



OCEAN OUTCOMES  
Fish | Food | Livelihoods

**Western and Central Pacific albacore and yellowfin tuna longline  
Fishery Improvement Project: fleet data collection and reporting  
improvement plan**

*December 2020*



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## *Improving data collection and reporting strategies*

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## Introduction

The Western and Central Pacific (WCP) albacore and yellowfin tuna longline Fishery Improvement Project (FIP) five-year work plan has a strong focus on improving the data collection and reporting of data by FIP vessels. These are to address identified deficiencies in the data collection and subsequent reporting for target, primary, secondary and endangered, threatened and protected species (ETP). The lack of verified data results in an inability to assess the impact of the fishery on primary, secondary and ETP species.

The FIP partners intend to move the FIP vessels into an electronic Fisheries Information System (eFIS), with different strategies to implement the electronic monitoring system (EMS) and eventually with the electronic reporting (ER). In the interim, it is important to improve the existing paper-based data collection and onward reporting to support science-based management decisions. This strategy is therefore broken into two parts: improving the current data collection and reporting; and moving to eFIS.

The FIP vessels land tuna in Fiji and are flagged to China and Fiji. The responsible management authorities for ensuring data collection are therefore the two flag states, and provision of data to the Western and Central Pacific Fisheries Commission (WCPFC) is the responsibility of the flag and port states depending on the data.

Data deficiencies were identified in, and information on some elements of the management system are derived from, the pre-assessment for SP albacore and WCP yellowfin tuna caught by longline, conducted by ME Certification Ltd (MEC, 2017). MEC Ltd provided summary logbook and pilot electronic monitoring (EM) catch data to use in undertaking the pre-assessment. They noted, "...the two datasets were not consistent and clear differences were identified. These differences concerned identification of species, and species catch composition. There is a clear paucity in data within these datasets, and concerns regarding data validation and verification remain as key issues. These require resolving prior to entering a full assessment under the Marine Stewardship Council (MSC) fisheries standard."

Guidance in the MSC Standards around what constitutes adequate information states "Generally, having only one form of data collection with a high level of potential bias or other limitation (e.g., logbooks or interviews with fishermen) by itself should not be enough to meet SG80..." (SGA3.6.3). Observer programs allow for verification, however the program needs to be robust, including having sufficient coverage rates to meet the program's objectives.

Information on the Chinese management system is derived from the addendum to the pre-assessment evaluating the People's Republic of China and Taiwan (Chinese Taipei) longline tuna fishery management systems in Western and Central Pacific (WCPO) yellowfin and albacore longline and Indian Ocean (IO) albacore longline fisheries against Principles 2 and 3 of the MSC Fisheries Standard.

The purpose of this plan is primarily to improve the FIP vessels/fishery data collection and reporting, not to try and improve the whole WCPFC information system. While these fishery-wise improvements may lead to WCPFC-wide changes, and specific actions will arise to



affect change at the WCPFC-level, that is not the aim. Such broadscale improvements would not be feasible to achieve at the WCPFC within the next four years of the FIP.

This document is the interim plan to improve data collection and reporting. It focuses on logbooks and observer coverage, however that will be expanded to include port sampling and transshipment (mentioned in the electronic section).

## Data-related FIP Work Plan tasks

There are six year one FIP work plan tasks that are primarily associated with improving the data collection and reporting by the FIP vessels (see Table 1).

Table 1. FIP year one data-related work plan tasks (text in green is directly relevant to this data collection and reporting assessment and plan).

PI#	Performance Indicator	Task #	Task
1.2.3	Stocks - Information and Monitoring	1.5	Conduct a gap analysis for, and develop an approach to, improving provision of operational level catch and effort data and data identified as source of uncertainty in assessments at both the vessel and flag-state levels.
		1.6	Conduct a gap analysis for, and develop a plan to, improve monitoring programs (including discard reporting and observer coverage), and if needed, conduct training for improved data collection and reporting.
2.1.1, 2.2.3 & 2.3.3	Primary species - Outcome, & Secondary species & ETP species - Information	2.1	<p>Work with relevant national authorities to evaluate current data collection and reporting strategies and identify areas of improvement. Develop improved data collection plan; this can be through increased observer coverage (human or electronic), improved self-reporting (e.g. e-logbooks), or through some other measure as appropriate. An observer sampling approach and protocol, to address different data needs and compliance issues, will also need to be developed.</p> <p>The aspiration is for 100% scientific observer coverage (with at least 20% analysed), including sampling at landing sites and transshipment operations, when applicable. This information will also be helpful to demonstrate compliance with existing RFMO, national and international measures for ETP species.</p> <p>Conduct an initial assessment on the sourcing of bycatch, extend data collection to determine the origin and amounts of bait should be documented and monitored. Ensure integration with the Bycatch policy/code of conduct being developed in Task 3.2, which should also include data collection.</p>
		2.2	Commence assessment of how to integrate e-observer coverage into a comprehensive data plan, including: how e-observer coverage can be used to increase observer coverage from 5% to 100%; sampling approach and protocol to address different data needs and compliance issues; encouraging buying and installing units;



			<p>responsibility for undertaking analysis and analysis costs; how the data will be used; and how the data may be accepted by the WCPFC. Ensure integration with the Bycatch policy/code of conduct being developed in Task 3.2, which should also include adequate percentage (20+%) of analysed observer coverage.</p> <p>Encourage the WCPFC E-reporting and E-monitoring Working Group stays on track. Adoption of CMM in 2020.</p> <p>Discussions both within the FIP and with the working group need to include future responsibility for e-observer footage analyses.</p>
		2.4	<p>Regarding sharks, assess whether: i. supplying vessels are complying with the shark finning ban (5% ratio); ii. supplying vessels comply with the prohibition from retaining, transshipping, storing or landing oceanic whitetip sharks; iii. that supplying vessels comply with recommendation for incidentally caught sharks to be released, the incident recorded and reported; iv. China, Taiwan, Vanuatu and Solomon Islands implement the FAO International Plan of Action for the Conservation and Management of Sharks. If data are insufficient to determine these, integrate into Task 2.1. If any non-compliance is identified, set process to address (in Action 3 to meet Outcomes 5b and 7b).</p>
2.1.1 and 2.2.3	Primary species - Outcome, & Secondary species - Information	2.5	<p>Regarding marlin and swordfish, assess whether the catches of FIP vessels from China, Taiwan, Solomon Islands and Vanuatu: complied with reduction in catches of striped marlin resulting in an 80% reduction of 2000-2003 levels (individual countries were to identify ways to accomplish this); and are limiting the number of fishing vessels targeting swordfish to levels from any year between 2000 and 2005. The level of marlin and swordfish catches will need to be confirmed as part of improved data collection.</p>
		2.6	<p>Require vessels to fill in discard information in logbooks.</p>
2.2.2 & 2.3.2	Secondary and ETP species - Management	3.2	<p>Commence development of a compulsory and verifiable bycatch policy/code of practice for participating vessels, that includes full retention of tunas, best practices, gear improvements, mitigation and research, best practices which include each of the ETP species groups (sharks, rays, cetaceans, turtles and birds), 100% observer coverage, data collection and reporting of all interactions and fate.</p> <p>Appropriate monitoring and bycatch policies are critical to characterise, quantify and manage the interactions as well as verify the implementation of any Bycatch policies.</p> <p>Cumulative effects with other MSC certified fisheries should be taken into account.</p> <p>Skipper and crew training considerations to be made in conjunction with the Bycatch policy/code of practice development.</p>



## Year two tasks, and carryover from Year one

There are three year two FIP work plan tasks that follow on from year one tasks that are primarily associated with improving the data collection and reporting by the FIP vessels (see Table 2). In addition, due to Covid-19, consultation with relevant authorities and the China Overseas Fisheries Association did not occur. It will therefore need to occur in year two of the FIP.

Table 2. FIP year two data-related work plan tasks (text in green is directly relevant to this data collection and reporting assessment and plan).

PI#	Performance Indicator	Task #	Task
		1.5, 1.6, 2.1	Consultation with national authorities required.
1.2.3	Stocks - Information and Monitoring	1.5.2	Approach to improve catch and effort data provision commenced.
		1.6.2	Monitoring programs and training commenced, if required.
2.1.1, 2.2.3 & 2.3.3	Primary species - Outcome, & Secondary species & ETP species - Information	2.1.2	Demonstrate new data collection and reporting plan has been implemented, including recording of discard information.



## Improving the current paper-based data collection and reporting

The Oceanic Fisheries Program of the Pacific Community (SPC-OFP) serves as the Commission's Science Services Provider and Data Manager. This relationship ensures that there is no duplication of effort in the area of collection and processing of scientific data on fishing activities in the region. The SPC-OFP has a combined repository containing WCPFC data and SPC members data (note there are some overlaps and differences between each data set). SPC-OFP in its capacity as scientific services provider and scientific data manager, does hold and manage WCPFC scientific data holdings, on behalf of the WCPF Commission. SPC-OFP in its responsibility to SPC members countries and territories also holds and manages scientific data holdings on behalf of SPC members.

If a foreign-flagged vessel (e.g. Taiwan) fishes in the EEZ of a Pacific Island country (PIC), the catch is allocated to the coastal state or the flag state depending on how the vessel is licenced to fish in that EEZ. If the vessel is fishing in a coastal state under charter or bilateral licenses<sup>1</sup>, all catch will be counted as the coastal national annual catch volume during the chartering period, no matter if the catch is from EEZ or high seas. In this scenario, for bigeye tuna the catch would count against the PIC's quota. On the other hand, if a PIC longline vessel (e.g. Fijian) caught bigeye tuna under bilateral license in another PIC's EEZ (e.g. Solomon Islands), then it's flag state's obligation (Fiji in this example) to issue the bigeye tuna certificate.

### Logbooks

#### *Summary of the need and current situation*

Chinese-flagged fishing vessels that engage in fishing for tuna and tuna-like species in the high seas areas of the WCPO are managed through the Bureau of Fisheries under the Ministry of Agriculture and Rural Affairs (MoRA), the highest body in fisheries administration in China, through its Fisheries and Enforcement Bureau. The High Seas Fisheries Data Centre, established by the Chinese government in May 2015, collects, analyses, stores, inspects, and manages the high seas fishing data on behalf of MoRA. The centre is managed by and affiliated with the Shanghai Ocean University. Fijian-flagged vessels that engage in fishing for tuna and tuna-like species are managed by the Fisheries Department of the Ministry of Agriculture, Fisheries and Forests. The Offshore Fisheries Division is tasked with ensuring compliance and enforcement, surveillance, and data management amongst other roles. The majority of the

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<sup>1</sup> A bilateral license is issued by individual PICS to Distant Water Fishing Nation (DWFN) vessels that pay an agreed up license fee. The licenses are restricted to the EEZ of the issuing PIC and comprise most the license issued to DWFN vessels.





domestic fleet fish within their own waters, but they also engage in fishing activity on the high seas.

As identified by MEC (2017), “There is a clear paucity in data within [logbook and EM pilot] datasets, and concerns regarding data validation and verification remain as key issues.” FIP vessels. The WCPFC Scientific Committee repeatedly reports that the quality of logbook data, compared with observer data, is poor, especially for secondary or ETP species. Discard data are a key area of missing data. “Resolution 2005-03 [(Resolution on non-target species)] asks operators, where practicable, to avoid catching non-target fish species that are not retained and release unwanted fish alive. Observers are required to record all species data, including discards [noting the rate of observer coverage is extremely low].” (MEC, 2017). The FIP’s secondary species as per the pre-assessment are: longnose lancetfish, pelagic stingrays, opah, South Pacific blue shark, and bait species.

The FIP vessels all use the paper Pacific Community (SPC) logsheet (logbook). All except one FIP vessel are using the SPC Mandarin/English bilingual logbook. Figure 1 below illustrates the current data flow for paper-logbooks. Logbook data are sent to the licensing State (the flag State of joint venture /charter State) at the end of each trip as this is a condition of their license.

For vessels licensed by Cooperating Members, Cooperating non-members (CCMs), paper logbooks go to the licensing State at the end of each trip. For SPC members, of the SPC licensing States have data entry capacity, the licensing State enters the data into TUFMAN2, SPC’s database system. If the licensing State does not have capacity, they send the logbooks to SPC to be entered into TUFMAN2. For the Chinese-flagged FIP vessels and longline vessels fishing exclusively on the high seas, they provide their logbook to their flag who then submit data to WCPFC as part of annual scientific data reporting requirements by 30 April. A copy of the logbook will also go to the port authority where the fish are landed. For this FIP, the port authority is Fiji for the vessels that are not transshipping at sea. For vessels that are transshipping, the product is transshipped to China or landed China at the end point of the transshipment vessel’s multi year trip. It is common practice to submit a copy of logbooks to the port authority. Even when a country has implemented its logbook fully electronically, such as Taiwan, captains still have to keep a paper-based logbook just to fulfill this purpose when calling into Fiji.

Licensing States also report summary (amalgamated) logbook information to the WCPFC Secretariat directly in Part 1 of the annual CCM reporting.

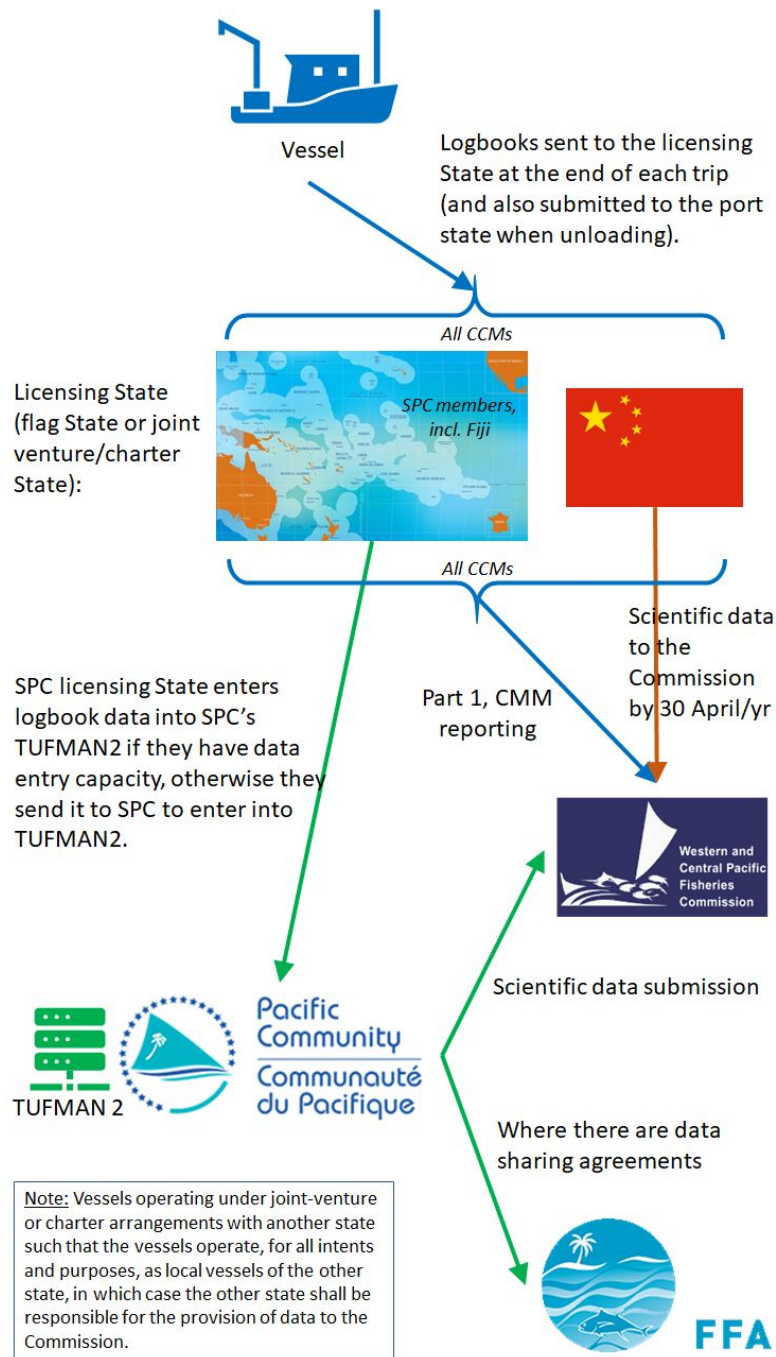


Figure 1. Current paper logbook data flow.

### Discards

As noted above, the WCPFC Scientific Committee repeatedly reports that the quality of logbook data, compared with observer data, is poor, especially for secondary or ETP species. Discard data are a key area of missing data for both the WCPFC and the FIP vessels (MEC, 2017). As a



result "it is highly likely that a Risk Based Framework process including a range of stakeholders, under the MSC Fisheries Standard would be required to enable appropriate scoring".

In 2016, WCPFC adopted a requirement for flag states to submit annual estimates of discards/releases for the key WCPFC species in metric tonnes for the longline fishery (this submission was previously non-binding), starting with the submission of 2017 data. The provision of discards in aggregate and operational data is non-binding and "Some CCMs instead provide an annual estimate of discards in number." (Williams, 2018). To summarise, the recording by vessels and subsequent national reporting is only required for the following specific list of species: "yellowfin, bigeye, skipjack, albacore, blue shark, silky shark, oceanic whitetip shark, mako sharks, thresher sharks, porbeagle shark (south of 20°S, until biological data shows this or another geographic limit to be appropriate), hammerhead sharks (winghead, scalloped, great, and smooth), and whale shark".

A fishery aiming to get certified should always have strategies "if necessary" for impacts on primary /secondary. Information matters for the primary/secondary species (Pls 2.1.2 and 2.2.2) management strategy (scoring issue a) and review of alternative measures (scoring issue e). The FIP needs to consider its impact on discards (unwanted catch), in terms of both observed and unobserved mortality. Collecting data on all discards would make part of the strategy.

William (2018) requested CCMs to consider a number of suggestions, which were generally supported, but not taken forward by Scientific Committee:

- "reviewing their respective longline logbooks to ensure there is differentiation between (i) releases of live fish (in healthy condition), and (ii) releases/discards of dead fish, or fish "unlikely-to- survive", which will facilitate the estimation of annual discards for the WCPFC key species [This differentiation is also consistent with the reporting requirements of several shark species Conservation and Management Measures (CMMs)];
- ensuring the definition of "live (in healthy condition)" which is consistent with observer data collection is included in the logbook instructions;
- ensuring the annual estimates of discards/releases reconcile with discards/releases in their aggregate and operational data; and
- in addition to estimates of discards in weight by species, provide annual estimates of discards in number (dead fish, or fish "unlikely-to-survive") for the longline fishery only;"

### Swordfish and marlins

As part of the first year of the FIP, to the greatest extent possible, Ocean Outcomes assessed China, Taiwan, Solomon Islands and Vanuatu's compliance with the following measures: CMM for Striped Marlin in the Southwest Pacific (CMM 2006-04); Conservation and Management for Swordfish (CMM 2009-03); and Conservation and Management Measure for North Pacific Striped Marlin (CMM 2010-01). CMM 2010-01 is the only one of these three measures reported against in the WCPFC's annual Compliance Monitoring Report (WCPFC, 2019). In 2019, the



Commission assessed China as “Priority non-compliant” for paragraph 5 on catch limits. “The European Union suggested that China work with the SPC to reconcile the data to assist future assessments...”

The Technical Compliance Committee advised the Commission in 2019, the south west striped marlin and swordfish measures contain two of “nine quantitative limits where there are limited or no additional data presently available to WCPFC to verify the CCM’s report on their implementation against the limit”. The 2019 annual Commission meeting did not make any revisions to improve this situation.

### *Improving paper-based logbook data collection*

1. Incorporate data collection and reporting of all interactions, and fate if possible, into the bycatch policy/code of conduct being developed for the FIP by the International Seafood Sustainability Foundation.
2. In working toward improved discard recording (2021):
  - annotate the Mandarin/English logbook regarding discards in Mandarin. Ocean Outcomes to download SPC Chinese-language logbook and add in text boxes (in Chinese) highlighting what needs to be completed/how.
  - FCF to print and laminate one for each vessel and provide training when handing laminated reference pages to skippers in Fiji. For those vessels that do not come into port in Fiji, FCF will devise an alternative process.
  - FCF to also disseminate the SPC Mandarin instructions for the captains to use when completing their Mandarin/English logbooks.
  - Provide vessels a species reference sheet in Chinese that syncs with the format of the English only SPC/FFA logbook currently in use.
  - Consider how fate can be included in the logbook, and if the logbook could be expanded to list more species, rather than having the additional species entered in blank rows (2022).
3. Assess how the FIP may work with China’s High Seas Fisheries Crew Training Centre to further educate companies and crews of their data collection and reporting obligations, and the new bycatch policy/code of conduct, and disseminate information. The High Seas Fisheries Crew Training Centre is a comprehensive training institution affiliated with the Shanghai Ocean University that aims to improve the quality of China’s offshore fisheries crews.
4. ISSF and AZTI have prepared a new remote training module that includes a section on correct logbook completion. The module will be used in the Indian Ocean Bumble Bee longline FIP, and we will look to include it in further training in this FIP.
5. Assess other avenues for education, e.g. the China Overseas Fisheries Association.



## Observers

### *Summary of the need and current situation*

Scientific observers collect extremely valuable, high-quality data, albeit from a miniscule, and largely unrepresentative subset of annual fishing effort. Low levels of non-representative observer coverage results in: inaccurate data on target and bycatch species; illegally, underreported and mis-reported caught fish, fishing beyond the authorised zones; and shark finning. The importance of higher levels of observer coverage is addressed in the [Electronic Monitoring - Summary of the need and current situation](#) section below.

The WCPFC requirement for the longline fishery is 5% coverage (established in 2012). China's longline human observer coverage has historically not met the 5% minimum, however in 2018 the 5% was exceeded. China's coverage was 4.1% of days at sea in 2017 and 6% in 2018. These figures from Williams *et al.* (2019) are an indication of the longline Regional Observer Programme (ROP) data submitted to WCPFC/SPC, and the coverage of the data provided. This allows a comparison to the coverage nominated by the flag state and is used to evaluate compliance in achieving the required ROP. Fiji's human observer coverage was 8.3% of trips in 2017 and 13.5% 2018 (Williams *et al.*, 2019). Fiji also participated in an EM trial in 2015, referred to under [EM below](#).

The Chinese and Fiji-flagged FIP fleets' human observer coverage levels as distinct from the Chinese and Fiji-flagged fleets as a whole are unknown. They are likely to be lower than 5%.

On the high seas, observer reports are sent directly to the licensing states. Island countries assign islander observers on fishing vessels that fish in island EEZs.

Observers send observer reports to national programs. China and some other non-SPC members send their data to the WCPFC Secretariat, and SPC members send the reports to SPC who then provide the data to the WCPFC as part of the ROP submission. Licensing States also report observer information, such as observer coverage rates and amalgamated observer data, to the WCPFC Secretariat directly in Part 1 of the annual CCM reporting.

In 2019, China was one of a number of CCMs highlighted as having provided 'non-standard'<sup>2</sup> observer data in 2018. The development and update of data loaders for the non-standard observer data is time intensive for SPC.

The flag state has the right to request observer data from the SPC, and may wish to do so for data and also to receive notices of any offences/violations. However it can be difficult obtaining original observer reports from island countries.

Figure 2 below illustrates the current data flow for paper-observer coverage for the FIP fleets. The data flows are not straight forward, and there are some variations such as for the US

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<sup>2</sup> "We refer to "non-standard" as observer data that are not entered using the Tufman 2 system, or do not align to the WCPFC ER observer data field standards (i.e. they are provided in different formats by CCMs which requires the development of specific data loaders)" (Williams *et al.*, 2019)



Multilateral Purse Seine Treaty, which is processed by the Pacific Island Forum Fisheries Agency (FFA).



## Improving data collection and reporting strategies

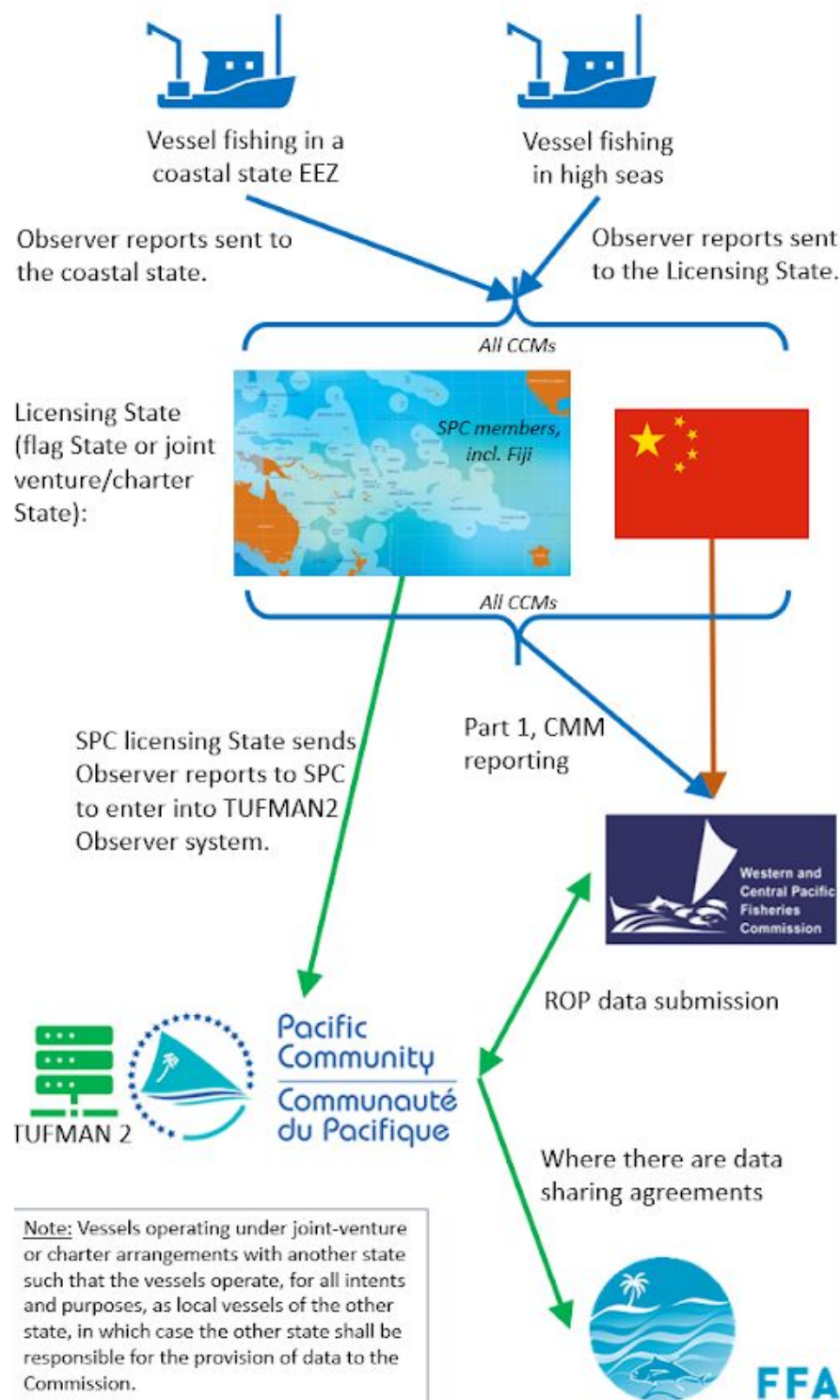


Figure 2. Current observer data flow.



### *Improving paper-based observer data collection*

1. Work with the Chinese Government to improve compliance with the 5% observer requirement amongst the FIP fleet (CMM 2018-03). Encourage representative coverage of the 5% by the FIP fleet. (2021)
2. Encourage the Chinese Government to work with the SPC to determine if they can make it easier to upload China's observer data. (2021)
3. FCF to work with the Solomon Islands, Vanuatu, and Fijian Governments to encourage any observer reports received by those Governments for FIP vessels fishing in their waters are automatically shared with the relevant Chinese authority. (2021)
4. Commence discussions on moving to e-reporting for logbooks and observer data as discussed under the e-FIS sections below.
5. Pursue verification that vessels have available, and are complying with, a Garbage Management Plan that meets the MARPOL ANNEX 5 requirements.

## **National reporting to the WCPFC**

### *Summary of the need and current situation*

In the WCPFC's 2019 Compliance Monitoring Report, China was "priority non-compliant" or "non-compliant" for the following two relevant CMM paragraphs, both of which were for missing reporting deadlines:

6. CMM on the Regulation of Transshipment (CMM 2009-06), para 35. a. (iii): "notify the information in Annex III to the Executive Director at least 36 hours prior to each transshipment". Priority non-compliant.
7. CMM for Bigeye, Yellowfin and Skipjack Tuna in the Western and Central Pacific Ocean. (CMM 2017-01 (now superseded by 2018-01)), para 41: "CCMs listed in Attachment 1, Table 3 shall report monthly the amount of bigeye catch by their flagged vessels to the Commission Secretariat by the end of the following month. The Secretariat shall notify all CCMs when 90% of the catch limits for a CCM is exceeded." Non-compliant.

Fiji was not highlighted as non-compliant for any CMM.

### *Improving national reporting to the WCPFC*

- FCF to contact the Chinese Government, or their representatives, to raise these identified reporting non-compliance issues.

## **Bait data collection**

### *Summary of the need and current situation*

The pre-assessment (MEC, 2017) noted that "Argentinian squid (bait species), Japanese sardine (bait species) and ... could possibly be listed as main, however, data from [the] client





need improvement, which is the main reason for achieving a score of potentially below 80”. “The summary of electronic monitoring for 22 longline trips in 2015 identified likely scoring elements, however the lack of observer data for the units of assessment and information on bait species and quantities for all vessel companies made it difficult for the team to give a complete analysis and confident PI scores.”

There are no WCPFC data reporting requirements on bait use. The WCPFC does not receive data on bait use as the treaty doesn’t cover stocks used for bait.

Each vessel owner in the FIP should already be maintaining a record of their bait sourcing. This should be evaluated as part of the MSC pre-assessment and any deficits addressed in the FIP workplan. The bait records should contain information on:

- date the bait was supplied to the vessels
- scientific and common name of each species
- weight of each species supplied
- name of the bait supplier
- source fishery(ies) of each species of bait - flag state, fishing grounds or otherwise stock, gear type(s)

From experiences with MSC-certified fisheries in the WCPO, it can be initially challenging for the vessel owner to have their bait suppliers identify the source fisheries and fishing grounds of the bait, and to identify all the bait to the species level. However, in time they managed to collect the needed minimum information in order to enable an assessment under MSC principle 2.

In the interim, FCF believes they should be able to obtain species level and fish origin information.

### *Improving bait data collection*

- FCF to seek bait species and origin information from FIP vessel owners. (2021)
- FCF to work with the FIP owners on updating their bait records to include the information described above. (2022)
- The FIP bycatch Code of Conduct to specify the information that should be collected in the bait records, and indicate how to verify the bait is responsibly sourced. (2021)

## **Port sampling**

Port sampling is critical as an independent source of scientific data on landed (retained) catch for fisheries. Even if EM systems, including cameras, are installed on boats, the subsequent analyses are unable to collect all necessary data that would usually be collected by at-sea observers, for example fish weights. Currently the standard SPC/FFA port sampling form has very few fields (species, length and weight), and this may need to expand in due course if there is a transition from at-sea observers to EM.



Most of the FIP's vessels directly land their product in Fiji. Fiji does port sampling 100% on MSC catch while randomly on non-MSC catch, approximately twice a week. The FIP expanded to include approximately 66 vessels that operate on the high seas. These vessels rarely come into port and therefore tranship their product at-sea to carrier vessels. At this stage we do not know the port sampling that occurs for the carrier vessels that are unloading FIP product. The FIP product is being landed primarily in China, however if they call into Fiji for example once a year they will land product there.

The "Annual report to the Commission Part 1: Information on fisheries, research and statistics" outlines what should be included in the Part 1 national reports, and the format of the documents, that are due one-month prior to the annual regular session of the Scientific Committee each year. It includes the following regarding port sampling:

"Table 5. Estimated annual coverage of operational catch/ effort, port sampling and observer data for the [National fleet], by gear, active in the WCPFC Convention Area, by gear, for years [x-5] to [x-1]." and

"X Summary of observer and port sampling programmes (scientific data)"

### *Improving fleet port sampling*

- Confirm the sampling protocols that occur in Chinese and other ports where FIP product is being landed outside of Fiji. As part of this, if possible, obtain a copy of the WCPFC Part 1 annual report for China.
- Depending on what is occurring for the product landed outside of Fiji, determine if there are some actions the FIP can take to encourage increased port sampling.

## **Transshipment**

### *Summary of the need and current situation*

"The transshipment of catch, which allows fresh fish to get to market sooner, is a vital but largely hidden part of the global commercial fishing industry. Transshipment involves hundreds of refrigerated cargo vessels, or carrier vessels, roaming the oceans, taking in catch from thousands of fishing vessels and transporting it to shore for processing" (The Pew Charitable Trusts, 2019a). The relative lack of transparency surrounding the movement of carrier vessels and their activities has meant that transshipment operations remain poorly monitored at both the regional and global levels. Pew concluded that through the "combined analysis of Automated Information System data and publicly available reports to WCPFC, a strong probability exists that more at-sea transshipment events occurred that year than were reported by carrier vessels themselves or by relevant flag or coastal State authorities". Rates of transshipment have skyrocketed (Pew, 2019) despite the WCPFC's "Conservation and Management Measure on the Regulation of transshipment" requiring: "There shall be no transshipment on the high seas except where a CCM has determined, in accordance with the guidelines described in paragraph



37 below, that it is impracticable for certain vessels that it is responsible for to operate without being able to tranship on the high seas, and has advised the Commission of such”.

There are many additional concerns with transshipment ranging from non-compliance with notification and declaration requirements, to lack of standardised observer data collection, and significant underreporting of transshipment events.

Transshipments within waters of national jurisdiction shall take place in accordance with applicable national laws. There are a number of requirements for high seas transshipments, including notifying the WCPFC Executive Director at least 36 hours prior to each transshipment and submitting a WCPFC Transshipment Declaration within 15 days of each transshipment. WCPFC members “shall report on all transshipment activities... (including transshipment activities that occur in ports or EEZs) as part of their Annual Report in accordance with the guidelines at Annex II”. Vessels (fishing vessels and carriers) cannot perform transshipment without approval from the flag state and its under regional observers oversight (observer on carrier). Catches are reported in the WCPFC Transshipment Declaration.

Transshipment vessels and the fishing vessels are not necessarily flagged to be the same country. The transshipment carrier vessels that take product from the FIP vessels are generally landing either in Fiji or main Asian ports like Bangkok or Ho Chi Minh city. FCF prefers to have the albacore landed in Fiji.

One hundred percent observer coverage by observers from the WCPFC ROP is required for longline transshipments at sea, with the observer(s) deployed on the receiving vessel. “At this time, the measures do not define training programs specific for carrier vessels or for transshipment activities. As such it would be beneficial for observers to be trained to a specific standard and understand the key things to look for in transshipment activities” (van der Geest, 2019). This strategy supports 100 per cent electronic observer coverage of all transshipment events. The combination of electronically observing the longline vessel activities, and the carrier vessel activities should dramatically reduce the number of likely unreported transshipments, and therefore reduce illegal fishing.

For the FIP vessels, transshipments usually occur on the high seas. Pre-transshipping notices are sent to the flag state. Vessels (fishing vessels and carriers) are not allowed to perform transshipment without prior approval from the fishing vessel flag state. Regional observers are meant to oversee transshipments via an observer on the carrier vessel. Once the transshipment is completed the signed Transshipment Declaration is sent off by the carrier observer to the flag state. The flag is meant to submit the Transshipment Declarations to the WCPFC, however this rarely occurs. For example, in the WCPFC between 2016 and 2017 the WCPFC Secretariat only received one observer transshipment report. This is despite more than 2000 reported at-sea transshipments during that period (Pew, 2019b). SPC does not normally receive the transshipment data. Transshipment Declaration forms are not collected by port authority when calling port.



For transshipments that occur in EEZs or ports, the vessel provides the data to the coastal State and it is assumed the coastal State has a system to record this information. The Regional Information Management Facility portal is a collaboration between the Pacific Islands FFA and the SPC (Oceanic Fisheries Programme), particularly the transshipment module, which coastal States can use.

The International Sustainable Seafood Foundation and The Pew Charitable Trusts have both been very active in evaluating transshipment practices across the RFMOs. The two organisations prepared a best practices document for the NGO Tuna Forum, which was finalised in 2020 and signed onto by members of the forum: “The NGO Tuna Forum: Collective Best Practices for Well-Managed At-Sea Transshipment”.

### Improving paper-based transshipment elements

8. that Transshipment Declarations are provided to the and any other relevant authorities.
9. Work with national authorities to establish a system that requires information on all FIP vessel at-sea transshipment events (notifications, declarations, observer reports) to be reported to the relevant WCPFC Secretariat, flag states of both vessels, port state and coastal state, with summarised information reported publicly by the WCPFC. (2020/2021)  
Including to:
  - Confirm the relevant authorities.
  - Preferably within 24 of the event occurring.
  - Establish procedures to share data.
10. Cross check each year that the number of observer reports submitted to the WCPFC Secretariat annually and that the annual reported data match.
11. See if we can check the number of at-sea transshipments being declared in the new vessels, noting that the vessels are not just supplying FCF. Find some useful way to indicate if IUU transshipments might be occurring, for example: a pilot project to identify non-reported transshipments in a collaboration with the Global Fishing Watch; and confirming with the Chinese Government their level of monitoring of transshipments via Vessel Monitoring System (VMS) and enforcement.

## Moving to eFIS

### Electronic reporting (E-logbooks)

#### Summary of the need and current situation

The FIP vessels and their flag states (China and Fiji) do not use e-logbooks. In 2018, the third WCPFC ER and EM Working Group considered a paper *Progress on ER and EM implementation in the region*. While there has been a little more uptake of e-logbooks since then, the general description of the process remains the same. “The Pacific Community (SPC) at the request of, and in collaboration with member countries and longline vessel owners has started



to implement the Android application “OnBoard”. This application allows longline vessel operators to report their effort and catch data at any time when internet connectivity is available (either on-board the vessel or on shore). The e-logs are securely lodged to the TUFMAN2 database system where they can be verified and validated by the respective member countries’ fisheries authorities. Currently around four WCPFC member countries and 30 longline vessels are using OnBoard. The logsheet can also be exported and printed into the SPC/FFA paper format. The majority of vessels using OnBoard no longer submit paper log sheets.” (Hosken *et al.*, 2018).

Very few longline vessels operating in the WCPO use an SPC developed longline eLog application “OnBoard” for data transmission to SPC. Some longline vessels are trialling third party applications, and these applications are able to submit data to SPC. Five non-FIP longline vessels were using the system as at August 2019 (SPC-OFP, 2019).

Licensing States also report logbook information to the WCPFC Secretariat directly in Part 1 of the annual Cooperating Members, Cooperating non-members (CCM) reporting.

The Integrated Fisheries Information Management System (iFIMS) “includes an Android application (eForms) which allows longline vessel operators to report their effort and catch data electronically on a daily basis. Approximately 150 longline vessels are currently using the iFIMS E-Reporting system. E-logs are securely lodged to the [Parties to the Nauru Agreement Office (PNAO’s)] iFIMS database system and are then forwarded to SPC’s TUFMAN2 database system. These vessels continue to also report their effort and catch data using the SPC/FFA Regional Longline Logsheets paper form.” (Hosken *et al.*, 2018).

While not in this FIP, it is worth highlighting that some north east Asian countries are using e-reporting in the WCPO. For example, Taiwanese and Korean vessels are using 100% e-logbook reporting already. Some vessels are doing both electronic, and paper-based SPC logbooks as a requirement by some island countries. China is testing e-reporting now, FYI.

Figure 3 below illustrates the current data flow for e-logs (from OnBoard and iFIMS). The dotted arrows represent data flow processes that have yet to be fully implemented.



## Improving data collection and reporting strategies

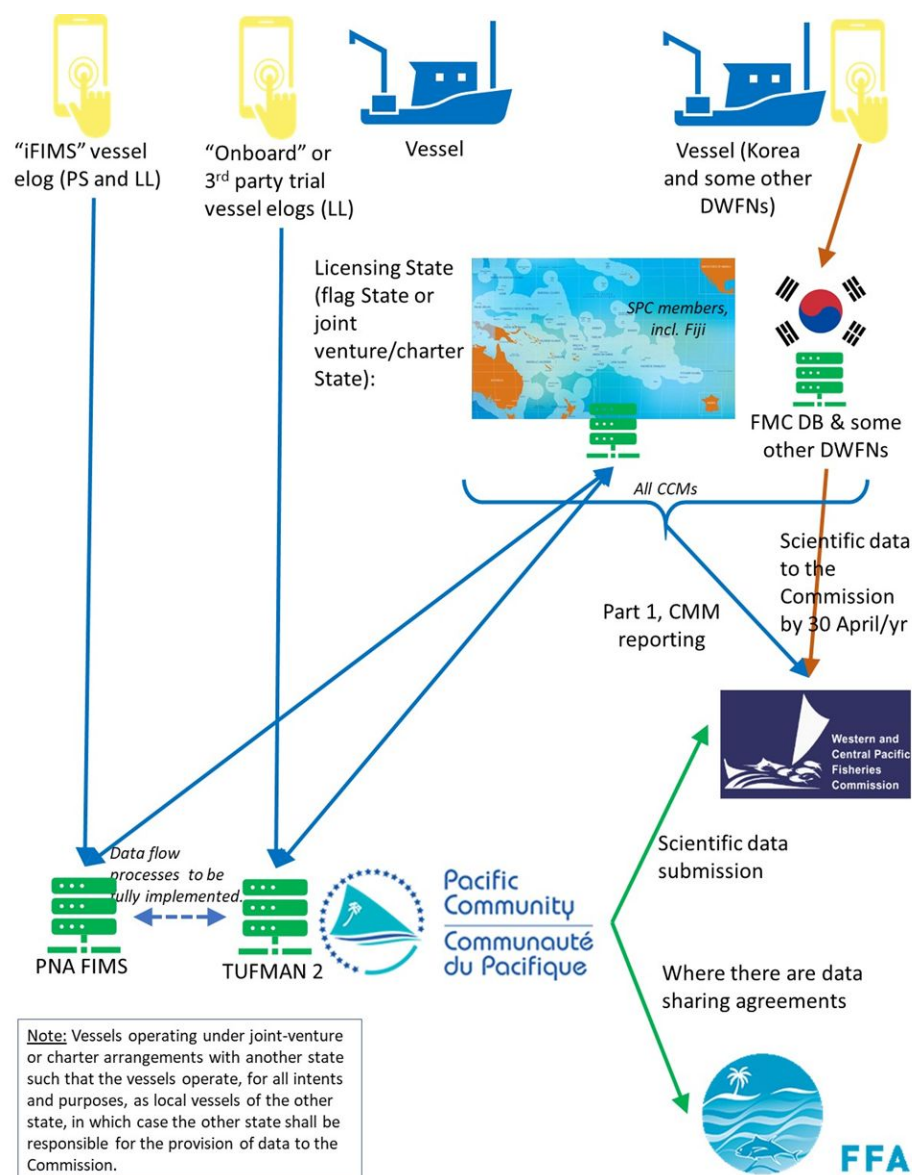


Figure 3. Current e-reported logbook data flow from iFIMS and OnBoard.

The OLLO app is the latest app from the SPC-developed tablet based E-Reporting tools suite. It is essentially used to collect extensive observer data from Longline vessels fishing in the WCPO. OLLO can then remotely send data to the master cloud based system TUFMAN2. Once in the system, the data can be viewed and/or edited by Fisheries officers from Pacific Island countries, almost in real-time. SPC has developed an app "OLLO" for longline observer reporting, however this has only been trialled in the Northern Committee. WCPFC receives data from SPC particularly on GEN-3 forms, which SPC alerts as flag State investigation in the online casefile system.



## Improving data collection and reporting strategies

Figure 4 below illustrates the current data flow for e-observer (from iFIMS). The dotted arrows represent data flow processes that have yet to be fully implemented.

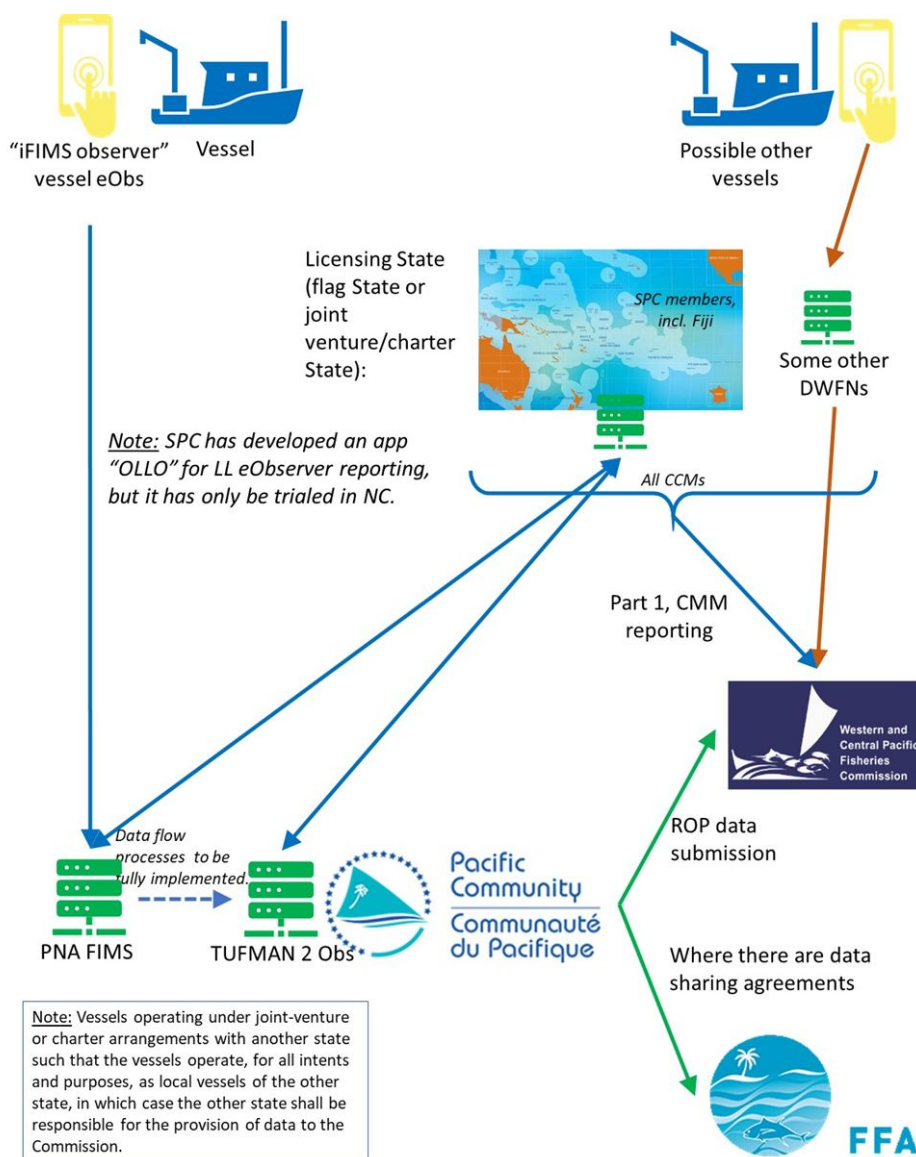


Figure 4. Current e-observer data flow from iFIMS observer.

### The plan going forward

China is moving to ER, as indicated in the 2020 revision to the primary law governing distant water fishing. Their timeframes are unclear, but it is highly likely that conversion will happen during the lifespan of this FIP. It makes sense to work with national authorities, SPC (as appropriate), and vessels preemptively to start the transition. Not least because this will align very strongly with the broader eFIS plan of integrating these systems. A key challenge will be to



enable the appropriate access to eLog and EM datasets for cross-referencing, and finding the resources to conduct the cross-referencing. Will require careful work with BB/FCF to manage this (with them representing the interests of the vessel owners).

1. O2 to reach out to SPC and WCPFC as appropriate to understand the nature of solutions and options, and to communicate to Bumble Bee/FCF as soon as there's a plan
2. Bumble Bee/FCF to work with the Fiji Government on the adoption/access of information and processes relating to ER data. (During 2020/21)
3. O2 to reach out to TR regarding China's plans for ER and how best to integrate this work. (Ongoing)
4. All to work on confirming data access by companies in an ER system (presumably vessel owners are authorised to access their logbook data, and this would be the mechanism whereby the FIP can access relevant data?) and develop data access and sharing plans/agreements internally and with other parties (e.g. flag state/vessel owners/coastal states). (Dec 2020)

## **Electronic monitoring**

### *Summary of the need and current situation*

As established, most primary data on fishing activities for the fleet is derived from handwritten information in logbooks. Until recent times, there were few verification systems for what was written, and none whatsoever for many important aspects of high seas fishing. Scientific observers collect extremely valuable, high-quality data from a miniscule, and largely unrepresentative subset of annual fishing effort in any given tuna fleet (except Purse Seine fleets), leaving the vast majority of global effort without any independent observation or verification. This 'invisibility' of high seas fishing activities has led to huge challenges in those fisheries' sustainably (see Figure 5).



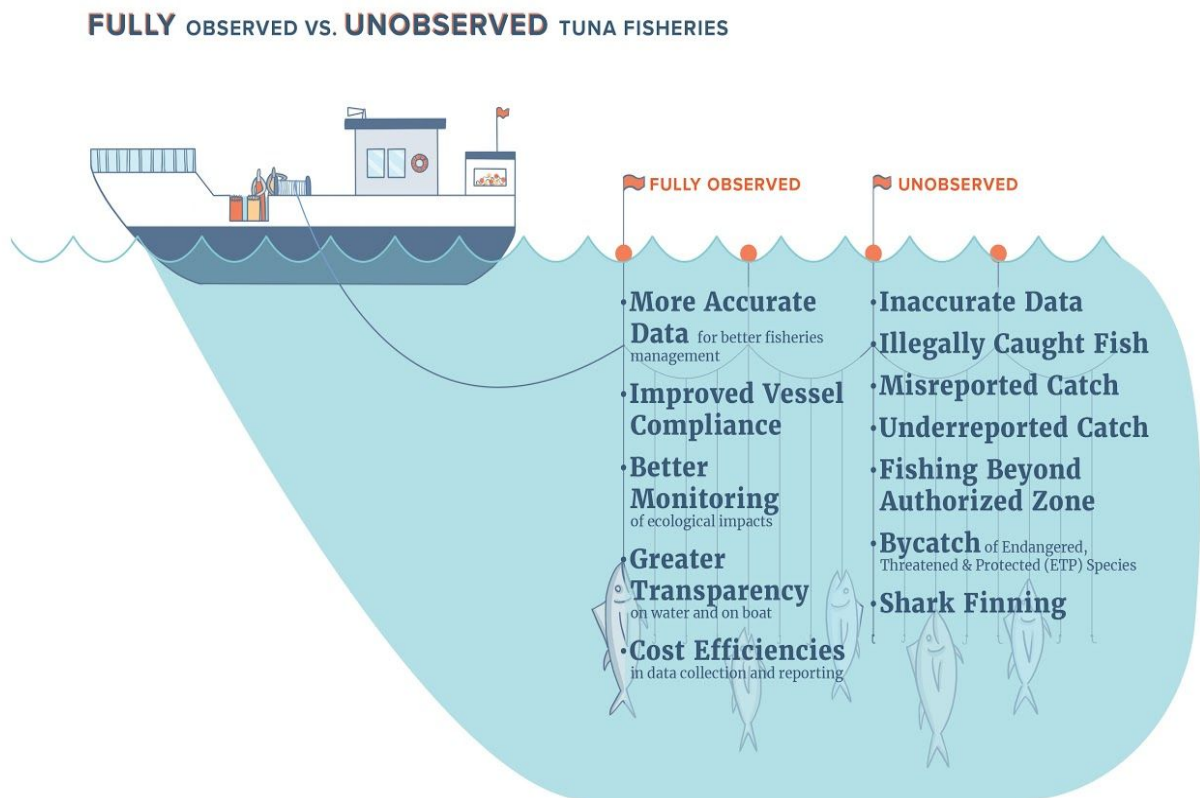


Figure 5. The NGO Tuna Forum’s summary of key benefits of observer coverage (2019).

Electronic monitoring is a cost-effective and efficient tool for better tuna governance, as it provides both scientific and compliance-related data, including large quantities of high-quality data for stock assessments. There is widespread agreement between marine conservation NGOs and retail industry bodies largely agree that 100% observer coverage is the target, to be achieved in relatively few years<sup>3</sup>. The COVID-19 pandemic has provided a regrettable cause to accelerate the uptake of eFIS, namely legitimised lack of observer coverage, including for transshipments. While the need to protect vulnerable crew and observers is clear, there remains the need: to ensure vessels comply with the rules; and that vital scientific data are collected. Removal of key Monitoring, Control and Surveillance elements (in this case, observers) weakens the links that maintain the verifiability of fishing-related activities throughout the seafood supply chain. It would open the door to increased Illegal, Unreported and Unregulated fishing and, in doing so, could undermine the recovery and resilience of many important fish stocks globally.

<sup>3</sup> [NGO Tuna Forum statement](#)



Compliance-related data can range from: the shark measures, such as the prohibition from retaining, transshipping, storing or landing oceanic whitetip sharks, and for incidentally caught sharks to be released, the incident recorded and reported; to the correct use of bird scaring lines (incorporating the use of tension detectors, not just cameras); turtle dehooking; and incorrect discharging.

Electronic Monitoring is not the silver bullet to solve all sustainability issues confronting the tuna industry, but for several challenges it's very close to that. EM should not, for the foreseeable future, put human observers out of work, but should complement them. Human observers are, however, expensive and require significant resources to manage and deploy; further, space on many High Seas vessels, observer safety, high turnover for relatively low-paid, arduous work makes EM a very attractive option in high seas fishing. For example, the Pacific Island countries have agreed that in the foreseeable future, only EM-equipped vessels will be allowed to fish tuna within the waters under their collective jurisdiction.

Tuna stakeholders are starting to expect more from tuna fisheries, including the uptake of electronic observer coverage. In 2018, The NGO Tuna Forum, which comprises environmental Non-Governmental Organizations (NGOs) focused on global tuna conservation, commenced a long-term campaign for longline fisheries to adopt and implement a 100 per cent observer coverage requirement – human and/or electronic – within five years. This was supported by a diverse, global group of 118 commercial and nonprofit organisations in a letter to the four key tuna RFMOs. In 2019, more stakeholders in the tuna supply chain voiced their support. To facilitate the uptake of electronic observer coverage, we encourage retailers to more explicitly request the longline vessels to adopt 100% observer coverage.

Forum Fisheries Committee members have agreed in principle to require all tuna fishing within their managed waters to have electronic monitoring installed by 2024, and are developing minimum standards and an implementation plan. The WCPFC will consider draft EM standards for adoption at its meeting in 2020. The International Commission for the Conservation of Atlantic Tunas will require an increase to 10% observer coverage for longliners from 2022, which will also propel fisheries towards using EM. The Inter-American Tropical Tuna Commission is developing its own set of standards. The draft was prepared for the 11th Scientific Advisory meeting in May 2020 (Román *et al.*, 2020). The document presents a summary of the current sources of EPO fisheries data, the staff's assessment of the potential of EM and how it might be implemented, and proposals for minimum standards for the various components of an EM system. The FIP is working with The Nature Conservancy, which is due to release its "Electronic Monitoring Performance standards for licensees Long line pelagic" at the end of June.

The primary reason for advocating 100% coverage is because compliance is patchy, and strongly linked to observer presence - levels of compliance are very high when observers are present, and unknown or considerably lower when observers are not present. It's not necessary to observe every fishing event for scientific purposes, but representativeness (the ability to



extrapolate from the observed subset to the entire fleet) and even-handed approaches essentially demand that all vessels have observer systems of some description.

Coverage levels of 20%-30% of fishing effort are adequate to estimate catch rates for target species with sufficient precision. As observer coverage levels increase from zero to around 20%, the accuracy of bycatch estimates increases exponentially (Lawson 2003, 2004). At 20% coverage, species comprising 35% of the catch will be estimated to within 10% of their actual catch levels 90% of the time (Babcock et al. 2003). More than 20% coverage yields decreasing increments in accuracy (Lawson 2004). Higher rates of coverage to estimate bycatch rates of rarer events. For example, to estimate captures within 10% of true levels 90% of the time for species comprising <0.1% of the catch, >50% coverage is required (Babcock et al. 2003).

We are seeking 100% coverage of fishing activities by cameras, with approximately 20% sampling of that coverage for analysis.

Williams (2018) included a preliminary review of discard/release data for the longline fishery. Among other things, the preliminary review noted discard data by species from observer data are considered the most reliable, and that “the estimates of discards in weight are not as accurate, nor as easy to determine, as estimates of discard in number”. Given the importance of observer data for estimating discards, and the current low levels of human observer coverage, the e-observer system must incorporate discards reporting, with a view to technologies (e.g. artificial intelligence) enabling tonnage as well as number recording.

EM does have its limitations, and there will likely always be a need for ongoing human involvement for biological sampling. Emery *et al.* (2018) evaluated the WCPFC ROP and identified “Only eight [longline] fields (16%) were classified as not possible to be collected using integrated EM systems (EM-NP), with two additional fields (4%) possible to be collected in the future following technological advancement (EM-P2)...”

While China is currently not using EM in its frozen fleets, it has used some EM in its Ice/Fresh fleets. In 2017 that coverage was 1.9% of trips of processed EM data made available to SPC, and in 2018 none. The Fiji fleet had 19.6% of its longline trips electronically monitored in 2017, and 10.6% in 2018 (Williams *et al.*, 2019). The Fijian-flagged longline vessel fleet as a whole has a higher level of electronic observer coverage after a trial of 50 sets of EM in 2015 funded through the Global Environment Fund Sustainable Management of Tuna Fisheries and Biodiversity Areas Beyond National Jurisdiction project. There was a small amount of overlap with some of the FIP vessels/company fleets. The Fijian Government secured funding to continue with the project.

An initial hurdle for implementing EM in the FIP fleets is obtaining approval from the Chinese Government on installing equipment on vessels and using data. After that we can move to data reporting sharing in Fiji or the wider regional area (SPC etc). Consideration will need to be given to how the EM data from our FIP will need to be integrated into the Fijian system, if that is needed at all.



As identified by MEC (2017), “There is a clear paucity in data within [logbook and EM pilot] datasets, and concerns regarding data validation and verification remain as key issues.” FIP vessels. Systematic verification of logbook data has been shown to lead to improved data collection by vessels if appropriate incentives are incorporated (Emery *et al.*, 2019). However, in a situation where the FIP does not own the data, have direct access, or have the capacity to conduct analysis, it is unlikely verification could be run by the FIP, and the implementation of appropriate incentives is challenging. Verification ultimately needs to be incorporated into licensing state management. The implementation of an e-logbook system that relates to the observer data system would make verification easier.

Bumble Bee’s e-observer trial on 13 vessels, included eight FIP vessels. There were a further two FIP vessels, however these vessels were scrapped. As of June 2020, four of the eight FIP vessels still had operational cameras, while the other four had broken or missing equipment. Ocean Outcomes completed an evaluation of the EM data collection previously employed in Bumble Bee’ and FCFs EM trial (Confidential 1). The evaluation was shared with FIP participants. That strategy forms the basis for future EM data capture.

### *The plan going forward*

1. Decide upon and resource a person to access and undertake regular analysis of EM and logbook data (2020)
2. Confirm data needs that will be met through the system to address data deficiencies
3. Finalise inventory of existing EM infrastructure (July 2020)
4. Refurbish units as needed (Need FCF input for this)
5. Establish contract with DOS (2020?)
6. Commence recording and capture of data
7. Confirm EM protocols that will be used. Ensure potentially additional requirements such as ensuring cameras set up for capturing seabird interactions and including hook counting are covered in the EM standards. Consider if it is possible to estimate marine debris discarded during fishing and the Garbage Management Plan is being complied with.

### **In addition - longer term, starting January 2021**

8. Determine pathway to obtaining approval by the Chinese and Fijian Governments on: how the EM might integrate with the fisheries management and regulatory framework; installing equipment on vessels; and using data. Obtaining approval is a key priority as many strategies are dependent on it for longer term to successful uptake and implementation.
9. Secure commitment from Bumble Bee for 100% EM plan. (October 2020?)
10. Secure funding for roll-out (Sustainable Seafood Fund). (December 2020)
11. Establish pre-competitive collaboration for expanded EM support (with TNC) (initiated in May 2020, expect to be completed by May 2021)
12. Assist in negotiating EM data capture contract. (June 2021)



13. The base model is 20% random subsampling from EM datasets on a per-trip basis (so each trip is randomly subsampled at 20% of sets, however that could vary. It will depend to some extent on what the video data shows, and if we can access logbook data to cross-reference (this may not be possible for O2, but may be for BB/FCF).
14. Secure approval from the Chinese Government on installing equipment and using data, and ensure appropriate management and regulatory framework is being established.
15. Consider feasibility of verification of logbook data, and/or work with the Chinese and Fijian Governments to develop a verification program that incorporates incentives to accurate logbook reporting.
16. Oversee implementation of new EM units.
17. By end 2023, all vessels have EM installed and in use.

## Transshipments

The summary of the need and current situation for transshipments are outlined above in the paper-based section. Additional information for the electronic section is that the SPC developed the WCPFC [High Seas Transshipment Electronic Reporting System](#) (TERS). “TSER is a computer system (app) that allows vessel masters, company managers and staff of national fisheries management agencies to submit high seas transshipment notifications and declarations to the WCPFC electronically.”

There are an array of recommendations for improving transshipping practices, however most relevant to the data and reporting elements of the FIP is the implementation of EM.

### *Improving electronic-based at-sea transshipment elements*

12. Investigate implementation of eReporting of declarations in the fleet data improvement plan.
13. 100% observer monitoring is key. Observer coverage needs to be on both the fishing and carrier vessels.
14. As part of developing EM standards there needs to be specific clarity of what the cameras would need to record and what would need to be analysed in relation to transshipment data collection.
15. The FIP can also encourage transshipments at port where there is much greater visibility of what is occurring and easier access for people to observe and sample.

## MARPOL Annex V - Garbage Management Plans

The International Maritime Organization's International Convention for the Prevention of Pollution from Ships (MARPOL) includes Annex V, Regulations for the Prevention of Pollution by Garbage from Ships. Annex V prohibits all types of all types of garbage into the sea unless



explicitly permitted under the Annex. All “shipowners” and operators should minimize taking onboard material that could become garbage. Vessel-specific garbage minimisation procedures should be included in the vessel’s Garbage Management Plan.

*The plan going forward*

1. FCF to check whether FIP vessels have MARPOL complaint Garbage Management Plans, and if not, ensure vessel owners to develop them and begin implementation. (2021)
2. Point 5 of the Observer “Improving paper-based observer data collection” section includes: “Pursue verification that vessels have available, and are complying with, a Garbage Management Plan that meets the MARPOL ANNEX 5 requirements”.
3. Point 7 of the Electronic Monitoring “The plan going forward” section includes: “Consider if it is possible to estimate marine debris discarded during fishing and the Garbage Management Plan is being complied with”.



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## Appendix 1

# Notes regarding EM data for FIPs

(quarter two, 2019)

There are two main issues to consider here. First, what data is it the responsibility of the FIP project partners to collect, so as to ensure and be able to demonstrate to third parties that deck practice and catches are within acceptable standards/limits. The second is data ownership and access.

There is an increasing need to improve the quality and completeness of data collected, cross-reference data from EM with logbook data, and use EM to ensure compliance with various measures. Some of the basic data, such as time and positions of activities (e.g. setting or line-hauling) can be obtained from EM sources quickly and efficiently through automated routines. Other data, such as identifying catch, is considerably more time-consuming, does not currently have Artificial Intelligence (AI) routines (this is changing rapidly...), and so is very costly data to recover from video. There is clearly a need for balance, so as to minimize costs without compromising the purpose of EM. What this project should do is to ensure high quality data from 20% of sets, from every trip, and to cross-reference all catch data from EM with logbook data. This will give clear indications of reliability, and could lead to future reductions in the proportion of sets analyzed, if there is sufficiently high congruence between observed and reported catches. It is highly recommended that participating vessel operators (owners and captains) have this process (subsampling and cross-referencing) explained, so that they are aware that their logbook entries are likely to be verified.

There are multiple potential uses for EM data. Here we describe what O2 believes to be essential for good FIP purposes. There are other datasets that may be required by flag states for reporting to RFMOs, by vessel owners/operators for quality control or other purposes, etc. We will focus on what is required for FIP, and make suggestions for what can be either no longer collected, or the funding for continued collection should be explored with parties that want the data.



## OPERATIONAL DATA

### Spatial and temporal data of events

Currently, when units are retrieved by Satlink/DOS, they are connected to a server and VMS data stored in association with the video files allows AI to detect all setting operations for an entire voyage, within minutes. Thus, every set start and end time and position can be provided within hours of retrieving the drives.

**Key take home message:** all trips should be subsampled at  $\geq 20\%$  sets observed, and entire sets should be quantified (not subsampling within a set). All catch on observed sets should be quantified to species level whenever possible.

### Things that DOS currently gathers for BB/FCF, but which is not be required for FIPs:

1. *Total hooks set.* This is done by having the dry observer (rather laboriously) count the number of hooks between floats (not all, but a large sample), and count the number of floats (all). For **every** set. However, this is not of any interest or relevance to the FIP, which can safely rely on the logbook effort reporting without any concerns. Paying DOS to provide this is unnecessary and **removing this requirement should reduce costs significantly**. Setting duration can be delivered automatically, and this will give a very robust ‘rule of thumb’ for verifying the total effort in the logbook.  
Note: this information (total hooks and total floats and hooks between floats) is currently required from observer programs by RFMOs, however this is a national competence, not a FIP requirement. Wet observers typically take these data from the logbooks, so asking the EM operations to expend significant resources to capture these is irrational. It could be a point of discussion for national governments to have collected (but who would be responsible for the costs, as this is an expensive dataset to obtain?). This is an area where rudimentary “Electronic Reporting” can add value – skippers log can electronically record how many hooks and floats were set, as they would ordinarily do in their paper logbook; this information can then accompany the EM data (should such a system be implemented – tbd) and be served to RFMOs as required.
2. *Detecting fish on deck.* Data on managed species (tunas, billfish, etc.) should be gathered from a random subset of 20% of sets, and **cross-referenced with logbook data**. If there are consistent discrepancies, this will require further investigation into appropriate solutions.
3. *Bait species/proportions.* For FIP purposes it should suffice to know where the companies (including FCF) are procuring their bait from, and what fish species are used.

## BYCATCH of ETP SPECIES

### Discards



1. For all sets observed ( $\geq 20\%$ ), **all catch** should be recorded, by species or groups if species is not identifiable from video. This includes bycatch/discards.
2. Where lines are cut away before being hauled, they should be recorded as such (i.e. there should be a 'cutaway' column to be completed. If camera placements allow the observer to view the area of water around the hauling bay, then the species/group (e.g. 'shark') should be recorded as discarded, ideally with a tag denoting that it was cut away not hauled aboard.

RFMO discard reporting requirements are mixed and often recommended rather than required. Discards are ubiquitously poorly reported. Part of the FIP aims to educate fishers about discard reporting in logbooks, and encouraging recording and reporting of all discards. This will involve improving the logbook fields and verification through cross-referencing with EM.

According to DOS, roughly 20% of bycatch is cut away before being hauled. Recording of ETP species is a requirement in all RFMOs, and cut-away behavior introduces meaningful uncertainty, likelihood of under-reporting of true captures, and therefore risk to the FIP. This loophole can be eliminated through placement of a camera with a wide-angle view over the water immediately around the hauling bay area. This is not something that should be factored in immediately, unless existing camera arrangements allow cutaways to be viewed and quantified, but certainly something to consider as EM roll-outs progress.

## Seabirds

Compliance with seabird bycatch mitigation measures can and should be verified through EM, whenever vessels operate south of  $25^{\circ}\text{S}$ . There are nuances between the relevant CMMs for WCPFC and IOTC areas. For the purposes of the FIP, and to simplify instructions to participating vessels, we recommend that all vessels be required to use 2 out of 3 measures whenever operating south of  $25^{\circ}\text{S}$ , in either ocean:

1. Night setting
2. Line weighting
3. Bird scaring lines

From January 2020 WCPFC (2018-03) will allow vessels to ignore the above 2 out of 3 measures in favor of hookpods – this can be evaluated through EM on a case-by-case basis (i.e. through vessel-specific instructions to DOS).

Ross Wanless has engaged with DOS to request that they develop an AI routine to determine night setting, which should be possible for DOS to provide within 3 days of receipt of hard drives. If requested in future, DOS will automatically run the routine when any vessel conducts any operations in the south, and deliver a report on which sets were conducted at night. Note that night setting as a seabird bycatch mitigation measure is binary; there is no possibility within the CMMs for 'partial night setting'. Either all hooks are set between nautical dusk and nautical dawn, or night setting was not used.



DOS should further be instructed to automatically flag up any sets that occur south of 25°S, and immediately check the following from the stern (setting deck) camera:

1. Was a bird scaring line (BSL) deployed?<sup>4</sup> This should include checking within 10 minutes of the start and within 10 minutes from the end of setting, and at least once in between. An AI routine could be developed to select 30-second clips randomly for checking – i.e. this should NOT be an onerous and time-consuming effort, as all that is required is to verify presence/absence.
  - a. If no, then mark the set as not using this measure.
  - b. If yes, was the BSL deployed when setting commenced and for the duration of setting operations?
    - i. If yes, then mark set as having used this measure.
    - ii. If no, then mark 'BSL partial use'. Partial use should trigger internal interventions to engage with the captain, with the purpose of ensuring that in future, BSLs are deployed correctly.
2. Is there any evidence of weights attached to branchlines? This can be achieved through visual inspection by a dry observer of a reasonable subset of hooks (~100?) selected at random from the entire setting process. If no, mark set as 'No line weighting'. If yes, mark set as 'Line weighting used', if partial, then flag this for further visual inspection and/or direct communication with the skipper in future.
3. Use of hookpods can be assessed in future, currently no vessels are using this measure

## Sharks

Identifying the species, or major group, of sharks is difficult and time-consuming. However, there are certain species for which “no retention” is required. These are mostly easily identifiable species/groups (e.g. thresher sharks, hammerheads, etc.). DOS should be requested to quantify, from 20% of all operations of each voyage, how many of the following were a) captured and b) retained:

1. oceanic white-tips
2. threshers
3. hammerheads
4. Others (all other sharks, unless easily identified, should simply be recorded as “shark NEI”)

Finning is banned, although removing fins is not. Cameras can detect any discarding of trunks from the hauling deck, but cannot detect covert discarding. Cameras may be used to verify that fins are landed attached to the trunks – i.e. during landing/transshipment. This should be explored further. During the 20% detailed analysis, DOS should be asked to look specifically for and report upon

- a) any trunk discarding

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<sup>4</sup> This may not be possible to determine currently, and will depend on the layout of the setting deck, and the placement and angle of the stern camera. It would be good to review each vessel's camera setup and adjust as needed to ensure this information can be collected.



- b) how many branchlines are cut away (i.e. catch not landed and so not detectable)
- c) how many sharks are landed and taken out of camera view

## **Turtles**

DOS should observe turtle handling procedures (likely to be very few). Guidelines for how DOS should quantify handling procedures on deck are required, and perhaps this is where a turtle bycatch expert could be commissioned to provide advice? Or O2 can explore further how to bring data capture routines to DOS that meet Best Practice standards, or which provide good information that can be used to train crew in future. All FIP vessels use only circle hooks, and there is a strong preference for fish bait, both of which are recommended turtle bycatch mitigation options. There's thus no need to have EM evaluate these mitigation options, occasional inspections and bait info from elsewhere will suffice.



## LOGISTICAL CHALLENGES

A technician is required to be physically present at each landing site where hard drives are to be removed/replaced. DOS/Satlink currently do not have a presence in Mauritius, and this is going to have to be addressed if EM is to be effective in the Indian Ocean.

A second challenge is ‘batching’ of drives. It is ideal for DOS to receive a regular stream of returning drives. It is very problematic for drives to accumulate from multiple vessels and to then be couriered to DOS together. There may be minor additional costs for sending drives more regularly in smaller consignments, but this will help prevent massive delays in getting data captured and returned.

Satlink and FCF should explore setting up a relationship with transshipment observer service providers, and to provide them with the training and means to replace drives during transshipment operations.

Ultimately, the ideal (and very likely future in the next 12-24 months) is for each vessel to have a dedicated laptop computer that uses AI algorithms to analyze all video streams ‘on the fly’, and to generate reports with negligible data transmission costs. This will allow reports from EM to be transmitted near-realtime (at daily/5-day/weekly intervals) and will eliminate most of the costs currently associated with EM data capture. However, AI is unlikely to provide the full picture – certain things, such as finning or use of BSL, probably cannot be evaluated by AI at this stage. Nonetheless AI should vastly increase the volume and quality of data (i.e. no need to subsample 20% of sets), reduce the lag times from events to data provision, and eliminate much cost.

## COLLABORATIVE SYNERGIES

Privately funded observer programs, such as those that FCF and BB are implementing, represent a significant opportunity to national reporting obligations. FCF and BB should explore relationships with flag states, to include the FIP EM data as observer data into the national observer programs. Typically, observer schemes are funded through license fees, so FCF could seek to secure rebates on behalf of participating vessels that have EM installed. This raises challenges – such as ownership of data, who pays for data capturing costs, etc. But it’s worth exploring these options. Also worth exploring if flag states are willing to pay for certain data to be captured, which BB/FCF/the FIP could then use, in return for sharing with the State the data that BB/FCF are paying for. Finally, sharing the data for scientific analyses should be strongly encouraged. O2 will establish a group to, *inter alia*, consider how and where to share EM data.