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WHAT DOES WELL-MANAGED FAD USE LOOK LIKE WITHIN A TROPICAL PURSE SEINE FISHERY?

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ABSTRACT

The authors participated in the Global FAD Science Symposium, March 20-23, 2017, in Santa Monica, California and are presented without affiliation. This paper is one of several from the Symposium and does not represent an exhaustive discussion of the issue but includes points agreed by participants. The participants recognized that impacts of FADs and FAD management cannot be considered entirely independently of harvest strategies, issues related to fishing capacity, ecosystem structure, or management of all other fishing gears in tropical tuna fisheries. None of these points alone will address the management challenges associated with FAD use. The effectiveness of any of these points will depend on the levels of implementation and compliance and need to be connected to processes at the RFMOs. Participants underlined the need for data harmonization, standardization, and availability and stressed the need to develop standardized language and definitions to support consistent interpretation of what conservation and management measures intend to achieve across ocean basins. In response, participants offer a glossary (**Appendix 1**) as a "straw man" for consideration and/or development, and underline the clear need for this standardization. Participants noted that "best practices" are not necessarily "most practical" and will need to be assessed to determine which are most appropriate to apply in any particular management setting or geographic area. Finally, participants stressed the need for ongoing and close collaboration among scientists, managers, and industry in driving innovative solutions within and across RFMOs. The points presented here are not in an order of priority; priorities and solutions may change on a regional basis.

Introduction

The topic of "FAD management" in tropical tuna purse seine fisheries has been the subject of considerable attention in recent years. However, with very few exceptions, there are no purse seine fleets that fish all year round on FADs only or on free schools of tuna only. Furthermore, the species of tuna targeted by purse seine fisheries (primarily skipjack, yellowfin and bigeye) are also targeted by other fisheries such as longline, pole-and-line, gillnet and troll. For these reasons, the impacts of FADs and FAD management cannot be considered entirely independently of harvest strategies, fishing capacity, ecosystem structure, or management of all other fishing gears in tropical tuna fisheries.

In this paper, we consider the issue of managing FAD use within tropical tuna purse seine fisheries. These considerations are separated into three general categories: (1) Managing impacts on target species; (2) managing impacts on non-target species, coastal habitats, and the pelagic marine ecosystem; and, (3) the management framework, including monitoring, compliance and surveillance (MCS).

1 Managing impacts on target tunas

A well-managed purse seine fishery has the following attributes regarding target species:

- Target stocks are maintained around the target levels and away from biological limits that

could severely impact the stocks;

- Where a target stock is overfished, a rebuilding program is in place with a clear timetable and milestones to rebuild the stock to around the target level;
- Assessments of the target stocks are conducted regularly to inform decision makers.

Clearly, these cannot be achieved by managing FAD use alone. They require agreement on a number of elements such as management objectives for each stock (targets, limits, etc.) and decisions about allocation, both among gears and within the purse seine fishery. Nevertheless, there are a number of management actions for FAD use that are high priority and consistent with the above principles. These are actions that will mitigate the impact of FAD use on overfished target tuna stocks, including bigeye in the Atlantic and Pacific oceans and yellowfin in the Indian and (to a lesser extent) Atlantic oceans.

Examples of best practices for target species include:

- Setting catch limits specifically for juvenile tunas caught by purse seine operations, particularly of overfished stocks;
- Shifting some purse seine fishing effort from FAD sets to sets on unassociated tuna schools (free schools), either voluntarily or through annual FAD set limits;
- Avoiding setting on FADs with large concentrations of juvenile or overfished tunas, including by:
  - Avoiding hotspots, where overfished species are relatively abundant or vulnerable (this could include time-area closures);
  - Developing techniques to use FAD acoustic technology to avoid sets that are likely to contain high numbers of overfished species, recognizing that this practice will require technological and methodological advances;
- Avoiding purse seine setting techniques or equipment that are more likely to select overfished species (if such things can be identified);
- Using improved datasets to develop science-based, FAD deployment limits.

Some of these practices (e.g., avoiding hotspots or use of acoustic technology to inform purse seine captains) require market- or policy-based incentives to encourage or require operators to make good choices when setting their purse seine gear.

2 Managing impacts on non-target species, coastal habitats, and the pelagic marine ecosystem

A well-managed purse seine fishery has the following attributes regarding non-target species and marine ecosystems:

- Non-target stocks are maintained above biological limits that could severely impact the stocks. For endangered, threatened, and protected (ETP) species, measures are in place to minimize mortality;
- Where a non-target stock is overfished, the fishery will not hinder its recovery and there are timetables and milestones in place to rebuild the stock to around the target level;
- Operators collect and report data on interactions with non-target species and their fate (discarded, kept), at the species level;
- Waste is minimized;
- The fishery is operated so that it is unlikely to reduce the structure or function of habitats and the pelagic ecosystem.

Tropical purse seine tuna fisheries have relatively low bycatch rates compared to other industrial fisheries. However, impacts vary by set type and region, with FAD sets generally catching higher diversity, numbers, and biomass of non-target species (e.g., sharks, small tuna species, etc.). Though bycatch rates are relatively low, the large scale of the global purse seine fishery may lead to measurable impacts on non-target species, via entanglement in the FAD itself or encirclement by the purse seine vessel during a set.

Examples of best practices for non-target species include:

- Shifting some purse seine fishing effort from FAD sets to sets on unassociated tuna schools (free schools), either voluntarily or through annual FAD set limits;
- Avoiding interactions before a purse seine set by:
  - Using FADs that are not likely to entangle sharks, sea turtles, or other species;
  - Avoiding sets on small FAD-associated schools that generally have a higher bycatch rate than large schools;
  - Identifying and avoiding "hotspots" where the risk of catching non-target species is high;
- If encircled by a purse seine net, actively releasing sharks (via other fishing gear) and turtles (via manual capture);
- If brought on deck, practicing safe-handling techniques for sharks and resuscitation/revival techniques for sea turtles, to reduce mortality after release;
- Reducing dead discards and promoting increased utilization of non-target bony fishes, accounting for impacts on local markets and artisanal fisheries.

In addition to the impacts of FADs and FAD fishing on non-target species, there is some concern about the contribution of FADs to marine debris and direct impacts on sensitive habitats, such as coral reefs.

Examples of best practices for ecosystem impacts include:

- Using biodegradable FADs;
- Improving monitoring of FAD deployments and locations of drifting FADs for use in evaluating FAD density impacts on the pelagic ecosystem, including tuna aggregation dynamics;
- Using improved datasets to develop science-based, FAD deployment limits;
- Developing FAD recovery plans with provisions to minimize loss, abandonment, or interaction with sensitive habitats, including by partnering with coastal groups to use FAD location information to assist in recovery of FADs before they encounter sensitive areas.

3 Management framework, including MCS

A well-managed fishery has the following attributes regarding management:

- Short and long-term objectives are clearly stated and explicitly defined;
- The management system exerts effective cooperation with other fisheries for the management of shared stocks;
- Overall capacity of the fishery is limited, either directly or through effort or catch limits, in order to be commensurate with management objectives;
- An effective MCS system is in place to ensure compliance with management measures and collection of data necessary to inform management.

The effectiveness of any of the practices identified in (1) and (2) above will be dependent on implementation by management bodies and compliance by stakeholders and as such will need to be connected to those processes at the tuna RFMOs.

Examples of best practices for MCS include:

- Requiring 100% observer coverage (human or electronic) of purse seine vessels, in order to record FAD deployment, retrieval, set types, and catch numbers;
- Requiring 100% observer coverage (human or electronic) of supply vessels, in order to record FAD deployment and retrieval;
- Requiring 100% vessel monitoring system(VMS) coverage, with a reporting resolution sufficient to detect fishing;
- Implementing full tuna catch retention and effectively monitoring catch numbers during unloading;

- Using FAD positional data in combination with VMS data to identify FAD sets;
- Effectively and comprehensively addressing suspected non-compliance at the licensing authority, flag state, or RFMO, as appropriate.