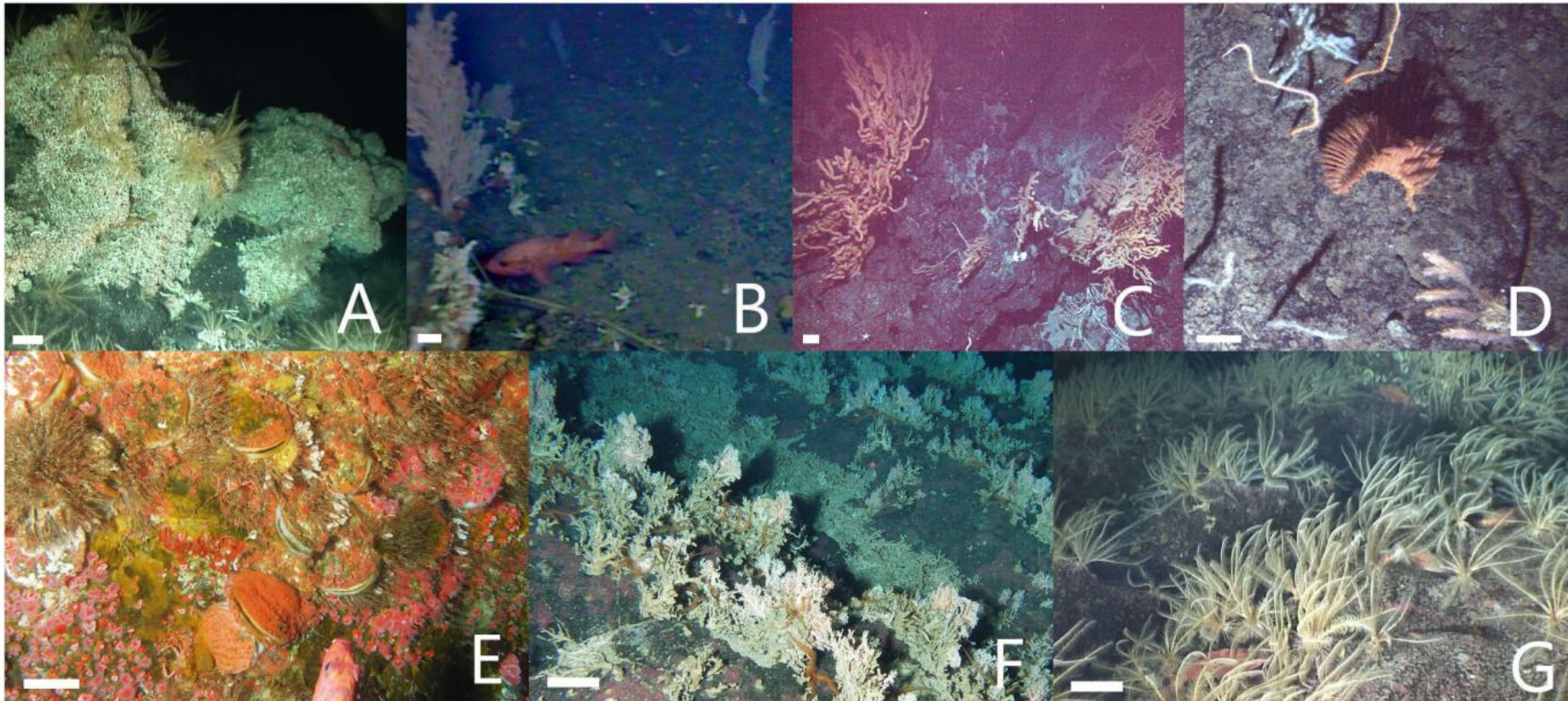# A framework for identifying vulnerable marine ecosystems in the North Pacific Ocean (NPFC-2020-SSC BFME01-WP12)

Janelle Curtis, Chris Rooper, and Devon Warawa
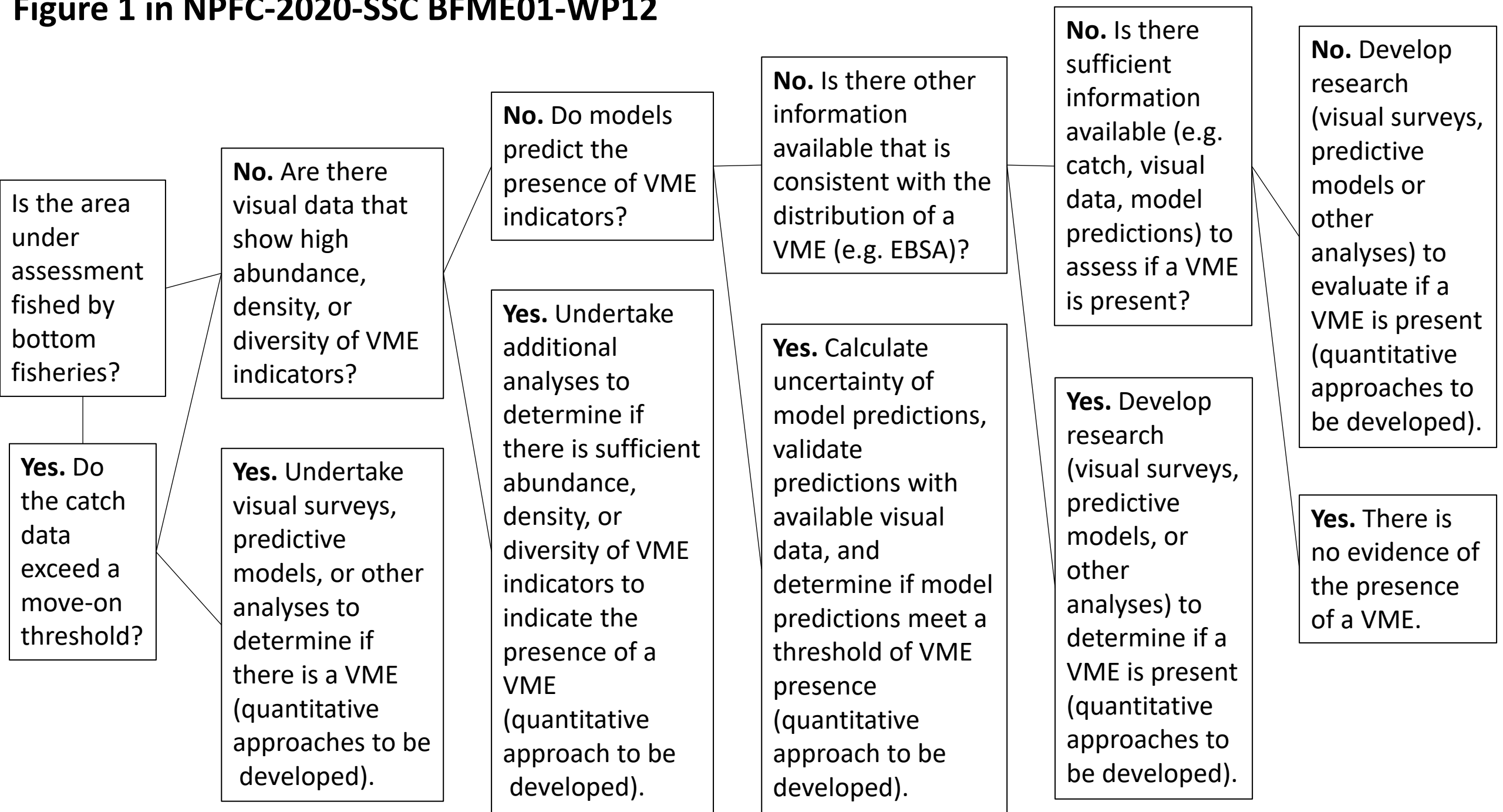(janelle.curtis@dfo-mpo.gc.ca)

Fisheries and Oceans Canada   Pêches et Océans Canada   Canada

A framework for identifying vulnerable marine ecosystems in the North Pacific Ocean (NPFC-2020-SSC BFME01-WP12)

Article 10(4) of the Convention: 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...

SC Research Plan: develop consensus on criteria used to identify VMEs and how this might be applied in the NPFC

CMM 2019-05 and CMM 2019-06: science-based standards and criteria for identification of VMEs

Figure 1 in NPFC-2020-SSC BFME01-WP12

Is the area under assessment fished by bottom fisheries?

Yes. Do the catch data exceed a move-on threshold?

No. Are there visual data that show high abundance, density, or diversity of VME indicators?

Yes. Undertake visual surveys, predictive models, or other analyses to determine if there is a VME (quantitative approaches to be developed).

No. Do models predict the presence of VME indicators?

Yes. Undertake additional analyses to determine if there is sufficient abundance, density, or diversity of VME indicators to indicate the presence of a VME (quantitative approach to be developed).

No. Is there other information available that is consistent with the distribution of a VME (e.g. EBSA)?

Yes. Calculate uncertainty of model predictions, validate predictions with available visual data, and determine if model predictions meet a threshold of VME presence (quantitative approach to be developed).

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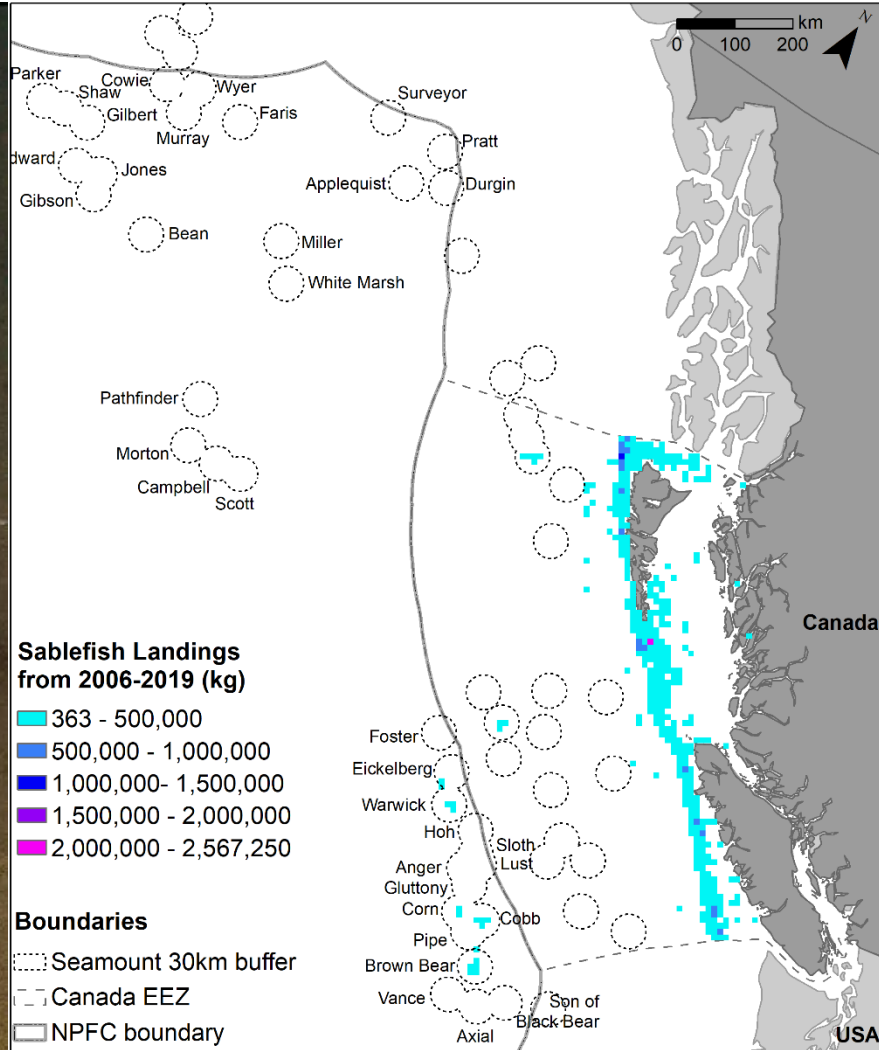
Yes. There is no evidence of the presence of a VME.

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Canada fishes for Sablefish in the NPFC Convention Area

www.oceannetworks.ca

Sablefish Landings
from 2006-2019 (kg)

- 363 - 500,000
- 500,000 - 1,000,000
- 1,000,000- 1,500,000
- 1,500,000 - 2,000,000
- 2,000,000 - 2,567,250

Boundaries

- Seamount 30km buffer
- Canada EEZ
- NPFC boundary

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Du Preez C, Swan KD, and Curtis JMR (2020) Coldwater Corals and Other Vulnerable Biological Structures on a North Pacific Seamount After Half a Century of Fishing. *Frontiers in Marine Science* 7(17): 1-22
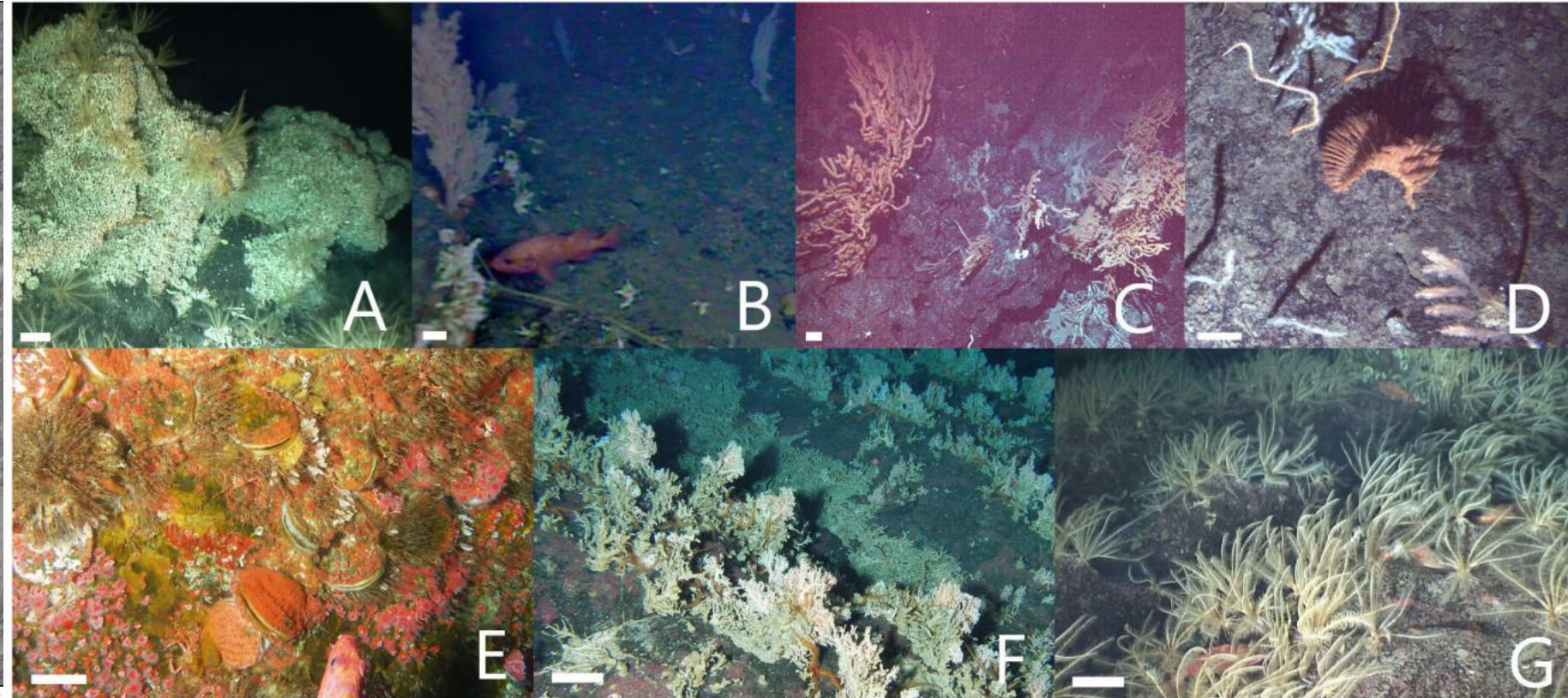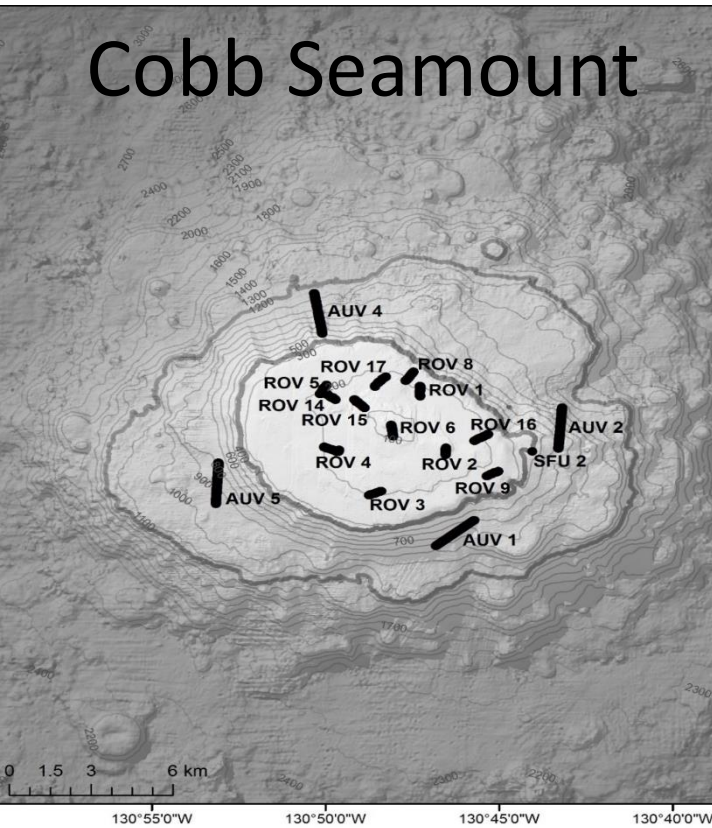

Figure 2: visual transects

Figure 7: Examples of potential VMEs on Cobb Seamount

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Predicted habitat distribution of VME indicators
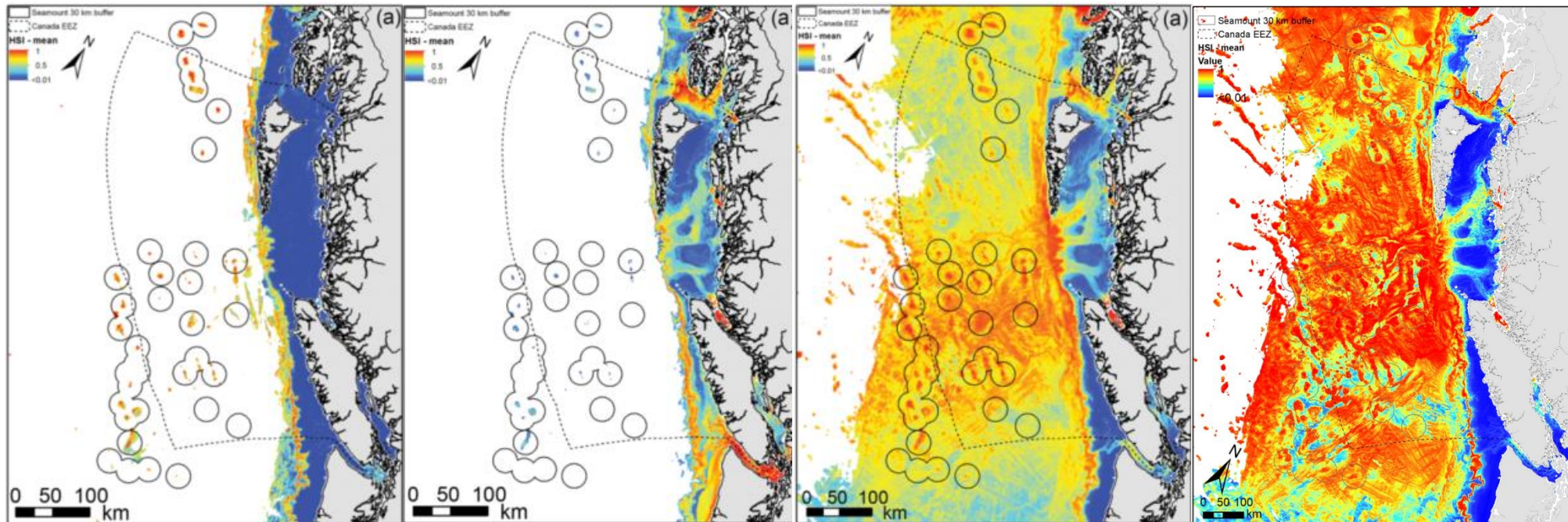## Species distribution models - high habitat suitability in red
(Chu et al. 2019. Deep Res Part I Oceanogr Res Pap. 151(March):103063.

Black corals
(Antipatharia)

Stony corals
(Scleractinia)

Soft corals
(Alcyonacea)

Gorgonian corals

VME indicator taxa have been confirmed to occur at seamounts
where they have been predicted using post-hoc visual surveys.

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Assess model predictions with visual data and other information
## e.g. visual survey data, EBSAs

Canada's visual survey:

Cobb Seamount: 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. *Can Tech Rep Fish Aquat Sci* 3124: xii + 145.

USA's visual surveys include:

Warwick Seamount: survey by Peter Etnoyer in 2002

Pratt Seamount: Stone RP and Shotwell SK. 2007. State of Deep Coral Ecosystems in the Alaska Region: Gulf of Alaska, Bering Sea and the Aleutian Islands. pp. 65-108. In: SE Lumsden, Hourigan TF, Bruckner AW and Dorr G (eds.) The State of Deep Coral Ecosystems of the United States. NOAA Technical Memorandum CRCP-3. Silver Spring MD 365 pp.
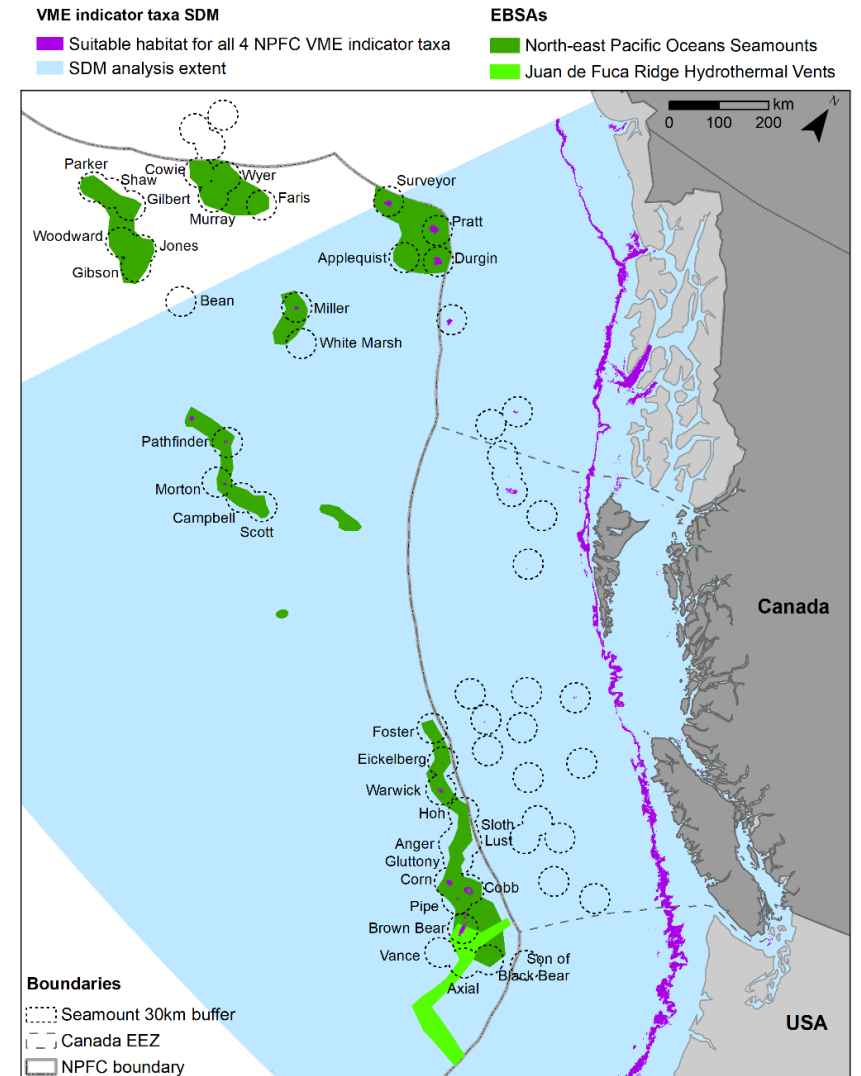
Recommendations

1 – SSC BFME endorses this framework for selecting data to identify VMEs

2 – Canada develops a method to use predictive models for quantitatively identifying VMEs
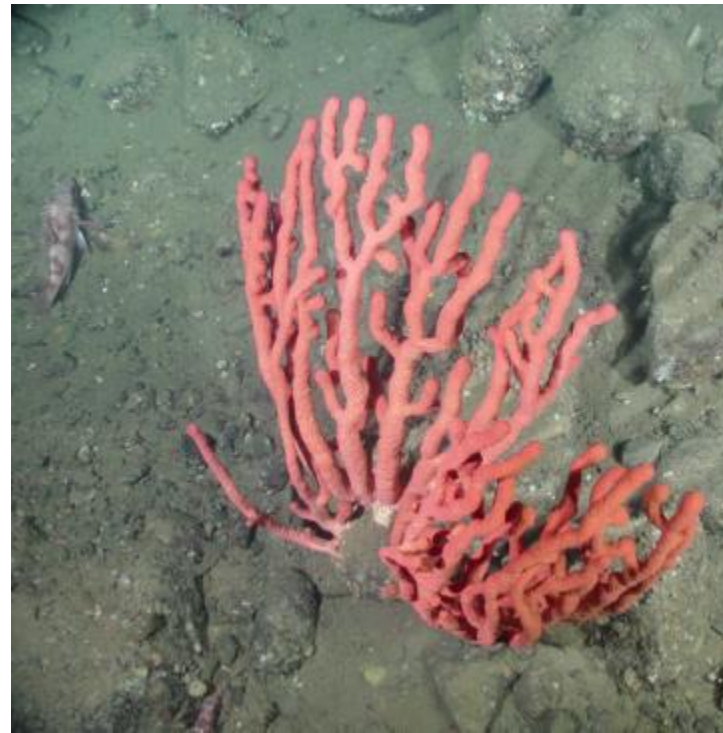
Thank you

Questions? Comments? Suggestions?