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INTERIM

Improving data collection and reporting strategies

June 2020

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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) 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."

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, ghost gear, bait data, and transshipment (currently only 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	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. 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. 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.
		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; 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. Encourage the WCPFC E-reporting and E-monitoring Working Group stays on track. Adoption of CMM in 2020.

			Discussions both within the FIP and with the working group need to include future responsibility for e-observer footage analyses.
		2.4	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).
2.1.1 and 2.2.3	Primary species - Outcome, & Secondary species - Information	2.5	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.
		2.6	Require vessels to fill in discard information in logbooks.
2.2.2 & 2.3.2	Secondary and ETP species - Management	3.2	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. Appropriate monitoring and bycatch policies are critical to characterise, quantify and manage the interactions as well as verify the implementation of any Bycatch policies. Cumulative effects with other MSC certified fisheries should be taken into account. Skipper and crew training considerations to be made in conjunction with the Bycatch policy/code of practice development.

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 data collection and reporting

The Oceanic Fisheries Program of the Secretariat 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.

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 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." (MEC, 2017)

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.

WCPFC do not receive the data directly from the vessels or their flag, they receive the data from SPC.

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.

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

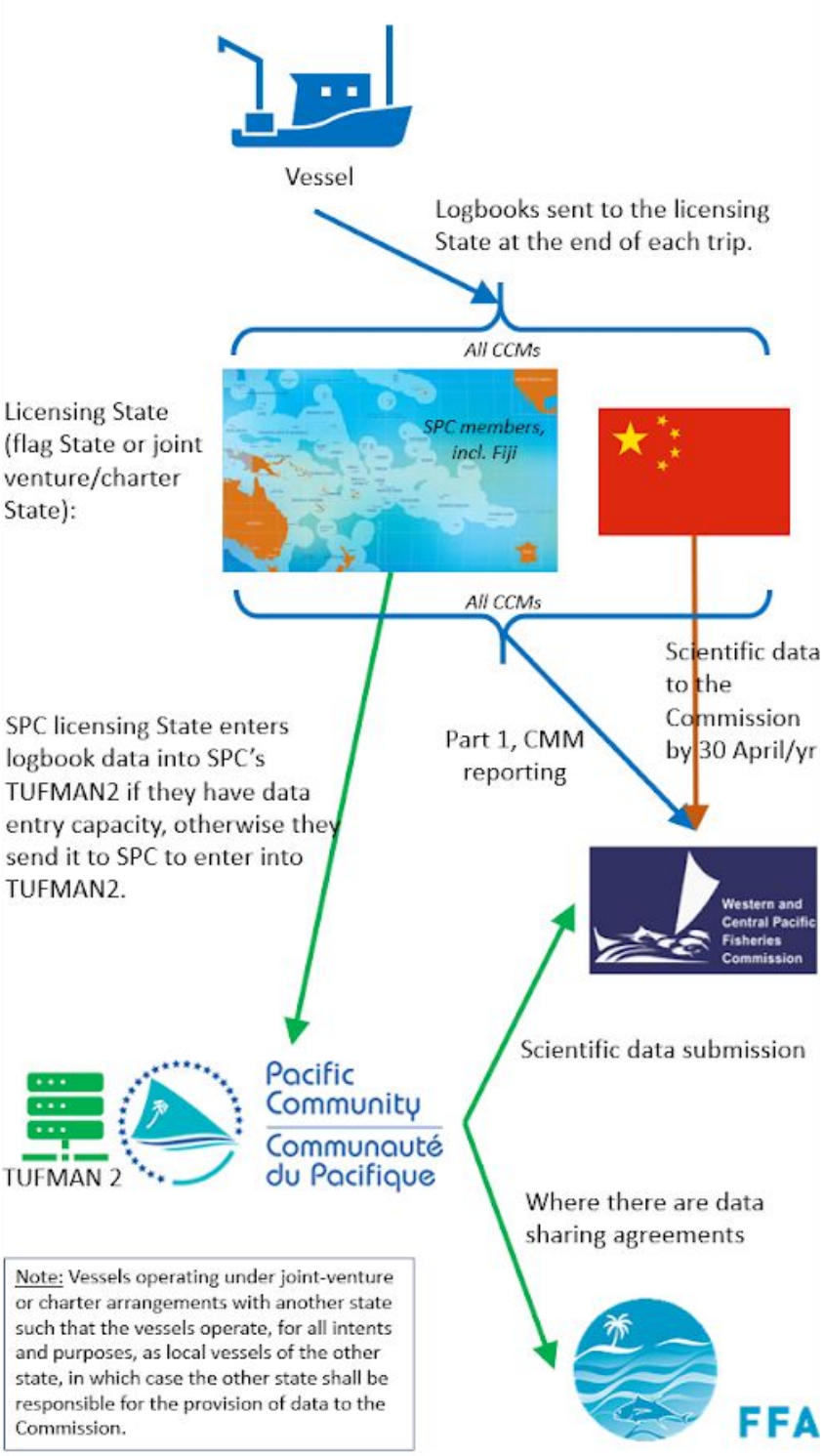

Figure 1. Current paper logbook data flow.

Discards

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).

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 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. In 2019, the Commission assessed China as "Priority non-compliant". "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 (2021)

- In working toward improved discard recording:
  - annotate the Mandarin/English logbook regarding discards in Mandarin.

  - 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.
- Ocean Outcomes to delve deeper into compliance with the striped marlin (2006-04) and swordfish (2009-03) CMMs. In the future it may be possible to verify compliance, if is acceptable to the fleets, by using the logbook data that the FIP may be able to obtain.
- Provide vessels a species reference sheet in Chinese that syncs with the format of the English only SPC/FFA logbook currently in use.
- Ocean Outcomes to delve deeper into compliance with the striped marlin (2006-04) and swordfish (2009-03) CMMs. In the future it may be possible to verify compliance, if is acceptable to the fleets, by using the logbook data that the FIP may be able to obtain.
- 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.
- Assess other avenues for education.

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 WCPFC 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 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'[1] 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 Multilateral Purse Seine Treaty, which is processed by the Pacific Island Forum Fisheries Agency (FFA).

[1] "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)

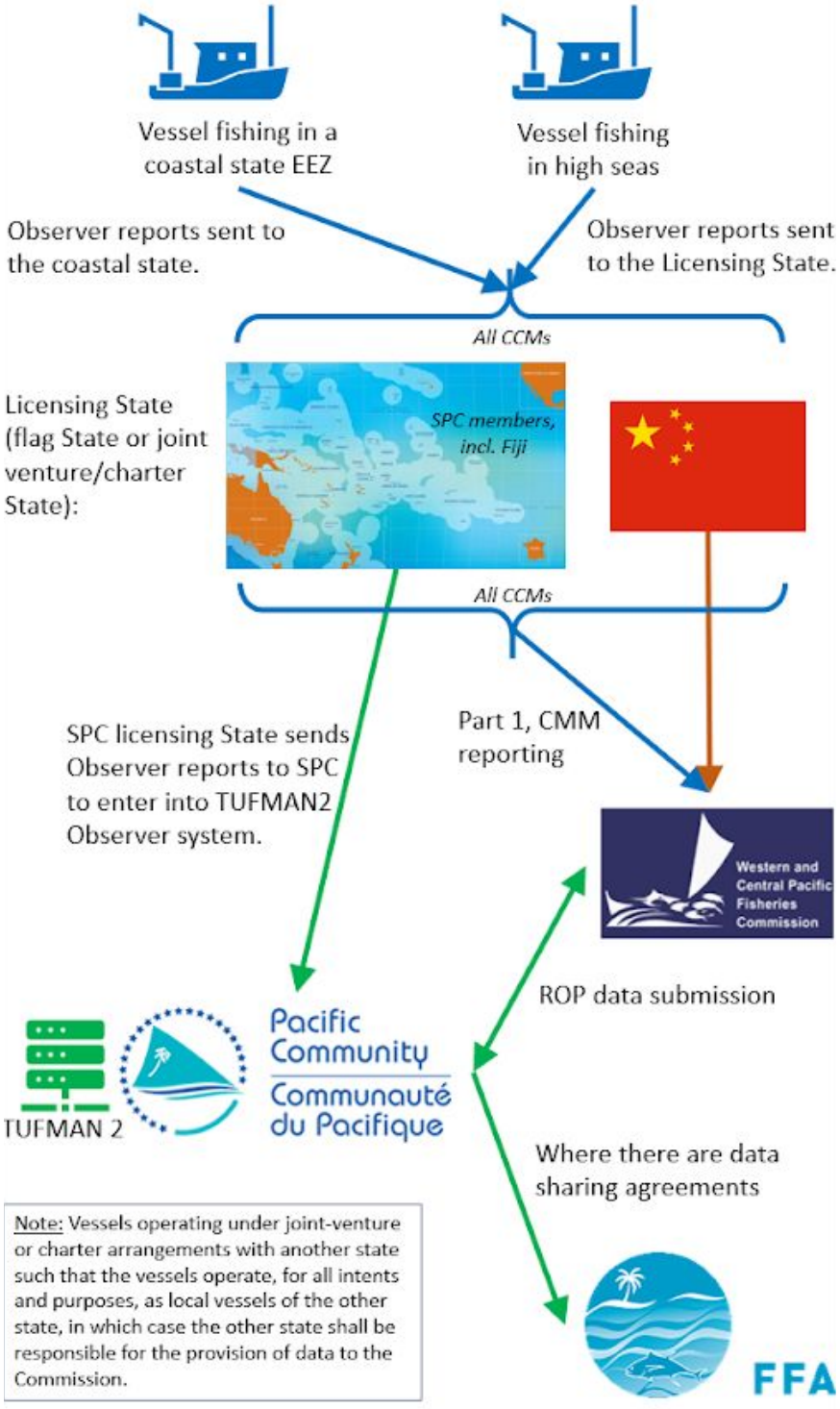

Figure 2. Current observer data flow.

Improving paper-based observer data collection

- Work with the Chinese Government to improve compliance with the 5% observer requirement (CMM 2018-03). Encourage representative coverage of the 5%. (2021)
- Encourage the Chinese Government to work with the SPC to determine if they can make it easier to upload China's observer data. (2021)
- 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)
- Commence discussions on moving to e-reporting for logbooks and observer data as discussed under the e-FIS sections below.

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."

Moving to eFIS

Electronic reporting

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 elogbooks 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/[Pacific Islands Forum Fisheries Agency](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 Logsheet paper form. (Hosken *et al.*, 2018)”.

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.

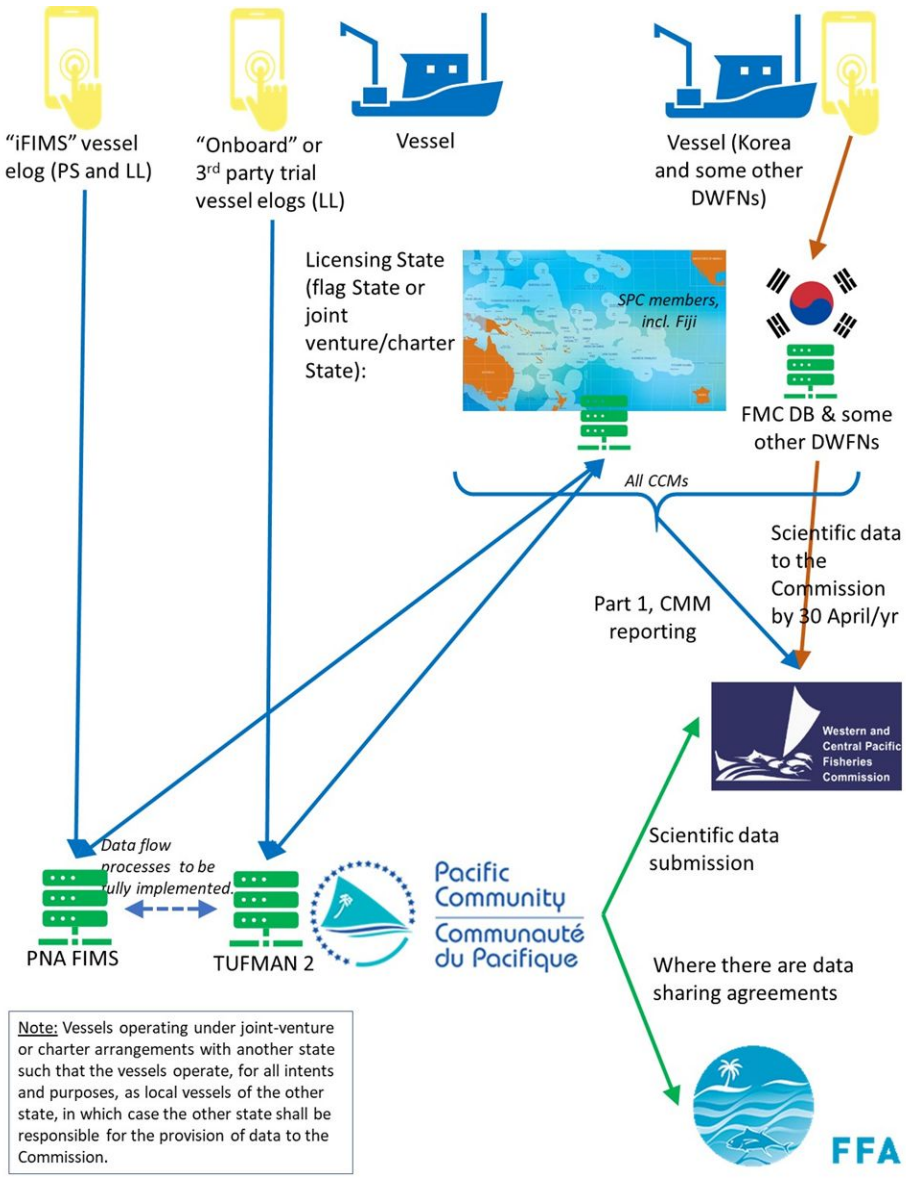

Figure 3. Current e-reported logbook data flow from iFIMS and OnBoard.

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.

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.

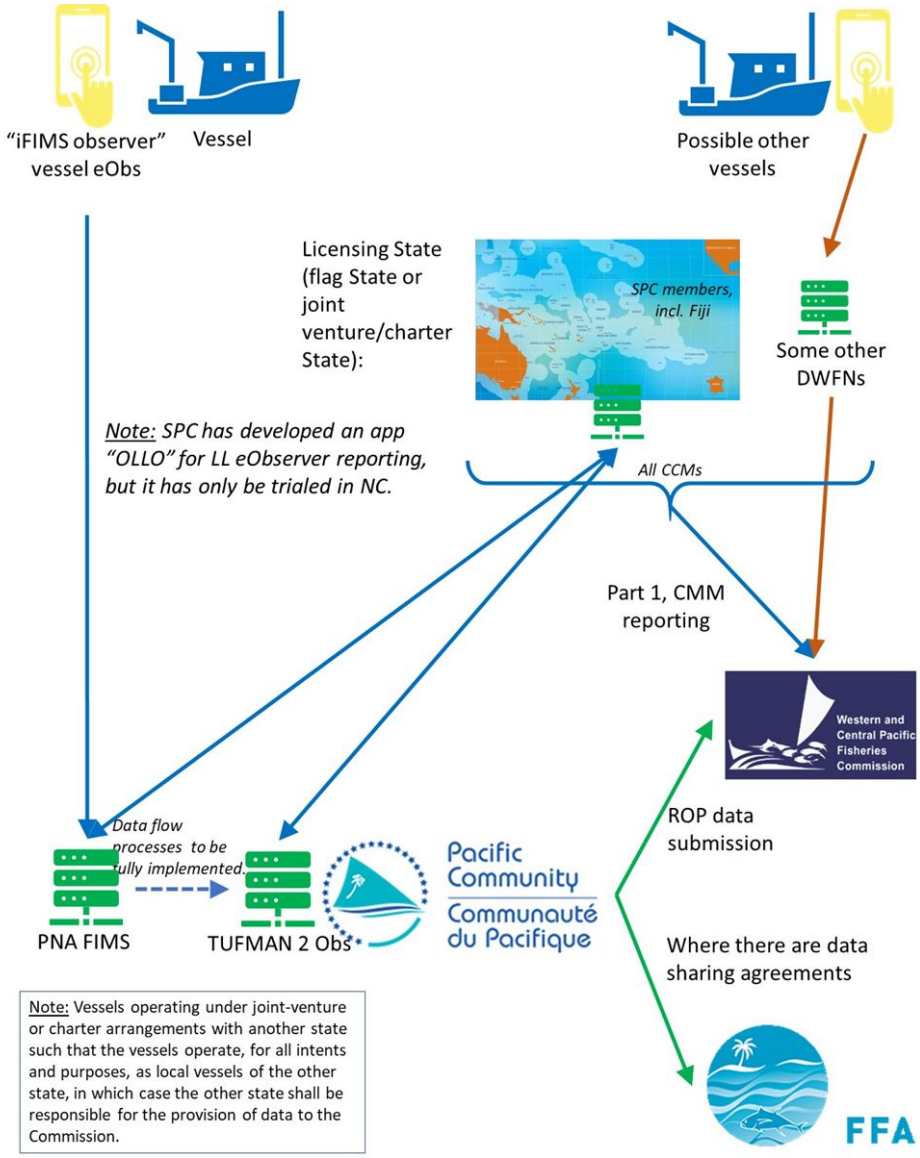

Figure 4. Current e-observer data flow from iFIMS observer.

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. Bumble Bee/FCF to work with the Fiji Government on the adoption/access of information and processes relating to ER data. (During 2020/21)
2. O2 to reach out to TR regarding China's plans for ER and how best to integrate this work. (Ongoing)
3. All to work on understanding data access (presumably vessel owners are authorised to access their 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).

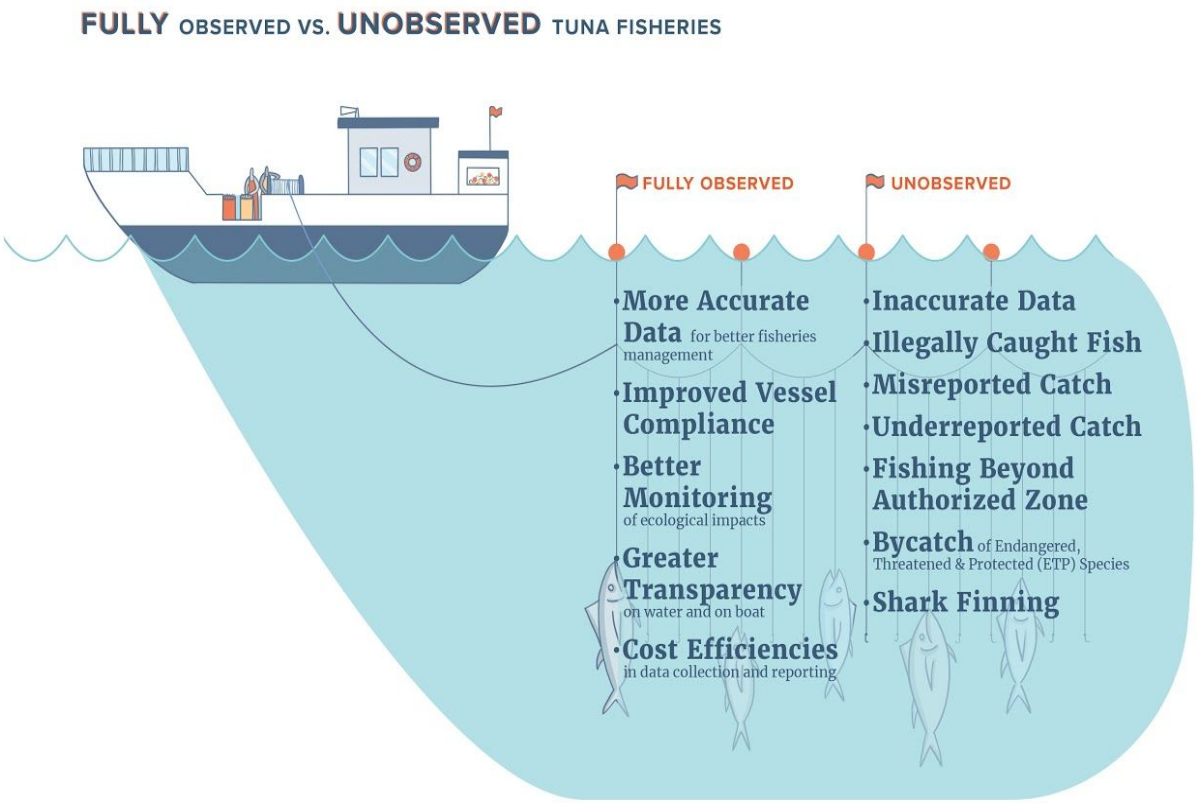

Figure 5. The NGO Tuna Forum's summary of key benefits of observer coverage (2019).

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[2]. 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.

[2] *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. 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 is a 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 elogbook 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. The evaluation was shared with FIP participants. Ocean Outcomes also 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 (Aug 2020)
2. Finalise inventory of existing EM infrastructure (July 2020)
3. Refurbish units as needed (Need FCF input for this)
4. Establish a contract with DOS (August 2020?)
5. Commence recording and capture of data (Sept 2020)
6. Determine pathway to obtaining approval by the Chinese Government on: how the EM might integrate with the fisheries management and regulatory framework; installing equipment on vessels; and using 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.
8. Consider how the EM data from our FIP will need to be integrated into the Fijian system, or if that is needed at all.

In addition - longer term, starting July 2020

9. Secure commitment from Bumble Bee for 100% EM plan. (August 2020?)
10. Secure funding for roll-out (Investment fund). (December 2020)
11. Establish pre-competitive collaboration for expanded EM support (with TNC) (May 2021)
12. Assist in negotiating EM data capture contract. (June 2021)
13. The base model is 20%, but 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.

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 transhipment have skyrocketed (Pew, 2019) despite the WCPFC’s “Conservation and Management Measure on the Regulation of Transhipment” requiring: “There shall be no transhipment 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 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 transhipment and submitting a WCPFC Transshipment Declaration within 15 days of each transshipment. WCPFC members “shall report on all transhipment activities... (including transhipment 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. However, unlike for some other tuna RFMOs, transshipment observers on carrier vessels are not provided with any specific training or protocols to ensure consistent data collection. This strategy supports 100 per cent electronic observer coverage of all transhipment events. The combination of electronically observing the longline vessel activities, and the carrier vessel activities should dramatically reduce the number of likely unreported transhipments, 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 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 transhipment 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 transhipment module, which coastal States can use.

The International Sustainable Seafood Foundation and The Pew Charitable Trusts have both been very active in evaluating transhipment 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”.

The plan going forward

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.

- 100% observer monitoring is key. Observer coverage needs to be on both the fishing and carrier vessels.
- 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.

- 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.
- Work with national authorities to ensure that Transshipment Declarations are provided to the WCPFC Secretariat and any other relevant authorities. (2020/2021)

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