**The Relationship Between Vegetative Coverage and Erosion Levels in NYC Wetlands**

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**Introduction**

New York City (NYC) has roughly 4,000 acres of tidal marshlands that help filter polluted water from the city. We visited six wetlands, where there had been monumental vegetation loss along the riverbanks amounting to a total of 53 acres or 18%. In other words, NYC has lost more than 80% of its historic marsh coverage over the past 40 years. The New York City Department of Parks & Recreation (NYCDPR) conducted an analysis to determine marsh loss from 1974-2012. The data from this research allows the NYCDPR to implement management and support restoration projects. These projects will make NYC's coastal habitats more resilient to future Sea-Level Rise (SLR), specifically by restoring the lost marsh edges. This summer we had the opportunity to work alongside the NYCDPR to continue these erosion studies.

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**Methods**

**Erosion Pin Protocol**

a) We aligned transects (measuring tape) perpendicular to shoreline orientation at 5 sites comparative to Surface Elevation Table (SET) locations.

b) 3 Erosion Pins (Rebar) were later positioned along transects.

c) Erosion Pins were located: 0m from shore, 3m from shore, and 6m from shore inland towards vegetation.

**Vegetation Coverage**

a) Percent cover of various plant species, bare ground, and garbage were monitored in 1 x 1 m quadrats centered over Erosion Pins.

b) Each quadrat was assessed using percent cover estimate averages to determine the cover by individual species and non-vegetation.

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**Figure 1**: Quadrat set up around erosion pin at Saw Mill Creek.

**Figure 2**: Total Percent Coverage in Relation to Distance from Vegetative Line

**Figure 3**: Total Percentage of Mud Flat in Relation to Vegetative Line

**Figure 4**: Average Distance to Vegetation

**Figure 5**: Average Total Vegetation

**Figure 6**: Average Total Vegetation (Pin 1)

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**Discussion/Conclusion**

From our data, we concluded that vegetative coverage has a positive correlation with erosion along the coast of tidal wetlands. Furthermore, when we compare Figures 4 and 6, the sites that possess a lower percentage of vegetative cover at Pin 1 are also generally losing soil. This means that the abundance of vegetation in the area has an influence on how creek banks are gaining vegetation or eroding away. This is consistent with our hypothesis because we predicted that areas with more vegetation would have less erosion.

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**Next Steps/Management**

Our research this summer has helped us gain a better understanding of the erosion present in New York City’s salt marshes. Moving forward, we believe that marshes could be restored by supplementing sediment to the water edge and planting native vegetation to increase the stability of the surrounding soil. Future efforts of the NYCDPR should focus on increasing public awareness regarding the function and pivotal importance of salt marshes. Our team noted the vast amount of garbage present in the tidal marshes during our field research. The NYCDPR could implement cleanup events in collaboration with the local communities.

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Wetland Scientists, Corpus Christi, TX.

Restoration of New York City’s Receding Salt Marshes. Poster presented at the Society of Wetland Scientists, Corpus Christi, TX.

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**Research Question**

How does vegetation abundance affect erosion levels?

**Hypothesis**

If there is more vegetation abundance, then there is less erosion.

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**Objective**

The purpose of this study was to gather more information about how vegetative coverage relates to erosion levels. We worked with the NYCDPR to analyze the erosion facing coastal wetlands today. Specifically, our group wanted to understand how vegetation affects erosion levels, in order to anticipate how the marshes will respond to global change factors.