South Pacific Regional Fisheries Management Organisation

6th Meeting of the Scientific Committee

Puerto Varas, Chile, 9 - 14 September 2018

SC6-DW12

Proposals for a revised conservation and management measure for bottom fisheries within the SPRFMO Convention Area

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10 August 2018

1. Purpose of paper

This paper updates the Scientific Committee on progress towards the development of proposals for a new conservation and management measure (CMM) for bottom fishing throughout the SPRFMO Area. The main focus of the paper is on scientific aspects of the work related to current bottom fisheries in the western part of the SPRFMO Area and the Committee's approval for these methods is sought.

Australia and New Zealand updated the Commission in January 2018 on progress as at the end of 2017 and provided a draft CMM as an information paper and a supporting summary document. This paper summarises work to support the development of a proposed bottom fishing CMM since the Commission meeting in January 2018.

2. Elements of a Bottom Fishing CMM

2.1. Fishing areas

Any new conservation and management measure (CMM) for bottom fishing will require the identification of areas where bottom fishing will be permitted in the future.

2.2. Catch limits

Catch limits based on each stock's biological characteristics should be determined to ensure the fisheries' long term sustainability. A tiered stock assessment framework is required to ensure catch limits include the precaution necessary to accommodate for uncertainties in available data and methods. The key target species (orange roughy) probably continues to warrant the most work at this stage.

2.3. VME identification/mapping

Because biological information on deep-sea fauna in the SPRFMO Area is sparse, the known and likely distribution of vulnerable marine ecosystems (VMEs) has had to be estimated using predictive models. Such models have been under development for several years at a range of spatial scales.

2.4. Spatial management – open (managed) and closed areas

Guidance for Scientific Committee for several years has been that a spatial management approach to bottom fisheries is preferred. Information on the location and amount of fisheries catch and the known and likely distribution of VMEs can be considered together in the design of such measures. Spatial decision support software has been used to integrate the information and explore the relative benefits of candidate spatial management settings and areas. Work has continued to fine-tune the indicative boundaries provided to Commission in January 2018.

2.5. Encounter protocols for VMEs inside the managed areas

Notwithstanding the focus on a spatial management approach, Australia and New Zealand included a VME encounter protocol in their draft CMM for Commission. This is regarded very

much as a "back stop" measure to allow a rapid response to benthic bycatch events that suggest that the models used to predict the distribution of VME taxa are misleading (following guidance in SC-05's report[1]).

3. Progress on each element of a Bottom Fishing CMM

New Zealand has been working for some time on low-information stock assessment approaches, models for predicting the distribution of VMEs, and the application of spatial decision support tools. Periodic updates have been provided to SC. At SC-03, Australia, New Zealand, and Chile agreed to work together on finalising these analyses to underpin a new CMM for bottom fishing and a draft CMM and a supporting paper were provided to the Commission in early 2018 (see Bottom Fishing CMM Information Paper).

3.1. Fishing areas

Only Australia and New Zealand have current bottom fisheries in the SPRFMO Area (these are summarised in the Australian BFIA and New Zealand BFIA) and these two Members have been working closely together, with support from Chile and the EU, to develop potential measures. A draft CMM including indicative catch limits and management approaches to avoiding significant adverse impacts on vulnerable marine ecosystems were presented to Commission and feedback was received from several Members at that meeting.

3.2. Catch limits

Catch limits based on each stock's biological characteristics will be determined to ensure the fisheries' long term sustainability. A tiered stock assessment framework was agreed by SC-05 and this is being population to enable the determination of catch limits that are sufficiently precautionary to accommodate for uncertainties in available data and methods. Various analyses are underway to assess risks posed by fishing and to determine precautionary catch limits where necessary. This work is most advanced for the main target species, orange roughy, but a range of other assessment approaches are being considered for lesser target species and bycatch species. Several papers in this area were considered by SC-05 and at two preceding deepwater workshops and advice on catch limits for orange roughy was given to Commission. The following papers to SC-06 relate primarily to this element:

- Cordue (SC-06-DW-05): A generic acoustic survey design for spawning orange roughy aggregations within the SPRFMO Area;
- Georgeson, Nicol, & Cryer (SC-06-DW-06): Interim categorisation of SPRFMO species into tiered assessment framework and exploration of assessment options based on data availability;
- Georgeson, Nicol, Rigby, Duffy?, Francis? (SC-06-DW-08): Quantitative and semi-quantitative risk assessment for deepwater sharks caught in SPRFMO bottom fisheries;

[1] SC-05 **agreed** that, should a move-on rule be implemented as part of the revised CMM for bottom fisheries, the threshold for triggering such a rule should be high. Ideally a move-on response should follow more than one encounter involving weights of bycatch of benthic fauna that would indicate the models used to predict the distribution of VME taxa are misleading

- Georgeson, Nicol, & Cryer (SC-06-DW-07): Update on progress on PSA and SAFE ecological risk assessment for secondary teleosts in line and trawl fisheries;

3.3. VME identification/mapping

Because biological information on deep-sea fauna in the SPRFMO Area is sparse, the known and likely distribution of vulnerable marine ecosystems (VMEs) has had to be estimated using predictive models. Such models have been under development for several years at a range of spatial scales. Habitat suitability models at the New Zealand regional scale are relatively mature and appear sufficiently reliable for use in designing management measures. Fine scale models (at the scale of individual seamounts or other features) would be superior, but have been developed only for the five features where appropriate data exist. SPRFMO-scale models have been found not to be reliable, mainly because of the poor bathymetric information outside of the New Zealand regional area. No new modelling papers were offered to SC-05 or are offered to SC-06 on this element because the work is considered sufficiently mature to underpin management advice. A review in 3–5 years' time should consider the model predictions in relation to any new data collected and it may be appropriate to update the models. Highly surprising benthic bycatch events (whether or not these involve a move-on response) could trigger an earlier review and the following paper relates primarily to this element:

- Geange & Cryer (SC-06-DW-14): Review of benthic sampling and bycatch data, including VME taxa, in SPRFMO bottom fisheries

3.4. Spatial management – open (managed) and closed areas

A spatial management approach to bottom fisheries is anticipated and information on the location and amount of fisheries catch and the known and likely distribution of VMEs can be considered together in the design of such measures. Spatial decision support software can be used to integrate the information and explore the likely performance of different spatial management settings and areas to deliver on the objectives of the Convention. New Zealand has developed such an approach using the *Zonation* package for several years and, working closely with Australia, convened a series of stakeholder workshops to develop the understanding, capacity, and guidance to apply the software in the context of SPRFMO bottom trawl fisheries (mostly for orange roughy). The products of this workshop process were presented to SC-05 and to the Commission in early 2018 but further workshopping and consultation have been organised to "fine tune" the indicative spatial management boundaries in the draft CMM presented to Commission. It is hoped that some results of workshops held in August 2018 can be presented to SC-06. Feedback from SC-05 and Members at the Commission meeting suggested that the process used to develop the indicative spatial management boundaries using outputs from Zonation and other data layers was not widely understood so the following paper is offered to SC-06:

- Cryer, Geange, Bock (SC-06-DW-11): Methods of designing spatial management areas using outputs from Zonation.

New Zealand and Australia have agreed that bottom fishing methods with lesser impacts on VMEs than bottom trawling (bottom line methods and midwater trawling for bentho-pelagic

species) are more appropriately dealt with outside the *Zonation* analyses. A method has been developed to assess the cumulative bottom impact of each method separately and in combination (this was accepted by SC-05) and this will guide the design of appropriate management measures for fisheries other than the orange roughy bottom trawl fishery. Pending the resolution of data issues, the following paper to SC-06 relates primarily to this element:

- Authors TBC (SC-06-DW-10): Cumulative bottom impact statistics for SPRFMO bottom trawl, midwater trawl, and bottom line methods;

3.5. Encounter protocols for VMEs inside the managed areas

SC-05 agreed that, should a move-on rule be implemented as part of the revised CMM for bottom fisheries, the threshold for triggering such a rule should involve weights of benthic bycatch that indicate the models used to predict the distribution of VME taxa are misleading. New Zealand and Australia have worked together on identifying possible approaches to developing such thresholds. A formal quantitative approach based on the (predicted) distribution and density of VME taxa and their catchability in trawl gear cannot currently be supported by the available data and models. While such approaches are developed (probably over several years), a more pragmatic approach has been developed using the observed benthic bycatch data from New Zealand-flagged vessels over the last 11 years. Numerous ways of using these data have been discussed in technical working groups, and the results are summarised in the following paper to SC-06:

- Geange & Cryer (SC-06-DW-09): Methods of deriving thresholds for VME encounter protocols for SPRFMO bottom fisheries.

3.6. Upcoming work on the new measure

A draft new bottom fishing CMM was prepared for consideration by the Commission meeting in early 2018 and presented as an information paper. Substantial feedback was received from Members at that meeting and Australia and New Zealand have been working very closely together to use the existing and anticipated scientific results to finalise a new CMM for the 2019 Commission meeting in order to meet the objectives of the SPRFMO Convention. The scientific work has already been done, and is summarised in the sections above, but fine-tuning of the indicative spatial management areas and discussions on catch allocations will be completed between SC-06 and the deadline for papers to the Commission in 2019.

4. Recommendations

It is recommended that the Scientific Committee:

- **Notes** the fine tuning that has occurred since the Commission meeting in 2018 to the scientific analyses required to underpin a comprehensive bottom fishing CMM for the SPRFMO Area;
- **Notes** that further work is required and New Zealand and Australia will continue to progress the development of a revised bottom fishing CMM in order to submit a proposed draft CMM to the Commission meeting in early 2019;
- **Agrees** that the scientific approaches applied by Australia and New Zealand are appropriate to underpin a revised bottom fishing CMM;
- **Agrees** to convene or otherwise support, if necessary, an additional workshop in October or November 2018 to finalise the boundaries of spatial management areas or other management controls with stakeholders.