SPRFMO
South Pacific Regional Fisheries Management Organisation

Jack Mackerel MSE Workshop – REPORT

11 February 2023

1. Introductions and Agenda

The SC Chairperson (Dr Jim Ianelli) welcomed all participants and explained the objectives of workshop. He then invited Dr Ana Parma, an external expert in MSE, and Dr Niels Hintzen, the SC vice-Chair, to introduce themselves, followed by participants of the workshop. Jim Ianelli introduced the agenda and schedule for the day (Annex 1).

2. Introduction and Management Strategy Evaluation

Jim Ianelli gave a presentation about the Management Strategy Evaluation (MSE) process, Management Procedures (MPs), and important definitions to ensure clarity for the ensuing discussions. All presentations were made available on the Teams platform.

Ana Parma gave a presentation on the objectives of MSE, the concept of tuning, including examples from Southern bluefin tuna, Atlantic bluefin tuna, and bigeye tuna from the Indian Ocean. A general discussion around objectives and time frames to complete an MSE process followed. Dr Parma presented a suite of example objectives, including, for example, the technical guidelines for the Marine Stewardship Council (MSC) certification include an MSE (with 5-years to implement it) as part of the certification requirements.

Participants inquired about the process to develop the operating models (OMs). For example, there was concern that Members may seek to evaluate the technical models independently. It was clarified that OMs are always chosen jointly by a Committee, and that if several teams are conducting MSE trials, they are all working off the same OM code. Participation in this process was welcomed.

Several Members inquired about the ability to include environmental variables/processes in the MSE, either in the OM or the MPs. It was explained that this is rare because while possible to include environmental variables in the model, it is difficult to predict (with certainty) future environmental conditions. Uncertainty in environmental condition is more commonly treated as a type of process error, sometimes with temporal correlation. Also, plausible future shifts in stock productivity (driven by unspecified variables and processes) are included as robustness tests in the MSE.

One Member asked how the decision about whether to use an absolute amount or a percentage change in limit catch changes between management periods is decided upon and what the potential implications are of one over the other, with respect to the MP. In other fisheries, these decisions have been taken by stakeholder and managers, and can be tested within the MSE framework.

An MSE was compared to operating on autopilot. The management procedure is followed, but under supervision to ensure the process track. One Member asked how you decide when such intervention is required. It was explained that these decisions are detailed in what is referred to as meta-rules. In this case, meta-rules would check whether exceptional circumstances are occurring, with respect to indicators developed, and ensure that the performance of the fishery is within the uncertainty bands simulated during the MSE.

There was a discussion about how the life histories of different species are considered as part of this process. The longevity of the TAC is one way in which this is accomplished. For example, for a long-lived species, the TAC may be set for a longer period; however, for short-lived species, that time frame may need to be reduced.

3. Introduction to the Jack Mackerel Operating Models

Niels Hintzen gave a presentation to describe the general technical components of an MSE process, the role of OMs, and then explored the details of the jack mackerel OM. It was noted that a distinction needs to be made between management stock units and biological stock units during this process.

The possibility of evaluating a spatial model with mixing rates, to account for different population structures, was raised. This approach is possible, and spatial models of jack mackerel (SEAPODYM) have been tested in the past; however, mixing rates are often non-stationary. Therefore, assuming stationary rates may introduce bias, and estimating time-varying mixing rates may be challenging and uncertain as well.

With respect to the steps involved in the MSE process, the first step is to update the model from the benchmark assessment and prepare projection code able to generate simulated data. At that point, technical testing will be done to ensure that under the model specification the uncertainty can be properly quantified (e.g., using a Bayesian approach). This work would be best carried out with guidance from a small technical working group; a request to the COMM to task the SC with this work is suggested.

One of the long-standing questions and uncertainties with the jack mackerel assessment and management is around the stock structure, and specifically whether there are multiple stocks or a single stock. The idea would be to build an OM that allows testing the robustness of candidate MPs to these different, potential realities.

4. Breakout Groups and Feedback

Participants were split into two break outgroups to work towards identifying objectives for the jack mackerel fishery. The results were then generally grouped into four main categories of objectives: stock status, stability, yield, and safety (Table 1).

5. Next Steps

The group noted that a working group will need to be formed with initial goals to:

- Schedule an action plan to progress the activities of the working group (terms of reference)
- Coordinate with the contractor on the status of updating the revisions to the OM that are needed to be consistent with the Benchmark data and model changes
- Compile a prioritized list of technical features required for the OM including data generation

Table 1. Summary of the broad objectives identified by the managers and stakeholders during the breakout sessions.

Stock Status	Achieve MSY, being tracked with associated target reference points Remaining in the green quadrant of a Kobe plot with high certainty Satisfy conditions for MSC certification Ensure underfishing as well as overfishing doesn't occur
Stability	Reduced interannual variability Food security Allow for TAC rollover; consider adjusting TAC every year or every 2-3 years except when extreme environmental conditions occur Market/supply concerns relative to prices and profitability Relax constrains to increase TAC when market conditions or fish availability are favourable
Yield	Allocation of sufficient quota to have a viable fishery Establish limitations on small size classes (e.g., X% of catch cannot be below certain size); recognizing potential implications for bycatch and unintended discarding Assess opportunities for fishery expansion
Safety	Incorporate Blim or similar precautionary reference point/indicator that satisfy MSC certification requirements with regards avoiding the point of recruitment impairment. Strengthen management measures if the stock is below Btarg (and even more so if stock drops below Blim) Ensure management procedure is responsive enough to low recruitment Develop reference points relative to observed minimum stock depletion (e.g., 8% that is currently used) Account for recoverability of the stock if the stock falls below limit reference points
Other	Reduce ecosystem impacts from the jack mackerel fishery

Annex 1 – Agenda

Morning Tea at ~ 10:30
Lunch at ~ 13:00
Afternoon Tea at ~ 15:30

1. Opening of workshop
    a. Introductions
    b. Agenda and workshop objectives
2. Introduction of Management Strategy Evaluation
    a. Generic presentation on MSE, MPs, definitions and applications
    b. Presentation on MSE objectives, concept of tuning, including examples from other fisheries, presentation on Performance Metrics
3. Introduction to the Jack Mackerel Operating Models
    a. Current jack mackerel assessment model—data and indications
    b. Presentation of the updated OM (following the benchmark) and stock structure treatment, implementation error, and other sources of uncertainty
4. Identify MSE Objectives
    a. Goal of the break-out groups, what to achieve
    b. Break out groups
    c. Feedback from break out groups to plenary
5. Identify MSE Performance Metrics
    a. Goal of the break-out groups, what to achieve
    b. Break out groups
    c. Feedback from break out groups to plenary
6. Wrap Up and Next Steps