

IOTC Yellowfin Tuna Management Procedure (MP)

Evaluation Update June 2021¹

Management Procedure Evaluation Status

- Management Procedure (MP) evaluation is being pursued in the strict sense (i.e. as in the International Whaling Commission and Commission for the Conservation of Southern Bluefin Tuna), in which the data to be input to the MP, the analysis, and the Harvest Control Rule (HCR) are all defined in advance and simulation-tested together.
- The yellowfin reference set Operating Model (simulator) is being iteratively developed in line with requests from the IOTC technical working parties (WPTT and WPM) and the stock assessment process.
- Funding to continue the scientific and technical support for two years (August 2021 – June 2023) is being sought from the Australian Government.
- The latest iteration of the Operating Model was fit with data up to and including 2017. There are now catch observations available for 2018 and 2019, which are adopted for the first two years of the MP evaluation testing. The Operating Model was found to be unrealistically pessimistic, because most or all of the simulations could not extract the observed 2019 catch (Figure 1). 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. This indicates a critical failure of the predictive capacity of the Operating Model. The Operating Model and stock assessment are afflicted by similar problems, that need further investigation before MP evaluation results can be considered meaningful. See IOTC-2021-WPM12(MSE)-03 for more detail. A full yellowfin stock assessment with a broad collaboration of IOTC scientists is scheduled for WPTT 2021.

Yellowfin MP Development Guidance from TCMP-03 (2019)

Tuning objectives refer to a key management objective that the MPs can achieve precisely (e.g. achieving $SB \geq SB_{MSY}$ with a 50% probability by 2024). The tuning objective normally relates to a desirable biomass (in terms of the risk of exceeding reference points and/or a rebuilding timeframe) and has a very strong influence on the obtainable yield (because biomass risk and attainable catch are closely related). Tuning ensures that candidate MPs are identical with respect to this high priority objective, making it easier to select among MPs on the basis of performance with respect to secondary management objectives (e.g. yield and catch stability). Ideally the Commission will have narrowed down the tuning objectives to 1 or 2 before MP selection. This will allow MP developers to focus on MP development. TCMP-03 retained 2 of the 3 interim yellowfin tuning objectives from TCMP-02, which differ in terms of the timeframe for rebuilding the stock to the target level.

Y2: $Pr(SB(2029) \geq SB(MSY)) = 0.5$ (SB in 2029 exceeds SB_{MSY} in exactly 50% of the simulations).

Y3: $Pr(SB(2034) \geq SB(MSY)) = 0.5$ (SB in 2034 exceeds SB_{MSY} in exactly 50% of the simulations).

TCMP-03 (2019) also recognized the desirability of other MP constraints:

- All of the MP evaluations to date have assumed that the Total Allowable Catch (TAC) would be set every 3 years (and held constant between settings)

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- TCMP-03 recognized the value of applying TAC change constraints, and requested results that showed how long rebuilding would take with a maximum of 15% change. Other values were to be explored by the developers in consideration of the dynamics of the final Operating Model.

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 Operating Model can be resolved, or alternative means of representing the Operating Model uncertainty can be established.

Feedback Requests for the TCMP-04

At this time, there are no specific MP evaluation results from which to obtain feedback, but the TCMP may have new views on rebuilding timeframes, tuning objectives, TAC change constraints, or performance trade-off preferences since TCMP-03.

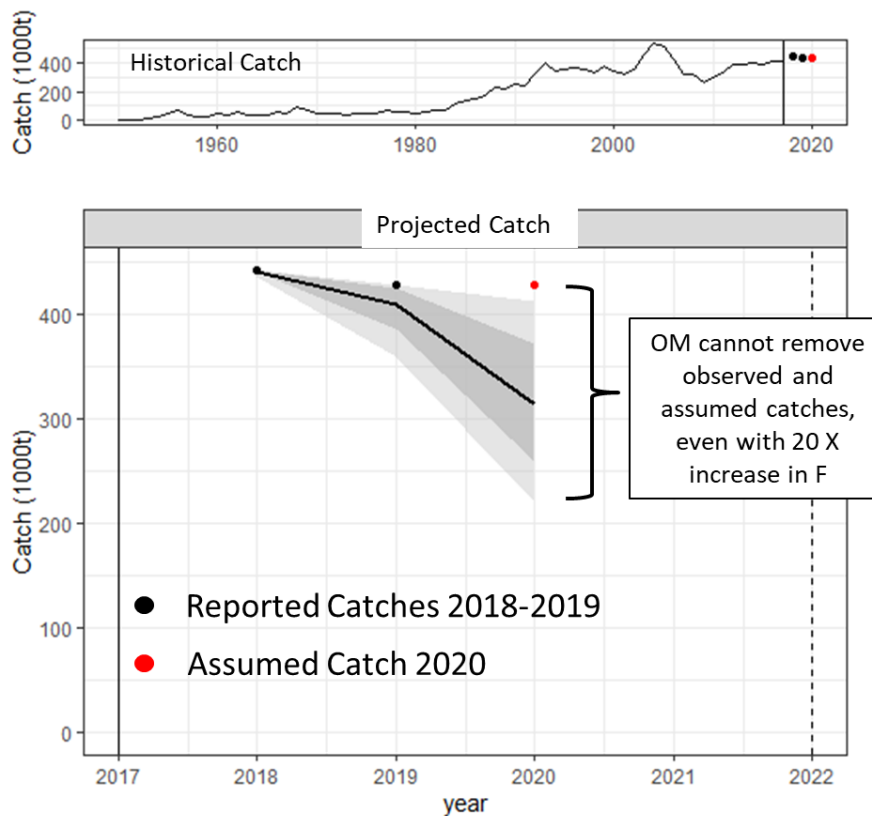


Figure 1. Illustration of the problem with the latest iteration of the yellowfin Operating Model. As with the most recent stock assessment, the models were fit with data up to and including 2017. Projections start in 2018, with the first MP application not scheduled until 2022. For the majority of simulations, 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).