

11th MEETING OF THE SCIENTIFIC COMMITTEE

11 to 16 September 2023, Panama City, Panama

SC11 – Obs01

**Comment on anomalies in changes to CMM 03 and a path back to
evidence-based management**

High Seas Fisheries Group

TO: The SPRFMO Commission

11th August 2023

Summary Paper one:

HIGH SEAS FISHERIES GROUP SCIENCE COMMENT REGARDING PROCEDURAL ANOMALIES IN THE PROPOSED CHANGES TO CMM-03 BOTTOM FISHING, AND A PATH BACK TO RATIONAL EVIDENCE-BASED MANAGEMENT

This submission is HSFG's commentary on the material in paper COMM11-Obs05, which was submitted to the SPRFMO Commission in February 2023.

In that paper we expressed our concern that SPRFMO appeared to have abandoned the approach embodied in the SPRFMO Bottom Fisheries Impact Assessment Standard, which had been accepted by the Scientific Committee in 2019 and endorsed by the Commission in 2020, in favour of an alternate 'percent protected' approach without reference to an impact assessment.

We also expressed concern that adoption of this changed approach would set dangerous precedents for other fisheries, and risk undermining the foundational principles of SPRFMO.

The departure from the mandated process is effectively closing an entire fishery based on scientific analyses and advice that did not arise from -- and have to a large extent effectively circumvented the Scientific Committee. This is not good for SPRFMO.

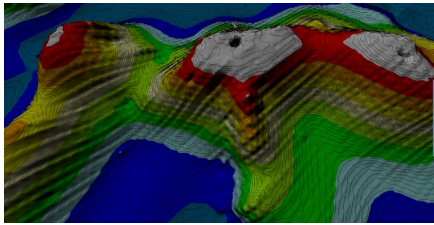
In this paper we reiterate our concerns over the procedural flaws in SC's approach.

As it is the SC that is responsible for providing best scientific advice to the commission to make the best decisions possible, we believe we are obliged, (both scientifically and morally) to point out the flaws in the science as this has impacted the lives of fishermen in NZ.

HSFG has no desire to critique the work of SPRFMO without proposing constructive solutions and providing assistance in delivering those solutions. These are proposed in this paper.

Chair HSFG

Andy Smith



TO: The SPRFMO Commission

11th August 2023

HIGH SEAS FISHERIES GROUP SCIENCE COMMENT REGARDING PROCEDURAL ANOMALIES IN THE PROPOSED CHANGES TO CMM-03 BOTTOM FISHING, AND A PATH BACK TO RATIONAL EVIDENCE-BASED MANAGEMENT

1. HSFG submission to Commission 2023

This submission is an update of much of the material in paper COMM11-Obs05, which was submitted to the SPRFMO Commission earlier this year (February 2023). In that paper we expressed our concern that SPRFMO appeared to have abandoned the approach embodied in the SPRFMO Bottom Fisheries Impact Assessment Standard, which had been accepted by the Scientific Committee in 2019 and endorsed by the Commission in 2020, in favour of an alternate 'percent protected' approach without reference to an impact assessment. We warned that this radical change in approach:

- i) ... is not scientifically consistent with prior Scientific Committee advice or international precedent; and
- ii) ... is not legally consistent with international requirements under UNGA and the FAO, or with practices in other RFMOs; and
- iii) ... is in clear breach of the requirements of the Bottom Fisheries Impact Assessment Standard adopted by SPRFMO in 2019-20.

We also expressed concern that adoption of this changed approach would set dangerous precedents for other fisheries, and risk undermining the foundational principles of SPRFMO.

Sadly, it seems that those warnings were unheard, because the Commission 11 (2023) has adopted advice that implicitly endorses the radical change in approach embodied in the recommendations of the Bottom Fisheries Intersessional Working Group (IWG) report of 2022 (Comm11-Doc07). We suspect that this oversight occurred for the following reasons.

- i) The proper forum for this entire discussion was the Scientific Committee, not the Commission. But the IWG did not submit its analyses to SC10 in 2022. Instead it bypassed the SC completely and went straight to Commission.

- ii) It is likely that all or most of the Members present at Commission 11 did not understand that the approach they endorsed was in fact a radical departure from the previously adopted BFIAS and BFIA.
- iii) Because the BFIA was not updated for Commission 11, and even the previous (outdated) Relative Benthic Status (RBS) results were not shown alongside the 'percent protected' results in Comm11-Doc07, the Members present at Commission 11 were not confronted with evidence of the change, and did not appreciate how different their advice would be if they were using the previously endorsed RBS.
- iv) The level of technical detail required to draw attention to these facts in our paper Comm11-Obs05 was incompatible with a Commission meeting, and should have been discussed instead in the Scientific Committee.
- v) HSFG is 'only' an observer organisation, and bottom fishing is 'only' of direct interest to a small number of SPRFMO Members, so our opportunity to draw attention to these matters on the floor of the Commission meeting was very limited.

The departure from the mandated process is effectively closing an entire fishery based on scientific analyses and advice that did not arise from -- and have to a large extent effectively circumvented -- the Scientific Committee. This is not good for SPRFMO. The precedent set by these decisions will affect bottom fishing into the future.

In this paper we re-present our serious procedural concerns, this time to the appropriate scientific body. HSFG feels strongly that on purely procedural grounds, proposals for new management targets under CMM03 never should have gone to Commission without being submitted to the SC for a proper scientific review.

We feel even more strongly that proposals for additional fishery closures to meet these targets should never go to Commission without being reviewed by SC. We note that there are no formal proposals for revised Bottom Trawl Management Areas (BTMAs) in the documents list for this meeting, yet the re-presented BFIA makes reference to new fishery closures to be proposed at Commission 2024. This is inconsistent with the high standard of scientific rigor that we have come to expect from RFMOs.

2. Summary:

HSFG has no desire to critique the work of SPRFMO without proposing constructive solutions, and providing assistance in delivering those solutions. To that end in this paper we:

- Provide an updated critique of the new bottom fishing impacts management approach (i.e. the 'percent protected' analysis) underpinning the apparent push for new spatial bottom fisheries closures.
- Track the emergence (or absence) of Scientific Committee advice supporting (or not) the adoption of this new approach at the expense of the

previously adopted impact assessment approach, highlighting our procedural concerns.

- Provide an outline of a conceptually clarified management framework with a quantitative performance metric to evaluate current and future impacts against an operational definition of SAI, consistent with international requirements and the SPRFMO Bottom Fisheries Impact Assessment standard;

In a separate paper we:

- Provide scientific feedback regarding the (non-) updated but re-presented BFIA, and also the VME spatial habitat modelling that underpins the entire SPRFMO bottom fisheries approach. Some of these critiques are with reference to new analyses that were previously unavailable.
- Provide suggestions for essential elements of an updated scientific work plan to deliver a rational and effective bottom fisheries management programme.

In closing, we urge that SPRFMO needs to restore its previous commitment to a clearly defined bottom fishing impact management framework, using a quantitative impact-based performance metric indicative of VME status (e.g. RBS) as required by the BFIAS, and an operational definition of 'Significant Adverse Impacts (SAI)' against which status can be compared (noting that to 'avoid SAI' is the only management objective consistent with international best practice as defined by the UNGA resolution and the FAO).

HSFG cautions the SC that the current approach to prevent SAI on VMEs does not address SPRFMO's obligations to UNGA Resolution 61/105 or the FAO (2008) Deep-sea Guidelines.

Until that framework is in place and the BFIA has been updated, no further changes to CMM-03 should be adopted relating to move on rules, encounter protocols, or additional spatial fishery closures.

3. The 2023 Commission meeting has (perhaps unknowingly) endorsed a problematic new approach to the SPRFMO bottom fishing spatial management framework, inconsistent with the approach taken until 2020

HSFG argues that some of the new advice arising from the SPRFMO bottom fishing Intersessional Working Group which was adopted by Commission11 to modify CMM-03 is neither legally, procedurally, nor scientifically defensible.

Upon reviewing the development of the science informing management of bottom fishing impacts in SPRFMO to date, it appears that that SPRFMO was initially committed to developing a defensible evidence-based approach up until the publication of the Bottom Fisheries Impact Assessment (BFIA) in 2020, but since

that time has abruptly changed course. Specifically, since 2021 SPRFMO appears to have abandoned the previously agreed impact assessment approach in favour of a new approach based on what proportion of each VME taxon is 'protected' (i.e. located in areas closed to fishing) *without reference to 'preventing significant adverse impacts on VMEs'*.

We are concerned that there is little or no legal basis in the text of the convention or in international law that supports this significant change in approach. The FAO (2008) Deep-sea Guidelines reflect the requirement of UNGA Resolution 61/105 to 'prevent significant adverse impacts' (SAI) on VMEs. *There is no reference in UNGA or the FAO to 'protection' (i.e. spatial fishery closures), except as a means to prevent SAI. The objective is to prevent SAI; spatial protection is then a means to that end, not an end in itself.*

3.1 BFIAS

In 2019-20 SPFMO adopted the 'Bottom Fisheries Impact Assessment Standard', which outlined the following requirements for bottom fishing impact assessments (see SC7-DW19rev, section 1.3.5).

Determining the level of risk to benthic habitats, biodiversity and VMEs for each hazard should be based on quantifiable criteria where possible.... Criteria that should be considered are

*Intensity – The intensity or severity of the impact. ... **should, where possible, be based on quantitative measures derived from impact assessment methods that have been applied successfully elsewhere** (e.g. Sharp et al. 2009, Ellis et al. 2014; Pitcher et al. 2016).*

*Spatial extent – The spatial **impact** relative to the extent of VME indicator taxa (e.g. **will fishing impact 5%, 30% or 80% of the VME indicator taxa distribution**)*

*Cumulative impact – The frequency of the impact will influence the risk... **This will depend on the amount of fishing effort and should be considered in relation to the recovery of the VMEs/taxa.***

*Overall risk – The overall risk ranking of an activity is evaluated from the combination of the criteria used. The method for combining these criteria **Preferably, to derive absolute estimates of status...** [emphasis added]:*

Each of these requirements of the BFIAS – i.e. *quantitative estimates of impact intensity, spatial extent, cumulative impact, and absolute VME status*, were met by the RBS analysis included in the BFIA in 2020, but were de-emphasized by only displaying the outputs in an appendix (and have not been updated). Since that time they have not been used including in the material supporting the IWG advice to Commission 2023. Instead, the IWG report utilised other summary statistics about 'percent protection' (unrelated to actual impact) which were also included in the BFIA but that *do not meet the requirements of the BFIAS*. The extent to which new fishery closures are deemed to be necessary (or not) is now almost completely unrelated to actual estimates of impact.

On this basis it appears that SPRFMO developed a sound approach to managing the effects of bottom fishing consistent with international law and best practice, adopted it as a standard, developed rigorous scientific analyses to implement it, then promptly abandoned the standard and proceeded to ignore the science that delivered on it, in favour of a new approach that does not address the requirements of the discarded standard.

4. What are the implications of this new approach?

4.1 Advice that the SPRFMO Commission abandon a management approach to 'prevent significant adverse impacts' on VMEs in favour of adopting a 'minimum areal protection' threshold is not legally, procedurally, or conceptually defensible

As detailed above, since the presentation of the BFIA in 2020, SPRFMO has abruptly abandoned its commitment to deliver a rational bottom fisheries management framework based on the impact assessment and a commitment to prevent SAI. Recent advice would replace this approach with a commitment to impose spatial fisheries closures over 70% each VME distribution, *regardless of actual impact*.

This approach is not consistent with the legal framework of the SPRFMO convention, or with the language of the FAO and the UNGA resolution. The binding commitment regarding VMEs is to 'avoid significant adverse impacts' NOT to 'ensure minimum levels of protection'.

It cannot be argued that the approaches are interchangeable, as if 'protection' is merely the inverse of 'impact'. Specifically:

- *Impact is a function of fishing gear and fishing practices.* Dependant on the type of trawl, the vessel and the captain and target species, and what is actually on the sea floor. All other considerations being equal, a trawl with a 100 m wide footprint will have twice as much impact as a trawl with a 50 m wide footprint. A tow that is in contact with the ocean floor for 1 km will have 10x more impact than a tow that is in contact with the ocean floor for 100 m. In contrast, 'protection' is insensitive to differences in gear and fishing practices.
- *Impact scales directly with the level of fishing effort.* A fishery with 100 vessels will have a higher impact than a fishery with only 10 vessels. A vessel that deploys 100 tows will have higher impact than a vessel that deploys a single tow. In contrast, 'protection' is insensitive to differences in fishing effort.
- *Impact varies between fishing methods;* bottom trawls have higher impacts than bottom longlines (per unit length), so will require more restrictive management to prevent SAI (except perhaps in locations where trawl lengths are very short). In contrast 'protection' is measured and expressed the same for all fishing methods.

Replacing an impact-based performance metric with a 'percent protected'-based performance metric means that SPRFMO treats all fisheries as if they have equal impact -- regardless of differences in method, gear configuration, fishing practices, or effort levels – and assumes that areal closures are the only way to reduce impact. This approach cannot be defended with reference to the SPRFMO convention or UNGA resolution and will set an alarming precedent for other RMFOs.

4.2 Adopting a single benchmark for what proportion of each VME taxon should be closed to bottom fishing in each FMA will produce inconsistent and illogical results.

Even without updating the RBS estimates with current available data, by comparing proposed BTMA scenarios in SC9-DW06rev1 with RBS results in SC11-DW01 Tables 30-38 that adopting a single 'minimum % protected' standard across all FMAs will produce wildly inconsistent and illogical results: some FMAs will experience additional fishery closures despite having negligible impacts (e.g. with all VME taxa being 98-100% intact even if fishing continues indefinitely) while other FMAs may experience no additional closures despite those same taxa being impacted more heavily already. In our other paper (SC11-Obs-BB) we draw these outputs together for critical scrutiny.

On what logical basis would SPRFMO expand the areas currently closed to fishing to 'protect' VMEs in an FMA where every VME taxon is (and will remain) at or above 99% status... yet consider that a reduction below 80% status is acceptable for the same VME taxa in different FMAs? Why would SPRFMO impose the highest fishery costs (in terms of forgone formally fished areas) in the least impacted FMAs and impose relative minor reductions in the more 'heavily' impacted FMAs?

These kinds of illogical outcomes are inevitable if SPRFMO adopts a single 'minimum % protected' standard across all bottom fisheries; adherence to the BFIAS demands instead that protection be scaled on the basis of an updated impact assessment and a coherent operational definition of SAI. Furthermore, changes to BTMA boundaries should be targeted with reference to the mapped distributions of those particular taxa for which RBS estimates are too low.

4.3 Replacing the impact-based performance metric required by the BFIAS with a new protection-based metric will create destabilising precedents for other SPRFMO fisheries and in other RFMOs, and will disincentivise effective mitigation

HSFG urges other fishing countries to consider the effect that adopting this new approach to managing bottom fishing impacts would have if the same precedent were applied to other kinds of impacts in other fisheries. Application of this same precedent to other fisheries impacts would logically lead to outcomes such as the following:

- For seabirds: *"It doesn't matter how few seabirds your fishery actually captures; because captures are not zero, we need to prohibit longline fishing in 70% of the area inhabited by seabirds".*
- For marine mammals: *"It doesn't matter that improved fishing methods have reduced the bycatch rate of marine mammals to negligible levels relative to historical impacts; because historical impacts occurred, we need to prohibit fishing in 70% of the spatial distribution of each mammal species."*
- For non-target fish: *"It doesn't matter that non-target fish populations are stable at high population status relative to B_0 ; we need to prohibit fishing within 70% of the spatial distribution of all non-target fish."*

We are all aware there are groups that would welcome this approach,. However, such an approach is contrary to the purpose of SPRFMO expressed in Article 2 of the Convention, which includes "to ensure the long-term conservation *and sustainable use* of fishery resources".

Effects on mitigation uptake: Tremendous progress has been made in fisheries management around the world through the adoption of mitigation, new gear technology, and changed fishing methods all designed to reduce **impact**. Abandoning an impact-based performance metric in favour of spatial protection measures affecting all vessels equally (regardless of their impact) would effectively negate any incentive for vessels to continue to develop and deploy low-impact methods or gears. This is contrary to ongoing good fisheries management.

5. How did we get here?

It is instructive to have regard to the chronology of the development of the SPRFMO bottom fishing impact management framework to date, with particular reference to the specific advice of the Scientific Committee, *and also what changes have been proposed (and now adopted) without any supporting Scientific Committee advice*. In the summary that follows we highlight (in bold) references to 'avoiding SAI' as the underlying objective of VME management, to emphasize that abandoning an impact-based performance metric means abandoning the rationale for most of the adopted scientific advice.

Chronology

- In 2019 the Bottom Fisheries Impact Assessment Standard (BFIAS) outlined the means by which SPRFMO shall meet the obligations of the FAO and UNGA to prevent SAI on VMEs. *This standard states clearly that impact assessments should include quantitative estimates of the intensity, spatial extent, and cumulative impact of bottom fishing on VME taxa or habitats, to derive absolute estimates of status* (see section 1.3.5 of SC7-DW19rev, summarised in section 1.3 below).

- The BFIAS endorsed specific existing methods that meet these requirements, including the 'Mormede-Sharp-Parker-Roux' method (Sharp et al. 2009, Mormede et al. 2017) and the 'Relative Benthic Status' (RBS); (Ellis et al. 2014, Pitcher et al. 2015, Pitcher et al. 2016).
- In 2019 the SC (SC7 paragraph 172)

Recommended to the Commission that the revised BFIAS at Annex A (of SC07-DW19) be adopted for any relevant BFIA processes undertaken in accordance with CMM 03-2019 and CMM 13-2019.

- In 2020 the New Zealand-Australia Bottom Fisheries Impact Assessment (BFIA; SC8-DW07rev1) provided quantitative estimates of cumulative impact and VME status for ten VME taxa, using RBS. However, without agreement about the spatial scale at which impact should be assessed, and without a quantitative operational definition of SAI, it was not yet possible to use these impact estimates to evaluate the risk of SAI.

- Each of the requirements of the BFIAS – i.e. *quantitative estimates of impact intensity, spatial extent, cumulative impact, and absolute VME status*, are delivered by the RBS results of the BFIA, but without agreement about spatial scale it was unclear which outputs should be used.
- It is also unhelpful that the RBS outputs were de-emphasized by only displaying the outputs in an appendix rather than numerically.
- The BFIA publication also included the 'percent protected' analysis for these same taxa. The fact that these outputs appeared alongside the impact assessment results in the same document under the same title likely contributed to subsequent confusion, but to be clear, the 'percent protected' analysis does not even refer to either impact or status, so does not meet the requirements of the BFIAS. The percent protected results are supplemental to the impact assessment results, but they are not themselves an impact assessment.

- In 2020 the SC (SC8 paragraph 73):

agreed that the cumulative BFIA provided by New Zealand and Australia represents: the best science available to the SC at the current time; provides a sound basis for formulating management advice to the Commission; meets international standards (such as the FAO Deep-Seas Guidelines) and complies with the SPRFMO BFIA Standard and, consequently, accepts the BFIA (SC8-DW07_rev1, emphasis added).

- Note in particular the use of the word 'cumulative' to describe *which* results constitute the best available science. This sentence cannot

be interpreted to refer to the 'percent protected' analysis because that analysis is completely insensitive to different levels of fishing effort and so cannot represent the cumulative effects of additional effort over time.

... and... (SC8 paragraph 74)

*Recommended that the Commission provides guidance to the SC on the level of protection, structure, or function of VMEs it requires **to assure that Significant Adverse Impacts on VMEs are prevented** [emphasis added]*

- At the 2021 Commission meeting the following text was added to the Scientific Committee Work plan (COMM9-Doc06_rev3):

Develop protection level options for VME indicator taxa at ecologically-meaningful spatial scales, using different approaches. Scenarios should encompass protection levels 70%, 80%, 90%, 95% for the modelled VME indicator taxa using temporally static and temporally dynamic assessment methods. The Scientific Committee should also explicitly account for uncertainties in current model predictions, the relative availability of VME indicator taxa in an area, and information from other RFMOs or guidance documents (if any) when formulating its recommendations to the Commission. Evaluations should be undertaken at spatial scales comparable to the Fisheries Management Areas described in SC8- DW07_rev1

- It seems this is the first ever mention of the 'percent protected' approach in adopted SPRFMO text. Careful review of the SC 2020 text does not reveal any science advice that would support or logically lead to what is in fact a radical departure from the impact assessment approach previously embodied in the BFIA and endorsed in the SC. That this text only appeared in Rev3 of the work plan, with no supporting text in the record of the meeting itself, suggests that it was added during text finalisation and perhaps without much discussion.
- In 2021 New Zealand and Australia presented spatial protection scenarios consistent with the Commission workplan advice. In response the SC (SC9 paragraph 78) appeared to support the changed approach, without acknowledging that it did in fact constitute a radically changed approach:

a. Noted the metrics used to assess the protection levels for VME indicator taxa, ROC 0-linear and Power Mean, are representative of the metrics spectrum presented in the BFIA.

b. Noted that protection level assessment was completed for all protection levels using both temporally static and a temporally dynamic methods, as requested by the Commission.

c. Agreed that the approach taken to develop spatial management protection scenarios and report on their performance is appropriate and work will

continue intersessionally to refine scenarios to meet all protection targets for presentation to Commission

d. Recommended that the Commission consider the results of the spatial protection scenarios including to inform its determination of the level of protection required to prevent SAI on VMEs in the SPRFMO Convention Area
e. Noted that ecologically relevant spatial scales for assessing protection levels to prevent SAIs on VME indicator taxa still remain to be agreed, but that the existing information at the FMA is likely to be a more biologically appropriate compared with larger scales [emphasis added]

- We note that both the 2020 Commission meeting and the 2021 Scientific Committee meeting were only held remotely due to Covid19 travel restrictions. We ask SC members to consider whether such a radically changed approach would have been adopted without substantial discussion in an in-person meeting more conducive to transparent discussion.
- In 2022 the SC (SC10 paragraph 138):
 - a. requested that the Commission provides clear guidance to the SC on the spatial scale at which significant adverse impacts should be evaluated, and other matters related to operationalising **the objective of preventing significant adverse impacts on VMEs** [emphasis added]*
 - b. noting the reference in CMM 03-2022 to the United Nations General Assembly (UNGA) Resolution 61/105 calling on RFMOs to avoid significant adverse impacts on VMEs, SC10 requests that the Commission develop specific objectives for VME management and **provide clarity on the choice of an operational / quantitative threshold defining what level of impact would constitute a significant adverse impact** [emphasis added]*
 - d. requested further clarification on the acceptable severity (significance of the damage) and extent (spatial proportion of the VME habitat impacted) of the impact, if these differ from the guidelines provided by the FAO*
 - We note that in 2022 the advice of the SC again refers to the original impact assessment approach rather than the 'percent protected' approach (because the need for a quantitative/operational definition of SAI only makes sense to evaluate estimates of impact, but the 'percent protected' approach is completely blind to / insensitive of impact).
- In 2022 (but subsequent to the advice of the SC) the bottom fishing IWG finalised its advice to the Commission (COMM11-Doc07), including the following:

Recommendation 5: The Commission should accept the advice of SC10 (2022) to provide guidance on the spatial scale at which SAIs should be evaluated, and to develop specific objectives for VME management and provide clarity on the choice of an

operational/quantitative threshold defining what level of impact would constitute an SAI.

Recommendation 6: The Commission should apply a minimum level of protection of suitable habitat for each modelled VME indicator taxa. Members should work over 2023 to develop new candidate management area boundaries that achieve that level of protection...

- At Commission 2023, HSG (COMM11-Obs5) noted that fulfilling the IWG Recommendation 5 is a precondition for determining how much additional protection is required (if any) in the different FMAs, and that recommendations 5 and 6 actually refer to two distinct and incompatible approaches, of which only the former approach is legally and scientifically consistent with the SPRFMO approach to date. We objected to the latter approach on the following grounds:

In Recommendation 6 (and its supporting material in Topic 2, summarised in paragraphs 84-96) the IWG proposes to modify CMM-03 to require a commitment to a uniform minimum level of VME 'protection' -- but without reference to impact. This approach does not meet the clearly stated requirements of the BFIAS, and effectively abandons the entire impact assessment approach to which SPRFMO had been committed up until at least 2020. It is not defensible that SPRFMO would first adopt and then abruptly abandon the Bottom Fisheries Impact Assessment Standard which has already been adopted by the Commission.

*The changed approach is also inconsistent with SPRFMO SC advice subsequent to the adoption of the BFIAS, and with the requirements of the UNGA Convention and the FAO. For example, in every instance where 'protection' is mentioned in SC advice, it is a **means** to prevent SAI on VMEs (see bolded text in excerpts above); 'protection' is never an objective in its own right. The objective is the prevention of SAI, not the establishment of fishery closed areas without reference to impact. The FAO and UNGA requirements also refer only to managing impact to prevent SAI, not ensuring 'protection'.*

In this context the IWG Recommendation 6 is illogical, because the level of protection required can only be determined by comparing actual impacts against whatever level of impact that would constitute SAI (a threshold that has not yet to be defined, as highlighted in the IWG recommendation 5). There can be no legal basis for requiring a uniform level of 'protection' unrelated to the level of impact: where impacts are high, more protection will be required; where impacts are negligible or low, no new protection is required. Logically, once the SAI threshold has been defined, different protection levels will emerge from the updated impact assessment, but this cannot be determined without reference to specific impact assessment results.

- Commission 2023 adopted the following (COMM11 Annex 7b):

From 2023, the Scientific Committee shall adopt the Fishery Management Area as the appropriate scale of management for assessing the performance of the VME spatial management scenarios that underpin this CMM

From 2024, the Commission shall apply a minimum of 70% protection of suitable habitat for each modelled VME indicator taxa. The Commission, taking into account the advice and recommendations of the Scientific Committee, shall review the boundaries of the Management Areas established in paragraph 13 and Annex 4 of this CMM and make any modifications necessary to achieve this level of protection at its 12th annual meeting in 2024.

In summary, from this chronology we note that what was in effect a radical change in the science approach to quantifying and managing VME impacts was introduced in 2020-21 during the Covid travel restrictions, when open discourse was difficult and likely commentator's attentions were diverted. The new approach appeared first in a Commission level workplan item and then in Member's submissions but without any science discussion of the methodological choices or their implications. The IWG then adopted the same approach and made recommendations to the Commission in COMM11-Doc07 without ever presenting to the Scientific Committee. At the same time, the SC continued to deliver advice consistent with the previously endorsed impact assessment approach (i.e. to develop a quantitative/ operational definition of SAI; SC10 paragraph 138), apparently without expecting or appreciating that Commission would implicitly endorse a new metric for evaluating BTMAs that is completely insensitive to impact, so comparison with SAI will be impossible or moot.

Even now, we wonder to what extent Members are aware that the 'percent protected' approach is radically different from what is endorsed in international legal frameworks and applied in other jurisdictions. If SPRFMO intends to continue down this new path, we feel it is incumbent on the Scientific Committee to ensure that there is rigorous scientific discussion of the available options, and that the implications of the different options are made clear. To that end we request a substantive debate about the concerns we have raised.

We are hopeful that following such a debate, the Scientific Committee will recommend a return to the previously endorsed impact assessment approach consistent with the BFIAS and the UNGA and FAO guidance. We identify the remaining necessary elements of this approach in the outline below.

6. SPRFMO should renew its commitment to a clearly defined bottom fishing impact management framework, with reference to a quantitative impact-based performance metric, and consistent with the existing international framework

We propose the following simple pathway to guide and clarify a rational evidence-based bottom fishery impact management framework, consistent with the legal requirements of the SPRFMO convention and with scientific advice to date.

- Points 6.1 and 6.4-6.5 have been largely implemented already, culminating in the BFIA (SC8-DW07rev1);
- Point 6.2 has so far prevented implementation of the framework pending guidance from Commission, but with that guidance it can be delivered in the coming year
- Points 6.5-6.7 are now resolved by advice from Commission 11 (2023) regarding the spatial scale at which the impact assessment is applied
- Likewise, points 6.3 and 6.8-6.11 are readily deliverable in the coming year;

6.1 SPRFMO already has a conceptual definition of a bottom fisheries management objective: "prevent significant adverse impacts on VMEs"

All fisheries management organisations, both internationally and within national jurisdictions, define and rely upon a balance between the values of ecosystem protection on the one hand, and the rational and sustainable utilisation of marine resources on the other. The definition of, and commitment to, this balance is generally encoded in national legislation or in the founding documents of various international agreements or conventions, and it is the case with SPRFMO.

For bottom fishing impacts, UNGA resolution 61/105 requires that RFMOs "prevent significant adverse impacts on VMEs". The FAO Deep-Sea Guidelines (FAO 2008 paragraph 17) characterise 'significant adverse impacts' as follows:

Significant adverse impacts are those that compromise ecosystem integrity (i.e. ecosystem 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.

At its most basic level the FAO definition implies the following:

- *Some level of impact is acceptable, but impacts above a particular threshold (labelled 'SAI') are not acceptable.*
- *To qualify as SAI, an impact needs to be of sufficient magnitude to 'compromise ecosystem integrity'*
- Restrictions on fisheries are required to ensure that the level of impact remains below the SAI threshold.
- 'Protection' (i.e. closed areas) are an effective tool to reduce or manage bottom fishing impacts, but they are not the only possible tool.
- *The nature and amount of fisheries restrictions required depends on how much impact the fishery is having: fisheries that have no impact on VME*

habitats (e.g. pelagic fisheries) do not need to be restricted at all under the bottom fishing measure; fishing methods that have larger impacts (bottom trawling) will require higher levels of protection, relative to methods that have smaller impacts (bottom longlining), in order to maintain impacts below the SAI level

6.2 *SPRFMO needs a quantitative, operational definition of 'SAI'*

The FAO text provides conceptual guidance to help evaluate whether the effects of fishing in a particular location are high enough to constitute SAI. However the Scientific Committee has recognised that in order to implement an evidence-based framework to manage bottom fishing impacts, it is necessary to translate this conceptual definition of SAI into a practical, quantitative metric against which actual impacts can be estimated and compared.

“noting the reference in CMM 03-2022 to the United Nations General Assembly (UNGA) Resolution 61/105 calling on RFMOs to prevent significant adverse impacts on VMEs, SC10 requests that the Commission develop specific objectives for VME management and provide clarity on the choice of an operational / quantitative threshold defining what level of impact would constitute a significant adverse impact.” (SC10, paragraph 138b)

Conceptually, an operational definition of the SAI threshold level can be illustrated as in Figure 1. In this conceptual diagram, bottom fishing impacts accumulate over time, reducing the intact status of VME taxa over time until they reach an equilibrium status (where the rate of impact is balanced by the rate of recovery). The SAI threshold is illustrated as a horizontal line; taxa for which the equilibrium status is estimated or projected to fall below the SAI level require management intervention to prevent SAI.

There is no completely objective basis to define what proportion of a benthic taxon or habitat can be damaged before the impact will *'compromise ecosystem integrity'*, but precedents from other forums may be helpful. For example the Marine Stewardship Council (2022) defines *'serious or irreversible harm'* as a reduction in the habitat structure and function (i.e., *'status'*) below 80% of the unimpacted level (unless recovery can occur in less than 20 years).

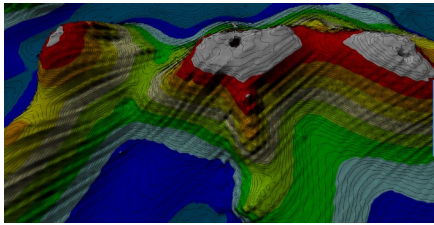
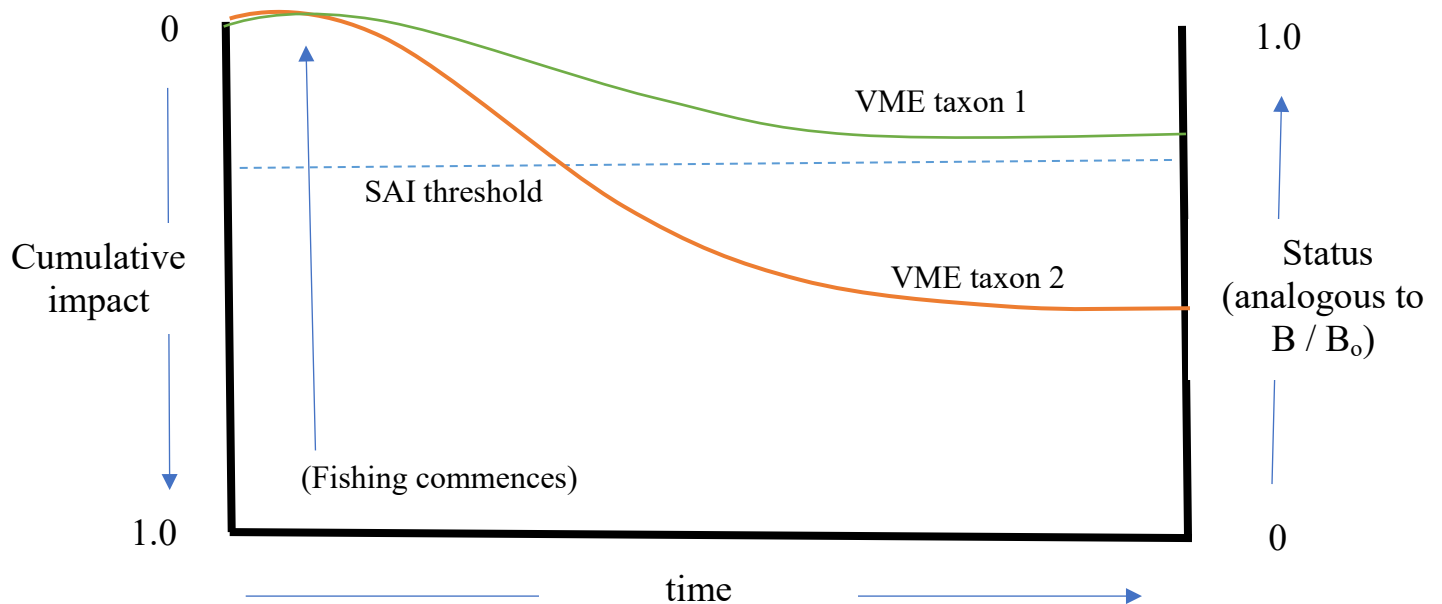


Figure 1. Conceptual illustration of impacts accruing and reducing the status of VME taxa over time (assuming constant fishing effort). Equilibrium status is reached when incremental impacts are balanced by the rate of recovery. In this example, VME taxon 2 is projected to drop below the SAI level, requiring management intervention to prevent SAI. VME taxon 1 is projected to stabilize at a status level higher than SAI, and requires no intervention.



- **Impact** in this figure refers to physical damage to benthic habitats (including VME taxa) in locations where bottom fishing gear makes contact with the sea floor.
- **Status** in this figure refers to the proportion of the VME taxon or habitat that is intact or undamaged.
 - o Conceptually, $\text{status} = (1 \text{ minus cumulative impact})$; as impact increases, status decreases.
 - o The concept of status also includes recovery (i.e. status can also increase over time) but for benthic organisms, recovery is often slow.
- **'SAI threshold'** is the threshold defining how far the status can be reduced before the impact is considered to be 'too high'. In this framework SAI can be expressed as a number between 0 and 1. An SAI threshold of .80 would imply that the maximum acceptable cumulative impact is .20

Definition of a quantitative SAI threshold is analogous to defining a target or limit biomass or exploitation rate in fisheries (expressed proportional to the unimpacted state, e.g. B_{msy} / B_0 or B_{mey} / B_0).

Without this threshold being defined in a quantitative way, it is not possible to assert how much bottom fishing impact is 'too much'. It is not scientifically, logically, procedurally, or legally defensible for SPRFMO to continue imposing new management measures without defining an operational threshold; it would be the equivalent of managing a target fishery without defining how much reduction in fish biomass is allowed.

6.3 *It may be that different choices of the SAI threshold are justified for different VME taxa, reflecting biological properties*

The FAO Deep-Sea Guidelines (FAO 2008 paragraph 18) state:

18. When determining the scale and significance of an impact, the following six factors should

be considered:

- i. the intensity or severity of the impact at the specific site being affected;*
- ii. the spatial extent of the impact relative to the availability of the habitat type affected;*
- iii. the sensitivity/vulnerability of the ecosystem to the impact;*
- iv. the ability of an ecosystem to recover from harm, and the rate of such recovery;*
- v. the extent to which ecosystem functions may be altered by the impact; and*
- vi. the timing and duration of the impact relative to the period in which a species needs the habitat during one or more of its life-history stages.*

Most of these considerations are reflected in the choice of which benthic taxa are considered to be VME indicator taxa, but to reflect the recommendations regarding recovery time, it would be logical to define a higher SAI threshold for slower-growing taxa, and a lower SAI threshold for faster-growing taxa. This is analogous in fisheries to allowing a higher exploitation rate for faster-growing fish species, and a low exploitation rate for slow-growing species.

Alternately, the Marine Stewardship Council (2022) defines 'serious or irreversible harm' differently for taxa that can or cannot be expected to recover from impacts in less than 20 years; for slower-growing taxa, the maximum impact threshold is **0.80**.

This is a topic that should be considered by the Scientific Committee.

In any event, we note that the 'percent protected' analysis presented to Commission 2023 does not deliver any of the requirements of FAO (2008) paragraph 18.

6.4 *SPRFMO requires an estimate of 'current intact status' and a projection of 'equilibrium status' for VME taxa and/or habitats (i.e. we need an updated BFIA)*

To evaluate whether impacts have exceeded or are likely to exceed SAI, it is necessary to assess how much impact has already occurred, and is likely to continue to occur under different management options. This is what was delivered by the RBS outputs in the BFIA (SC8-DW07rev1). However, the SC was unable to provide actionable advice at that time, because:

6.5 *It is impossible to estimate or refer to either 'impact' or 'status' without defining the spatial scale at which impact and status are summarised; (but since Commission 11 this has been resolved)*

'Impact' denotes what proportion of a VME habitat has been damaged *in a defined area*. References to impact are meaningless if the area is not defined: the amount of impact occurring from a single trawl fishing event could be as high as 100% (if measured only within the footprint the trawl) and simultaneously so low as to be almost zero (if measured at the scale of a whole ocean basin). When the BFIA was delivered there was no consensus regarding at what spatial scale bottom fishing impacts should be summarised or managed, hence no agreed estimate of current status for each VME habitat, and no way of evaluating whether that status is currently above or below any agreed SAI threshold.

The NZ High Court has recently commented that:

“An activity that jeopardises the whole of a species or ecosystem, or the whole of one of its constituent parts, may obviously cause material harm to the environment. However, the position is likely to be different where the activity has more limited effect. By way of example, harm to the environment may not be material where the activity jeopardises a species or ecosystem (or one of its constituent parts) in a confined area but the population of that species or ecosystem remains unaffected beyond the confined area”¹

Until now, lack of clarity regarding the spatial scale at which the BFIA results should be applied was the primary obstacle to progress in implementing a rational bottom fishing management approach. This is no longer the case: Commission 11 (2023) agreed (paragraph 39):

39. From 2023, the Scientific Committee shall adopt the Fishery Management Area as the appropriate scale of management for assessing the performance of the VME spatial management scenarios that underpin this CMM.

6.6 *With the FMA spatial scale now adopted for bottom fisheries impact assessment, estimates of VME status for 10 VME taxa already exist.*

The original RBS results at the FMA scale are now included in Tables 30-38 of the re-presented BFIA (SC11-DW01). Because the impact assessment has not been updated, the 2020 'current' fishing effort estimates *represent the 'best available science' (SC8 paragraph 73) regarding the impacts of bottom fishing in the SPRFMO area; and should therefore be used to inform spatial management design.*

Note that scientific advice from before the results of the BFIA were clear, suggested that VME protection in the three FMAs shown in Figure 2 was

¹ Protect Aotea v Environmental Protection Authority, [2022] NZHC 1689 (2022), Paras 46-48

'qualitatively less favourable' than elsewhere (SC8 paragraph 73) and this statement was carried through into IWG advice that more fishery closures may be warranted in these areas (IWG report paragraph 85). However the requirements of the BFIAS are clear that wherever possible, *quantitative methods* should be used, including estimates of both *cumulative impact* and *VME taxon status*. Since the publication of the BFIA these quantitative estimates are now available and easily updated; now that the spatial scale question is resolved, ***there is no need or justification to base spatial management decisions on qualitative or relative statements based on analyses that are incompatible with the BFIAS.***

To facilitate discussion, in our other submission to this meeting (SC11-Obs-BB) HSFSG has combined the most relevant figures from these tables, i.e. 'median' estimates based on 'current' fishing effort levels, and provided additional information regarding subsequent TAC reductions (to illustrate to what extent future effort will be lower) and also cost to fishing of the '70% protection' scenarios referred in SC11-DW01 (extracted from SC9-DW06rev1). This combined table is included as Table 1.

6.7 *Best available estimates of cumulative impact and status reveal very low or even negligible impacts in most FMAs, including some FMAs where increased spatial fishery closures are now proposed*

RBS estimates at the FMA scale demonstrate almost without exception that cumulative impacts are low and equilibrium status is high, such that *there is no scientific or legal basis for further fishery closures in the vast majority of SPRFMO bottom fishery FMAs (Table 1).*

Note in particular the huge discrepancy between RBS and 'percent protected' outputs for the Southern Louisville FMA. The BFIA estimates *that even if current fishing effort levels were to continue indefinitely, VME status will remain >99% intact for every single VME taxon for which estimates are available.*

- What **reasonable scientist** could honestly assert that reducing the intact status of a marine organism by less than 1% will somehow 'compromise ecosystem integrity' (FAO 2008 paragraph 17) and therefore constitute a 'significant adverse impact'?
- How can we justify eliminating more than 80% of fishery value in this FMA when the marginal value to be gained is so small?
- What **reasonable fishing nation** would be willing to adopt this same standard inside its own EEZ?
- What would be the effect on other SPRFMO fisheries if the same maximum impact threshold were set for other non-target species such as sharks or seabirds or non-target fish?

Note also that even in the more 'heavily' impacted FMAs (e.g. Northwest Challenger) the most 'heavily' impacted VME taxa are and will remain above 90-95% intact status under current fishing effort patterns.

- 6.8 *The RBS estimates in the BFIA should be updated before new spatial management boundaries are proposed, noting that known biases will cause the current estimates to over-estimate impact (and under-estimate status)*

The SC (e.g. SC9 paragraph 74) and IWG submission (COMM11-DW05rev1 Recommendation 6) both advise that the BFIA should be updated with the best available information and then used to inform the design of bottom fishing measures. In particular, modelled spatial distributions are now available for all 17 VME indicator taxa listed in Annex 5 of CMM 03-2022, but the BFIA has not been applied to estimate equilibrium status for the 7 newest taxa for which distributions were only reviewed for the first time at SC10. (SC10 paragraph 119-122). If the new distributions are shown to be useful, then impact and status figures should include these new taxa.

Furthermore, the BFIA produces estimates of future VME status based on different projections of future fishing effort. Because orange roughly TACs were reduced in 2023, RBS projections in *the BFIA no longer reflect current or expected fishing effort levels, and will overestimate impact. To avoid producing actively misleading advice, the BFIA should be updated accordingly.*

Finally, the BFIA acknowledges that in locations where tow lines are targeted more precisely than is represented in the fisheries data (due to positional rounding of reported tow positions and the imposition of a 0.5 degree random jitter in the impact assessment stage of the BFIA) then *the impact estimates will over-estimate actual impact and underestimate VME status. This is almost certainly the case for bottom fishing impacts on all seamount features, including all three Louisville Ridge FMAs.*

The extent to which this is also true for the other FMAs is unclear. The 2020 BFIA (p 112) recommended that *"This issue may be investigated in future by examination of more recent data with higher spatial resolution". This investigation should occur before any new spatial restrictions are proposed to address bottom fishing impacts, especially in FMAs with primarily seamount habitats.*

The need to update the BFIA impact estimates will not create undue hardship or delays in the work of the SC; it is a relatively simple matter to update existing computer code and re-run the BFIA using current available VME taxa distributions and updated fishing effort projections.

- 6.9 *Once the impact and status estimates arising from the BFIA are updated, these can be used to evaluate and modify existing spatial area closures to achieve whatever SAI threshold is agreed in step 6.2 above.*

Where impact estimates are clearly below the SAI threshold, this indicates that further protection may be required. *Proposals for new BTMAs should be designed with specific reference to the particular taxon or taxa which fail to exceed the SAI*

threshold, i.e. by protecting those specific locations which will achieve the necessary increase in RBS with least cost to other (rational use) objectives.

Where impact estimates are low, such that status estimates are consistently above the SAI threshold, this indicates there is no risk of SAI to that taxon, and therefore no justification for additional spatial management measures to prevent SAI.

Where different spatial modelling sensitivities give widely diverging estimates of status, such that some sensitivities are higher than the SAI threshold and others are lower, then this situation warrants more focused model validation exercises to determine which spatial model assumptions best matches the available data. It is not scientifically defensible to just 'pick the lowest number' of a suite of sensitivities without taking steps to determine which is more accurate (as was done in the IWG report to SC11).

We identify this and other problems with the validation and use of spatial model sensitivities in our other paper (SC11-Obs-BB).

6.10 In FMAs where the projected status of every VME taxon is well above the SAI threshold, BTMAs should be adjusted to increase the fishable area within limits consistent with the agreed SAI threshold

Any principled, evidence-based management framework should be applied equally in all areas, whether the equilibrium status projection is estimated to stabilise either above or below the SAI threshold. Where all current and future impact projections produce status estimates substantially higher than the threshold, this indicates that there is no risk of a significant adverse impact in this location, meaning current fishery closures are more restrictive than necessary.

The equilibrium status estimates in SC12-DW01 Tables 30-38 strongly suggest that in some FMAs, the previous areal closures were larger than required to meet any reasonable definition of the SAI threshold. For example this will be the case for all three Louisville Ridge FMAs, unless the Commission adopts an operational definition of the SAI threshold at or above the 98% level.

Conclusion

We believe that SPRFMO have gone off task, and respectfully request that prior to the Bottom Fishing measure being debated, the SC engages in an open and rigorous discussion on whether the development of the bottom fishing measure and associated advice has followed an appropriate procedure. We need to consider a 'reset' to align SC advice with the BFIAS and the previously text of the Convention. In the meantime, the impact assessment results demonstrate clearly that there is no urgency. SPRFMO should take the time required to evaluate its own procedures and test the validity of the science on which it is relying..

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http://www.un.org/Depts/los/general_assembly/general_assembly_reports.htm, 21pp.

Table 1. Relative Benthic Status (RBS) from the 2020 BFIA analysis (SC8-DW07_rev1; and extracted from SC11-DW01 Tables 30-38) for ten VME taxa. Note that estimates arising from the base case HSI models are missing. The extracted figures are the ‘median’ impact estimates from ‘current’ fishing effort scenario (i.e. 2010-2019 fishing effort levels within BTMAS mandated under CMM03-2020). Also shown (top row) are estimates of the extent to which these RBS figures will be biased low (i.e. over-estimating impact, under-estimating status) due to fishing effort reductions since the 2010-2019 period (TAC reductions in 2023 relative to previous year). Also shown are estimates of cost to fisheries (% value lost) associated with adoption of the ‘70% protected’ scenario (extracted from COMM10-Info03).

TAC change	-29%		-33%				-60%		none		none		-49%						
	West Norfolk		North Lord Howe		Central Lord Howe		Northwest Challenger		Westpac Bank		South Tasman Rise		North Louisville		Central Louisville		South Louisville		
VME Indicator Taxa habitat	ROC-linear	Power mean	ROC-linear	ROC-linear	ROC-linear	Power mean	ROC-linear	Power mean	ROC-linear	Power mean	ROC-linear	Power mean	ROC-linear	Power mean	ROC-linear	Power mean	ROC-linear	Power mean	
Sponges (<i>Porifera Demospongiae</i>)	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	1.00	1.00	1.00	1.00
Sponges (<i>Porifera Hexactinellida</i>)	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Stony corals (<i>Enallopsammia rostrata</i>)	0.99	0.99	1.00	1.00	0.99	0.99	0.91	0.93	0.99	1.00	1.00	1.00	NaN	1.00	1.00	0.99	NaN	0.99	
Stony corals (<i>Goniocorella dumosa</i>)	0.97	1.00	0.95	1.00	0.99	0.99	0.99	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.98	0.99	1.00	
Stony corals (<i>Madrepora oculata</i>)	1.00	1.00	1.00	1.00	0.98	0.99	0.94	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Stony corals (<i>Solenosmilia variabilis</i>)	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	0.97	1.00	0.99	
Black corals (<i>Antipatharia</i>)	1.00	1.00	1.00	1.00	0.99	0.99	0.95	0.96	0.99	0.99	1.00	1.00	1.00	1.00	0.99	0.99	1.00	1.00	
Gorgonians (<i>Gorgonian Alcyonacea</i>)	1.00	0.99	1.00	1.00	0.99	0.98	0.98	0.98	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Sea pens (<i>Pennatulacea</i>)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Hydrocorals (<i>Stylasteridae</i>)	1.00	1.00	0.89	0.99	0.62	0.82	1.00	1.00	0.97	0.99	1.00	1.00	1.00	1.00	0.99	0.99	1.00	1.00	
Fishery cost: Loss of value (%) under 70% protection scenario	21.12		19.8		21.39		32.18		1.28		1.74		41.7		88.36		83.38		