



## TECHNICAL AND COMPLIANCE COMMITTEE

Thirteenth Regular Session  
27 September – 3 October 2017  
Pohnpei, Federated States of Micronesia

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### REFERENCE PAPER FOR FADMgmtOptions-IWG02 RECOMMENDATIONS AND SC13 OUTCOMES

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WCPFC-TCC13-2017-16A  
18 September 2017

Paper by Secretariat

#### Purpose

1. The purpose of this paper is to provide a quick reference guide to support TCC13's consideration of the FADMgmtOptions-IWG02 recommendations. A copy of the full FADMgmtOptions-IWG-2 Report is provided as **WCPFC-TCC13-2017-16B**.

#### WCPFC13 outcome

2. At WCPFC13, the FADMgmtOptions-IWG Chair presented the report of the second meeting of the FADMgmtOptions-IWG Report (WCPFC13-2016-FADMgmtOptions-IWG02\_rev2) which was held on 28 – 29 September, 2016 at Pohnpei, FSM immediately after TCC12.
3. The Commission adopted the Report of the second meeting of the FADMgmtOptions-IWG (WCPFC13-2016-FADMgmtOptions-IWG02\_rev2), and agreed that the outcomes therein should be further considered at SC13 and TCC13. (WCPFC13 Summary Report, paragraph 601)

#### FADMgmtOptions-IWG02 Recommendations for TCC13 consideration

4. The relevant recommendations of the FADMgmtOptions-IWG02 and notes on relevant SC13 outcomes are presented for TCC13 consideration with appropriate referencing, below:

##### *Marking and Monitoring of FADs*

- i) The FADMgmtOptions-IWG recommends to WCPFC13 that the consultant's report on options and considerations of implementing a marking and identification system for FADs in the WCPO (FADMgmtOptionsIWG-02 -04) be forwarded to SC13 and TCC13 for further consideration. (*FADMgmtOptions-IWG02, para 51*)
- ii) SC13 recommended as a first step the Commission should consider introducing a buoy ID scheme which requires the registration of all buoys attached to FADs deployed. Field tests in conjunction with industry and observers should be undertaken to determine the optimal configuration of future developments of a fully marking system that also includes the FADs themselves. (*SC13 draft summary report, section 3.2.2 FAD Marking and Monitoring*)

- iii) SC13 reviewed preliminary data analyses from the PNA's FAD tracking programme, investigating research areas such as FAD densities in time and space, beaching events, dynamics around the WCPO FAD closure and some initial FAD life-history information (WCPFC-SC13-2017/MI-WP-05). While acknowledging the confidentiality associated with FAD-tracking data, SC13 was supportive of these new data being made available to the Scientific Services Provider for analysis, and noting the scope for further analyses and the importance of complete FAD tracking data to support these analyses, encouraged additional data being made available by fishing companies to continue this research. SC13 also noted the importance of FAD marking and monitoring to better identify and follow individual FADs required to facilitate this research, and the on-going WCPFC considerations on FAD marking and monitoring. SC13 recommends that WCPFC14 note these preliminary analyses and identify mechanisms to help facilitate further analyses, if the Commission requires improved information for decision-making on this subject. (*SC13 draft summary report, section 5.2.1 FAD tracking*)
- iv) A copy of the full FAD marking consultancy report (2016) is provided as **WCPFC-TCC13-2017-16C**.

***Collection of additional data on FADs and their use in WCPO fisheries***

***Fields to be provided by vessel operators***

- i) The FADMgmtOptions-IWG endorsed in principle the fields in the table on page 3 of the Working Paper to be provided by vessel operators and recommended that the fields be referred to the SC and TCC for further consideration (*FADMgmtOptions-IWG02, para 62., Attachment C*) A copy of the Attachment C to the FADMgmtOptions-IWG-2 Report is provided as **Attachment 1**.
- ii) The FADMgmtOptions-IWG recommended that the elaboration of the data fields to be provided by vessel operators should take into account the data fields for provision of FAD data by vessel operators by the IATTC. (*FADMgmtOptions-IWG02, para 64*) A copy of the IATTC Resolution C-16-01 and draft IATTC FAD form is provided as **Attachment 2**.
- iii) SC13 recommended that the operators of all vessels involved in FAD fishery, including support vessels, provide as a minimum the fields of information identified in Attachment C of the report of the 2nd meeting of the FAD management options intersessional Working Group (WCPFC-2016-FADMgmtOptionsIWG021\_rev2). (*SC13 draft summary report, section 3.2.1 Additional FAD data fields to be provided by vessel operators*)
- iv) SC13 further recommended that the WCPFC Secretariat, together with SPC and other interested parties, prepare the set of data fields to be provided by vessel operators and coordinate with the IATTC staff to try to harmonize the minimum standards to be required across the Pacific Ocean. Special attention should be paid to avoid duplications of information by vessel operators and/or an increase of unnecessary paperwork. (*SC13 draft summary report, section 3.2.1 Additional FAD data fields to be provided by vessel operators*)
- v) SC13 recommended that the proposed fields to be collected by vessel operators be forwarded to TCC13 for review and WCPFC14 for adoption. (*SC13 draft summary report, section 3.2.1 Additional FAD data fields to be provided by vessel operators*)

- vi) The FADMgmtOptions-IWG recommended that the issue of data to be provided by observers be referred to SC13 and TCC13, and CCMs were encouraged to provide delegation papers on this aspect. (*FADMgmtOptions-IWG02, para 63*)
- vii) SC13 recommended the following revisions to the ROP Minimum Standard Data Fields:
  - Addition of a new section “FAD Information” that will include inventories of the FAD buoys on board at the start and end of each trip.
  - Addition of a new field for FAD Identification.
  - Deletion of FAD Data fields related to a) materials FAD is made from and b) estimated size of FAD.

(*SC13 draft summary report, section 3.2.2 Review of ROP minimum standard data fields*)
- viii) SC13 noted that the revisions of the ROP minimum standards will require careful planning and implementation to ensure that the value of WCPFC data on FADs is maintained. In particular, there may need to be a period of overlap in reporting of FAD data where observers continue to report on FAD design and construction while the new reporting requirements for vessel operators are introduced. (*SC13 draft summary report, section 3.2.2 Review of ROP minimum standard data fields*)
- ix) SC13 recommended that the revisions to the ROP Minimum Standard Data Fields standards be forwarded to TCC13 for review and WCPFC14 for adoption. (*SC13 draft summary report, section 3.2.2 Review of ROP minimum standard data fields*)
- x) An updated paper from PNA Members is provided to TCC13 as **WCPFC-TCC13-2017-DP03 FAD data to be provided by Observers**.

### ***FAD Research Plan***

- xi) The FADMgmtOptions-IWG recommends that WCPFC13 considers the revised draft FAD research plan proposal (*FADMgmtOptions-IWG02, para 72 and Attachment D*)
- xii) SC13 reviewed the report of the Global FAD Science Symposium, March 20-23, 2017, in Santa Monica, California (What does well-managed FAD use look like within a tropical purse seine fishery? WCPFC-SC13-2017/MI-WP-06). SC13 noted the ‘best-practices’ recommended in this paper under the three broad categories: (1) managing impacts on target species; (2) managing impacts on non-target species, coastal habitats, and the pelagic marine ecosystem; and, (3) the management framework, including monitoring, compliance and surveillance. SC13 also noted that impacts of FADs and FAD management cannot be considered entirely independently of harvest strategies, issues related to fishing capacity, ecosystem structure, or management of all other fishing gears in tropical tuna fisheries. SC13 also noted the report from the joint t-RFMOs working group (WCPFC-SC13-2017/MI-IP-03). SC13 recommends that WCPFC14 take into consideration the examples of best practice made within these reports when developing a framework for the management of FADs within the WCPO. (*SC13 draft summary report, section 5.2.2 FAD Management*)
- xiii) Based on the results and recommendations of SC13-EB-WP-02, which reviewed the scientific information on drifting FAD designs that have a high risk of entangling sharks, turtles and other species, such as designs that use open net panels with (stretched) mesh sizes of 7cm or greater, SC13 requests that the Commission notes:
  - That bycatch was more frequently observed on sets on drifting FADs, anchored FADs and logs than for sets on unassociated schools, and schools associated with

whales and whale sharks. However, species-specific bycatch rates do not always follow this pattern; and

- The available scientific information on non-entangling dFAD designs.

*(SC13 draft summary report, section 6.1.3.1 Case studies on FADs)*

xiv) With SC13-EB-WP-05, consider potential research activities on and at-sea trials of designs for reducing small BET/YFT catch rates and trials of non-entangling and biodegradable design options in the WCPO to fill key knowledge gaps provided in the report of SC13 ISG-2 on FAD data fields and FAD research plans (Attachment E). *(SC13 draft summary report, section 6.1.3.2 FAD research plan)*

xv) SC13 adopted the report of ISG-2 on the FAD data fields and FAD Research Plan (Attachment E). *(SC13 draft summary report, section 6.1.3.2 FAD research plan)* A copy of the Attachment E to the SC13 draft summary report is provided as **Attachment 3**.

### *Next Steps*

xvi) The FADMgmtOptions-IWG recommends that a formal meeting of the working group is not envisaged during 2017. *(FADMgmtOptions-IWG02, para 97)*

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**Attachment 1**

**FAD Mgmt Options IWG02 Attachment C: FAD related data fields to be reported by vessel operators based on ROP minimum standard data fields, and the data fields (collected by other RFMOs)**

<b>FAD Fields seen as basic to collection for Vessel logs for individual FADS</b>	
Name of Vessel	
Vessel IRCS	<b>MATERIALS FAD IS MADE FROM</b>
WCPFC VID	
IMO Number	
Page Number	
Captain/Vessel Master Name	
Vessel Owner or Company	
Number of FADS onboard Vessel (at commencement of trip)	
Number of FADs Deployed by Vessel (Current) or previous trip.	
FAD Number/s and/or Markings	
Date/Time – Lat. & Long when FAD Deployed	
Date/ Time –Lat. & Long when FAD if Retrieved	<b>Attachments</b>
Date/Time – Lat. and Long of FAD if Investigated only	<b>Codes for FAD Attachments</b>
Date/Time – Lat. and Long of FAD if Fished. (Set Made)	11 Chain /Cable rings /Weights
Date/Time – Lat. and Long of FAD if Serviced	12 Cord/Rope
FAD – Drifting or Anchored (Circle)	13 Netting hanging underneath FAD
List all Main Construction Materials FAD is made from using Codes	14 Bair containers
List all Construction Attachments to FADS using Codes	15 Sacking /Bagging
Size of Main FAD. – Record the width, breadth, depth of the main body of the FADs deployed by the vessel	16 Coconut fronds/Tree branches
Depth of Netting bait boxes etc or Materials hanging from Main FAD	17 Other materials (Describe)
List FAD Electronic Attachments using Codes	<b>Electronic Associated With FAD</b>
	1 Radio buoy (with identification)
	2 Radio buoy -unidentified
	3 GPS buoy (with identification)

List Electronic Attachments numbers and or markings	4 GPS buoy - unidentified
How was FAD Located use codes	5 Sounder buoy (with identification)
List any vessel activity involving FADS use codes	6 Sounder buoy - unidentified
	7 Light buoy
	8 Other (describe)
	<b>HOW FAD IS Found/Detected</b>
	1 Seen from vessel (No other Method)
	2 Reported by Helicopter
	3 Marked with Radio Beacon
	4 Using Bird Radar
	6 Information from other vessel
	7 FAD is Anchored (GPS)
	8 Marked with Satellite/GPS beacon
	9 Navigation Radar
	10 Lights
	11 Flock of Birds sighted from vessel
	12 Other - please specify
	<b>FAD ACTIVITY</b>
	<u>Codes for FAD Activity</u>
	1 Setting on FAD
	2 Deploying FAD
	3 Servicing FAD
	4 Retrieving FAD
	5. Vessel drifting beside FAD
	6. Vessel setting close to FAD
	7 Vessel using lights of boat or light boat
	8 Other (Describe)
	9 Investigate FAD using sonar/sounder



**SCIENTIFIC COMMITTEE  
THIRTEENTH REGULAR SESSION**

**Rarotonga, Cook Islands  
9 – 17 August 2017**

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**Resolution C-16-01: Amendment of Resolution C-15-03  
on the Collection and Analyses of Data on Fish-Aggregating Devices**

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**WCPFC-SC13-2017/ ST-IP-13**

**IATTC**

**INTER-AMERICAN TROPICAL TUNA COMMISSION****90<sup>TH</sup> MEETING****La Jolla, California (USA)****27 June-1 July 2016****RESOLUTION C-16-01****AMENDMENT OF RESOLUTION C-15-03 ON THE COLLECTION AND ANALYSES OF DATA ON FISH-AGGREGATING DEVICES**

*The Inter-American Tropical Tuna Commission (IATTC):*

*Taking into account* the best available scientific information on the status of the bigeye, yellowfin and skipjack stocks;

*Committed* to the long-term conservation and sustainable exploitation of fisheries in the eastern Pacific Ocean (EPO);

*Understanding* that all fishing gears, including fish-aggregating devices (FADs), have an effect on the stocks and the pelagic ecosystem in the EPO, and that such effects should be fully understood by the Members of the Commission;

*Attentive* to the provisions of IATTC Resolution C-99-07 on measures related to the regulation of FADs;

*Agreeing* that, to accurately provide the scientific advice necessary to effectively manage tuna fisheries in the EPO, it is necessary for the scientific staff of the IATTC to have access to, and analyze, the relevant data regarding such fisheries and gears, and for Commission Members to put in place measures as needed to collect such information in their fisheries;

*Acknowledging* that observers currently collect data on FADs in the EPO that have been examined by the IATTC staff (Document SAC-02-13) and that the Commission has adopted measures for further research on FADs; the significant effect that FADs may have on bigeye tuna spawning biomass, according to IATTC estimates (Document SAC-03-06); that skipjack tuna is captured on FADs and in unassociated schools in the EPO (Document SAC-03-03), and according to IATTC estimates, its exploitation rate has been increasing in recent years (Document SAC-03-07);

*Recognizing* that these measures need to be expanded and improved upon to ensure that the effects of the use of FADs on highly migratory fish stocks along with non-target, associated and dependent species, are fully understood and that the Commission can receive the best available scientific advice concerning mitigation of any negative effects;

*Committed* to ensuring that such scientific advice is taken into account in the development of the Commission's conservation and management measures concerning fishing for tunas;

*Noting* that the Scientific Advisory Committee (SAC) has recommended that the Commission should strengthen the work on FADs by holding a meeting involving managers, scientists, and other stakeholders;

*Noting* that, based on recent scientific analysis, the development of improved FAD designs, in particular non-entangling FADs, both drifting and anchored, helps reduce the incidence of entanglement of sharks, sea turtles and other species;

*Further noting* that whale sharks are particularly vulnerable to exploitation, including from fishing, and noting the ecological and economic value these species can bring to the EPO; and

*Concerned* about the potential effects of purse-seine operations on the status of whale sharks when deliberately or accidentally set upon;



*AGREES:*

1. For the purposes of this Resolution, the term “Fish-Aggregating Device” (FAD) means anchored, drifting, floating or submerged objects deployed and/or tracked by vessels, including through the use of radio and/or satellite buoys, for the purpose of aggregating target tuna species for purse-seine fishing operations.

**SECTION 1. FAD DATA COLLECTION**

2. Beginning 1 January 2017, CPCs shall require the owners and operators of all purse-seine vessels flying their flag, when fishing on FADs in the IATTC Convention Area, to collect and report the information contained in Annex I. The data may be collected through a dedicated logbook, modifications to regional logsheets, or other domestic reporting procedures.
3. CPCs shall provide the data collected for the previous calendar year, pursuant to Paragraph 2, which are available at the time of submission, to the Director. CPCs shall submit the data to the Director no later than 60 days prior to each regular meeting of the SAC.
4. No later than the IATTC annual meeting in 2018, the scientific staff of the IATTC, in coordination with the SAC, shall present to the Commission the preliminary results of its analyses of the information collected pursuant to Paragraph 2, and shall identify additional elements for data collection, as well as specific reporting formats, necessary to evaluate the effects of the use of FADs on the ecosystem of the EPO fishery. The analyses shall also incorporate information from data on FADs collected by observers through the *Flotsam Information Record*.
5. In addition, no later than the IATTC annual meeting in 2018, the scientific staff of the IATTC, in coordination with the SAC and taking into account the outcomes of the *Ad Hoc* Working Group on FADs, shall present to the Commission initial recommendations based on information collected, based on this resolution and through other mechanisms, for the management of FADs, including possible effects of FADs in the tuna fishery in the EPO. The Commission shall consider adopting management measures based on those recommendations, including a region-wide FAD management plan, and which may include, *inter alia*, recommendations regarding FAD deployments and FAD sets, the use of biodegradable materials in new and improved FADs and the gradual phasing out of FAD designs that do not mitigate the entanglement of sharks, sea turtles, and other species.
6. The scientific staff of the IATTC, in coordination with the SAC, shall also formulate recommendations for regulating the management of the affected stocks for presentation to the Commission, on the basis of the results of its analyses of the collected FAD information. Such recommendations shall include methods for limiting the capture of small bigeye and yellowfin tuna associated with fishing on FADs.
7. In 2018, compliance with the FAD reporting requirements of this Resolution will be comprehensively reviewed by the *Committee for the Review of the Implementation of Measures adopted by the Commission* and presented to the Commission.
8. Data collected pursuant to this resolution shall be treated under the rules established in the IATTC Resolution on Confidentiality.

**SECTION 2. FAD IDENTIFICATION**

9. No later than 1 January 2017, CPCs shall require the owners and operators of their applicable flagged purse-seine fishing vessels to identify all FADs deployed or modified by such vessels in accordance with a Commission identification scheme detailed in footnote 1 of Annex 1.

**SECTION 3. NON-ENTANGLING FADS**

10. To reduce the entanglement of sharks, sea turtles or any other species, the design and deployment of FADs should be based on the principles set out in Annex II.
11. Annex II is consistent with the 2015 recommendations of the scientific staff of the IATTC. The scientific staff of the IATTC, in coordination with the SAC, shall continue to review research results

on the use of non-entangling material and biodegradable material on FADs, and shall provide specific recommendations no later than the 2018 IATTC annual meeting, consistent with Paragraph 5.

**SECTION 4. WHALE SHARKS**

12. CPCs shall prohibit their flag vessels from setting a purse-seine net on a school of tuna associated with a live whale shark, if the animal is sighted prior to the commencement of the set.
13. CPCs shall require that, in the event that a whale shark is not deliberately encircled in the purse-seine net, the master of the vessel shall:
  - a. ensure that all reasonable steps are taken to ensure its safe release; and
  - b. report the incident to the relevant authority of the flag CPC, including the number of individuals, details of how and why the encirclement happened, where it occurred, steps taken to ensure safe release, and an assessment of the life status of the whale shark on release (including whether the animal was released alive but subsequently died).

**SECTION 5. AD HOC PERMANENT WORKING GROUP ON FADS**

14. An *ad hoc* Permanent Working Group on FADs (Working Group) is established.
15. This Working Group shall be multi-sectorial, involving various stakeholders such as scientists, fishery managers, fishing industry representatives, administrators, representatives of non-governmental organizations, and fishers. Expressions of interest to participate in the Working Group shall be provided to the Director, who shall inform CPCs and the Chair of the FADs Working Group.
16. To the highest degree possible, the Working Group shall conduct its work electronically or, if convenient and cost-effective, in targeted face-to-face meetings that take place in conjunction with other Commission meetings.
17. The Working Group shall report on a regular basis to the Commission and present an initial report of its findings at the 2017 meeting of the SAC.
18. The Terms of Reference of the Working Group are those indicated in Annex III.
19. The Working Group shall liaise, as far as possible, with other similar working groups on FAD management established in other tuna regional fisheries management organizations (tuna RFMOs), in particular the Western and Central Pacific Fisheries Commission (WCPFC).
20. The IATTC, at its 2017 annual meeting, will review the progress and outcomes of the Working Group and will decide on the necessity for its continuation.
21. This Resolution replaces Resolution C-15-03.

### Annex I

CPCs are required to ensure their vessel owners and operators record and report to the appropriate national authorities any interaction with FADs, using a standard format to be developed by the Commission staff.

For each interaction with a FAD, the following information shall be recorded:

- i. Position;
- ii. Date;
- iii. Hour;
- iv. FAD identification<sup>1</sup>;
- v. FAD type (*e.g.*, drifting natural FAD, drifting artificial FAD);
- vi. FAD design characteristics (dimension and material of the floating part and of the underwater hanging structure);
- vii. Type of the activity (set, deployment, hauling, retrieving, loss, intervention on electronic equipment, other (specify));
- viii. If the activity is a set, the results of the set in terms of catch and bycatch; and
- ix. Characteristics of any attached buoy or positioning equipment (positioning system, whether equipped with sonar, *etc.*).

### Annex II

#### Principles for design and deployment of FADs

1. If a flat raft is used as a FAD, the surface structure should not be covered, or only covered with material that attempts to minimize entanglements.
2. Any subsurface component of the FAD should be constructed in a manner designed to avoid entangling marine life.
3. To reduce the amount of synthetic marine debris, the use of natural or biodegradable materials (such as hessian canvas, hemp ropes, *etc.*) for drifting FADs should be promoted.

### Annex III

The objectives of the Working Group are the following:

1. Collect and compile information on FADs in the EPO, including but not limited to data collected by the IATTC and reports prepared by the scientific staff of the IATTC;
2. Review the FAD data collection requirements established in this Resolution to assess the need for revision;
3. Develop data reporting formats and definitions of terms related to FAD fishing (*e.g.* biodegradable FADs, non-entangling FADs, *etc.*), to implement obligations under this Resolution, in cooperation

<sup>1</sup> CPCs shall obtain unique alphanumeric codes from the IATTC staff on a periodic basis and distribute those numbers to the vessels in their fleets for FADs that may be deployed or modified, or in the alternative, if there is already a unique FAD identifier associated with the FAD (*e.g.*, the manufacturer identification code for the attached buoy), the vessel owner or operator may instead use that identifier as the unique code for each FAD that may be deployed or modified.

The alphanumeric code shall be clearly painted in characters at least 5 cm in height. The characters shall be painted on the upper portion of the attached radio or satellite buoy in a location that does not cover the solar cells used to power the equipment. For FADs without attached radio or satellite buoys, the characters shall be painted on the uppermost or emergent top portion of the FAD. The vessel owner or operator shall ensure the marking is durable (for example, use epoxy-based paint or an equivalent in terms of lasting ability) and visible at all times during daylight. In circumstances where the observer is unable to view the code, the captain or crew shall assist the observer (*e.g.* by providing the FAD identification code to the observer).

with the scientific staff, to be submitted to the Commission for consideration;

4. Compile information regarding developments on FADs in other tuna RFMOs;
5. Compile information regarding developments on the latest scientific information on FADs, including information on non-entangling FADs, and identify priority areas for research;
6. Prepare annual reports for the SAC, including specific recommendations, as appropriate; and
7. Identify and review possible FAD management measures, in coordination with the scientific staff and the SAC, and make recommendations to the Commission, as appropriate.

## Fish-aggregating device form (FADS)

### GENERAL INSTRUCCIONS.

This form is designed to satisfy the requirements in Annex I of Resolution C-16-01. It is important that it be completed as thoroughly as possible.

Do not write in the shaded areas.

This form should be completed by the master or the person in charge of the fishing operations. The master can delegate this duty to another appropriate officer.

### HEADING

**Vessel:** The name of the vessel.

**Trip number:** Write the calendar year of the start of the trip and the consecutive number of the trip for that calendar year in the spaces provided. For example: '2015-001', denotes the first trip in 2015.

**License No.:** This makes reference to the vessel's unique identification provided by the flag State.

### FAD ACTIVITY

**Date:** The date of the event in the format DD/MM/YY (day/month/year)

**Time:** The local time of the event in a 24 hour format (13:00 = 1 pm).

**Identification (of the locating buoy):** Record the unique identification number of the locating buoy. If this is a satellite buoy, it **must** be the unique serial number. If it is another type of locating buoy, use a unique identification code that you provide to the FAD or the locating buoy and that can be use as reference for future encounters. For cases not described here, use the space under *Comments*.

**Activity:** From the following list, chose the numeric code that best describes the activity that you are registering.

<b>1. Assessing:</b> The vessel approaches the FAD to evaluate the quantity of tuna, but makes no set.	<b>2. Deployment:</b> A new or replacement FAD is deployed.
<b>3. Set:</b> The vessel makes a set on the object. If the set is made on a recently deployed FAD, make notes in <i>Comments</i> section.	<b>4. Recovered.</b> The FAD is recovered and placed onboard.
<b>5. Other:</b> Record any other activity not described above, on comments.	

**Geographic location:** Write the geographic location of the event (Latitude and Longitude) in degrees and minutes. Note the corresponding hemisphere (N=North, S=South, E=East, W=West).

**Tuna catch:** If the event is a set, write the catch in metric tons of each of the tuna species denoted. When the catch includes other tunas (OTH), record the quantities and species under *Comments*. For events that are not sets, leave blank.

**Incidental catch:** For the groups noted (Sharks – SHRK –, Turtles – TURT –, Billfishes – BILL –, Manta rays – MANT – and Other vertebrates – OTR –), present in the set, indicate either the number of individuals (N) or metric tonnage (t) caught. Use the line below to record the quantity of these, released alive.

**Comments:** Use this space as noted above or to make observations that you deem important.

## INFORMATION ON FADS

**Identification (of the locating buoy):** Record the unique identification number of the locating buoy. If this is a satellite buoy, it **must** be the unique serial number. If it is another type of locating buoy, use a unique identification code that you provide to the FAD or the locating buoy and that can be used as reference for future encounters. For cases not described here, use the space under *Comments*

**Description:** From the following list, choose the numeric code that best describes the floating object.

1. Natural (log, ropes, pallets/racks, fronds, dead animal)	2. FAD owned by your vessel
3. FAD owned by another vessel	4. Anchored object

**Components of the surface structure:** Choose from the following list the predominant materials used in each section of the surface structure of the floating object.

**Raft:**

1. Bamboo Rack	2. Bamboo in a sausage form	3. Metallic
4. PVC or plastic	5. No raft	6. Other

**Wrapping/covering:**

1. Entangling net	2. Non-entangling net	3. Cloth
4. Palm fronds	5. No wrapping	6. Other

**Floating devices:**

1. Net corks	2. Plastic buoys	3. Plastic containers
4. No floats	5. Other	

**Dimensions (in meters); W –Width-, L –Length-, D –Depth-:** Record the dimensions of the floating object in the provided spaces. Do not consider the hanging structure (tail) if one is present.

**Hanging structure (tail)**

**Components 1 and 2:** Choose the numeric code from the following list, of the two predominant materials used in the construction of the tail. If only one is used, leave the second space blank.

1. Nylon	2. Palm fronds	3. Bamboo
4. No tail	5. Other	

**Config. (Configuration) :** Choose the configuration that best describes the tail.

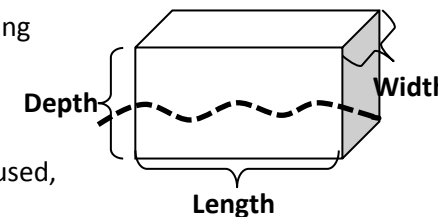
1. Sausage	2. Ropes	3. Cloth	4. Other
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**Mesh size:** If the tail is made of net, indicate the mesh size. Otherwise, leave blank.

**Type of loc. buoy (attached to the FAD):** Choose from the following list the numeric code that describes the locating beacon attached to the FAD.

1. GPS, SHERPE type	2. Satellite with eco-sunder	3. Satellite with no eco-sunder	4. Other
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**Comments:** Use this space to provide additional information.









**The Commission for the Conservation and Management of  
Highly Migratory Fish Stocks in the Western and Central Pacific Ocean  
Scientific Committee  
Thirteenth Regular Session  
Rarotonga, Cook Islands  
9 - 17 August 2017**

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**Report of the ISG-02  
FAD data fields and FAD Research Plan**

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**Terms of Reference:**

- Additional FAD data fields to be provided by vessel operators [3.2.1]
- FAD marking and monitoring [3.2.2]
- Review of ROP minimum standards data fields [3.3.2]
- FAD Research Plan [6.1.3.2]

**Relevant papers:**

- SC13-FADMgmtOptionsIWG-01 ‘Monitoring of FADs Deployed and Encountered in the WCPO’
- SC13-FADMgmtOptionsIWG-02 ‘2nd Meeting of the FAD Management Options Intersessional Working Group Summary Report’
- SC13-ST-WP-06 ‘FAD Data To Be Provided By Observers’
- SC13-EB-WP-02 ‘Review of research into drifting FAD designs to reduce bycatch entanglement and bigeye/yellowfin interactions’
- SC13-EB-WP-05: Project proposals related to purse seine FAD use within the WCPO, as requested by the WCPFC FAD Intersessional Working Group

**Agenda 3.2.1 Additional FAD data fields to be provided by vessel operators**

The Commission requested SC13 to consider the outcomes of the 2nd FADMgmtOptions-IWG, in particular to the FAD data fields to be provided by vessel operators, taking into account the data fields for provision of FAD data by vessel operators by the IATTC.

**SC13 recommended that the operators of all vessels involved in FAD fishery, including support vessels, provide as a minimum the fields of information identified in Attachment C of the report of the 2nd meeting of the FAD management options intersessional Working Group (WCPFC-2016-FADMgmtOptionsIWG021\_rev2).**

**SC13 further recommended that the WCPFC Secretariat, together with SPC and other interest parties, prepare the set of data fields to be provided by vessel operators and coordinate with the IATTC staff to try to harmonize the minimum standards to be required across the Pacific Ocean. Special attention should be paid to avoid duplications of information by vessel operators and/or an increase of unnecessary paperwork.**

**SC13 recommended that the proposed fields to be collected by vessel operators be forwarded to TCC13 for review and WCPFC14 for adoption.**

### **Agenda 3.2.2 FAD marking and monitoring**

SC13 has been requested to consider the consultancy report on options of implementing a marking and identification system for FADs in the WCPO (SC13-FADMgmtOptionsIWG-01) and provide recommendations as appropriate.

**SC13 recommended as a first step the COM should consider introducing a buoy ID scheme which requires the registration of all buoys attached to FADs deployed. Field tests in conjunction with industry and observers should be undertaken to determine the optimal configuration of future developments of a fully marking system that also includes the FADs themselves.**

### **Agenda 3.3.2 Review of ROP minimum standards data fields**

The FADMgmtOptions-IWG recommended that the issue of data to be provided by observers be referred to SC13 and TCC13, and CCMs were encouraged to provide delegation papers on this aspect. Document ST-WP-06 'FAD Data To Be Provided By Observers' proposed revisions to the WCPFC ROP Minimum Standard data Fields to reflect the decision of WCPFC12 that vessel operators should provide data on FAD design and construction and FAD activity.

**SC13 recommended the following revisions to the ROP Minimum Standard Data Fields:**

- **Addition of a new section "FAD Information" that will include inventories of the FAD buoys on board at the start and end of each trip.**
- **Addition of a new field for FAD Identification.**
- **Deletion of FAD Data fields related to a) materials FAD is made from and b) estimated size of FAD**

**SC13 noted that the revisions of the ROP minimum standards will require careful planning and implementation to ensure that the value of WCPFC data on FADs is maintained. In particular, there may need to be a period of overlap in reporting of FAD data where observers continue to report on FAD design and construction while the new reporting requirements for vessel operators are introduced.**

**SC13 recommended that the revisions to the ROP Minimum Standard Data Fields standards be forwarded to TCC13 for review and WCPFC14 for adoption.**

### Agenda 6.1.3.2 FAD Research Plan

ISG-2 reviewed the proposed priority researches identified in the revised draft FAD research plan proposal. ISG-2 also considered the joint work conducted by the FAD-IWG Chair, SPC, and the WCPFC Secretariat to further develop a costed project proposal for each of four identified research topics [SC13-EB-WP-05]. The four research topics were:

- FAD designs to reduce unwanted interactions with Species of Special Interest;
- FAD designs to reduce unwanted catches of juvenile bigeye and yellowfin tuna;
- Acoustic FAD analyses;
- Fleet behaviour.

The duration and indicative costs are shown below.

Project	Duration	Budget (US\$)	
1- FAD designs – SSIs	24 mm	446,000	871,000
2- FAD designs – juvenile YFT/BET	24 mm	526,000	
3- Acoustic FAD analyses	18 mm [1] + 18 mm [2]	192,000 [1] + 500,000 [2]	
4- Fleet behaviour	18 mm	192,000	

It was noted that those projects involving sea trials and associated activities will require more detailed costings if the projects are taken forward. At-sea trials are expensive, and require the collaboration and support of industry to be effective. For this purpose, collaborative funding between WCPFC/CCMs, NGOs and in-kind support by industry should be considered. This collaborative funding schemes have demonstrated their utility in other RFMO Convention areas.

ISG-2 considered the proposed projects as extremely relevant giving the highest priority to projects involving sea trials (Projects #1 and #2) and the Project #4 on the analysis of the effect of fleet behavior in large catches of ‘non-target’ species. Project #3, although highly important, it was given less priority linked to the possibility of accessing to existing data, in particular acoustic biomass estimates, and the ability to relate set-level events to FAD-specific acoustic data.

Even if the type of acoustic data analysis proposed was given less priority in the context of the SC work program and budget, ISG-2 believes that acoustic technology on FAD buoys offers a real basis for species discrimination prior to the fishing activity. It is one of the few clear options for reducing juvenile bigeye catches in the FAD purse seine fishery. Several technological institutes, ISSF and buoy manufacturers are already investing in this area of research and for this reason it was given less priority in the context of the SC work program and budget of this year.

As for Project #1, two different options were discussed:

- Not to incorporate Project #1 in the SC work program and budget because the current scientific information on alternative dFAD designs for reducing entanglement risk was considered sufficient to provide scientific recommendations to the Commission on appropriate WCPO dFAD designs. The effectiveness of designs across other oceans suggests similar performance can be expected.
- Incorporate Project #1 in the SC work program and budget because there is still a need to define first clear standards for non-entangling and biodegradable FADs adapted to the

particularities of the region. And there is a need to strengthen linkages with the industry to cooperate in the effective implementation of any new design.

ISG-2 agreed to incorporate in the SC work program and budget the 4 research proposals provided in SC13-EB-WP-05, including Project #1.

Annex: Project proposal for each of four identified research topics [SC13-EB-WP-05]

<b>FAD Project #1</b>	
<b>Project</b>	<b>FAD designs to reduce unwanted interactions with Species of Special Interest (SSIs; sharks, turtles)</b>
Objectives	Identify FAD design features that lead to lower interaction rates with key SSIs, while minimising the impact on catches of target tuna species.
Rationale	<ul style="list-style-type: none"> <li>• Builds upon work in all other Oceans on the design of lower- and non- entangling FADs (e.g. WCPFC-2016-FADMgmtOptionsIWG02-OP02; SC13-EB-WP-02).</li> <li>• Builds upon work by organisations such as ISSF in the development of SSI-friendly designs.</li> <li>• Provides region-specific information on the efficacy of SSI reduction and impacts on tuna catch levels in the WCPO.</li> <li>• Provides a scientific basis for potential CMMs in this area.</li> </ul>
Assumptions	<ul style="list-style-type: none"> <li>• The information provided in SC13-EB-WP-02 is considered by SC13 to provide insufficient evidence of the potential effectiveness of non- entangling designs in the WCPO, and hence local trials are needed. Note that if SC13-EB-WP-02 is considered by SC13 to provide sufficient evidence, this project should be revised to focus on extension, to ensure rapid uptake and deployment of non-entangling FAD designs, and to ensure the cost effectiveness of those designs for all WCPO fleets, in particular those domestic fleets of PICTs.</li> <li>• The relationship between design and SSI interactions can be gained through tracking FADs from construction, through deployment, to setting activity by any fleet, and SSI interactions.</li> <li>• If tracking is not possible, the regular removal of a set-upon FAD from the water can be undertaken so observations of its sub-surface structures and the occurrence of captured SSIs can be made.</li> <li>• Periodic removal of tracked designs may also be necessary to identify changes over time (e.g. unravelling of bound netting, degradation of components).</li> <li>• A coordinated trial of designs, in collaboration with industry, is suggested as the most efficient approach. Cost, material availability and environmental impact would be key factors in assessing the merit of various designs.</li> <li>• Sufficient data are available across different designs and locations to allow</li> </ul>

	<p>statistical analyses to be effective.</p> <ul style="list-style-type: none"> <li>• Where specific field trials are undertaken, they might be able to be performed at the same time as trials required under FAD project #2 to create cost efficiencies.</li> </ul>
<p>Scope</p>	<p>Through review of existing studies and best practices in other oceans (see SC13-EB-WP-02) identify plausible non-entangling FAD designs, in collaboration with industry. This should include sub-FAD structure depth and mesh size, removal of netting on the surface of FADs and alternative platform widths.</p> <p>Implement at-sea FAD trials across the WCPO [deployment and fishing activity] to be completed within 18 months. This will most effectively be performed in partnership with observers and industry to ensure marking, deployment and monitoring of FADs in a coordinated way. Two levels of industry participation are anticipated: (1) the fleets that deploy the FADs and are actively engaged in the research. (2) All other fleets that find the FADs from (1) and set upon them. Information from (2) will be critical to the success of the research.</p> <p>Using ISSF Technical Report 2016-18A as a guide:</p> <ul style="list-style-type: none"> <li>• Fleets deploy a given number of FADs per vessel (e.g. 10-20 FADs per vessel to reach a significant large number of FADs).</li> <li>• Maximum 4 standardized designs tested, constructed in port and deployed in the same area as traditional FADs, so their effectiveness could be compared with that of the traditional FADs for the same spatial and temporal strata.</li> <li>• Deployment site, design and the code of the geo-locating buoy should be registered. Every FAD should be well identified so that data can be retrieved and followed if ownership changes.</li> <li>• If a trial FAD is encountered at sea register: the catch (if any), interactions with SSI, the condition of the FAD and the new code for the buoy if the original has been replaced.</li> <li>• Where possible, use trajectories and sounder of attached buoys to assess ability of alternative designs to aggregate tuna even if they are not visited or fished by purse seiners, as well as following their lifetime if they are not retrieved.</li> <li>• Collaboration between industry, related parties, and the science services provider to collect and analyse data.</li> <li>• Collaborate with industry to identify the cost of alternative FAD designs relative to ‘standard’ designs.</li> </ul> <p>Analysis of results should be presented to WCPFC SC (approximately 2 years after the trial begins). SC and TCC of that year to provide recommendations for a draft CMM on appropriate FAD designs.</p>
<p>Links to other work</p>	<p>The IATTC and ISSF have done considerable work on the design of non- entangling FADs (see SC13-EB-WP-02).</p>

Timeframe	24 months
Budget	1 year FTE at SPC (data analysis) 1.5 year FTE at SPC (technical and fieldwork, travel)
Note: Costed on a fieldwork required basis. If project is extension related (i.e. trials of designs not required on the basis of SC13-EB-WP-02 findings), project budget	Project management Observer training Approximate total budget: US\$446,000*  Note overlap with Project #2 – if both are undertaken concurrently then some personnel costs can be ‘shared’ across the two projects. (Approximate total budget if Projects 1 and 2 undertaken simultaneously: \$871,000)  *Final costings will depend on the approach undertaken within at-sea trials, including the level of practical and financial contribution by industry. Note this will need to include the purchase of necessary FAD materials, including marking and tracking components, facilitation of liaison with industry representatives, and any related travel.
will need to be revised	
Additional considerations	This project will necessitate additional data collection by fisheries observers, irrespective of whether it relates to additional trials, or, extension. This has consequence for forms, data management and observer training.  If FADs are not able to be tracked from markings or similar, this research will require fishers to lift all FADs for descriptions to be made (there are other technical solutions such as camera ROVs and/or research divers however they are likely overly costly).  Understanding the vertical behaviour of silky sharks at FADs within the WCPO would help inform how deep the FAD underwater structure should be checked.  This project if it proceeds to extension/implementation will have direct costs for fishers with the lifting of existing FADs require to update them with non- tangling designs. Obviously the period of implementation will determine if this occurs faster or slower than the normal frequency of lifting, and hence the incurred cost.

<b>FAD Project #2</b>	
<b>Project</b>	<b>FAD designs to reduce unwanted catches of juvenile bigeye and yellowfin tuna</b>
Objectives	Identify any FAD design features that lead to lower catch rates of undersized/juvenile bigeye and yellowfin tuna, while minimising the impact on catches of larger target tuna species.

<p>Rationale</p>	<ul style="list-style-type: none"> <li>• Builds upon trials underway in the IATTC area in collaboration with ISSF, but given oceanographic differences between regions WCPO trials may be required if designs in IATTC area focus on depths shallower than the WCPO thermocline depth.</li> <li>• Represents an area of work not yet pursued in the WCPO that could provide a simple management intervention to reduce FAD impacts.</li> <li>• Builds upon EU-funded work identifying factors influencing BET hotspots.</li> <li>• Provides a scientific basis for potential CMMs in this area.</li> </ul>
<p>Assumptions</p>	<ul style="list-style-type: none"> <li>• BET hotspot analyses provide some indication of potential FAD characteristics that can be examined within this project.</li> <li>• Can relate the design of FADs noted by observers and/or others directly to subsequent fishing sets that have reliable catch composition estimates.</li> <li>• A coordinated trial of designs, in collaboration with industry, is suggested as the most efficient approach. Cost and environmental impact would be key factors in assessing the merit of various designs.</li> <li>• Periodic removal of tracked designs may also be necessary to identify changes over time (e.g. change in the depth of the structure or unravelling of bound netting, degradation of components that might modify drift speed).</li> <li>• Sufficient data are available across different designs and locations to allow a statistical analysis to be performed.</li> <li>• Where field trials are required, they could possibly be performed at the same time as trials required under FAD project #1 to create cost efficiencies.</li> </ul>
<p>Scope</p>	<p>While Project #1 benefits from existing activities and research in other oceans, the background on FAD designs to reduce juvenile tuna catch is less mature. However, the proposed scope is comparable to that proposed for Project #1.</p> <p>Use relevant results from the BET hotspot analyses and from information available from ISSF studies in the IATTC area, and in collaboration with industry, identify plausible FAD designs to trial.</p> <p>Implement at-sea FAD trials across the WCPO [deployment and fishing activity] to be completed within 18 months. This will most effectively be performed in partnership with industry and observers to ensure marking, deployment and monitoring of FADs in a coordinated way. Two levels of industry participation are anticipated: (1) the fleets that deploy the FADs and are actively engaged in the research. (2) All other fleets that find the FADs from (1) and set upon them. Information from (2) will be critical to the success of the research.</p> <p>Understanding how the real working depth of sub-surface FAD structures interacts with oceanographic features during the period of the drift, and the resulting influence on species biomass and catch will be important. Equipping FAD sub- surface structures with depth/temperature sensors, which are tracked for the</p>

	<p>duration of a scientific trip and retrieved, regularly feed-back information, or pop off the FAD after a given period, should be used.</p> <p>Using ISSF Technical Report 2016-18A as a guide:</p> <ul style="list-style-type: none"> <li>• Fleets deploy a given number of FADs per vessel (e.g. 10-20 FADs per vessel to reach a significant large number of FADs).</li> <li>• Maximum 4 standardized designs tested, constructed in port and deployed in the same area as traditional FADs, so their effectiveness could be compared with that of traditional FADs for the same spatial and temporal strata.</li> <li>• Deployment site, design and code of the geo-locating buoy should be registered. Every FAD should be well identified so that data can be retrieved and followed id ownership changes.</li> <li>• If a trial FAD is encountered at sea, register: the catch (if any), the condition of the FAD and the new code for the buoy if the original has been replaced.</li> <li>• Where possible, use trajectories and sounder of attached buoys to assess ability of alternative designs to aggregate tuna even if they are not visited or fished by purse seiners, as well as following their lifetime if they are not retrieved.</li> <li>• Collaboration between industry, e.g. ISSF and the science services provider to collect and analyse data.</li> <li>• Collaborate with industry to identify the cost of alternative FAD designs relative to ‘standard’ designs.</li> </ul> <p>Analysis of results should be presented to WCPFC SC (approximately 2 years after the trial begins). SC and TCC of that year to provide recommendations for a draft CMM on appropriate FAD designs.</p>
Links to other work	<p>Note that due to the nature of the thermocline in the WCPO and the impact of the thermocline on tuna behaviour, in particular for bigeye tuna, results from the EPO may not be of specific use in the western or central WCPO.</p>
Timeframe	<p>24 months</p>
Budget	<p>1 year FTE at SPC (data analysis)  1.5 year FTE at SPC (technical and fieldwork)  Associated travel and subsistence to relevant WCPFC meetings  Project management  Observer training  Approximate total budget: US\$526,000*</p> <p>Note overlap with Project #1 – if both are undertaken then some personnel costs can be ‘shared’ across the two projects. (Approximate total budget if Projects 1 and 2 undertaken simultaneously:  \$871,000)</p> <p>* Final costings will depend on the approach undertaken within at-sea trials, including the level of practical and financial contribution by industry. Note this will need to</p>



	include the purchase of necessary FAD materials, including marking and tracking components, temperature/depth sensors, facilitation of liaison with industry representatives, and any related travel.
Additional considerations	This project will necessitate additional data collection by fisheries observers, irrespective of whether it relates to additional trials, or, extension. This has consequence for forms, data management and observer training.
	<p>The field work component of this research may require additional data collection on catch composition for specific sets from a trip (with the catch kept separated and subject to a census in port).</p> <p>There may be the potential to geo-fence FADs used in these trials with special requirements around reporting and access to enhance the data collected.</p>

FAD Project #3	
Project	Acoustic FAD analyses
Objectives	Identify whether <b>limiting sets to only those FADs that have a large biomass</b> beneath them can reduce the proportion of 'non-target' species caught.
Rationale	<ul style="list-style-type: none"> <li>• Larger purse seine sets on FADs tend to have higher proportions of skipjack and commensurately lower proportions of yellowfin and bigeye (Lawson 2008, WCPFC-SC-4-ST-WP3).</li> <li>• Acoustic data from echo-sounder buoys can provide, given sufficient equipment, environmental conditions and interpretation skills, sufficient information on the biomass of tuna under a FAD.</li> <li>• Acoustic information has shown promise for discriminating skipjack from other species, if not yet routinely using commercial fishing equipment. However, there is a need to identify signals that discriminate other species within the WCPO, building on existing work by ISSF in this area.</li> <li>• Acoustic information has also suggested some ability to differentiate fish sizes.</li> <li>• The acquisition of acoustic FAD data has the potential to provide insight into dynamics of the interaction between tuna and FADs.</li> <li>• Information could inform FAD design options, FAD deployment, remote identification of size and abundance of tuna under echo-sounder- equipped FADs, and spatial management considerations.</li> <li>• Incentivising limiting setting activity to only FADs with large biomass could reduce the proportion of non-target species caught.</li> <li>• In addition, acoustic FAD data could provide 'ground truthing' for the effective soak time of FADs, stock assessment biomass estimates (see WCPFC-SC12-2016/SA-IP-14), FAD density effects on movement and catch rates of target spp.</li> </ul>
Assumptions	<ul style="list-style-type: none"> <li>• There is a consistent relationship between biomass levels on FADs and tuna</li> </ul>

	<p>species composition across the WCPO, as indicated in Lawson (2008), WCPFC-SC-4-ST-WP3.</p> <ul style="list-style-type: none"> <li>• Biomass can be accurately assessed through acoustic buoys, noting that it depends on the equipment used, environmental conditions and the interpretational skills of the user.</li> <li>• Existing acoustic information can be made available for analysis, combined with sufficient information to relate that information to a setting event.</li> <li>• Target strength information from other studies is sufficiently robust and comparable to that in the WCPO that it can be used directly.</li> <li>• The analysis can be undertaken over sufficient space/time to ensure any influences of those factors can be examined statistically.</li> </ul>
Scope	<p>The scope of work is divided into three stages. The ability to undertake the second stage will depend on access to existing data, in particular acoustic biomass estimates, and the ability to relate set-level events to FAD-specific acoustic data.</p> <p><i>Stage 1. Examination of existing data to investigate the relationship between total biomass/catch and the proportion of small bigeye/yellowfin</i> Based upon existing combined logsheet/observer data from FAD sets, investigate the relationship between total biomass/catch size and the</p>
	<p>degree of small bigeye/yellowfin, both spatially and temporally within the WCPO. Based upon these analyses, identify the level of definition required by echo-sounder buoys to render this strategy effective.</p> <p>In addition, review available information on the vertical behaviour of individuals of different sizes relative to e.g. thermoclines, to examine whether a depth layer can be used to discriminate between species/sizes.</p> <p><i>Stage 2. Examination of existing (historical) observer-based FAD set data and echo-sounder buoy data</i> Where data are available to link an observed FAD set event to acoustic information, compare the most appropriate set-level overall catch and corresponding species composition to available acoustic information. Where data allow, further compare to relevant operational factors (e.g. location, FAD and vessel information, regional FAD density, etc.) to identify potential relationships.</p> <p><i>Stage 2. Undertake at-sea experimental fishing trials to identify effective acoustic equipment and operational approaches</i> In collaboration with industry, and building on outputs from Stages 1 and 2, design and implement a limited fishing trial of current and alternative cutting-edge acoustic gear/settings (e.g. multi-frequency) to obtain acoustic information on FAD-associated tuna biomass and species/size composition, and related fishing trials to ‘ground-truth’ that information based upon resulting catches. Gaining target strength measurements for single schools (in particular of yellowfin) will be particularly important. Trials should be sufficiently extensive to examine the influence of spatial and potentially oceanographic factors.</p>

	Analyses of results from each stage should be presented to WCPFC SC for scientific review and where relevant for the consideration of advice to TCC and the Commission.
Timeframe	Approximately 36 months (see below)
Budget	<p>Stage 1</p> <p>1.5 year FTE at SPC USD\$182,000</p> <p>Associated travel and subsistence to relevant WCPFC meetings USD\$10,000</p> <p>Stage 2</p> <p>Not costed at this time. It is likely to be on the scale of project one or two, but there may be some other cost savings to be made by incorporating some fieldwork into the 2018 or 2020 tag research voyages.</p>
Additional considerations	If this proceeds to a fieldwork stage, additional input on the design of the at-sea component should include consideration of concurrent data collection in the context of tuna foraging and links to ecosystem modelling (e.g. SEAPODYM).

<b>FAD Project #4</b>	
<b>Project</b>	<b>Fleet behaviour</b>
Objectives	Characterisation of effort creep due to FAD use and fleet specific factors resulting in large catches of ‘non-target’ species.
Rationale	<ul style="list-style-type: none"> <li>Understanding how rapid developments in FAD technology and their use within the WCPO can influence FAD-related catch rates will provide additional information for key stock assessments and the harvest strategy approach, and scientific advice that can inform discussions under future tropical tuna CMMs.</li> <li>Analyses will complement activities currently underway on PNA FAD tracking and those undertaken through the EU-funded ‘BET hotspot’ analysis presented to SC13.</li> </ul>
Assumptions	<ul style="list-style-type: none"> <li>Sufficient data on FAD design and technology are available for analysis.</li> <li>Sufficient time series of data are available to support analyses.</li> <li>Information is sufficiently detailed and accurate to allow analyses to be performed.</li> <li>Fishing sets can be related to specific FADs and associated FAD/vessel technological information.</li> <li>Fleet behaviours that influence fishing performance can be understood.</li> <li>The effort creep component of improved FAD technologies can be separated from other elements (schooling behaviour of fish, overall fleet behaviour, stock size, oceanography, other technological advances etc.).</li> </ul>

Scope	<p>The proposed work programme comprises a data compilation activity, subsequent statistical analysis activities and a data review activity. These are briefly outlined below:</p> <p>Evaluate and combine available logsheet, observer and VMS data to develop a comprehensive purse seine associated fishing data set. This data set should also include available (time series of) vessel and technical FAD characteristics, where possible.</p> <p>Analyse patterns of fleet activity relative to FAD setting based upon VMS/logsheet data, to assess changes in vessel searching activity, as well as trip length. This may also be compared within and outside the FAD closure period, and be related to location (e.g. distance from port), time of the year/day, the period of the trip, etc.</p> <p>Examine changes in the ‘reliance’ on FAD fishing over time, at the fleet or vessel level. Relate the reliance on FADs to geographic location.</p> <p>Analyse using appropriate statistical techniques factors that could influence time series or relative patterns in purse seine associated set CPUE (catch per set, but catch per day or trip may also be examined), including fleet, location, oceanography, FAD set density (as a proxy for FAD density), observed FAD design, vessel characteristics, stock abundance, etc. This may evaluate the probability of a successful set, as well as the level of catch if a set were successful.</p> <p>Identify data gaps and provide advice on potential areas of additional data collection to improve future analyses.</p> <p>Where observer information is sufficient, work will also examine the number and activities of supply vessels, including identifying which particular purse seine vessels each support, and the number of FADs being deployed and serviced by such vessels.</p>
Timeframe	18 months
Budget	1.5 year FTE at SPC USD\$182,000 Associated travel and subsistence to relevant WCPFC meetings USD\$20,000

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