

Small Working Group on VMEs - Summary for 2021

The Small Working Group on VMEs (SWG VME) was tasked by SSC BF-ME01 with five items to address intersessionally:

1. Updating the Members' views on a temporary measure, SAI assessment, potential conservation measures and other elements of a post-encounter measure
2. Defining the types of data that can be used to identify VMEs
3. Reviewing Members' available VME-related data
4. Analyzing the potential impact of current fishing activities on known potential VME sites in the Emperor Seamount area
5. Continuing to develop standardized approaches to defining risk of SAI for all NPFC Members

To achieve these tasks, the SWG VME met three times in 2021. The meetings were held on 21 April, 9 June, and 9 September. The meetings were led by Dr. Janelle Curtis and participants included Canada, China, Japan, Korea, Russia, and the USA. The Secretariat also participated in the meetings, as did an observer, Dr. Amy Baco-Taylor.

The Secretariat prepared summaries of SWG VME's three meetings with input from the lead and participants. This working paper summarizes the key progress on achieving SSC BF-ME's five tasks.

1. Updating the Members' views on a temporary measure, SAI assessment, potential conservation measures and other elements of a post-encounter measure

Members discussed responses to a questionnaire circulated in 2020 on the potential elements of a post-encounter measure. Participants agreed:

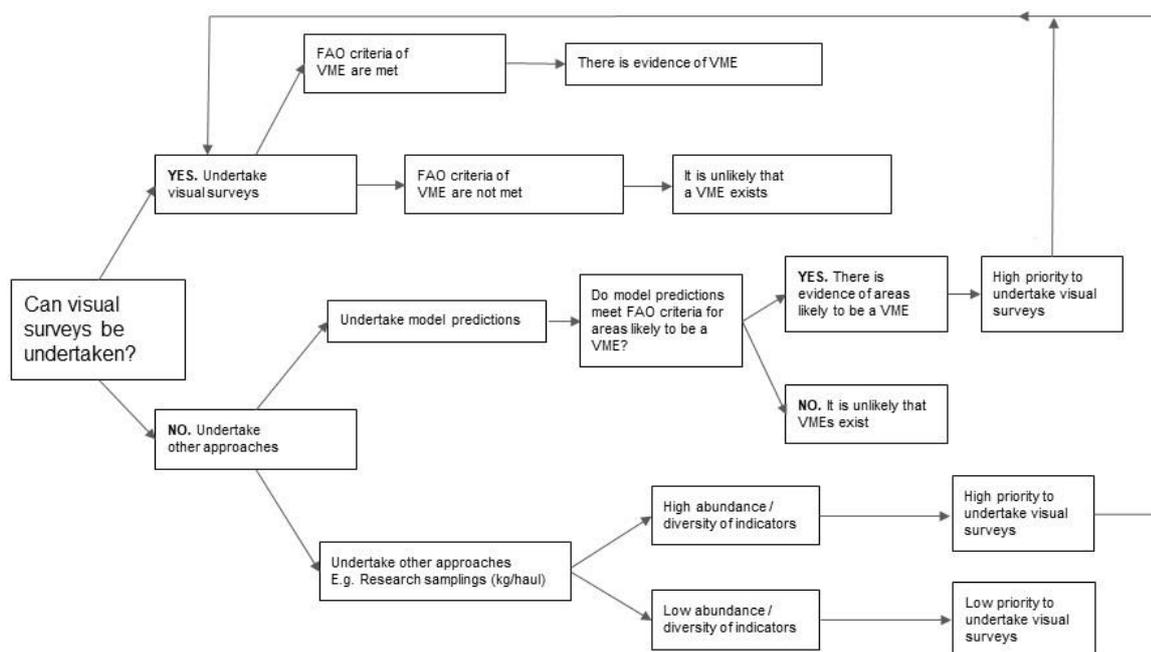
- That a temporary closure be implemented when an encounter occurs. Four options for the types of vessels to exclude were proposed for consideration at the SSC BF-ME02 meeting: (1) full closure (no transit), (2) no fishing with any gear type, (3) no fishing with the same gear used during the encounter, and (4) no bottom contact fishing. Members were encouraged to conduct analyses, using their data or literature, on the impact of different fishing gears on VMEs to inform discussions about which vessels should be closed out of the area at the SSC BF-ME02 meeting.
- Participants discussed the size of the closure and discussed two options, 1 nm and 2 nm, for consideration at the SSC BF-ME02 meeting (Trawl: 1 or 2 nautical mile wide band (polygon) on both sides of the "track" of a trawl haul; Other gears: 1 or 2 nautical mile radius around a reported VME encounter location). Japan and Korea agreed to conduct analyses, if data are available, to determine the precision and uncertainty of the position of fishing gear relative to the fishing vessel to inform SSC BF-ME-02's discussions about the size of the temporary closure.
- Participants proposed that (1) the Executive Secretary shall inform heads of delegations and designated representatives through a Circular within one business day of the receipt of the notification about a VME encounter and that (2) Members shall inform their fleets and enforcement operations within one business day of the receipt of the notification from the Executive Secretary.
- Participants agreed with the following proposed measure with respect to VME identification and SAI assessment: Based on all the available data, including data on the VME encounter and distribution received from the fishing vessel(s), research survey data, visual survey data, and/or model results, the Scientific Committee shall assess and conclude if the area has a VME. Participants discussed the importance of the Scientific Committee assessing the distribution of a proposed VME and providing advice to the Commission on adjusting the boundary of a VME closure accordingly with periodic review if new information or data become available.

- Participants agreed with the following measure with respect to providing scientific advice: the Scientific Committee shall provide advice to the Commission on whether a VME exists in the area and suggest appropriate measures. The Commission shall consider the advice and whether or not to adopt conservation and management measures.
- Participants agreed that the same encounter protocol should be applied in both fished and unfished areas.
- Participants also agreed that encounter thresholds should be gear-specific and recommended the SSC BF-ME02 consider gear-specific thresholds.

The Secretariat was tasked to revise CMMs 2021-05 and 2019-06 based on the above agreements and submit them to the SSC BF-ME02 meeting for consideration by members.

2. Defining the types of data that can be used to identify VMEs

Participants discussed the data types that can be used to identify VMEs and the relative merits of different types of data. They also discussed the decision trees proposed by Canada and Japan and agreed to recommend the following framework for identifying data that can be used to identify VMEs in the NW and NE parts of the NPFC’s Convention Area.



3. Reviewing Members' available VME-related data

Participants updated Member's available VME-related data drafted by SSC VME04. The updated tables are as follows:

Table 1. Existing Data for Potential Combined Footprint and Effort Map of all Bottom Fisheries by Gear and Time.

Gear type	Time period	Temporal resolution	Spatial resolution
Eastern North Pacific			
CANADA			
Longline	Recent/current (1996-2018)	Set by set (1-2 days)	1'' x 1''
JAPAN			
Non-commercial			
RUSSIA			
Bottom Trawl (observer or fishery independent data)	1973- 1985, not annual	Set by set (finer than a day)	6''x 6''
USA			
TBD			
Western North Pacific			
JAPAN			
Trawl	Historical (1969-1981)	Month	1° (long) x 30'(lat)
	Historical (1989-present) – logbook data	Day	1° (long) x 30'(lat)
	Recent/current (from 2009) – scientific observer data	Haul by haul (finer than a day)	30'' x 30''

Gillnet	Historical (2000-present) – logbook data	Day	1° (long) x 30' (lat)
	Recent/current (from 2009) - scientific observer data	Set by set (finer than a day)	30'' x 30''
KOREA			
Trawl	Historical (2004-present)	Day	20'x 20'
	Recent/current (from 2014)	Haul by haul (finer than a day)	30'' x 30''
RUSSIA			
Longline (observer data)	Recent/current (from 2014)	Set by set (finer than a day)	6''x 6''
Bottom Trawl (observer or fishery independent data)	1969- 2019, not annual	Set by set (finer than a day)	6''x 6''

Table 2. Existing Taxa Data for Combined Assessment

Survey type	Gear type	Taxa resolution	Time period	Temporal resolution	Spatial resolution
Eastern NP					
CANADA					
Fisheries	Longline	≥species	Recent/current (1996-2018)	Set by set (1-2 days)	1' (long) x 1' (lat)
Fisheries independent	Underwater image survey	≥species	2012	~1 sec	<1' (long) x 1' (lat)
Eastern NP (outside CA)					
CANADA					
Fisheries independent adjacent to CA	Underwater image survey	≥species	2017-2018	~1 sec	<1' (long) x 1' (lat)
Western NP					
JAPAN					
Fisheries	Trawl, Gillnet	≥species	2009-2018 (continue)	Set by set	30" (long) x 30" (lat)
Fisheries independent	Beam trawl	≥species	2009-2018 (continue)	Set by set	30" (long) x 30" (lat)
Fisheries independent	Underwater image survey	≥species	2009-2018 (continue)	~1 sec	30" (long) x 30" (lat)
KOREA					
Fisheries	Trawl	≥species	2016-2018 (continue)	Haul by haul	30" (long) x 30" (lat)
USA					
Fisheries independent	Autonomous underwater vehicle	≥species	2014-2015		
	Submersible	≥species	2016-2017		

Table 3. Existing Multibeam Data for Combined Assessment

Seamount	Collected by	Survey and gear type	Time period	Spatial resolution	Back-scatter	Stored by	Publicly available?
Eastern NP							
Canada/ USA							
Cobb	United States	Survey RB0002; SeaBeam2112 onboard the NOAA Ship <i>RV Ronald Brown</i>	2000	20 m x 20 m	No	NOAA	Y website
Far Cobb	na						
Cobb South	na						
Western NP							
JAPAN							
C-H, Colahan, Kammu, part of Koko (ongoing)	National Fisheries University	EM710S MBES onboard the TV Koyomaru	2010-present	30" x 30"	Y	Fisheries Agency of Japan	Y

Russia also updated participants on its 2021 research survey of the Emperor Seamounts with an ROV.

Potential data to be consolidated for predictive modeling and potential iterative predictive models were also summarized, as follows:

Potential data to be consolidated for predictive modeling

Input data: taxa (point data)

- Taxa abundance, presence-absence, or presence only data from
 - Fisheries bycatch
 - Science survey collections (e.g., university records; museum records)
 - Underwater-image derived data
- *Consideration: what is the probability of detecting presence (i.e., catchability or

sampling effectiveness)

*Consideration: taxa to be included, taxa resolution

Input data: environmental (continuous data)

- Anthropogenic
 - Fisheries bycatch
 - Naturalness (e.g., historic fishing)
 - Location of fishing activity (consider gear type)
 - Other local human impacts
- Benthic
 - Depth (e.g., at specific location; at-summit)
 - Substrate type (e.g., multibeam backscatter; online models)
 - Slope
 - Rugosity, roughness, complexity
 - Aspect
- Oceanographic (at-surface, at-depth, at-summit, and/or considering a temporal variability, such as annual mean)
 - Current flow strength
 - Current flow direction
 - Temperature (sea surface; at depth)
 - pH (alkalinity)
 - Salinity
 - Oxygen
 - Aragonite and calcite saturation states
 - Nitrate
 - Silicic acid
 - Primary productivity (chlorophyll a)
 - Particulate organic carbon
- Geographic
 - Biogeographic region
 - Locality (Eastness, Northness)
 - Isolation/proximity

Potential iterative predictive models

- Models used by Members
 - Marxan (i.e., decision-support tool)
 - Maxent (maximum entropy modelling)
 - Random Forest (can take both abundance & presence-absence data)
- Additional Models

- GLM/GAM
- Boosted regression models
- Validation and sensitivity assessment (e.g., post hoc; independent data)

4. Analyzing the potential impact of current fishing activities on known potential VME sites in the Emperor Seamount area

This task was agreed by participants as being related to task 5 and was not discussed in 2021.

5. Continuing to develop standardized approaches to defining risk of SAI for all NPFC Members

Participants discussed approaches proposed by Canada and Japan and agreed that the two approaches were similar in concept and that a standardized approach could be developed and applied in both the western and eastern parts of NPFC's Convention Area. The lead proposed to draft a working paper on a standardized approach for application in both the western and eastern Pacific Ocean.