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An update on cannery data with potential use to the WCPFC

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INTRODUCTION

Comprehensive cannery receipts data from more than twenty processors [receiving WCPFC purse seine catch] have been provided to the WCPFC over the past 6-7 years as part of an initiative of the International Seafood Sustainability Foundation (ISSF) and their participating processing companies. Lewis and Williams (2016) reviewed the potential use of cannery receipt data for the work of the Western and Central Pacific Fisheries Commission (WCPFC), and in particular, providing a means of validating the estimates of the purse seine catch by species using logsheet-reported catches adjusted with observer data estimates of species and size composition. The main findings of Lewis and Williams (2016) were that there is clearly potential for using cannery receipts data to validate/compare species and size composition breakdowns by fleet determined from observer-derived estimates, provided the following applies:

- The consolidated total trip catch according to cannery data is consistent with the total trip catch from logsheets and the observer data (that is, the data from canneries covering the entire trip are collected, compiled and available), and
- The cannery is recording species composition for all relevant size categories.

Unfortunately, Lewis and Williams (2016) found that only 5% of the available cannery data satisfies the following criteria, which would be necessary to validate observer data:

(i) Matching of trips for observer and cannery data, and
(ii) Species composition was undertaken by the processing company for all size categories, and
(iii) The difference between estimated catch from observer and cannery data is < 5%.

Williams (2017) outlined a methodology for increasing the coverage of cannery data that can be used to validate species composition determined from observer data (from 5% to around 20-25%).

This brief paper provides an update of recent developments in the management of cannery data and an update of the data summaries presented in Williams (2017) and Williams (2018).

This paper also provides a list of minimum required fields for cannery data (see ANNEX), which are currently provided by the ISSF participating processing companies, and can be used as the basis for any voluntary submissions of cannery data from other processing companies that are yet to provide data.

RECENT DEVELOPMENTS

Cannery data continue to be provided, now covering years 2018 and 2019 (with thanks to respective processing plants compiling and submitting the data). The web-based system (a component of the integrated tuna fishery database system – TUFMAN 2) to enter/import/manage cannery data has been enhanced over the past year, through the addition of data quality control checks and better support for the automatic import of MS EXCEL files of cannery data files received from most processing plants. The cannery data are automatically linked to respective logbook and observer data at the trip level, which facilitates the comparison of total trip catch by species (noting that cannery data are only accessible to the Scientific Service Provider in this system, at this stage). These developments have made it much easier to make comparisons of cannery data with other types of data which will facilitate future analyses of these data.

Unfortunately, there has not been any increase in coverage of cannery data over recent years (Table 2); despite the continued excellent cooperation of the ISSF-affiliated companies in submitting data, there remain gaps in processor/unloadings data from other sources (acknowledging there is no requirement for the provision of purse seine cannery receipt/unloading data at this stage). Peatman et al. (2019) highlights the potential of processor/unloadings data in future work under the WCPFC Project 60 (Better purse seine catch composition estimates), so consideration of a more formal arrangement for the submission of this type of data to the WCPFC is anticipated.

A related development in the past year was the signing of a Memorandum of Understanding (MoU) between Marshall Islands Marine Resources Authority (MIMRA) and Thailand's Department of Fisheries (DoF) mainly for the reciprocal exchange of fisheries data (https://marshallislandsjournal.com/mimra-signs-historic-thai-pact/). The capital of the Republic of the Marshall Islands (RMI), Majuro, is one of the largest purse seine transshipping port in the world and having access to the Thailand processor data will provide a key component of catch traceability, and allow the verification of catch transshipped in RMI. At least one other PNA member country (e.g. Papua New Guinea) are also using processor/unloading data in their catch documentation initiatives.

DISCUSSION AND OBSERVATIONS

The following are observations on information presented in Figures 1–3:

1. Figures 1 shows that the species composition of the WCPFC estimates and the observer data are relatively close, which is to be expected. The difference is due to the WCPFC estimates being raised estimates so it will depend on the relative coverage of the observer data by fleet and set type for that year.
2. The cannery data shown in Figure 1 have been adjusted according to the methodology in Williams (2017). The method augments the cannery data with 'missing' large yellowfin tuna catch through the comparison of logsheet and cannery unloadings at the trip level (in cases where the catch of large yellowfin tuna from a trip are destined for another processer which is not covered by the WCPFC cannery data submissions).
3. The adjusted cannery data show a close alignment to WCPFC estimates and observer data for skipjack and yellowfin tuna, but less so for bigeye tuna, particularly the years 2013–2014 and 2018, although the ranges in the Y-axis for each species are different and so gives a distorted view. While encouraging to see the alignment in species composition (and annual trends) between the adjusted cannery data and the official WCPFC estimates (at this highly aggregated level), resolution of the gaps in the cannery data would be required before further in-depth analyses could be undertaken.
4. The differences in bigeye tuna species composition in the cannery data (Figure 1) could be due to the relatively small sample size, since only the cannery data linked to logsheet trips have been considered in this graph.
5. Figures 2 and 3 contrast the tuna species and size composition breakdowns for a selected fleet for 2018, between (i) cannery/processor data and (ii) adjusted and raised observer estimates of species and size composition (see Lawson, 2013). Coverage of available US PS processor data for 2018 is high, and there is broad alignment in both species and size composition of the catch in these two sources of data. The main differences appear to be:
    a. There are more small skipjack (0–4 lbs) in the cannery data than estimated from observer data;
    b. There are more bigeye tuna in the (7.5–20 lbs) category in the cannery data compared to the estimated observer data, although less large bigeye tuna (20+lbs) in the cannery data;
    c. The category of large yellowfin tuna (> 20lbs) appears to be around 2,000 MT less in the cannery/processor data, although this could be due to some of the large yellowfin/bigeye catch from this fleet directed to a processor that is not covered in the ISSF submissions of data. Further investigation into this difference will be undertaken in order to further confirm the value of cannery/processor data as a means of independent validation of WCPFC estimates.

    One explanation for the differences mentioned above could be the length-weight conversion factor used to convert observer-recorded lengths to weights and further investigation of conversion factors will be undertaken through WCPFC Project 90. Other explanations may be issues in the availability of small fish to the observer, and/or that the relative coverage of observer length samples to the overall catch.

FUTURE WORK

This brief paper continues to provide updates and examples of how cannery data can be used in the process of validating estimates of the species composition of the purse seine catch. This work is ongoing and a better understanding of the representativeness of the cannery data will only improve these insights to the point where, for example, this type of information could be included in the work under Project 60, with a goal to investigate better methods for comparing cannery and observer data (see Peatman et al., 2018 and Peatman et al., 2019).

The paper again notes that improved coverage of cannery data (i.e. submissions from all processor plants) will obviously improve the usefulness of these data; for this reason a list of minimum required fields for cannery data (see ANNEX) are provided for voluntary submissions of cannery data from other processing companies that are yet to provide data.

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TABLES

Table 1. Typical Cannery Data Size Categories

Commercial categories	Equivalent categories in KGs	Equivalent used on PS logbooks for YFT and BET
< 3lbs	(< 1.4 kgs)	SMALL < 20 lbs (~9 kgs)
3.0 - 4.0 lbs	(1.4- 1.8 kgs)	
4.0 -7.5 lbs	(1.8 – 3.4 kgs)	
7.5 - 20 lbs	(3.4 – 9.1 kgs)	
20 lbs up	(9 or 10 kgs up)	LARGE > 20 lbs (~9 kgs)

Table 2. Coverage of matched logsheet/observer/cannery trip data for the WCPFC tropical purse seine fishery (excludes Indonesia, Philippines and Vietnam domestic fisheries).

YEAR	Total Purse seine Tuna catch (MT)				
	WCPFC Estimates	Processor data	%	Matched Log / Obs / Cannery	%
2013	1,549,404	713,979	46.1%	401,344	25.9%
2014	1,754,588	767,820	43.8%	569,357	32.4%
2015	1,560,208	509,091	32.6%	297,533	19.1%
2016	1,564,663	584,734	37.4%	320,309	20.5%
2017	1,460,434	535,599	36.7%	273,574	18.7%
2018	1,669,460	624,806	37.4%	295,466	17.7%

FIGURES

Figure 1. Purse seine tuna species composition by source of data, including <u>adjusted</u> cannery data.

WCPFC Estimates: Estimates of WCPFC tropical purse seine fishery catch, excluding Indonesia, Philippines and Vietnam domestic fisheries. Catch is estimated according to Lawson 2007, Lawson 2010, Lawson 2013.
Logbook: Unadjusted logbook data for the WCPFC tropical purse seine fishery.
Observer: Observer sample estimates, adjusted for size and species selectivity.
Cannery (adjusted): Adjusted cannery data (see section METHODOLOGY in Williams, 2017). Trips matched to logsheet data only.

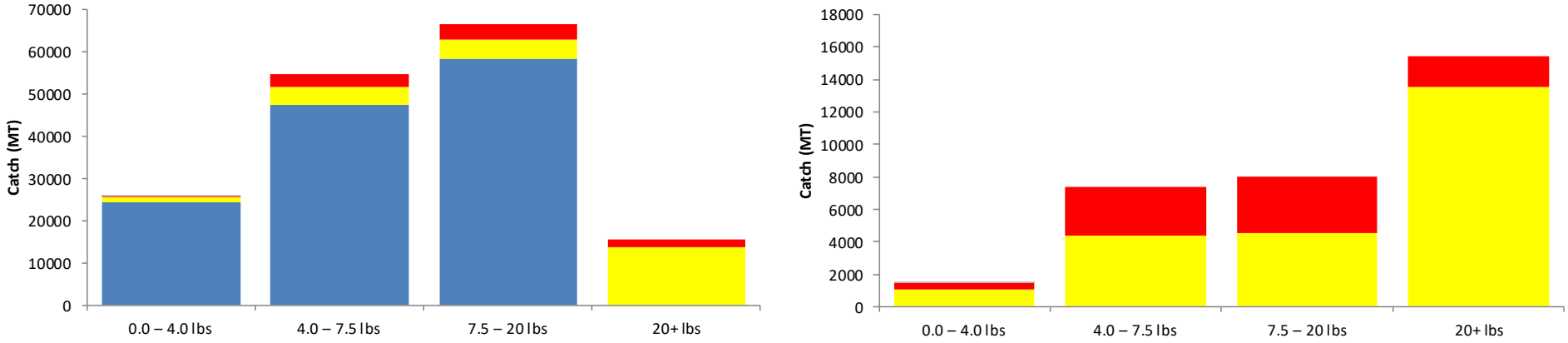

Figure 2. Purse seine tuna species and size composition for the US purse seine fleet 2018 catch.
Left–skipjack tuna (blue), yellowfin tuna (yellow) and bigeye tuna (red)
Right–yellowfin tuna (yellow) and bigeye tuna (red)
(Source: adjusted and raised observer estimates of species and size composition; see Lawson, 2013)

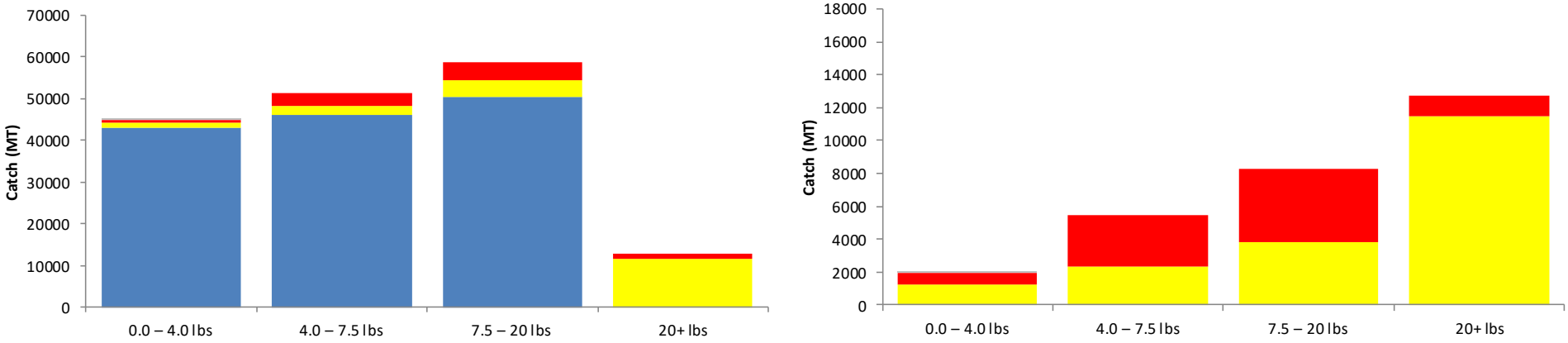

Figure 3. Purse seine tuna species and size composition for the US purse seine fleet 2018 catch.
Left–skipjack tuna (blue), yellowfin tuna (yellow) and bigeye tuna (red)
Right–yellowfin tuna (yellow) and bigeye tuna (red)
(Source: available cannery/processor data, unadjusted)

ANNEX

Draft list of minimum required fields for cannery data submissions of catch from purse seine vessels

Carrier vessel information
- Carrier vessel name
- Carrier vessel flag
- Carrier vessel IMO
- Carrier vessel Call sign
Fishing vessel information
- Fishing vessel name
- Fishing vessel flag
- Fishing vessel IMO
- Fishing vessel Call sign
- Fishing vessel gear type
Start of Unloading at processing plant
End of Unloading at processing plant
RFMO Area where catch taken (e.g. WCPFC Area)
Start date of fishing trip (departure from port of fishing vessel)
End date of fishing trip (return to port of fishing vessel)
Port of offloading or transshipment to Carrier vessel
Coordinates of transshipment at sea (if relevant)
Start date of transshipment from fishing vessel to carrier
End date of transshipment from fishing vessel to carrier
[Actual measured quantities (in kilograms or metric tons to 3 decimal places) of catch received at processing plants in the following commercial size categories]
Skipjack tuna : 0–3 lbs
Skipjack tuna : 3–4 lbs
Skipjack tuna : 4–7.5 lbs
Skipjack tuna : >= 7.5 lbs
Yellowfin tuna : 0–3 lbs
Yellowfin tuna : 3–4 lbs
Yellowfin tuna : 4–7.5 lbs
Yellowfin tuna : 7.5–20 lbs
Yellowfin tuna : >= 20 lbs
Bigeye tuna : 0–3 lbs
Bigeye tuna : 3–4 lbs
Bigeye tuna : 4–7.5 lbs
Bigeye tuna : 7.5–20 lbs
Bigeye tuna : >= 20 lbs