Sea level rise and climate change effects on marsh plants *Spartina alterniflora* and *Typha angustifolia* using mesocosms

Alana Hanson, Cathleen Wigand, Roxanne Johnson, Autumn Oczkowski, Earl Davey, Erin Markham

A four month experiment using greenhouse mesocosms was conducted to analyze the effect of sea level rise and climate change on salt marsh plants *Spartina alterniflora* (cordgrass) and *Typha angustifolia* (narrow-leaved cattail). Our goal was to examine the effects of three different seawater flooding levels and three levels of freshwater input on the growth of the marsh plants. Pots containing the plants were placed across three 600L tanks with treatments of ambient rain, storm, or drought conditions. Each shelf in each tank had *Spartina* and *Typha* plants in individual 6in diameter pots (n=3) containing a homogeneous soil matrix. The tanks received different levels of freshwater input which compared the climate change effect of infrequent, severe rain storms to ambient rain or drought conditions. The plants in the ambient rain tank experienced a daily 3.25mm rise in freshwater, the storm tank a biweekly freshwater level rise of 10cm, and the drought tank never received freshwater. All tanks received seawater on a twice daily tidal cycle. The pots were situated on shelves at three different levels to receive three levels of tidal flooding: low, medium, and high. Above ground plant growth was measured once monthly for the duration of the experiment. We observed a low survival rate for all *Typha* exposed to high levels of flooding in all tanks, as well as drought conditions, while *Typha* that experienced both freshwater input and low tidal flooding thrived. *Spartina* plants proved resilient in all conditions. At the conclusion of the study belowground biomass was calculated and showed *Spartina* plants to have an extensive root structure across all treatments, while *Typha* had minimal root mass. From the results of this pilot study, we will conduct further experiments that reexamine sea level rise and additional climate change effects on marsh plants.