North Pacific Fisheries Commission

NPFC-2022-SSC BFME03-WP18

2nd Meeting of the Small Working Group on VME
20 July 2022 (9 am – 1 pm Tokyo time)
Webex

Summary

Agenda Item 1. Opening of the Meeting.

The 2nd intersessional meeting of the Small Working Group on VME (SWG VME) in the 2022 operational year commenced at 9:00 AM on 20 July 2022, Tokyo time in the format of video conferencing via WebEx. The meeting was attended by Members from Canada (Janelle Curtis, Chris Rooper, Devon Warawa), China (Libin Dai), Japan (Taro Ichii, Mai Miyamoto, Moto-omi Yamaguchi), Korea (Kyum Joon Park, Haewon Lee, Sanggyu Shin) and Russia (Oleg Katugin, Vladimir Kulik, Dmitrii Antonenko) as well as the Secretariat (Alex Zavolokin, Judy Dwyer, Sungkuk Kang, Natsuki Hosokawa, Mervin Ogawa). Amy Baco-Taylor and Ryan Gasbarro attended the meeting as an observer and invited expert, respectively. The meeting was opened by Janelle Curtis (Canada) who served as the SWG VME Lead.

Agenda Item 2. Adoption of Agenda.

There were no amendments to the agenda.

Agenda Item 3. Review of SWG VME Tasks for 2022.

The Lead reminded participants that SSC BF-ME02 assigned nine tasks to the group. Four tasks relate to VMEs and five relate to Significant Adverse Impacts (SAI) to VMEs.

Agenda Item 4. Discussion of VME-related tasks.

4.1. Consider VME indicator taxa list for additions/changes.

The Lead recalled that NPFC currently recognizes four orders of coral as VME indicator taxa and that Article 10 of the NPFC Convention mandates the SC to identify and advise the Commission on indicator taxa. During the SWG VME01 in April 2022, participants agreed to recommend that the list of VME indicator taxa be revised to *Antipatharia, Scleractinia,* and *Alcyonacea,* which now includes *Gorgonacea.* This recommendation is to reflect the recent change to the taxonomy of corals. At SWG VME01, participants also agreed to revisit the question of recognizing a subset of families in *Alcyonacea* based on differences in ecological roles among the taxa in that order and agreed to discuss the

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potential to recommend adding one or more classes of the phylum *Porifera* to the NPFC list of VME indicator taxa.

4.1.1 Presentation and recommendations on Gorgonian taxa in the order Alcyonacea.

Japan (Mai Miyamoto) presented their recommendations on *gorgonian* taxa in the order *Alcyonacea* by showing the bycatch occurrence frequencies from 2009 to 2021 based on the cold-water corals and sponges collected by Japanese fishing vessels and scientific surveys as reported in SWG VME01, highlighting that *Gorgonacea* has the highest occurrence in frequency, followed by *Antipatharia* and *Scleractinia*. In terms of bycatch weight composition from 2009 to 2021, gorgonians and *Porifera* were dominant in both commercial fisheries and scientific surveys while the weights of non-gorgonian soft corals were negligible. At SWG VME01, Japan proposed (a) adding *Porifera* to the list of VME indicator taxa due to their large individual weight, (b) treating gorgonian and other soft corals separately because of differences in their ecological characteristics and functional roles, and (c) only including gorgonian taxa in the *Alcyonacea* on the list of NPFC's VME indicator taxa because other soft corals were negligible in terms of their bycatch frequency and weight composition in Japan's surveys. Japan specifically proposed to revise the VME indicator taxa into four taxonomic groups: gorgonians, *Antipatharia, Scleractinia* and *Porifera*, with *gorgonians* comprising three sub-orders of *Alcyonacea*: *Scleraxonia*, *Holaxonia* and *Calcaxonia.* Those sub-orders correspond to 10 families of soft corals (*Anthothelidae, Paragorgiidae, Corallididae, Keroeididae, Acanthogorgiidae, Plexauridae, Gorgoniidae, Chrysogorgiidae, Primnoidae* and *Isididae*). The five other families in *Alcyonacea* (*Clavulariidae*, *Alcyoniidae*, *Nephtheidae*, *Nidaliidae* and *Paralcyoniidae*) were described as having small body sizes.

Korea (Kyum Joon Park) reiterated their opinion during SWG VME01 about their hesitation to remove the non-gorgonian soft corals from the list of VME indicator taxa. Although Korean observers are trained in classification of various marine life such as corals and sponges, they are still experiencing challenges differentiating non-gorgonian soft corals from gorgonians.

The observer, Amy Baco-Taylor, pointed out that from a taxonomic perspective, it might prove challenging to only include the group formerly known as *Gorgonacea* from the order *Alcyonacea* because none of the sub-orders are a monophyletic group and there is a lot of intermixing within the order. When asked by the Lead if

the same issue would arise if instead of sub-orders, the focus was on identifying families of gorgonian taxa, the observer replied that identifying families might just be too specific and that there is nothing to gain from removing non-gorgonian soft corals from the indicator taxa due to their low abundance in Japan's surveys.

Japan (Taro Ichii) stated that soft corals and gorgonians have quite different ecological characteristics and size, affirmed that it is not so difficult to differentiate between them, and expressed confusion over Korea's statement. It was also mentioned that Japanese fishers are hesitant to increase indicator taxa.

The Lead clarified that a discussion on how the list of VME indicator taxa might influence fishers is a management issue that should be discussed by the Commission and not by SC.

Canada (Chris Rooper) agreed that challenges with identification of taxa in *Alcyonacea* are a concern, but ensuring the protection of the larger soft corals is important.

Korea reiterated that they have identification issues for *Alcyonacea* but expressed hope to resolve these issues in the future by having a workshop on identification of VME taxa as planned by Russia.

Russia supported the identification of the three sub-orders of *Alcyonacea* (*Scleraxonia*, *Holaxonia* and *Calcaxonia*) rather than the whole order *Alcyonacea*.

China expressed the need to take some time for research.

In summary, Canada, Japan, Korea, and Russia agreed to recommend including the sub-orders *Scleraxonia*, *Holaxonia* and *Calcaxonia* of *Alcyonacea* on the list of NPFC's VME indicator taxa. The observer (Amy Baco-Taylor) reiterated that it was preferable to include all sub-orders of the *Alcyonacea*.

4.1.2 Presentation and recommendations on taxonomic groups within Porifera.

Japan (Moto-omi Yamaguchi) presented on sponges as a potential VME indicator. Sponges were collected from the Emperor Seamounts with glass sponges (*Hexactinellida*) as the most abundant, mixed with a small number of demosponges (*Demospongiae*). Japan conveyed that there is no current necessity to examine the detailed taxonomy for recognizing sponges as VME indicator taxa but indicated that future discussion on this matter is desirable.

The Lead clarified if Japan's proposal was to include all sponges on the list of VME indicator taxa, which Japan responded in the affirmative.

Canada (Chris Rooper) concurred with Japan in adding *Porifera* to the list of VME indicator taxa and added that the sponge taxa that should be protected are the ones

that are vulnerable to fishing, create some structure on the seafloor, and are long-lived and potentially rare.

China agreed with Japan's proposal and suggested that the SWG give participants more time to think about the inclusion of sponges and make a final decision about that recommendation at the formal SSC BFME-03 meeting in December.

Korea appreciated Japan's effort in presenting a good background on suggesting the inclusion of *Porifera* as a VME indicator taxon.

Russia expressed a similar position as China's and agreed to accept sponges, but mentioned the complex nature of taxonomic classification and that there is a need for more specification of sponge taxa to include on the list of VME indicator taxa.

The observer, Amy Baco-Taylor, expressed her strong support to include the *Porifera* as a VME indicator taxon, reminding participants that NPFC is the only bottom fish RFMO that does not include *Porifera* as an indicator taxon.

The Lead reminded participants that CMM 2019-06 and CMM 2021-05 identify examples of species, groups, communities, and habitat-forming species that are potentially vulnerable to deep-sea fisheries in the high seas and may contribute to forming VMEs. These include the hydrocorals (*Stylasteridae*), communities of large sessile protozoans and invertebrates that form habitat, and seep and vent communities comprised of invertebrate and microbial species found nowhere else.

No additional taxa were considered by participants.

In summary, participants agreed to formally revisit the taxonomic list of VME indicators at the SSC BF-ME03 meeting in December 2022. Participants considered treating gorgonians and soft corals separately, by recognizing 3 sub-orders of structure-forming gorgonians in the *Alcyonacea*: *Scleraxonia*, *Holaxonia* and *Calcaxonia*. Participants also agreed to discuss recommending the addition of one or more classes of *Porifera* to the list of NPFC's indicator taxa during the same meeting.

4.2 Candidate objectives for sharing visual data.

The Lead recalled that she circulated a questionnaire compiling available information to identify VMEs, areas likely to be VMEs, and areas that are at risk of SAI and that Canada, Korea, Japan, Russia and the observer provided detailed information about the photo and video data that they have collected in the NPFC Convention Area. However, during the previous meeting, it was agreed that these datasets were very large and that the objectives of sharing these data would need to be identified first. Chris Rooper of Canada volunteered to propose some candidate objectives.

Canada (Chris Rooper) presented candidate objectives for VME data sharing, which were divided into two broad VME management areas: (1) management of fisheries and (2) management of VME impacts. Management of fisheries includes setting gear-specific encounter definitions and data-based VME closures and move-on rules. For these, participants do not necessarily need to share data and can simply report what the data show. On the other hand, management of VME impacts relies on mapping areas of fishing activity, identifying areas of potential or suspected VME and/or determining risks of SAIs. These tasks may require spatial analysis that involves sharing aggregated spatially-explicit data among relevant Members, e.g., visual data, bycatch records, and/or fishing locations. For fishing activity, this has already been implemented through a spatial map of fishing footprint data shared on a 30 arc-second scale, which is available to members through the NPFC website. Another VME objective is to identify areas of potential or suspected VME and this is being done by defining or predicting the distribution of VME indicator taxa. Five specific objectives relevant to sharing visual data for identifying areas of potential or suspected VME were proposed: (1) Compile known locations of the presence of VME indicator taxa in the NPFC CA through visual surveys or possibly fisheries bycatch data in the future, (2) Compile known locations of the absence of VME indicator taxa in the NPFC CA through visual surveys, (3) Compile density and size information for the VME indicator taxa in the NPFC CA, (4) Overlay maps of fishing footprint with maps of known or predicted locations of the VME indicator taxa, (5) Make the data available to Members on the NPFC website for NPFC-related use only.

Canada proposed future research that could draw on these data to identify strategies and objectives for assessing SAIs. In terms of assessing SAIs, there is a need to define what "significant" is and to know what issues need to be addressed. A preliminary look at the intersection of VME indicator taxa and fishing effort should provide guidance for next steps. Canada also presented data sharing templates for point data, transect data and biological data.

Japan and the Lead inquired if Canada was proposing that the data template be used for sharing Member's data. Canada replied that participants must first agree on the objectives of sharing the data before sharing the type of data that is needed to meet the objectives.

Russia strongly supported the summarizing of data into a template as a way to move forward and suggested that the objectives be used as a basis for developing terms of reference for a future group responsible for sharing these data.

Korea expressed strong support of Canada's suggestion. They have not conducted any visual surveys in the Emperor Seamounts but have submitted all bycatch data. They also expressed a willingness to contribute to this work.

China strongly supported Canada's proposal but remarked that they do not have bottom fisheries in the NPFC Convention Area or scientific research for collecting related information.

The observer informed participants that most of their AUV visual data from 2014 and 2015 is in their publications, i.e. in supplementary materials and publicly available database repositories. She also has submersible observations from 2016 and 2017, and is aiming to submit those papers for publication later this year; so those visual data will also be publicly available when published.

Canada volunteered to draft the objectives and a corresponding Terms of Reference with the help of Russia and present them at the SSC BFME meeting in December 2022.

4.3 Recovering VME sites.

4.3.1 Candidate objectives for recovering VME sites.

The Lead recalled that during the SWG VME01 in April 2022, one candidate objective for recovering VME sites was discussed and that is to maintain healthy VME taxa populations or communities across contiguous regions of seamounts. She asked if any participants objected to this objective. Participants noted that this objective was not specific to VME recovery.

4.3.2 Characteristics of recovering VME sites to monitor.

Japan commented that in NAFO, recovering VME sites are defined as areas outside fishing grounds and suggested that this could be a realistic approach to achieving a balance between VME conservation and fisheries activities in the NPFC Convention Area as well.

The observer pointed out that even heavily fished areas have the potential to recover if they are protected. She also expressed confusion as to what recovering areas refer to. She suggested to identify candidate areas to monitor VME recovery. She also suggested one way to find candidate sites was to draw on the use of satellite AIS data to track fishing vessels and compare their tracks with the fishing footprint of areas where there has not been any fishing in previous years.

Canada (Chris Rooper) emphasized that before we select candidate sites, we first need to clearly define one or more goals for VME recovery and agree on how we will measure it.

4.4 Intersessional activities to address any outstanding VME-related tasks.

Canada suggested to define objectives that can be met for recovering VMEs and suggested

that the Lead circulate an email proposing one or more objectives to participants intersessionally and present the results at the meeting in December 2022.

Agenda Item 5. Discussion of SAI-related tasks.

5.1 Determine scientific basis for gear-specific encounter thresholds if possible.

The Lead briefly reviewed recent literature that suggests encounter thresholds should be specific to an area fished as well as the type of fishing gear and VME indicator taxa. Encounter threshold values could be supported by empirical relationships between the abundance of VME indicator taxa on the seafloor, the catch efficiency of the bottom contact gear and the biomass of VME indicator taxa retained as bycatch on the deck of fishing vessels. Unfortunately, such data are usually lacking including in the NPFC CA. The importance of refining the NPFC encounter threshold of 50 kg of corals has been discussed since the first SC meeting in 2016. At SSC VME01, the value of analyzing bycatch data was discussed. The following year at SSC VME02, it was recognized that the uniform threshold of 50 kg of cold-water corals in one gear retrieval, regardless of species or gear was lacking a scientific basis. During the SSC VME03 in 2018, Members agreed to refine the encounter thresholds based on scientific information including bycatch levels and catchability estimates and use taxon-specific and gear-specific thresholds. At SSC BFME01, Members agreed that there is a need to recommend gear-specific encounter thresholds. In terms of bottom contact fishing gear, NPFC Members used trawls, gillnets and longlines, but in practice, the current encounter threshold of 50 kg of corals per tow only really has the potential to apply to trawl gear. The Lead summarized a brief review of coral bycatch in longline gear. The first two SSC VME meetings reported that Russia had almost no occurrence of VME indicator taxa in bycatch on their longline vessels. SSC VME02 also reported low capture of VME indicator taxa in Canada's longline and pot gear. NEAFC has gear-specific encounter thresholds for trawl and longline gear. Their threshold for trawl gear is 30 kg of VME indicator taxa while for longline gear their threshold is the presence of VME indicators on 10 hooks per 100 hook segment or per 1200 meter section of longline, whichever is shorter. SIOFA also has gear-specific threshold for trawls and longline gears. Their threshold for a trawl tow is more than 60 kg of live corals or 300 kg of live sponge in any one tow, while their encounter threshold for longline is similar to that of NEAFC. CCAMLR has a similar threshold for longline and pot gear as NEAFC and SIOFA. At CCAMLR, trawling is not permitted. An analysis of NPFC gear-specific catch rate, coupled with estimates from the literature would help in providing recommendations on gear-specific encounter thresholds.

5.1.1 Analysis of historical bycatch data in a similar way done by Canada in

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The Lead asked if any of the participants have analyzed their bycatch data in a similar way done by Chris Rooper of Canada in December 2021 and asked if any Members are looking to undertake a similar analysis for the SSC BFME03 in December 2022. Given that no Members are planning on doing such analysis, the Lead asked if participants would like to consider recommending an encounter threshold for longline gear that is similar to the one used by NEAFC, SIOFA or CCAMLR.

Japan asked the Lead to share the details about gear-specific thresholds and also requested time to consider the examples from the other RFMOs. The Lead responded that she would share the notes and continue the discussion at the SSC BFME meeting in December 2022.

5.2 Determine scientific basis for move-on rules and size of the area for temporary closure.

The Lead briefly reviewed move-on distances from other RFMOs including NEAFC, SIOFA, CMMLAR and SEAFO, as many RFMOs have implemented move-on rules to help prevent SAIs on VMEs. This has been an important topic during the SSC BFME meetings in the past few years. The abovementioned RFMOs require two (2) nautical miles from a trawl tow and one (1) nautical mile distance for other gears including gillnets and longlines. In a 2020 article by Williams et al. published in *Frontiers in Marine Science*, it was estimated that the size of coral reef VMEs is 0.2 to 1.1 sq km in the South Pacific Ocean. This size is small compared to the 1km-by-1km grid size that is often used to predict suitable habitat for VME indicator taxa, which is also the grid size used by NPFC in the NE Pacific.

At SWG VME01, participants recognized the challenges of estimating VME patch sizes from visual surveys which often involved linear transects. The Lead recalled that the observer agreed to review their visual data from linear transects to estimate VME patch sizes, however the observer responded that they have not yet completed that analysis. She agreed to present her analysis at SSC BFME-03 in December 2022. The observer did note that the linear length of the reefs surveyed by her in the Emperor Seamounts ranged from ~3–786 m. These values should be viewed as conservative estimates for reef length because the AUV employed in her study followed a preset course heading regardless of what was on the seafloor. The observer also noted that these transect lengths were just for scleractinian reefs and that octocorals generally occupy much larger patches. She also noted that most of the surveyed sites were heavily impacted, so the size of VME patches were likely underestimated.

5.2.1 Estimate of VME patch sizes.

Japan (Mai Miyamoto) presented on their estimation method of VME patch sizes. The Japanese estimation method involves exploring potential VME areas with seafloor observation surveys which are conducted intensively around discovered communities. When dense VME indicator assemblages are found during seafloor observation surveys, the edge (endpoint) of the VME indicator assemblage is searched and the VME patch size is estimated. Japan also presented the biggest patch size in the Emperor Seamounts. The two VME assemblages discovered in the Emperor Seamounts area have already been reported, and the patch extents of the Emperor Seamounts VME assemblages are both considered to be less than 1 mile in length from east to west and north to south. These areas are located in the northwestern part of Koko Seamount and the northern ridge of Colahan Seamount. The Lead recalled that Japan proposed that the distance from a trawl tow be changed from 2 nautical miles to 1 nautical mile, which Japan confirmed.

Chris Rooper, the Chair of SSC BFME, informed the Lead that he is expecting to receive VME patch size estimates from Amy Baco-Taylor and Mai Miyamoto for the SSC BFME03 in December 2022.

5.3 Review literature on fisheries impacts on VME indicator taxa.

Canada (Devon Warawa) presented on the response and recovery potential of temperate benthic marine ecosystems following bottom-fishing disturbance, a study completed a decade ago.

The objective was to assess current information about response and recovery to anthropogenic activities on benthic marine ecosystems and to identify specific factors that affect recovery time such as physical habitat types, species life history characteristics, and disturbance intensity. The study focused on fishing disturbances to address the international commitments discussed, temperate and polar areas, and subtidal benthic ecosystems. The research concluded that the type of fishing gear, life history characteristics and physical habitat were all important predictors of response in species richness and abundance after disturbance. At the time of this study, there was insufficient data to measure recovery times. The next steps include updating this study with recent literature and to come up with interim measures to identify and protect VMEs.

Canada (Chris Rooper) suggested that the updated research focus more on the types of gear that are used by vessels in the North Pacific, i.e., longline, longline trap, gillnet, and otter trawl.

The Lead requested that the Secretariat create a Mendeley site to share papers about fisheries-related impacts to benthic ecosystems and proposed to send an email to participants asking for details on the fishing gear used by Members.

5.4 Determine data requirements and spatial/temporal resolution for SAI assessment.

5.4.1 Presentation on data requirements and spatial/temporal resolution for SAI assessment.

Ryan Gasbarro, an invited expert, presented on assessing the relative risk of SAIs on VMEs in the northeast part of the NPFC CA using predictive habitat suitability models and cumulative fishing footprint. In the study, the habitat suitability model is used to model the occurrence probability of 4 VME indicator taxa. These predictions are coupled with the cumulative fishing footprint from sablefish fisheries from 2006 to 2021 (CIA) to assess the relative risk of SAIs. The proposed formula for calculating the SAI Relative Risk Index (SAI_{RR}) is as follows:

SAI_{RR} = Habitat Suitability Index (HSI) × Cumulative Impact Area (CIA)

The method is a viable approach to map the relative risk of SAIs on VMEs applied to the NE Pacific.

The Lead asked SWG VME participants if there are methods they are aware of on how to determine if an SAI has happened, and how SAIs are defined.

Canada (Chris Rooper) responded that the struggle of defining and measuring SAIs is not unique to NPFC.

The observer commented that based on visual surveys, nets tangled up in coral beds and vast areas of coral rubble with gear have been observed, so there is no question that impacts have happened. Therefore, there is a need for more visual data.

The Lead concluded that because of the lack of visual data to monitor VME areas that have been affected by bottom-contact fishing gear, the best that Canada can do currently is to assess the relative risk of SAIs because there is information on the cumulative area fished, and there are predictions of the distribution of VME indicator taxa.

Canada (Chris Rooper) commented that the same relative risk of SAI might be obtained in a situation with high fishing intensity and low probability of occurrence as in a situation with low fishing intensity and high probability of occurrence. He suggested that alternative ways to scale the relative risk be explored.

5.5 Bathymetry base layer and heat map aggregated by gear type.

The Data Coordinator, Sungkuk Kang, updated the participants on the completed Bottom

Fishing Map with bathymetry base layer and heat map that can be accessed from the Science page of the NPFC website. Members are encouraged to explore the map and give feedback to the Secretariat.

The Lead asked if the Secretariat needs additional information from Members, including bathymetry data or updated fishing effort by gear types. The Data Coordinator responded that the Secretariat will contact Members if further information is needed.

Agenda Item 6. Intersessional activities to address any outstanding SAI-related tasks.

The Lead reminded everyone that Canada will update its literature review on fisheries impact to VMEs and prepare a paper that will outline the group's approach to assess the relative risk of SAIs to VMEs in the NE part of the NPFC CA.

6.1. Selection of a third SWG VME meeting date, if needed.

There will be no additional meeting of the SWG VME in 2022, but participants will continue discussion through email correspondence.

Agenda Item 7. Summary of activities/analyses/discussion to report to SSC BF-ME.

The SWG VME agreed to report the following outcomes of the SWG VME02 meeting to the SSC BF-ME:

(a) Members agreed to recommend that NPFC's list of VME indicator taxa be revised to *Alcyonacea* (which now includes the *Gorgonacea*), *Antipatharia,* and *Scleractinia*.

(b) Members agreed to discuss recommending that only three sub-orders in the *Alcyonacea* (*Scleraxonia*, *Holaxonia* and *Calcaxonia*) be included on the list of VME indicator taxa because of the differences in ecological characteristics and their larger size.

(c) Members agreed to discuss recommending the addition of *Porifera* to the list of VME indicator taxa.

(d) Members noted that Canada with the help of Russia will draft Terms of Reference for sharing visual data.

(e) Members noted that Canada will continue to define objectives that can be met for recovering VMEs and suggested that the Lead circulate an email proposing one or more objectives to participants intersessionally and present the results at the meeting in December 2022.

(f) Members noted the estimated VME patch sizes provided by Japan and encouraged Dr. Amy Baco-Taylor to provide VME patch sizes from her analyses to inform discussions on move-on rules and size of the area for temporary closure at the SSC BFME03 in December 2022.

(g) Members were invited to share papers about fisheries related impact on VMEs through a Mendeley site created by the Secretariat (an Mendeley invitation has been sent to SWG

VME members).

(h) Members noted that Canada will update its literature review on fisheries impact to VMEs and prepare a paper that will outline the group's approach to assess the relative risk of SAIs to VMEs in the NE part of the NPFC CA.

Agenda Item 8. Close of the Meeting

The meeting closed at 12:22 noon on 20 July 2022, Tokyo time.