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The utility of move on rules in Conservation and Management Measures to prevent Significant Adverse Impacts of bottom fisheries on VMEs in the SPRFMO Area

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## Executive Summary

Move-on rules provide a rapid response to evidence of vulnerable marine ecosystems (VMEs) in bottom fisheries and they can be used to develop protective measures for VMEs in the early stages of a fishery when information is scarce. However, once objectively-designed spatial management measures have been implemented to prevent significant adverse impacts on VMEs, move-on rules provide little additional benefit for VMEs and they have significant costs in terms of monitoring requirements and operational uncertainty for fishers. We consider that the potential information gathering benefits of move-on rules can be better met using structured and mandatory collection and review of benthic bycatch in bottom fisheries.

## 1. Purpose of paper

This paper informs the Scientific Committee on the utility of move-on rules as part of a bottom fishing conservation and management measure (CMM) designed to meet the Objective of the SPRFMO convention and obligations under UNGA resolutions (insofar as these relate to impacts on habitat and vulnerable marine ecosystems, VMEs).

## 2. Objectives and guidance for managing the impacts of bottom fisheries on VMEs

In their review of best practice for RFMOs, [Lodge et al. \(2007\)](#) described the shifting expectations of fishery management on the High Seas brought about by

- the FAO's Code of Conduct for Responsible Fisheries (FAO, 1995a; 1997);
- international guidance documents on the precautionary approach to fisheries (FAO, 1995b);
- responsible fisheries (FAO, 1997); and
- the ecosystem approach to fisheries (FAO, 2003).

These expectations widened the focus of management beyond the target species to include the impacts of fishing on the structure and process of the broader ecosystem and require the application of a precautionary approach when there is scientific uncertainty.

The intent was still to attain high long-term benefits from fisheries, but maintenance of future options for use and development and minimization of the risk of irreversible change had become much more important. Lodge et al. (2007) noted that best practice in relation to habitat management (in 2006 when they first convened) was:

- Habitats are described and mapped and are monitored and reported on.
- Moratoria or other restrictions on fishery access and impact are placed on the development of new fisheries that are expected to have a significant impact on sensitive habitats, and these are maintained until there is adequate assessment of the impacts and development of appropriate management measures.
- Protected areas are established in representative and/or key habitats, and gear types that could have an impact on those habitats are not permitted in those areas.
- Undertake active protection and rehabilitation of habitats, where this is possible, both by direct management action and through influence on other management authorities.

Shortly after Lodge et al. (2007) made these general recommendations, the General Assembly of the United Nations adopted [UNGA Resolution 61/105](#) on sustainable fisheries (Appendix 1). This included more specific guidance (Section X, Responsible fisheries in the marine ecosystem) on the management of bottom fisheries to avoid significant adverse impacts on Vulnerable Marine Ecosystems (especially Paragraph 83 *et seq.*). No specific guidance on move-on rules was included in this resolution, the focus was on conservation and management measures to prevent significant adverse impacts on VMEs. In 2008, the Food & Agriculture Organization (FAO) released international guidelines ("the 2008 Guidelines") for the management of deep-sea fisheries in the high seas to: *provide tools, including*

*guidance on their application, to facilitate and encourage the efforts of States and RFMO/As towards sustainable use of marine living resources exploited by deep-sea fisheries, the prevention of significant adverse impacts on deep-sea VMEs and the protection of marine biodiversity that these ecosystems contain.*

The 2008 Guidelines include reference to move-on rules (Paragraph 67) in the context of more comprehensive measures established to prevent significant adverse impacts on VMEs (Paragraph 66). In 2010, [UNGA Resolution 64/72](#) reaffirmed the UN's previous resolutions on sustainable fisheries and recognized the need to further integrate ecosystem approaches into fisheries conservation and management. Specifically, it: *called upon States to take action immediately ... to implement the 2008 Guidelines in order to sustainably manage fish stocks and protect VMEs.*

In response to the two UNGA resolutions and the guidelines, and often in the absence of more comprehensive measures, many RFMOs, including SPRFMO (see [SPRFMO Convention](#) and [CMM-03-2017](#) for bottom fisheries) established move-on rules that require fishing to cease when evidence of VMEs is encountered, typically based on some pre-determined minimum threshold for bycatch of specified taxa ([Hansen et al. 2013](#)). These protocols triggered temporary or longer-term closures to fishing operations to prevent further impacts. Many different move-on protocols have been adopted, and there can be differences even among members within an RFMO (as there is between Australia and New Zealand within SPRFMO). Hansen et al. (2013) suggested that several RFMOs had started to develop spatial management measures (closure or zoning of relatively large areas) to protect VMEs rather than relying on move-on-rules.

### 3. Measures to prevent significant adverse impacts on VMEs

#### 3.1. Components of a new CMM and processes to address these

Australia and Chile agreed at SC-03 to work with New Zealand in an ad hoc working party to develop a revised bottom fishing measure (see the [2016 Commission report](#) and the updated [Roadmap for SC](#)). Discussions at SC-04 and at the 2017 Commission meeting widened participation in the working party to include the EU. The new bottom fishing measure should address:

- target fisheries (principally orange roughy, alfonsinos, bluenose, wreckfish);
- non-target fish (commonly called bycatch);
- interactions with seabirds, marine mammals, reptiles or other species of concern;
- habitat-related issues, including preventing significant adverse impacts on VMEs; and
- monitoring and review procedures.

New Zealand drafted and circulated a summary of these potential components of a new CMM for the information of SC's 3rd workshop (Deep Water) which met in Hobart in May 2017 ([SCW3-INF01](#)). Other papers to SC-05 will be dealing with components other than spatial management and other measures to prevent or avoid significant adverse impacts on VMEs.

### 3.2. The design and application of spatial management measures

There are several methods of designing spatial management regimes ranging from entirely political or stakeholder-driven proposals to sophisticated decision-support software approaches drawing on explicit objectives and large amounts of data. New Zealand used bespoke decision-support software in the design of MPAs in the Ross Sea ([Sharp & Watters 2011](#)), and has been focussing on the application of Zonation<sup>3</sup> software to considering potential spatial management approaches within the SPRFMO Area ([Cryer 2015](#) and New Zealand's [National Report to SC4](#)).

Both approaches require information or predictions on the distribution of biodiversity attributes to be protected, on the potential cost of achieving protection through spatial closure, and on the objectives to be met. Using this information, the software can be used to generate candidate spatial management areas for discussion and to identify and quantify trade-offs among specified objectives and the extent to which such objectives are met by different candidate measures (e.g., Kukkala & Moilanen 2012; Ardron et al. 2014).

Since SC-04, New Zealand has been working closely with Australia, Chile, and the EU to assemble all the necessary information and models to support the application of the Zonation decision-support tool. This work culminated in a series of stakeholder workshops in July-August 2017 to seek and document stakeholder views on which biodiversity and resource use layers should be included in Zonation analyses, the relative weighting of these layers, and the part that spatial management should play in a revised bottom fishing measure. This will allow the needs and values of a full range of stakeholders to be acknowledged, and where possible, incorporated into the planning and implementation of a new CMM.

### 3.3. The design and application of move-on rules

Rogers & Gianni (2010) reviewed the responses by RFMOs and CCAMLR to UNGA resolutions 61/105 and 64/72, including the development of measures to prevent significant adverse impacts on VMEs and the use of move-on rules. They concluded, for SPRFMO, that the move-on rules adopted by New Zealand<sup>4</sup> and proposed by Spain combined with closed areas represented a serious attempt to implement the resolutions and the FAO Guidelines. However, they noted that areas remaining open to bottom trawl fishing by New Zealand vessels may contain significant areas of VMEs and that the move-on rule is not applied to heavily trawled blocks within New Zealand's trawl footprint.

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<sup>3</sup> Zonation is a software tool that maximizes the representation of all VME layers within spatial closures. For individual VMEs this may mean substantial portions of their distribution do not occur within the spatial closures if they are not spatially correlated with other VME taxa. Zonation can reduce the likelihood that areas are prioritised for spatial closures if these areas are important for existing use, allowing the joint consideration of VMEs and fishing activities and the exploration of a range of trade-offs between VME protection and continued fishing activity

<sup>4</sup> At the time Rogers & Gianni wrote their review, Australia's measures may not have been made public

In a more focused review, Kenchington (2011) assessed the application of move-on rules by RFMOs up to 2010 and inferred that these had not been intended as stand-alone measures to protect VMEs, rather they were “back stops” to complement long-term closures. At that time, move-on rules had been adopted only as an interim measures, pending further development, and Kenchington (2011) considered that none could be said to be efficient or even effective. Hansen et al. (2013) reviewed developments up to 2013 and provided an excellent and detailed summary of move-on rules and protocols for various gear types in three other RFMOs, CCAMLR, and SPRFMO (as proposed or implemented by New Zealand, Australia, and the EU) (see their Appendix A, updated and adapted from Kenchington (2011)). Although both Rogers & Gianni (2010) and Kenchington (2011) contended that move-on rules are not intended as stand-alone measures and should be complemented with spatial closures, it is clear from these three published reviews that wide variation and interpretation of the guidance described in section 2 exists (both in terms of the protocols around move-on rules, and whether they are complemented with spatial closures), even within a single RFMO or CMM.

In its [report to the Commission](#) in 2013, SC-01 **endorsed** the following characteristics of effective move-on rules:

- Lists of regionally specific VME indicator taxa should be identified for each fishery, using all available information on species occurrence and retention by fishing gears;
- VME taxa should be specified at a level that facilitates rapid and accurate onboard visual identification by trained observers;
- Encounter thresholds indicating evidence of a VME should be based on analyses of historical bycatch data, taking account of the different retention rates of species by each gear type. Multiple species can be used to indicate higher biodiversity;
- Once evidence of a VME is encountered using an agreed protocol, move-on areas should be closed to fishing by all demersal fishing vessels until further analysis or evidence indicates that area does not contain VMEs;
- Move-on distances and area closures should encompass the area covered by typical fishing operations using that gear type.

However, SC-01 also **emphasized** in the following paragraph 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 is a consistent theme through many documents and publications on move-on rules; they appear most useful as stop-gaps or temporary measures when information is almost non-existent and before well-designed spatial management areas can be put in place. Once well-designed spatial management is in place, their utility seems restricted to “back stops” or “insurance” to the main management measures in case these turn out to be deeply flawed. For instance, a move-on rule can put a quick stop to fishing in a place where large amounts of sensitive and structural benthic fauna are recovered when none or little was predicted by the models used to design the spatial management regime.

**Table 1: Move-on rules and criteria in force in SPRFMO bottom fisheries pursuant to CMM-03-2017**

Member	Taxa	Move-on criteria	Move-on response	Relevant implementation details	Other management measures in place to protect VMEs
<b>Bottom trawl fisheries (including midwater trawls for benthic-pelagic species)</b>					
Australia	Live & dead corals & sponges	50 kg per tow	Move 5 n. miles from the tow track and remain away for duration of permit. Area closed to all Australian flagged vessels using same gear type	5 mile movement is away from any point on trawl track or on line between locations of longline anchors	No spatial closures (all trawl footprint "open" subject to move-on)
New Zealand	Live & dead sponges	50 kg per tow	If any one of the criteria is met, the vessel must move 5 miles from the tow track and remain away for duration of trip. Area remains open to other vessels	5 mile movement is away from the location at which the trawl tow commenced	Nested within spatial closures (move-on applies within moderately-fished areas only)
	Live & dead scleractinians	30 kg per tow			
	Live & dead gorgonians	1 kg per tow			
	Live & dead black corals	1 kg per tow			
	Live & dead soft corals	1 kg per tow			
	Live & dead hydrozoans	1 kg per tow			
	11 named taxa, live or dead	Presence of any 3 taxa in a tow			
<b>Bottom line fisheries</b>					
Australia	Live corals & sponges	10 kg per line section	Move 5 miles from the set and remain away for duration of permit. Area closed to all Australian flagged vessels using same gear type	Line section is 1000 hooks or 1200 m whichever shorter	No spatial closures (all line-fishing footprint "open" subject to move-on)
New Zealand	N/A	N/A	N/A	N/A	No spatial closures (all line-fishing footprint "open" and not subject to move-on)

## 1.1. Advantages of move-on rules

At a high level, the key advantage of move-on rules is that they provide a rapid response to evidence of a VME. This could lead to greater protection for areas of biodiverse benthic habitat which may constitute (or be part of) a VME. This advantage pertains whether or not there is prior information on the distribution of VMEs; a move-on rule can act as a stand-alone management measure and, if properly designed, implemented, and reviewed, can progressively shift fishing effort away from vulnerable habitats and areas. A secondary advantage (and one envisaged by New Zealand when it designed its management measures for SPRFMO) is that screening benthic bycatch for the purpose of assessing whether a move-on was required can accelerate the collection of new data on the distribution of VMEs. Finally, move-on rules can be used in conjunction with spatial closures to test the extent to which spatial management measures appear well-designed and mitigate impacts on VMEs found unexpectedly outside spatial closures. Such unexpected results could occur given the moderate to large uncertainties inherent in the models used to predict the distribution of VME taxa using sparse data.

As currently implemented by Australia and New Zealand, move-on rules pursuant to CMM-03-2017 provide a rapid but uncertain and short-lived response to evidence of a VME. The response is uncertain because the Australian and New Zealand triggers and criteria are very different, because bottom trawl gear has low and variable selectivity for benthic invertebrates, and because Australian move-on exclusions apply to all Australian vessels using the same gear whereas New Zealand exclusions apply only to the vessel encountering evidence. The response is short-lived because exclusions apply only for the remainder of a fishing trip (New Zealand) or for the remainder of the permit year (Australia).

Such short-term protection is unlikely to be of value in protecting VMEs having many long-lived taxa with slow recovery from disturbance. In addition, the move-on rules have not led to the collection of more data on the distribution of VMEs because they are so rarely triggered. In addition, both Australia and New Zealand require 100% observer coverage on bottom trawling vessels and such observers collect much better and more detailed information on benthic bycatch than is required to test move-on thresholds and criteria.

## 1.2. Disadvantages of move-on rules

At a high level, the key disadvantages of move-on rules are that they impose costs and uncertainty on fisheries, they are relatively complex (and therefore costly) to design and administer, they do not avoid initial impacts on VMEs (providing only an uncertain response to an impact), and they may shift fishing effort away from preferred fishing areas, thereby potentially increasing total fishing effort and the impact of the fishery on vulnerable habitats and areas. The latter could occur where no spatial management exists or where open and closed areas have not been well-designed.

As currently implemented by Australia and New Zealand, move-on rules pursuant to CMM-03-2017 provide disincentives for fishers to fish in the middle tier of New Zealand's three-tier implementation, even though the rules are rarely triggered. New Zealand's protocol also requires a rapid but quite



detailed assessment, including taxonomic distinctions, of the benthic bycatch from each trawl in the move-on area before another trawl can be started. Australia's protocol is less demanding in that all that is required is an assessment of whether more than 50 kg of live and dead corals and sponges have been caught (and this is probably easily judged "by eye" by an experienced observer), but it applies across all parts of the Australian footprint (no blocks are closed other than those closed previously for other reasons).

Because both move-on rules have been so rarely triggered (for whatever reason), it is not likely that such protocols have increased total fishing effort by a significant amount or the impact of either the Australian or New Zealand fishery on vulnerable habitats and areas. However, by the same token, move-on rules do not seem to have added much value in terms of increased protection for VMEs in return for the complexity they add for fisheries managers and fishers, except to the extent that they may have deterred fishers from using the move-on areas within new Zealand's footprint.

#### 4. The utility of move-on rules within well-designed spatial management frameworks

Based on the analysis in sections 3.4 and 3.5, we believe move-on rules can be expected to provide a useful contribution to protecting VMEs from significant adverse impacts (though not preventing any adverse impacts) if there are no spatial management measures in place, or the measures in place are poorly-designed, arbitrary, or based on highly uncertain science about the distribution of VMEs. Effective use of move-on rules in this context would involve periodic, probably annual, review of new information and adjustment of the areas closed to fishing as and when new information became available. However, where well-designed spatial management measures are in place and evidence suggests that significant adverse impacts<sup>5</sup> have been prevented (at the system scale) by those measures, then move-on rules would appear to offer utility only if new and highly unexpected insights into the distribution or density of VME indicator taxa arose from the benthic bycatch in a particular trawl.

It is implicit in the preceding paragraph that we interpret the term "preventing significant adverse effects on vulnerable marine ecosystems" at a system level and we interpret the international obligations and agreements and the SPRFMO Convention also to apply at the system level. We do not, therefore, think an obligation exists to prevent all and any impacts on vulnerable marine taxa or ecosystems, or for move-on rules to be mandatory under UNGA resolutions and the SPRFMO Convention, as long as overall ecosystem integrity, structure, function, and biodiversity are maintained.

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<sup>5</sup> The 2008 Guidelines define significant adverse impacts as those that compromise ecosystem integrity, structure or function in a manner that: (i) impairs the ability of affected populations to replace themselves; (ii) degrades the long-term natural productivity of habitats; or (iii) causes, on more than a temporary basis, significant loss of species richness, habitat or community types. Impacts should be evaluated individually, in combination and cumulatively.

Thus, our analysis of the advantages and disadvantages of move-on rules leads us to agree with the conclusion of Hansen et al.'s (2013) review for SC-01 that *“given all of the shortcomings of move-on rules based on commercial benthic by-catch data, it is difficult to escape the conclusion that the main value of move-on rules is as an imperfect interim data collection and protection measure, until regions of highly diverse VMEs can be identified and properly protected using evidence-based and objectively planned spatial closures”*. SC-01 endorsed and emphasised that suggestion in its report. Below we describe how these fundamentals have been met.

The evidence base for the spatial closures previously contemplated by SC and Commission includes predictive maps of VME indicator taxa and VMEs and highly detailed information on the location of fishing. The predictive maps of VMEs have gone through several years of development and cover the locations of all the bottom fisheries in the western part of the SPRFMO Area apart from New Zealand's exploratory line fishery for toothfish<sup>6</sup>. Given the sparse data and the novel modelling approaches required, there are moderate to large uncertainties in some aspects of the predicted distributions, but the predicted maps constitute the best available scientific information on the distribution of VMEs. The distribution and intensity of bottom fishing is much more precisely known, based on statutory returns and independent observer records, and is the subject of separate papers describing a spatially-explicit cumulative impact assessment and (Sharp & Watters 2009) and the report from the workshops described below.

New Zealand and Australia have, together with support and advice from Chile and the EU, been through a series of workshops where these data sets were brought together using *Zonation* decision support software to develop and test spatial management measures with all stakeholders (fishers, environmental NGOs, researchers, and officials). Not surprisingly, those stakeholders had widely different values and perspectives but these workshop members worked through the data, settings and assumptions required for the decision-support tools to be used to identify and quantify the trade-offs between these values inherent in any a range of candidate spatial management approaches. We believe this is an objective and defensible way of implementing the balancing act between sustainable use and protection of VMEs inherent in the objective specified in the SPRFMO Convention<sup>7</sup>.

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<sup>6</sup> [New Zealand's exploratory fishery for toothfish](#) occurs in a distinctly different part of the SPRFMO Area and is not overlapped by any other bottom fishery. It was the subject of a separate risk assessment in Cryer & Fenaughty (2015) [SC-03-DW-01](#).

<sup>7</sup> The objective of this Convention is, *through the application of the precautionary approach and an ecosystem approach to fisheries management, to ensure the long-term conservation and sustainable use of fishery resources and, in so doing, to safeguard the marine ecosystems in which these resources occur*

## 5. Conclusions

- Move-on rules are best viewed as an interim data collection and protection measure until evidence-based and comprehensive measures are in place;
- Australia and New Zealand, with support and advice from Chile and EU, have used a series of stakeholder workshops to consider the best available science using decision-support tools to design potential spatial management areas to provide for sustainable fisheries while preventing significant adverse impacts on VMEs;
- Move-on rules may have some utility within a spatial management regime designed to provide these joint outcomes if new and highly unexpected insights into the distribution or density of VME indicator taxa arose from the benthic bycatch in a particular trawl or a sequence of two or more trawls.

## 6. Recommendations

It is recommended that the Scientific Committee:

- **notes** the diverse guidance on conservation and management measures for bottom fisheries available from UNGA resolutions, FAO documents and guidelines, published reviews, the SPRFMO Convention, and the existing CMM;
- **notes** the progress on the development and testing of methods to model and map VMEs in the western part of the SPRFMO Area and on the application of software-based methods to design candidate spatial management areas to provide for sustainable use while preventing significant adverse impacts on VMEs;
- **notes** the application of such decision-support tools by Australia and New Zealand in multi-stakeholder workshops in July-August 2017;
- **affirms** its agreement at SC-01, SC-02, SC-03, and SC-04 that a revised comprehensive CMM for bottom fisheries in the SPRFMO Area should be based on a spatial management approach;
- **agrees** that move-on rules should be viewed only as “back-stop” measures (if required) to complement spatial closures developed using decision-support software and designed to prevent significant adverse impacts on VMEs;
- **agrees** that that the potential information gathering benefits of move-on rules can be better met using structured and mandatory collection and review of benthic bycatch in bottom fisheries;
- **agrees** 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 might be expected in an area predicted to have very high habitat suitability for structural VME taxa and a high state of naturalness.

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## Appendix 1: relevant text from UNGA resolutions, other international guidance, the SPRFMO Convention, and the existing CMM for bottom fisheries

### UNGA Resolutions and other international guidance

Paragraph 83 of [UNGA Resolution 61/105](#) (2007): *Calls upon regional fisheries management organizations ... to adopt and implement measures, in accordance with the precautionary approach, ecosystem approaches and international law, for their respective regulatory areas as a matter of priority, but not later than 31 December 2008:*

- (a) To assess, on the basis of the best available scientific information, whether individual bottom fishing activities would have significant adverse impacts on vulnerable marine ecosystems, and to ensure that if it is assessed that these activities would have significant adverse impacts, they are managed to prevent such impacts, or not authorized to proceed;*
- (b) To identify vulnerable marine ecosystems and determine whether bottom fishing activities would cause significant adverse impacts to such ecosystems and the long-term sustainability of deep sea fish stocks, inter alia, by improving scientific research and data collection and sharing, and through new and exploratory fisheries;*
- (c) In respect of areas where vulnerable marine ecosystems, including seamounts, hydrothermal vents and cold water corals, are known to occur or are likely to occur based on the best available scientific information, to close such areas to bottom fishing and ensure that such activities do not proceed unless conservation and management measures have been established to prevent significant adverse impacts on vulnerable marine ecosystems;*
- (d) To require members of the regional fisheries management organizations or arrangements to require vessels flying their flag to cease bottom fishing activities in areas where, in the course of fishing operations, vulnerable marine ecosystems are encountered, and to report the encounter so that appropriate measures can be adopted in respect of the relevant site”.*

Paragraph 119 of [UNGA Resolution 64/72](#) (2010): *Calls upon regional fisheries management organizations ... to take the following urgent actions in areas beyond national jurisdiction:*

- (a) Conduct the assessments called for in paragraph 83 (a) of 61/105, consistent with the Guidelines, and ensure that vessels do not engage in bottom fishing until such assessments have been carried out;*
- (b) Conduct further marine scientific research and use the best scientific and technical information available to identify where vulnerable marine ecosystems are known to occur or are likely to occur and adopt conservation and management measures to prevent significant adverse impacts on such ecosystems consistent with the Guidelines, or close such areas to bottom fishing until conservation and management measures have been established, as called for in paragraph 83 (c) of 61/105;*
- (c) Establish and implement appropriate protocols for the implementation of paragraph 83 (d) of 61/105, including definitions of what constitutes evidence of an encounter with a vulnerable marine ecosystem, in particular threshold levels and indicator species, based on the best available scientific information and consistent with the Guidelines, and taking into account any other conservation and management measures to prevent significant adverse impacts on*

*vulnerable marine ecosystems, including those based on the results of assessments carried out pursuant to paragraph 83 (a) of 61/105 and paragraph 119 (a) of the present resolution”.*

Section 5.4 of FAO’s 2008 Guidelines for the management of deep-sea fisheries describes expectations for management and conservation tools to prevent significant adverse impacts on VMEs:

61. *A functioning regulatory framework should include an appropriate set of rules and regulations for the management of existing fisheries, as well as for the opening of new areas to exploratory fishing, consistent with these Guidelines and other relevant instruments. Such a framework should also include regulations to protect vulnerable populations, communities and habitats.*
62. *States and RFMO/As should adopt specific conservation and management measures for all DSFs pursuant to these Guidelines. Where no competent RFMO/A exists, or where interim measures governing such fisheries have not been established, such measures should be developed and implemented by flag States.*
63. *Until a functioning regulatory framework is developed to prevent significant adverse impacts on VMEs and to ensure the long-term sustainability of DSFs, conservation and management measures should include, at a minimum:*
  - i. *closing of areas to DSFs where VMEs are known or likely to occur, based on the best available scientific and technical information;*
  - ii. *refraining from expanding the level or spatial extent of effort of vessels involved in DSFs;*  
*and*
  - iii. *reducing the effort in specific fisheries, as necessary, to the nominal levels needed to provide information for assessing the fishery and obtaining relevant habitat and ecosystem information.*

*Such interim measures are without prejudice to future allocations and participatory rights in the fishery, in accordance with international law.*
64. *Comprehensive maps showing the spatial extent of existing fisheries should be compiled by RFMO/As. For areas not covered by RFMO/As, each flag State should develop such maps and cooperate with other States concerned and FAO in developing joint maps for relevant areas.*
65. *Precautionary conservation and management measures, including catch and effort controls, are essential during the exploratory phase of a DSF, and should be a major component of the management of an established DSF. They should include measures to manage the impact of the fishery on low productivity species, non-target species and sensitive habitat features. Implementation of a precautionary approach to sustainable exploitation of DSFs should include the following measures:*
  - i. *precautionary effort limits, particularly where reliable assessments of sustainable exploitation rates of target and main by-catch species are not available;*
  - ii. *precautionary measures, including precautionary spatial catch limits where appropriate, to prevent serial depletion of low-productivity stocks;*
  - iii. *regular review of appropriate indices of stock status and revision downwards of the limits listed above when significant declines are detected;*
  - iv. *measures to prevent significant adverse impacts on vulnerable marine ecosystems; and*
  - v. *comprehensive monitoring of all fishing effort, capture of all species and interactions with VMEs.*
66. *In areas where VMEs have been designated, or are known or likely to occur, based on seabed surveys and mapping or other best available information, States and RFMO/As should close*

*such areas to DSFs until appropriate conservation and management measures have been established to prevent significant adverse impacts on VMEs and ensure long-term conservation and sustainable use of deep-sea fish stocks, in accordance with Section 5.2.*

67. *States and RFMO/As should have an appropriate protocol identified in advance for how fishing vessels in DSFs should respond to encounters in the course of fishing operations with a VME, including defining what constitutes evidence of an encounter. Such protocol should ensure that States require vessels flying their flag to cease DSFs fishing activities at the site and report the encounter, including the location and any available information on the type of ecosystem encountered, to the relevant RFMO/A and flag State.*
68. *In designing such protocols and defining what constitutes an encounter, States and RFMO/As should take into account best available information from detailed seabed surveys and mapping, other relevant information available for the site or area, and other conservation and management measures that have been adopted to protect VMEs pursuant to paragraphs 70 and 71.*
69. *States and RFMO/As should, in light of reports (as referred to in paragraph 67), and in accordance with developed protocols and Section 5.2, adopt or modify management measures, appropriate for the DSF concerned, in regard to the relevant site or area to prevent significant adverse impacts on the VME.*
70. *States and RFMO/As should, based on the results of assessments carried out pursuant to Section 5.2, adopt conservation and management measures to achieve long-term conservation and sustainable use of deep-sea fish stocks, ensure adequate protection and prevent significant adverse impacts on VMEs. These measures should be developed on a case-by-case basis and take into account the distribution ranges of the ecosystems concerned.*
71. *Conservation and management measures pursuant to paragraph 70, may include:*
- i. effort controls and/or catch controls;*
  - ii. temporal and spatial restrictions or closures;*
  - iii. changes in gear design and/or deployment or operational measures, including,*
    - a reduction of contact between the fishing gear and the seabed,*
    - b use of effective bycatch reduction devices, and*
    - c use of technical measures to eliminate or minimize ghost fishing; or*
  - iv. other relevant measures necessary to achieve the objective of paragraph 70.*

*The performance of each measure depends on many factors related to the particular fishery, ecosystem, and how these measures are implemented. Management measures for DSFs, where applicable, should take account of appropriate biological reference points. Such measures should be accompanied by an effective set of MCS measures sufficient to ensure compliance with agreed measures.*

72. *Some of the above management measures for DSFs, such as effort, catch and temporal controls, may be limited in their effectiveness for the protection of some types of VMEs. Effective protection of such VMEs will usually require complementary measures, such as gear restrictions and spatial controls, as appropriate.*
73. *States and RFMO/As should assess, on the basis of the best available scientific and technical information, whether DSFs activities would have significant adverse impacts on VMEs. They should ensure that these activities are managed to prevent such impacts or not authorized to proceed, if it is assessed, in accordance with Section 5.2 of these Guidelines, that they would have significant adverse impacts.*



74. *If after assessing all available scientific and technical information, the presence of VMEs or the likelihood that individual DSFs activities would cause significant adverse impacts on VMEs cannot be adequately determined, States should only authorize individual DSFs activities to proceed in accordance with:*

- i. precautionary conservation and management measures to prevent significant adverse impacts as described in paragraph 65;*
- ii. a protocol for encounters with VMEs consistent with paragraphs 67-69; and*
- iii. measures, including ongoing scientific research, monitoring and data collection, to reduce uncertainty.*

## SPRFMO Convention

Article 2 specifies the objective of the organization as:

*“Through the application of the precautionary approach and an ecosystem approach to fisheries management, to ensure the long-term conservation and sustainable use of fishery resources and, in so doing, to safeguard the marine ecosystems in which these resources occur”.*

Article 3 sets out the principles and approaches to be applied to the conservation and management of fisheries in the SPRFMO Area, including:

*“1(a)(ii) fishing shall be commensurate with the sustainable use of fishery resources taking into account the impacts on non-target and associated or dependent species and the general obligation to protect and preserve the marine environment;*

*1(a) (vii) marine ecosystems shall be protected, in particular those ecosystems which have long recovery times following disturbance;*

*2(a) The precautionary approach as described in the 1995 Agreement<sup>8</sup> and the Code of Conduct<sup>9</sup> shall be applied widely to the conservation and management of fishery resources in order to protect those resources and to preserve the marine ecosystems in which they occur, and in particular the Contracting Parties, the Commission and subsidiary bodies shall:*

- (i) be more cautious when information is uncertain, unreliable, or inadequate;*
- (ii) not use the absence of adequate scientific information as a reason for postponing or failing to take conservation and management measures; and*
- (iii) take account of best international practices regarding the application of the precautionary approach, including Annex II of the 1995 Agreement and the Code of Conduct.*

*2(b) An ecosystem approach shall be applied widely to the conservation and management of fishery resources through an integrated approach under which decisions in relation to the management of fishery resources are considered in the context of the functioning of the wider marine ecosystems in which they occur to ensure the long-term conservation and sustainable use of those resources and in so doing, safeguard those marine ecosystems”.*

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<sup>8</sup> ) Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks of 4 December 1995

<sup>9</sup> Code of Conduct for Responsible Fisheries adopted by the 28th session of the Conference of the Food and Agriculture Organisation of the United Nations (FAO) on 31 October 1995

Article 10 specifies that the functions of the Scientific Committee include:

*“2(c) provide advice and recommendations to the Commission and its subsidiary bodies on the impact of fishing on the marine ecosystems in the Convention Area including advice and recommendations on the identification and distribution of vulnerable marine ecosystems, the likely impacts of fishing on such vulnerable marine ecosystems and measures to prevent significant adverse impacts on them”.*

Article 20 specifies that conservation and management measures shall include measures to:

*“1(d) protect the habitats and marine ecosystems in which fishery resources and non-target and associated or dependent species occur from the impacts of fishing, including measures to prevent significant adverse impacts on vulnerable marine ecosystems and precautionary measures where it cannot adequately be determined whether vulnerable marine ecosystems are present or whether fishing would cause significant adverse impacts on vulnerable marine ecosystems”.*

### Existing CMM for bottom fisheries, CMM-03-2017

The objective of CMM-03-2017 is specified as follows:

*“To promote the sustainable management of bottom fisheries including target fish stocks as well as non-target species taken as bycatch, in these fisheries, and to protect the marine ecosystems in which those resources occur, including inter alia, the prevention of significant adverse impacts on vulnerable marine ecosystems”.*

Paragraph 5 specified that the Scientific Committee should:

*“5(c) develop and provide advice and recommendations to the Commission on criteria for what constitutes evidence of an encounter with a VME, in particular threshold levels and indicator species;*

*5(d) develop and provide advice and recommendations to the Commission on the most appropriate response to a VME encounter, including inter alia closing particular areas to a particular gear type or types”.*

Under paragraph 8, in respect of bottom fisheries, Members and CNCPs agreed to:

*“8(f) until the Scientific Committee has developed advice on SPRFMO threshold levels pursuant to paragraph 5(c) of this CMM, establish threshold levels for encounters with VMEs for vessels flying their flag, taking into account paragraph 68 of the FAO Deep-sea Fisheries Guidelines;*

*8(g) require vessels flying their flag to cease bottom fishing activities within five (5) nautical miles of any site in the Convention Area where evidence of a VME is encountered above threshold levels established under sub-paragraph (f) in the course of fishing operations, and to report the encounter to the Secretariat of the Commission in accordance with the guidelines at Annex 1, so that appropriate action can be taken in respect of the relevant site;*

*8(h) notwithstanding sub-paragraphs (d) and (g) above, a Member or a CNCP may exclude part of its bottom fishing footprint from the application of sub-paragraph (g) by dividing its footprint into areas open to bottom fishing, areas closed to bottom fishing and areas to which subparagraph (g) would apply. These exclusions must have the purpose of preventing significant adverse impacts to VMEs”.*

Paragraphs 10–15 outline the process that must be followed to determine that bottom fishing will not have significant adverse impacts on VMEs bottom fishing:

10. *No Member or CNCP shall authorise their flagged vessels to engage in any bottom fishing within the Convention Area unless they have undertaken an assessment of the impact of their flagged vessels' bottom fishing. Any assessment carried out after 2011 must be done in accordance with the FAO Deepsea Fisheries Guidelines, and taking into account the SPRFMO BFIAS and areas identified where VMEs are known or suspected to occur in the area to be fished. When preparing assessments, Members and CNCPs will take into account the information provided pursuant to paragraph 23 of this CMM.*
11. *Assessments by Members or CNCPs shall also address whether the proposed activities achieve the objectives described in paragraph 1 of this CMM and Article 2 of the Convention.*
12. *The Scientific Committee shall:*
  - a) *assess, on the basis of the best available scientific information, whether the proposed bottom fishing would have significant adverse impacts on VMEs and if it is assessed that these activities would have significant adverse impacts, recommend measures to prevent such impacts, or recommend that the proposed bottom fishing should not proceed;*
  - b) *assess, taking into account, inter alia, the cumulative impacts of other fishing occurring in the region where such information is available, whether the proposed activities are consistent with paragraph 1 of this CMM and Article 2 of the Convention;*
  - c) *provide recommendations and advice to the Commission on the assessment.*
13. *The Commission shall:*
  - a) *on the basis of these assessments and taking into account the recommendations and advice of the Scientific Committee, consider whether, and if applicable the extent to which, bottom fishing in the region of the Convention Area for which the assessment was conducted, can be authorized and which, if any, measures are required, to prevent significant adverse impacts on VMEs;*
  - b) *make their determinations and any Scientific Committee evaluations publicly available.*
14. *Members and CNCPs shall ensure that assessments are updated when a substantial change in the fishery has occurred, such that it is likely that the risk or impacts of the fishery may have changed.*
15. *These assessments shall be made publicly available on the SPRFMO website.*