

Investigating seamount effects on zooplankton in the Northeast Pacific

Daniel Labbé, Akash Sastri, Cherisse Du Preez, Julian Smith, & John Dower



University
of Victoria

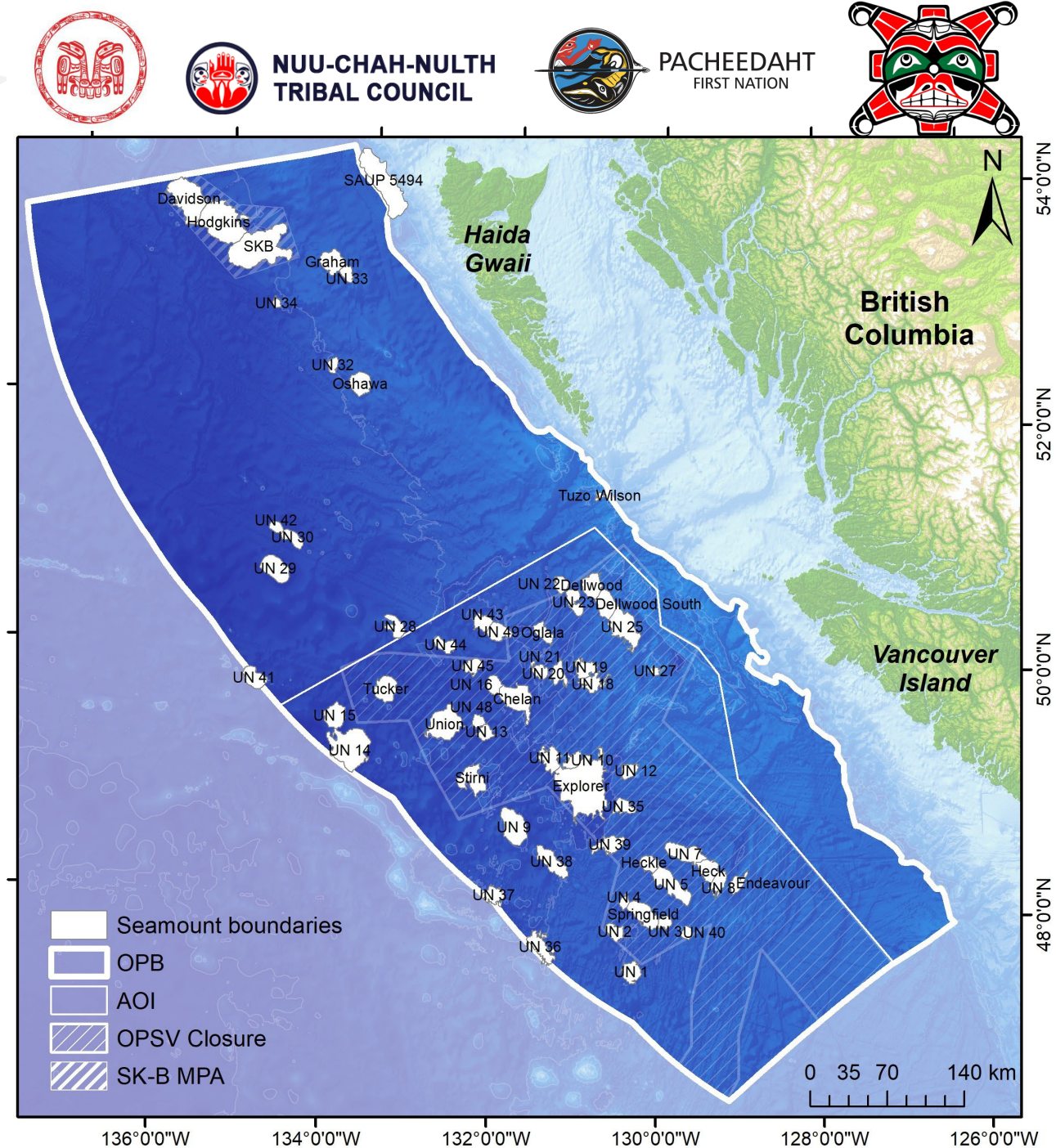


Fisheries and Oceans
Canada

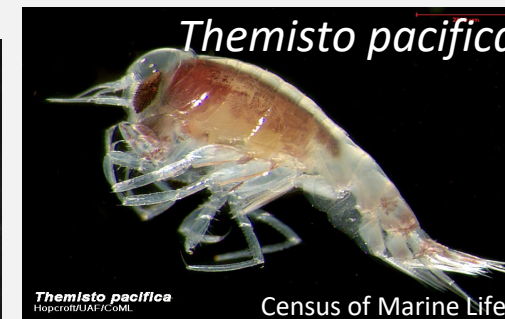
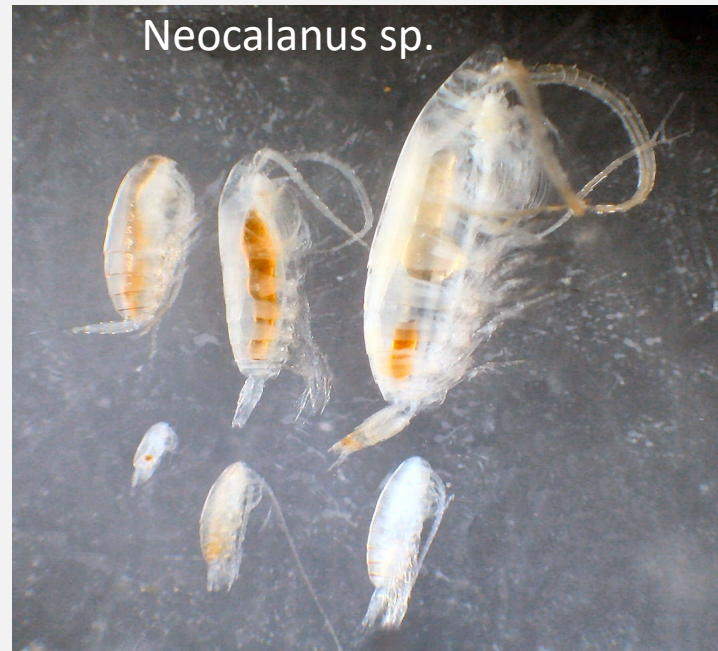
Pêches et Océans
Canada

Study Region

- Proposed **Tang.gwan · ḥačx^wiqak · Tsigis MPA** (Pacific Offshore Area of Interest)
 - Canada's Pacific offshore bioregion
- Contains 45 known seamounts (Du Preez and Norgard 2022)
 - Underwater mountains >1000m above the ocean floor
- Bifurcation of the North Pacific current
 - Separates into the Californian and Alaskan currents
 - Transitional zone



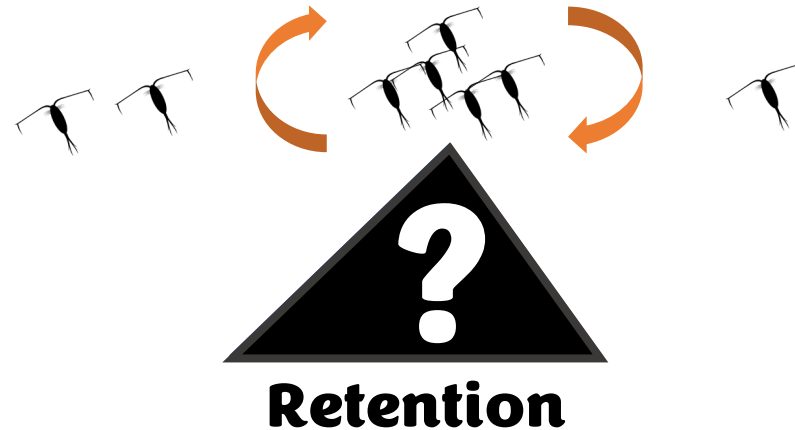
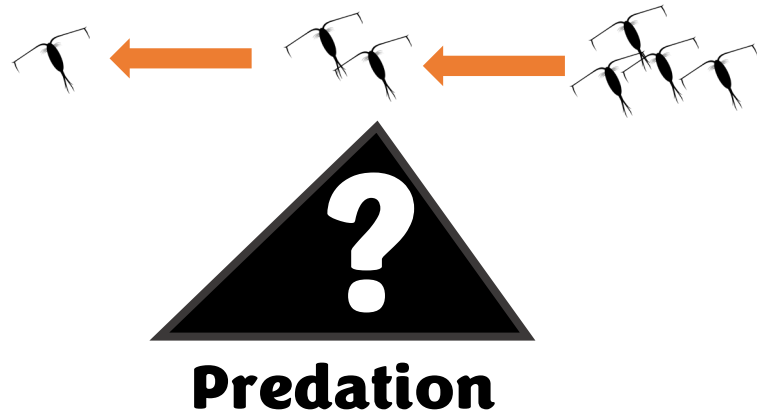
A Diverse Zooplankton Community



Research Questions

Are zooplankton communities uniform across the AOI seamounts?

Are there any significant seamount effects on zooplankton distribution?

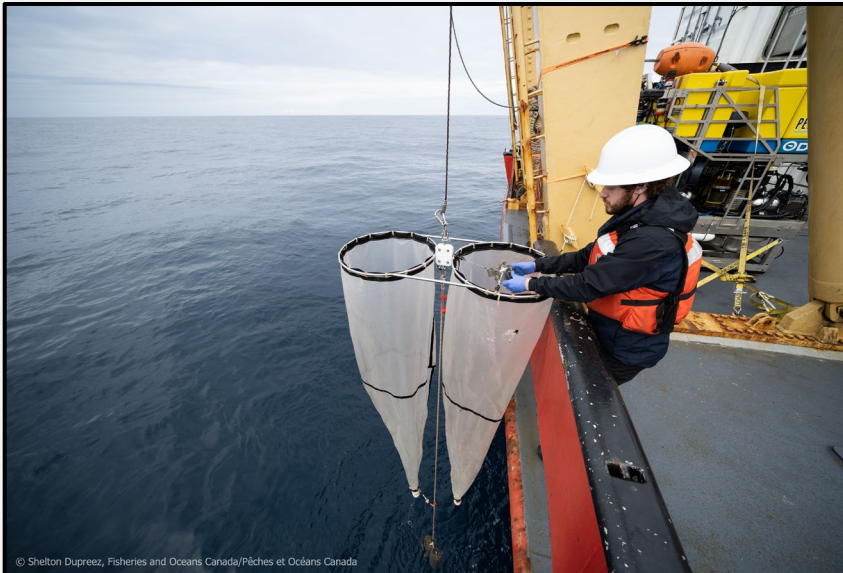


Sample Collection

- Zooplankton were sampled to 250m with vertical net tows
 - Size Fractionated -> Freeze dried (Biomass)
- CTD/Water sampling at each station



© Shelton Dupreez, Fisheries and Oceans Canada/Pêches et Océans Canada



© Shelton Dupreez, Fisheries and Oceans Canada/Pêches et Océans Canada



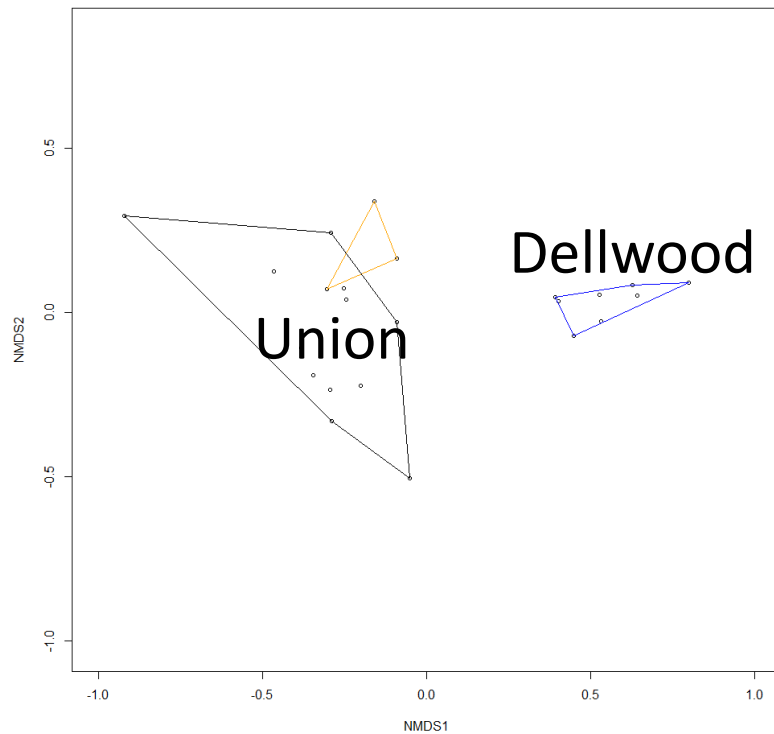
© Shelton Dupreez, Fisheries and Oceans Canada/Pêches et Océans Canada



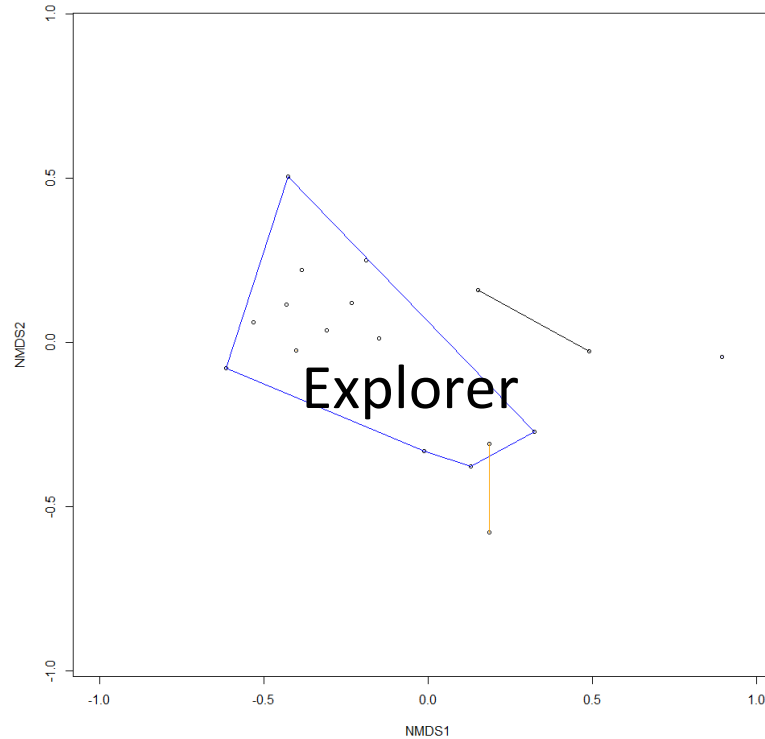
© Shelton Dupreez, Fisheries and Oceans Canada/Pêches et Océans Canada

Differences in Seamount Zooplankton Communities

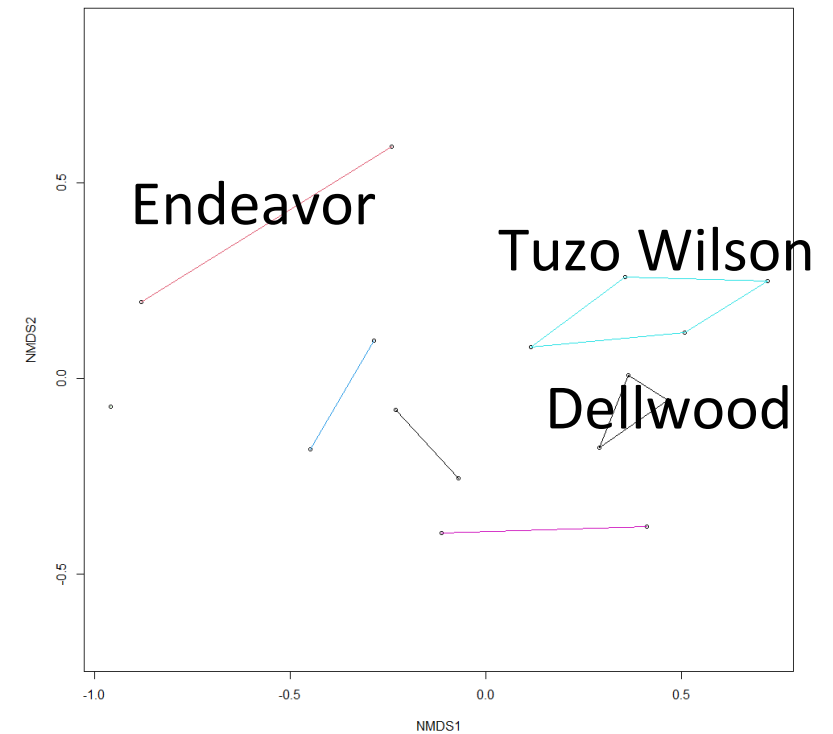
2017



2019

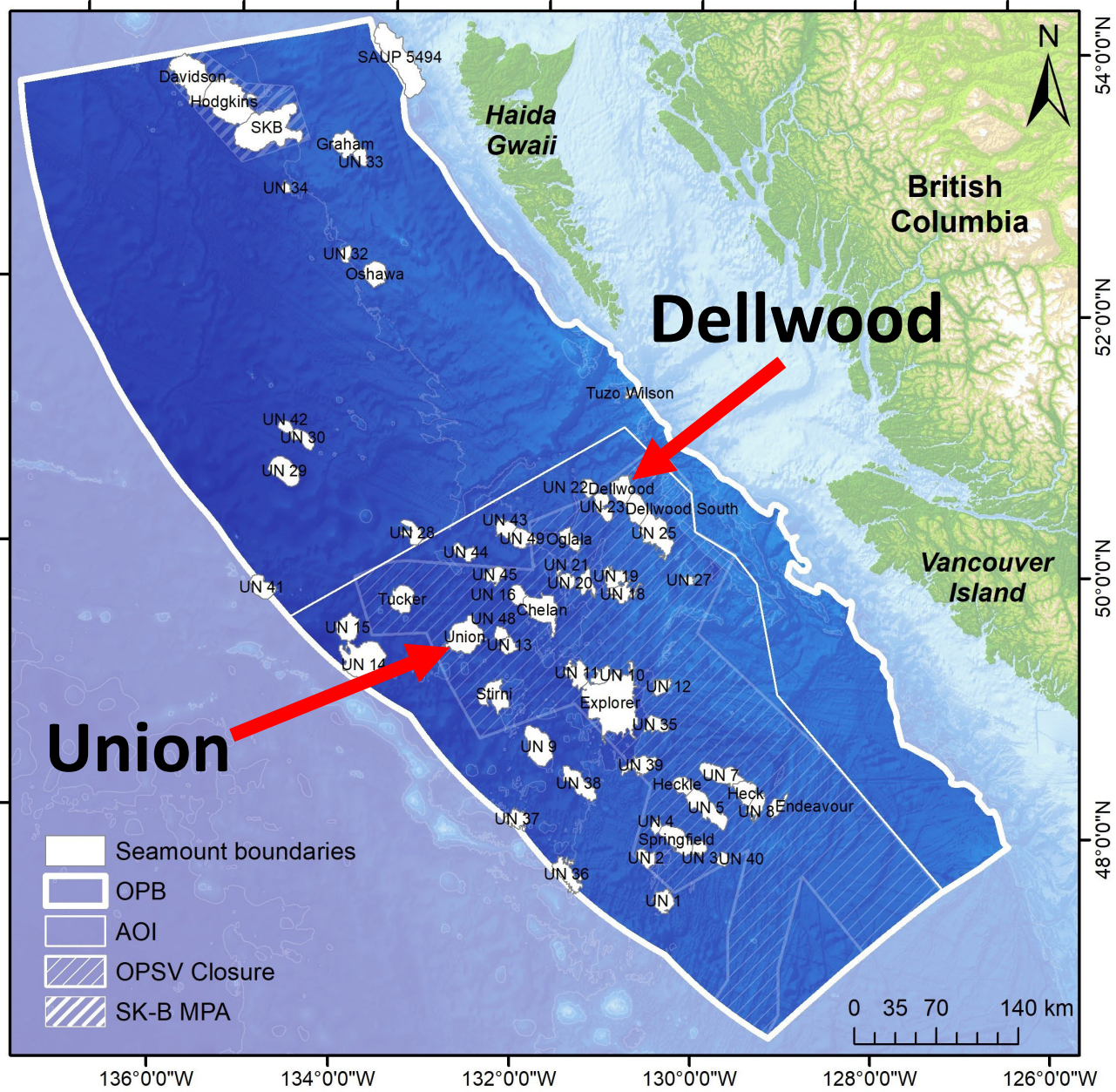
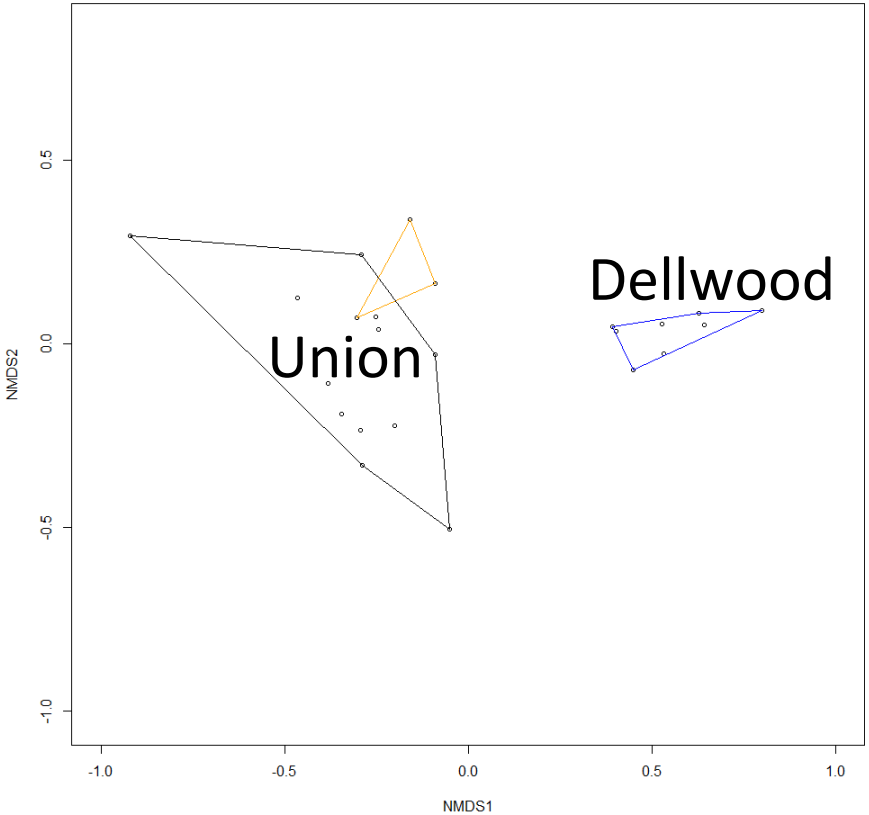


2021



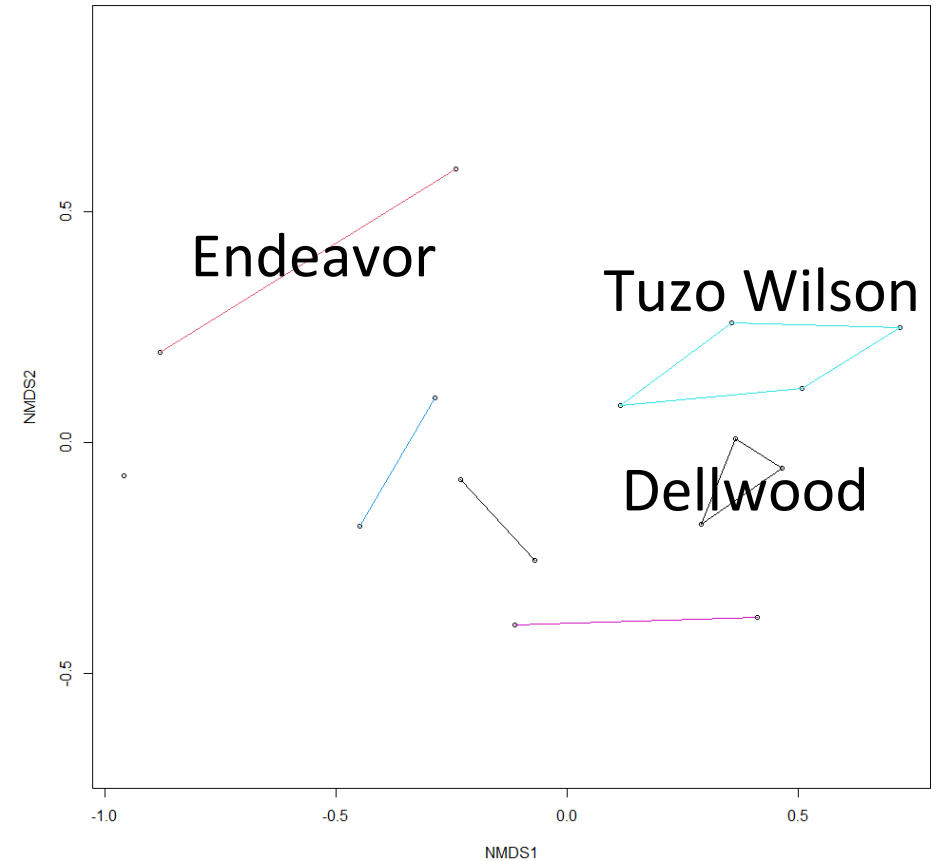
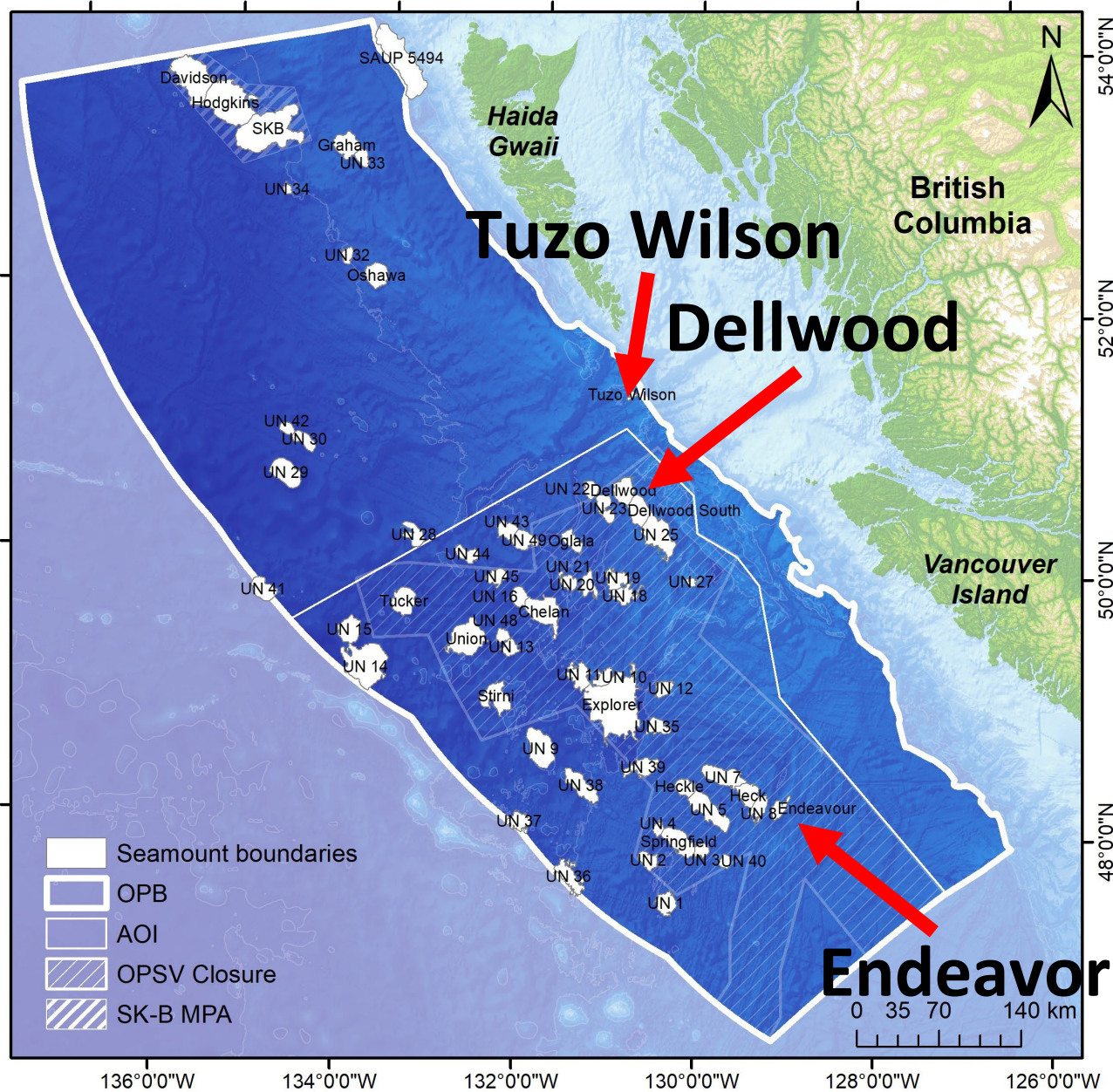
Differences in Seamount Zooplankton Communities

2017



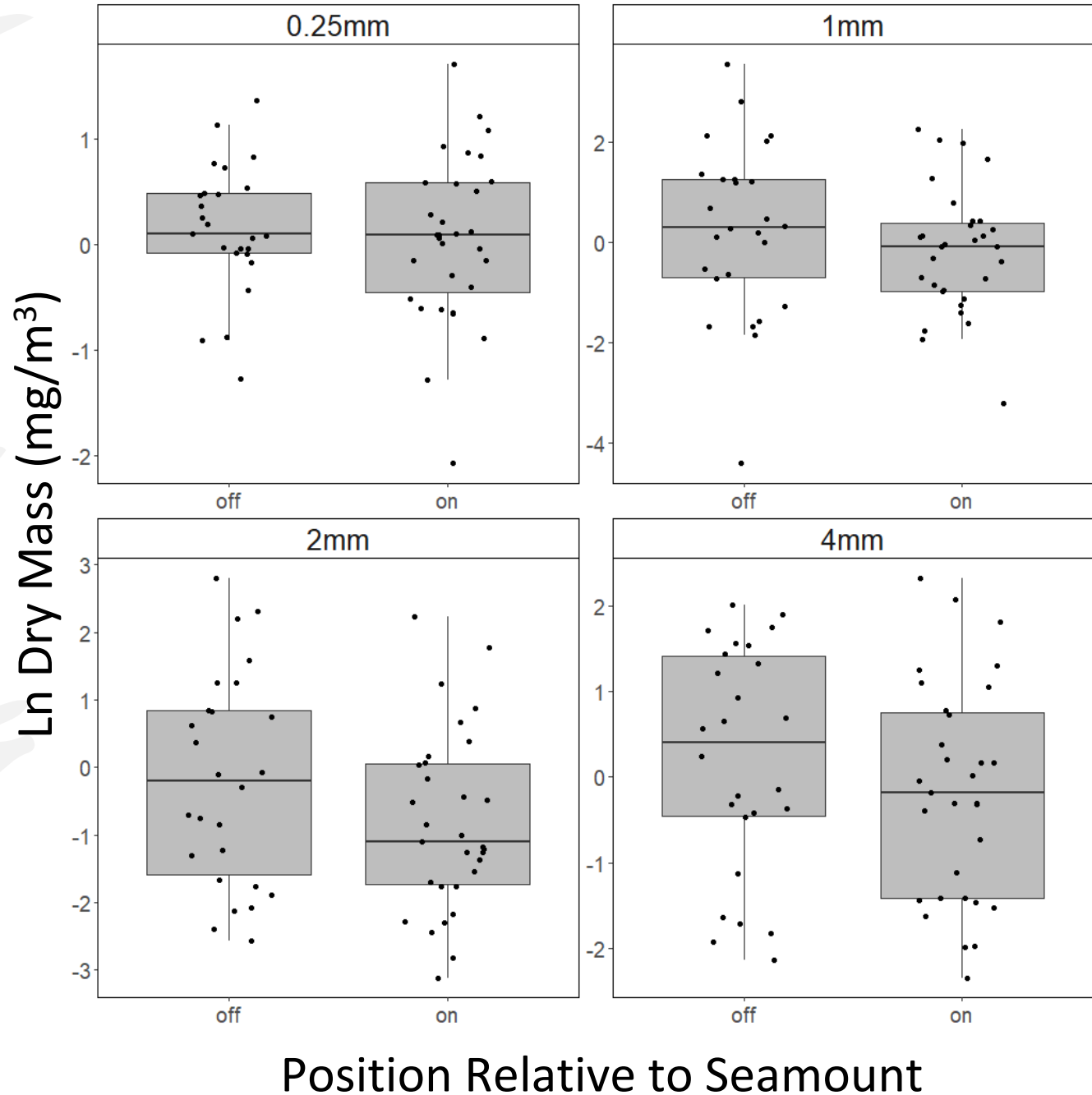
Differences in Seamount Zooplankton Communities

2021



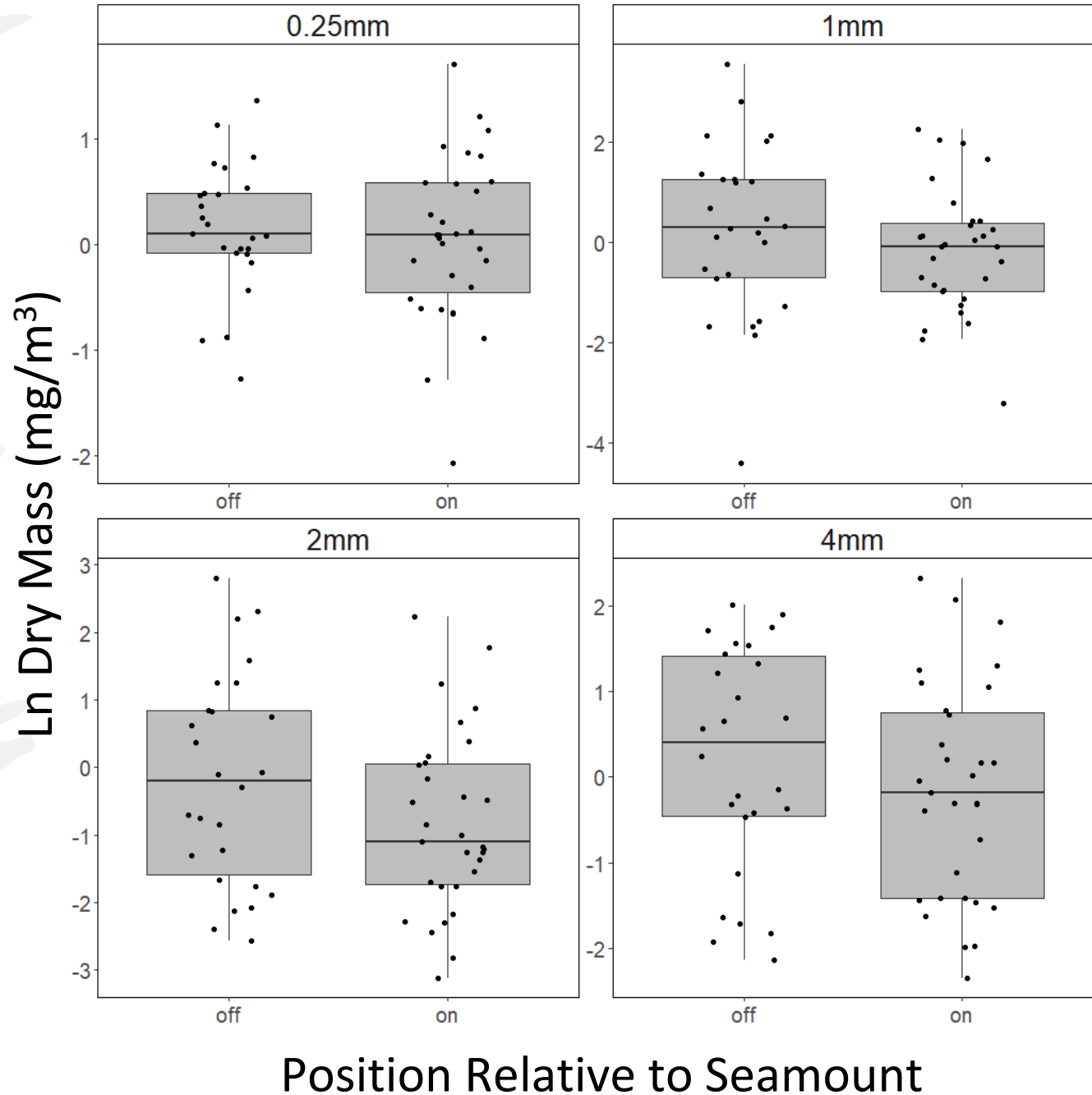
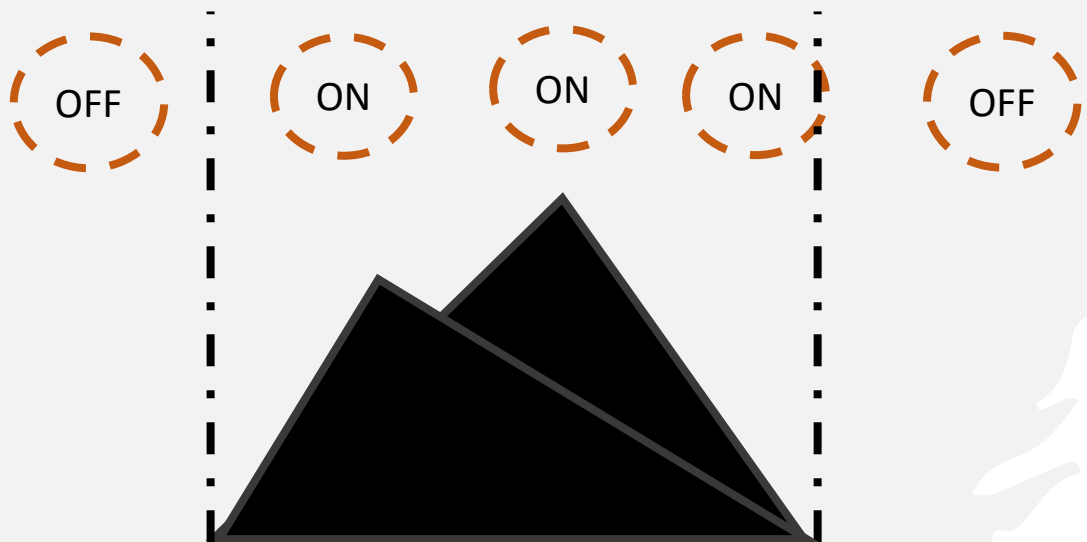
Seamount Effects on Zooplankton Biomass

- No difference in biomass based on site location in relation to seamount



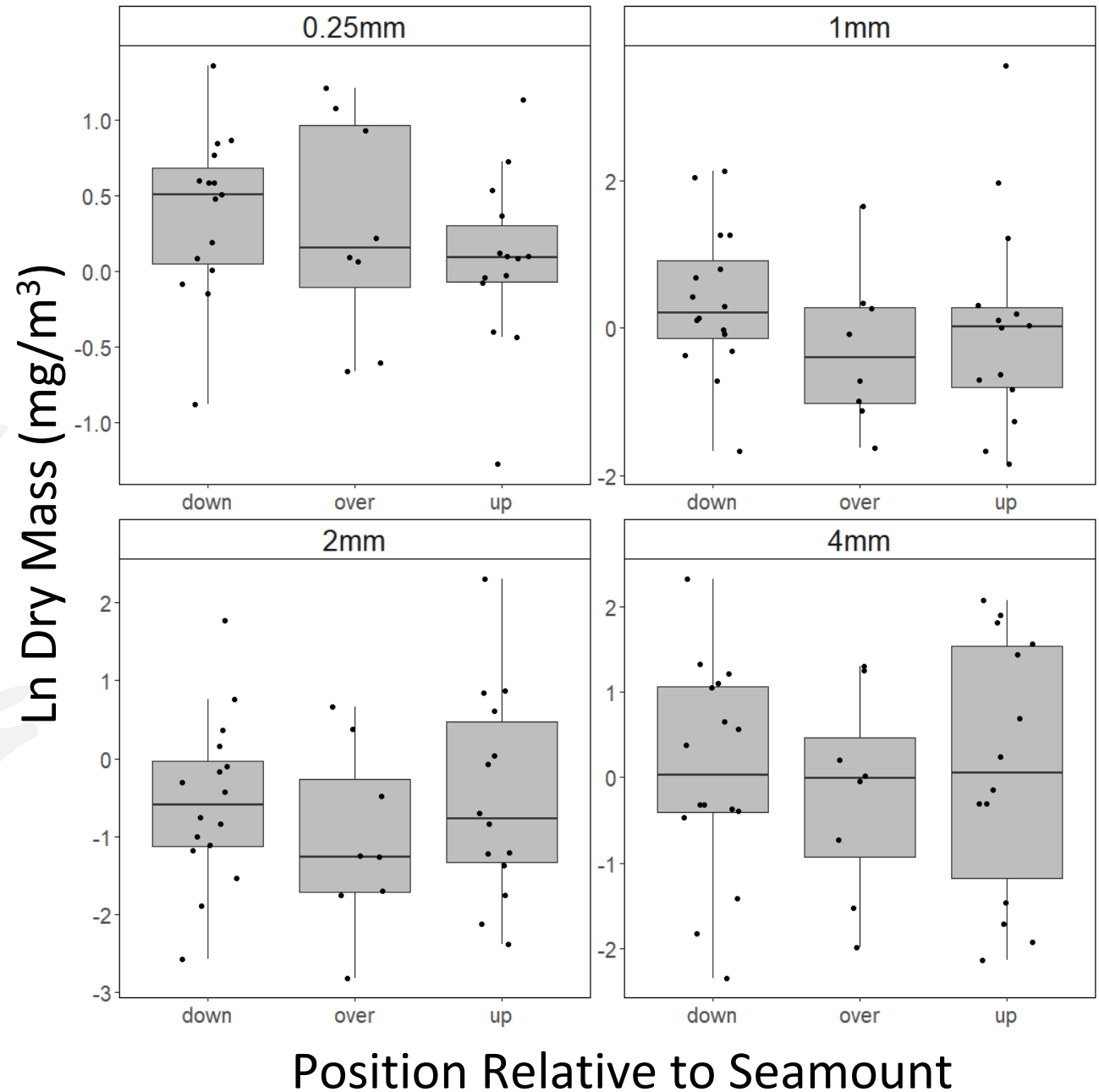
Seamount Effects on Zooplankton Biomass

- No difference in biomass based on site location in relation to seamount



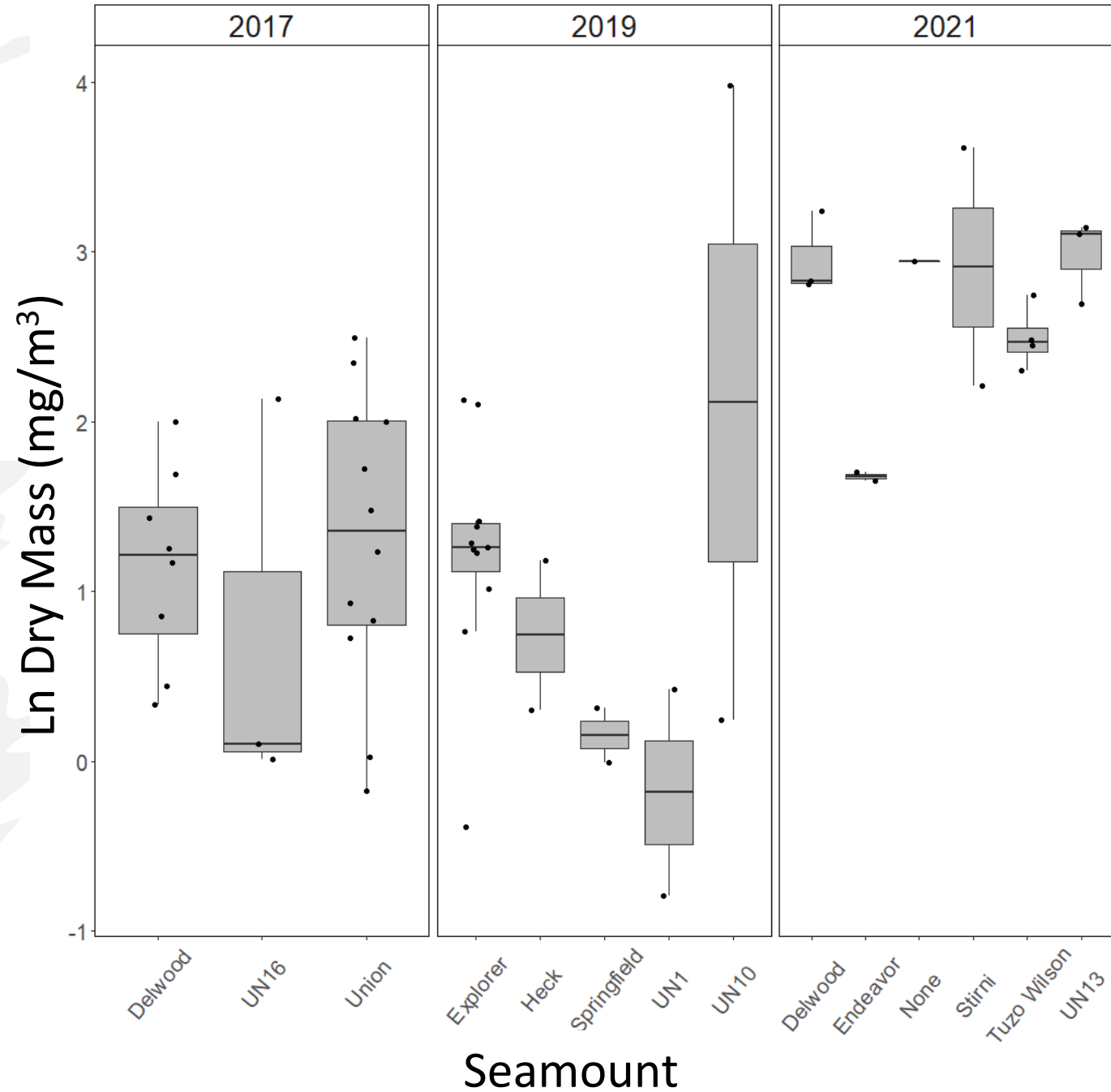
Seamount Effects on Zooplankton Biomass

- No difference in biomass based on site location in relation to seamount
- No difference in biomass upstream or downstream of seamounts



Seamount Effects on Zooplankton Biomass

- No difference in biomass based on site location in relation to seamount
- No difference in biomass upstream or downstream of seamounts
- No difference in biomass between seamounts



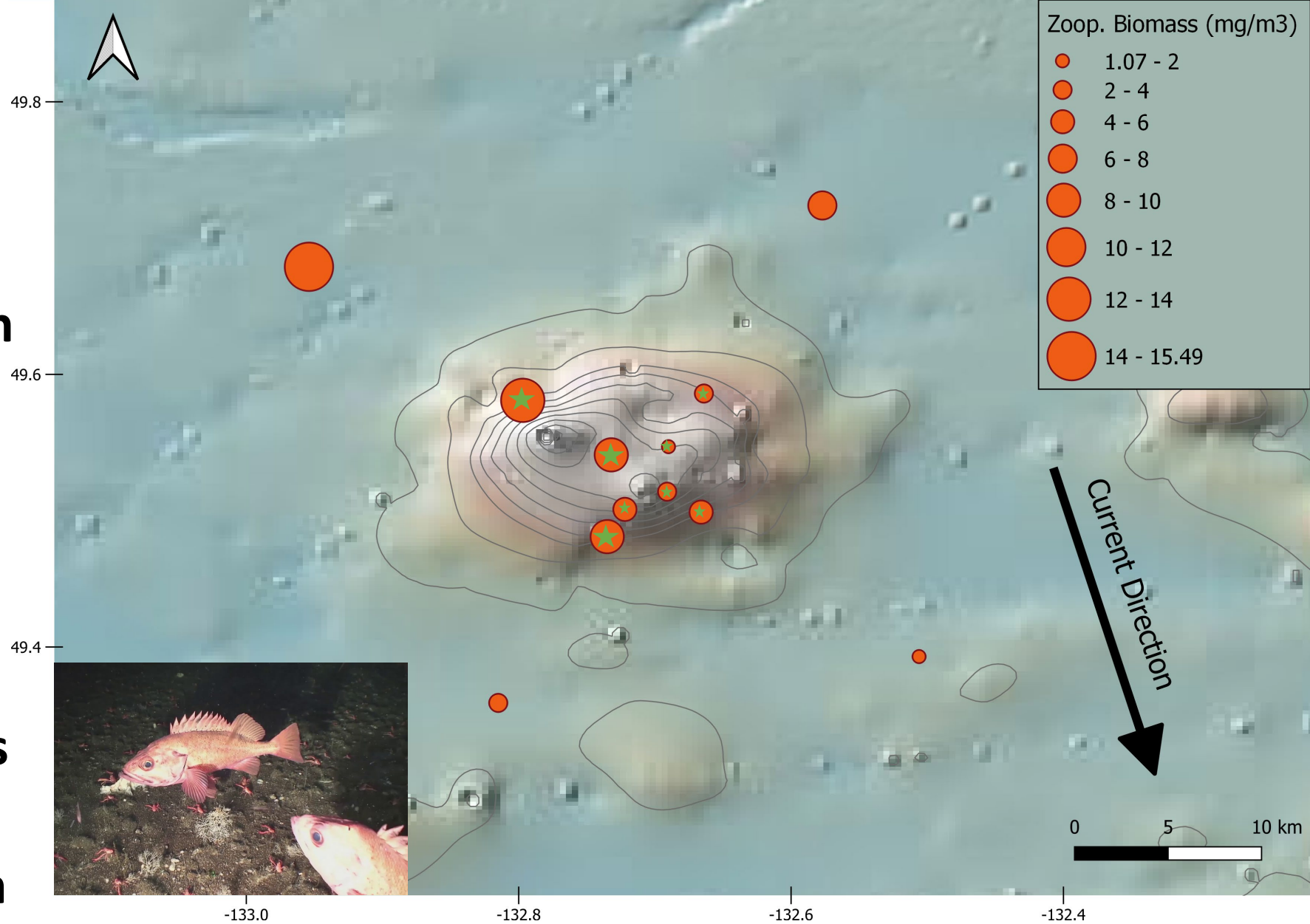
Union

Seamount Description:

Isolated cone with a medium summit depth & high Oxygen (Class H4; Du Preez & Norgard 2022)

Notable Features:

- **Higher Chlorophyll maximum at stations over seamount**
- **Potential decrease in zooplankton biomass moving down current**



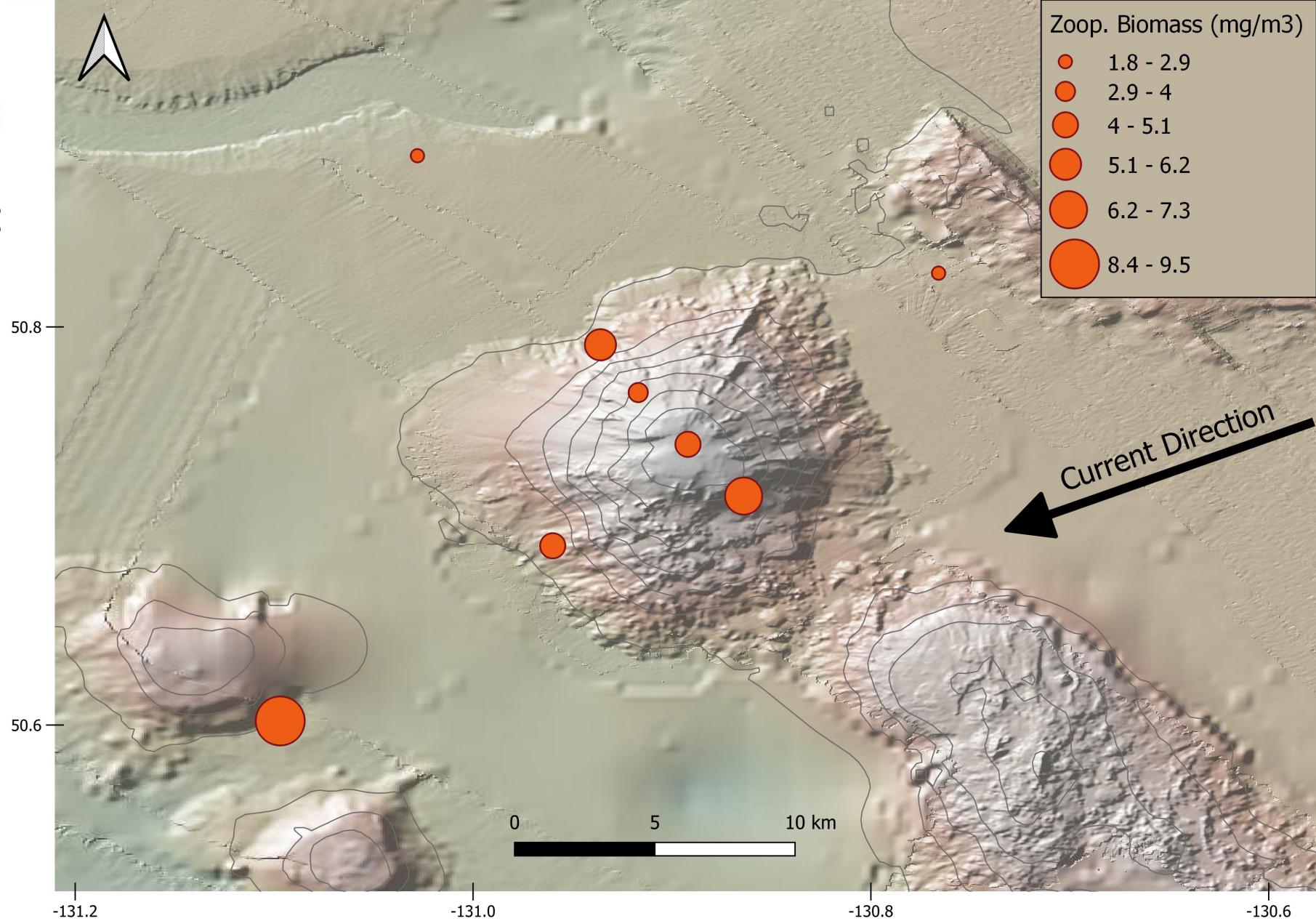
Year Sampled: **2017**

Summit Depth: **271m**

Dellwood

Seamount Description:

Conical seamount in ridge system with a medium summit depth and low oxygen (Class H3; Du Preez & Norgard 2022)



Year Sampled: **2017**

Summit Depth: **535m**

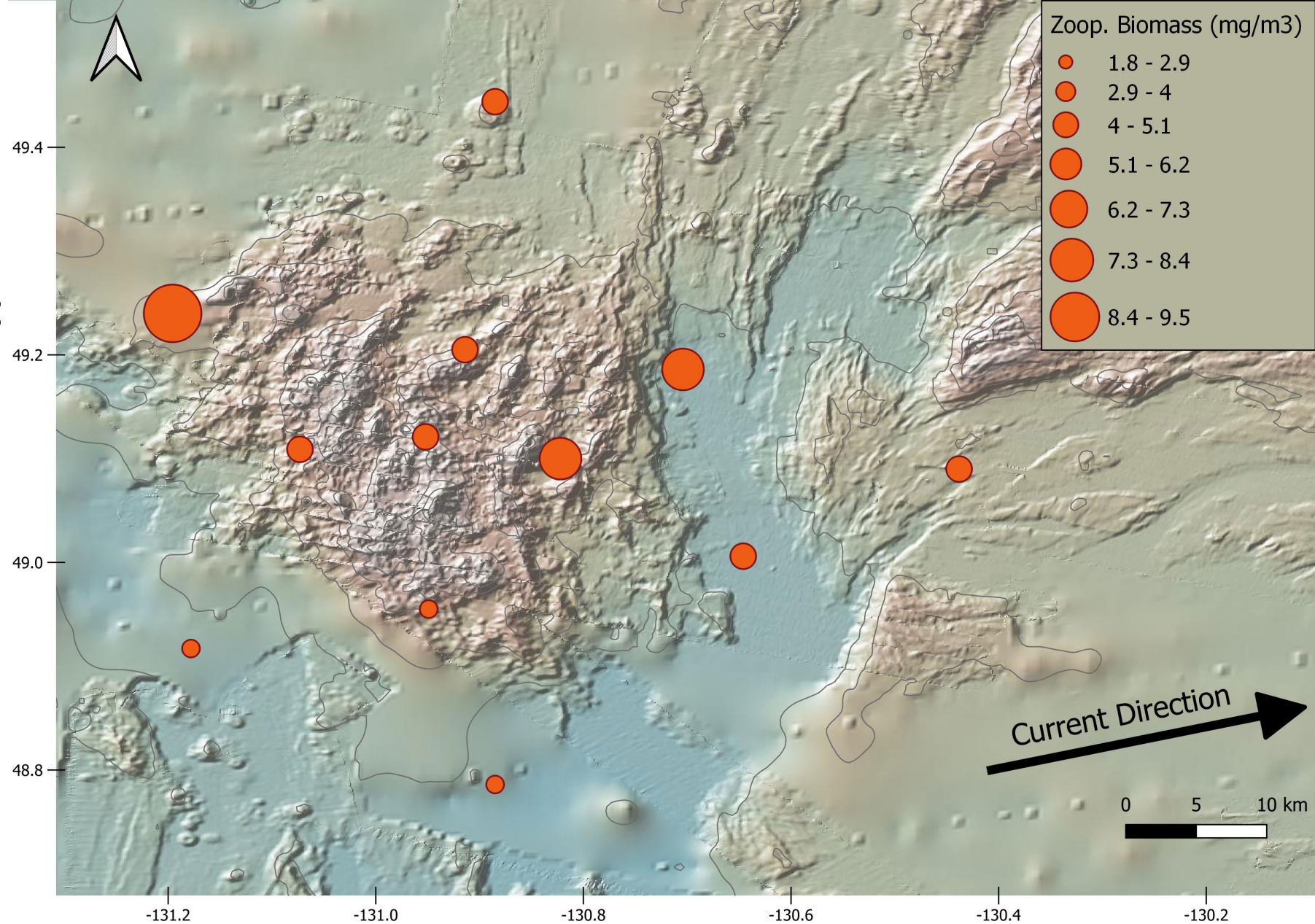
Explorer

Seamount Description:

Super volcano complex with a medium summit depth and low oxygen (Class H3; Du Preez & Norgard 2022)

Notable Features:

- **Higher richness on sites over top of seamount**



Year Sampled: **2019**

Summit Depth: **814m**

In Summary...

- No universal seamount effects on AOI zooplankton
- There are differences in zooplankton community composition but not biomass between seamounts
 - Most likely to do with seamount location and up current environment
- Hints of seamount effects on phytoplankton and zooplankton biomass at Union Seamount

Suggestions for future monitoring...

- Monitoring sites with imaging devices on the seamount summit and slope
 - Allows for the continuous monitoring of zooplankton species and local oceanography
- Stable isotope analysis of the fish and zooplankton to identify where they receive nutrients