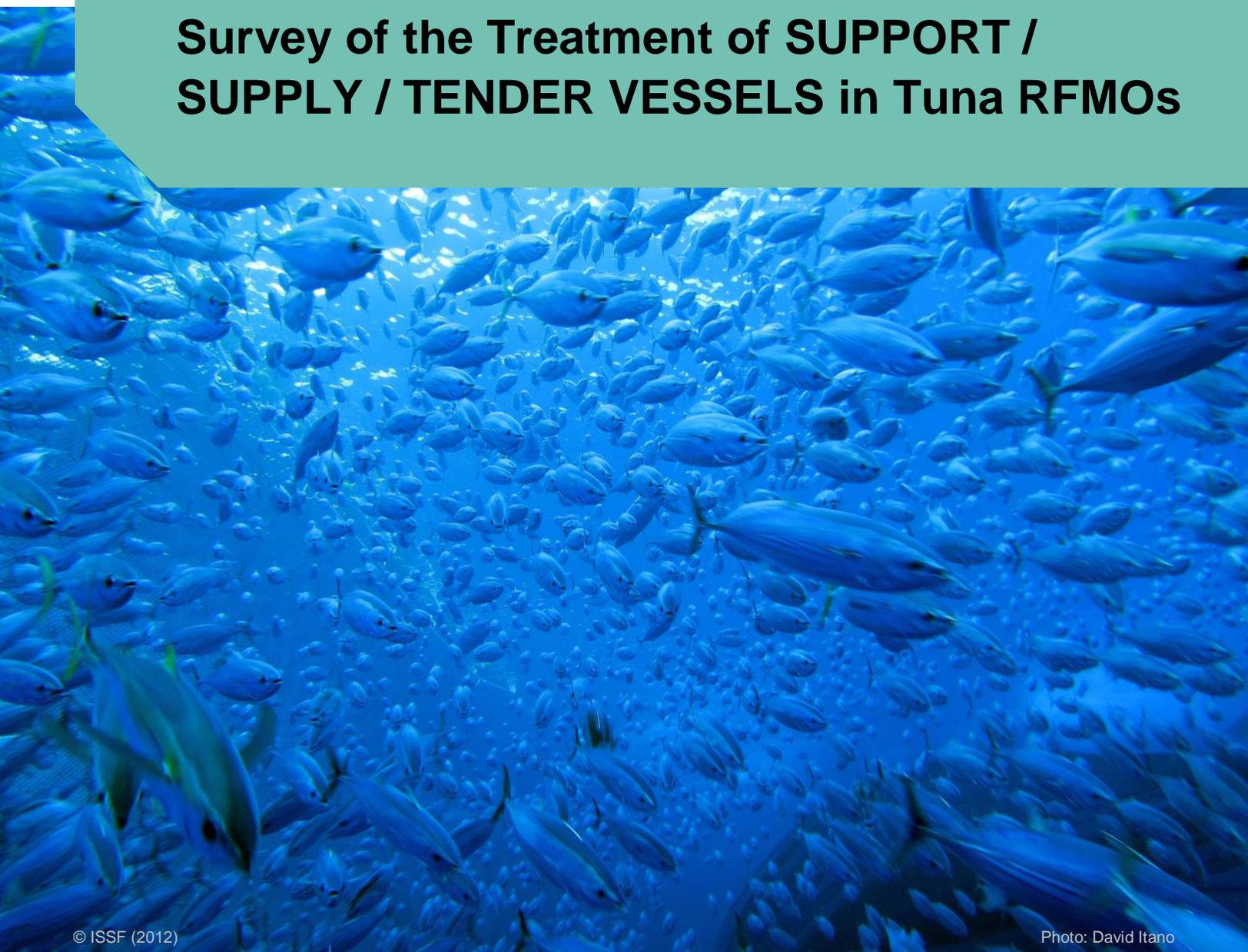


Survey of the Treatment of SUPPORT / SUPPLY / TENDER VESSELS in Tuna RFMOs



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Abstract

The use of man-made floating objects, also known as drifting fish aggregating devices (dFADs), by purse seine vessels has increased in all oceans. In addition, purse seine vessels often utilize other vessels – called supply, support, auxiliary or tender vessels – to deploy dFADs and service them. The use of such vessels and recent technological advances have made purse seine fishing with dFADs increasingly efficient and contributed to effort creep. At present, three of the four tropical tuna RFMOs allow the use of these vessels in the tuna purse seine fishery. The degree to which the use of support vessels is regulated, monitored, or data collected on these vessels' activities, including the deployment of FADs, varies. This Technical Report surveys how support vessels are currently treated in tuna RFMOs and identifies a set of Best Practices.

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Executive Summary

The use of man-made floating objects, also known as drifting fish aggregating devices (dFADs), by purse seine vessels has increased in all oceans. In addition, purse seine vessels often utilize other vessels – called supply, support or tender vessels – to deploy dFADs and service them, such as to repair damage to the dFAD structure itself, to determine if the dFAD is productive, etc. The use of such vessels and recent technological advances have made purse seine fishing with dFADs increasingly efficient and contributed to effort creep.

The purpose of this Technical Report is to review how the tuna Regional Fisheries Management Organizations (tRFMOs) in the Atlantic, Indian, Western and Central Pacific and Eastern Pacific and Southern Oceans treat support/supply/tender vessels (hereafter “support vessels”), including if they are defined as “fishing vessels” under the parent conventions, and whether or not their use is monitored or regulated by the tRFMOs. Four of the five tuna RFMOs have also established working groups on dFAD management, which have begun to consider support vessel activities as part of their recommendations.

A set of Best Practices is identified to assist RFMOs and other stakeholders in strengthening the monitoring, data collection and regulation of support vessels in the global purse seine fishery.

Key Findings:

- 1 Only IATTC has banned the use of support vessels, and in the CCSBT they are only used for supply provisioning, as FADs are not used in that fishery.**
- 2 WCPFC, CCSBT, ICCAT and IOTC require support vessels to be on the vessel record and have IMO numbers.**
- 3 ICCAT and IOTC have taken the most proactive steps with respect to data collection and regulating the use of support vessels.**
- 4 ICCAT requires support vessels to report to a VMS.**
- 5 Other than ICCAT during the 2 month Gulf of Guinea FAD closure, tuna RFMOs do not require support vessels to carry observers.**
- 6 Electronic Monitoring Systems can be used to monitor FAD usage on support vessels.**

Research Questions

These research questions are for readers to begin to examine how aspects of our best practice recommendations for support vessels may help them in their work. The questions are not intended to be comprehensive or represent every recommendation in the Report, but are designed to assist users in identifying how to use these best practices. We have organized these questions around the key themes covered in the Report.

- **To what extent are support vessels used in a particular ocean area?**
- **How many purse seine vessels work with a single support vessel?**
- **To what extent does the use of support vessels increase the efficiency of a purse seine vessel that fishes on drifting FADs?**
- **To what extent are support vessels monitored or regulated in RFMOs in the same manner as fishing vessels? If they are not, why not?**
- **To what extent are data collected on support vessels, such as the number of FADs they deploy or service?**
- **To what extent do RFMO tuna conservation and management measures cover the activities of support vessels, e.g., limiting the number of FADs that can be deployed by these vessels and whether they can operate during closures?**

Introduction

The use of man-made floating objects, also known as drifting fish aggregating devices (dFADs), by purse seine vessels has increased in all oceans, and the technology to track dFADs (e.g., echo-sounder and satellite buoys, remote locating/tracking instruments) is evolving rapidly (Lopez et al., 2014)¹. In addition, purse seine vessels often utilize other vessels – called supply, support, auxiliary or tender vessels – to deploy dFADs and service them, such as to repair damage to the dFAD structure itself or replace inoperable buoys, to determine if the dFAD is productive, etc. The use of such vessels and recent technological advances have made purse seine fishing with dFADs increasingly efficient and contributed to effort creep.

The purpose of this survey paper is to review how the tuna Regional Fisheries Management Organizations (tRFMOs) in the Atlantic, Indian, Western and Central Pacific and Eastern Pacific and Southern Oceans treat support/supply/tender vessels (hereafter “support vessels”), including if they are defined as “fishing vessels” under the parent conventions, and whether or not their use is monitored or regulated by the tRFMOs. Four of the tuna RFMOs have also established working groups on dFAD management, which have begun to consider support vessel activities as part of their recommendations.

A set of Best Practices is identified to assist RFMOs and other stakeholders in strengthening the monitoring, data collection and regulation of support vessels in the global purse seine fishery.

Use of Support Vessels

Support vessels are in some regions used by purse seine vessels fishing with dFADs. These support vessels range from 40 to 50 meters in length and are operated by a crew of around 6 persons. In the 1990s, bait-boat fishing vessels were recycled to be used as support vessels to work with dFADs. However, now, in some fleets, support vessels are built specifically to serve as dFAD maintenance boats with deck characteristics designed to manipulate dFADs. Depending on the company, support vessels can be shared between two or more vessels either simultaneously or with a shift system, or a single purse seine vessel can use one of them. The activities of support vessels are governed by the fishing master of the purse seiner who maintains continuous communication with the captain of the support vessel.

The main task of the support vessel is maintaining a purse seine vessel’s network² of dFADs at sea in good condition and in the appropriate areas. This includes seeding or deploying dFADs, replacing the structure of old or damaged dFADs and geo-locating buoy if needed, moving dFADs from areas that are not productive to areas where fishing may be better, retrieving dFADs from areas far from the authorized fishing zone, etc. While visiting dFAD networks, support vessels also inform purse seiners about the presence of fish by estimating the abundance of fish using acoustic instruments onboard, sampling using trolling or hand-line fishing gears and/or through visual observations. Anecdotal reports suggest that if the support vessel finds a productive dFAD in an area with a high density of purse seiners, they will sometimes try to deter other purse seiners from using the dFAD by waiting near the dFAD until their associated purse seiner arrives. All of these activities related to dFAD network maintenance increase the efficiency of the purse seiner, reducing the time needed by the purse seiner to search for or maintain dFADs, which increases the time available for fishing and therefore contributes to effort creep. The use of support vessels allows a purse seine vessel to use more dFADs at sea. Anecdotal information

¹ Lopez, J., Moreno, G., Sancristobal, I., and Murua, J. 2014. Evolution and current state of the technology of echosounder buoys use by Spanish tropical tuna purse seiners in the Atlantic, Indian and Pacific Oceans. *Fisheries Research* 155, 127-137.

² A network of dFADs refers to a group of dFADs that were seeded simultaneously and have the potential to drift together towards productive areas.

is that a single vessel, with a support vessel, can work with around 1000 dFADs. However, operating without a support vessel, the maximum number of dFADs that can be worked is 400 (unless a vessel is sharing FADs with another vessel).

Support vessels spend most of the time sailing and working for the purse seiner, but also help with performance and logistics, by navigating to port for food, water, equipment or oil for purse seiners. They also help with activities related to the exchange of crew and taking fishermen to port in case of illness. Navigation and travel costs of support vessels are lower compared to those of the purse seiner, so there are economic efficiencies with their use for the purse seiner including for example reduced fuel consumption and a lower carbon footprint. Therefore, when working with support vessels, purse seiners have more time to devote to dedicated fishing activities, and realize increased economic efficiencies with reduced navigation and travel time, again increasing fishing and contributing to effort creep.

Finally, there are some support vessels that act as anchored FADs (aFADs), by being positioned above seamounts. Their performance is completely different to the support vessels mentioned above because these vessels remain anchored and do not engage in any other activity. These support vessels aggregate tunas and then inform their purse seiners about the amount of fish beneath their vessel.

Purse seiners associated to anchored support vessels benefit from this alternative when fishing is not as good in other areas. Presently, there are two support vessels permanently anchored in a seamount in the Indian Ocean. This activity started in the 1990s. Although it stopped for a period of time due to the risk of piracy, it has resumed in recent years. In the Atlantic Ocean, there is a support vessel that intermittently is anchored above two different seamounts.

Support vessel activities related to dFAD network maintenance increase the efficiency of the purse seiner, reducing the time the seiner needs to search for or maintain dFADs, which increases the time available for fishing and therefore contributes to effort creep.

Treatment of Support Vessels in Tuna RFMOs

IATTC

Definition. The 2003 Antigua Convention defines “vessel” in Article 1 as “any vessel used or intended for use for the purpose of fishing, including support vessels, carrier vessels and any other vessels directly involved in such fishing operations.” Therefore, the provisions of the Antigua Convention, and any conservation measures adopted pursuant to it, that refer to “vessels” would apply to support vessels, unless specifically exempted.

Applicable conservation and monitoring measures. In 1999, the IATTC adopted Resolution C-99-07 on Fish-Aggregating Devices³ that prohibits the use of tender vessels operating in support of vessels fishing on FADs in the Eastern Pacific Ocean, without prejudice to similar activities in other parts of the world. This Resolution is still active and is included in the compliance questionnaire that CPCs are to complete annually for review during the meeting of the Committee for the Review of Implementation of the Measures Adopted by the Commission. In addition, the IATTC’s Resolution establishing a list of vessels resumed to have carried out illegal, unreported and unregulated (IUU) fishing activities (C-15-01) requires that CPCs shall take all necessary measures, under their applicable legislation and pursuant to paragraphs 56 and 66 of the FAO International Plan of Action to Combat IUU to ensure that fishing vessels, support vessels, mother ships or cargo vessels flying their flag do not participate in any transshipment or joint fishing operations with, support, or re-supply vessels on the IATTC IUU Vessel List.

WCPFC

Definition. The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPFC Convention) defines “fishing” in Article 1 as:

- (i) searching for, catching, taking or harvesting fish;
- (ii) attempting to search for, catch, take or harvest fish;
- (iii) engaging in any other activity which can reasonably be expected to result in the locating, catching, taking or harvesting of fish for any purpose;
- (iv) placing, searching for or recovering fish aggregating devices or associated electronic equipment such as radio beacons;
- (v) any operations at sea directly in support of, or in preparation for, any activity described in subparagraphs (i) to (iv), including transshipment;
- (vi) use of any other vessel, vehicle, aircraft or hovercraft, for any activity described in subparagraphs (i) to (v) except for emergencies involving the health and safety of the crew or the safety of a vessel;

The WCPFC Convention further defines “fishing vessel” as “any vessel used or intended for use for the purpose of fishing, including support ships, carrier vessels and any other vessel directly involved in such fishing operations.” Therefore, the provisions of the WCPFC Convention, and any conservation measures adopted pursuant to it, that refer to “fishing” or “fishing vessels” would apply to support vessels, unless specifically exempted.

Applicable conservation and monitoring measures. Conservation Measure (CMM 2013-10) on the WCPFC Record of Fishing Vessels and Authorizations to Fish requires members to take necessary measures to ensure that its fishing

³ <http://www.iattc.org/PDFFiles/C-99-07%20FAD%20resolution%20Jul%2099.pdf>

vessels, when in the Convention Area, only transship to/from, and provide bunkering for, are bunkered by or otherwise supported by: (a) vessels flagged to members, or (b) other vessels flagged to States not members of the Commission only if such vessels are on the WCPFC Interim Register of non-Member Carrier and Bunker Vessels established under that CMM; or (c) vessels operated under charter, lease, or similar mechanisms as outlined in the CMM. Further, because support vessels are “fishing vessels,” as defined by the WCPF Convention, flag States are obligated, under international law⁴, to authorize their vessels to fish on the high seas, to maintain a record of such vessels, and to share that record with the Commission, where it becomes part of the Commission Record per CMM 2013-10. Further, because support vessels are considered “fishing vessels” if they are authorized to be used in the Convention Area and are at least 100 GT or 100 GRT in size they are required to have an IMO number when listed on the WCPFC Record of Fishing Vessels as of 1 January 2016.

Defining support vessels “fishing vessels” also makes them subject to the WCPFC VMS requirements (CCM 2014-02), high seas boarding and inspection (CMM 2006-08) and the marking and identification of fishing vessels (CMM 2004-03). In addition, the WCPFC’s Conservation Measure establishing a list of vessels resumed to have carried out illegal, unreported and unregulated (IUU) fishing activities (CMM 2010-06) requires that members take all necessary non-discriminatory measures under their applicable legislation, international law and each CCMs’ international obligations, and pursuant to paragraphs 56 and 66 of the FAO International Plan of Action to Combat IUU to ensure that fishing vessels, support vessels, mother ships or cargo vessels flying their flag do not participate in any transshipment or joint fishing operations with, support or re-supply vessels on the WCPFC IUU Vessel List.

The current tropical tuna conservation measure (CMM 2017-01) prohibits the operation of support vessels during the 3-month FAD closure (paragraph 16) and the 2 sequential months per year that it is prohibited to deploy, service or set on FADs in the high seas also applies to support vessels (paragraph 17).

CMM 2017-01 not appear to require support vessels to carry an observer as the 100% coverage requirement applies specifically to purse seine vessels, fishing in the area bounded by 20 N and 20 S⁵. However, if the support vessel is a purse seine vessel, under the WCPFC Convention definition of “fishing,” the CMM observer requirement could be argued to apply to those support vessels. Further, CMM 2007-01, establishing the Commission’s Regional Observer Program (ROP) outlines the scope as follows:

“5. The Commission ROP shall apply to the following categories of fishing vessels authorized to fish in the Convention Area in accordance with the Commission’s Conservation and Management Measures 2004-01:

- i) vessels fishing exclusively on the high seas in the Convention Area, and*
- ii) vessels fishing on the high seas and in waters under the jurisdiction of one or more coastal States and vessels fishing in the waters under the national jurisdiction of two or more coastal States.”*

Further, in the section on the implementation program for the ROP, the CMM anticipates possible future measures that would require observers on additional vessel types engaged in other covered fishing activities:

“CCMs shall also be expected to meet any additional ROP observer obligations that may be included in any measure adopted by WCPFC, such as provisions of a catch retention measure, a FAD management measure or a transshipment measure. Such measures may include observer requirements for freezer longliners, purse seiners and/or carriers.”

⁴ See Article 18 of the UN Straddling Fish Stocks and Highly Migratory Fish Stocks Agreement, Article III of the FAO Compliance Agreement, and Article 7.6 of the FAO Code of Conduct for Responsible Fisheries.

⁵ See paragraphs 33-34.

Data Collection. The WCPFC ROP Minimum Standard Data Fields⁶ includes “how a FAD is detected” and “origin of FAD” in the FAD data fields. One of the codes for the “Origin of FAD” is “deployed by FAD auxiliary vessel.” The Commission also has noted the need for FAD data to be provided by ROP observers for all vessels involved in FAD activities, including support vessels.

ICCAT

Definition. The International Convention for the Conservation of Atlantic Tunas does not include definitions of “fishing” or “fishing vessels”. However, some in force ICCAT Recommendations do, by their terms, define “large-scale fishing vessels” or “commercial fishing vessels” or “fishing vessels” such that they include auxiliary, supply and support vessels⁷. In addition, the use of the terms “operate” and “authorized to fish,” as opposed to “fishing,” could be interpreted to and, in fact, may extend some measures to auxiliary, support and support vessels.

Applicable conservation and monitoring measures. ICCAT Recommendation 13-13 Establishing an ICCAT Record of Vessels 20 meters in Length Overall or Greater Authorized to Operate in the Convention Area requires CPCs to submit a list of fishing vessels that are authorized to operate in the Convention area, there is no requirement to report support, carrier, or other kinds of vessels that may assist fishing vessels in their operations under this measure. However, ICCAT Recommendation 16-01 on a Multi-annual Conservation and Management Programme for Tropical Tunas requires that CPCs authorize vessels 20 meters LOA or greater flying their flag allowed to fish bigeye and/or yellowfin and/or skipjack tunas in the Convention area and vessels flying their flag used for any kind of support of this fishing activity (referred to as “authorized vessels”). Those authorized vessels must be entered in an ICCAT record of authorized tropical tuna vessels.

In addition, as of 1 January 2016, such authorized vessels must have an IMO number or a number in the seven-digit numbering sequence allocated by IHS-Fairplay (LR number), as applicable. Vessels without such a number shall not be included in the ICCAT record. Further, fishing vessels 20 meters LOA or greater not entered into this ICCAT record are deemed not to be authorized to fish, retain on board, transship, transport, transfer, process or land bigeye and/or yellowfin and/or skipjack tunas from the Convention area. Additionally, Recommendation 14-04 Amending the Recommendation 13-07 by ICCAT to Establish a Multi-Annual Recovery Plan for Bluefin Tuna in the Eastern Atlantic and Mediterranean requires the listing of “catching vessels authorized to fish actively” for bluefin tuna in the eastern Atlantic and Mediterranean Sea and “all other fishing vessels (i.e. catching vessels excluded) authorized to operate for bluefin tuna in the eastern Atlantic and Mediterranean Sea.” As a result, the online integrated ICCAT Record of Vessels includes more than 120 auxiliary vessels, which are further broken down into two categories of “support” and “support (BB/PS)” vessels.⁸ Therefore, ICCAT requires the listing of support vessels on the ICCAT Record that are active in the bluefin tuna fishery in the eastern Atlantic and Mediterranean Sea and authorized in bigeye and/or yellowfin and/or skipjack tuna tropical tuna fisheries.

ICCAT Recommendation 11-08 establishing a list of vessels presumed to have carried out IUU fishing activities requires that CPCs take all necessary measures, under their applicable legislation so that the fishing vessels, support vessels, refueling vessels, the mother-ships and the cargo vessels flying their flag do not assist in any way, engage in fishing processing operations or participate in any transshipment or joint fishing operations with vessels included on the ICCAT IUU Vessels List.

ICCAT Recommendation 14-09 Concerning Minimum Standards for the Establishment of a VMS in the ICCAT Convention Area refers to all vessels, including catching, carrier and support vessels) in the preamble; suggesting that the

⁶ http://www.wcpfc.int/system/files/Table-ROP-minimum%20standard%20data%20fields%20-%202016%20update_0.pdf

⁷ ICCAT Recommendations use these terms interchangeably.

⁸ <http://www.iccat.int/en/vesselsrecord.asp>

intent of the Recommendation is that it cover all such vessels that exceed 20 meters between perpendiculars or 24 meters LOA. ICCAT Recommendation 16-01 (paragraph 44), however, does clearly require that supply vessels in the purse seine fishery to carry VMS.

Data Collection. Recommendation 16-01 requires the use of FAD logbooks, and that these data be made available to national scientists, including on supply vessels (paragraph 21); reporting obligations specific to support vessels (paragraph 23); VMS data reporting for supply vessels to national scientists (paragraph 44); and, while not explicit, the requirement for FAD management plans could reasonably be interpreted to include support vessel activity (paragraphs 18-20, Annex 6). Recommendation 16-01 also requires support vessels to comply with the 2 month FAD time/area closure and carry observers during the closure (paragraph 38).

IOTC

Definition. The Agreement for the Establishment of the Indian Ocean Tuna Commission does not include definitions of “fishing” or “fishing vessels”. However, some in force IOTC Resolutions do, by their terms, define “fishing vessels” to include auxiliary, supply and support vessels.

Applicable conservation and monitoring measures. IOTC Resolution 15-04 establishes an IOTC Record of Fishing Vessels states:

“For the purpose of this Resolution, fishing vessels including auxiliary, supply and support vessels that are not entered in the IOTC Record are deemed not to be authorised to fish for, retain on board, tranship or land tuna and tuna-like species or supporting any fishing activity or set drifting fish aggregation devices (DFADs) in the IOTC area of competence. This provision shall not apply to vessels less than 24 m in length overall operating inside the EEZ of the flag state.”

Further, as of 1 January 2016, vessels registered on the IOTC Record must have an IMO number.

It is possible that support vessels must have VMS under Resolution 15/03; however, this depends on if the activities of support or supply (IOTC resolutions appear to use these two terms interchangeably) vessels are considered “fishing” by the Commission.

IOTC has three specific management measures or provisions related to support vessels:

- IOTC Resolution 16/07 (On the Use of Artificial Lights to Attract Fish to Drifting FADs) prohibits fishing vessels, including support and supply vessels, flying the flag of a CPC from installing or operating surface or submerged artificial lights for the purpose of aggregating tuna and tuna-like species or non-target, associated or dependent species on dFADs.
- Resolution 16/08 (On the Prohibition of the Use of Aircrafts and Unmanned Aerial Vehicles as Fishing Aids) includes support and supply vessels.
- Resolution 17/01 (Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence) contains a progressive reduction on the number of support vessels that can operate with purse seine vessels and that a single purse seine vessel cannot be supported by more than a single supply vessel of the same flag State at any point in time.

Data Collection. IOTC Resolution 15/02 on Mandatory Statistical Reporting Requirements mandates CPCs to provide:

“a) The number and characteristics of purse seine supply vessels: (i) operating under their flag, (ii) assisting purse seine vessels operating under their flag, or (iii) licensed to operate in their exclusive economic zones, and that have been present in the IOTC area of competence;

b) Number of days at sea by purse seine and purse seine supply vessels by 1° grid area and month to be reported by the flag state of the supply vessel;

c) *The total number set by the purse seine and purse seine supply vessels per quarter, as well as:*

i. *The positions, dates at the time of setting, FAD identifier and FAD type (i.e. drifting log or debris, drifting raft or fad with a net, drifting raft or FAD without a net, anchored FADs and other FADs e.g. Payao, dead animal etc.;*

ii. *The FAD design characteristics of each FAD (consistent with Annex 1 to Resolution 15/08*

These data would be for the exclusive use of IOTC Scientific Committee and its Working Parties, subject to the approval of the data owners and in accordance with Resolution 12/02 Data confidentiality policy and procedures, and should be provided in a timely fashion.”

Resolution 17/01 also requires CPCs to report annually which of their flagged purse seiners are served by each supply vessel.

CCSBT

Longline gear is the predominant gear used in the CCSBT to harvest southern Bluefin tuna. Purse seines are only used for the catch of juveniles for stocking farms, and only by Australian-flagged vessels. FADs are not used in the SBT fishery to aggregate schools (aerial spotting is the primary method). Support vessels are therefore only used to provide supplies to vessels fishing for SBT (e.g., fuel, bait, food, gear, etc.), or to assist with the towing of cages for farming.

Definition: The CCSBT Convention does not define “fishing vessels” but defines “fishing” in a manner that includes support vessels:

(i) the catching, taking or harvesting of fish, or any other activity which can reasonably be expected to result in the catching, taking or harvesting of fish; or

(ii) any operation at sea in preparation for or in direct support of any activity described in sub-paragraph (i) above.

Applicable conservation and management measures: CCSBT does not have any conservation measures that are specific to supply and tender vessels, or support vessels. However, due to the definition of fishing, CCSBT does require that support vessels be listed on the CCSBT authorized vessel record, and those not listed are deemed not to be authorized to “fish for, retain on board, tranship or land SBT regardless of their size.” In addition, support vessels can be listed on the CCSBT IUU Vessel List.

Data Collection: CCSBT does not require the collected of data on the use of supply and tender vessels, or support vessels that are used by vessels fishing for SBT.

Summary: Monitoring and Management of Support Vessels

A summary of the current treatment of support vessels in IATTC, ICCAT, WCPFC and IOTC is provided in Table 1.

Monitoring: The WCPFC, ICCAT and IOTC require support vessels to be on the RFMO’s regional vessel records and have IMO numbers, and IOTC requires parties to submit annual statistical data regarding the fishing effort of purse seine supply/support vessels and which purse seiners are supported by each support vessel.

WCPFC defines support vessels as fishing vessels, and therefore they are subject to the WCPFC VMS requirements, high seas boarding and inspection, the standards for marking and identification of fishing vessels, and required to have a unique vessel identifier, such as an IMO or LR number.

ICCAT also requires support vessels to report to a VMS and report those data to their national scientists, use of FAD logbooks, and has reporting obligations specific to support vessels. Further, it is probable that the ICCAT requirement for CPCs to develop FAD management plans will result in plans that include support vessel activity. However, other than ICCAT during the 2-month FAD closure, support vessels are not required to carry observers, and in none of the tuna RFMOs surveyed are they to use electronic monitoring systems in lieu of human observers.⁹

In the WCPFC and IOTC it may be possible to mandate observer coverage for support vessels under existing management measures due to either clear (such as in the RFMO parent convention) or ad hoc (only in some recommendations or resolutions) definitions of “fishing vessel” or “vessel” and/or “fishing.”

Electronic Monitoring: Electronic monitoring has been demonstrated to be an effective monitoring tool for fisheries management, and are increasingly being used on tuna purse seine fishing vessels as a complement or alternative to human observers (Restrepo *et al.*, 2014; Ruiz *et al.*, 2016). It has also been shown that electronic monitoring can collect accurate data on FAD information from supply and tender vessels, particularly if the electronic monitoring system, including the number of cameras, is tailored to the specific design of the supply and tender vessel and how the crew conducts its activities (Legorburu *et al.*, 2018).

Management: One tRFMO has banned the use of support vessels (IATTC). ICCAT and IOTC have taken the most proactive steps thus far with respect to data collection and regulating the use of support vessels. The WCPFC, in its 2017 conservation measure for bigeye, yellowfin, and skipjack tuna now prohibits supply and tender vessels from deploying or servicing FADs during the two FAD closures outlined in the measure (CMM 2017-01, paragraphs 16-17).

RFMO FAD Working Groups

With the exception of CCSBT, because it is not needed, the other tuna RFMOs surveyed in this Report have established FAD working groups to collect analyze data and develop recommendations for FAD management options. In IOTC and WCPFC these working groups have been directed to include the activities of support vessels in their work. In ICCAT the working group is to consider their impact on the effective fishing effort and fishing capacity, extending data requirements to include reporting the number of FADs deployed by support vessels and addressing and monitor possible changes of fishing strategies, in particular, fishing activities of purse seiners in association with bait-boats and/or support vessels.

⁹ Such systems are being trailed in various fleets and oceans as an alternative when conditions make deployment of human observers challenging. For example see:

http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Hosken_2016_SI_EReport.pdf

<http://iss-foundation.org/download-monitor-demo/download-info/issf-technical-report-2016-07-international-workshop-on-application-of-electronic-monitoring-systems-in-tuna-longline-fisheries/>

<http://iss-foundation.org/taking-fisheries-monitoring-to-the-next-level-electronic-monitoring-in-ghana/>

<http://iss-foundation.org/download-monitor-demo/download-info/issf-technical-report-2014-08-updated-guidance-on-electronic-monitoring-systems-for-tropical-tuna-purse-seine-fisheries/>

Table 1

	Use Prohibited?	Must Be on the Vessel Register?	Applicable MCS Measures	Data Reporting Requirements?	Observers Required?
IATTC	Yes	N/A	N/A Can be listed on the IATTC IUU Vessel List if > 23m LoA	N/A	N/A
IOTC	No	Yes	VMS may apply, but depends on how “fishing” defined by Commission IMO # required Can be listed on the IOTC IUU Vessel List	Yes	Observer coverage does not explicitly apply, but could depending on how definition of “fishing” is applied
ICCAT	No	Yes	IMO # required Can be listed on the ICCAT IUU Vessel List VMS, FAD logbooks, FAD management plans	Yes and data, including VMS position reports are reported to national scientists	Only during the 2-month FAD closure in the Gulf of Guinea
WCPFC	No	Yes	Given the definition of “fishing,” VMS, HSB&I, marking and identification of fishing vessels should apply IMO # required Can be listed on the WCPFC IUU Vessel List	Support vessels not explicitly included in the WCPFC provision of scientific data documentation	Observer coverage does not explicitly apply, but could depending on how definition of “fishing” is applied
CCSBT	No	Yes	Other MCS measures depends on if required in the RFMO Convention Area in which the vessels targeting SBT is operating IMO # required Can be listed on the CCSBT IUU Vessel List	No	Depends on if required in the RFMO Convention Area in which the SBT fishing vessels are operating

Recommendations

Despite the current patchwork of conservation and monitoring measures that apply, or could apply, to support vessels, it is clear that tRFMOs recognize the contribution of support vessels by purse seine vessels in the global FAD-associated tropical tuna fishery and therefore the need for management.

Based on this survey of the current treatment of support vessels in the four tropical tuna RFMOs surveyed, the following are best practice recommendations and suggestions for further work and action in tRFMOs:

Recommendation 1: Clear Definitions and Application

- RFMOs should have definitions in relevant conservation and management measures that clearly prescribe the universe of vessels to which these measures apply, or whether “fishing vessel” used broadly includes support vessels.
- RFMO conservation and management measures that regulate FADs should clearly identify how these measures apply to the activities of support vessels, including deploying and servicing FADs during closures.

Recommendation 2: Monitoring and Data Collection

- VMS requirements for fishing vessels should apply to support vessels.
- Observer coverage requirements should apply to support vessels.
- If human observers are not possible or available for operational or other reasons, RFMOs should require the use of electronic monitoring systems. These electronic monitoring systems should be tailored to the specific design of the supply and tender vessel and how the crew conduct their activities, and have a minimum of three cameras (Legorburu *et al.*, 2018).
- Detailed data on support vessel activities should be collected, including:
 - the number of active support vessels, including identifying which purse seine vessels each support,
 - the number of FADs being deployed and serviced by such vessels, and
 - the time spent by support vessels in fishing related activities and FAD related activities

Recommendation 3: RFMO Vessel Register Information

- RFMO vessel registers should clearly list the types of activities support vessels are engaged in and whether they are working as bait boats, servicing FADs, engaging in fishing, etc.

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