

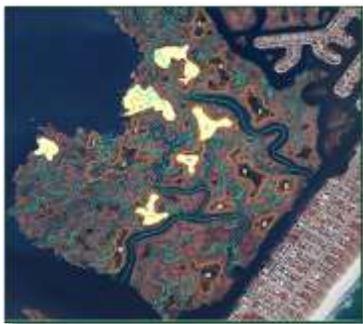


Restoring and Sustaining Ecological Function in Coastal Marshes Affected by Sea Level Rise

Ecosystem Management and Restoration Research Program

Background

Loss of coastal marsh areas critical for their ecological and storm protection functions has become a national concern. Loss can be attributed to sediment starvation, sea level rise, and other local factors. Currently, little guidance exists pertaining to the sustainable restoration and management of impacted marsh areas. This Ecosystem Management and Restoration Research Program (EMRRP) research unit focuses on developing an empirically supported framework delineating the ecological and environmental considerations relevant to restoration of salt marshes for the purpose of offsetting effects of sea level rise.



Objectives

This Ecosystem Management and Restoration Research Program (EMRRP) research unit focuses on developing an empirically supported framework delineating the ecological and environmental considerations relevant to restoration of salt marshes for the purpose of offsetting effects of sea level rise.

Approach and Applications

Because this is a rapidly developing field, multiple lines of evidence are being undertaken to support the framework: 1) a literature review synthesizing 200 references; 2) participation in three active case studies using thin layer placement of dredged material and other techniques to intervene at degraded marshes; 3) engagement with stakeholders including a webinar series, workshop participation, and presentations at conferences; and 4) final reporting. The three case studies include Seal Beach, CA (upper and lower right pictures), Avalon New Jersey (upper left picture), and Narrow River Rhode Island.

Outcomes and Products

This project will contribute to the understanding of how and when thin layer placement and other management activities benefit degrading marshes. In addition to synthesizing published information and outcomes from multiple case studies around the country, this research effort has funded fieldwork to address existing gaps in understanding, particularly related to soil evolution in thin layer placement sites. The Framework and multiple TNs are currently in development. The research has also generated multiple conference presentations and workshop contributions, fact sheets for each of the three case studies, and these selected products:

Journal Articles:

- Berkowitz, J. C., VanZomeran, and C. Piercy. 2017. "Marsh Restoration Using Thin Layer Sediment Addition: Initial Soil Evaluation", *Wetland Science and Practice (WSP)*
- Berkowitz, J. C., VanZomeran, C. Piercy, J. White. (In review) "Evaluation of Coastal Wetland Soil Properties in a Degrading Marsh", *Estuarine, Coastal and Shelf Science (ECSS)*
- VanZomeran, C., F. Berkowitz, C. Piercy, J. White. (In review) Restoring a degraded marsh using thin layer sediment placement: Short term effects on soil physical and biogeochemical properties. *Ecological Engineering (Ecol. Eng.)*.

Technical Reports (TRs):

- VanZomeran, C., D. Acevedo-Mackey, E. O. Murray, and T. Estes. (In review) Maintaining Salt Marshes in the Face of Sea Level Rise - Review of Literature and Techniques. ERDC/EL TR, U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Technical Notes (TNs):

- VanZomeran C. M., E.O. Murray, and D. Acevedo-Mackey. (In review) Marsh Assessment and Restoration Implementation at Three Salt Marshes in Response to Relative Sea Level Rise: A Report from Webinars and Supplemental Findings. EMRRP Technical Notes Collection. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

