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## 8<sup>TH</sup> MEETING OF THE SPRFMO COMMISSION

Port Vila, Vanuatu, 14 to 18 February 2020

### COMM 8 – Report ANNEX 8b Jack Mackerel MSE Management Objectives (COMM 8 - WP 17\_rev1)

#### Why will an MSE help the Commission?

For adequate management of Jack mackerel over its range the Commission has requested the update of the management procedure for Jack mackerel. This work has begun (via contract within the EU) and comprises a new Management Strategy Evaluation (MSE).

An MSE will help resolve a number of key issues relative to managing the resource. The operating model used for simulating data and testing management procedures will integrate over critical sources of uncertainty on:

- a. Stock structure hypotheses
- b. Growth and growth variability
- c. Natural mortality (and variability)
- d. productivity (regimes and stock-recruitment relationships)
- e. Fishery distribution patterns

In so doing, the selected management procedure will dispense with discussions and debates about each of these issues because the procedure has been tested over the gamut of these identified uncertainties. Additionally, the procedure for catch advice can be tested for robustness to these uncertainties.

#### Objectives and summary of catch advice approach

A first step in developing this evaluation is to reconsider the Commission's overarching management objectives. Presently, the harvest control rule described in "adjusted Annex K" is designed to be precautionary with a primary objective *to rebuild the stock to above the interim Bmsy (5.5 million t) level*. Since this objective is presently estimated to have been achieved, it is useful to draft some explicit modifications of the objectives to assist in the design of a management process. For example, the analysts could start with an overarching specification that:

Ensures that a candidate management procedure provides a spawning biomass greater than Bmsy with 50% probability in 2030 and is above Blim (point to avoid, taken to be the value in 2010) with 95% probability over the period 2025-2040.

Alternative management procedures shall be tuned (via testing within the simulation routines) so that these overarching objectives are met. This will simplify selection of a management procedure by the Commission. This is considered a draft because once the operating model (for simulated data testing) may require further refinements once operational.

#### *Process of management procedure selection*

Given that any candidate management procedure satisfies the overarching objectives outlined above, the Commission may consider the following **example** performance metrics to weigh the trade-offs and other objectives include:

- Landings (TACs)
- Catch stability term (delta TAC)
- Risk (e.g., spawning stock size relative to unfished)
- Minimum TAC to be available in each year over the next 10 years



- Fishery performance (employment, number of viable vessels)
- Frequency of TAC change (annual, every 3 years?)

#### *Designing management procedures for TAC advice*

Setting TACs can follow simple or complex procedures. One of the simplest approaches is to maintain a constant catch over a set period of time. More complex are those evaluating changes in stock indices such as CPUEs and set TAC on the basis of the change. Another option would be to use a “full” stock assessment model and projections into the near future to set TACs. Discarding the first option given the unlikely nature it will achieve the overarching objectives, we provide further background on the data driven and assessment driven procedures.

Empirical data-driven TAC setting management procedures can be specified as a function of the current TAC and say a set of survey and fishery indices (e.g., a weighted average of the change in Chilean CPUE, Peruvian CPUE and offshore fleet CPUE). If CPUEs change by a percentage the TAC could be adjusted to reflect this. Such a procedure is simple, transparent, and has minimal computational requirements. Alternatively, TACs can also be set making use of stock assessment population estimates projected into the future, crossed with fishing mortality targets to calculate an expected catch. Such a procedure is currently implemented in SPRFMO for Jack mackerel. However, the specification of the model configurations over the years has not been fixed and its performance has not been fully tested in a closed loop simulation. Both types of procedures are vulnerable if there are changes in data collection protocols and processes used to standardize the data.

The Commission reviewed and commented and approved the draft modification of the overarching management objectives. They further acknowledged that other specific performance metrics will be part of the analysis and eventual selection of a single catch-advice setting procedure. The SC-MSE Team is requested to respond with some worked-out examples to evaluate if the revised overarching objective requires refinements and/or modifications.