Effects of nutrients on the abundance of *Spartina alterniflora* in Sandy Point Saltmarsh

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### Introduction

Salt marshes reside along many parts of the Connecticut coast line providing important habitats for both marine and terrestrial species as well as act as filters for pollutants (Beck et al. 2001). The plant species that reside in salt marshes are affected in their zonation by many factors including salinity (Morris and Bradley 1991), competition (Bertness 1991) and the availability of nutrients (Kiehl et al. 1997). Many of the plants in a salt marsh, such as *Spartina alterniflora*, obtain some their nutrients from the pore water, which is the water that resides between the sediment particles. *Spartina alterniflora* is one of the major salt marsh plants in New England salt marshes (Bertness 1991) and is limited to nutrient levels (Kiehl 1997). Studies have shown ammonia (Bradley and Morris 1991), sulfides (Bradley and Morris 1990) and salinity (Kiehl et al. 1978) have effects on the growth of *Spartina alterniflora*. Since hydrogen sulfide, ammonia and salinity have been shown to have an effect on *Spartina alterniflora* growth this experiment was done to determine whether these nutrient levels correlate to the abundance of *Spartina alterniflora* in Sandy Point salt marsh. Sandy Point is a *Spartina* dominated salt marsh in West Haven, CT (Figure 1).

### Materials and Methods

**Peeper Pore Water Collection**

To collect the data for this experiment a pore water sampler, a peeper, was built. A peeper allows for the concentrations of the pore water to be determined. To create this peeper we used 4.15 mm long 12.7 mm pieces of PVC pipe spaced with 25 mm between each tube. Between each pipe was used piece of cement to eliminate space and create structure to the peeper. The pipes were placed between two pieces of Plexiglass 12.7 cm wide and 22.9 cm long. On each side of the tubes were cut a 10.2 cm long 1 mm wide slit to allow for the exchange of pore water. Inside each of tube was placed 25 mL of deionized water in dialysis tubing tied at each end with string to prevent leakage. Each peeper was placed into the ground for one week to allow for the deionized water to equilibrate with the pore water. Peeper samples were collected by removing the dialysis tubing and placing it into 500 mL plastic containers with caps to be transported to the lab for testing.

**Abundance**

Each sample site before the cores and peeper were removed a quadrant was used to determine the abundance of *Spartina alterniflora* within a 1 m² around the peeper. Table 1 has the abundance numbers that were used for each of the trials.

### Discussion

Many of the core samples after centrifuging yielded no water to test therefore no data for those cores was obtained. The value < 0.01 ppm was the value given by the exact Eco-Check Advanced Photometer when the value obtained was out of its lower range of measurement. Sulfide levels for the experiment were low, < 0.2 ppm, for all but a few samples. The value < 0.02 ppm was used for tests that were of a lighter color than the lowest range of the LaMotte test kit which was a value of < 0.2 ppm. Based upon the concentrations of NH₄ in the peeper samples in comparison to the abundances the areas with some *Spartina alterniflora* grow have the lowest levels where as the highest levels were in areas without *Spartina* growth. The data from the core samples backs this up with the core near the peeper with some abundance of *Spartina* had lower NH₄ concentration than the area without that plant. A study in 2009 had similar results in that concentrations of NH₄ were lower in areas with *Spartina Alterniflora* than in areas without (Wang 2009). Based upon the data, areas with *Spartina alterniflora* growth have a lower concentration of NH₄ in the pore water than those without *Spartina* and areas with some growth have levels that fall between high growth and no growth.

### Results

Based upon the results obtained during this experiment it is inconclusive as to whether sulfide, or salinity, have an effect on the abundance of *Spartina alterniflora* at Sandy Point salt marsh. Ammonia is possible has an effect on the abundance of *Spartina alterniflora* though more data is needed to determine this. Different sites with *Spartina* growth as well as other abundances of *Spartina* would also help in determining a correlation. There were also discrepancies between concentrations in the peeper and concentrations obtained through the cores. A longer time for each trial might help to limit this problem. Also salt water with a salinity similar to that of the pore water to be collected could be used instead of deionized water.

### Conclusions

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**References**

