

Variation in Subtidal Community Structure Along a Glacial Gradient

Elizabeth Hasan, Brenda Konar, University of Alaska, Fairbanks

Introduction

Alaska EPSCoR Coastal Margins includes questions around variation in communities along a glacial gradient (0-60% glaciated) and variation in environmental factors. Here we examine variation in subtidal community structure along the glacial gradient in Kachemak Bay. Variation in environmental factors due a gradient of glacial coverage in each watershed may have an impact on the subtidal community structure.

Hypothesis: Subtidal community structure will vary across five estuaries in Kachemak Bay due to differences in glacial coverage.

Methods

- Two 30 m transects at five sites in Kachemak Bay (Fig. 1)
- Transects extend from either end of sensor array that is collecting environmental data
- Five quadrats cleared of all organisms per transect at random intervals
- Samples sorted for species and biomass
- Sampled once/month for June-August 2019

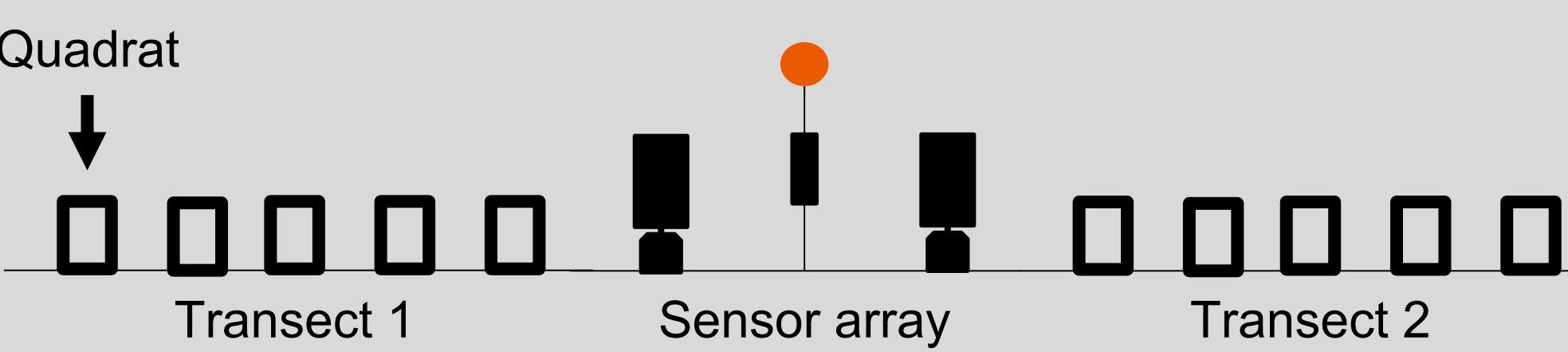


Figure 1: Schematic demonstrating sampling regime.

Results and Discussion

- Preliminary results demonstrate that subtidal community structure is highly variable within and between sites (Figs. 2 & 3)
- Within site variability is almost as great if not greater than between site variability (Figs. 2 & 3)
- Tutka and Wosensenski exhibit unique trends in community structure (Figs. 2 & 3)
- Jakalof (0% glaciated), Halibut (16% glaciated), and Grewingk (60% glaciated) demonstrated similar community structures (Figs. 2 & 3)
- Variability of algal and invertebrates communities does not follow the glacial gradient pattern (Figs. 4 & 5)
- Saccharina* and *Acrosiphonia* (Fig. 4) and *Lacuna* and *Mytilus* (Fig. 5) are dominant across multiple sites (Fig. 8)
- Total algal biomass and number of invertebrates varies across sites (Figs. 6 & 7)
- Subtidal community structure does not demonstrate a pattern linearly associated with degree of glacial coverage
- Further analyses would be beneficial in determining if the present trend in subtidal community structure is related to environmental factors other than glacial coverage.

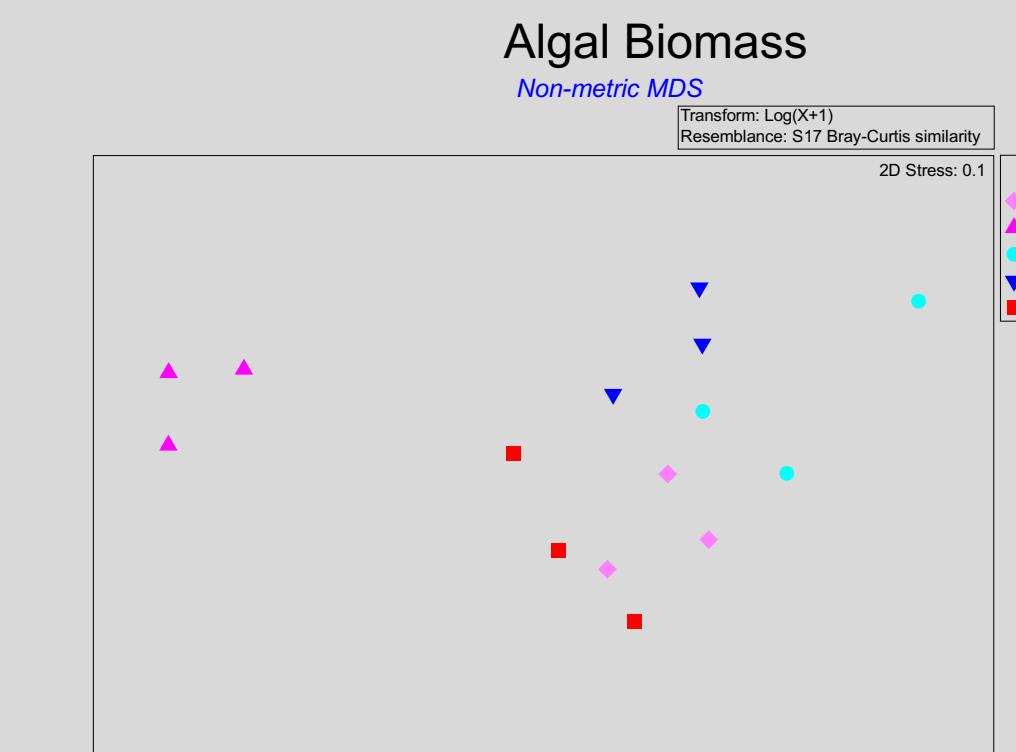


Figure 2: MDS output of algal communities for five sites in Kachemak Bay. Both transects were combined for each sample set. Each point represents one month of data.

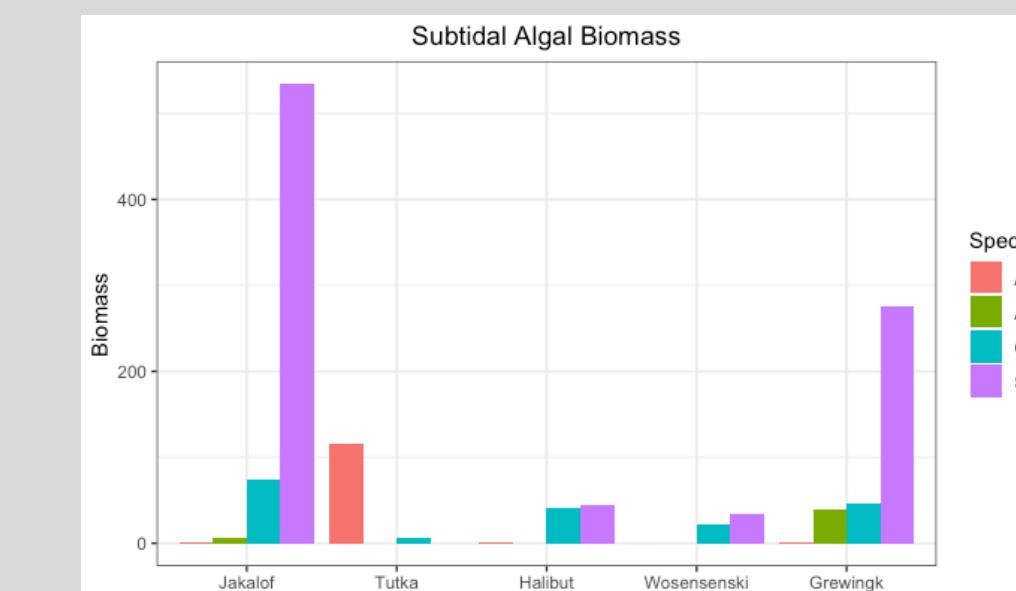


Figure 4: Top three dominant algal species at each site. All remaining algal species are represented by "other."

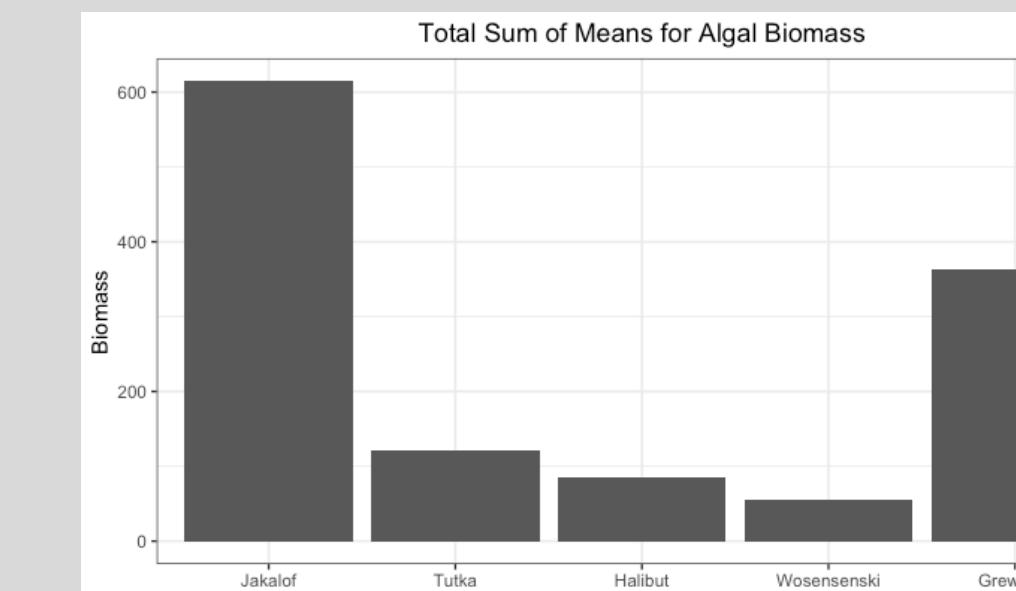


Figure 6: Total sum of mean algal biomass of all species at each site.



Figure 8: Dominant algal and invertebrate species. Left to right: *Saccharina*, *Acrosiphonia*, *Lacuna*, *Mytilus*.

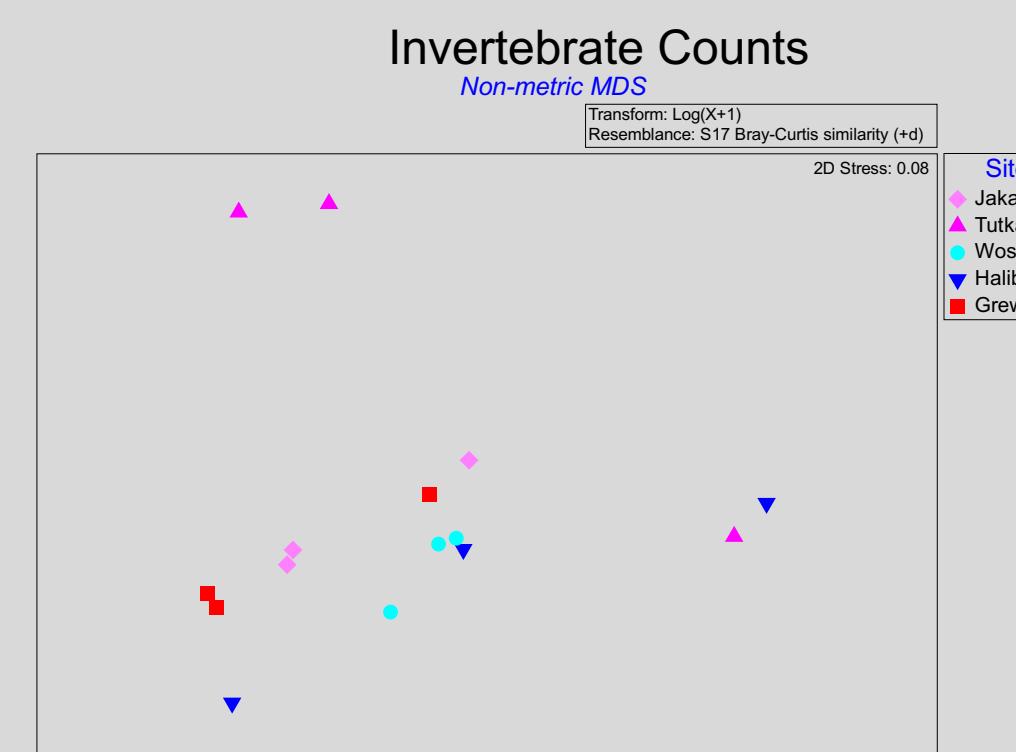


Figure 3: MDS output of invertebrate communities for five sites in Kachemak Bay. Both transects were combined for each sample set. Each point represents one month of data.

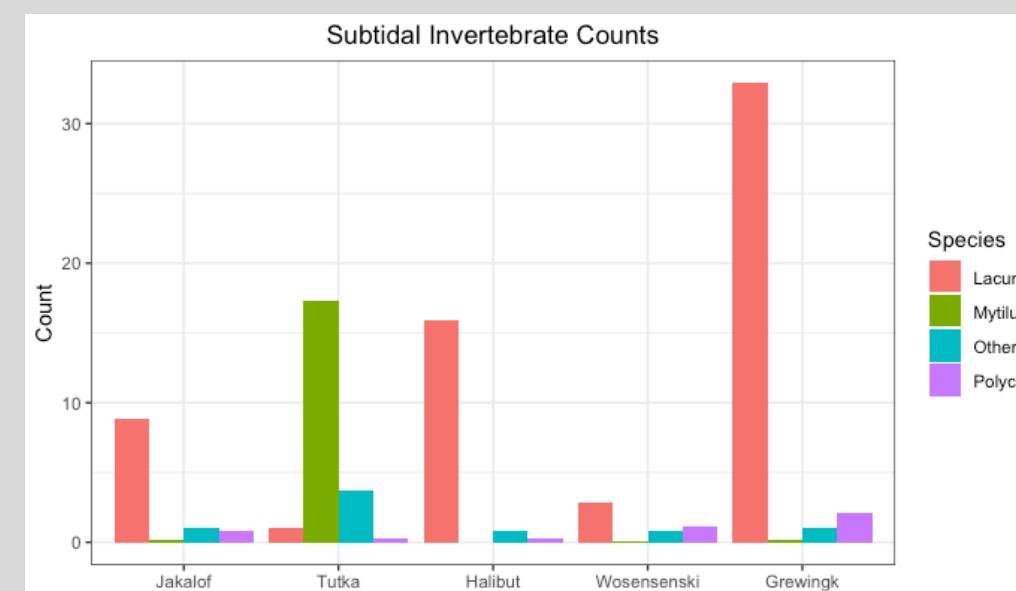


Figure 5: Top three dominant invertebrate species at each site. All remaining invertebrate species are represented by "other."

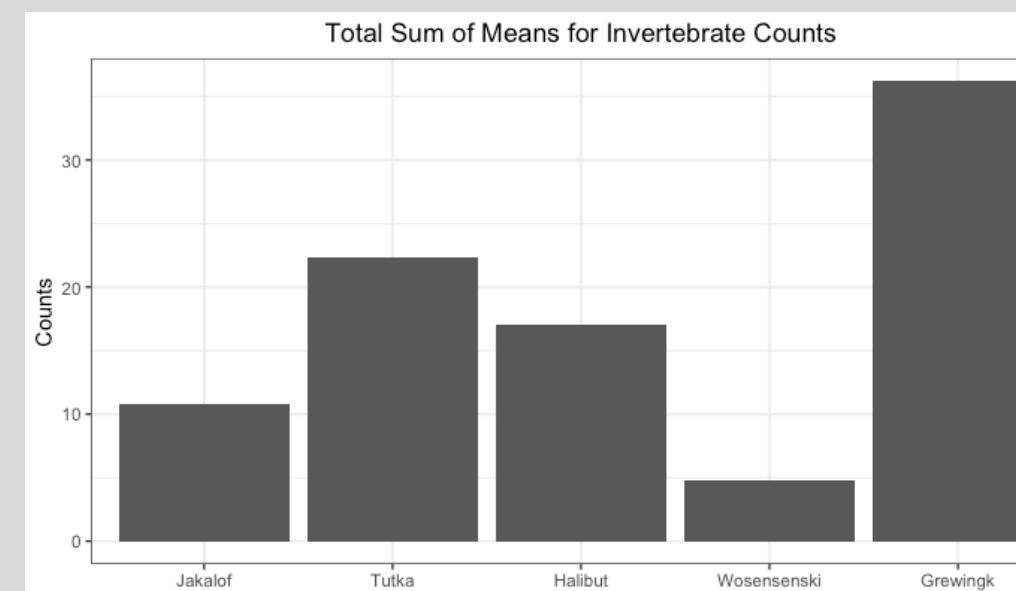


Figure 7: Total sum of mean invertebrate counts of all species at each site.

Acknowledgements

Thank you to Our World-Underwater Scholarship Society and the American Academy of Underwater Sciences for making this opportunity possible. In addition, thank you to EPSCoR for supporting research in Kachemak Bay.