



**North Pacific Fisheries Commission**

NPFC-2023-SSC BFME04-IP02

**Joint Canada-USA International Seamount Survey update for 2023**

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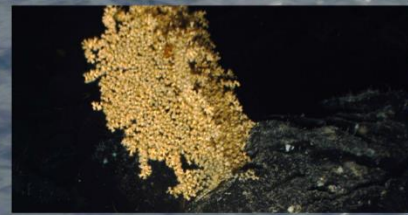
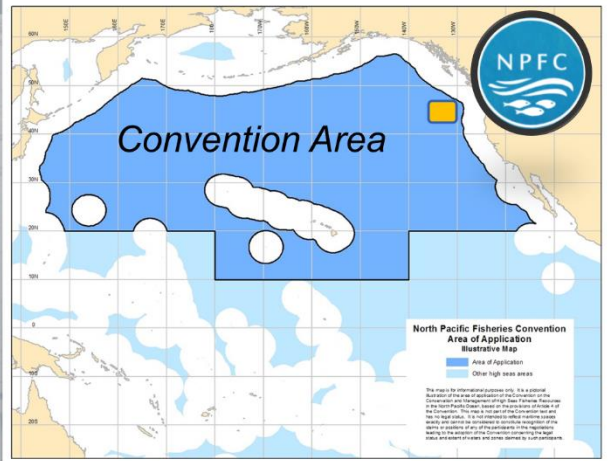
In 2022, Canada and the USA conducted a survey of five seamounts in the Cobb Seamount chain using an underwater stereo camera system. Oceanographic data, eDNA and bird and mammal observations were also collected. This joint survey was designed to study deep-sea coral and sponges and their associated taxa. In total 77 camera transects were completed, with a high proportion of them observing glass sponges and corals, particularly those transects below 600 m. Species distribution models were developed predicting both presence and abundance of coral and sponge taxa. Densities of sponges and corals were relatively low and appeared to be related to the oceanographic and geological conditions at the sites. The sizes of sponges and corals were generally large indicating a mature community. The fish fauna was dominated by rockfishes and pleuronectids that are found in the adjacent shelf and slope ecosystems. The communities appeared to be largely organized by depth. Evidence of both historical and present day fishing activity was observed on most of the seamounts. Comparisons were made with shelf and slope systems around the Gulf of Alaska to gauge the uniqueness of the seamount ecosystems. Analysis of the data and samples collected during this survey is ongoing. The data collected during this survey will be useful for the regional fisheries management organization responsible for assessing the risks and sustainability of the Canadian sablefish fishery conducted at these seamounts. The most updated information on the survey results can be found in the figures attached to this document that were presented at the annual PICES Meeting in Seattle, WA, USA in October 2023.

### Background

- o Marine environment outside 200 nm managed by NPFC
- o Seamounts have been identified as sensitive
- o Canadian Sablefish pot fishery at seamounts in international waters
- o Potential interactions between structure forming invertebrates (VME) and fisheries
- o Historically these seamounts fished by Canada, USA, Japan & Russia

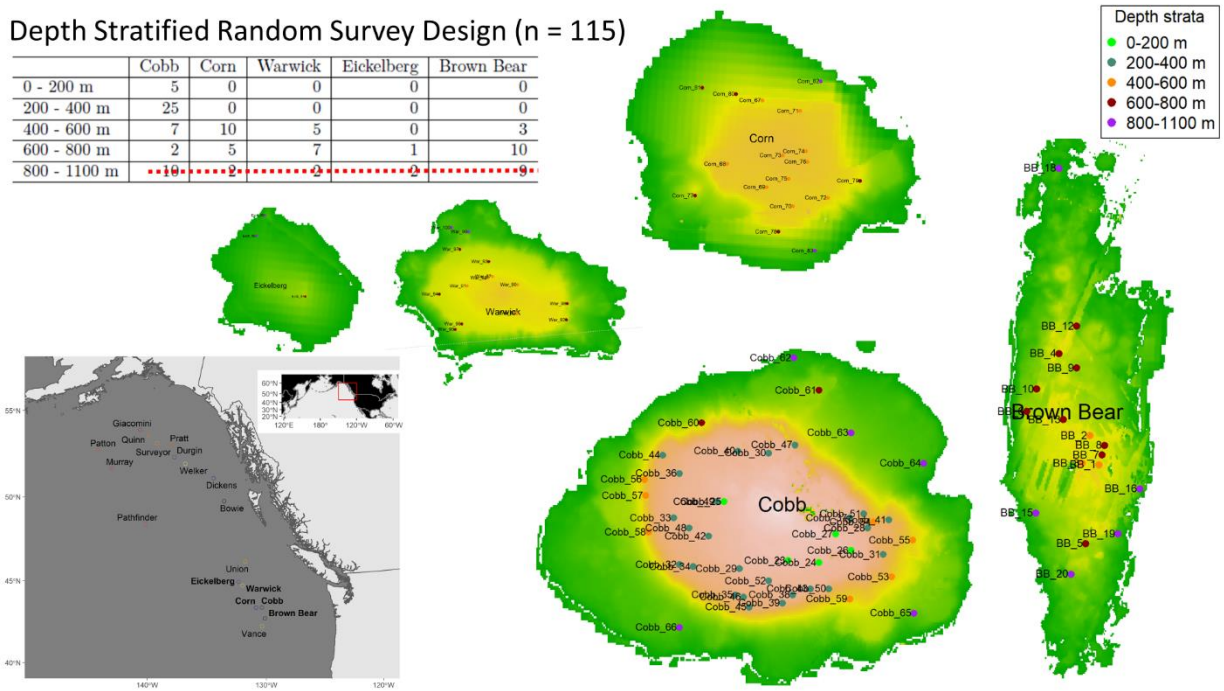
### Objectives

- o Survey 5 NE Pacific Seamounts (0 - 900 m)
- o Estimate abundance/size structure of DSCS
- o Produce models of presence, density, size
- o Identify fish and habitat associations
- o Assess risk of fishery impacts to VME



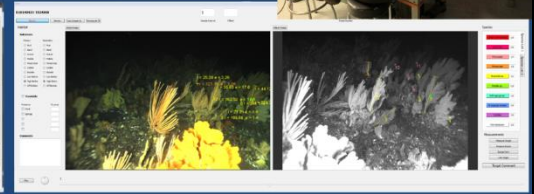
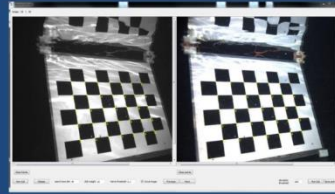
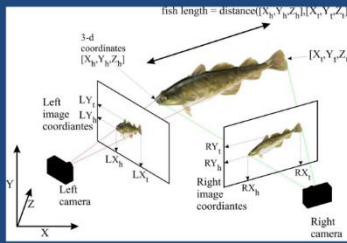
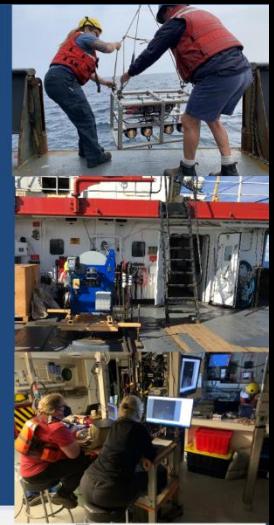
### Depth Stratified Random Survey Design (n = 115)

	Cobb	Corn	Warwick	Eickelberg	Brown Bear
0 - 200 m	5	0	0	0	0
200 - 400 m	25	0	0	0	0
400 - 600 m	7	10	5	0	3
600 - 800 m	2	5	7	1	10
800 - 1100 m	10	2	2	2	9

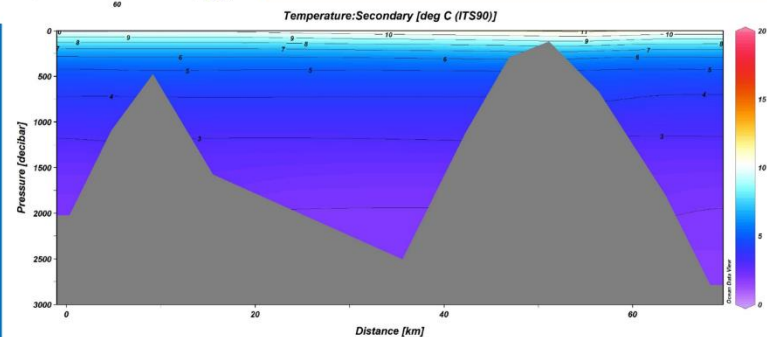
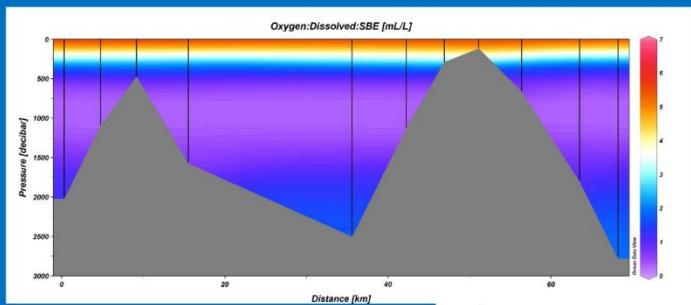


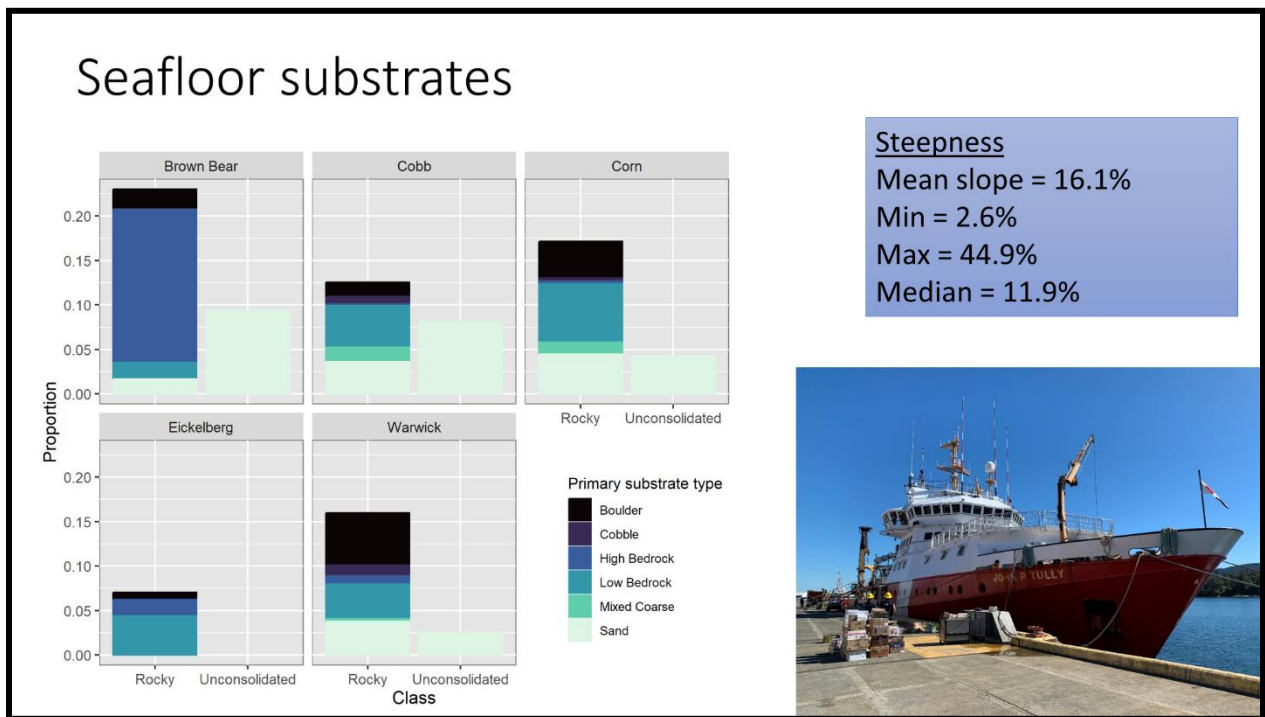
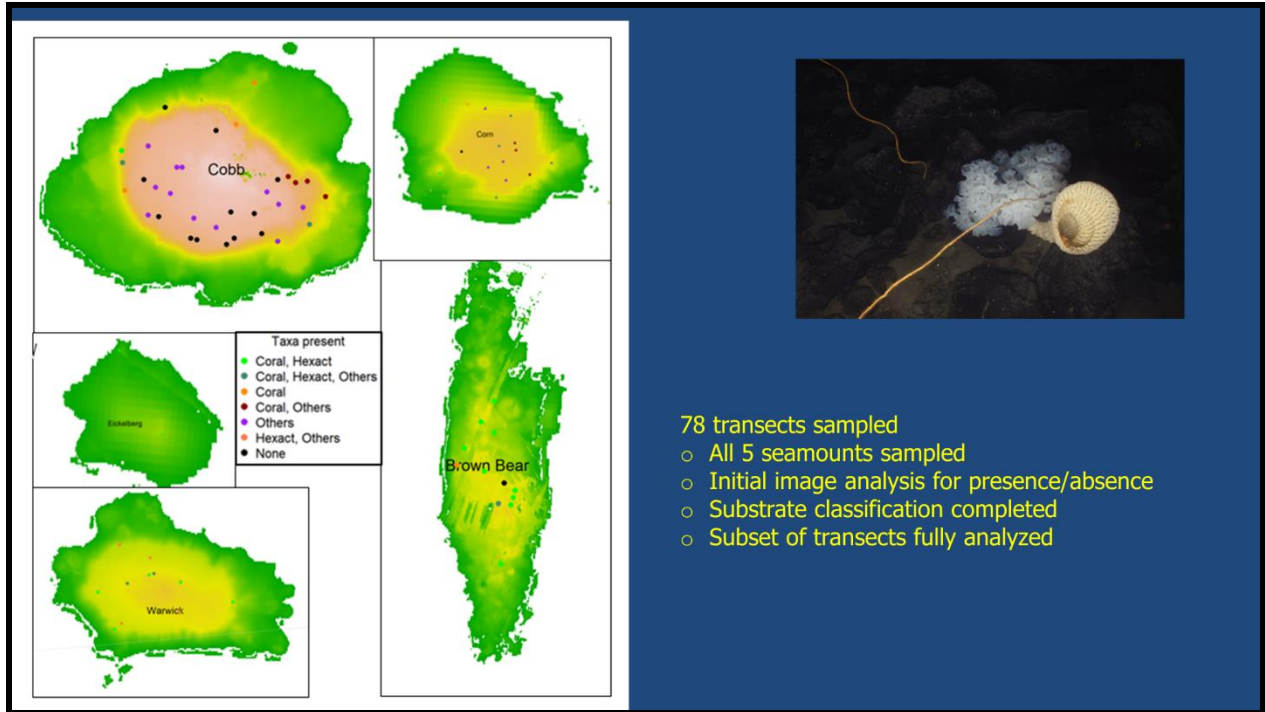
## Visual survey tool

- Stereo drop camera system (collects paired calibrated images @ 1 Hz)
- Towed along 15 minute transects (~250 m)
  - Substrate classified
- All fish, coral and sponge species enumerated and size measured



## Temperature and Oxygen

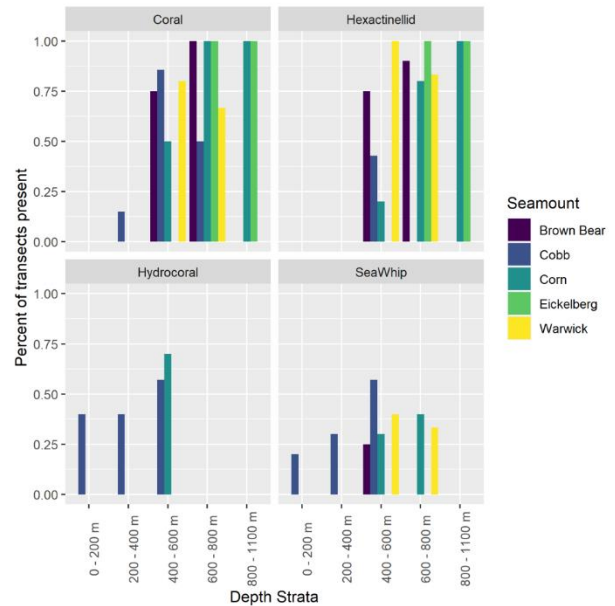




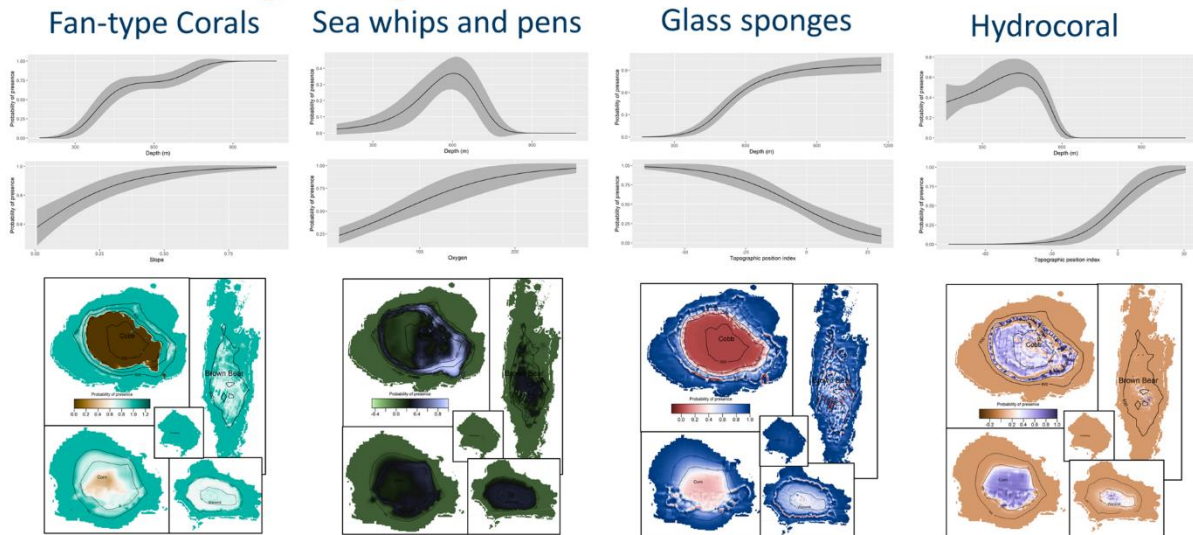
# Distribution of presence – by depth & seamount

## Overall proportions present

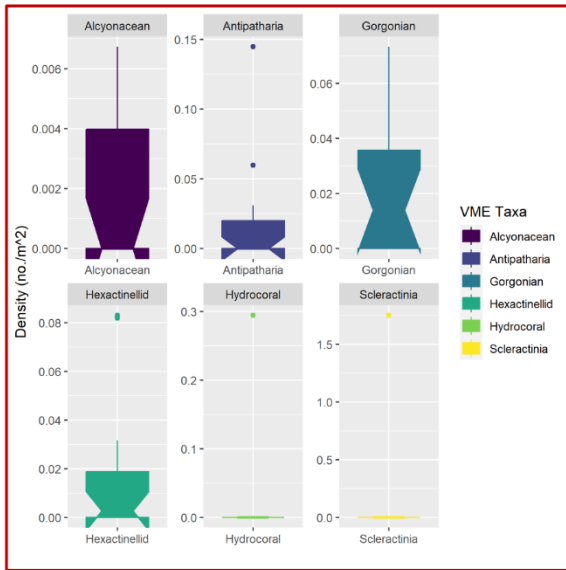
- 57% of transects had coral
- 44% of transects had hexactinellids
- 27% of transects had sea whips
- 27% of transects had hydrocorals



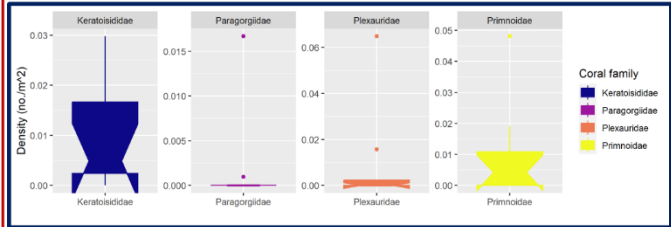
## Simple species distribution models



## Density of DSCS



## Density of "Gorgonian" corals

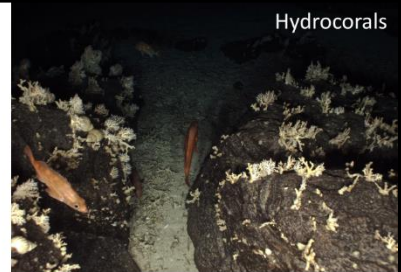
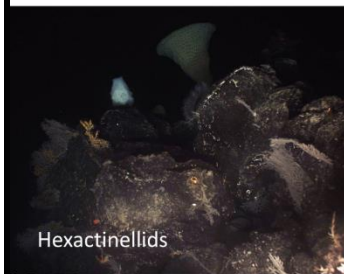


### Densities

- ~0.004 to – 0.04 per m<sup>2</sup>
- Patterns with depth

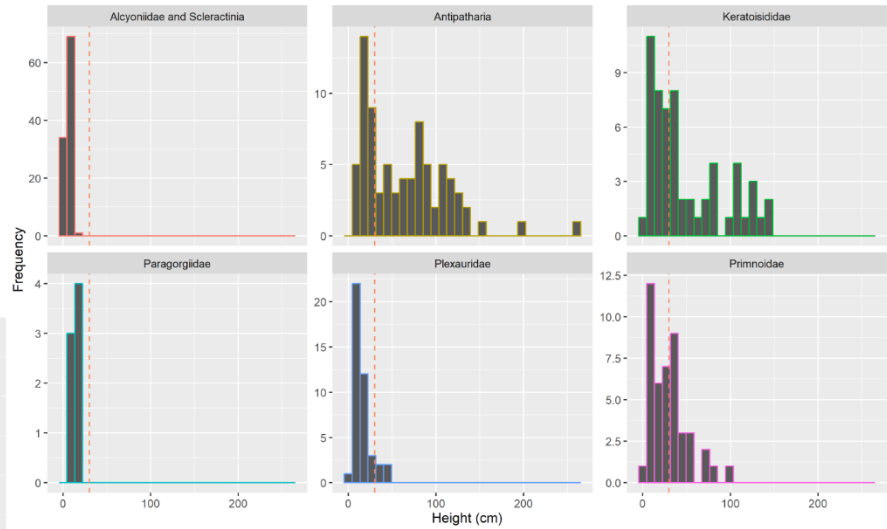
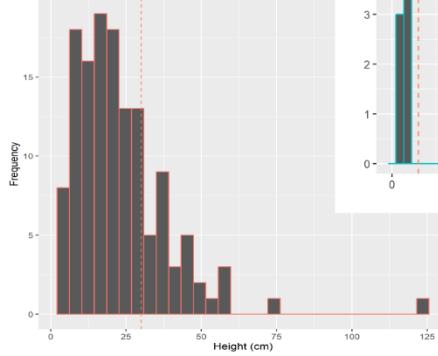
### Within transects

- Patchy distributions
- Mixed substrates
- High density areas



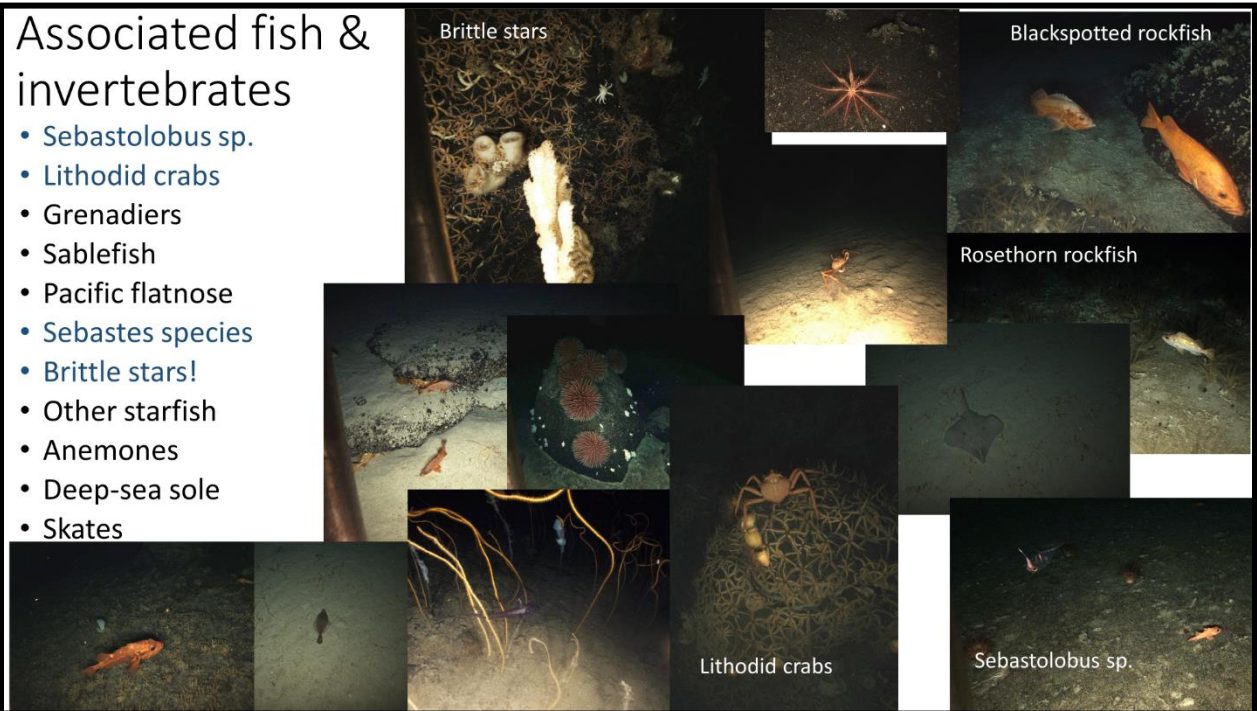
# Height of structure forming invertebrates

## Hexactinellid sponges

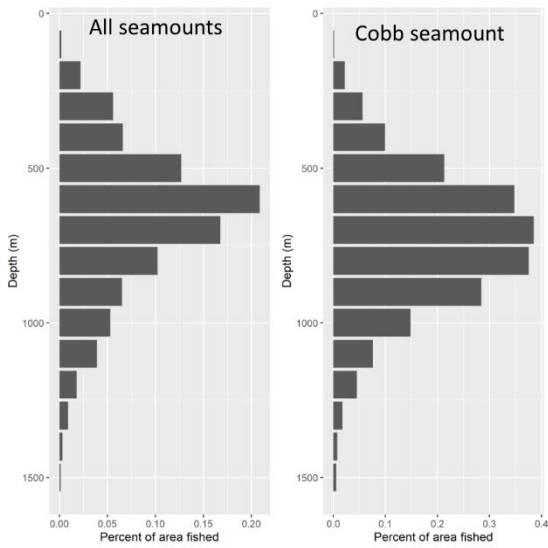


# Associated fish & invertebrates

- Sebastolobus sp.
- Lithodid crabs
- Grenadiers
- Sablefish
- Pacific flatnose
- Sebastes species
- Brittle stars!
- Other starfish
- Anemones
- Deep-sea sole
- Skates



## Historical fishing (1991-2019) and damage or lost gear

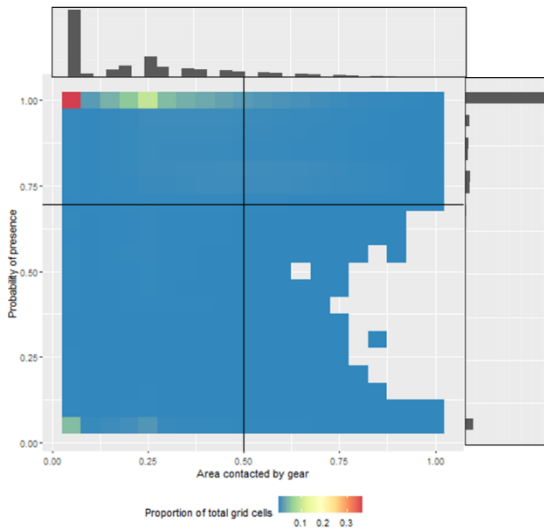


Strata	Gear	Brown				
		Bear	Cobb	Corn	Eickelberg	Warwick
0 - 200 m	Longline gear	--	0	--	--	--
	Trawl tracks	--	0	--	--	--
200 - 400 m	Longline gear	--	<b>0.60</b>	--	--	--
	Trawl tracks	--	0.05	--	--	--
400 - 600 m	Longline gear	0	<b>0.57</b>	0.20	--	0
	Trawl tracks	0	0	0	--	0
600 - 800 m	Longline gear	0	<b>0.50</b>	0	0	0.17
	Trawl tracks	0	0	0	0	0
Total		0	<b>0.26</b>	0.06	0	0.05

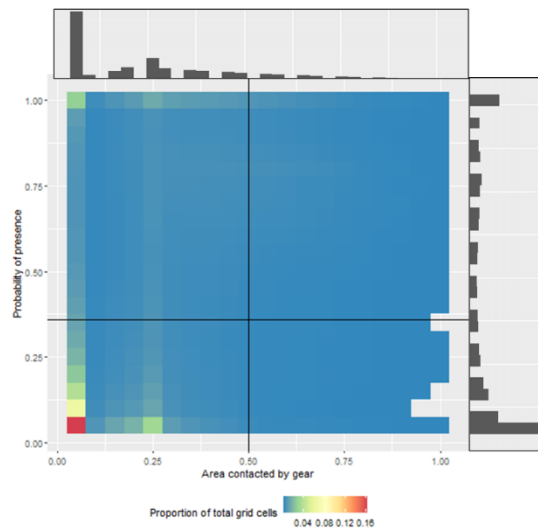


## Comparisons with fishing distribution - risk

Gorgonian-type Corals



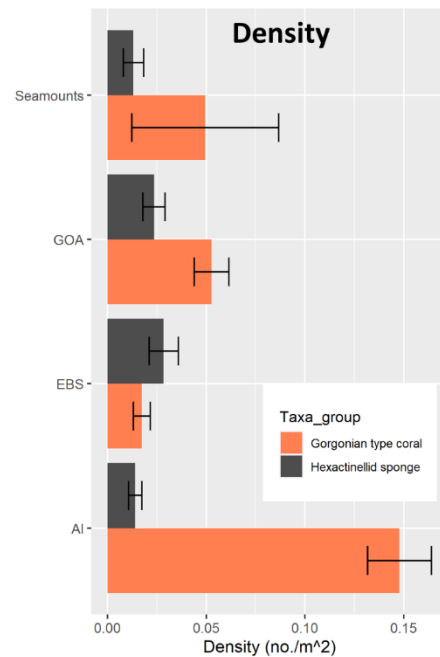
Hexactinellid sponges





## Comparisons with other regions (Alaska)

Region	Transects with rocky substrate	Transects with coral	Transects with hexactinellids
<b>NPFC Seamounts</b>	<b>74%</b>	<b>57%</b>	<b>44%</b>
Gulf of Alaska	35%	30%	20%
Eastern Bering Sea	19%	13%	22%
Aleutian Islands	61%	59%	41%



## Summary

- Occurrence is widespread
  - High proportion of transects with VME present
  - High probability of presence throughout the seamounts (at depths > 600 m)
- Given the amount of hard substrates VME densities fairly low
  - Low productivity (low density of fish as well)?
  - Isolated populations = low historical recruitment or species characteristics?
  - Depth (temperature?) restricted to > 400 m?
- Observed sizes are large
  - Mature communities?
- Relatively high risk of fishing impacts
  - High proportion of transects with discarded gear (Cobb)
  - Extensive overlap between fishing activity and predicted VME presence (Cobb)

