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Mixed-fishery harvest strategy update

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Mixed-fishery harvest strategy update

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Executive Summary

WCPFC12 agreed to a workplan for the adoption of harvest strategies for WCPO skipjack, bigeye, yellowfin and South Pacific albacore tuna. An important consideration when developing harvest strategies for these stocks is to account for mixed fishery interactions. SC15 agreed to initially consider developing a multi-species modelling framework that can be used for mixed fishery management strategy evaluation (MSE) for the four tuna stocks. This framework involves developing prospective single stock management procedures (MPs) for skipjack, South Pacific albacore and bigeye respectively. The impact of these MPs on yellowfin would then be evaluated.

Work presented at SC17 demonstrated how skipjack, bigeye and yellowfin can be included in the multi-species modelling framework (Scott et al., 2021). WCPFC-SC18-2022/MI-IP-05 presents a proof of concept implementation for including South Pacific albacore in this framework, focusing on the albacore and bigeye interactions, paving the way for all four tuna stocks to be included in the multi-species modelling framework (Scott et al., 2022a). As work progresses, it will be possible to use this approach to determine the impact of the skipjack, bigeye, and South Pacific albacore MPs on yellowfin.

Fully incorporating the bigeye and South Pacific albacore interactions requires the albacore and bigeye simulations to be run simultaneously where the result of each simulation influences the other. This leads to significant computational complexities that are very difficult to resolve. Given the potentially small impact of the South Pacific albacore MP on the bigeye stock, it is suggested that it is not included in the bigeye evaluations. Instead, assumptions about the level of bigeye catches from the southern longline fisheries will be made. These assumptions would need to be carefully monitored in the monitoring strategy. This simplification makes the multi-species modelling framework technically tractable without materially changing the results.

The development and calculation of mixed-fishery performance indicators is an important component of the WCPO harvest strategy development as they will provide information to support the selection of preferred single stock MPs with particular attention paid to the mixed-fishery interactions. For example, it is important to understand how the bigeye stock could potentially be affected by the selection of the skipjack MP.

WCPFC-SC18-2022/MI-WP-07 presents the results of some preliminary indicators for skipjack, bigeye and yellowfin (Scott et al., 2022b). The evaluations were performed using the framework presented in WCPFC-SC17-2021/MI-WP-05 using a range of skipjack MPs. In the evaluations there is no dynamic bigeye MP, i.e. one that sets fishing opportunities for the TLL fisheries based on the stock status of bigeye. Instead, three bigeye 'MPs' based on scenarios for constant future levels of bigeye catch by the TLL fisheries are evaluated. Evaluations are performed for each combination of the skipjack and bigeye MPs.

Four performance indicators are calculated for each stock: probability of SB/SBF=0 falling below the Limit Reference Point; expected SB/SBF=0; expected catches; and the 'impact' of each MP

on each stock.

A key consideration is how to present these indicators. In particular, the catch and impact indicators can be calculated over many different dimensions, e.g. different model regions and fisheries, making them potentially challenging to interpret. Noting that the role of indicators is to support the selection of preferred MPs, careful consideration must be given as to how useful these indicators are. If an indicator is unclear, or presents information that is difficult to interpret, then it should not be considered further.

The next steps for developing the mixed-fishery harvest strategies include:

- Building a full suite of operating models for bigeye and yellowfin;
- Considering candidate bigeye MPs for the tropical longline fishery and South Pacific albacore MPs for the southern longline fishery;
- Including all four stocks in the multi-species modelling framework, including MPs for skipjack, bigeye and South Pacific albacore; and
- Refining and continuing to develop the mixed-fishery performance indicators.

We invite WCPFC-SC to:

- Note progress in development of mixed-fishery harvest strategies;
- Provide feedback on the initial approach for including South Pacific albacore in the existing multi-species modelling framework for skipjack, bigeye and yellowfin;
- Provide feedback on the mixed-fishery indicators, particularly on how useful they are and whether any, such as the impact indicator, should not be considered further; and
- Suggest additional indicators that could be included.

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References

Scott, F., Scott, R., Yao, N., Pilling, G., and Hamer, P. (2022a). Including South Pacific albacore in the mixed-fishery harvest strategy framework. WCPFC-SC18-2021/MI-IP-05, 10–18 August 2022.

Scott, F., Scott, R., Yao, N., Pilling, G., and Hamer, P. (2022b). Mixed-fishery harvest strategy performance indicators. WCPFC-SC18-2021/MI-WP-07, 10–18 August 2022.

Scott, F., Scott, R., Yao, N., Pilling, G., Hamer, P., and Hampton, S. (2021). Mixed-fishery harvest strategy developments. WCPFC-SC17-2021/MI-WP-05, 11–19 August 2021.