



# Indian Ocean Yellowfin Tuna Management Procedure Evaluation Update

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# Acknowledgments

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# Executive summary

- No updates to the IOTC yellowfin Management Procedure (MP) evaluation project have been undertaken since the last WPM given problems in the current Operating Model (OM) which are closely associated with the problems encountered in the yellowfin stock assessment model.
- The TCMP (June 2021) agreed to defer discussions on the yellowfin MP evaluation given the updated yellowfin stock assessment due in 2021 which should provide the basis for the updated OM for yellowfin.
- Phase 3 of the current yellowfin tuna MP evaluation project ended in June 2021, and funding has been secured from the Australian Department of Foreign Affairs and Trade for the next phase of the yellowfin MP evaluation to June 2023.
- To enable progress during the next phase of this project, options to progress the development of the yellowfin tuna OM, given the possible outcomes from the 2021 yellowfin stock assessment are defined.

# 1 Yellowfin MP issues

A satisfactory Operating Model (OM) for yellowfin tuna is yet to be identified to evaluate candidate MPs and provide advice to the Commission. The latest iteration of the OM was fit with data up to and including 2017. Catch observations from 2018 and 2019 were used as part of the MP evaluation testing, but the OM was found to be unrealistically pessimistic with most or all simulations unable to extract the observed 2019 catch, even with unrealistic levels of fishing mortality (Figure 1). Stock status or productivity estimates for the population are too pessimistic and/or the spatial distribution of fish is not sufficiently realistic to allow the removal of these catches. This indicates a critical failure of the predictive capacity of the OM. The OM and stock assessment are afflicted by similar problems, that need further investigation before MP evaluation results can be considered meaningful. See Kolody and Jumpanen (2021a, b) for more detail.

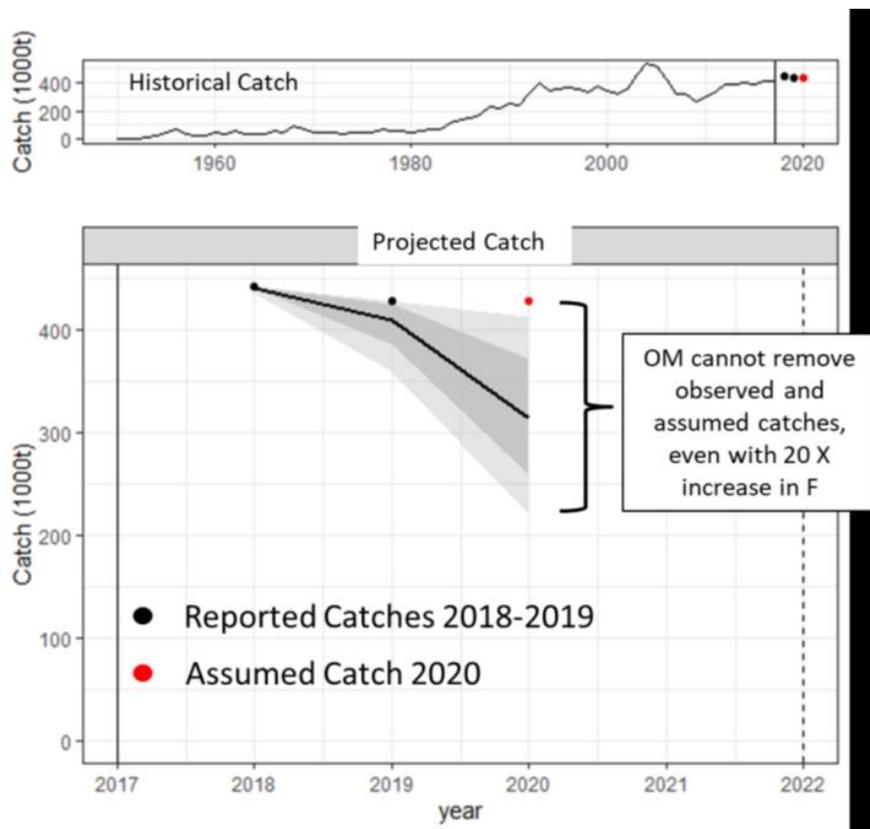


Figure 1. Illustration of the problem with the latest iteration of the yellowfin Operating Model. As with the most recent stock assessment, the models were fit with data up to and including 2017. Projections start in 2018, with the first MP application not scheduled until 2022. For the majority of simulations, the fisheries cannot remove the actual catches that were reported in 2019, even with a 20-fold increase in effective effort (F) from 2017 levels for all fisheries. This indicates a critical failure of the predictive capacity of the Operating Model. The stock status or productivity estimates for the population are too pessimistic and/or the spatial distribution of fish is not sufficiently realistic to allow the removal of these catches. Within the current model structure, there appears to be an inconsistency between the reported catches and the standardized longline CPUE series (which are used as the relative abundance indices in the stock assessment).

## 2 Summary of candidate yellowfin MP Performance

For the reasons described above and outlined in Figure 1, MP evaluation results will not be presented until the underlying problems in the yellowfin stock assessment and OM can be resolved, or alternative means of representing the OM uncertainty can be established.

## 3 Options to progress the OM

The yellowfin MP evaluation team has clear direction and work to continue with once a yellowfin OM is functional and endorsed by the WPM and SC. To progress the development of the OM over the next two years, the yellowfin MP evaluation team will pursue the following options:

- If a yellowfin tuna stock assessment is endorsed by the WPTT and SC in 2021, the MP evaluation team will update the OMs based on the revised and endorsed stock assessment.
- If a yellowfin tuna stock assessment is not endorsed by the WPTT and SC in 2021, the team will explore alternative approaches for OM conditioning that diverge from an endorsed stock assessment model.

Potential alternative approaches for OM conditioning for yellowfin tuna that do not rely on an accepted stock assessment model are described in Hillary et al. (2021).

## 4 Summary

The evaluation of candidate MPs will not be possible until the underlying problems in the yellowfin stock assessment and OM can be resolved, or alternative means of representing the OM uncertainty can be established. Depending on the outcome of the yellowfin tuna stock assessment in 2021, the yellowfin MP evaluation team will either update the OMs based on the revised and endorsed stock assessment or explore alternative approaches for OM conditioning that diverge from stock assessment model. Progress on yellowfin OM development will then be presented to the WPM MSE Task Force and TCMP in 2022.

# References

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