materials.

More detail on the previous page.



No netting is used in any components (raft and tail)

These FADs are expected to have no risk of causing entanglement.

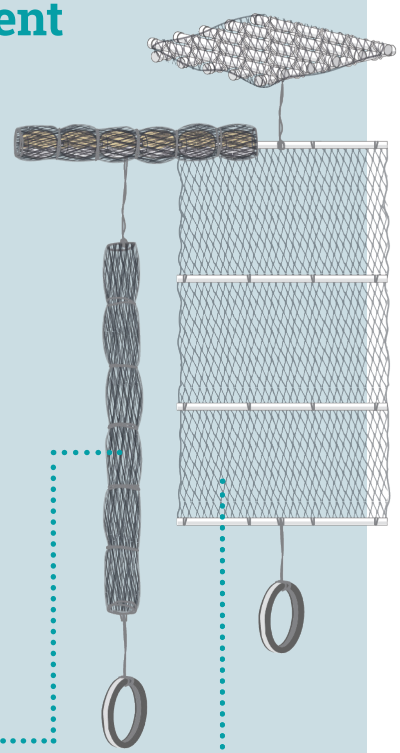
LOWER Entanglement Risk FADs

RAFT

- Use only small mesh netting (< 2.5 inch / 7 cm stretched mesh) if covering with net (both upper and submerged parts).
- If small mesh netting is used as cover, it is tightly wrapped, with no loose netting hanging from the raft.

TAIL

- If net is used as submerged tail, could be of any mesh size if tightly tied into sausage-like bundles.
- If open panel netting is used, only small mesh size (< 2.5 inch [7 cm] stretched mesh) can be used, but weight the panel to keep it taut.



Despite using netting, these design elements reduce the risk of entanglement events.

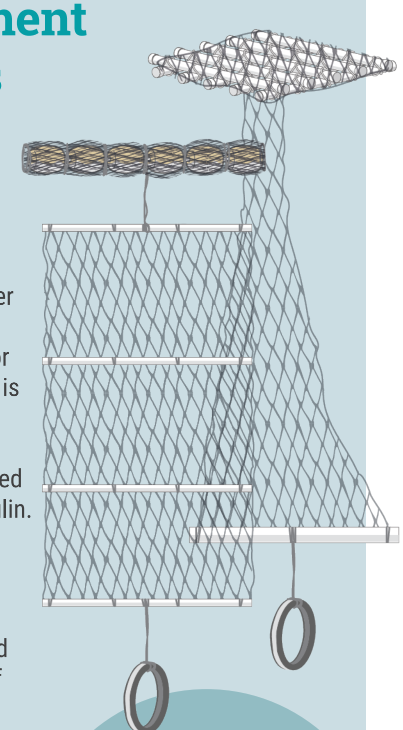
HIGH Entanglement Risk FADs

RAFT

- Covered with large mesh netting (e.g. > 2.5-inch mesh).*
- If mesh size is larger than 2.5 inches (both in the upper or submerged part), it is high entanglement, whether the net is tightly tied or covered by canvas or tarpaulin.

TAIL

- Submerged part of the FAD constructed with open panels of large mesh netting (> 2.5-inch mesh).



*Accounting for mesh sizes available in the market, 2.5 inch (7 cm) mesh size offers the lowest likelihood of entanglements across species and body parts.

These FADs are known to cause entanglements with turtles and sharks.

RFMO REGULATIONS

The four tuna RFMOs responsible for the conservation and management of tropical tunas have adopted measures requiring the use of non-entangling FADs by purse seine fleets. These regulations differ in terms of the degree to which the technical criteria of FAD designs are specified.

In some cases, the measures also encourage the use of biodegradable materials in the construction of FADs or require their use some time in the future.

In addition, observers working under RFMOs 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 and managers to assess the efficacy of different designs in reducing FAD entanglements and in maintaining fishing efficiency. The collection and recycling of old FADs by fishers can also help reduce the environmental impact of this gear.

RFMOs now record the types & configuration of FADs used by fishers.

Photo by Fernando Rivero © 2018

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This guide is written and designed with input from the ISSF Scientific Advisory Committee and the ISSF Bycatch Steering Committee.

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