

SECOND MEETING OF THE AD HOC WORKING GROUP ON FADs
(Bilbao, Spain, 14-16 March 2016)

1. Opening of the meeting

Mr. Shep Helguile, co-Chair of the FAD Working Group, opened the meeting and reminded participants (**Appendix 2**) of the objectives of the Working Group. The ICCAT Executive Secretary, Mr. Driss Meski, welcomed all the participants in the name of ICCAT.

2. Adoption of the Agenda and meeting arrangements

The Chair of the Working Group presented the final Agenda of the meeting which was adopted by the Working Group (**Appendix 1**). The Executive Secretary of ICCAT provided the meeting arrangements.

3. Nomination of Rapporteur

The following participants agreed to serve as Rapporteurs for various sections of the report:

<i>Section</i>	<i>Rapporteurs</i>
1-3	Paul de Bruyn
4-6	Michelle Sculley
7	David Die, Jon Lopez
8	Justin Konan

4. Review of the information provided by CPCs pursuant to the FAD related provisions in the relevant ICCAT conservation and management measures

During the meeting several documents and a few presentations were provided by participants and discussed by the Working Group (**Appendix 3**).

A presentation on retaining by-catch to avoid wastage of fishery resources was provided (SCRS/2016/017), noting the importance of by-catch landed by purse-seiners in Abidjan. It was noted that the average annual amount of fish sold on the local market by the main tuna purse seiners operating in the eastern Atlantic (France, Ghana and Spain) accounts for half of the total annual by-catch in the tropical tuna fishery (21,582 t for all species of fish), which could be used by the local populations, and that the capacity of absorption of this market remains high when considering the characteristics of the market in Côte d'Ivoire. It was noted that ICCAT is the only tuna RFMO which does not have a tuna retention requirement; however, approximately 50% of the small tuna caught are retained for sale in the local markets or for consumption by the fishers.

A presentation was given on the results achieved within the framework of the EU research project: Catch, effort, and ecosystem impacts of FAD-fishing (CECOFAD, SCRS/2016/030). The CECOFAFAD project aimed to improve the understanding of the use of drifting fish-aggregating devices (dFADs) in tropical purse seine tuna fisheries in open ocean ecosystems. The goals of this project are to: define a unit of fishing effort for FADs, standardize CPUEs for FADs, and estimate catch composition and ecosystem impacts of FADs.

It was noted by the Group that the work to standardize catch per unit effort of FADs is important to both management and science. When doing assessments it is important to standardize the catch rate which takes into account the changes in the fleets in order to identify changes in the catch rate that are related to abundance. Changes in purse seine fleets have been rapid and complex and have prevented the SCRS from standardizing the purse seine CPUE in a satisfactory manner, in spite of the importance of this fleet which accounts for a large part of the catch. It was noted that there has been good cooperation among elements of the EU purse seine fleet and that significant forward progress has been made to collect the data necessary to perform these standardizations and incorporate the data into the stock assessment. It was noted that the Ghanaian fleet is also an important component of the purse seine FAD catch and has a different fishing technique than the European Union fleets. The work to improve Ghanaian statistics, including EU-Ghana cooperation, should be continued.

The effects of FAD associated purse seine catches on ecosystem function in the Gulf of Guinea was discussed, noting that the FAD fishery in the eastern tropical Atlantic has increased in recent decades and accounts for over 60% of the tropical tuna catch from purse seine vessels (SCRS/2016/044). The use of FADs has raised concerns due to the wide array of species that are associated with these floating objects and are caught as by-catch along with tuna. An ECOPATH with ECOSIM model of the northern Gulf of Guinea was developed to investigate the effects of the FAD fishery on the ecosystem. In 2015, the Commission agreed to close the FAD fishery for two months [*Recommendation by ICCAT on a Multi-Annual Conservation and Management Program for Tropical Tunas*, Rec. 15-01] which, in terms of time, would represent a 15% decrease in effort. While the spatial extent of the Gulf of Guinea model presented encompasses a larger area than the FAD closure, the simulation strategy which reduced FAD effort by 25% may be an indication of the order of magnitude of ecosystem changes that may be expected from the FAD closure.

Document SCRS/P/2016/013 presents a study of the aggregative behavior of acoustically tagged tuna around anchored FADs that was used to parameterize a simulation model of the population dynamics of tuna aggregations at different spatial scales. The study showed the sensitivity of abundance estimates to different hypotheses about association dynamics, FAD numbers, population sizes and heterogeneities of the FAD-array. The main conclusion of the study was the importance of knowing the number of FADs.

The Group discussed whether the distance between FADs would impact the estimates of abundance around them. It was suggested that an increased distance between FADs may result in a longer time between detections and this could be included in the estimation models. It was noted that these abundance estimates have only used data from FADs with instrumentation. However, abundance estimates for non-instrumentalised FADs could be extrapolated by adding information on FADs from scientific observers. Further, the model suggests that an increase in FADs will potentially cause the fish to be more dispersed between them which would result in a lower catch per set. It was noted, however, that in the Atlantic the catch per set has increased with the increase in the number of FADs deployed. This suggests that either when there are more FADs, fish are not dispersed or that the fleets are able to select FADs with larger biomass thanks to the eco-sounder information.

The verification of best practices to reduce FAD impacts on by-catch fauna, and of the limitation of the number of FADs was presented (SCRS/2016/040). The paper explained how two initiatives of the Spanish tuna purse-seiners organizations ANABAC and OPAGAC helped monitor the number of active FADs. The study focused on evaluating the effects on the pelagic ecosystem of the: (1) limitation of the number of FADs (currently in force in the Indian Ocean and to be implemented in the Atlantic Ocean in 2016) and (2) the application of good practices to reduce the mortality of FAD-associated fauna, encompassing fauna release operations and the use of non-entangling FADs.

The presenter noted that shark by-catch rates by purse-seiners are lower than those in other fleets. Although the survival of released sea turtles approaches 100%, the current mortality of sharks released as by-catch is close to 80%. With the implementation of best practices for releasing by-catch, and 100% observer coverage, significant progress may be made to further reduce the mortality of sharks during fishing activities.

5. Assessment of the use of FADs in tropical tuna fisheries in ICCAT and of the relative contribution of FADs to overall fishing mortality in ICCAT tropical tuna fisheries

A presentation described the adoption of entanglement-reducing dFADs by several key fleets through skipper workshops sponsored by ISSF (SCRS/2016/054). The acceptance degree of NE FADs by fishers and ship-owners has been gradually increasing since 2010 and especially after learning how some fleets (e.g. European Union) have moved almost entirely to 100% NE FADs without adverse effects on their catches of tuna.

The Group noted that different fleets have different definitions of entangling and non-entangling FADs and suggested that the terminology used to describe FADs should be standardized across all tuna RMFOs. During fishing operations, sharks released at the beginning of operations have a much lower mortality rate, but survival decreases with time and many sharks which are brought on board are already dead. To reduce mortality on sharks it is important to develop technology which would allow for the removal of sharks at the beginning of fishing activities.

The use of fishers' echo-sounder buoys to estimate biomass of fish species associated with fish aggregating devices in the Indian Ocean was presented (SCRS/P/2016/012). The aim of this study was to progress towards improved biomass estimates using echo-sounder buoys and to improve the algorithms used by buoy manufacturers. Improvements of these algorithms are proposed by incorporating new knowledge on species vertical distribution of tuna, behavior of tuna around FADs, and new target strength values for tuna species.

It was noted that while the research presented uses a single frequency and cannot differentiate between species, some echo-sounder buoys being developed use multiple frequencies which may allow for the differentiation between skipjack and other tuna species.

Document SCRS/2016/039 examined the evolution and current use of FADs by the different fleets operating with FADs around the globe and provided insights into the first field experiment towards biodegradable FADs. The presenters discussed the dynamics on the use of different FAD designs and their implication for sustainable fishing, including non-entangling and biodegradable FADs.

The Group noted that it was often difficult to obtain feedback from fleets testing these materials because there is no guarantee that FADs will be visited multiple times by a skipper as other vessels may retrieve the FAD. It is unknown how long FADs remain active; however estimates suggest that they are active between six months to a year. There were questions on the risks of non-entangling FADs using biodegradable material becoming entangling FADs. So far, there is not enough information from the experiments to draw any conclusions about this. It was also noted that FADs with biodegradable materials cost approximately twice as much as FADs without biodegradable materials. However, these costs are insignificant compared to the cost of the satellite buoy attached to the FADs.

6. Assessment of developments in FAD-related technology

The Secretariat provided a summary of the data available on FADs provided as prescribed initially in Rec [11-01], Rec [13-01] and Rec [14-01] with additional management measures and requirements stipulated in Rec [15-01] (SCRS/2016/053). The information submitted to the Secretariat was presented in summarized tables in this document and a brief was provided in the *Management Plan for Fish Aggregating Devices*. It was noted that this document was submitted by Spain as a working document but has not been officially submitted as a FAD management plan on behalf of the EU. A description of the additional reporting requirements required in 2016 was provided and discussed.

The FAD management plan for EU-Spain stated that it can be difficult for fishers to record the information requested because some of the data are not easy to collect during fishing activities. It was suggested that the logbook should be revised to make this data recording easier.

Document SCRS/2016/042 presented an analysis of the methodology applied for collecting information from logbooks for the Fish Aggregating Devices Management Plan undertaken by the Spanish Institute of Oceanography. The design of the FAD logbook, the quality of the information obtained and the level of accomplishment by the fleet are examined.

It was noted that the logbook included in the document SCRS/2016/053 is an example of a logbook which could be used to record FAD fishing operations but not the format required for use. The Working Group was reminded that the SCRS has already provided specific recommendations regarding the data that should be collected, and the Commission acted on those recommendations through the adoption of Rec. 13-01. The CECOFAD project (SCRS/2016/030) has proposed factors which may be important in standardizing catch per unit effort for FAD catches; these factors should be taken into account when deciding what data is to be collected. It was noted that it was important to ensure that the amount of data collected does not overburden the vessel skippers.

Document SCRS/2016/044 was presented discussing potential management measures which could be implemented to reduce the catch of juvenile bigeye and yellowfin tuna from FADs. The document reminded the Group of recent management measures taken by the Commission to reduce mortality of bigeye tuna, and the terms of reference of the current Working Group. The presenter urged the Working Group to address the unsustainable take of juvenile bigeye in FAD-associated purse seine fishing in the ICCAT Convention Area, by considering recommending additional new management measures.

Regarding the suggestion to place catch limits on purse seine catches to reduce the mortality of juvenile tunas, the Group noted that the bigeye tuna quota allocation may have the indirect effect of limiting mortality of juvenile bigeye associated with FAD fisheries. The Group discussed the scientific uncertainty regarding the reduction in the number of FADs deployed or the number of FAD sets that would be necessary to reduce mortality on juvenile tunas and support rebuilding of the bigeye tuna stock. The efficacy of any management actions to reduce juvenile tuna mortality on FADs would depend upon how successfully they were implemented. Further, the environmental impact of FADs must also be considered when implementing management recommendations.

7. Consideration of recommendations to the Commission for possible additional actions relating to FAD management and recovery

The Group agreed that it was important to summarize the conclusions reached by the Group during the entire two years of its functioning. For that purpose, the SCRS Chair developed a draft synthesis of such results in a separate document that was presented to the FAD Working Group during the meeting (*Synthesis of findings reached by the Ad-Hoc Working Group on FADs*). The FAD Working Group discussed the document and made modifications to it before adopting a final version to be provided to the Commission (**Appendix 4**).

After the discussions on the synthesis document, the FAD Working Group prepared a series of recommendations to be presented to the Commission. These are attached to this Report as **Appendix 5**.

8. Other matters

[Rec. 15-02] requested that ICCAT should work during 2016 to organize a joint meeting with other tuna RFMOs which have their own FAD working groups. ICCAT did approach these other RFMOs but it was not possible for them to fully participate in the current meeting because of timing. Some of the participants at the current meeting participated in the other RFMO FAD working groups and were able to provide information on relevant progress in other RFMOs, as can be seen by the number of presentations that refer to work conducted in other RFMOs, especially IOTC. Efforts are still being made to organize such a meeting of FAD working groups of tuna RFMOs in the future.

It was noted that the success of the meeting was largely due to the productive discussions which took place and to the constructive input of all participants. Several CPCs were represented at the meeting, however, certain CPCs that harvest important amounts of tropical tunas in association with FADs did not attend. The Working Group reiterated the invitation to all the CPCs concerned with FAD fisheries to contribute to the work of the SCRS and the Commission with regards of the management of tropical tuna fisheries.

9. Adoption of Report and Adjournment

The synthesis of the work conducted by the Working Group during the last two years (**Appendix 4**) and the recommendations to the Commission (**Appendix 5**) were adopted at the meeting. The rest of the Report was adopted by correspondence after the meeting. Mr. Shep Helguile thanked all participants for their contributions and adjourned the meeting.

Agenda

1. Opening of the meeting
2. Adoption of the agenda and meeting arrangements
3. Nomination of Rapporteur
4. Review of the information provided by CPCs pursuant to the FAD related provisions in the relevant ICCAT conservation and management measures
5. Assessment of the use of FADs in tropical tuna fisheries in ICCAT and of the relative contribution of FADs to overall fishing mortality in ICCAT tropical tuna fisheries
6. Assessment of developments in FAD-related technology
7. Consideration of recommendations to the Commission for possible additional actions relating to FAD management and recovery
8. Other matters
9. Adoption of Report and Adjournment

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List of Documents and Presentations

Documents

SCRS/2016/017	Retaining bycatch to avoid wastage of fishery resources: How important is the bycatch landed by purse-seiners in Abidjan	Amandè M.J., Restrepo V., Scott J.
SCRS/2016/030	Results achieved within the framework of the EU research project: Catch, effort, and ecosystem impacts of FAD-fishing (CECOFAD)	Gaertner D., Ariz J., Bez N., Clermidy S., Moreno G., Murua H., and Soto M.
SCRS/2016/042	Review of the Spanish Fish Aggregating Device Management Plan: implementation, evolution and recommendations	Soto M., Justel-Rubio A. and Lopez J
SCRS/2016/044	An assessment of FAD management options for the ICCAT Convention Area	Galland G.R.
SCRS/2016/045	Effects of FAD associated purse seine catches on ecosystem function in the Gulf of Guinea	Forrestal F., Menard F., and Coll M.
SCRS/2016/053	Summary of information available on FADs submitted to the ICCAT Secretariat	de Bruyn P.
SCRS/2016/054	Progress on the adoption of non-entangling drifting fish aggregating devices in tuna purse seine fleets	Murua J., Moreno G., and Restrepo V.

Presentations

SCRS/P/2016/012	Using fishers' echo-sounder buoys to estimate biomass of fish species associated with fish aggregating devices in the Indian Ocean	Orúe B., Lopez J., Murua H., Moreno G., Santiago J., and Soto M.
SCRS/P/2016/013	The importance of knowing the number of FADs for building sound indicators and impact assessments	Capello M., and Dagorn L.
SCRS/P/2016/015	Verification of best practices to reduce FAD impacts on bycatch fauna, and of the limitation of the number of FADs	Goñi N., Santiago J., Murua H., Fraile I., Krug I., Ruiz J., and Pascual P.
SCRS/P/2016/016	Verification of best practices to reduce FAD impacts on bycatch fauna, and of the limitation of the number of FADs	Goñi N., Santiago J., Murua H., Fraile I., Krug I., Ruiz J., and Pascual P.

Synthesis of Findings Reached by the Ad-Hoc Working Group on FADs

This synthesis reflects a compendium of conclusions related to the terms of reference of Recommendation by ICCAT to Establish an Ad Hoc Working Group on fish Aggregating Devices (FADs) [Rec. 15-02]. It has been developed on the basis of the documents presented at the two meetings of the working group, the discussions held during them, the response to the Commission's request on the effects of the FAD moratoria in place prior to [Rec. 15-01], and the latest stock assessments of yellowfin, bigeye and skipjack. The synthesis presented is arranged in sections corresponding to the terms of reference of [Rec. 15-02].

a) Assess the use of FADs in tropical tuna fisheries in ICCAT, including by estimating the past and current number of and different types of buoys and FADs operating in ICCAT tropical tuna fisheries, and evaluate ways to improve the use of information related to FADs in the process of stock assessments, including quantifying the effort associated with this type of fishery

a.1 Past and current use of FADs

- Technological improvements have increased the fishing power of purse seine vessels fishing on FADs, but also on those fishing on free schools.
- There are indicators suggesting that the number of FADs seeded, and the number of active FADs has continued to increase, however, the absolute number of these are not yet known. It is estimated that at least 17,000 FADs have been released each year in the ICCAT Convention area since 2010.
- It has been shown that adoption of FADs and other technologies have helped purse seine fleets expand the fishing area.
- It is unknown how long a FAD remains active after released by a vessel. Some estimates suggest six months to a year; however, FADs are often exchanged between vessels or retrieved by a different fleet, so the length of time a FAD is used by a single vessel can be much shorter.
- FADs are increasingly fitted with sophisticated technology; lately most FADs have satellite buoys and echo-sounders.

a.2 Ways to improve the use of information on FADs in the process of assessment

- Data collected on positions of FAD seeding and FAD drift and made available to CPC scientists, has helped the SCRS understand distribution of one of the main components of fishing effort: the area searched by purse seine fleet.
- Buoys equipped with echo-sounders provide relative estimates of aggregate biomass (all species combined) under the FAD.
- Some echo-sounders are being developed to use multiple frequencies to determine the species present under FADs. Initial trials suggest it may be possible to differentiate between skipjack and the other two tropical tunas, yellowfin and bigeye.
- If estimates of biomass from echosounders were made available to the SCRS they could be used to:
 - Improve estimates of relative abundance obtained from purse seine CPUE.
 - Provide new estimates of relative abundance by using biomass estimated by the buoy prior to the FAD been fished.

a.3 Quantifying the effort associated with this type of fishery

- Improvements in efficiency gained by the development of the strategy of fishing in associations of baitboats and purse seiners (with or without FADs) have yet to be estimated but are assumed to be significant.
- Current available data do not allow to accurately quantify the total effective effort and fishing capacity associated with this type of fishery, including the contribution of baitboats and support vessels.

b) In view of the identification of data gaps, review the information provided by CPCs pursuant to the FAD related provisions in the relevant ICCAT conservation and management measures

b.1 FAD moratoria

- A preliminary evaluation of the effectiveness of the moratorium agreed to in Rec. 15-01 will likely not be able to be conducted until at least three years have passed since its full implementation.
- Three important sets of data from all CPC purse seine and baitboat fleets that would improve the analyses of current and future moratoria are:
 - Catches by fishing mode (FAD, free) made by 1 degree and by month.
 - Number of sets by fishing mode (FAD, free) made by 1 degree and by month.
 - Number of active buoys with GPS set on FADs or other floating objects made by 1 degree and by month.

Some CPCs are already providing most of this data to ICCAT, however, for the data to be most useful to the SCRS all fleets need to provide it.

b.2 Reporting obligations regarding FADs

- The analyses of the efficacy of the collection of data on FAD operations recorded in vessel logbooks has been conducted for the Atlantic and other oceans. These analyses can identify the reasons why data collected in such logbooks do not always record the information intended or why these records contain erroneous data. Such analyses can also provide solutions to these challenges.
 - Data collection related to FADs requires a standard set of definitions that can be adopted equally for all fleets. When practical, such a set of definitions should be ideally developed in consultation with other tuna RFMOs. The European CECOFAD project, which benefited from the participation of associations of French and Spanish fishermen, standardized a list of definitions and of minimum data requirements to be collected. These lists can be used to inform this process.
- It is premature to predict whether the number of active FADs will be constrained by the per vessel limit imposed by [Rec. 15-01].
- Initial efforts by industry and scientists to monitor the number of active FADs are encouraging.
- Data provided by scientific observers are crucial to complement logbook data and to provide more accurate knowledge of the biological information (e.g. by-catch, catch at size, biological samples, catch composition) related to the tropical tuna fishery. It should be noted that some purse seine fleets already moved towards a 100% coverage.

- Reporting obligations on FADs and support vessels would benefit from additional requirements concerning:
 - the role of support vessels in the evolution of fishing effort and
 - more accurate spatial and temporal scales for catch and effort reporting.
- A preliminary review of the information submitted by CPCs reveals that the degree of reporting differs among CPCs. As a result it is not possible to establish with certainty the number of deployed FADs.

c) Assess the relative contribution of FADs to overall fishing mortality in ICCAT tropical tuna fisheries

c.1 Fishing mortality of purse seine relative to the total fishing mortality of all gears

- Purse seine sets on FADs contribute considerably to the catch of tropical tunas in ICCAT. However, purse seine sets on free-swimming schools as well as catches from other fishing gears are also important. The relative contribution, by weight, of different fishing gears to the landings of the three species in recent years (2010-2013 averages) is as follows:

Gear	BET	YFT	SKJ
PS_Object	21%	20%	41%
PS_FS	4%	36%	4%
PS No info*	12%	15%	26%
LL	47%	17%	0%
BB	15%	8%	26%
Other	1%	4%	3%

- The catch of some species by purse seining has grown relative to other fishing gears. For example, the relative contribution of purse seine gear to the total catch of bigeye tuna in the period 2009-2014 has increased by 50% in comparison to the period 2000-2008.

c.2 Fishing mortality of FAD fishing relative to the total fishing mortality of purse seine

- Targeting skipjack schools by purse seine fleets will always lead to some unintended capture of juvenile bigeye and yellowfin. These catches of juvenile bigeye and yellowfin are greater when catches are made on FAD associated schools.
- As the number of FADs and their efficiency has increased, the relative contribution of FADs to the overall fishing mortality on skipjack, juvenile bigeye and juvenile yellowfin has continued to increase.
- Estimates of fishing mortality on juvenile tunas are challenged by the limited historical information on the details of changes in past FAD operations. If data on FAD operations requested in [Rec. 15-01] are reported accurately and comprehensively, they can be used to significantly improve the ability of the SCRS to estimate future fishing mortality of yellowfin, bigeye and skipjack.
- In October 2016 the SCRS will update whether the increase in relative fishing mortality on juvenile yellowfin has continued since 2010.
- The moratorium on FAD fishing agreed in Rec. 11-01 and Rec. 14-01 was not effective in reducing the mortality of juvenile bigeye tuna, and any reduction in yellowfin tuna mortality was minimal, largely due to the redistribution of effort into areas adjacent to the moratorium area.

* Purse seine catches on unclassified school type (PS No info) correspond mainly to catches on FAD operations for fleets operating in the Gulf of Guinea.

- Any moratoria in FAD fishing that does not encompass the majority of the area where FADs are used can potentially lead to the redistribution of FAD fishing effort to areas outside the moratoria.
- The proportion of juvenile bigeye from FAD catches is not constant across areas of the equatorial region. Moratoria placed in areas where juvenile bigeye catches are greater are likely to lead to greater reductions of the mortality on bigeye juveniles.
- Observer data show that purse seine discards of skipjack, yellowfin and bigeye is very small compared with the retained catch. Relative rates of discard are greater from sets made on FADs.
- An important component of “*faux poisson*” sold to local markets in Western Africa consist of tropical tunas that are not suitable for canning (e.g. considered too small or damaged). A larger proportion of these fish come from FAD sets. It is essential to ensure the monitoring of these catches with the help of on-board observers and to improve the monitoring of landings of purse seiners in African ports in accordance with the ICCAT port sampling program.
- It is still premature to attempt to estimate the effect that the new measures (catch limit on bigeye, limitation on active FADs per vessel and the new FAD closure) contained in [Rec. 15-01] will have in reducing the mortality on juvenile bigeye and yellowfin.
- Scientific research on tuna dynamics at various spatial and time scales related to the use of FADs by tuna schools can improve understanding of tropical tuna abundance and fishing mortality. This research is hampered by the lack of accurate estimates of the total number of FADs and its spatio-temporal distribution within the ICCAT area.

c.3 Fishing mortality on by-catch species

- Fishing on FADs results in increased mortality of not only tunas but also of other species that are discarded and do not survive the fishing operations. These mortalities can lead to changes in the ecosystem that can be detected by ecosystem models such as the one developed for the Gulf of Guinea. Changes detected in the Gulf of Guinea, however, are smaller than those estimated for other fished ecosystems.
- Fishing on FADs leads to the incidental capture of some species of sharks and sea turtles that are of conservation concern. These incidental catches are much smaller than incidental catches made by longliners. Some purse seine fishing fleets have developed best practices (monitored by 100% scientific observer coverage) for dealing with these captures. When best practices are used survival rates of sharks that reach the deck of the vessel are between 15-20% and survival rates of sea turtles are close to 100%.

d) Assess the developments in FAD-related technology, including with regard to:

- *Technological improvement in relation to fishing mortality*
 - Technological improvements that lead to fishing power change need to be properly monitored and cooperation between scientists and the fishing sector should be ensured.
- *FAD and buoys marking and identification as a tool for monitoring, tracking and control of FADs*
 - Monitoring of the number of active FADs is feasible and can be achieved by:
 - Using the identifying buoy-number provided by the buoy manufacturer.
 - Recording the identifying buoy-number associated with any newly deployed FAD and the identifying buoy-number associated with any recovered FAD. In cases where there is a change of buoy in a FAD, both the ID code of the buoy associated with the FAD and the ID code of the buoy that serves as a replacement need to be recorded.

- Establishing a consolidated database of records of FAD activity across all purse seine fleets.
- *Reducing FADs' ecological impact through improved design, such as non-entangling FADs and biodegradable material*
 - FADs that are lost or abandoned can potentially negatively impact ecosystems by contributing to marine debris, and drift into and damage sensitive habitats (such as coral reefs).
 - It was estimated that during the period 2007-2013 approximately 10% of FADs equipped with buoys end up in the coast and some of these end up in sensitive habitats.
 - Non-entangling or lower entanglement risk FADs contribute to reducing mortality on protected species.
 - Purse seine fleets in the Atlantic and other oceans are aware of the need to shift to lower entanglement risk on non-entangling FADs and have been in the forefront of the testing and development of this technology.
 - Research is being conducted on the construction of FADs with biodegradable materials, primarily with funds from the fishing industry. Results of initial trials are encouraging. More comprehensive trials are planned to be conducted under typical fishing conditions of drifting FADs in tropical areas.
 - Further development of this technology is necessary and urgent given new provisions included in Rec. 15-01 and the fact that one CPC already requires the use of biodegradable material as a condition of their permit to operate in their EEZ.

e) Identify management options and common standards for FAD management, including components of FAD management plans, the regulation of deployment limits, characteristics and use of FADs, such as marking and activities of support vessels and evaluate their effect on ICCAT managed species and on the pelagic eco-systems, based on scientific advice and the precautionary approach. This should take into consideration all the fishing mortality components, the methods by which FAD fishing has increased a vessel's ability to catch fish, as well as socio-economic elements with the view to provide effective recommendations to the Commission for FAD management in tropical tuna fisheries.

e.1 Fishing capacity, including number of FADs

The ICCAT FAD Working Group recommends that relevant data are made available to accurately quantify the total effective effort and fishing capacity associated with this type of fishery, including the contribution of baitboat and support vessels. The FAD Working Group recommends that the SCRS review that information and provide advice on adapting the fishing capacity in all its components (number of FADs, number of fishing vessels and support vessels) to achieve the management objectives for tropical tuna species.

e.2 FAD management plans

Definitions of FAD activities

The ICCAT FAD Working Group recommends that:

- By taking into account as baseline the outputs of the EU CECOFAD research project (SCRS/2016/30) the SCRS:
 - develops a set of definitions for floating objects and types of activities developed on them including “FAD sets” and “FAD fishing”. In particular, definitions and characteristics of non-entangling and bio-degradable FADs should be established;

- reviews and recommends additional changes, as appropriate, to the minimum standard reporting requirements on data to be collected in FAD fisheries through logbooks;
- establishes guidelines addressed to vessel masters detailing how data and more particularly qualitative information would have to be reported.

In light of the SCRS outcomes the ICCAT FAD Working Group recommends that:

- National FAD management plans include a specific chapter on vessel masters' training programmes aiming at standardizing data collection and reporting procedures.

Recovery of FADs

- The ICCAT FAD Working Group urges CPCs, in collaboration with the industry, to address issues related to impacts of FADs on sensitive coastal habitats, in particular to mitigate risks of beaching.
- As a first step the ICCAT FAD Working Group recommends asking the SCRS to identify coastal areas, which would be likely impacted by possible beaching of FADs.

e.3 FAD data reporting and scientific collaborations related to reporting obligations

Data reporting

The ICCAT FAD Working Group recommends extending data requirements for CPCs laid down in Rec. 15-01 as follows:

- Report purse seine and baitboat catches and efforts including the number of sets in line with Task II data requirements (i.e. per 1°x1° statistical rectangles and per month) and by distinguishing floating-object associated schools and free school fisheries;
- Report the number of floating objects equipped with active buoys observed per 1°x1° statistical rectangles, month and flag state;
- Report the number of FADs deployed by support vessels per 1°x1° statistical rectangles and per month.
- When the activities of purse seine are carried out in association with baitboat, report catches and effort in line Task I and Task II requirements as “purse seine associated to baitboats” (PS+BB).

The ICCAT FAD Working Group also highlights the needs to address and monitor possible changes of fishing strategies, in particular fishing activities of purse seiners in association with baitboats and/or support vessels.

The ICCAT FAD Working Group recommends that the ICCAT Secretariat develop a common format allowing CPCs to submit information and data required in Rec. 15-01 in a standardised way. The ICCAT Secretariat should also develop the related data base.

Scientific collaborations

The CPC FAD management plan should include a specific chapter describing how the national fishing sector and the national fisheries scientists collaborate to exchange information on fishing strategies and fisheries dynamics, by identifying in particular data and information to be gathered and provided beyond compulsory reporting provisions laid down in Rec. 15-01. Data recorded by echo-sounders should be made available to national scientists, as well as any quantitative and qualitative information allowing national scientists to better assess links and trends between nominal and effective fishing effort.

Recognizing that the full analysis of detailed information on FAD effort may be hampered by existing restrictions limiting access to data from CPC fleets to national scientists from the same CPC, it is recommended that approaches be considered (e.g. confidentiality agreements) to enable the analysis of more complete data sets reflecting the FAD activities of multiple fleets.

e.4 Provision of scientific advice on FADs

The ICCAT FAD Working Group recommends asking the SCRS to develop fisheries indicators describing catch compositions, size structures and catch average sizes of the different métiers contributing to the tropical tunas' fishing mortality and in particular of purse seine fleets fishing on floating objects.

The FAD Working Group recommends asking the SCRS to provide advice on possible modifications of fishing patterns affecting the catch-at-size composition and their impact on MSY and relative stock status.

e.5 Compliance

The ICCAT FAD Working Group recommends that the Compliance Committee assesses the compliance of the concerned CPCs with the reporting obligations laid down in Rec. 15-01. To this end the ICCAT Secretariat should report on the information received to the Compliance Committee.

Concerning the number of FADs, the ICCAT FAD Working Group recommends implementing and monitoring the limits in accordance with the Rec. 15-01 as well as ensuring compliance assessment by ICCAT on a regular basis.

e.6 Marking and identification of FADs

The ICCAT FAD Working Group recommends the Commission to consider that monitoring of active FADs is achieved by:

- using the identifying buoy-number provided by the buoy manufacturer;
- recording the identifying buoy-number associated with any newly deployed FAD and the identifying beacon-number associated with any recovered FAD; In cases where there is a change of buoy in a FAD, both the ID code of the buoy associated with the FAD and the ID code of the buoy that serves as a replacement need to be recorded.
- establishing a consolidated database of records of FAD activity across all purse seine fleets.

e.7 Observers

The ICCAT FAD Working Group recommends the Commission to increase the observer coverage for large scale vessels with a view to collect more accurate data on catch composition and incidental by-catches. The FAD Working Group notes that the issue of by-catch in ICCAT fisheries should be addressed in a comprehensive way for all fleets.

e.8 Discards

The ICCAT FAD Working Group recommends the Commission to develop, in line with the principles of the *FAO International Guidelines on By-catch Management and Reduction of Discards*, an appropriate retention policy for tropical tunas to better manage by-catch and reduce discards in tropical tuna fisheries.

f) Identify and assess options for and timing of recovery of FADs in order to ensure a proper management of the marine environment

- The use of FADs equipped with buoys allows for the continuous monitoring of their position. This helps reduce the numbers of lost FADs through strategies that seek to recover and/or re-use them. Increase recovery of FADs may result in a reduction of potential impacts on sensitive habitats and protected species.
- There are strategies that can successfully increase the re-use of different components of active FADs. These include voluntary return of recovered buoys to their owners through industry networks, and the contracting of recovery efforts for lost FADs that approach coastal areas, in particular sensitive habitats.
- Re-use of FADs reduces impact on ecosystems and target species.
- It is important to distinguish between the recovery of the entire FAD from the recovery of instrumentation (buoys) alone, which, although economically advantageous to the industry, only partially mitigate the potential impact of unrecovered FADs.

References

- ICCAT 2016. Report of the first meeting of the Ad-Hoc Working group on FADs. ICCAT Report for biennial period, 2014-15, Part II (2015) - Vol. 1. Annex 4.3. pp 187-206.
- ICCAT 2016. Response to the Commission 19.1: *Evaluate the efficacy of the area/time closure referred to in paragraph 24 for the reduction of catches of juvenile bigeye and yellowfin*, [Rec. 14-01] paragraph 26. In Report of the Standing Committee of Research and Statistics (SCRS). ICCAT Report for biennial period, 2014-15, Part II (2015) - Vol. 2. pp 245-247.
- ICCAT 2016. Rec. 15-01. *Recommendation by ICCAT on a multi-annual conservation and management program for tropical tunas*. 16p. In ICCAT Report for biennial period, 2014-15, Part II (2015) - Vol. 1. pp 317-332.
- ICCAT 2016. Rec. 15-02. *Recommendation by ICCAT to establish an ad hoc working group on fish aggregating devices (FADs)*. 2p. In ICCAT Report for biennial period, 2014-15, Part II (2015) - Vol. 1. pp 333-334.
- ICCAT 2016. Report of the second meeting of the Ad-Hoc Working group on FADs.

Plus all other SCRS documents presented at the two FAD meetings.

Recommendations

- ICCAT should, in collaboration with industry, facilitate the training of fishers in the collection of current requirements for data collection on FAD activities. Such training should be repeated when data requirements change.

Final Recommendations

e.1 Fishing capacity, including number of FADs

The ICCAT FAD Working Group recommends that relevant data are made available to accurately quantify the total effective effort and fishing capacity associated with this type of fishery, including the contribution of baitboat and support vessels. The FAD Working Group recommends that the SCRS review that information and provide advice on adapting the fishing capacity in all its components (number of FADs, number of fishing vessels and support vessels) to achieve the management objectives for tropical tuna species.

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In light of the SCRS outcomes the ICCAT FAD Working Group recommends that:

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