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Indian Ocean Tuna Commission
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COLLECTION OF DRIFTING FISH AGGREGATING DEVICES MANAGEMENT PLANS

Prepared by: IOTC Secretariat, 15 April, 2017

At its 19th Session, the Commission adopted Resolution 15/08 *procedures on a fish aggregating devices (FADs) management plan, including more detailed specifications of catch reporting from fad sets, and the development of improved FAD designs to reduce the incidence of entanglement of non-target species*.

The paragraph 1 describes the application of Resolution 15/08:

> *"This Resolution shall apply to CPCs having purse seine vessels and fishing on Fish Aggregating Devices (FADs), equipped with instrumented buoys for the purpose of aggregating tuna target species, in the IOTC area of competence."*

This document contains the FAD management plans made available to the IOTC Secretariat in accordance with IOTC Resolution 15/08, to assist CPCs in analysing the FADs management plans, as required in paragraph 12, and in particular with the provisions of paragraph 11 of the Resolution:

> *"CPCs having vessels fishing on FADs shall submit, to the Commission, on an annual basis, Management Plans for the use of FADs by their purse seiners covered in paragraph 1s. Due to their specificity in terms of users, number deployed, type of boat/vessel involved, fishing method and gear used and materials used in their construction, the Management Plans and Reporting Requirements for Drifting FADs (DFAD) and Anchored FADs (AFAD) shall be addressed separately for the purposes of this Resolution. The Plans shall at a minimum meet the Suggested Guidelines for Preparation for FAD Management Plans by each CPC as provided for DFADs in Annex I and AFADs in Annex II. For the purpose of this Resolution, the term Fish Aggregating Device means drifting (DFAD) or anchored floating or submerged objects (AFAD) deployed for the purpose of aggregating target tuna species."*

The following ten CPCs have purse seine vessels registered in the IOTC Record of Authorised Vessels: Australia, EU (France, Italy and Spain), Indonesia, Iran (Islamic Rep. of), Japan, Korea (Rep. of), Mauritius, Philippines, Seychelles and Thailand.

From those ten CPCs mentioned above, eight have provided a DFAD management plan. Four revised DFAD management plans were provided in 2017. The DFAD management plans available to the IOTC Secretariat are presented in Annex 1, for:

- Australia (Received 01.05.14)
- European Union (Received on 15.01.14, Spain, and 11.03.16, France; revised plan received 13.04.17, France, and 19.04.17, Spain),
- Indonesia (Received 12.01.15),
- Iran, Islamic Rep. of (Received 26.01.14),
- Japan (Received 25.12.13; revised plan received 26.12.14 & 10.04.17),
- Republic of Korea (Received 31.12.13; revised plan received 16.03.16 & 21.03.17),
- Mauritius (Received 14.03.14),
- Seychelles (Received 27.04.2015)

The two CPCs listed below have reported they will provide a DFAD management plan:

- Mozambique had indicated that it is preparing to implement its fleet development plan for tuna fisheries and will take first steps in order to develop a FAD management plan and will keep the Commission informed on the progress. No new information has been received from Mozambique during the last intersessional period.
- Sri Lanka had indicated that a plan will be submitted. No new information has been received from Sri Lanka during the last intersessional period

Thailand has one purse seine vessel and Philippines has 48 purse seine vessels on the record of authorized vessels, and both CPCs have not submitted a DFADs management plan.

Progress report on implementation of DFADs

IOTC Resolution 15/08, paragraph 14, request CPCs to provide a report on the progress of the management plan:

> *"The Management Plans shall include initiatives or surveys to investigate, and to the extent possible minimise the capture of small Bigeye tuna and Yellowfin tuna and non-target species associated with fishing on FADs. Management Plans shall also include guidelines to prevent, to the extent possible, the loss or abandonment of FADs. To reduce the entanglement of sharks, marine turtles or any other species, the design and deployment of FADs shall be based on the principles set out in Annex III, which will be applied gradually from 2014. From 2015 on, CPCs shall submit to the Commission, 60 days before the Annual Meeting, a report on the progress of the management plans of FADs, including reviews of the initially submitted Management Plans, and including reviews of the application of the principles set out in Annex III."*

From the eight CPCs that have provided a DFADs management plan, five CPCs have provided a report on the progress of implementation of the DFADs management plan:

- European Union (Received on 22.03.17; report on the progress are reported in IOTC-2016-SC19-NR06 Rev_1 and IOTC-2015-WPTT17-33),
- Indonesia (Received 17.03.17),
- Japan (Received 15.03.17),
- Republic of Korea (Received 21.03.17),
- Mauritius (Received 17.03.17),

Two CPCs, Iran (Islamic Rep. of) and Seychelles have not provided a report on the progress of implementation of the DFADs management plan.

One CPC, Australia, has indicated that no FAD fishery was authorised in 2016 in IOTC fisheries (*Source: IOTC-2017-CoC14-IR01*).

Annex 1

Collection of DFADs management plans

Australia DFADs Management Plan

Received 01.05.2014

Australian Government
Australian Fisheries Management Authority

Fish Aggregation Device (FAD) Management Plan in Australia's Tropical Tuna Fisheries

2013

Version 1.2

Important Note:

This is not a statutory Management Plan under the *Fisheries Management Act 1991*.

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Document Information

Distribution List

Title	Name	Date
TTMAC	TTMAC members	**21 Nov 2012**
TTRAG	TTRAG members	
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Version Control

#	Status	Change Description	Author(s)	Date
01	Version 1.0	Drafting the FAD Management Plan	Nigel W. Abery	27 Aug 2012
02	Version 1.1	Review by AFMA's Foreign Compliance Section		28 Sep 2012
03	Version 1.2	Review by AFMA's Bycatch Section		12 Nov 2012

ACRONYMS

AFMA	Australian Fisheries Management Authority
FAD	Fish Aggregation Device
IOTC	Indian Ocean Tuna Commission
WCPFC	Western and Central Pacific Fisheries Commission

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SCOPE OF THIS POLICY

The Australian Fisheries Management Authority (AFMA) is the Australian Government agency responsible for the efficient management and sustainable use of Commonwealth fish resources on behalf of the Australian community.

This policy applies in both the Australian Fishing Zone and on the High Seas to Commonwealth managed commercial tropical tuna fisheries that permit purse seining as a fishing method. These include the Western Tuna and Billfish Fishery, the Western Skipjack Tuna Fishery and the Eastern Skipjack Tuna Fishery.

OBJECTIVE OF THIS POLICY

The objective of this policy is to describe AFMA's requirements for the use of fish aggregation devices by fishing concession holders in Commonwealth managed commercial tropical tuna fisheries.

This policy fulfils Australia's obligations to regional fisheries management organisations; the Indian Ocean Tuna Commission (IOTC) and the Western and Central Pacific Fisheries Commission (WCPFC). IOTC Resolution 12/08 (*Procedures on a Fish Aggregating Devices (FADs) Management Plan*) requires a Management Plan for the use of Fish Aggregation Devices (FADs). Management of FADs is also an issue under discussion at the WCPFC.

BACKGROUND

WHAT IS A FISH AGGREGATION DEVICE?

FADs are floating objects that attract fish. There are two main types of FADs: natural and man-made. Natural FADs are naturally occurring floating objects such as logs, branches, debri and large live marine organisms (whales, whale sharks, manta rays, etc). Man-made FADs can be found either drifting or anchored.

Tropical tuna such as Bigeye tuna, Yellowfin tuna, and Skipjack tuna show a natural behavioural tendency to aggregate around such floating objects. Fish aggregation devices are used in commercial tuna fisheries to target schooling tuna using a purse seine.

Fishing beside/under FADs takes advantage of the fact that tuna and other pelagic fish naturally congregate around floating objects in the open ocean and can be substantially more efficient than setting on unassociated schools. Man made FADs, improve the efficiency of fishing by aggregating tuna and reducing the time needed for searching. This is especially the case of technologically advanced FADs, with satellite beacons that enable fast location and sonar to monitor the presence and size of aggregations beneath them (Bromhead et al. 2003) thus, FAD fishing saves time, resources and fuel, and has

become a major tool of the industrialised purse seine tuna fleet globally. Tuna that school around FADs are also easier to encircle and catch than free-swimming schools. It is estimated that fishing sets around floating objects have a higher success rate (90%) than those made on free-swimming schools (50%) (Dagorn et al. 2012). FADs are also used by hand line, troll, pole and line and even gillnet fisheries. Livelihoods, food security and the economies of many regions and countries are dependent on FAD fishing.

ISSUES WITH FADS

Fishing by its very nature impacts the marine environment, yet fish are a vital source of protein and income for communities throughout the world. Fishing on FADs can have additional impacts compared to fishing around free schools:

1. It can increases the catch of 'non target' species and sizes of tunas (especially undersized, juvenile Bigeye and Yellowfin Tunas);
2. There can be relatively high bycatch of sharks, threatened, endangered and protected species (e.g. turtles and manta rays), and of other unmarketable fish species and sizes of fish;
3. Without clear ownership they can become persistent marine debris impacting marine habitats such as reefs; and
4. The ecological impact of a network of thousands of artificial drifting and anchored FADs aggregate tunas and other pelagic species from surrounding waters has not been assessed.

Catches associated with FADs (associated catches) typically consist of adult skipjack tuna, juvenile yellowfin tuna and juvenile bigeye tuna. Free-swimming school catches (un-associated catches) typically consist of adult yellowfin tuna and adult skipjack tuna. However, there is a large regional and seasonal variation in the catch compositions of fish caught in both FAD and free-school sets.

A summary of the divergence in catch composition between sets on FADs and free-swimming schools in different regions for the period 2000-2009 is provided in Table 1.

FADs also attract non-tuna species (byproduct and bycatch) (e.g., sharks, turtles, cetaceans, rays, whale sharks, countless variety of other bony fishes) which can be caught with the purse seine in associated sets on FADs. Free-swimming school catches typically contain low levels of non-target (non-tuna) species. It is estimated that the amount of non-tuna and discarded tuna is between 2.8 to 6.7 times more in FAD associated catches than free-swimming school catches (Dagorn et al. 2012).

Large numbers of FADs put into the ocean may change the movement behaviour of tunas, as they move with the FAD instead of following their natural movement pattern exhibited without the addition of extra FADs. However, it has been suggested that where floating objects are naturally present in the environment the impact from the use of additional FADs would be minimal.

Issues of FADs have been acknowledged and are in the process of finding solutions to address these issues on a regional/international scale through Regional Fisheries Management Organisations. FAD closures are being used in the WCPFC to reduce the Bigeye catches and the IOTC requires that Contracting Parties and Cooperating non-

Contracting Parties using FADs have a FAD management plan to collect information on which to base management decisions.

Table 1. Percentage composition of catches of Yellowfin, Skipjack and Bigeye tuna under floating objects (FADs) and in free-swimming schools by region for the period 2000-2009. Reproduced from Dagorn et al. (2012).

	Floating objects			Total	Free-swimming schools			Total
Ocean	Yellowfin	Skipjack	Bigeye		Yellowfin	Skipjack	Bigeye	
Atlantic	17%	69%	14%	100%	76%	19%	5%	100%
Indian	25%	67%	8%	100%	72%	22%	6%	100%
E. Pacific	15%	57%	28%	100%	43%	56%	1%	100%
W. Pacific	14%	82%	4%	100%	22%	77%	1%	100%
Global	16%	75%	9%	100%	35%	63%	2%	100%

FADS USE IN AUSTRALIAN FISHERIES

FADs are not commonly used in Australian fisheries as Australia's skipjack tuna fisheries have been in-active for the past several years for economic reasons.

COMMONWEALTH FISHERIES FAD MANAGEMENT

Purse seining can be used in the Western Tuna and Billfish Fishery, Western Skipjack Tuna Fishery and Eastern Skipjack Tuna Fishery. Fishing concession holders in these fisheries wishing to utilise FADs must apply to AFMA in writing[1].

Upon application the use of FADs in these fisheries is:

1. allowed anywhere in the Western Tuna and Billfish Fishery and Western Skipjack Tuna Fishery.
2. prohibited north of the parallel of latitude 20°S in the Eastern Skipjack Tuna Fishery.

[1] Statutory Fishing Rights still require amendment

REGISTRATION OF FADS

The applications to utilise FADs must include:

1. the number of FAD(s) to be deployed;
2. the type of FAD(s) (drifting / anchored); and
3. details on the design, construction and materials utilised in the FAD(s) (including any electronic devices and their specifications including the serial numbers of radio buoys and satellite transceivers).

AFMA will then issue a unique identification number for each FAD which must be displayed on the FAD.

DEPLOYMENT AND RETRIEVAL OF FADS

Fishing concession holders or their agents are required to give prior written notice and information to AFMA of their intention to deploy and retrieve FADs. The information to be provided includes:

1. location in latitude and longitude, to the nearest second;
2. whether the FAD is being deployed or retrieved;
3. date of deployment or retrieval;
4. if the FAD is a new or replacement FAD; and
5. the FAD's identification number as issued by AFMA.

If the concession holder fails to deploy or retrieve any of the FADs in the manner reported they must immediately notify AFMA in writing of any changes to their FAD deployment(s) or retrieval(s).

LOST AND REPLACED FADS

When a FAD has been lost the fishing concession holders or their agents are required to notify AFMA immediately. The replacement FADs must be of the same type, design, construction, materials and number as the FAD being replaced. Replacement of anchored FADs shall be in the same position as the FAD being replaced.

MARKING OF FADS

All FADs must be suitably marked for visibility and identification, the raft section must be clearly painted with reflective paint so that the raft can be seen from a distance of at least one kilometre. The marking must include the name of the vessel that deployed the FAD and the identification number as issued by AFMA.

In addition, the raft section of the FAD must also support a radar reflector and flashing light that must be suspended at least two meters above the waterline of the raft. At all times, the raft must register on radar at a reasonable distance. Electronic devices such as transponders and radio beacons which automatically and continuously indicate their position by means of signals may be used. Satellite transceivers and radio beacons must have their serial numbers clearly marked. These must not be operated at radio frequencies that would conflict with other devices used for navigation and search and rescue purposes.

DESIGN, CONSTRUCTION, OPERATION AND MAINTENANCE OF FADS

The design, construction, operation and maintenance of FADs will be the responsibility of the fishing concession holder deploying the FADs.

However, FADs must be constructed from natural and/or biodegradable materials and must not be constructed of any materials (e.g. netting) that may entangle fish, sharks, turtles and/ or any other non-target species. The "*ISSF Guide for non-entangling FADs*" includes best practice design recommendations (current as at 2012).

Anchored FADs must be constructed such that they can be reliability located at their place of deployment.

The design of anchored FADs should include an appropriate number of counter weights along the rope to ensure that the rope sinks to the bottom in the event that the raft section has come detached and drifted away.

Operators who register FADs must regularly maintained them, replace them as necessary and removed them from the water when they are not in use.

LOCATION OF FADS

Navigational routes and shipping

FADs shall not be set at locations of known high volume of sea traffic. General areas where FADs are deployed shall be reported to the relevant authorities to be published as Notice to Mariners. AFMA reserves the right to refuse FAD deployment in areas of known high volume of sea traffic.

Closed areas

FADs deployment is prohibited from all waters within 12 nautical miles of any land or island. Other closed areas include the Torres Strait Protected Zone, and any other area that may from time to time be declared by relevant Government bodies to be a prohibited area.

Australia will implement any area closures for FAD use as agreed by the WCPFC and IOTC.

FISHING ON FADS

Setting the purse seine or fishing around natural FADs is permitted. It is prohibited to fish around a man-made FAD that is not registered to the fishing concession holder.

BYCATCH MINIMISATION RELATING TO FADS

Fishing around natural or man-made FADs is prohibited if any of the following are present:

- shark(s);
- whale shark(s);
- whale(s);
- manta ray(s);
- dolphin(s); or
- Sea Turtle(s).

The fishing concession holder must take all reasonable measures to ensure that any of these species that are incidentally caught are handled in an appropriate manner and released alive as quickly as possible to maximise post release survival. The ISSF Skippers' guidebook to sustainable fishing practices, Chapter 3 Bycatch mitigation and handling provides best practice guidelines on this.

Concession holders must record interactions in their logbook or listed marine and Threatened Species Forms as usual.

MANAGEMENT OF THE CATCH OF YELLOWFIN TUNA AND BIGEYE TUNA

Yellowfin Tuna and Bigeye Tuna are subject to quota in the Western Tuna and Billfish Fishery and Eastern Skipjack Tuna Fishery.

In the Western Skipjack Tuna Fishery, fishers must retain on board and land all bigeye (*Thunnus obesus*) and yellowfin (*Thunnus albacares*) tuna taken. The total live weight that may be taken must not exceed:

(a) two percent (2%) of the total live weight of skipjack tuna taken with the use of the boat during the season commencing 1 July in any year and ending on 30 June in the following year; and

(b) in any trip, fifty percent (50%) of the total live weight of skipjack tuna taken during that trip.

CATCH AND EFFORT REPORTING RELATING TO FADS

Where fish are caught using a FAD, the FAD identification number for man-made FADs or the type of FAD for natural FADs and recorded in the comments section for the corresponding shot of the vessel's logbook, currently *the Purse Seine Daily Fishing Log* (PS01A).

Relevant information collected in logbooks will be reported to the IOTC as required under their standards for scientific data according to Resolution 10/02.

INTERNATIONAL FAD MANAGMENT

Conservation and Management Measures and Resolutions agreed to by Australia at the WCPFC and IOTC will be reflected in domestic management.

IMPLEMENTATION OF THIS PLAN

This plan will be implemented through conditions on Statutory Fishing Rights or fishing permits for the relevant fisheries.

DURATION, MONITORING AND REVIEW OF THIS POLICY

This policy remains valid until revised, replaced or removed. The use and catch composition of FAD associated fishing will be monitored through the mandatory prior reporting (stated in this policy), routine observer coverage, mandatory logbook records and routine compliance activity. This policy will be reviewed after two years of data on catch and effort taken on FAD has been collected.

REFERENCES

Bromhead, D., Foster, J., Attard, R., Findlay, J. and Kalish, J. (2003) *A review of the impact of fish aggregating devices (FADs) on tuna fisheries*. Bureau of Rural Sciences, Department of Agriculture, Fisheries and Forestry. Pp 121.

Dagorn, L., Holland, K.N., Restrepo, V., and Moreno, G. (2012) *Is it good or bad to fish with FADs? What are the real impacts of the use of drifting FADs on pelagic marine ecosystems?* Fish and Fisheries. 16 May 2012 online.

Indian Ocean Tuna Commission (2012) Resolution 12/08 *Procedures on a Fish Aggregating Devices (FADs) Management Plan*.

European Union (France) DFADs Management Plan

Received 13.04.2017

FAD management plan for the Indian Ocean implemented by Orthongel for the year 2017

Section I – Management measures context

Article 1 - Reference texts

- Resolution 16/01 On an Interim Plan for Rebuilding the Indian Ocean Yellowfin tuna Stock in the IOTC area of competence
- Resolution 15/08 Procedures on a fish aggregating devices (FADs) management plan, including a limitation on the number of FADs, more detailed specifications of catch reporting from FAD sets, and the development of improved FAD designs to reduce the incidence of entanglement of non-target species
- Resolution 16/07 On the use of artificial lights to attract fish
- Resolution 16/08 On the prohibition of the use of aircrafts and unmanned aerial vehicles as fishing aids
- Guidelines to Reduce Sea Turtle Mortality in Fishing Operations adopted by FAO at the 26th session of COFI, in March 2005
- Recommendations from the CECOFAD Programme on the collection of data related to floating objects (Annex 1)

Article 2 - Scope

This FAD Management Plan applies to tuna purse seiners registered in a French port and operating in the waters of the Indian Ocean.

This management plan also applies to support vessels flagged in France and used in the tropical tuna purse seine Fishery.

Article 3 - Definitions

Fishing activity: Any activity relating to locating fish, laying underwater, deploying, trolling or hauling fishing gear, hauling catch on board, transshipping, retaining, processing on board, transferring and unloading fish and fish products;

Beacon: Electronic device used for locating and monitoring FADs.

Active beacon: Any beacon that is in the water and in a working state (transmitting/receiving information). A beacon that no longer emits a position can not be considered active.

Proprietary beacon: A beacon whose information (position and echo sounder signal) is transmitted to a single vessel only to which the beacon has been associated.

Common beacon: A beacon whose information (position and echo sounder signal) is transmitted to at least two ships that share the beacon.

Fish Aggregating Device (FAD): Floating and drifting, natural or artificial, object deployed or used by a fishing vessel in order to aggregate tuna schools that are targeted to be caught by purse seine gears. FAD-

related activities are: deployment/launch, beacon setting to monitor FAD trajectory (whether it is deployed or simply found by the vessel), FAD-aggregated school fishing, FAD visiting, maintenance, repair and removal;

Traceable Fish Aggregating Device (TFAD): Floating and drifting, natural or artificial, object equipped with a beacon allowing for its localisation and tracking, hence modifying markedly a vessel's fishing strategy and effort. TFAD-related activities are similar to FAD-related ones, with additional beacon setting, exchange or removal in order to monitor FAD trajectory;

Fishing vessel: Any vessel equipped for commercial exploitation of aquatic living resources;

Support vessel: Any vessel assisting a fishing vessel in its fishing activities. The support vessel doesn't have any fishing gear.

Number of active beacons per vessel at a given time: The sum of the number of active proprietary beacons and of the number of common beacons (managed by a fishing vessel or support vessel) divided by the number of tuna vessels using these common beacons.

Article 4 - Objectives

The French FAD Management Plan has 3 objectives:

- **Improving knowledge on FAD-associated fishing activities:**

A deeper knowledge of this fishing practice will allow to better assess its potential impacts and define the most appropriate management measures. In this perspective, the scope of the information entered by vessel skippers on FAD activities, specifically, will be extended and made systematic.

In addition to details regarding the type of FAD fished (natural log, artificial draft, "classic" or "non-entangling" FAD) which are already recorded, information on FAD launch, recovery or transfer/modification will be collected by the Masters of the seiners as well as those of the support vessels using the logbooks (which format has been amended) and through a "FAD" module in electronic logbooks (ELB) adapted to tuna fisheries and RFMO requirements. These data are of major interest for scientific assessments because they allow to better quantify purse seine fishing effort and consequently improve stock assessments, and they can easily be cross-referenced with the information reported by scientific observers. Additional data could also be collected by onboard observers. This data will be collected according to the recommendations of the CECOFAD Programme (Annex 1).

Moreover, the number of activated/deactivated beacons per vessel is subject to quarterly reports from beacon suppliers since January 1st, 2010. Theses reports are independent of skippers and shipowners. Two control levels can be implemented by the the competent authority. On one hand, at the level of buoy suppliers (Each INMARSAT or IRIDIUM identifier is assigned to a vessel (or several vessels in the case of shared buoys). The identification of the vessel(s) can be checked with each buoy supplier). And, on the other hand, at the level of satellite communication providers (To allow satellite transmission of buoy information (position/sounder messages), all buoy suppliers must activate the buoy transmitter for their customers).

All this data will be submitted as soon as possible to the IRD scientists in the context of the preparation for the RFMO Working Parties on FADs.

- **Limiting the use of FADs:**

For French shipowners, the main management measure for FAD fishing is to limit the use of FADs. This limitation must apply to FAD-associated beacons (more than 90% of purse seine sets made under objects

involve drafts or natural logs that have already been encountered before and equipped with beacons). Since these beacons are satellite-monitored, the most efficient and accurate way to know the effective number of drafts deployed at sea is to use the data provided by the beacons (including information on their activation and deactivation). A system based on systematic reporting of beacons in use, along with a “numerus clausus” mecanism, has therefore been implemented by shipowners.

A limitation regarding support vessels that can be used by shipowners to manage a pool of FADs is also in place.

- **Reducing potential impacts of FADs on ecosystems:**

In addition to the reduction of potential impacts resulting from limitation of the number of TFADs, the Management Plan also incorporates provisions of a more qualitative nature resulting from experimentations or additional research in the following fields: adoption of best practices (release of entangled turtles, for instance), improvement of selectivity (non-entangling FADs, "*turtle/shark free FAD*"), adaptation of fish-finding strategies, identification of fish sizes through echointegration on lateral sounders…

Progressively, the FAD management plan also includes the modification of FADs to make them biodegradable within a few years (elimination of nets used to consolidate the raft and underwater hanging structure).

Finally, measures are proposed to reduce the risk of damage that rafts may cause when running aground on a coral reef.

Section 2 – Management measures

Article 5 - FAD identification and marking

All TFADs launched by French tuna purse seiners are identified by a serial number on the associated beacon. This number must be visible without dismounting the beacon and designed to be sea water-proof and remain legible through the whole lifespan of the beacon.

Article 6 – Beacon Registry and monitoring

The vessel skipper or owner holds a specific record of beacons used by the vessel, where each beacon is referenced:

- Its serial number;
- The vessel(s) having access to the localisation information of this beacon;
- The make and type of the beacon;

The use of TFADs is subject to monitoring through quarterly reports from beacon suppliers, who track their FADs. This quarterly report establishes the number of active beacons at the beginning of the period, the number of activated beacons during the quarter, the number of deactivated beacons during the quarter, the number of active beacons at the end of the period and the number of beacons that transmitted during the quarter.

For scientific research and statistical purposes, this data, along with the recording of beacon positions and echo sounder data will be communicated to scientific institutions and relevant fisheries management bodies, in compliance with confidentiality requirements.

Article 7 - Recording of FAD-related activities

The skippers of fishing or support vessels record in their logbooks the following activities:

- Deployment/launch of any FAD or marking of any FAD with a beacon
- Removal of any FAD or beacon
- Visiting of or fishing on any FAD with or without handling (maintenance/exchange)
- End of transmission by a beacon (corresponding to the loss of the FAD).

For each of these activities, the information collected is the following:

- Date and time;
- Position (latitude, longitude);
- Type of FAD (natural or anthropic log, artificial, "classic" or "non-entangling" draft) along with a short description (tree trunk, pile of straw, container, rope, …) if necessary;
- Type and number (if ownership is unavailable) of associated beacon in case of a TFAD;
- Number (if ownership is unavailable) of removed beacon in case of a TFAD;

In addition to the information listed above, skippers of fishing vessels also record in their logbooks, for each FAD-associated fishing operation, the following information (already partly covered by regulations):

- In case of a TFAD, if the beacon belongs to their vessel or to a third vessel;
- Tons caught per species (targeted tunas or bycatch);
- Any discard quantities

On-board observers systematically record:

- The same information as that collected by the captains;
- The characteristics of the FAD (Annex 1);
- Any observations of entangled sharks or turtles when the FAD contains parts made of nets.

For scientific research and statistical purposes, the data on FAD activities reported by vessel skippers can be communicated to scientific institutions and relevant fisheries management bodies, in compliance with confidentiality requirements (cf. Article 15).

Article 8 – Limitation of the number of TFADs

Given the absence of an opinion on this issue by RFMO Scientific Committees;

Considering that an excessive proliferation of TFADs poses a threat to the sustainability of the exploitation of tropical tunas;

In line with the commitments of French shipowners since 2012 to curb the proliferation of FADs;

Having taken note of the scientific advice on yellowfin tuna issued by the IOTC Scientific Committee at its 18th session, in November 2015;

Applying a precautionary approach;

Considering that the limitation of the number of active beacons per vessel at any given time effectively limits the number of TFADs at sea;

Considering that, to ensure a responsible and sustainable fishing, Orthongel will continue to promote a rational use of FADs through the limitation of the number of active beacons, as adopted by RFMOs and applicable to all fleets;

Encouraging shipowners not to increase the number of their FADs beyond the levels deemed reasonable by the OP in 2012;

Considering that IOTC Resolution 16/01 limiting the number of active beacons per vessel at any given time to 425 does not ensure the sustainability of the tropical tuna resource;

Shipowners limit their annual purchases of beacons to an average of 250 beacons per ship.

No fishing vessel may at any time have more than 250 active beacons.

Article 9 - Prohibition of HF beacons

As these can not be independently checked, the use of HF beacons is prohibited.

Article 10 - Prohibition of the use of light to attract tunas under FADs

In accordance with IOTC Resolution 15/07, the use of light under FADs is prohibited, as is the anchorage of a support vessel on shallows in accordance with Resolution 61/105 on sustainable fishing adopted in December 2006 by the United Nations, which states the need for immediate action to protect the marine ecosystems of seamounts which are considered vulnerable.

Article 11 - Supervision of Support vessels and other Auxiliary devices for the Management of FADs

FADs may be managed by support vessels provided that :

- they are included in the relevant IOTC registers;
- they do not use lights (aerial or underwater) with the objective to encourage the concentration of fish;
- a support vessel shall serve a minimum of two designated purse seiners not associated with another support vessel.

A table of support vessels and their associated purse seine vessels for 2017 is attached as Annex 2 and provided to the DPMA. A revision of this list will be immediately notified to the DPMA in the event of a change during the year (entry in, or exit from, the fleet of a support vessel, change of associated vessels).

In addition, the use by fishing vessels or support vessels of on-board helicopters and/or drones is prohibited.

Article 12 – Mitigation of uncontrolled drift of TFADs in sensitive areas

Vessel skippers and owners will continue to implement all necessary measures to prevent or limit the loss of FADs at sea.

The shipowners agree that the positions of the TFAD beacons entering areas where the risk of of FADs stranding on coral reefs[1] or interacting with other activities (such as seismic prospecting[2]) be communicated to agencies - previously identified and guaranteeing the confidentiality of the data - likely to eliminate or limit the above-mentioned risks to the lowest possible level.

Article 13 - Mitigation measures for catches of juveniles, small tunas and bycatch associated with FADs

All actions aiming at improving purse seiners' selectivity when fishing under objects are encouraged so as to limit discards and, in particular, harvesting of juveniles and small individuals of targeted species, or bycatch of non-targeted species (with particular attention to sensitive species such as sharks).

Shipowners provide the crews with the information necessary to build FADs that offer the smallest entanglement risk possible, if not zero, for turtles and sharks, and provide vessels with the materials to build those FADs. Shipowners will continue to develop and implement workshops on designing non-entangling FADs in each of the home ports of the French purse seiners (Seychelles and Mauritius).

It is forbidden for fishing and support vessels to launch a FAD that was not designed to reduce to zero the risk of turtle and shark entanglement.

Article 14 - Shark conservation measures (mainly associated with FADs)

Shipowners encourage crews to implement methods for live release of sharks that seem the most efficient and least dangerous to them, develop standard procedures for different types of catch (big sharks, small sharks, mantas, whale sharks) and disseminate them.

Shipowners ask crews to facilitate the work of on board scientists who tag sharks before their live release to assess their survival rate.

Shipowners make available to crews the necessary information and training to improve live release practices for sharks caught by purse seiners, under optimal security conditions for the crew, and provide vessels with shark and ray handling and releasing devices.

Section 3 – Implementation measures

Article 15 - Confidentiality measures regarding information related to FAD fishing

Any information reported in accordance with the present Management Plan must be treated as confidential and can only be used for scientific, statistical and/or control and surveillance purposes. Any other use of this information shall obtain the vessel owner's consent.

Article 16 – Duration and revision of the management plan

This management plan is established for the year 2017 and is applicable from 1 January 2017. It will be the subject of an annual review between the relevant shipowners, the administrative authorities and the competent scientific agencies and may then be renewed for the following years, as is or with any amendments deemed necessary, on the basis of the experience gained in the implementation of this plan and/or on the development of international regulations.

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[1] A reflection on a FAD-WATCH mechanism to inform Coastal State Authorities in the event of a FAD stranding is under way. A study on buoy losses and main stranding areas is being carried out with scientific agencies. A partnership work with environmental associations is also under consideration to limit the impact of FADs on the marine ecosystem (collection of FADs ...). The results of this work may be incorporated, where appropriate, in the revision of this plan.

[2] The mechanism mentioned in this article is already being implemented in the context of the seismic surveys carried out off Gabon.

European Union (Spain) DFADs Management Plan

Received on 19.04.2017

(COURTESY TRANSLATION)

MANAGEMENT PLAN FOR FISH AGGREGATING DEVICES (FAD)

1. Basis and background of this plan

The current legislation in force covers the following provisions that justify the elaboration of this management Plan for fishing aggregating devices utilized by the Spanish purse seiner fleet targeting tropical tunas:

- The 1995 United Nations Stock Agreement has as the main goal the assuring of long term conservation and sustainable exploitation of the stocks of highly migratory species.
- FAO code of good practices, with regard to fishing investigation, sets the obligation of the reliable data collection which enables the due stock assessment just like the implementation of studios on fishing gear selectivity and its environmental impact and to promote the results of the investigation as the basis to establish the management objectives.
  FAO code of conduct points out that "fishing gear should be marked according to national legislation to identify the owner of the gear. The requirements of this marking should have into account uniform marking systems and internationally acknowledged."
  Lastly, and following the FAO Code, "the States should cooperate in the perfection and implementing of operative fishing technologies, materials and methods to minimize the loss of fishing gear and its effect as ghost fishing".
- EU Regulation 1380/2013, 20th Dec 2002, on the Common Fisheries Policy, points out as the main target is the sustainable exploitation of living aquatic and aquaculture resources in the context of sustainable development, having into account environmental, economic and social aspects in a balanced fashion. This regulation modifies EC Regulations 1954/2003 and 1224/2009, and repeals Regulations 2371/2002 and 639/2004, as well as Council Decision 2004/585.
- Law 3/2001, of Maritime Fisheries, sets amongst its goals, in article 3 the safeguard of the responsible fisheries resources exploitation, encouraging its development and adopting all necessary measures to protect, preserve and regenerate the said resources and their ecosystems and promote the fisheries and oceanographic research.

The experience from the first FAD plan in Spain of 2010, as well as the new international provisions, has led to the current revision of the Plan.

2.- Scope of application of the present plan

The present plan is aimed at Spanish-flagged freezer tuna purse seiners operating in the Indian, Atlantic and Pacific Ocean, targeting tropical tuna as well as Spanish

flagged supply vessel supporting the mentioned purse seiner vessels.

The Secretary General for Fisheries shall be the authority that ensures the implementation of this plan.

3. Objectives

- Improving information collection for scientific advice purposes.

- Contributing to enhanced knowledge of catch composition in FAD sets.

- Increasing knowledge of these devices with regard to their technical features and their possible impact on ecosystems.

- Establishing information-sharing mechanisms among operators, scientists and administrations, in order to achieve better knowledge of progress made in this field and the implications thereof.

4.- Definitions

The following definitions shall only affect the present plan, in order to enhance understanding thereof.

- Main vessel: Fishing vessel making catches and to which catches made are assigned.

- Support vessel: Fishing vessel acting as an auxiliary vessel for main vessels, assisting in fishing; for example in deploying, monitoring and hauling in FADs.

- Fishing activity: Extracting fishing resources in external waters, as well as crustaceans and mollusks, using fishing gears and methods.

- Fish Aggregating Device (FAD): Natural or artificial objects deposited on the surface, under which various species aggregate, thus making them more accessible for fishing vessels to locate and catch.

Types of FADs

o Anchored FADs: Those artificially moored to the seabed to prevent drifting, including support vessels anchored to a seamount.
o Drifting raft with a net: Unanchored FADs composed of a panel— either continuous or grill-shaped—associated with a net used as a sail at sea.
o Drifting raft without a net: Unanchored FADs composed of a panel— either continuous or grill-shaped.
o Natural FADs: Any FAD found at sea (e.g. plant remains, dead animals, man-made waste) used as a FAD
o Other drifting FADs: Any FAD other than those above.

FAD-related activities
o Deployment: Operation by which a vessel release a FAD at sea.
o Verification: Operation by which a vessel monitors a previously deployed FAD in order to perform maintenance activities or to check the aggregation of fish around the device.
o Set: Fishing maneuver to catch shoals of fish associated with a FAD.
o Hauling: Operation by which a vessel retrieves a FAD from the sea.

- Beacon: Device whose purpose is locating or monitoring a FAD.

Types of beacons
o GPS beacon: Beacon accompanied by a global positioning system (GPS)
o Radio beacon: Beacon accompanied by a radio system
o Visual beacon: Beacon without any electronic device, only identifiable by sight

- Oceanographic buoy: Buoys used for oceanographic research

5.- Obligations under the RFMOS regarding FADS.

Tuna RFMO have adopted the following provisions:

WCPFC:
o Conservation and Management Measure for bigeye, skipjack and yellowfin tuna (CMM 2015-01). It includes provisions on FADs.
o Conservation and Management Measure on the application of high seas FAD closures and catch retention (CMM 2009-02), which sets out the specifications regarding FAD closure.
o Conservation and Management Measure on instrumental buoys (CMM 2009-05)
o Conservation and Management Measure on cetaceans (CMM 2011-03)

IOTC:
o Resolution 10/02, on mandatory statistical requirements for IOTC members and cooperating non contracting parties (CPCS), sets that all parties shall submit on a quarterly basis the number of FADS deployed per vessel.
o Resolution 15/08, on FAD management Plan.
o Resolution 15/02, on the recording of statistical data. Sets the obligation of reporting number of FADs by quarter, including position, type and other information.
o Resolution 15/09 that sets a Working Group on FADs
o Resolution 12/03 on recording catches, including information on deployment of FADs.
o Resolution13/04, on the conservation of cetaceans.
o Resolution 13/05 on the conservation of whale sharks.

IATTC:

Resolution 2013-01 on the multiannual program for the conservation of tunas in the East Pacific Ocean (2014-2016), which sets the intention of this Commission to undertake a pilot program for research into and gathering information on FADs.

Resolution 15-03 on recording FAD information, which also sets a working group on FADs.

ICCAT:
Recommendation 14-03 which sets a working group on FADs.
Recommendation 14-01 on a multiannual program for the conservation of tropical tunas.

6.- Identification of FADs

Each FAD shall have a sequence of characters serving as an identifier for each device to be used. This sequence shall not vary during the device's lifespan.

Operators may choose the identification system, with the only prerequisite that it be individual and unique for each FAD.

Depending on the results obtained through the implementation of the present plan, in the future—if it is considered appropriate—a single

7. Register and information-sharing regarding FADs

7.1. Inventory

As an initial measure, operators shall send the Deputy Directorate General for Agreements and Regional Fisheries Organizations, by 31 December 2010, a list of operative FADs being used by the fleet at that date.

This list shall include, for each FAD, the information contained in Annex I. As far as possible, this information should be provided at the detail level of fishing vessels.

This list shall be promptly updated whenever a change takes place, and such updates must be sent at least quarterly. The aim of this inventory is to provide as much information as possible on the characteristics of FADs being used, and to enable scientists to analyze the data collected in fishing logs thanks to the individual identification of each FAD.

7.2. Specific Activity Register (FAD logbook)

Operators shall keep a register where FAD-related activities shall be recorded. The information that must be recorded in this register is included in Annex II of this plan.

If operators use any natural FADs, this information shall also be recorded, and in such cases deployment shall be understood as assigning a beacon, and hauling as withdrawing the beacon. Should this FAD be intended for periodical use, information regarding it shall be included within the inventory envisaged above.

Whenever an activity is conducted involving a FAD that does not initially belong to the fishing or auxiliary vessel that detected it, all the information regarding this activity shall also be reported. The word "external", together with the visible character sequence leading to its identification, shall be recorded in the section corresponding to identification.

Finally, for each activity conducted involving a FAD, every incident regarding accidental catches shall be recorded: species, number of specimens, and number of specimens released alive.

This activity register shall be sent at least quarterly to the Deputy Directorate General for Agreements and Regional Fisheries Organizations.

7.3. Records in fishing logbooks

In addition to the specific register set forth above, ship captains shall record in the fishing logbook if each set has been done on Fads or free schools.

When the set is done on FADs, the identification must me recorded, according to the criteria set in the preceding point.

8. Monitoring of FADs

As far as possible, vessels must record monitoring information for each FAD that has a satellite beacon, based on its assigned number.

Moreover, efforts should be made to record information obtained from other beacons (e.g. visual, radio).

There shall be no obligation to communicate the recorded information. However, such information may be requested in order for the designated scientific personnel to conduct specific studies or in order to carry out monitoring activities. This information may be requested, prior approval by the operators for its use.

9. Measures to prevent loss of FADs

Vessel operators shall prevent, as far as possible, loss of FADs at sea.

In the event of a loss or of the impossibility of hauling in a FAD (areas or seasons closed to fishing), operators must record, in the Specific Activity Register, its last known date and position.

10. Measures to mitigate the catch of juvenile tuna and non-target species

From January 1, 2015 on, all entangling FADs should be progressively replaced by others which minimize incidental catches, including these features:

- The upper part will not be covered, and if that is metallic, the material should be tightly covered or with a maximum of net size of 3 cm.

- The tail should be of non entangling material. If that include nets, its máximum size will be 3 cm.

All withdrawal or replacements should be recorded in the In the FAD logbook and the inventory

From June, 30, 2015 on all activity on entangling FADs is forbidden.
.
From September, 30, 2015 on all entangling FADs must have been removed, even if they are recorded in the inventory of the vessel.

The use of methods that reduces juvenile catches and associated species is encouraged in order to get cleaner catches.

The Parties to this plan may propose pilot actions in order to advance in some of the aspects described.

11. Specific closures on fishing with FADs

ICCAT:

Fishing for, or supported activities to fish for bigeye, yellowfin and skipjack tunas in association with objects that could affect fish aggregation, including FADs, are prohibited during the period 1 January to 28 February in the following area:

− Southern limit: parallel 4º / South latitude
− Northern limit: parallel 5º / North latitude
− Western limit: meridian 20º / West longitude
− Eastern limit: the African coast

The prohibition referred to in paragraph includes:
− launching any floating objects, with or without buoys;
− fishing around, under, or in association with artificial objects, including vessels;
− fishing around, under, or in association with natural objects;
− towing floating objects from inside to outside the area.

In order to comply with the FAD limit set in Recommendation 15-01, each vessels must submit a certificate issued by the company that supplies the beacons or by a scientific institute that certifies the following data:

- Number of instrumental buoys per vessel at any time by quarter.

IOTC

In order to comply with the FAD limit set in Resolution 15-08, each vessels must submit a certificate issued by the company that supplies the beacons or by a scientific institute that certifies the following data:

- Number of instrumental buoys per vessel at any time by quarter.
- Number of instrumental bouys contracted by year.

Non instrumental bouys shall be gradually eliminated by January 1, 2017.

12. Measures to monitor and follow up the present plan

The relevant authorities may perform documentary monitoring of the provisions envisaged in the present plan, and they may require, if necessary, the data described in section 6.

The Spanish Institute of Oceanography (IEO), as the Spanish scientific authority in this regard, shall be responsible for processing and monitoring the information provided by the operators, and shall be authorized to draft the follow-up reports for this plan and to propose the measures it deems appropriate in order to improve the functioning thereof.

Moreover, the General Secretariat for Fisheries may determine, in coordination with the IEO, the participation of other scientific bodies in order to fulfill the objectives set forth in the present plan.

13. Confidentiality measures for the information provided by operators

The information provided by the operators shall be treated as confidential at all times, and its use shall be restricted solely to scientific or monitoring purposes, if necessary. The General Secretariat for the Sea undertakes not to disclose this sensitive information, other than for the aforementioned purposes, without the express consent of the shipowners.

14. Amendments to the present plan

This plan shall be amended in line with future measures adopted within the different RFMOS and with the conclusions of the reports envisaged in section 12.

15. Implementation

All provisions in this Plan will be in force until further modifications are adopted or new international provisions are set.

The infringements of these provisions would be considered as a non compliance to the conditions required to obtain the Temporary Fishing Permit and will be penalized according to Title V of LAW 3/2001, 26 May, on Maratime Fishing of the State.

Annex I

ANNEX I: Inventory

Vessel: _____ Registration number: _____

FAD					FAD Dimensions			Rope					Associated beacon identification	Associated beacon type	FAD loss or casualty
Identificatión	Description	Material			width (m)	length (m)	height (cm)	draught (m)	material			mesh size (mm)			

ANNEX II: ACTIVITY RECORD

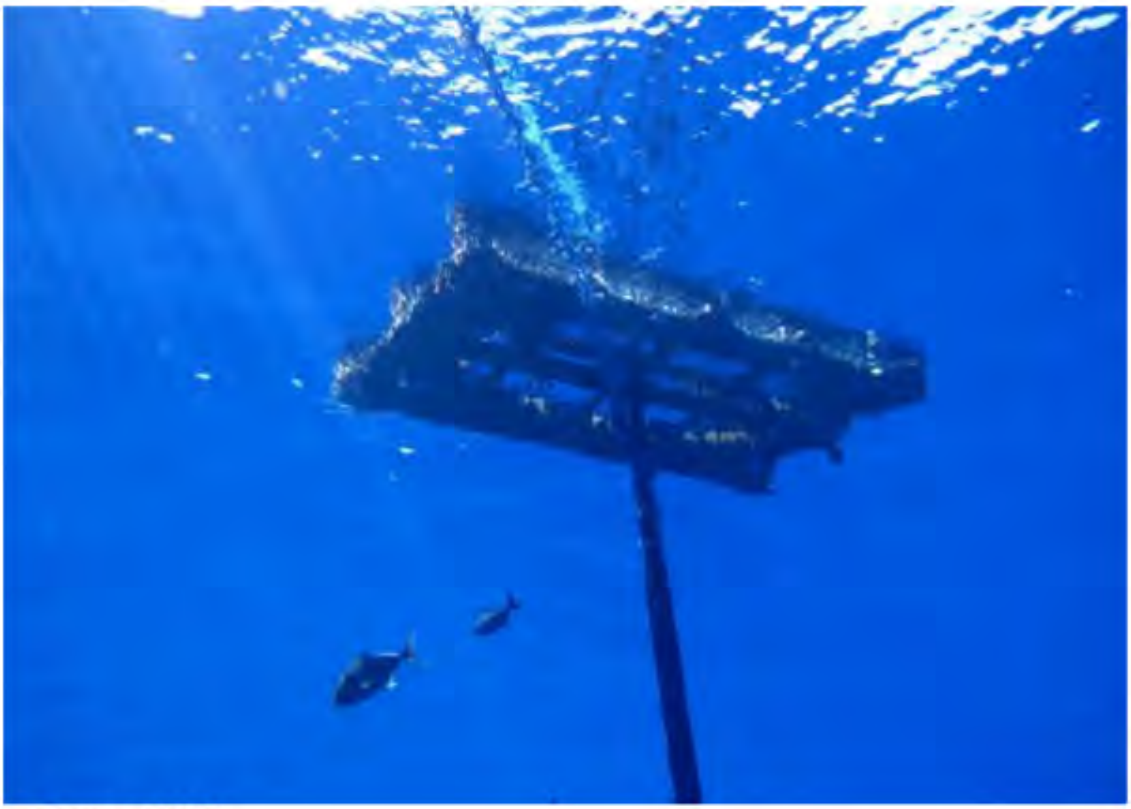
Vessel: _____ Registration number: _____

Date	Time	FAD Identification	Beacpn Identification	Activity	Positon		School Estimate (ton)	By-Catch Estimate				Observations
					Lat	Lon		Group	In Nº of specimens or Weight (t)	N/W	Nº specimens released alive	
DDMMYYYY	HHMM				ggmm	gggmm						

Indonesia DFADs Management Plan (drifting)

Received 12.01.2015

INDONESIA DRIFTING FISH AGGREGATING DEVICES MANAGEMENT PLAN IN INDIAN OCEAN (DFADs MANAGEMENT PLAN FOR 2015 – 2017)



Source: ISSF

DIRECTORATE GENERAL OF CAPTURE FISHERIES
MINISTRY OF MARINE AFFAIRS AND FISHERIES
2014

INDONESIA DRIFTING FISH AGGREGATING DEVICES MANAGEMENT PLAN IN INDIAN OCEAN
(DFADs MANAGEMENT PLAN FOR 2015 – 2017)

1. Objective

The objective of this FADs managment plan are but not limited to:

a. Strengthen a collection of scientific data.
b. Minimize the catch of bycatch of small tuna on FADs
c. Strengthen catch composition data collection to purse-seine fisheries on FADs.
d. Limit a number of deployed FAD.

2. Scope

Description of its application with respect to:

a. Vessel Type:
   i. Small pelagic purse-seiner with one boat;
   ii. Large pelagic purse-seiner with one boat;
   iii. Large pelagic purse-seiner-group
   iv. Handline
   v. Pole and line

b. DFAD numbers and/or DFADs beacon numbers to be deployed:

   Each eligible vessel only granted to deploy maximum 3 (three) sets of FADs.

c. Reporting procedures.

   Reporting procedure is clasified into two (2) categories, namely:

   c.1 Reporting Procedure for DFAD deployment

   Any company or operator or person who has deployed FADs is required to submit a FAD deployment report to Directorate General of Capture Fisheries, shall include:

   i. Date and time of FADs deployment.
   ii. Number of deployed FADs
   iii. Marking of FADs
   iv. FADs position (Latitude and Longitude)
   v. Name of fishing vessel and it's gear type.
   vi. Conclusion and recommendation

c.2 Reporting Procedure for DFADs Harvesting

Any fishing company or operator or person who has harvested fish on FADs is required to submit a harvesting report to Directorate General of Capture Fisheries, shall include:

i. FADs location (latitude and longitude)
ii. Marking of FADs
iii. Name of fishing vessel and it's gear type
iv. Frequency of harvesting.
v. Number and catch species
vi. Catch composition

d. incidental bycatch reduction and utilization policy:

i. Catch Retention

Each eligible vessel to have FADs shall retain all catch on board, both target species and bycatch such tuna juvenile.

ii. Releasing Turtle

Each eligible vessel to have FADs shall require to release all marine turtles which are entangled in fishing gear.

e. Consideration of interaction with other gear types:

There is a potential conflict between eligble vessel to have FADs and Tuna Longline fleet.

f. Plans for monitoring and retrieval of lost DFADs

Monitoring may be undertaken at the time of deployment as well as harvesting. During this monitoring, losted DFADs will be retrieved. In this incident, investigation will be made to find out the owner of DFADs.

3. Institutional arrangements for management of the DFAD Management Plans:

a. Institutional responsibilities:

Directorate General of Capture Fisheries, Ministry of Marine Affairs and Fisheries is responsible to manage FADs to be deployed by Indonesia flagged vessels.

b. Application processes for DFAD and /or DFAD beacons deployment approval:

b.1 Each person who is intending to deploy FADs within Indonesia Fisheries Management Area and High Seas shall require to have FAD License to be issued by Director General of Capture Fisheries.

b.2 Application to have FAD shall be submitted to Director General of Capture Fisheries by Providing the following information:

- Date of FADs Deployment;
- Proposed of Number of FADs;
- Location of FADs Deployment (latitude and longitude);
- Estimation of harvesting frequency (monthly or yearly basis);
- Estimation of fish species and catch in each setting.

b.3 In addition to the requirement as stipulated in point b.2, the application shall be accompanied with the following document:

- Copy of Fishing Permit;
- Copy of ID of vessel owner or responsible person;
- FADs layout and general specification such as material, dimension, and number of each FADs main component;

c. Obligations of vessel owners and masters in respect of DFAD and /or DFAD beacons deployment and use

c.1 Vessel owner and master shall submit a report to Director General of Capture Fisheries in respect of DFADs deployment shall include minimum information as following:

- Date of FADs Deployment;
- Number of Deployed FADs;
- Location of each FADs (latitude and longitude);
- FADs Marking;
- Name of vessel and type of fishing gear;
- Conclusion and recommendation.

C.2 Vessel owner and master shall submit a report to Director General of Capture Fisheries in respect of DFADs use shall include minimum information as following:

- Location (latitude and longitude) of used FADs;
- FADs Marking;
- Name of vessel and type of fishing gear;
- Frequency of harvesting of FADs;
- Catch by species.

d. DFAD and/or DFADs beacons replacement policy

d.1 In case FADs license is expired and not be renewed, the holder of FADs License shall discharge of the deployed of FADs.

d.2 In case the holder of FADs license does not discharge the deployed FADs as stipulated in para d.1, he or she will be classified as non-eligible person to have new FADs license.

e. Reporting obligations

e.1 Report of FADs deployment shall be submitted to Director General of Capture Fisheries within 14 days after the deployment.

e.2 Report of FADs use shall be submitted to Director General of Capture Fisheries every six (6) month.

4. DFAD construction specifications and requirements

a. DFAD design characteristics (a description)

DFAD component consist of:

i. buoy;
ii. attractor;
iii. rope; and
iv. weight.

b. DFAD markings and identifiers, including DFADs beacons:

DFAD marking composed of:

i. Name of owner;
ii. Number of fishing permit and fishing vessel authorized to use DFADs.
iii. Location (latitude and longitude) of DFADs deployment.

c. Lighting requirements

4000 watt – 16000 watt.

d. Radar reflectors

Radar reflector is a piece of flat galvanized steel that could be detected by radar.

e. Visible distance

DFADs can be deployed with a minimum distance ten (10) nautical miles each other.

f. Radio buoys (requirement for serial numbers)

No radio buoys requirement regulated.

g. Satellite transceivers (requirement for serial numbers)

No satellite transceivers requirement regulated

h. Technical requirement in DFADs use.

It is prohibited to shift of DFADs by vessel or other auxiliary tool which is intending to gather aggregated fish in more than one DFADs.

5. Applicable areas

This plan is applied to Indonesia flagged vessel that are fishing in the following watres:

a. Indonesia archipelagic waters
b. Indonesia territorial waters
c. Indonesia Exclusive Economy Zone
d. High Seas of Indian Ocean

6. Applicable period for the DFAD–MP

DFAD Management Plan will be implemented during 2015-2017.

7. Means for monitoring and reviewing implementation of the DFAD–MP

7.1 Regular monitoring will be undertaken by fisheries observer by fishing vessel or fisheries patrol boat.

7.2 DFAD Management Plan will be reviewed every 3 (three) year and will be amended at any time if deemed necessary. The first review will be done in 2017.

8. DFAD logbook

No specific DFAD logbook regulated.

Iran DFADs Management Plan

Received 26.01.2014

Plan of Iran for Fish Aggregating Devices (FADs) in Purse Seiner Vessels

1 – Current situation of Purse Seine Vessels in Iran

Industrial fishing vessels which are used for tuna fishing are eight purse seine vessels. One of fishing gears used in these vessels like any other purse seiners in high seas and international waters of the Indian Ocean are Fish Aggregating Devices (FADs). Each vessel, averagely install 20-30 FADs at sea and control them via radio buoys. Installation of FADs is according experiments of captain of vessel by climate changes, time and place of installation, sea currents and based on policies of IOTC for member countries.

Installation of FADs and collecting them are according national plans, policies and regulation of Iran besides local and regional regulations (like Tuna Fishing Regulations). It must be noted that industrial fishing vessels which are using purse seine methods in the Oman Sea (EEZ of Islamic republic of Iran) do not use FADs and they only use FADs for international waters fishing activities. They usually fetch missed or lost FADs by correspondence with coastal countries but, vessels owners are not so eager to inform others on how they use FADs.

2 – Program of Iran Fisheries Organization for Management of FADs

Iran Fisheries Organization believes that some of non-target fish species might be caught during fishing activity. Main part of catch in purse seine vessels are from high seas and international waters of the Indian Ocean with the help of FADs and fishing by FADs are much better than other methods used (like free herd, supply vessels and whale … methods) and on the other hand, due to some technical and non-technical reasons, despite using FADs by purse seiners catch level is lower comparing to other similar countries. Hence, there is no plan to substitute FADs with similar devices. Therefore, Iran is preparing regulations for controlling FADs and extension services to publicize the devices. However, vessel mangers and captains are committed (obliged) to report their activities in their improved logbook. In coastal waters and shallow waters of the Oman Sea using FADs are banned, thus there is no conflict with other fishing gears.

3 – FADs Characteristics

FADs used by fishing vessels are from D-FAD. This device is mostly made of bamboo wood or renewable materials in their natural forms. Some buoys are installed on these FADs which have special serial numbers and beside that number, name of vessel has been marked on FADs. These Buoys are traceable via satellite. Dimensions of these FADs are approximately 2*3 and or 3*3 meters. These devices have no reflection on radar instruments and can be seen from 4 mile distance.

4 – Operation Zones

Operation zone for purse seiners is the Oman Sea and international waters of Indian Ocean. Fishing around islands, coastal waters and EEZ of coastal countries should be through paying Royalty to these coastal countries.

5 – Inspection and Control program for Management of FADs

Vessel Monitoring Plan to monitor vessels using FADs can use three methods including VMS, logbook control and onboard inspector visits for these vessels according to a regular timetable. This plan can be tailored for two-year period.

6 –FADs Logbook

Supplying separated data on different log sheets seems to be a hard job for fishing community. Noting the common items between Logbook of Catch and Logbook of FAD, they can be merged in one sheet as attached.

(In last row of the Table, you can see name of person in charge, date of filling the Table besides his signature)

جدول گزارش روزانه عملیات صید کشتي هاي پرساینر (Purse Seiner vessels logbook)

Sheet No / شماره صفحه	Master / ناخدا	Name&No Vessel / نام و شماره ثبت شناور	ورود به/ Arrival TO : بندر/Port ☐ لنگرگاه/Loch ☐	خروج از/ Departure From: بندر/Port ☐ لنگرگاه/Loch ☐
			نام بندر / Name Port :	نام بندر / Name Port :
			تاریخ / Date : ساعت / Hour :	تاریخ / Date : ساعت / Hour :

Date تاریخ	Position ۱- موقعیت تور ریزی (طول و عرض جغرافیایی)	Set تور ریزی				Estimated catch صید تخمینی																Association صید از طریق این تجهیزات					درجه حرارت	Current جریان آب	
						گیدر yellowfin		هوور مسقطی skipjack		چشم درشت bigeye		هوور دم دراز longtail		زرده kawkaw		سایر گونه ها (غالب) Other (Species)			گونه های غالب در صید دور ریز Discards										
		Successful موفق	Nill ناموفق	2 - زمان تور ریزی specify time	Well شماره مخزن ماهی	averge catch size kg متوسط سایز صید	catch rate kg میزان صید	averge catch size kg متوسط سایز صید	catch rate kg میزان صید	averge catch size kg متوسط سایز صید	catch rate kg میزان صید	averge catch size kg متوسط سایز صید	catch rate kg میزان صید	averge catch size kg متوسط سایز صید	catch rate kg میزان صید	name of species نام گونه	averge catch size kg متوسط سایز صید	catch rate kg میزان صید	name of species نام گونه	averge catch size kg متوسط سایز صید	catch rate kg میزان صید	Free school گله آزاد	* log لاگ	supply vessel کشتی پشتیبان	beacan بویه	shark wale نهنگ کوسه/whale نهنگ		5- جهت degree/ direction	speed(سرعت (نات)

* اطلاعات لاگ: تاریخ استقرار:..........موقعیت جغرافیایی:(طول..........عرض.........)شماره سریال:(رادیو بویه.........گیرنده ماهواره ای.........)ابزار قد:(طبیعی ☐ مصنوعی ☐)سایزلاگ:(۲*۲ ☐ ۳*۳ ☐) مواد بکار رفته:(.................)نوع بازدید: (استقرار ☐ کنترل ☐ برداشت ☐ تعمیر ☐)

نام و نام خانوادگی تکمیل کننده : عنوان شغلی درشناور: تاریخ تکمیل : امضاء :

توضیحات :

Japan DFADs Management Plan

Received 10.04.2017

DFAD Management Plan for Japanese tuna purse seine fishing vessels

Fisheries Agency of Japan (FAJ)

1. Objective

This document describes Drifting Fish Aggregating Devices (DFAD) Management Plan to be applied to Japanese tuna purse seine fishing vessels, in order to fulfill paragraphs 2 and 6 of IOTC Resolution 15/08. The objective of the plan is to ensure that the use of DFAD by Japanese tuna purse seine fishing vessels is managed in a manner consistent with the conservation and management measures and data collection requirements of the IOTC.

2. Scope

(1) Vessel-types and support and tender vessels:

This Management Plan applies to DFAD used by Japanese tuna purse seine fishing vessels during their fishing operation in the Indian Ocean.

(2) DFAD numbers and/or DFAD's beacon numbers to be deployed:

Each vessel may deploy at maximum 150 sets of DFAD.

(3) reporting procedures for DFAD deployment:

A vessel operator shall record information about deployment of DFADs in the FAD logbook (See attached) and submit it to the Japan Far Seas Purse Seine Fishing Association after each cruise. The Japan Far Seas Purse Seine Fishing Association shall submit it to FAJ after reviewing it.

(4) incidental bycatch reduction and utilization policy:

The primary objective of this DFAD Management Plan is to reduce captures of non-target species associated with fishing on DFADs.

FAJ and Fisheries Research and Education Agency (FRA) have been carrying out a series of research activities in order to develop effective and practical methods for reduction of both juvenile bigeye and yellowfin tuna and non-target species catch in DFAD operation.

The more specific purposes of the research activities have been:

- To investigate effectiveness of larger mesh size nets;
- To develop simulation models visualizing under-water shapes of purse seine nets; and
- To evaluate new DFAD designs (sheet type) that potentially can avoid entanglements of non-target species such as sharks and sea turtles.

FAJ periodically holds consultation with scientists, industries and other experts to review the development of effective mitigation measures for juvenile bigeye and yellowfin tuna catch for further improvements of the measures.

(5) consideration of interaction with other gear types

When a fishing operator finds other gear type vessels, the operator does not deploy DFADs near the vessels.

(6) plans for monitoring and retrieval of lost DFADs:

The location of DFAD which is marked with the identified number is monitored by GPS. If the signal is lost, every effort is made to retrieve it. If it cannot be collected, the incident is recorded on FAD logbooks.

(7) statement or policy on "DFADs ownership":

Vessel operators monitor the location of DFAD through GPS. Each DFAD is marked with relevant information in order to identify the owner.

3. Institutional arrangement of the DFAD Management Plans:

(1) Institutional responsibilities:

Vessel operators are responsible for implementation of this DFAD Management Plans including the FAD logbook control. The Japan Far Seas Purse Seine Association will guide and assist the implementation of this plan. The FAJ provides guidance for proper application of this plan, if necessary, through the Japan Far Seas Purse Seine Fishing Association.

(2) application processes for DFAD and /or DFAD beacons deployment approval:

Vessel owners shall notify FAJ of the number of DFAD and beacons planned to deploy in advance. All actual deployment is recorded on the FADs logbook.

(3) Obligations of vessel owners and masters in respect of DFAD and /or DFAD beacons deployment and use:

Vessel operators and owners shall comply with requirements stipulated in this Management Plan and IOTC management measures regarding DFAD operation

(4) DFAD and/or DFADs beacons replacement policy:

All replacement will be recorded on the FADs logbook. Old DFAD should be retrieved as practically as possible.

(5) Reporting obligation

Fishing operators and/or owners will report use of DFAD through the FADs logbook after each cruise to the Japan Far Seas Purse Seine Fishing Association. The Japan Far Seas Purse Seine Fishing Association will submit the logbook to the FAJ.

4. DFADs construction specifications and requirements

(1) DFAD design characteristics

DFAD design characteristics are sheet type and net type.

(2) DFAD marking and identifiers, including DFADs beacons

Vessel operators monitor the location of DFAD through GPS. Each DFAD is marked with relevant information in order to identify the owner.

(3) Lighting requirements

The GPS buoy has a function to light up when the vessel approaches.

(4) radar reflectors

Radar reflectors are not installed in a DFAD.

(5) visible distance

It depends on the ocean condition.

(6) radio buoys (requirement for serial numbers)

No radio buoy is used on DFAD.

(7) satellite transceivers (requirement for serial numbers)

A GPS buoy is installed in each DFAD.

5. Applicable areas

This Management Plan will be applied to fishing operation in the IOTC convention area. All Japanese fishing vessels follow area/time closures adopted as the IOTC conservation and management measures.

6. Applicable periods for the DFAD-MP

This Management Plan will be applied for the entire period while Japanese purse seiners operate in the IOTC convention area. This plan may be modified if the IOTC conservation and management measures are amended.

7. Means for monitoring and reviewing implementation of the DFAD-MP

The Japan Far Seas Purse Seine Fishing Association will review the submitted logbook and will submit it to the FAJ. The FAJ provides guidance to the Japan Far Seas Purse Seine Fishing Association based on the information on the logbook, if necessary.

8. DFAD logbook

The format of FADs logbook is attached.

DFAD logbook

Address

Name

Nameof vessel		Gross tonnage		Tonnage
Call sign		Licence number		Number

year	month	day	Latitude	Longitude	ID	DFAD type(drifting natural FAD, drifting artificial FAD) DFAD design characteristics	(1)deployment (2)hauling (3)retrieving (4)loss (5)operation	Remarks
			NS	EW				
			NS	EW				
			NS	EW				
			NS	EW				
			NS	EW				
			NS	EW				
			NS	EW				
			NS	EW				
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Korea DFADs Management Plan

Received 21.03.2017

Management Plan for the use Drifting FADs (DFADs)

Ministry of Oceans and Fisheries

Republic of Korea

1. Objective

The objective of this management plan is to reduce bycatch associated with fishing on DFADs. It presents a summary of review on the use of DFADs by Korean flagged Purse seiners for the year of 2016 in accordance with paragraph 11 of the IOTC Reolution 15/08. The Ministry of Oceans & Fisheries (MOF) is responsible for the implementation of this Management Plan.

This management plan applies with respect to:

- Vessel-types
  : Korean flagged Purse seine fishing vessels and supply vessels

- DFAD numbers and/or DFADs beacon numbers to be deployed
  : No more than 425 active instrumented buoys at any one time and 850 acquired annually per purse siene vessel
- Reporting procedures for DFAD deployment
  : A master of fishing vessels records each deployment of DFAD on the DFAD logbook (Attachement 1) and reports to the National Institute of Fisheries Science (NIFS) on a monthly basis or within a shorter period of time, if necessary.
- Incidental bycatch reduction and utilization policy
  : The goverment of Korea encourages purse seine vessels to retain all non-target species onboard and land them except fish considered unfit for human consumption. The NIFS conducts a research plan to develop non-entangling FADs to reduce bycatch including sharks in 2016 as well.
- Consideration of interaction with other gear type
  : Collecting information and data
- Plans for monitoring and retrieval of lost DFADs
  : The goverment of Korea encourages fishing vessels concerned to prevent the loss of DFAD at sea. In the event of a loss or of the impossibility of hauling in a DFAD, a fishing mater shall record its last known date and position on the DFAD logbook. If a fisherman finds any FADs lost by other vessels at sea, they are encouraged to retrieve and bring it back to a port.

- Statement or policy on “DFAD ownership”
  : Instrumented buoy on which vessel name or callsign is marked is attached to every DFAD.

2. Institutional arrangements for management of the DFAD Management plans

- Institutional responsibilities
  : The MOF in collaboration with the NIFS and FMC monitor the implementation of IOTC resolutions related to FAD management including Res. 15/08 in accordance with domestic laws and regulations.
- Application processes for DFAD and /or DFAD beacons deployment approval
  : In order to comply with national DFAD management plan, each fishing vessel shall record required information in relation to the DFADs deployment on the DFAD logbook and fishing logbook, and report them to the NIFS.
- Obligations of vessel owners and masters in respect of DFAD and/or DFAD beacons deployment and use

: The fishing companies shall supervise their fishing vessels under the DFADs management plan, and the masters shall be in comply with DFADs management plan and the conservation and management measures related to the use of FADs.

- DFAD and/or DFADs beacons replacement policy
  : If deployed DFADs are worn out or needed to be replaced, the captains/fishing masters will replace it and record it on the DFAD logbook.
- Reporting obligation
  : Each captain/master shall record the information in relation to DFADs activities on the DFAD logbook and report them to the NIFS.
- Observer acceptance obligation
  : Each captain/master shall be in comply with Regional Observer Scheme of IOTC.

3. DFAD construction specifications and requirements

It is required for the Korean purse seine vessels to submit their DFAD construction specifications to the government. And each captain/master shall record information about FAD characteristics on the DFAD logbook.

4. Applicable areas

The IOTC area of competence

5. Applicable periods for the DFAD-MP

The DFAD-MP is applied during the purse seine vessels are in operation in the IOTC area of competence.

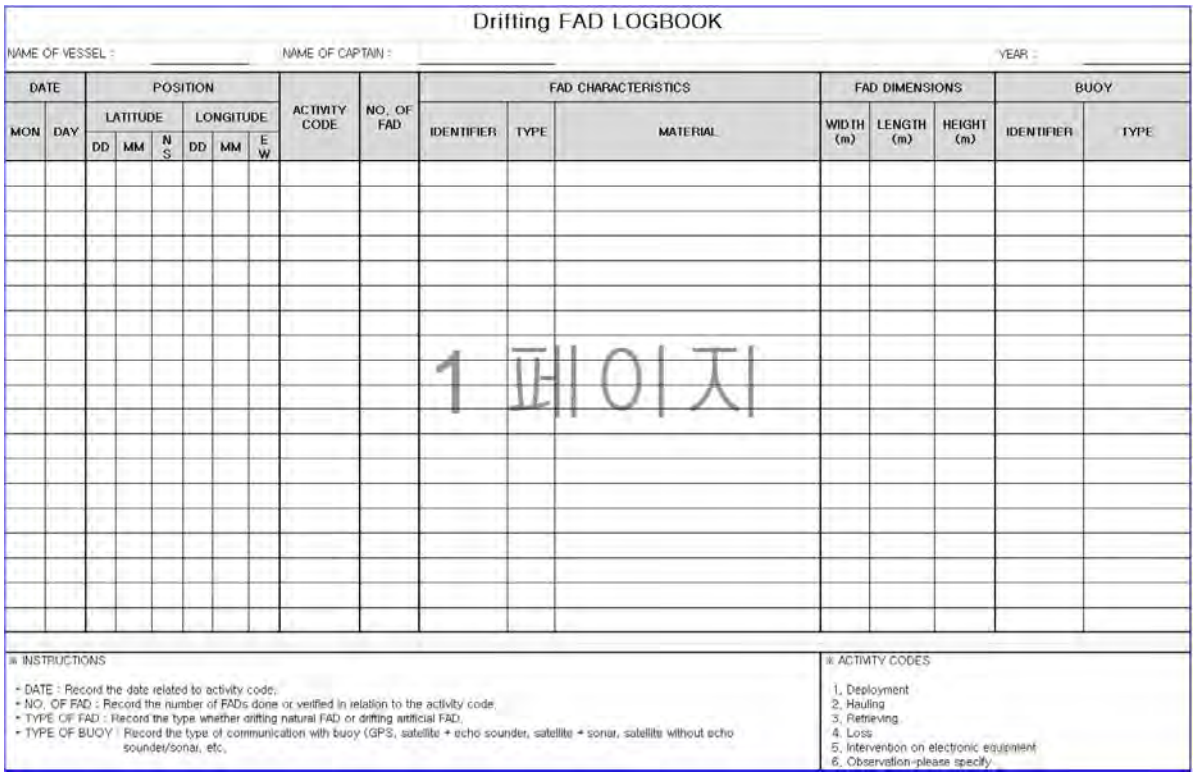
6. Means for monitoring and reviewing implementation of the DFAD-MP

Each deployment of DFAD is recorded on the DFAD logbook to be reported to the NIFS and a scientific observer

7. DFAD loglook

See the Attachment 1.

Attachment 1. DFAD logbook



Drifting FAD LOGBOOK

NAME OF VESSEL : _____ NAME OF CAPTAIN : _____ YEAR : _____

DATE		POSITION						ACTIVITY CODE	NO. OF FAD	FAD CHARACTERISTICS			FAD DIMENSIONS			BUOY	
		LATITUDE			LONGITUDE												
MON	DAY	DD	MM	N S	DD	MM	E W			IDENTIFIER	TYPE	MATERIAL	WIDTH (m)	LENGTH (m)	HEIGHT (m)	IDENTIFIER	TYPE

1 페이지

※ INSTRUCTIONS

- DATE : Record the date related to activity code.
- NO. OF FAD : Record the number of FADs done or verified in relation to the activity code.
- TYPE OF FAD : Record the type whether drifting natural FAD or drifting artificial FAD.
- TYPE OF BUOY : Record the type of communication with buoy (GPS, satellite + echo sounder, satellite + sonar, satellite without echo sounder/sonar, etc.

※ ACTIVITY CODES

1. Deployment
2. Hauling
3. Retrieving
4. Loss
5. Intervention on electronic equipment
6. Observation-please specify

Mauritius DFADs Management Plan

Received 14.03.2014

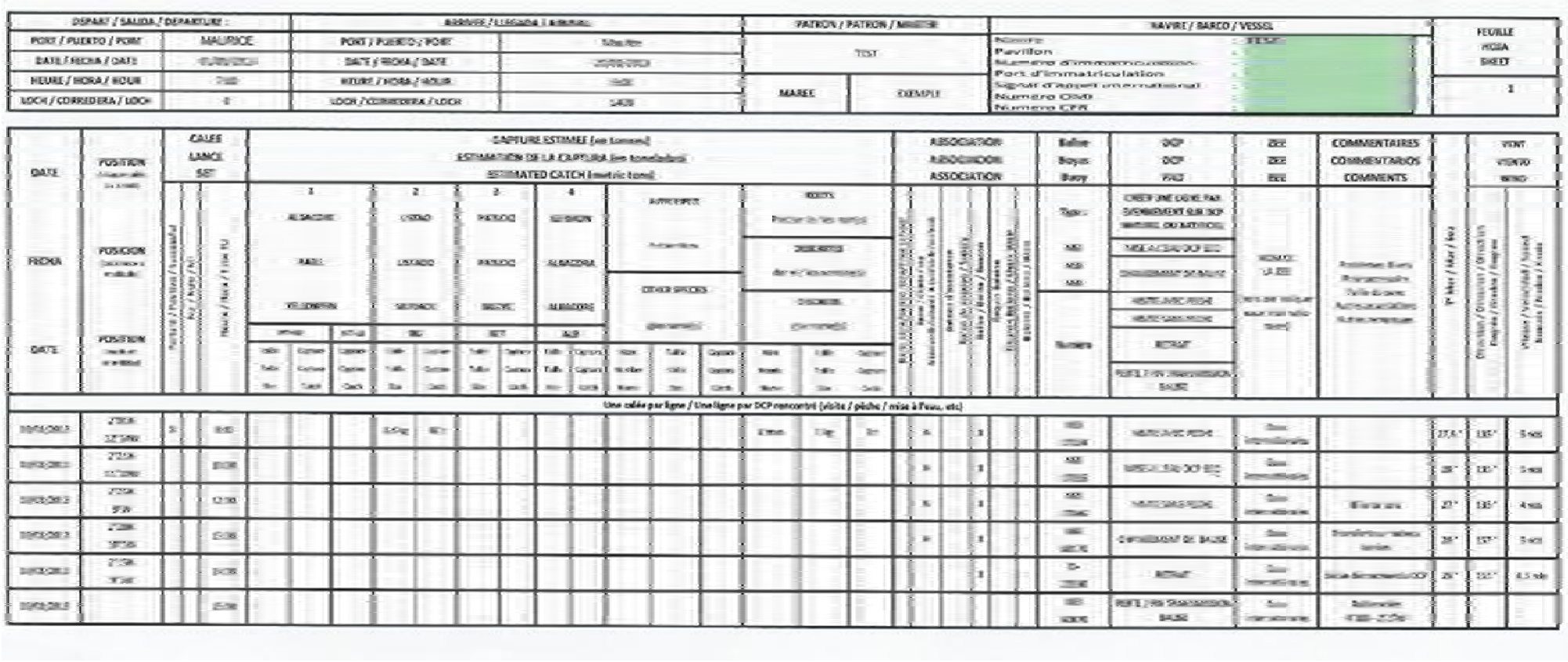
Submitted by: Mauritius

Operator: SAPMER/IOSMS (Indian Ocean Ship Management Services)

Purse Seiners: Belle Isle and Belle Rive

1. **Objective:** *To aggregate tuna target species, in the IOTC area of competence*.
2. **Scope:**
    a. Vessel type: *purse seiner*
    b. DFAD numbers or number of beacons to be deployed: *200 buoys/vessel/year*
    c. Reporting procedures: *Through Logbooks (refer to Appendix 1)*
    d. Incidental by catch reduction and utilization policy: *Non-entangling FADs (refer to Appendix 2)*
    e. Consideration of interaction with other gears type: *None*
    f. Monitoring and retrieval of lost DFADs: *Refer to Logbooks (Appendix 1)*
    g. Statement or policy on DFAD: *use of a limited number of non-entangling FADs*
3. **Institutional arrangement for management of the DFAD Management Plan:**
    a. Institutional responsibilities: *SAPMER and IOSMS*
    b. Application processes for DFAD and/or DFAD beacons deployment approval:
        Supplier – IOSMS/SAPMER
        Rules - IOSMS/SAPMER
        Deployment - Master
    c. DFAD and/or DFADs beacons replacement policy: *maintain 200 buoys per vessel per year*
    d. Reporting obligations - *Through Logbooks (refer to Appendix 1)*
4. **DFAD construction specifications and requirements**
    a. DFAD design characteristics (a description): *As per annexed plan (refer to Appendix 2)*
    b. DFAD markings and identifiers, including DFAD beacons: *DCP identified by serial number*
    c. Lighting requirements: *flash command*
    d. Radar reflectors: *visible without radar reflectors*
    e. Visible distance: *1 NM*
    f. Radio buoys (requirement for serial numbers): *marine instruments*
        MSI XXXXX
        M3I XXXXX
        M4I XXXXX
    g. Satellite transceivers (requirement for serial numbers): *IRIDIUM*
5. Applicable areas: *on high seas and EEZ Indian Ocean Coastal State through licenses, excluding closed area as stipulated by IOTC, shipping lanes, away from fishing grounds of the artisanal fishery.*
6. Applicable period for the DFAD-MP: *yearly*
7. Means for monitoring and reviewing implementation of the DFAD-MP: SAPMER/IOSMS
8. DFAD Logbook: *refer to logbook (Appendix 1)*

Appendix 1



Appendix 2a

CONTRAT D'AVENIR TECHNIQUE
ORTHONGEL

DCP NON-MAILLANT OCÉAN INDIEN

COMMENT ÉVITER LE MAILLAGE DES ANIMAUX ?

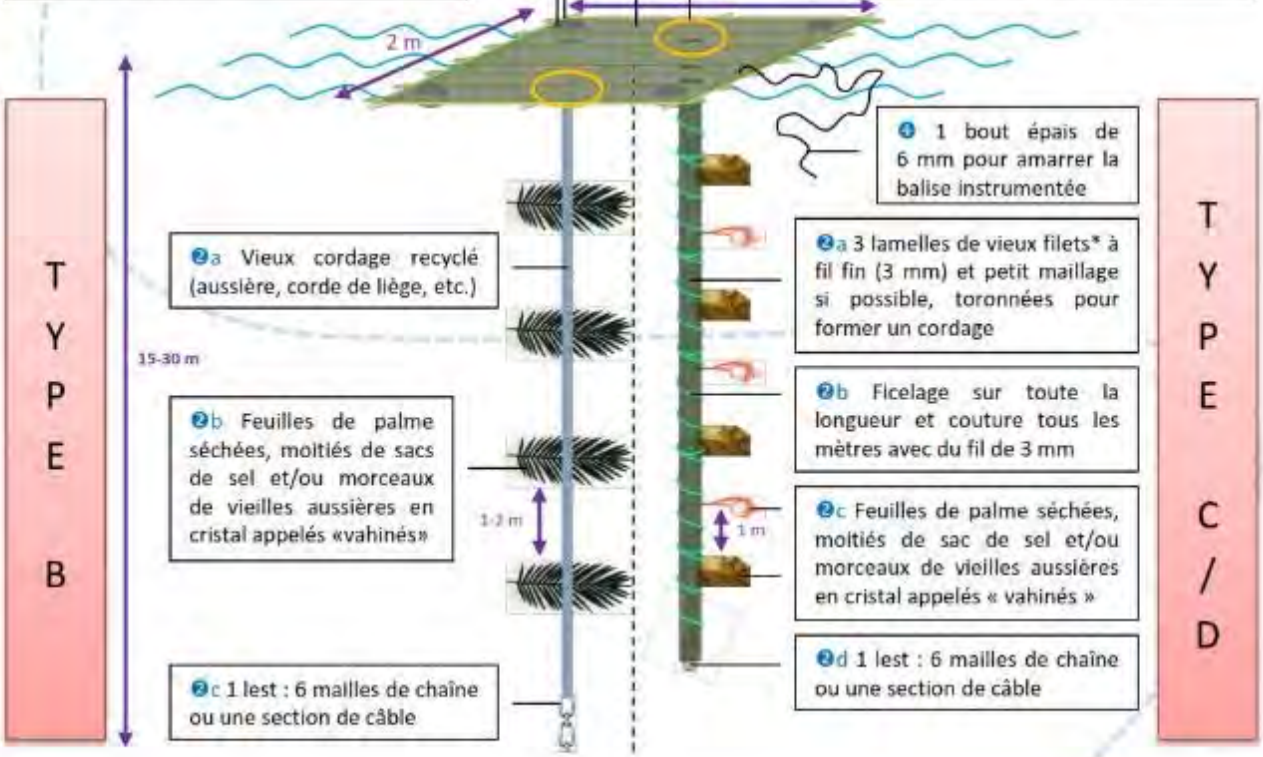
- ✓ Supprimer les battants de filet sur les côtés
- ✓ Tendre au maximum les couches de filet pour supprimer leur « souplesse »
- ✓ Coudre les couches de filet ensemble pour interdire l'accès entre elles.
- ✓ Coudre les couches de filet aux bambous.

❶a Grille de 11 bambous de 2 m (5 gros en-dessous et 6 au-dessus dont 2 gros en périphérie liés entre eux par du fil de 3 mm)

❶b 4 flotteurs en EVA amarrés à la grille avec du fil de 6 mm

❶c 2 couches externes de vieux filets à petit maillage (50 mm max) et fil épais (6 mm) et 1 couche interne constituée d'une bâche *

❸ Zone du support où la partie immergée est amarrée avec du fil de 3 mm



TYPE B

❷a Vieux cordage recyclé (aussière, corde de liège, etc.)

❷b Feuilles de palme séchées, moitiés de sacs de sel et/ou morceaux de vieilles aussières en cristal appelés «vahinés»

❷c 1 lest : 6 mailles de chaîne ou une section de câble

❹ 1 bout épais de 6 mm pour amarrer la balise instrumentée

❷a 3 lamelles de vieux filets* à fil fin (3 mm) et petit maillage si possible, toronnées pour former un cordage

❷b Ficelage sur toute la longueur et couture tous les mètres avec du fil de 3 mm

❷c Feuilles de palme séchées, moitiés de sac de sel et/ou morceaux de vieilles aussières en cristal appelés « vahinés »

❷d 1 lest : 6 mailles de chaîne ou une section de câble

TYPE C / D

COMMENT RENFORCER LA PRISE AUX COURANTS ?

✓ Par des « vahinés », des sacs de sel et/ou des feuilles de palme séchées qui permettent d'agrandir la surface de la structure immergée pour jouer le rôle d'ancre flottante (renforcement de la prise aux courants) et le rôle de refuge (augmentation des niches et interstices).

*Vieux filets et bâches remplacés plus tard par des géofilets (ex. fil coco avec mailles 10-20 mm) et/ou des géotextiles (= DCP éco)

Appendix 2b

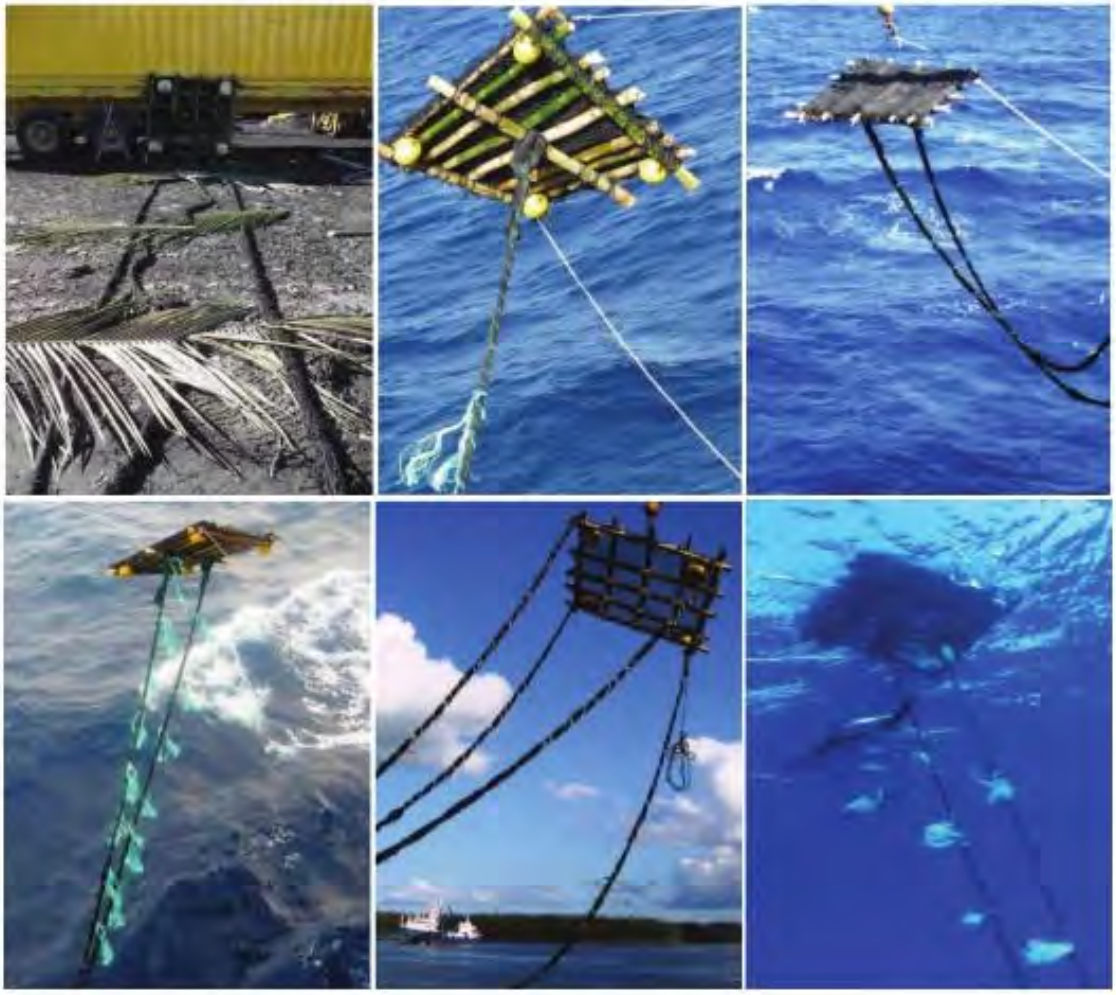
ANNEXE 3 : PHOTOS DE DCP NON-MAILLANTS

a) **DCP non-maillants en mer**

b) **DCP non-maillants déployés dans l'océan Indien**

Design B

Design C/D



Seychelles DFADs Management Plan

Received 27.04.2015

Drifting Fish Aggregation Devices (DFADs) Management Plan for Seychelles fleet fishing for tuna and tuna-like species in the IOTC area of competence

1. Objective

This Management Plan For Drifting Fish Aggregation Devices (DFADs) for Seychelles have as principal aim to provide guidelines for the use of drifting FADS by Seychelles'fleet targeting tuna and tuna-like species in the IOTC area of competence. This Management Plan fulfils Seychelles' obligations as a member of the Indian Ocean Tuna Commission (IOTC) in regards to IOTC's Resolution 13/08 (*Procedures on a Fish Aggregating Devices (FADs) Management Plan*) that requires all IOTCCPCs that use FADs to submit FAD Management Plansfor their fleets targeting tuna and tuna-like species in the IOTC area of competence.

2. Scope

The current plan applies to:

a) Seychelles flagged purse-seiners and
b) Support (or supply) vessels,
    i. under the flag of Seychelles, which operate in conjunction with purse-seiners of any flag;
    ii. of any flag, acting in support of Seychelles flagged purse seiners, provided that they are not covered by a FAD-MPs from their flag states or are not reporting DFAD logbooks to the Seychelles Authority.

Seychelles considers that support (or supply) vessels are an integral part of the purse seine fishing effort and that it is necessary to understand their operations, and the extent to which they contribute to increase the fishing efficiency of the purse seine fleet.

Seychelles vessels currently do not operate anchored FADs, so these are not covered by the current Plan.

3. Definitions

For the purpose of the DFAD- Management Plan, the term beacons is used to define radio buoys, satellite transceiver or any other electronic device used to track and retrieve DFADs.

4. Background

The term FAD stands for "Fish Aggregating Device". There are two main types of FADs: natural and man-made. Natural FADs are naturally occurring floating objects such as logs, branches, debris and large dead floating marine organisms (whales, whale sharks,

manta rays, etc). Man-made FADs are usually bamboo rafts with old nets hanging underneath and can be found either drifting or anchored.

In the open ocean many fish species including tuna, associate with objects floating on the surface, such as logs. This is highly advantageous to purse seine fishing as free swimming tuna tend to aggregate in the proximity of floating objects and remain highly aggregated making those schools more susceptible to capture by tuna purse seiners.

In the mid 1980's, skippers experimented with ways to maximize the potential of floating objects as tools to enhance fishing. Initially, reflectors and radio beacons were attached to logs to improve their detection over distances and fishers eventually started to construct purpose built Drifting Fish Aggregation Devices (DFADs) fitted with electronic buoys to simultaneously boost the number of floating objects in the ocean and further aid their detection.The most recent generation of DFADs are equipped with echo-sounders that transmit daily or hourly estimates of fish biomass beneath the buoy significantly reducing the searching time.

The increasing use of DFADs has improved catch rates thus greatly enhancing the ability of purse seiners to catch tropical tunas, and allowing boat owners to expand the capacity of their fleets in an attempt to exploit more of the resources. Thus, at present about half of the global tuna catches comes from the use of DFADs.

While DFADs are evidently useful fishing tools, their use has been associated with several potential negative ecosystem impacts such as;

- Catch of juvenile tuna (mainly yellowfin and bigeye)
- Higher levels of bycatch of non-targeted, associated and dependent species (NTAD) -such as sharks and marine turtles-, as compared to those obtained when fishing on free-swimming schools.
- Unsustainable exploitation of stocks through increased fishing effort.
- Ecological impact on marine habitat including coral reefs.
- Marine pollution (persistent marine debris)

In 2010 the IOTC adopted Resolution 10/02, which includes provisions for IOTC CPCs having industrial tuna purse seiners that use supply vessels and/or FADs to report information on the total numbers of FADs deployed by quarter and daily activities of supply vessels. However, in recent years the IOTC,recognizing the need to enhancing monitoring of activities on FADs, adopted Resolution 13/08. Resolution 13/08 calls for all IOTC CPCs that use FADs, drifting and/or anchored, to prepare and present FAD Management Plans for their fisheries, using the Guidelines provided in such resolution. Provisions in this resolution also include collection and reporting through FAD logbook.

5. Historical use of DFAD's by the Seychelles Purse seine fleet fishing for tuna and tuna-like species in the Indian Ocean.

There are very limited data on the actual number of DFAD's deployed by the Seychelles purse seine fleet and their supporting supply vessels. The logbook for purse seine vessels only make provisions for the reporting of sets made on DFAD's associated schools including the corresponding catches by species, irrespective of the type of DFAD involved (natural or man-made). Over the period 2004 to 2013 an annual average of 49,185 MT of tuna were reported as being taken on DFAD's associated schools which corresponds to an average of 73% of the total annual reported catch of this fleet. The catch composition of target species consisted on average of 63% skipjack tuna, 29% yellowfin tuna and 8% bigeye tuna.

6. Use of drifting FADS by Seychelles' purse seine fleet targeting tuna and tuna-like species in the IOTC area of competence.

This Management plan (DFAD – MP) will provide guidelines in the following nine areas:

i. Institutional arrangements for implementation of the DFAD Management Plans
ii. Deployment of DFAD (including numbers, markings and identifiers, recording of serial numbers of beacons),
iii. Fishing on DFADs,
iv. DFAD design and construction specifications,
v. Obligations of vessel owners and masters in respect of DFAD and DFAD beaconsdeployment and use,
vi. Data collection and reporting obligations (including DFAD logbook/ Observer programme),
vii. Applicable area for the DFAD–MP,
viii. Applicable period for the DFAD–MP,
ix. Means for monitoring and reviewing implementation of the DFAD–MP.

6.1 Institutional arrangements for management of the DFAD Management Plan:

The Seychelles Fishing Authority will be the entity responsible for monitoring the implementation of the DFAD – MP, and for taking action in case of infractions.

The responsibility for implementing the DFAD – MP is entrusted with the vessel owners and masters of the Seychelles flagged purse-seiners and supply vessels as defined under clauses 2(a) and 2(b).

6.2 Deployment of DFAD / DFAD beacons (including numbers and procedures)

a. Number of DFAD or DFAD beaconsto bedeployed

Noting the lack of fine-scale data on DFAD's related fishing activities and the need to regulate FAD fisheries, Seychelles *recognizes* the need for additional measures on FADs, in line with FAO Precautionary Approach to Capture Fisheries.
Seychelles will set an interim limit on the number of DFADs set and drifting at sea at any given time (i.e. equipped with beacon), at 550 FADs per tuna purse seine vessel. Therefore, the total number of DFADs that a fishing company can use will be estimated as the number of tuna purse seiners in operation at any time multiplied by 550, irrespective of whether they receive the support of supply vessels or not.

This measure will be applicable as from 1 January 2016. Following the analysis of data collected under the DFAD – MP, this interim limit could be revised basedon advice provided by the IOTC Scientific Committee.

All DFADs set by purse seine and support vessels shall be equipped with electronic devices such as radio buoys, satellite transceiver or any other device , (defined as beacons under section 3), which automatically and continuously indicate their position and allow tracking by the vessel that set the DFAD or its support vessel. Each beacon shall be activated onboard the vessels prior to deployment.

b. Application processes and approval for deployment of DFAD and DFAD beacons

No specific approval will be required prior to the deployment of a DFAD andDFAD beacons.

c. DFAD ownership

DFADs beacons or any other electronic devices used for locating DFAD should be clearly and visibly marked with the name of the fishing company owning the beacon and the name of the fishing vessel that set the device..

d. Recording of serial numbers

The serial numbers of all beacons shall be unique and recorded in the appropriate logbook at the time of deployment of the corresponding DFADs.

e. Reporting procedures for DFAD deployment and encounter

DFAD deployment, as well as all other activities related to the DFAD once it is deployed,

is to be reported in the DFAD logbooks *(see Annex I and II)*. Furthermore, whenever a scientific observer is present onboard the vessels the appropriate observer form *(Annex III)* shall also be filled in by the observer. Information to be collected include, type of DFAD deployed or visited, DFAD identification/markings, beacons type and serial number, type of operation undertaken on DFAD.

f. Monitoring and retrieval of lost DFADs

Every single DFAD must be equipped with radio buoys, satellite transceiver or any othertrackingdevice. Vessel masters are encouraged to prevent, as much as possible, loss of DFAD at sea. In the event of a loss or of the impossibility of hauling in a DFADs the master of the vessel must record in the appropriate logbook, the date it was lost and its last known position. Likewise, masters of fishing vessels shall report in the DFAD logbook of any encounter and interaction with DFADs belonging to a third party as per the same requirements applicable to the DFADs they set.

6.3 Fishing on DFADs

a. Mitigation for non-marketable specimens of tropical tunas and other by-catch

Vessels owners and masters shall do their utmost to improve purse seiners' selectivity when fishing on DFADs so as to limit bycatch and discards in particular, harvesting of non-marketable individuals of targeted species (e.g. tunas of very small size), and non-targeted species (with particular attention to sensitive species such as sharks and turtles).

Fishing around any DFAD shall be conducted in accordance with the following IOTCResolutions:

- Resolution 12/04 – On the conservation of marine turtles,
- Resolution 13/04 – On the conservation of cetaceans,
- Resolution 13/05 –On the conservation of whale shark (*Rhincodon typus*),
- Resolution 05/05 Concerning the conservation of sharks caught in association with fisheries managed by IOTC,
- Resolution 13/06 – On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries,
- Resolution 12/09 On the conservation of thresher sharks (Family Alopiidae) caught in association with fisheries in the IOTC area of competence, and
- Resolution 13/11 On a ban on discards of bigeye tuna, skipjack tuna, yellowfin tuna, and a recommendation for non-targeted species caught by purse seine vessels in the IOTC area of competence.

All reasonable measures must be undertaken under optimal security conditions for the crew, to ensure that any of these species that are incidentally caught are handled in an

appropriate manner and released alive as quickly as possible to maximize post release survival.

6.4 DFAD design and construction specifications,

a. DFAD design characteristics

The design, construction, operation and maintenance of DFADs will be the responsibility of the vessel owners and masters. As of January 1st 2016, all DFADs deployed should conform to the following design principles to mitigate the entanglement of non-target species:

- The surface structure of the DFAD should not be covered, or should only be covered with non-meshed material.
- If netting is used as a sub-surface component', it should be tied in a strand like manner so as to reduce its surface area.
- Each DFAD deployed shall be equipped with a beacon
- The use of non-meshed materials such as ropes or canvas sheets should be promoted as sub-surface component.
- To reduce the amount of synthetic marine debris, the use of natural or biodegradable materials (such as hessian canvas, hemp ropes, etc.) should be promoted.

More details on DFADs construction specifications and requirements are provided in Annex IV**.** As of 1st January 2017 all DFADs must be non-entangling DFAD's and as much as possible constructed from natural and or biodegradable materials.

6.5 Obligations of vessel owners and masters in respect of DFAD and DFAD beacons

Vessel owners and masters are responsible for the fulfillment of the obligations under the DFAD – MP, including observance of the limit on DFADs deployed, appropriate markings of DFADs, and completion of the relevant logbooks and submission of the required data.

6.6 Data collection and reporting obligations

The Commission does not currently have detailed catch and effort data on DFADs, such as how long DFADs are left in the water, composition and structure, hence unable to determine how any of those components may affect catch rates of DFADs. This information is essential to developing conservation and management measures in respect to DFADs.

Purse seine logbook (Annex I) shall be completed by the master of the vessel and

submitted to the Seychelles Fishing Authority at the end of each fishing trip.

Supply vessel logbook (Annex II) shall be completed by the master of the supply vessel and submitted to the Seychelles Fishing Authority at each port call of the supply vessel.

Observer form (Annex III) describing characteristic of DFAD's and operations undertaken on them shall be completed by an observer when present onboard the purse seiner or supply vessel.

Relevant information collected in logbooks will be compiled by the Seychelles fishing Authority and reported to the IOTC as per the requirements of IOTC Resolution 10/02.
In addition, the Seychelles will share DFAD logbooks data with any flagstate whose purse seiners receive the support of supply vessels flagged in Seychelles.

6.7 Applicable areas

The provisions of this Plan are applicable in all the areas of operation of the vessels, as described in section 2, for as long as they are flagged in Seychelles or support Seychelles flagged purse seiners.

6.8 Applicable period for the DFAD–MP

The provisions of this Management Plan will enter into effect on 1st January 2016. Provisions in this plan will be revised to accommodate any future recommendations from the IOTC, as required.

6.9 Means for monitoring and reviewing implementation of the DFAD–MP

The Seychelles Fishing Authority will be the authority responsible to compile the data needed for a proper monitoring and verification of the implementation of the DFAD – MP, including, but not necessarily limited to, logbook data, VMS data, the Seychelles National Observer Programme, and port inspections of the fishing fleet involved.

REFERENCES

Indian Ocean Tuna Commission (2013)- Resolution 13/08 *Procedures on a Fish Aggregating Devices (FADs) Management Plan*.

Indian Ocean Tuna Commission (2013)- Compendium of Active Conservation andManagement Measures for the Indian OceanTuna Commission

Annexe I: Purse seine Fishing Logbook Por favor, rellene una linea por lance (o por día cuando no hayan pescas) HOJA Nº 1

NOMBRE DEL BARCO **PATRON**

DIARIO DE PESCA (I.E.O)

Corredera Comienzo Marea (millas) **Corredera Final Marea (millas)**

PUERTO DE PARTIDA PORT VICTORIA **FECHA DE PARTIDA** **HORA (GMT)**

PUERTO DE DESCARGA **FECHA DE LLEGADA** **HORA (GMT)**

FECHA	HORA (GMT)	Nº LANCE	LANCE +	LANCE -	POSICION	CAPTURAS ESTIMADAS RABIL Captura (Tm)	RABIL Peso medio	LISTADO Captura (Tm)	LISTADO Peso medio	PATUDO Captura (Tm)	PATUDO Peso medio	OTROS Especie	OTROS Captura (Tm)	OTROS Peso medio	Nº de CUBA	OBSERVACIONES	BANCO RABIL	BANCO LISTA	OBJETO	BALIZA	PINTO	BALLENA	TIBURON	TEMP. AGUA (ºC)

ANNEXE II : SUPPLY VESSEL LOGBOOK

SALIDA / DEPARTURE		LLEGADA / ARRIVAL		PATRON / PATRON / MASTER		BARCO / VESSEL	HOJA SHEET
PUERTO / PORT		PUERTO / PORT					
DATE / FECHA		FECHA / DATE					
HORA / HOUR		HORA / HOUR		VIAJE / TRIP			
CORREDERA / LOCH		CORREDERA / LOCH					

		POSICION		LANCE		CAPTURAS ESTIMADAS (toneladas)/ Estimated catch (Tonnes)											ASOCIACION				ACTIVIDAD SOBRE LOS DCP					CORRIENTE			VIENTO		OBSERVACIONES
						YELLOWFIN		SKIPJACK		BIGEYE		ALBACORE		OTHERS																	
FECHA DATE	HORA TIME	LAT.	LONG.	POSITIVO / SUCCESSFUL	NULO / NIL	CAT.	TONS	CAT.	TONS	CAT.	TONS	CAT.	TONS	ESP.	CAT.	TONS	OBJETO / RAFT	AVES / BIRDS	BALLENA / WHALE	LIBRE / FREE	MARCAS DEL DCP	ID BALIZA/ BUOY ID	TIPO BALIZA/ BUOY TYPE	TIPO DCP/ FAD TYPE	TIPO DE VISITA/ VISIT TYPE	TEMPERATURA (°C)	DIRECCION (grados)	VELOCIDAD (m/s)	DIRECCION (grados)	VELOCIDAD (nudos)	

Annex III: Scientific Observer Data Collection Programme (Seychelles)

Form D

Version 4.3 Feb. 3013

Monitoring of Drifting FADs

Form D (Drifting FADs) N°:		Date :
Form Route N°:	Route Line Nº:	Vessel IOTC N°:

FAD Activities	Tick only one box
1 - Deployed at sea	
2 - Visited without fishing	
3 - Fished	
4 - Recovered without fishing	

FAD Operation		
FAD type (T.12)		
Future status (T.13)		
Number of days deployed		
Ownership of the FAD	Unknown	
	To the vesels or same company	
	To another vessel or different company	
Name of supply vessel (if associated)		

Beacon Operation	Oper. 1	Oper. 2
Type of activity(T.14)		
Type of Beacon (T.15)		
Code of beacon		
Brand (Make) of Beacon		

Est. Size of shoal (if	
Tuna species	Est. Weight (tons)

Presence of sea turtles, sharks,		
Associated species	Status (T.16)	Number

Remarks :

Data verified (tick):	

CONTRAT D'AVENIR THONIER
ORTHONGEL

DCP NON-MAILLANT OCÉAN INDIEN

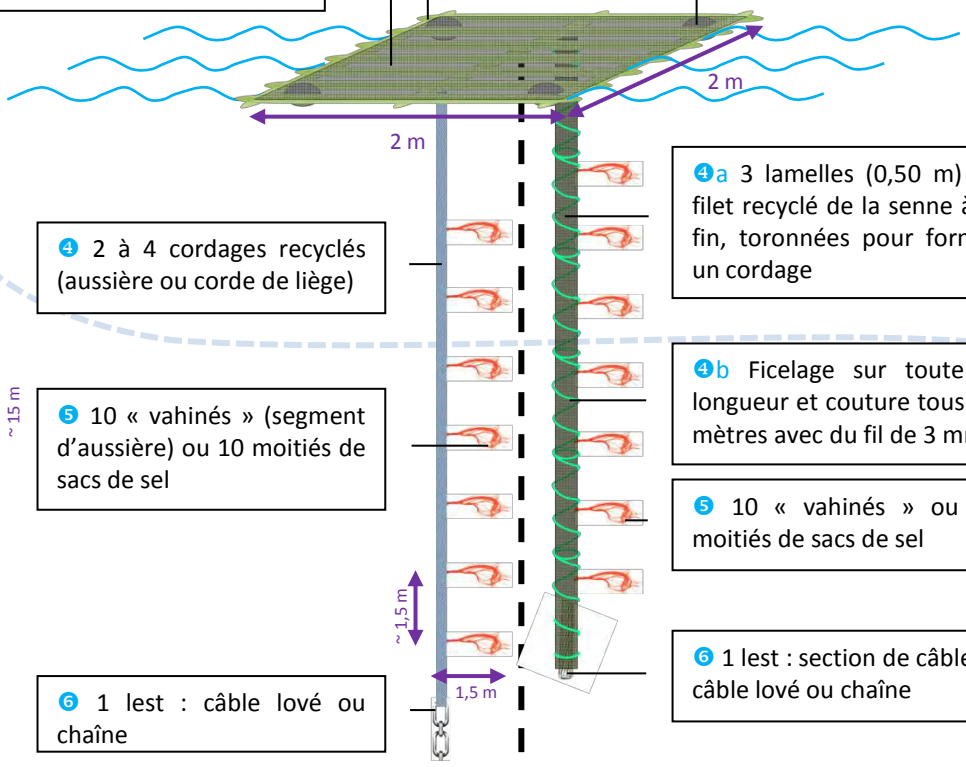
COMMENT ÉVITER LE MAILLAGE DES ANIMAUX ?

✓ Supprimer les battants de filet sur les côtés
✓ Tendre au maximum les couches de filet pour supprimer le flou.
✓ Coudre les couches de filet ensemble pour interdire l'accès entre elles.
✓ Coudre les couches de filet aux bambous.

❶ 1 grille de 10 à 12 bambous liés entre eux par du fil de 3 mm

❷ 4 flotteurs en EVA peints en gris militaire et amarrés à la grille avec du fil de 6 mm

❸ 4 couches de filet recyclé à petit maillage (50 mm) et fil épais (6 mm)



TYPE B

❹ 2 à 4 cordages recyclés (aussière ou corde de liège)

❺ 10 « vahinés » (segment d'aussière) ou 10 moitiés de sacs de sel

❻ 1 lest : câble lové ou chaîne

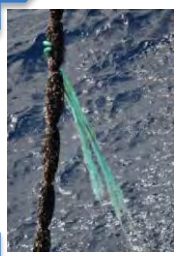
❹a 3 lamelles (0,50 m) de filet recyclé de la senne à fil fin, toronnées pour former un cordage

❹b Ficelage sur toute la longueur et couture tous les mètres avec du fil de 3 mm

❺ 10 « vahinés » ou 10 moitiés de sacs de sel

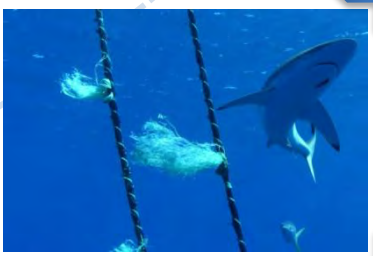
❻ 1 lest : section de câble, câble lové ou chaîne

TYPE C/D



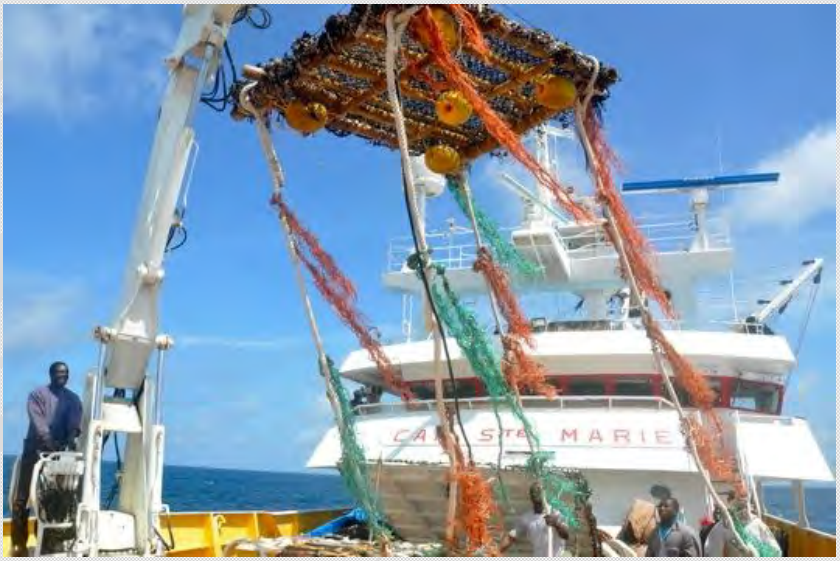
COMMENT RENFORCER LA PRISE AUX COURANTS ?

✓ Par des « vahinés » ou des sacs de sel qui permettent d'agrandir la surface de la structure immergée pour jouer le rôle d'ancre flottante (renforcement de la prise aux courants) et le rôle de refuge (augmentation des niches et interstices).

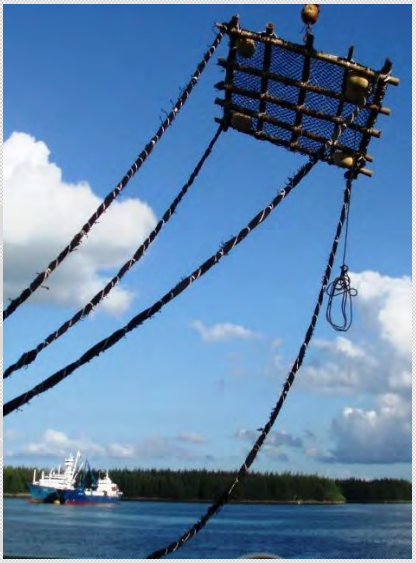


EXEMPLES DE DCP NON-MAILLANT OI

TYPE B



TYPE C/D



CONTRAT D'AVENIR THONIER
ORTHONGEL

DCP NON-MAILLANT OCÉAN ATLANTIQUE

COMMENT ÉVITER LE MAILLAGE DES ANIMAUX ?

✓ Supprimer les battants de filet sur les côtés
✓ Tendre au maximum les couches de filet pour supprimer le flou.
✓ Coudre les couches de filet ensemble pour interdire l'accès entre elles.
✓ Coudre les couches de filet aux bambous.

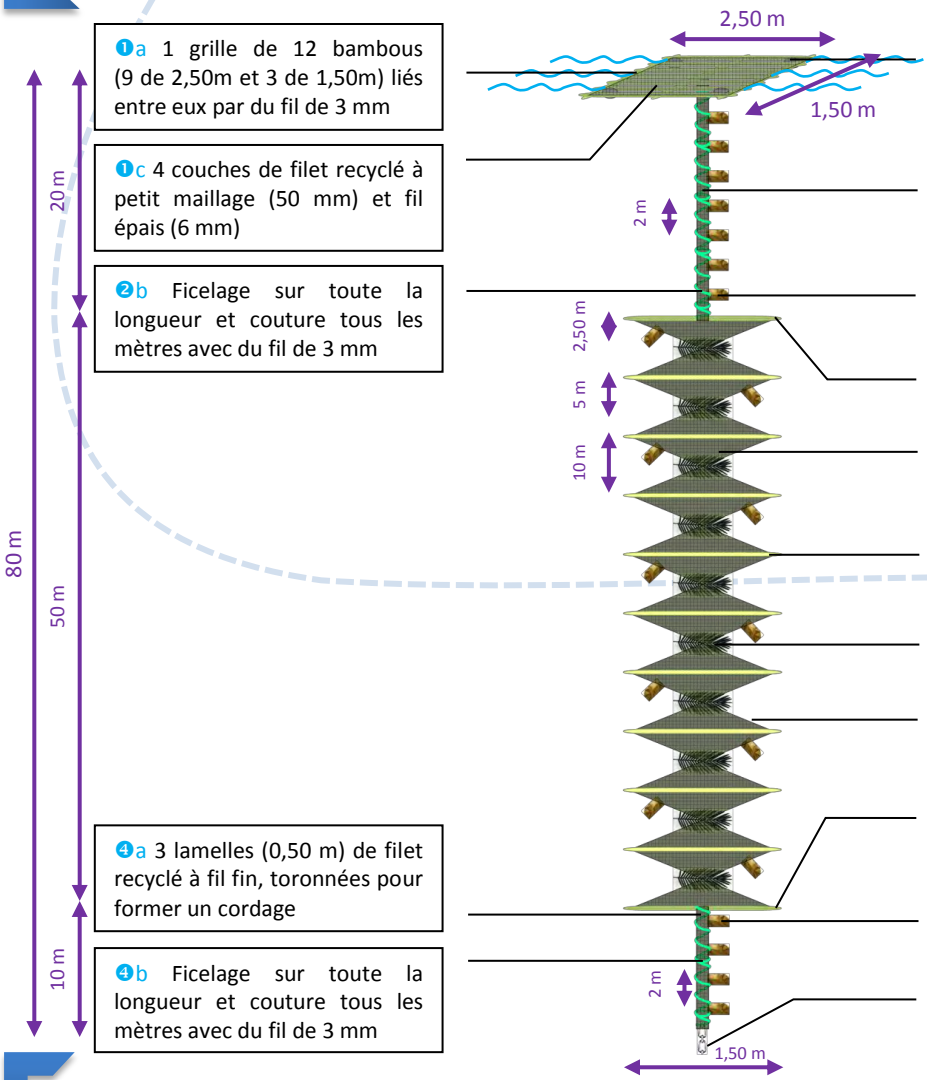
❶a 1 grille de 12 bambous (9 de 2,50m et 3 de 1,50m) liés entre eux par du fil de 3 mm

❶c 4 couches de filet recyclé à petit maillage (50 mm) et fil épais (6 mm)

❷b Ficelage sur toute la longueur et couture tous les mètres avec du fil de 3 mm

❹a 3 lamelles (0,50 m) de filet recyclé à fil fin, toronnées pour former un cordage

❹b Ficelage sur toute la longueur et couture tous les mètres avec du fil de 3 mm



❶b 4 flotteurs en EVA peints en gris militaire et amarrés à la grille avec du fil de 6 mm

❷a 3 lamelles (0,50 m) de filet recyclé à fil fin, toronnées pour former un cordage

❷c 10 « vahinés » ou 10 moitiés de sacs de sel

❸a 2 cannes de bambou (1ère)

❸b 1 nappe de filet recyclé à petit maillage et fil fin

❸c 9 lamelles de bambou (¼ d'une canne de bambou)

❸d 10 feuilles de palme séchées

❸e 10 moitiés de sacs de sel

❸a 2 cannes de bambou (dernière)

❹c 10 « vahinés » ou 10 moitiés de sacs de sel

❹d 1 lest de 6 kg : câble lové ou sac en filet avec des chaînes

COMMENT RENFORCER LA PRISE AUX COURANTS ?

✓ Par un panneau jouant le rôle d'ancre flottante (courant de sub surface)
✓ Par des « vahinés » ou des sacs de sel qui permettent d'agrandir la surface de la structure immergée pour jouer le rôle d'ancre flottante (renforcement de la prise aux courants) et le rôle de refuge (augmentation des niches et interstices).