

Daniela Lozada

University of California, San Diego, UC Natural Reserve System

INTRODUCTION

California's wetlands have shrunk by over 80%. The decline of wetlands has resulted in a decline of biodiversity. Over the years restoration projects have been assigned to marshes on the west coast of the United States to preserve the sites. The wetlands, such as Kendall Frost Marsh Reserve, provide shelter and habitat for many species. The restoration projects provide different management to prevent and control further loss of the ecosystem.

- ❖ Part of the management plan is to decrease invasive species
 - ❖ Invasive species disturb native species populations
 - ❖ Previous studies have manipulated a variable to test for an impact in declining the invasive population
- ❖ Species in this study: *Carpobrotus Edulis*, ice plant, invasive plant
 - ❖ *Monanthochloe littoralis*, pickleweed native plant
- ❖ **Hypothesis 1: Native species will thrive under the salinity pressures.**
- ❖ **Hypothesis 2: The added salt water will control the ice plant growth.**

MATERIALS&METHODS

- ❖ Materials: measuring tape, flags, salt water, scissors, grid box
1. Look for area where native and invasive species are growing together
 2. Pick 12 plots and measure each 1mx1m
 3. 11inx5in cut to Bare ground
 4. Water only treated plots 2x per week for a total of 5 weeks
 - a. Measure salinity concentration (32parts per hundred)
 5. After 5 weeks, estimated the percent coverage of the new growth in bare ground
 - a. Used a grid box with 20 squares (each square was estimated out of 5%)
 - b. the grid box was out of 100%
 6. Rstudio used for statistical analysis.

PLOTS	INVASIVE	NATIVE SPECIES	TREATMENT (Y/N)
1	ICE PLANT	Low marsh PW	N
2	ICE PLANT	none	N
3	ICE PLANT	Low marsh PW	Y
4	ICE PLANT	none	Y
5	ICE PLANT	Monanthochloe	Y
6	ICE PLANT	Monanthochloe	N
7	ICE PLANT	Monanthochloe	Y
8	ICE PLANT	Monanthochloe	N
9	ICE PLANT	High marsh PW	Y
10	ICE PLANT	High marsh PW	N
11	ICE PLANT	none	Y
12	ICE PLANT	none	N

RESULTS

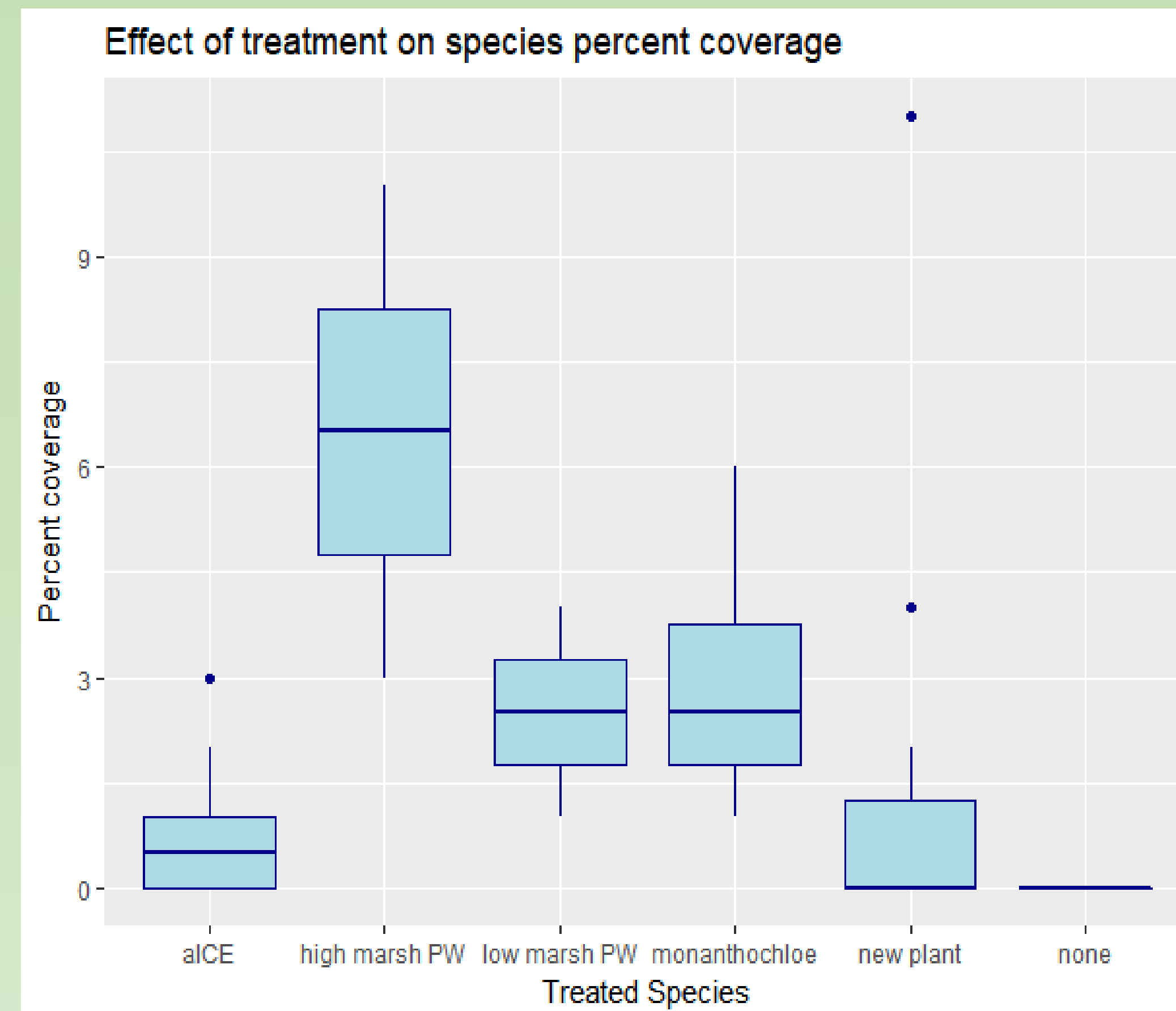


Figure 1 shows that after the 5 weeks, there was a marginal significance between the high marsh pickleweed's growth, in comparison to the ice plant ($F_{11,24}=2.05, p=0.07$). Overall the species' growth was significant compared to the ice plant's growth ($F_{5,24}=2.91, p=0.03$).

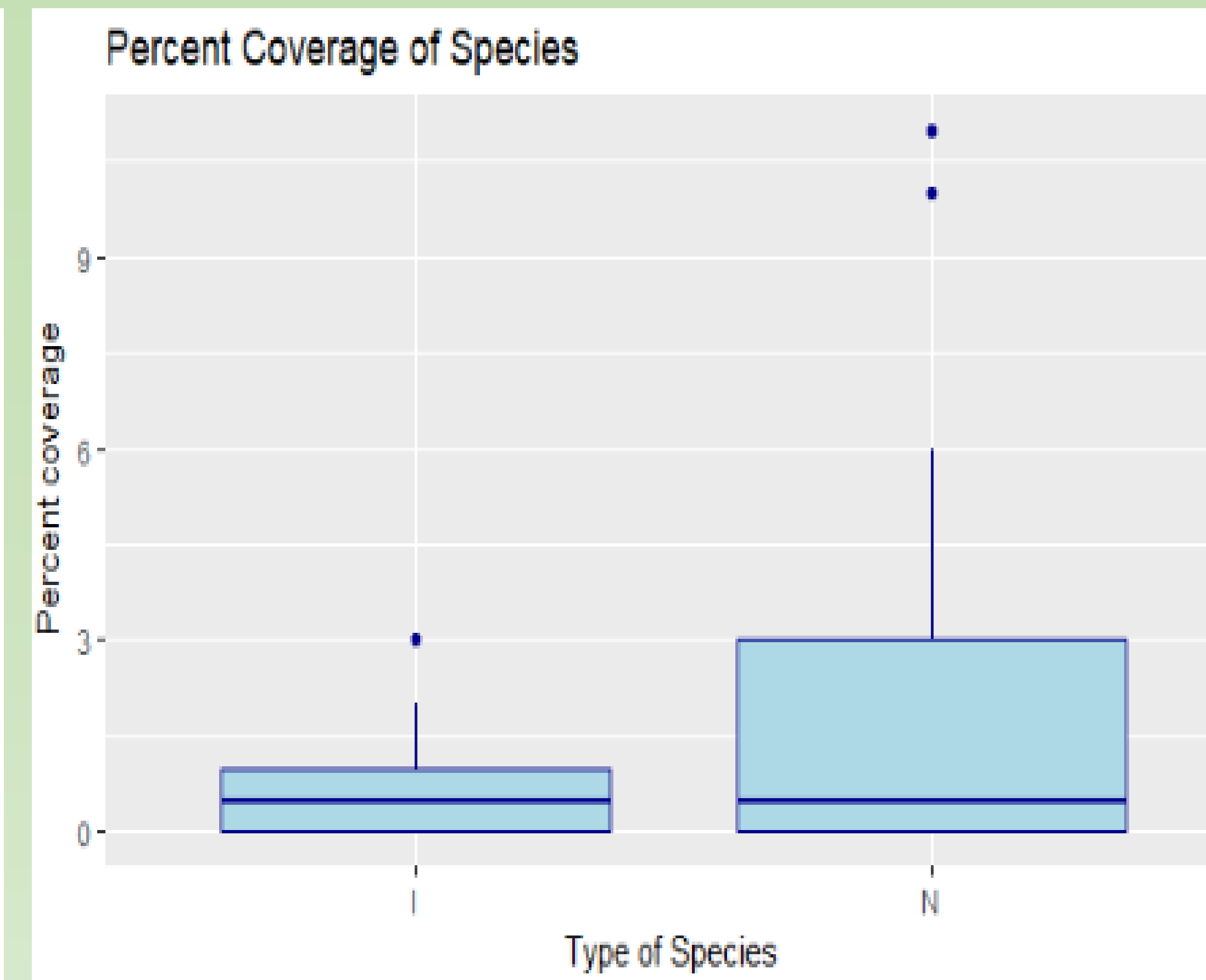


Figure 2 shows the percent coverage of the native versus the invasive species. The linear model analysis showed no significance between the native and the invasive species percent coverage ($F_{1,34}=1.23, p=0.18$).



The image on the left was the original photo of plot number 4. Plot 4 was located on the slope of the knoll, closest to a marsh channel. It was one of the plots that received the salt water treatment and originally had the only species of ice plant growing. After the 5 weeks of treatment, a different species grew in the bare ground. The image on the right shows the bare ground area with the new plant species. This species was mainly growing in the plots that were located on the same slope of the knoll. The percent coverage of this area was calculated by using a grid that summed to 100%. Plot 4 and 9 had the greatest percent coverage in the bare ground compared to the other plots.

CONCLUSIONS

- ❖ To diminish the disturbance of invasive species in the wetlands,
- ❖ Hypothesis 1, whether the native species will thrive and grow under salinity pressure was proven true, there was a significance between the growth of the species compared to the ice plant.
- ❖ Hypothesis 2 stated that the added salt water would control the growth of the ice plant but it was proven false, there was still growth of the invasive species.
- ❖ Other studies have gathered better analysis of root profiles and tested the soil before manipulating plots.
 - ❖ Next time, soil should be tested to further examine the nutrients that are nourishing the invasive species.
 - ❖ In addition, raising the concentration of salinity can have a greater impact on the species, Thus, during work parties, volunteers can help by adding salt water to invasive species in large quantities as part of the weeding process.



The image on the left is a photograph of Kendall Frost Marsh during a high tide. The image on the right is an image of myself during a volunteer work party, examining a species. As mentioned in the conclusion, during work parties volunteers can help apply salt water to invasive species that cover a large area.

ACKNOWLEDGEMENTS

Thank you Isabelle Kay for giving me the opportunity to intern at Kendall Frost Marsh and expanding my knowledge on plant species. Thank you Larry and the interns at Kendall Frost for helping with irrigation process. Lastly, thank you Heather Henter for your guidance during fall and winter quarter.

REFERENCES

1. D'Antonio, Carla M., and Bruce E. Mahall. "Root profiles and competition between the invasive, exotic perennial, *Carpobrotus edulis*, and two native shrub species in California coastal scrub." *American Journal of Botany* (1991): 885-894
2. "Natural Reserve System." *Kendall Frost Reserve*, nrs.ucsd.edu/.