



## North Pacific Fisheries Commission

NPFC-2022-SSC BFME03-WP17

### 1st meeting of the Small Working Group on VME

April 6, 2022 (9 am – 1 pm Tokyo time)

WebEx

### Summary

#### Agenda Item 1. Opening of the Meeting.

The 1<sup>st</sup> intersessional meeting of the Small Working Group on VME (SWG VME) in the 2022 operational year commenced at 9 AM on 6 April 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, Jackson Chu), China (Libin Dai), Japan (Taro Ichii, Mai Miyamoto, Yumiko Osawa, Moto-omi Yamaguchi), Korea (Kyum Joon Park, Haewon Lee, Sanggyu Shin) and Russia (Oleg Katugin, Vladimir Kulik, Oleg Ivanov, Tatiana Dautova, Viktor Zamyatin) as well as the Secretariat (Peter Flewwelling, Alex Zavolokin, Sungkuk Kang). Dr. Amy Baco-Taylor attended the meeting as an observer. The meeting was opened by Dr. Janelle Curtis (Canada) who served as the SWG VME Lead.

#### Agenda Item 2. Adoption of Agenda.

The Lead suggested adding a new agenda item 6.2.5 Add a bathymetry base layer and develop a heat map aggregated by gear type. Participants agreed with the proposed addition.

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

The Lead informed participants about nine tasks for the SWG VME identified during the SSC BF-ME02 meeting. Four tasks should be addressed at this meeting (Agenda Item 4) and the other five tasks will be fulfilled at the following meetings.

#### Agenda Item 4. Discussion of VME-related tasks.

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

The Lead reminded participants about the existing VME indicator taxa *Alcyonacea*, *Antipatharia*, *Gorgonacea*, and *Scleractinia*, as defined in the Convention and CMMs 2021-05 and 2019-06. Article 7(3)e of the NPFC Convention states that the Commission shall adopt and amend from time to time a list of indicator species for vulnerable marine ecosystems for which directed fishing shall be prohibited.

The Lead reminded the SWG VME that *Gorgonacea* is no longer a valid taxon and identified two issues for discussion by participants: (1) to update the existing list of VME indicator taxa to align it with the revised coral taxonomy, and (2) to discuss any changes to the VME indicator taxa.

To facilitate discussions about the list of VME indicator taxa, Japan gave a presentation on its updated analysis of VME indicators based on catch data from bottom fisheries and scientific surveys from 2009 to 2021 in the Emperor Seamounts region. The analysis showed that *Antipatharia*, *Scleractinia*, *Porifera*, and gorgonian taxa within *Alcyonacea* dominated by weight in both fisheries bycatch and catch in research surveys. By contrast, the percentage of non-gorgonian *Alcyonacea* was less than 1%.

#### 1. Taxonomy-related update

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

#### 2. Changes to the VME indicator taxa

Dr. Baco-Taylor presented a summary of VME indicator taxa recognized by other RFMOs and intergovernmental organizations. Participants noted that the NPFC currently recognizes the fewest number of VME indicator taxa among similar bottom fishing RFMOs. NPFC is the only bottom fishing RFMO that does not list sponges and sea pens as VME indicators. The Lead invited participants to propose changes to the list of VME indicator taxa. Participants discussed potentially including hydrocorals, *Pennatulacea*, or sponges on NPFC's list of VME indicator taxa. Participants also discussed the potential to recognize only a subset of *Alcyonacea* based on differences in ecological roles.

Japan noted that *Pennatulacea* represented a very small proportion (0.001%) of the total weight of organisms in their fisheries and scientific survey catch data.

Japan suggested adding *Porifera* to the list of VME indicator taxa because its analysis showed approximately 1/3 of catches by weight consist of *Porifera*, although occurrence of this taxon is low. Participants recognized the rationale and value of adding *Porifera* as a VME indicator taxon. They also recognized that there is considerable ecological variability within *Porifera* such that sponge taxa differ in their structural complexity and ecological roles. Thus participants made further suggestions to consider adding only some classes of the phylum *Porifera* (e.g. *Hexactinellida* and *Demospongiae*) as opposed

to the phylum as a whole.

Japan will draw on its data and provide recommendations at the next meeting of the SWG VME on the taxonomic groups of sponges to include on the list of VME indicator taxa.

Japan pointed out that although *Gorgonacea* is now taxonomically a part of *Alcyonacea*, taxa in the *Gorgonacea* differed from those in *Alcyonacea* because of their ecological characteristics and functional roles. Participants discussed challenges differentiating taxa in the *Alcyonacea*. Participants also discussed the option to specify the families which were originally listed under *Gorgonacea* and remove non-gorgonian taxa from the list of VME indicators within *Alcyonacea*. Japan agreed to make recommendations at the next SWG VME meeting with respect to the taxonomic groups within *Alcyonacea* to be considered as VME indicator taxa.

Participants re-affirmed that the SSC BF-ME should revisit VME indicator taxa on a routine basis, especially when new scientific data and information become available.

Participants agreed to recommend a single list of VME indicator taxa for both northwestern and northeastern parts of the Convention Area unless members gain scientific data which indicate a regional difference in benthic communities.

#### 4.2. Bring together observation data on VME from visual survey sources.

The Lead thanked participants for responding to the questionnaire about visual surveys. Canada, Japan, Korea, Russia and the observer provided the information about visual surveys they conducted in the Convention Area (Annex). The Lead will compile the responses from participants and submit an information paper to the next meeting of the SSC BF-ME.

Participants noted that large volumes of photo and video make it difficult to share all actual data. They agreed to first identify one or more objectives for sharing visual data, e.g. to identify patch size of VMEs or areas likely to be VMEs in order to inform recommendations on the size of area closure in the event of an encounter. Canada volunteered to provide candidate objectives at the next SWG VME meeting.

#### 4.3. Refine quantitative definition of VME.

According to the Convention, Article 10(4)e the SC shall develop a process to identify vulnerable marine ecosystems, including relevant criteria for doing so, and identify, based

on the best scientific information available, areas or features where these ecosystems are known to occur, or are likely to occur, and the location of bottom fisheries in relation to these areas or features, taking due account of the need to protect confidential information. The SSC BF-ME02 meeting tasked the SWG VME with reviewing and refining a quantitative definition of VMEs.

Canada presented its proposed quantitative method to identify VMEs and areas likely to be VMEs with predictive habitat models and visual surveys in the NPFC Convention Area. It described the methods used, identified next steps and invited participants to make their comments and suggestions. Participants discussed questions related to the predictive variables in the habitat models and suggested that Canada consider grouping its VME indicator data at lower taxonomic levels, if possible. SWG VME recognized Canada's challenges with validating model predictions given the limited visual data in the northeast part of the Convention Area.

Canada will revise the methodology following the discussions at the past SSC BF-ME meeting and feedback from the SWG VME and present it to the next SSC BF-ME meeting. The proposed method can be applied throughout the NPFC Convention Area, but Canada explained that it intends to apply it in the NE part of the Convention Area only this year. No other quantitative methods to identify VMEs or areas likely to be VMEs were proposed or discussed.

#### [4.4. Develop management objectives for recovering VME sites.](#)

The Lead reminded participants about the recommendation from the 2018 VME workshop to assess the recovery of VME sites and protect recovering sites. The SSC BF-ME02 meeting tasked the SWG VME with developing management objectives for recovering VME sites.

Participants noted that the long time scale of VME recovery takes at least a few decades and may make it difficult to develop workable management objectives. They also supported the recovery of VMEs but noted the newness of this work and agreed to continue discussions on management objectives for recovering VME sites as well as characteristics (e.g. size, density, diversity and/or species richness) which could be monitored.

It was suggested that one of the potential management objectives could be maintaining healthy VME taxa populations or communities across contiguous regions of seamounts.

## Agenda Item 5. Identification of intersessional activities to address any outstanding VME-related tasks.

No other VME-related tasks were identified, but Japan agreed to present its recommendations on the taxa within *Alcyonacea* and *Porifera* to include as part of the list of VME indicator taxa at the next SWG VME meeting.

## Agenda Item 6. Focus and date of 2nd intersessional meeting.

### 6.1. Selection of date (sometime from 13-27 June?)

Participants agreed to hold the next meeting of the SWG VME on 20 July from 9am-1pm Tokyo time. However, they noted that the meeting date may be changed if it conflicts with the Commission's next annual meeting.

### 6.2. Identification of intersessional activities to address SAI-related tasks:

Participants discussed intersessional activities to address SAI-related tasks and agreed with the following:

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

It is suggested to review the existing literature on gear-specific encounter thresholds or use the reviews submitted by members and the Secretariat to past meetings.

Members were encouraged to analyze and present historical bycatch data in the similar way done by Canada in [NPFC-2021-SSC BFME02-WP15](#).

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

It is suggested to review the existing literature on move-on rules and size of the area for temporary closure or use the reviews submitted by members and the Secretariat to past meetings.

Japan volunteered to analyze its data to estimate VME patch sizes so that SWG VME could make suggestions on move-on rules and size of the area for temporary closure following an encounter. Participants recognized the challenges of estimating VME patch sizes from visual surveys, which often involve linear transects.

#### 6.2.3. Review literature on fisheries impacts on VME indicator taxa

No suggestions were made.

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

Canada will make a presentation on data requirements and spatial/temporal resolution for SAI assessment at the next SWG VME meeting.

Japan reminded participants about its 4-step approach to identifying VMEs and assessing impacts of Japanese bottom fishing activities on VMEs, which was presented to the SWG VME meeting in September 2021.

#### 6.2.5 Add a bathymetry base layer and develop a heat map aggregated by gear type

The Secretariat requested guidance from participants with respect to the resolution of a bathymetry base layer and the source of data. Participants described two websites, <https://www.gebco.net> and [earthref.org](https://earthref.org), where bathymetry data can be acquired.

### 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 VME01 meeting to SSC BF-ME:

- (a) Compiled responses to the questionnaire about visual data (information paper).
- (b) Revised methodology on the quantitative definition of VMEs and areas likely to be VMEs.

The SWG VME agreed to continue discussions on the outstanding VME-related tasks through intersessional work and discuss these at its next meeting.

Canada invited participants to join its research survey of seamounts in the Gulf of Alaska scheduled for 6-20 September, 2022. Interested participants are asked to contact Chris Rooper at [chris.rooper@dfo-mpo.gc.ca](mailto:chris.rooper@dfo-mpo.gc.ca).

### Agenda Item 8. Close of the Meeting

The meeting closed at 12:45 PM on 6 April, Tokyo time.

## Data from visual surveys conducted by NPFC Members

## CANADA

	<b>Data information</b>	<b>Comments</b>
<b>Location</b>	Cobb Seamount	Eastern North Pacific Ocean
<b>Region</b>	Northeast Pacific Ocean	
<b>Data holder(s)</b>	Janelle Curtis / Fisheries and Oceans Canada	
<b>Dates</b>	21-26 July 2012	
<i>Raw data files</i>		
<b>Imagery data from video, photo, or both?</b>	Both	
<b>Platform used for data collection (e.g. ROV, AUV, drop camera, etc.)</b>	ROV - video, photo AUV - photo	
<b>Depth range of visual observations</b>	ROV: 34-211 m AUV: 435-1154 m	
<i>Annotated species data</i>		
<b>Have the visual data been annotated</b>	Yes	
<b>Have the visual data been georeferenced (latitude and longitude matched to the species records)?</b>	Yes	
<b>Can the species data be standardized to area (i.e. is there an estimate of area viewed such as image area (m<sup>2</sup>) for photo data or field of view width (m) for video data)?</b>	Yes	Photos have an estimate of photo area and videos have an estimate of field of view width.
<b>What are the units of the species data (e.g. presence only, presence-absence, area-standardized abundance)?</b>	ROV photos and video – density (individuals per m <sup>2</sup> ) or relative abundance. AUV photos - density (individuals per m <sup>2</sup> ). Species counts have been standardized to	For ROV imagery, individual counts of NPFC VME taxa are complete and density was calculated. However, only relative abundance was recorded for other organisms.

	the area of the images.	
<b>Were NPFC VME indicator taxa present and annotated in the imagery?</b>	Yes.	<ul style="list-style-type: none"> <li>- Alcyonacea (including gorgonians)</li> <li>- Antipatharia</li> <li>- Scleractinia</li> </ul>
<b>Were other taxa present and annotated in the imagery?</b>	Yes.	<p>ROV: Because of a small quadrat size, annotated organisms were mainly small, colonial, or encrusting organisms; the small quadrats did not reliably capture VME indicator taxa for annotation.</p> <p>AUV: all visible benthic megafauna were annotated.</p>
<b>Were physical features annotated?</b>	Yes.	<ul style="list-style-type: none"> <li>- Substrate type</li> <li>- Dominant and subdominant substrate percent cover</li> <li>- Fishing gear and evidence of fishing related impacts</li> <li>- Other anthropogenic objects</li> </ul>
<b><i>Other supplementary data notes</i></b>		
<b>Are there supplementary spatial data collected or available for use?</b>	Yes.	<ul style="list-style-type: none"> <li>- AUV/ROV Navigation (latitude, longitude)</li> <li>- Altimeter (m)</li> <li>- CTD (conductivity, temperature, depth, oxygen)</li> <li>- Multibeam bathymetry</li> </ul>
<b>Is there bottom-contact fisheries data available? If Yes, please describe the fisheries data.</b>	Yes. Sablefish fishery data from longline trap and longline hook and line gear.	Data are stored in Fisheries and Oceans' commercial catch databases and include dates, landing size in kg, and georeferenced start and end points.
<b>Notes about annotation of biological features</b>	ROV: Mainly annotated small, colonial, or encrusting organisms because of a small quadrat size, which did not reliably capture VME indicator taxa for annotation.	



	AUV: all visible benthic megafauna were identified.	
<b>Notes about annotation of physical features</b>	<ul style="list-style-type: none"> <li>- Substrate type</li> <li>- Dominant and subdominant substrate percent cover</li> <li>- Fishing gear and evidence of fishing related impacts</li> <li>- Other anthropogenic objects</li> </ul>	
<b>Associated with predictive maps/models (yes or no)</b>	Yes	Please contact Janelle Curtis for maps/models
<b>Cruise report or other publication</b>	Curtis JMR, Du Preez C, Davies SC, Pegg J, Clarke ME, Fruh EL, Morgan K, Gauthier S, Gatien G, and Carolsfeld W. (2015). 2012 Expedition to Cobb Seamount: Survey methods, data collections, and species observations. <i>Canadian Technical Report of Fisheries and Aquatic Sciences</i> , 3124: xii + 145 p.	
<b>Other associated publications</b>	<p>Du Preez C, Curtis JMR, Davies SC, Clarke ME, and Fruh EL. (2015). Cobb Seamount Species Inventory. <i>Canadian Technical Report of Fisheries and Aquatic Sciences</i>, 2122: viii + 108 p.</p> <p>Warawa D, Curtis JMR, Rooper CN, Gardner L, and Chu JWF. (2020). Process for Analyzing Trade-offs between Fishing and Vulnerable Marine Ecosystem Protection. <i>North Pacific Fisheries Commission NPFC-2020-SSC BFME01-WP13</i></p>	
<b>Other notes</b>		

JAPAN

	<b>Data information</b>	<b>Comments</b>
<b>Location</b>	Emperor Seamounts	Northern Koko, Koko, Kammu, Yuryaku, Colahan, C-H
<b>Region</b>	Northwest Pacific Ocean	
<b>Data holder(s)</b>	Oceanic Resources Group, Fisheries Resources Institute, Japan Fisheries Research and Education Agency, Japan	
<b>Dates</b>	2009-2017, 2019-2021	Survey takes about two weeks in summer each year.
<i>Raw data files</i>		
<b>Imagery data from video, photo, or both?</b>	Both	
<b>Platform used for data collection (e.g. ROV, AUV, drop camera, etc..)</b>	ROV - video, photo Drop camera system – video, photo	
<b>Depth range of visual observations</b>	ROV: 269-780m Drop camera: 277-1853m	
<i>Annotated species data</i>		
<b>Have the visual data been annotated</b>	Yes	
<b>Have the visual data been georeferenced (latitude and longitude matched to the species records)?</b>	Yes	
<b>Can the species data be standardized to area (i.e. is there an estimate of area viewed such as image area (m<sup>2</sup>) for photo data or field of view width (m) for video data)?</b>	Yes	Photos have an estimate of photo area and videos have an estimate of field of view width by the laser pointer.
<b>What are the units of the species data (e.g. presence only, presence-absence, area-standardized abundance)?</b>	individuals	Count all benthic megafauna when possible.

<b>Were NPFC VME indicator taxa present and annotated in the imagery?</b>	Yes.	- Alcyonacea (including gorgonians) - Antipatharia - Scleractinia
<b>Were other taxa present and annotated in the imagery?</b>	Yes.	
<b>Were physical features annotated?</b>	Yes.	- Substrate type - Fishing gear and evidence of fishing related impacts - Other remarks
<b><i>Other supplementary data notes</i></b>		
<b>Are there supplementary spatial data collected or available for use?</b>	Yes.	- Research vessel Navigation (latitude, longitude) - Multibeam bathymetry
<b>Is there bottom-contact fisheries data available? If Yes, please describe the fisheries data.</b>	Yes. Bottom fishery data from trawl and gillnet.	Data include dates, landing size in kg, and georeferenced start and end points.
<b>Notes about annotation of biological features</b>	All visible benthic megafauna were identified.	
<b>Notes about annotation of physical features</b>	- Substrate type - Fishing gear and evidence of fishing related impacts - Other remarks	
<b>Associated with predictive maps/models (yes or no)</b>	Yes	
<b>Cruise report or other publication</b>	Please refer previous NPFC-SWG or SSC documents. SWG10/WP4/J, SWG11/WP3/J, SWG13-WP10/J, NPFC01-2016-/SSC-VME01/WP03/Japan, NPFC-2017-SSC VME02-WP04, NPFC-2018-SSC VME03-WP01, NPFC-2021-SSC BF-ME02-WP09	
<b>Other associated publications</b>	Miyamoto M, Kiyota M, Hayashibara T, Nonaka M, Imahara Y, Tachikawa H	

	<p>(2017) Faunal composition of cold-water corals and other deep-sea benthos in the Emperor Seamounts area, North Pacific Ocean. <i>Galaxea</i> 19: 19-30.</p> <p>Miyamoto M, Kiyota M, Murase H, Nakamura T, Hayashibara T (2017) Consideration of grid-cell sizes in high-resolution habitat suitability analysis of cold-water corals on seamounts. <i>Marine Geodesy</i> 40: 205-223.</p> <p>Miyamoto M, Kiyota M (2017) Evaluation of cold-water corals and other benthic taxa as indicators of vulnerable marine ecosystems based on their Co-occurrence in the Emperor Seamounts area. <i>Ecological Indicator</i> 78: 301-310.</p>	
<b>Other notes</b>		

## KOREA

	<b>Data information</b>	<b>Comments</b>
<b>Location</b>	Koko, Kinmei, Yuryaku, Kammu, Colahan seamounts	Western North Pacific Ocean
<b>Region</b>	Northwest Pacific Ocean	
<b>Data holder(s)</b>	Kyum Joon Park / National Institute of Fisheries Science Korea	
<b>Dates</b>		
<b>Raw data files</b>		
<b>Imagery data from video, photo, or both?</b>	Neither. There were no visual surveys conducted by Korea	

<b>Platform used for data collection (e.g. ROV, AUV, drop camera, etc.)</b>		
<b>Depth range of visual observations</b>		
<b><i>Annotated species data</i></b>		
<b>Have the visual data been annotated</b>	No	
<b>Have the visual data been georeferenced (latitude and longitude matched to the species records)?</b>	No	
<b>Can the species data be standardized to area (i.e. is there an estimate of area viewed such as image area (m<sup>2</sup>) for photo data or field of view width (m) for video data)?</b>	No	
<b>What are the units of the species data (e.g. presence only, presence-absence, area-standardized abundance)?</b>	Not applicable	
<b>Were NPFC VME indicator taxa present and annotated in the imagery?</b>	No	-
<b>Were other taxa present and annotated in the imagery?</b>	No	
<b>Were physical features annotated?</b>	No	
<b>Are there supplementary spatial data collected or available for use?</b>	No	
<b>Is there bottom-contact fisheries data available? If Yes, please describe the fisheries data.</b>	Yes. North Pacific Armorhead and Alfonsino data from bottom trawl fishery.	Data collected from Korean commercial fisheries are available including bycatches in kg and towing start and end points.
<b>Notes about annotation of</b>	Not applicable	

<b>biological features</b>		
<b>Notes about annotation of physical features</b>	Not applicable	
<b>Associated with predictive maps/models (yes or no)</b>	No	
<b>Cruise report or other publication</b>	No	
<b>Other associated publications</b>	No	
<b>Other notes</b>	No	

## RUSSIA

	<b>Data information</b>	<b>Comments</b>
<b>Location</b>	Emperor Seamounts	Emperor Chain (Nintoku to Kimmei)
<b>Region</b>	Northwest Pacific Ocean	
<b>Data holder(s)</b>	National Center of Marine Biology FEB RAS, Vladivostok, Russia	
<b>Dates</b>	2019-2021	Survey takes about 2 months in summer each year.
<i>Raw data files</i>		
<b>Imagery data from video, photo, or both?</b>	Both	Both
<b>Platform used for data collection (e.g. ROV, AUV, drop camera, etc.)</b>	ROV - video, photo	
<b>Depth range of visual observations</b>	ROV: 269-2200 m	Suitable
<i>Annotated species data</i>		
<b>Have the visual data been annotated</b>	Yes	Yes
<b>Have the visual data been georeferenced (latitude and longitude matched to the species records)?</b>	Yes	Yes
<b>Can the species data be standardized to area (i.e. is there an estimate of area</b>	Yes	Photos have an estimate of photo area and videos have an estimate of field of view width by the laser

viewed such as image area (m <sup>2</sup> ) for photo data or field of view width (m) for video data)?		pointer.
What are the units of the species data (e.g. presence only, presence-absence, area-standardized abundance)?	individuals	Count all benthic megafauna when possible.
Were NPFC VME indicator taxa present and annotated in the imagery?	Yes.	- Alcyonacea (including gorgonians) - Pennatulacea - Antipatharia - Scleractinia
Were other taxa present and annotated in the imagery?	Yes.	Yes
Were physical features annotated?	Yes.	- Substrate type - Fishing gear and evidence of fishing related impacts - Other remarks
<b><i>Other supplementary data notes</i></b>		
Are there supplementary spatial data collected or available for use?	Yes. After discussion in the relevant organization	
Is there bottom-contact fisheries data available? If Yes, please describe the fisheries data.	No	
Notes about annotation of biological features	All visible benthic megafauna were identified.	
Notes about annotation of physical features	- Substrate type - evidence of fishing related impacts - Other remarks	Yes
Associated with predictive maps/models (yes or no)	Yes	
Cruise report or other publication	Please refer previous NPFC-SWG or SSC documents. SWG10/WP4/J, SWG11/WP3/J, SWG13-WP10/J, NPFC01-	Yes

	2016-/SSC- VME01/WP03/Japan, NPFC- 2017-SSC VME02-WP04, NPFC-2018-SSC VME03- WP01, NPFC-2021-SSC BF- ME02-WP09	
<b>Other associated publications</b>	<p>Dautova TN, Galkin SV, Tabachnik KR, Minin KV, Kireev PA, Moskovtseva AV, Adrianov AV. (2020) The First Data on the Structure of Vulnerable Marine Ecosystems of the Emperor Chain Seamounts: Indicator Taxa, Landscapes, and Biogeography. Russian Journal of Marine Biology. V. 45, P. 408–417.</p> <p>Dautova T.N. (2019) Octocorallia as a key taxon in the vulnerable marine ecosystems of the Emperor Chain (Northwest Pacific): diversity, distribution and biogeographical boundary. In: K.A. Lutaenko (Ed.). Marine Biodiversity for a Healthy Ocean – Biodiversity, Functional Groups and Ocean Health. Proceedings of the Russia-China Bilateral Workshop, October 10–11, 2019, Vladivostok, Russia. Vladivostok : Publishing House of the Far Eastern Federal University. P. 68-80.</p>	
<b>Other notes</b>		

OBSERVER (Dr. Amy Baco-Taylor)



	<b>Data information</b>	<b>Comments</b>
<b>Location</b>	Northwestern Hawaiian Ridge and lower Emperor Seamounts	North Pacific Ocean
<b>Region</b>	North Pacific Ocean	
<b>Data holder(s)</b>	Amy Baco-Taylor/Brendan Roark	
<b>Dates</b>	Fall 2014, Fall 2015	
<i>Raw data files</i>		
<b>Imagery data from video, photo, or both?</b>	Photo	
<b>Platform used for data collection (e.g. ROV, AUV, drop camera, etc..)</b>	AUV - photo	
<b>Depth range of visual observations</b>	250-700m	
<i>Annotated species data</i>		
<b>Have the visual data been annotated</b>	Yes at higher taxonomic levels for dominant 5 taxa and for all scleractinians and Coralliid octocorals	
<b>Have the visual data been georeferenced (latitude and longitude matched to the species records)?</b>	Yes as noted above	
<b>Can the species data be standardized to area (i.e. is there an estimate of area viewed such as image area (m<sup>2</sup>) for photo data or field of view width (m) for video data)?</b>	Yes	Photos have an estimate of photo area and we have length of vehicle dives and transects
<b>What are the units of the species data (e.g. presence only, presence-absence, area-standardized abundance)?</b>	Individual counts for coralliids and scleractinians, categorical abundance (2-5, 6-10, >10) for rest of taxa	
<b>Were NPFC VME indicator taxa present</b>	Yes.	- Aleyonacea (including gorgonians)

<b>and annotated in the imagery?</b>		<ul style="list-style-type: none"> <li>- Antipatharia</li> <li>- Scleractinia</li> <li>- Sponges</li> </ul>
<b>Were other taxa present and annotated in the imagery?</b>	Yes.	AUV: all visible megafauna of the 5 dominant taxa were annotated.
<b>Were physical features annotated?</b>	Yes.	<ul style="list-style-type: none"> <li>- Substrate type</li> <li>- Dominant and subdominant substrate percent cover</li> <li>- Fishing gear and evidence of fishing related impacts</li> <li>- slope</li> <li>- currents and other data derived from satellites and online databases</li> </ul>
<b><i>Other supplementary data notes</i></b>		
<b>Are there supplementary spatial data collected or available for use?</b>	Yes.	<ul style="list-style-type: none"> <li>- AUV/ROV Navigation (latitude, longitude)</li> <li>- Altimeter (m)</li> <li>- CTD (conductivity, temperature, depth, oxygen)</li> <li>- Multibeam bathymetry</li> </ul>
<b>Is there bottom-contact fisheries data available? If Yes, please describe the fisheries data.</b>	Yes from images of bottom contact gear scars and also compilation of publicly available AIS data from 2012 -2018	
<b>Notes about annotation of biological features</b>	AUV: all visible megafauna of the 5 dominant taxa were annotated along with Scleractinians and coralliids specifically	
<b>Notes about annotation of physical features</b>	<ul style="list-style-type: none"> <li>- Substrate type</li> <li>- Dominant and subdominant substrate percent cover</li> <li>- Fishing gear and evidence of fishing related impacts</li> </ul>	
<b>Associated with predictive maps/models</b>	Yes, in progress	Working on habitat suitability modeling for

(yes or no)		colonial scleractinians
<b>Cruise report or other publication</b>	<p>Baco, A.R., *N.B. Morgan, E. B Roark, and V. Biede. In prep. Disturbance to deep-sea precious corals from fisheries impacts in the Northwestern Hawaiian Islands and Emperor Seamount Chains.</p> <p>Baco, A.R., *N.B. Morgan, and E. B Roark. 2020. Observations of Vulnerable Marine Ecosystems and Significant Adverse Impacts on High Seas Seamounts of the Northwestern Hawaiian Islands and Emperor Seamount Chain. <i>Marine Policy</i>. 115: 103834. <a href="https://doi.org/10.1016/j.marpol.2020.103834">https://doi.org/10.1016/j.marpol.2020.103834</a></p> <p>Morgan, N.B. and A.R. Baco. 2020. Recent fishing footprint of the high-seas bottom trawl fisheries on the Northwestern Hawaiian Ridge and Emperor Seamount Chain: a finer-scale approach to a large-scale issue. <i>Ecological Indicators</i>. 121 (2021): 107051. <a href="https://doi.org/10.1016/j.ecolind.2020.107051">https://doi.org/10.1016/j.ecolind.2020.107051</a></p> <p>Baco, A.R., E. B Roark, *N.B. Morgan. 2019. Amid Fields of Rubble, Scars, and Lost Gear, Signs of Recovery Observed on Seamounts on 30-40 year Time Scales. <i>Science Advances</i>. 5: eaaw4513.</p>	
<b>Other associated publications</b>	<p>Baco, A.R., *N.B. Morgan, E.B. Roark, M. Silva, K. Shamberger, K.M., Miller, K. 2017. Defying dissolution, discovery of deep-sea scleractinian coral reefs in the North Pacific. <i>Scientific Reports</i>. 7: 5436   DOI:10.1038/s41598-017-05492-w</p> <p>Baco, A.R., F.A. Parrish, S. Auscavitch, S. Cairns, *B. Mejia-Mercado, *V. Biede, *N. Morgan, E.B. Roark, and *W.B. Brantley. Deep-Sea Corals of the North and Central Pacific. Invited Book Chapter In: <i>Cold-Water Corals Reefs of the World</i>. E. Cordes and F. Mienis editors. Springer. Revisions accepted 03/2021. In press.</p>	

<b>Other notes</b>		
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	<b>Data information</b>	<b>Comments</b>
<b>Location</b>	Northwestern Hawaiian Ridge and lower Emperor Seamounts	North Pacific Ocean
<b>Region</b>	North Pacific Ocean	
<b>Data holder(s)</b>	Amy Baco-Taylor/Brendan Roark	
<b>Dates</b>	Fall 2016, Fall 2017	
<i>Raw data files</i>		
<b>Imagery data from video, photo, or both?</b>	Video	
<b>Platform used for data collection (e.g. ROV, AUV, drop camera, etc..)</b>	Pisces Submersibles - video	
<b>Depth range of visual observations</b>	250-700m	
<i>Annotated species data</i>		
<b>Have the visual data been annotated</b>	In progress, screened for scleractinian locations and coralliids	
<b>Have the visual data been georeferenced (latitude and longitude matched to the species records)?</b>	Dive paths are georeferenced, most images not yet	
<b>Can the species data be standardized to area (i.e. is there an estimate of area viewed such as image area (m<sup>2</sup>) for photo data or field of view width (m) for video data)?</b>	Yes	we have length of vehicle dives and transects and width of camera field of view
<b>What are the units of the species data (e.g. presence only, presence-absence, area-standardized abundance)?</b>	All taxa to near species level as individual counts	

<b>Were NPFC VME indicator taxa present and annotated in the imagery?</b>	Yes.	<ul style="list-style-type: none"> <li>- Alcyonacea (including gorgonians)</li> <li>- Antipatharia</li> <li>- Scleractinia</li> <li>- Sponges</li> </ul>
<b>Were other taxa present and annotated in the imagery?</b>	Yes.	all visible megafauna
<b>Were physical features annotated?</b>	Yes.	<ul style="list-style-type: none"> <li>- Substrate type</li> <li>- Dominant and subdominant substrate percent cover</li> <li>- Fishing gear and evidence of fishing related impacts</li> <li>- slope</li> <li>- currents and other data derived from satellites and online databases</li> </ul>
<b><i>Other supplementary data notes</i></b>		
<b>Are there supplementary spatial data collected or available for use?</b>	Yes.	<ul style="list-style-type: none"> <li>- AUV/ROV Navigation (latitude, longitude)</li> <li>- Altimeter (m)</li> <li>- CTD (conductivity, temperature, depth, oxygen)</li> <li>- Multibeam bathymetry</li> </ul>
<b>Is there bottom-contact fisheries data available? If Yes, please describe the fisheries data.</b>	Yes from images of bottom contact gear scars and also compilation of publicly available AIS data from 2012 -2018	
<b>Notes about annotation of biological features</b>	all visible megafauna were annotated for transects so far completed, substrate is in progress	
<b>Notes about annotation of physical features</b>	<ul style="list-style-type: none"> <li>- Substrate type</li> <li>- Dominant and subdominant substrate percent cover</li> <li>- Fishing gear and evidence of fishing related impacts</li> </ul>	

<b>Associated with predictive maps/models (yes or no)</b>	Yes, in progress	Working on habitat suitability modeling for colonial scleractinians
<b>Cruise report or other publication</b>	<p>Baco, A.R., *N.B. Morgan, E. B Roark, and V. Biede. In prep. Disturbance to deep-sea precious corals from fisheries impacts in the Northwestern Hawaiian Islands and Emperor Seamount Chains.</p> <p>Baco, A.R., *N.B. Morgan, and E. B Roark. 2020. Observations of Vulnerable Marine Ecosystems and Significant Adverse Impacts on High Seas Seamounts of the Northwestern Hawaiian Islands and Emperor Seamount Chain. <i>Marine Policy</i>. 115: 103834. <a href="https://doi.org/10.1016/j.marpol.2020.103834">https://doi.org/10.1016/j.marpol.2020.103834</a></p> <p>Morgan, N.B. and A.R. Baco. 2020. Recent fishing footprint of the high-seas bottom trawl fisheries on the Northwestern Hawaiian Ridge and Emperor Seamount Chain: a finer-scale approach to a large-scale issue. <i>Ecological Indicators</i>. 121 (2021): 107051. <a href="https://doi.org/10.1016/j.ecolind.2020.107051">https://doi.org/10.1016/j.ecolind.2020.107051</a></p> <p>Baco, A.R., E. B Roark, *N.B. Morgan. 2019. Amid Fields of Rubble, Scars, and Lost Gear, Signs of Recovery Observed on Seamounts on 30-40 year Time Scales. <i>Science Advances</i>. 5: eaaw4513.</p>	
<b>Other associated publications</b>	<p>Baco, A.R., F.A. Parrish, S. Auscavitch, S. Cairns, *B. Mejia-Mercado, *V. Biede, *N. Morgan, E.B. Roark, and *W.B. Brantley. Deep-Sea Corals of the North and Central Pacific. Invited Book Chapter In: <i>Cold-Water Corals Reefs of the World</i>. E. Cordes and F. Mienis editors. Springer. Revisions accepted 03/2021. In press.</p>	
<b>Other notes</b>		

	<b>Data information</b>	<b>Comments</b>
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<b>Location</b>	Northwestern Hawaiian Ridge and lower Emperor Seamounts	North Pacific Ocean
<b>Region</b>	North Pacific Ocean	
<b>Data holder(s)</b>	Amy Baco-Taylor/Brendan Roark	
<b>Dates</b>	Fall 2021	
<i>Raw data files</i>		
<b>Imagery data from video, photo, or both?</b>	Video	
<b>Platform used for data collection (e.g. ROV, AUV, drop camera, etc..)</b>	ROV Lu'u'kai - video	
<b>Depth range of visual observations</b>	250-1000m	
<i>Annotated species data</i>		
<b>Have the visual data been annotated</b>	In progress	
<b>Have the visual data been georeferenced (latitude and longitude matched to the species records)?</b>	Dive paths are georeferenced, most images not yet	
<b>Can the species data be standardized to area (i.e. is there an estimate of area viewed such as image area (m<sup>2</sup>) for photo data or field of view width (m) for video data)?</b>	Yes	we have length of vehicle dives and transects and width of camera field of view
<b>What are the units of the species data (e.g. presence only, presence-absence, area-standardized abundance)?</b>	All taxa to near species level as individual counts, study was focused specifically on scleractinian reefs	
<b>Were NPFC VME indicator taxa present and annotated in the imagery?</b>	In progress	<ul style="list-style-type: none"> <li>- Alcyonacea (including gorgonians)</li> <li>- Antipatharia</li> <li>- Scleractinia</li> <li>- Sponges</li> </ul>
<b>Were other taxa present and</b>	In progress	all visible megafauna

<b>annotated in the imagery?</b>		
<b>Were physical features annotated?</b>	In progress	<ul style="list-style-type: none"> <li>- Substrate type</li> <li>- Dominant and subdominant substrate percent cover</li> <li>- Fishing gear and evidence of fishing related impacts</li> <li>- slope</li> <li>- currents and other data derived from satellites and online databases</li> </ul>
<b><i>Other supplementary data notes</i></b>		
<b>Are there supplementary spatial data collected or available for use?</b>	Yes.	<ul style="list-style-type: none"> <li>- ROV Navigation (latitude, longitude)</li> <li>- Altimeter (m)</li> <li>- CTD (conductivity, temperature, depth, oxygen)</li> <li>- Multibeam bathymetry</li> </ul>
<b>Is there bottom-contact fisheries data available? If Yes, please describe the fisheries data.</b>	Yes from images of bottom contact gear scars and also compilation of publicly available AIS data from 2012 -2018	
<b>Notes about annotation of biological features</b>	In progress	
<b>Notes about annotation of physical features</b>	<ul style="list-style-type: none"> <li>- Substrate type</li> <li>- Dominant and subdominant substrate percent cover</li> <li>- Fishing gear and evidence of fishing related impacts</li> </ul>	
<b>Associated with predictive maps/models (yes or no)</b>	Yes, in progress	These data are being used to improve on models made from initial data in previous studies, ms on earlier data in prep
<b>Cruise report or other publication</b>	Silva-Aguilera, M, *N.B. Morgan, E. B Roark, and V. Biede, K. Shamberger, A. Baco. In prep. Habitat suitability modeling of deep-sea scleractinian coral reefs in the	



	North Pacific.	
<b>Other associated publications</b>		
<b>Other notes</b>		