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1 Purpose

The purpose of this paper is to initiate a discussion on the elements of a new bottom fishing conservation and management measure (CMM) New Zealand intends to develop for consideration by the SPRFMO Commission in 2016.

We envisage the new bottom fishing measure taking a more comprehensive approach to the management of bottom fishing than the current bottom fishing measure (CMM 2.03) and being based on a spatial management approach. This approach will require 1) the identification of an appropriate fishing footprint, 2) the mapping of the vulnerable marine ecosystem (VME) distribution within the footprint, 3) the setting of sustainable catch levels and 4) the determination of management measures to provide appropriate protection for VMEs in particular areas that will be open or closed to fishing within the footprint.

These elements of the spatial management approach will be discussed in this paper.

The intention is not for an exhaustive review of these elements but rather to initiate a discussion and to identify issues where further feedback will be sought from the Scientific Committee and from the Commission. The intention is to submit a new draft bottom fishing CMM for consideration at the 2016 Commission meeting.

2 Fishing footprint

The fishing footprint defines the spatial extent of fishing during a defined period of time. With respect bottom fisheries, the footprint is also the area of seabed that has been subject to the impact of bottom fishing gear. The new bottom fishing CMM will require the identification of an overall fishing footprint to determine where bottom fishing has occurred previously and to inform where bottom fishing may or may not occur in future. To define the fishing footprint, the Commission will need to decide which reference years to use to define the spatial scale and intensity of benthic impacts. The reference period for defining the footprint of the historic fishery does not need not to be the same as a reference period used in any allocation of resource amongst parties.

CMM 2.03 currently limits bottom fishing to vessels which are flagged to SPRFMO Member States or CNCPs and that have an established ‘bottom fishing footprint’ (see paragraph 8(a) and (d)). This footprint is defined in CMM 2.03 under paragraph 6 and includes bottom fishing that has occurred by the SPRFMO Member’s flagged vessels between the years 2002–2006. To take into account this requirement New Zealand and Australia have identified their respective bottom fishing footprints based on their 2002–06 bottom fishing activities[1]. The choice of the 2002–06 reference period was chosen because it reflected the most current data submitted by members to the SPRFMO Secretariat when the interim measure was developed in 2007 and as the same as the reference period for the other major fishery SPRFMO fishery (jack mackerel). This reflects, however, only about half of the historical footprint for bottom fishing in the SPRFMO Convention area (see document SC-01-20 *Spatial analysis of Australian and New Zealand historical bottom trawl fishing effort in the Convention Area of the SPRFMO* submitted to the first meeting of the Scientific Committee by Australia).

To date, New Zealand and Australia have limited their fishing to within their own 2002–2006 footprints. We would expect a new comprehensive CMM to identify an overall fishing footprint that includes all bottom fishing that has occurred in the SPRFMO Convention Area during the selected reference years (i.e. from all SPRFMO members and CNCPs). This will

[1] Chile and Korea also have submitted bottom fishing footprints to SPRFMO but have not undertaken a Bottom Fishing Impact Assessment.

require those countries that have not yet done so to submit their historical bottom fishing data to the Secretariat.

To assist in the identification of a fishing footprint, further work is being undertaken on the ramifications of expanding the reference years to capture the bottom fishing that has occurred historically (i.e. beyond 2002–2006). We are also exploring the implications of using different degrees of resolution when identifying fished areas.

The paper submitted by Australia (SPRFMO document SC-01-20) to the Scientific Committee also provides a geospatial mapping and analysis of combined Australia and New Zealand bottom trawl data for the period 1990–2006. The paper produces alternative estimates of 'fished' area using actual trawl tracks, 6-minute blocks and 20-minute blocks over alternative historical time periods from 1990–2006. This analysis showed that estimates of fished area change substantially, depending on mapping resolution and time period used. Key conclusions from this paper were incorporated into the report of the first Scientific Committee.

A further paper will be submitted by New Zealand to the Scientific Committee outlining the implications of using different reference years to establish the bottom fishing footprint and seeking the Scientific Committee's recommendations on an appropriate set of reference years.

3 VME identification/mapping

VME identification and mapping will be used to identify where VMEs occur or potentially occur. This information will be used to develop spatial management measures that are designed to prevent significant adverse impacts on VMEs from bottom fishing in the SPRFMO Convention Area. Spatial management measures, including the use of spatial closures, are likely to be incorporated into the new CMM.

For this to occur a methodology to identify the location of VMEs will need to be developed and agreed by the Commission. Some work has already been progressed in this area through the development of predictive habitat suitability modelling techniques. Physical and biological data are used in mathematical models that predict the probability distributions for particular taxa of interest.

Habitat suitability modelling can then be used to define the probability distribution of VME indicator taxa across the SPRFMO region.

Additional work will be required to assess whether there are regional differences in benthic communities and address likely bioregional ecosystem differences protection measures take account of regional variations.

The National Institute of Water and Atmospheric Research (NIWA) in New Zealand has completed a project to develop regionally-tailored spatial scale predictive habitat models for commonly occurring vulnerable marine ecosystem (VME) indicator taxa in the western SPRFMO Convention Area (Rowden et al. 2013). This project has produced predictive habitat models using two different methods and maps of the predicted habitat suitability/distribution of corals and sponges and other vulnerable taxa in the western SPRFMO Area.

The results of this ongoing work will be submitted by New Zealand to the Scientific Committee for its recommendations and advice.

4 Catch limit determination

Catch limits will need be set in the SPRFMO Convention Area that are consistent with the fisheries' long term sustainability. In the 2007 bottom fishing interim measure the annual catch was set as an average of the 2002–06 catch levels and this was carried through into CMM 2.03. A more informed approach to setting sustainable catch limits will need be used in the comprehensive CMM. The catch limit should be a function of the stock's biological characteristics and be consistent with those areas that are opened to fishing.

The bottom fisheries within the SPRFMO area are data poor. Despite this, there are data relating to these fisheries that are available, including historic catches, effort and some recent biological data. Catch data has also been published by FAO.

Various effort data exist, including amounts of fishing in terms of vessel days, number of tows, distance towed and hours fished (trawlers), numbers of hooks fished (longlines). Coupled with the appropriate catch data, these effort data open the possibility of exploring CPUE as a tool to examine stock status. Other data exist but may not be currently available for analyses, or only partially available, including for example, details of fishing fleets (vessel size or power) that can also be useful in analyses of effort and catch-per-unit-effort (CPUE).

New Zealand has developed a draft paper on approaches to determining best estimates of exploitable biomass and sustainable yields. The focus will be on the principal target species, orange roughy which represents the largest catches of all demersal species. This draft paper has been submitted to the SPAC WG and it is intended to submit a final version to the SPRFMO Scientific Committee for review in October 2014.

5 Spatial management – open/closed areas

The spatial management approach will be used to develop a CMM that 1) allows for bottom fishing within agreed catch limits and 2) protects VMEs from significant adverse impact.

This area of work will draw heavily on the previously described elements of the CMM:

- definition of a footprint in terms of spatial extent and intensity of impact;
- VME mapping results;
- catch limits for bottom fishing (for identified species and areas).

The spatial management approach will be used to define areas that are open or closed to bottom fishing. The decision of which areas to open or close to bottom fishing will depend on the results of the VME mapping work. VMEs will be protected from significant adverse impact by ensuring that areas where they are known to occur or are likely to occur are closed to fishing. Areas where VMEs are not likely to occur and where there has been a history of bottom fishing will be open to bottom fishing. A balance of open areas that allow for sustainable fisheries and closed areas that protect VMEs from significant adverse impact will need to be established. Spatial management (open and closed areas) can be used as a stand-alone option (i.e. having no move-on-rule) if the Commission is satisfied that an appropriate

balance between open and closed areas is established. The spatial management approach can also be complemented with other measures, such as the move-on rule, when there is not enough information to rely on the spatial management approach.

Spatial management of fishing and the protection of VMEs requires knowledge of the spatial distribution of fishing and the distribution of known or potential VMEs. Bringing together the data regarding bottom fishing and the distribution of potential VMEs offers opportunities to optimise the development of spatial management within SPRFMO. NIWA has developed optimisation models that identify those areas that are believed to be most important for habitat protection and to the fishing industry (Rowden et al. in review). The optimisation models incorporate the relative value of an area to both fishing and habitat conservation (including bioregional differences).

Where there is an overlap between areas that are both important for bottom fishing and for benthic protection, this approach will provide the tool for policy makers, scientists and stakeholders to explicitly consider the trade-offs between opening and closing areas to bottom fishing. Ultimately, the goal is to agree, based on this knowledge, on those areas that should be proposed as 'open to bottom fishing' and proposed as 'closed to bottom fishing' to achieve an outcome that delivers both benthic habitat protection and a workable fishery.

The spatial management approach is consistent with the recommendation reached by the first meeting of the Scientific Committee that "move-on rules should be considered to be temporary measures, providing precautionary protection for areas showing evidence of VMEs until objectively planned spatial closures can be implemented to protect known and highly bio-diverse VME areas". This approach is also consistent with approaches being applied in other RFMOs.

The results of this area of work will be submitted by New Zealand to the Scientific Committee for its consideration, advice and recommendations.

6 Conclusion

This discussion paper describes some of the elements that are being considered in the development of a comprehensive bottom fishing CMM. This is still work in progress but early feedback from the Science WG on the approach that is being suggested would be welcome. Papers on these elements, as well as other aspects of the bottom fishing CMM, will be submitted to the WG and then to the SPRFMO Scientific Committee for its advice and recommendations providing further opportunities to comment on this area of work.

7 References:

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