

Abstract

In order to determine the range of species diversity of macro algae within the muddy intertidal zone, we studied the relationship between intertidal distance and diversity. We determined the percent coverage of species located at distances along the intertidal zone by dividing the area into multiple transects using a transect tape and plots. We found a significant positive correlation between diversity and distance from high tide, which shows that species diversity varies in the intertidal zone. This diversity is important to study as it helps us understand the diverse food webs and ecological structures of intertidal zones.

Introduction

- Intertidal zones are divided into three subsets: lower, mid, and upper.
- Each of these subsets has unique organisms that can tolerate the differing stressors present within them.
- The two main stressors are either biotic factors, such as predation, or abiotic, such as desiccation.
- We set out to investigate the effect of intertidal height on the diversity of macroalgae (seaweed, kelp).
- Southeast Alaska has some of the most diverse seaweed floras, so this is where we performed our study ².
- **Our alternative hypothesis was that species diversity and individual concentration would both change as the distance from the shore increased.**

Figure 1



Materials/Methods

- Bridget Cove (Figure 3) and Echo Cove (Figure 1) near Juneau, AK
- Transect tape and 66cm² plots marked by PVC pipes (Figure 2)
- Species' percent coverage to estimate abundance and diversity
- Observed six species total with varying presence within the area
- Linear regression to determine the significance of diversity along the tidal zone.



Figure 3

Figure 2



Results

- Our results showed a positive correlation between distance and diversity, which supports our alternative hypothesis, and rejects our null hypothesis.
- As distance from the high tide increased by 1 meter, the diversity of the plots increased by 0.006 ($p = 0.003$, $F_{1,91} = 9.54$, $R^2 = 0.095$).

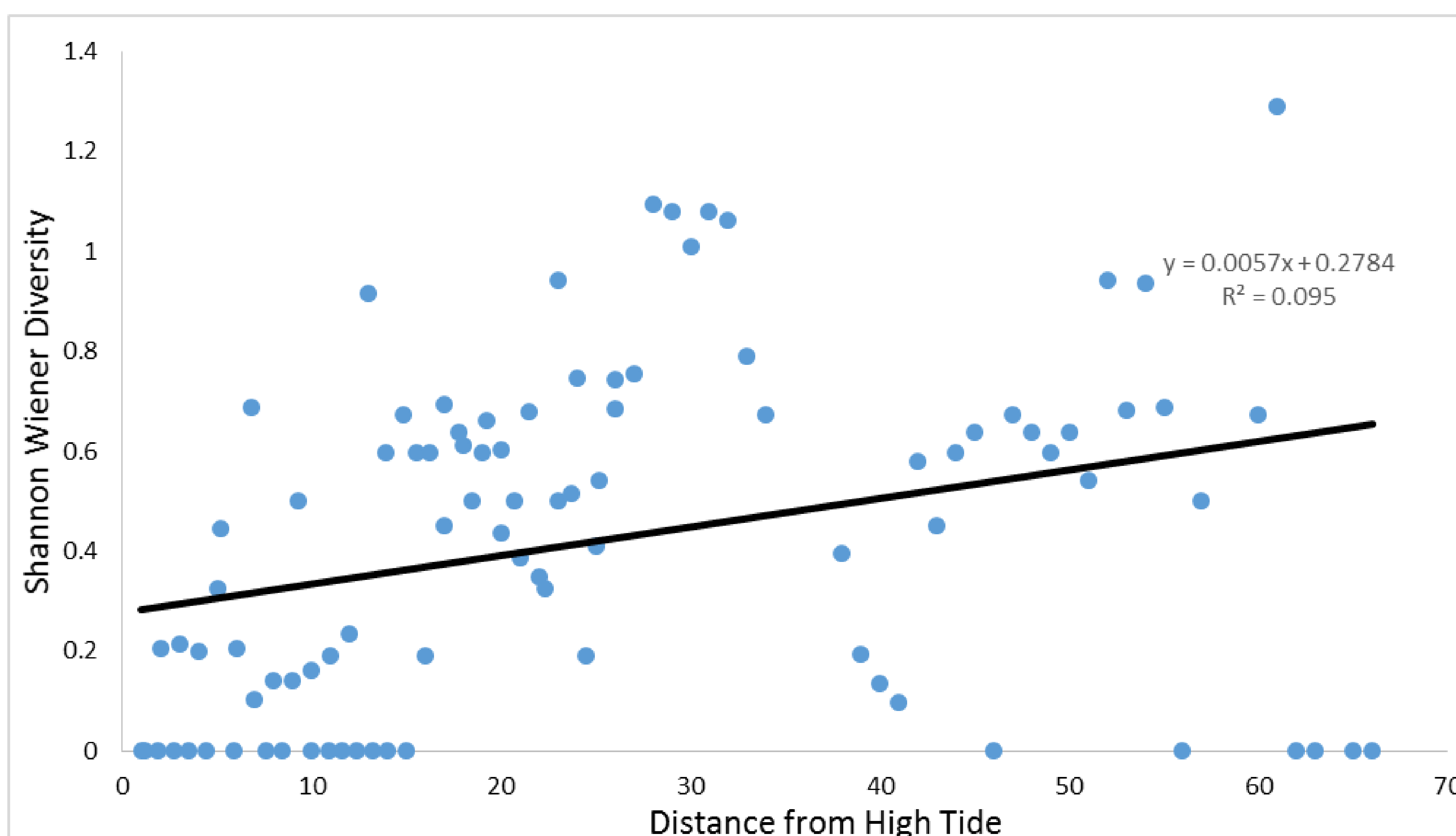


Figure 5: Seaweed diversity in the intertidal muddy zone near Juneau, AK. Data were collected in July of 2017. There was a significant positive correlation between distance from the high tide and diversity.

Conclusions

- Our results indicate that as distance from high tide increases in a muddy intertidal zone, the diversity of algal species will increase.
- This may be due to a dominant species in the lower zones not being able to cope with abiotic stressors in the upper zones.
- For example, *Fucus distichus* was much more present in the upper zone than in the lower, which opened more space for other species to inhabit the lower zone.
- Differences between the rocky intertidal and muddy intertidal zones may also be due to the presence or lack of predatory, herbivorous snails ³.
- Diversity creates a balance within the ecosystem and maintains the food webs already established.
- Understanding diversity allows us to identify the major changes in food web positions.

Figure 4



References

1. Lindeberg M and Lindstrom S (2010) Field Guide to Seaweeds of Alaska. University of Fairbanks Alaska.
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3. Beck MW (1998). Comparison of the measurement and effects of habitat structure on gastropods in rocky intertidal and mangrove habitats. Marine Ecology Progress Series, 169: 165-178

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