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Comparison of Seaweed Biodiversity At Odiorne Point State Park in the High and Low Tides
by Megan K

Introduction

The rocky shore intertidal ecosystem provides homes for many organisms. Rocky shores “are a productive food source and an important nursery area for fish and many other species”(Queensland, 2018). This habitat “also provides lots of food for fish and birds”(Queensland, 2018). Seaweeds are an important part of the intertidal. “Seaweeds, found mostly in the intertidal region, in shallow and deep waters of the sea and also in estuaries and backwaters, absorb the excess nutrients and balance out the ecosystem”(Sundararaju 2021). This study will focus on the question; Which tide zone at Odiorne Point State Park has the most seaweed biodiversity? To answer this question, the 7th and 8th grade students at Lincoln Akerman School gathered data using quadrats at Odiorne Point State Park in Rye, NH to identify the different species of seaweed. This study builds on ongoing research about invasive species. Invasive species threaten other seaweeds and could decrease seaweed biodiversity. “In the 1970s, Kelp and Irish moss accounted for nearly 80 percent of the seaweed cover on the seafloor off southern Maine, an area now dominated by low, scrubby, invasive seaweeds that account for more than 80 percent of the coverage, researchers at the University of New Hampshire have found”(Woodard, 2019).

Methods

The study was conducted on May 11, 2023 at Odiorne Point State Park Rye, NH. Both the high and low tide zones were sampled at 43.0440°N, 70.7162°W. The time for the low tide testing was around 9:00am and 10:45am and the time of the high tide testing was around 9:30am and 11:15am.

The protocol for the study was 10 groups using quadrats scattered throughout a transect line. The groups laid a quadrat, parallel to the water line, along a transect. Mrs. Lapointe used a random number generator for us to find a random location along the transect to place the quadrats. We searched our quadrats for any intertidal organisms. We identified each seaweed species and percent cover of seaweed in the quadrat. We IDed every organism found and recorded our findings on our datasheet. We collected photo evidence to support our findings. These species were tallied/totalled. No changes were made to the protocol in the field. In order to calculate the seaweed biodiversity we totalled the number species of seaweed in both tide zones.



Figure 1. This shows the quadrat and transect method used to gather data.

Results

Comparison of Seaweed Biodiversity In the High and Low Tide Zones At Odiorne Point State Park Rye, NH on May 11 2023

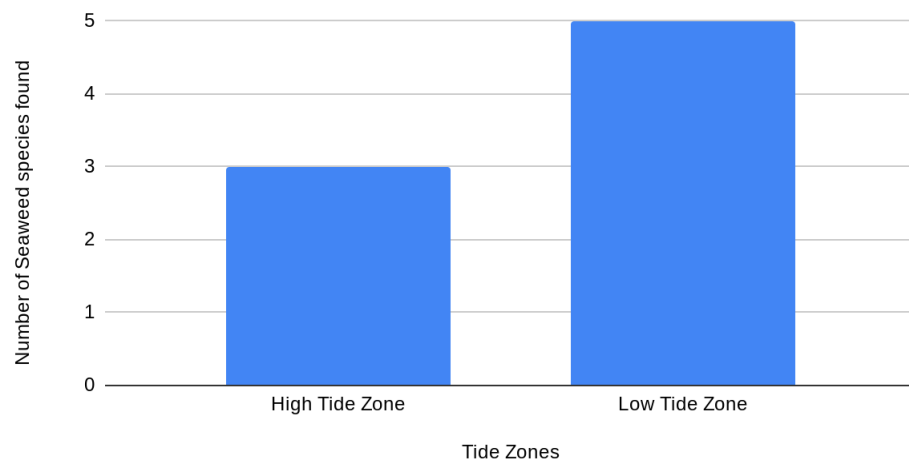


Figure 2. The graph above shows that there are 2 more species of seaweed in the Low Tide Zone than the High Tide Zone.

Discussion and Conclusion

The low tide zone at Odiorne Point State Park has more seaweed biodiversity. Figure 2 shows that there were 3 species found in the high tide zone and 5 species found in the low tide zone. That means that the low tide zone had 2 more species making it more diverse than the high tide zone. The low tide zone is only exposed to air during low tide and “has the greatest biodiversity of the three zones because it provides more favorable conditions for those organisms that cannot tolerate air exposure for long.”(National Geographic Society). When seaweed is exposed to air for too long it dries up, so they are less likely to thrive in the High tide zone due to the lack of water.

The 7th and 8th graders tried their best to identify the different species of seaweed, however, it is possible that they did not identify every species and didn't look thoroughly enough. This could be improved for future attempts by giving the students more time to identify the seaweeds and to look more thoroughly within the quadrat. From my experience, I looked very thoroughly to make sure that we identified every seaweed in the quadrat. I observed that others did the same. It's important to monitor seaweed in the intertidal because we need to know if invasive species are invading that ecosystem. For example, Dead Man's Fingers, also known as *Codium fragile*, is an invasive species that is “likely to displace native seagrasses and seaweeds”(Danoff-Burg) and, “*Codium* has annihilated the kelp beds of the North Atlantic.”(Danoff-Burg) If this species shows up in the intertidal then it can be a threat to the native seaweeds, and therefore important to monitor the seaweeds of the intertidal.

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