

Original: English

REPORT OF THE 3RD MEETING OF THE AD HOC WORKING GROUP ON FADs
(Madrid, Spain – 11-12 September 2017)

1. Opening of the meeting

The ICCAT Executive Secretary, Mr. Driss Meski, welcomed all the participants (**Appendix 1**) and reminded them of the Commission's request for this Group to meet in 2017. The Executive Secretary then introduced the two co-chairs of the meeting. Mr. Shep Helguile and Dr. David Die, the co-Chairs of the FAD Working Group, opened the meeting.

2. Adoption of the Agenda and meeting arrangements

Dr. Die presented the final Agenda of the meeting which was adopted by the Working Group (**Appendix 2**). The Executive Secretary of ICCAT provided the meeting arrangements. The Executive Secretary also listed the eight CPCs (Côte d'Ivoire, European Union, Gabon, Nicaragua, Nigeria, Sao Tomé e Príncipe, Senegal and the United States of America) and three Observers (International Seafood Sustainability Foundation, Marine Stewardship Council and Pew Charitable Trusts) present. The co-Chairs reminded presenters that presentations must be kept short due to the rather ambitious agenda (to make time for all).

3. Nomination of Rapporteur

The Secretariat agreed to serve as rapporteur for the meeting.

4. Review of the information on FADs provided by CPCs

The Secretariat provided the data received so far from Form ST08 regarding FAD deployments. The Secretariat highlighted that very few CPCs (3) provided data using the recently modified ST08 forms. In addition, several problems with the received submissions were noted. In one case information had been provided by 5 x 5 rather than 1 x 1 degree squares. There was also an error in the EU. EU-France submission, that resulted in incorrect estimations of the number of FADs deployed with beacons. This error was subsequently clarified with the EU and the misunderstanding was corrected. The corrected data is provided in **Appendix 3**. The Group was made aware of the discussions during the Tropical Tunas Working Group in 2017 that agreed that CPCs will provide feedback on the problems they have encountered submitting the data using the ST08 forms to the Sub-Committee on Statistics in 2017. These problems relate to both the complexity of the forms, as well as uncertainty with regards to interpreting the requirements in Rec. [16-01], particularly with regards to which data is required at which resolution (1 x 1, monthly etc.). The Sub-committee will then review this feedback and provide a response to the Commission on how these problems can be resolved. In particular, CPCs who did not submit ST08 data were encouraged to participate and contribute to this response.

Document FAD_014/17 was a short note regarding Information on the Number and the Monitoring of Active GPS Buoys for the French Purse Seine Fleet in the Atlantic Ocean Over 2010-2017.

This presentation highlighted the need to clearly define what is meant by an Active Buoy. The Group acknowledged the importance of this definition as currently, ICCAT manages FAD deployments based on active FADs. The Group noted that several documents may provide guidance on this issue. Firstly, the author provided a suggestion in the document presented, but other possible definitions may come from document j-FAD_035 and/or the IOTC adopted resolution regarding FADs (IOTC-2017-S21-PropO adopted 26 May 2017). It was also recognised that the definition is complicated by the fact that even if the buoy attached to a FAD is not active, the FAD may continue to actively aggregate fish populations. This latter problem is very difficult to quantify.

The Group discussed the issues regarding the monitoring of active FADs. It was noted that a FAD should only be activated or deactivated when on a vessel, and not remotely as this would be almost impossible to monitor. Buoys should only be considered active if they are drifting as this implies that the buoy is not onboard a vessel. It was clarified that vessels are requesting increasingly detailed information from service providers. Previously data from beacons was requested on a quarterly or monthly basis, whereas at present information can and is often being supplied daily. This detailed information is crucial for monitoring FAD activity and determining whether they are active and drifting. The access to this detailed information is also crucial for understanding FAD activity.

5. Evaluate progress made based on the recommendations issued by the Working Group in 2016

Dr. Die, the Co-chair of the Group provided a brief review of the *Second meeting of the Ad Hoc Working Group on FADs* (Anon., 2017) highlighting the recommendations that were made during that meeting. The recommendations from that meeting are contained in **Appendix 4**. Based on the Recommendations made during the past meeting, in 2016 the Commission agreed to extend the operation of this Working Group and modified the Terms of Reference for the Group accordingly. The modified Terms of Reference were used to develop the agenda of this Third meeting of the FAD Working Group. The Recommendations from the *Second meeting of the Ad Hoc Working Group on FADs* were also used to initiate collaborations between RFMOs, which culminated in the *First Meeting of the Joint Tuna RFMO FAD Working Group* in April 2017 under the Kobe process.

It was suggested that the SCRS could be tasked with developing a work plan with timeframes and responsibilities to address the recommendations that arose from the 2016 meeting. The Group generally agreed, however, that this could result in a delay in action on these issues, as the SCRS would not be able to address the work plan prior to 2018. As such the Group agreed to review these Recommendations during the meeting along with those arising from the Joint Tuna RFMO Working Group meeting (see **Appendix 6** and Item 6 below) and provide some feedback immediately. The Group then recommended that the SCRS develop a work plan on the remaining issues or clarify any issues that have already been addressed in 2018. It was agreed that further meetings of the ICCAT FAD Working Group will be needed to maintain and evaluate the progress made on FAD management thus far.

The Co-chairs clarified that these recommendations are addressed in Item 9 of this report.

6. Considerations from the *First Meeting of the Joint Tuna RFMO FAD Working Group*

Mr. Shep Helguile, the co-Chair of the Working Group introduced the table of key areas for future action arising from the *First meeting of the Joint tRFMO FAD Working Group* that was held in April 2017 (FAD_003). These action items covered three key areas, namely (i) General, (ii) Gaps and requirements for data, (iii) Mitigation measures. For each area, the table contains there a list of actions proposed together with responsibilities. This table formed the basis for the final recommendations provided by this Group. The comments made to this table are provided in **Appendix 6**.

One of the first discussion points was whether another meeting of the Joint Tuna RFMO FAD Working Group is necessary. The Group was very supportive of the progress and discussions that had taken place during the first meeting, and agreed that much work is still required to harmonise data collection and submission on FADs across the oceans, and that several common issues still exist that can best be addressed in collaboration with other tuna RFMOs. The first meeting addressed very broad topics, whereas a future meeting could be devised to address more technical or detailed issues. As such the Group recommended that another meeting of this joint Group be held. It was also noted that the joint Tuna RFMO FAD Working Group called for the creation of a smaller technical working group to address these more detailed issues. The ICCAT FAD Working Group agreed that this recommendation should be followed and that the Commission should support participation of experts familiar with ICCAT fisheries. It was noted that the Joint tuna RFMO Working Group did not have the mandate to decide on management actions or make firm Recommendations and this was used as further justification that the ICCAT FAD Working Group should continue in able to translate the advice provided across RFMOs into operational management actions for ICCAT.

The importance of the timing of the next meeting was discussed and the Group agreed that the SCRS should be provided time to address the work plan and timetable as pointed out in Item 5 and detail any progress made. The Group also recognised that the final recommendations provided in Item 9 may also guide the planning of this next joint tuna RFMO FAD Working Group meeting.

The Group stressed that an important consideration for the future is to ensure that scientists have access to the detailed information from the beacons to facilitate the assessment and evaluation of FAD activity. Several presentations under items 7 and 8 provide examples of collaboration between scientists and industry and the Group strongly encouraged the continuation and expansion of these initiatives. The Group agreed that these collaborations should not only occur within CPCs, but also between CPCs to provide a better understanding of FAD dynamics across the Atlantic Ocean.

7. Assessment of developments in FAD-related technology

FAD_05 summarized the results of a project to test biodegradable ropes, to be used at FADs, in a controlled environment. While, FAD_06 summarized the results of a pilot project to test biodegradable ropes at FADs in real fishing conditions.

The Group was informed that not all biodegradable materials are of equal quality and this would affect the durability in the buoys. This led to further discussions as to what is the current life of a FAD, which is not easy to determine as some FADs are repaired when components fail. The general understanding from an ISSF skippers workshop held in 2016 is that FADs should last for a year although studies have shown this may be closer to 160 days with about 10% resulting in beaching. It was clarified that future studies will include more vessels in order to improve these estimates. The study indicated that the fishers are happy with the biodegradable FADs and they were designed in consultation with them. Additional research is required to modify the floating portion of the FAD as until now, the focus has been on the submerged portion, which constitutes the majority of the FAD material.

A short presentation was provided on a recently initiated EU funded project on biodegradable FADs. As the contract for the project had only recently been signed, no document was available for the presentation. The presentation provided an overview on the research the project consortium intends to conduct. The results will be provided to the SCRS as they are available.

8. Describe the effects of FAD use on the fishing mortality of stocks of tropical tuna

i. Assessment of the relative contribution of FADs to age/length specific fishing mortality of bigeye, yellowfin and skipjack

FAD_07 provided information on the Evolution in Yield of the Spanish Fleet in the Purse Seine Fishery Directed at Tropical Tunas with a Comparison Between Sets on Objects and Free Schools.

The Group agreed that it is important to evaluate the time it takes for fish to accumulate on the FADs as well as if these rates differ by species and area. It is clear that FADs are being visited more regularly with less time between harvesting and this may result in a reduction in CPUE due to the shorter time for accumulation of biomass. This can only be analysed if the FADs do not change ownership. An increase number in FADs in the study area may also result in a dispersion of biomass between the FADs. In addition, the effect of the newly adopted FAD deployment limits will need to be monitored and evaluated. It was suggested that additional factors are required in the CPUE standardisation and error estimates around the figures will provide further insight into the catch rates around the FADs.

ii. Assess changes in bigeye, yellowfin and skipjack biomass and MSY estimates, associated to different selectivity patterns and juveniles fishing mortality levels

This particular item is the focus of an ongoing SCRS study, that was addressed during the *2017 Tropical Tuna Species Group Working Group* (Anon., in press) and a response to the Commission has been drafted by that Group. The Tropical Tuna Species Group has decided that further analysis is needed and the current study is not currently suitable for submission to the Commission. As such the Tropical Tuna Species Group recommended to the SCRS that these analyses be completed in 2018. The current draft response will be discussed by the SCRS in plenary.

Preliminary studies indicate that there are important impacts on the population when the ratios between different fishing strategies and gears are varied. It will be important to show the trade-offs between the levels of catches for different fleets fishing in the Atlantic. This study is also important for the planned Management Strategy Evaluation (MSE) work to be done by the SCRS. For the MSE it is important to receive guidance from the Commission with regards to specific objectives regarding the desired mortality balance between gears.

iii. Possible ways of improving the use of information related to FADs in the process of stock assessments

FAD_04 provided a study on the Fishing on Floating Objects (FOBs): How Tropical Tuna Purse Seiners Split Fishing Effort Between GPS-Monitored and Unmonitored FOBs.

The Group noted that this work has implications for management actions that require pre-set (before a purse seine fishing set) information about associated schools as only 1/5 of sets were on monitored FOBs. It was also highlighted that in the past the SCRS has attempted to split effort by free school and FAD sets, whereas the implications from this study are that the portion of effort dedicated to FAD sets should be further split into the proportion of sets made on FADs that the vessel has position information for versus those that it does not. This is important because there are different advantages gained from those two types of objects that affect fishing effort in dissimilar ways. In order to extend this study to other fleets, it is important to clearly associate each set with a buoy. However, this is not always possible because there may not be a buoy identifier to link the FAD to the set and because fishers not only fish on their own FADs but also on others they encounter and therefore will not appear in their country's data set.

FAD_09 provided information on the Colonization of Drifting Fish Aggregating Devices (DFADs) in the Western Indian Ocean, Assessed by Fishers' Echo-Sounder Buoys.

The author noted that the pattern of accumulation of biomass around a FAD is highly variable and dependant on many factors (e.g. Trajectory of FAD, time of deployment, area of deployment) and that biomass may increase and decrease over time. Also, although the buoy is monitored for biomass accumulation, fishing activity from other vessels on the FAD is unknown. The Group also noted with interest that according to the study, tuna accumulate on the FAD before by-catch species. This finding is preliminary, however, as several characteristics of the data collection may under-estimate the by-catch, such as the fact that by-catch may accumulate initially in small volumes which would not be recorded by the echo-sounders that have a minimum 1t threshold before submitting information. This threshold level will need to be reduced in the future to further investigate this observation and suppliers of the buoy information will need to be requested to provide far more detailed information. In addition, the colonisation time appeared to be very rapid, but further factors are required in the analysis to further clarify this observation (such as deployment strategy).

FAD_010 presented a study Towards the Derivation of Fisheries-independent Abundance Indices for Tropical Tunas: Progress in the Echosounder Buoys Data Analysis.

The Group stressed that the results from this study are preliminary and it appears that the sudden switches have been negative and positive coefficient values indicate the algorithm is not adequately modelling the data. Different model types should be used to investigate this perceived problem. In addition, sensitivity analyses are needed to test the bounds set on some of the parameters. It was also noted that the tests were carried out on mono-specific catches. This will become significantly more complicated when multi-specific estimations are attempted. Additional research is required to enable the identification of species composition based purely on acoustic data, and not to rely on monospecific catches which are only possible to validate afterwards.

What FAD Research for the Sustainability of FAD Fisheries? Was presented in document FAD_011.

It was acknowledged that a shift from FAD sets to free school sets will also shift impacts on various by-catch species. Reductions in interactions with silky shark may occur, but there may be increases in interactions with other sensitive species such as manta rays. Any measures proposed regarding shifts in effort between fishing strategies must take these shifts in by-catch species interactions into account.

9. Consideration of recommendations to the Commission for possible additional actions on management of FADs

FAD_013 provided information on Drifting Fish Aggregating Devices (DFADs) Beaching in the Atlantic Ocean: an Estimate for the French Purse Seine Fleet (2007-2015).

The Group was informed that an extensive database of small ports on the African coast was used in conjunction with the FAD trajectory information to determine beaching events. It was necessary to separate beachings with trajectories that terminated on boats. It can be difficult to determine FAD fate as buoys may stop transmitting prior to an event, or may be deactivated before beaching. Deactivation often occurs when fishers can no longer use the FAD for a reason (e.g. within 100kms of shore), or if they are found by other vessels. The fate of these FADs with deactivated buoys is therefore largely unknown.

FAD_012 provided information on the Main Results of the Spanish Best Practices Program: Evolution of the Use of Non-Entangling FADs, Interaction with Entangled Animals, and Fauna Release Operations.

The Group were informed that this has been an inclusive project, with EU fishers having been involved. Basic documents regarding safe-handling techniques have been developed and distributed and ISSF skipper workshops have been utilised to inform and receive feedback. In addition, a Steering Committee has been formed to review and guide the work of the project.

FAD_016 demonstrated How Drifting Fish Aggregating Device Density Affects Bycatch in the Tropical Tuna Purse Seine Fisheries in the Atlantic and Indian Oceans.

The Group discussed the fact that the data available for this study needs to be made available at a finer-scale resolution as the distribution of FADs is not even across a 2 x 2 degree square so it is difficult to evaluate density dependence effects of FADs. In addition, data is not available for all fleets, so estimates are difficult to extrapolate for the entire region.

FAD_08 explained how FAD Management Objectives Should be Defined and Implemented at ICCAT.

The Group welcomed this presentation as it provided suggestions for specific objectives which are required by scientists to evaluate management options. It was again discussed that tuna RFMOs are making progress in managing FAD fishing. Much work remains, and to date, small steps have been taken. The Group highlighted the importance of need to continue to advance this work and to ensure that gear-specific objectives should be used to compliment species- or stock-specific objectives. The objectives should likely start with reducing the mortality on juvenile tropical tunas, but should become more refined as additional information becomes available. The Group stressed that these objectives should be based on scientific guidance and to achieve this, the sharing of detailed data with industry is fundamental, as is the guidance by the Commission on quantitative objectives (e.g. 60% probability of maintaining the stock in the green zone). The Group again welcomed the collaboration of industry, particularly within the EU purse seine fleet and expressed its hope that this be continued and extended to improve the work on FAD management issues. The Group strongly encouraged that this collaboration between industry and scientists extend to other CPCs.

Presentation j-FAD_035 entitled "What Does Well-Managed FAD use Look Like Within a Tropical Purse Seine Fishery?" was provided by the co-chair (Chair of SCRS). It was noted this presentation was previously provided at the joint TRFMO FAD meeting held in April 2017 and arises from the previously held Global FAD Science Symposium (20-23 March 2017). This document provides some useful objectives and examples of best practice. Especially of note is the Annex to the document containing a Glossary of Terms. The Group suggested that this glossary form the basis of discussions by the SCRS to define terms for use at ICCAT.

Based on the presentations provided, and the various recommendations developed in other meetings, the Group discussed and finalised a list of recommendations to be passed to the Commission for consideration at their 2017 meeting. These recommendations are provided in **Appendix 6**.

10. Other matters

FAD_015 provided information on the Management of Moored Fish Aggregation Devices (FADS) in the Caribbean.

Several of the participants shared their similar experiences with moored FAD management and welcomed this study that may provide useful insight as to how they may address the problem in their own countries. They noted that they require assistance and advice in dealing with FAD fishing in artisanal fisheries, which is a fairly new development. It was noted that the WECAFC Commission has established a FAD Working Group and that ICCAT should follow developments in that region which may be applicable to other areas in the Atlantic.

The Group also briefly discussed the issue of closed areas and hotspots. To this end the SCRS has conducted some work on this issue, but potential closure areas have been difficult to evaluate. Also, thus far, no study has clearly identified a hotspot that if managed will have a significant beneficial impact on the tropical tuna populations. It is unclear what effect the displacement of effort resulting from a closed area or time/area closure may have. Again, these studies are limited by the quality of the data available to make the evaluations.

11. Adoption of report and adjournment

The recommendations to the Commission (**Appendix 6**) 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.

References

Anonymous. 2017. Report of the Second Meeting of the Ad Hoc Working Group on FADs (*Bilbao, Spain, 14-16 March 2016*). ICCAT Report for biennial period, 2016-17, Part I (2017) - Vol. 1. Annex 4.4. pp 224-244.

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Agenda

1. Opening of the meeting
2. Adoption of the agenda and meeting arrangements
3. Nomination of Rapporteur
4. Review of the information on FADs provided by CPCs
5. Evaluate progress made based on the recommendations issued by the Working Group in 2016
6. Considerations from the 1st joint t-RFMO FAD Working Group meeting
7. Assessment of developments in FAD-related technology
8. Describe the effects of FAD use on the fishing mortality of stocks of tropical tuna
9. Consideration of recommendations to the Commission for possible additional actions on management of FADs
10. Other matters
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Appendix 3

Information regarding FAD deployments provided to the Secretariat using the ST08-FadsDep forms

Type of beacon deployed	FAD type	Month	BLZ						FRA						GHA					
			No. Deployed with beacons	Average No. Active beacons followed per vessel	Average No. Deactivated beacons followed per vessel	No. Deployed without beacons	Average No. of active lost FADs	No. Of FADs deployed by support vessels	No. Deployed with beacons	Average No. Active beacons followed per vessel	Average No. Deactivated beacons followed per vessel	No. Deployed without beacons	Average No. of active lost FADs	No. Of FADs deployed by support vessels	No. Deployed with beacons	Average No. Active beacons followed per vessel	Average No. Deactivated beacons followed per vessel	No. Deployed without beacons	Average No. of active lost FADs	No. Of FADs deployed by support vessels
SAT	FADA	5	39		2	0	2	0												
RDFGPS	FADA	1													300	50				
		2													500	70				
		3													1500	100				
		4													2500	190				
		5													1600	120				
		6													3500	260				
		7													2000	150				
		8													3000	230				
		9													2000	150				
		10													2000	150				
		11													2000	150				
		12													1500	100				
SATES	FADA	1	126		7	0	7	0	162			0		0						
		2	98		11	0	11	0	83			0		11						
		3	102		9.333333333	0	9.333333	0	144			0		32						
		4	158		7.2	0	7.2	0	202			0		0						
		5	8		1	0	1	0	248			0		51						
		6	141		6.25	0	6.25	0	169			0		0						
		7	71		4.333333333	0	4.333333	0	274			0		0						
		8	117		7.333333333	0	7.333333	0	255			0		0						
		9	213		3.8	0	3.8	0	298			0		16						
		10	33		3	0	3	0	416			0		152						
		11	52		6.5	0	6.5	0	407			0		168						
		12	133		3.666666667	0	3.666667	0	187			0		7						
	FADN	9							4			0		0						

2016 Ad Hoc Working Group on FADs Meeting***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.

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.

Appendix 5

Review of final Recommendations presented by FAD Working Group to the Commission in 2016, including the 2017 Recommendations to the Commission (right column)

	<i>Recommendation WG FAD 2016</i>	<i>SCRS progress/response</i>	<i>Commission Progress/response</i>	<i>Additional Recommendation needed?</i>
e.1	Fishing capacity, including number of FADs			
	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.	See section 4 of this report	[Rec. 16-01] requires submission of some of the necessary data	
	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.	No progress	n/a	SCRS Sub-com. Statistics should review during 2017 meeting
e.2	FAD management plans			
	SCRS develops a set of definitions 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.	Some progress by Trop Tuna WG	n/a	The Group recommends that definitions in j-FAD-035 be referred to the SCRS to consider adjustments in the context of ICCAT fisheries, to be provided to the Commission. Pay attention to definition of FAD sets, active buoy and biodegradable FAD, from both a scientific and compliance aspect.
	SCRS reviews and recommends additional changes, as appropriate, to the minimum standard reporting requirements on data to be collected in FAD fisheries through logbooks.	See section 4 of report	n/a	SCRS Sub-com. Statistics should review during 2017 meeting
	SCRS establishes guidelines addressed to vessel masters detailing how data and more particularly qualitative information would have to be reported.	No progress	n/a	SCRS should develop after review by SCRS Sub-com. statistics

	National FAD management plans include a specific chapter on vessel masters' training programmes aiming at standardizing data collection and reporting procedures.	n/a	n/a	Continue recommending
	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.	n/a	See section 9 of this report	Continue recommending
e.3	FAD data reporting and scientific collaborations related to reporting obligations			
	<p>Extending data requirements for CPCs laid down in Rec. 15-01 as follows:</p> <ol style="list-style-type: none"> 1. 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; 2. Report the number of floating objects equipped with active buoys observed per 1°x1° statistical rectangles, month and flag state; 3. Report the number of FADs deployed by support vessels per 1°x1° statistical rectangles and per month. 4. 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). 	n/a	All requirements extended except for #4?	
	Address and monitor possible changes of fishing strategies, in particular fishing activities of purse seiners in association with baitboats and/or support vessels.	No progress	n/a	Continue recommending

	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 database.	Format completed, database waiting for format to be accepted and complied with	n/a	Continue recommending completion of database when format has been finalized
	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.	n/a	n/a	Continue recommending
	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.	See section 7 of report	n/a	SCRS should review approaches used by national scientists that have conducted analyses on these data sets
	Approaches be considered (e.g. confidentiality agreements) to enable the analysis of more complete data sets reflecting the FAD activities of multiple fleets.	No progress on agreements but few analyses completed for EU- Spain/EU-France fleets	n/a	Continue recommending
e.4	Provision of scientific advice on FADs			
	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.	Some progress by tropical tuna WG	n/a	Continue recommending
	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.	See response to the Commission being prepared by tropical tuna WG	n/a	Continue recommending

e.5	Compliance			
	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.	n/a	Compliance Committee needs to assess	Continue recommending
	Implementing and monitoring the limits in accordance with the Rec. 15-01 as well as ensuring compliance assessment by ICCAT on a regular basis.	n/a	Compliance Committee needs to assess	Continue recommending
e.6	Marking and identification of FADs			
	Monitoring of active FADs is achieved by: <ul style="list-style-type: none"> • 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. 	n/a	No progress	Continue recommending
e.7	Observers			
	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.	n/a		Continue recommending
	By-catch in ICCAT fisheries should be addressed in a comprehensive way for all fleets.	SCRS has plans to organize regional workshops in 2018 to review catch and by-catch of artisanal gillnet fisheries		Continue recommending

e.8	Discards			
	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.	See response to the Commission being prepared by tropical tuna WG	Discussed during tRFMO FAD WG	Continue recommending

Appendix 6

Key areas for Future Action for the Joint T-RFMO FAD WG

KEY AREAS	SPECIFIC ACTIONS	KOBE	RFMO	CPC	Recommendations
GENERAL ISSUES	Legal aspects:				
	– Definition of a FAD	X	X		Comments on legal aspects are beyond the scope of this group.
	– Definition of ownership and responsibilities	X	X		The FAD Working Group should follow the FAO survey on definitions of ownership and track positions of FADs.
	Definitions and common indicators:				
	– Identify available sources for common definitions	X			
	– Harmonize definitions related to science and management of FADs: FAD set (associated vs non-associated), non-entangling, biodegradable, active buoy, type of operation at FADs etc. Prioritization should be given to those definitions with direct management implications and the science needed to guide that management	X	X		Refer definitions in j-FAD-035 to the SCRS to consider adjustments in the context of ICCAT fisheries, to be provided to the Commission. Pay attention to definition of FAD sets, active buoy and biodegradable FAD, from both a scientific and compliance aspect.
	– Need to develop harmonized FAD fishery indicators (e.g. number of FADs, FAD sets, ratio of FAD-associated sets to unassociated sets, numbers of vessels deploying FADs and supply vessels etc.) to estimate the contribution of FADs to the overall effective fishing effort and capacity in tropical tuna fisheries across ocean regions	X	X		Remains a priority to develop harmonized indicators and look at overall effective effort and how it affects stock status and MSY.

	Enhanced cooperation:				
	– Collaboration between industry and scientists for the improvement of the collection of data, scientific research and to develop effective mitigation techniques			X	Some of this work is already happening, but collaboration should be broader than just within CPCs. This should be done across all participants in FAD fishing.
	– Coordination and collaboration on research plans on FADs across t-RFMOs	X	X		This relates to proposal of tRFMO FAD WG to establish a technical working group. The establishment of this WG is recommended to be for 2018. Priorities (TORs) should also be established for group, across RFMOs and oceans (eg. Harmonization of reporting formats and data collection, biodegradable FADs etc.). This group would be established under the existing Kobe FAD WG, as an advisory technical group and work electronically initially. It was agreed that ICCAT would nominate Josu Santiago to lead this group. This nomination would need to be approved by the Kobe steering Committee after approval by ICCAT Commission.
	– Creation of a small technical working group of experts under the KOBE umbrella, with a focus on research and other technical aspects	X	X		
	Elaboration and implementation of appropriate management frameworks:				
	– Define clear management objectives	X	X		Presentation FAD-08 provides examples of clear management objectives. In order to proceed with establishing management objectives it may be necessary to see the current scientific understanding of the impact of FADs on biomass and MSY (due to impacts on juveniles) so as to determine what kind of objectives should be considered. It is necessary to make objectives operational. As TACs for BET and YFT were exceeded in 2016, Rec [16-01] will be reviewed by the Commission and this may be an opportunity to raise the FAD management objectives during the Panel 1

					meeting in 2017. The Panel 1 discussions this year are an opportunity to begin the process of setting management objectives for both tropical tuna species and FAD fisheries and can then feed into the scientific process, which in 2018 includes the assessment of BET. This assessment can be used to further evaluate the success of potential objectives, including the fishing of juveniles, which extends beyond simply FAD fishing.
	– Review existing FADs management plans and explore potential for harmonization across t-RFMOs	X	X		In ICCAT, minimum requirements for FAD management plans are required but submission of this information is not standardised. Standardisation may be required within ICCAT before dialogue with other RFMOs, although minimum requirements could be harmonised.
	– Assess the effectiveness of various management options for FADs within the framework of general tropical tuna fisheries management (e.g. overall fishing capacity)		X		Already some elements in Rec [16-01] deal with FAD management and the SCRS has started to address some of these issues already. This process must flow from short term work such as the establishment of management objectives and feedback from the SCRS regarding the impact of FADs.
	– Address monitoring (e.g. 100% observer and VMS coverage) and compliance issues		X	X	There is strong scientific evidence that scientific observer coverage needs to be increased from the current requirement of 5%, for PS and Baitboats engaged in FAD fishing as directed by the SCRS. This should be standardized across gears and CPCs. The aim of 100% is ideal, but may be difficult to achieve although there is the possibility of combining human and electronic observers to achieve this level. It is noted that the EU large-scale PS fleet already has 100% coverage and this should serve to encourage other fleets and gears to achieve this level (e.g. Baitboat and longline or PS of other CPCs). It was stressed that scientific and compliance observer schemes should be kept separate.
	– Consider adaptive, precautionary, management with respect to emerging issues with FADs, taking into account the best available science		X	X	

DATA GAPS AND NEEDS	Data:				
	– Identify data gaps and needs		X		Agenda item 4 of the report has specifically addressed data gaps and issues. The access of scientists to the data is fundamental. CPC scientists should analyse their national fleets operational data, but there is also a need for collaborations between CPCs. Confidentiality protocols could be investigated for the latter option if necessary. However, collaboration already appears to have increased dramatically and this should be acknowledged and encouraged. Recovery of historical data is still an important need and this can be done in cooperation with industry. Recent history of FAD fishing is not well characterised, and data recovery would assist in this.
	– Optimize and harmonize the collection of data and develop common minimum standards and formats	X	X	X	
	– Improve data collection in FAD fisheries in general		X	X	
	– Establish comprehensive systems to accurately quantify numbers of FADs and active buoys	X	X		
	– Need for development of robust FAD marking and tracking systems	X	X		
	– Establish wide-scale collection of individual FAD deployment, tracking, and set-history data		X	X	
	– Collect new types of data on the operational and technical fleets' characteristics, including on supply vessels		X	X	

	– Facilitate access by scientists to acoustic records of the echo-sounder buoys as a potential source of fishery independent indices		X	X	
	– Develop appropriate framework of confidentiality	X	X	X	
	– Ensure/facilitate access to data for scientists and managers		X	X	
MITIGATION	– Mitigate the impact of FADs, consider establishing limits on the number of FADs deployed, and consider feasibility and cost-effectiveness of FAD recovery practices	X	X	X	It is recommended that the SCRS evaluate the effect of the current limit on FADs on tropical tuna species.
	– Evaluate economic incentives and disincentives in all FAD management measures.	X	X	X	
	Target species:				The SCRS is already responding to this issue as requested in Rec [16-01]
	– Identification of hotspots for juvenile BET and YFT		X		The SCRS has conducted some work on this issue, but closure areas have been difficult to evaluate. Also, thus far, no study has clearly identified a hotspot that if managed will have a significant beneficial impact on the tropical tuna populations. It is unclear what effect the displacement of effort resulting from a closed area or time/area closure may have. Again, these studies are limited by the quality of the data available to make the evaluations.
	– Evaluate benefits of gear modifications: net changes, FADs designs, etc.	X	X	X	
	– Encourage further research on pre-set echo-sounder discrimination of species, and size, at a FAD	X	X	X	

	– Consider the regional effectiveness of time-area closures, including adaptive closures, and catch and/or FADs sets limits and allow this to inform future management		X		
	Non-target species:				
	– Improve information on the impacts of FAD fisheries on vulnerable elasmobranch and turtle species	X	X		
	– Identification of hot spots for vulnerable species		X		
	– Implement best practices for handling and safe release of by-catch species as appropriate			X	Scientific evidence suggests safe handling techniques adopted by EU PS fleets have been effective in reducing mortality for non-target species. It is recommended that these techniques be adopted across all PS fleets.
	– Introduction of non-entangling FADs designs			X	
	– Outreach and training of operators		X	X	
	– Promote full utilization of low value bony fish by-catch, as appropriate, and reduction of discards			X	
	Habitat:				
	– Mapping and recognition of sensitive areas using available information and identification of post-beaching impacts to inform mitigation initiatives		X		Much work is currently being conducted to monitor FAD drifting as well as assess their beaching rates/levels. Involving coastal communities in this issue is recommended. Combination of measures may be effective in reducing beaching and identifying areas at risk.
	– Tracking positions and trajectories of FADs		X	X	

	– Develop innovative FAD designs to mitigate the habitat impact of FAD fisheries such as prevention of FADs sinking and beaching, recovery at sea, “smart FADs”, biodegradable designs...		X	X	Several presentations were made and studies are ongoing regarding the use and development of biodegradable FADs. It is recommended that there should be an increase in the research on biodegradable FADs so that CPCs can work towards the full use of biodegradable FADs as recommended in Rec [16-01].
	– Assess the effect of establishing limits on numbers of FADs deployed as well as on areas or periods of deployment		X	X	
	– Promote involvement of coastal communities in implementing actions or management measures		X	X	
	– Consider anchored and drifting FADs in the overall analysis of impacts		X	X	The group acknowledges that anchored FADs should also be managed and many of the issues discussed for drifting FADs are applicable to anchored FADs. Rec [16-01] also references anchored FADs and the necessity to report activities regarding these FADs.