

MUD ON THE MOVE: NEW APPROACHES TO SAMPLING SUSPENDED SEDIMENT

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The National Estuarine Research Reserve System (NERRS) Science Collaborative is committed to sharing information about the projects we fund in the most effective way we can. Updates about this project will be communicated through nerrs.noaa.gov, webinars, conferences, and meetings. If you would like to stay in touch with this project, contact our program coordinator Cindy Tufts: cindy.tufts@unh.edu.

For questions about the applied science aspect of this project, contact Matt Ferner, research coordinator, San Francisco Bay NERR: mferner@sfsu.edu

For questions about the collaborative process of this project, contact Christina Sloop, science coordinator, San Francisco Bay Joint Venture: csloop@sfbayjv.org

What's happening?

A team led by the San Francisco Bay National Estuarine Research Reserve (NERR) has received \$379,795 to support marsh sustainability and coastal wetland conservation in the context of accelerating sea level rise. The team is using a structured decision making framework to work with marsh managers, monitoring programs, and scientists to develop and test a standard protocol to assess suspended sediment concentration (SSC) in tidal marshes at NERR sites in California, Mississippi, and South Carolina. In the process, they aim to improve the understanding of sediment dynamics, increase the accuracy of ecological forecasting models, and inform effective tidal marsh conservation and restoration.

Why this project?

Tidal marshes provide many ecosystem services, such as supporting habitats and food webs, mitigating impacts of coastal storms, and improving water quality. As sea levels rise, however, these important habitats and the valuable services they provide are at risk from flooding or "drowning" unless they can maintain their relative elevation through accretion, a process through which sediment suspended in the water accumulates on the surface of the marsh. For marshes to survive, accretion must keep pace with sea level rise.

This issue is of particular importance for future management and restoration of



Researcher surveys marsh sampling elevations at China Camp project site, San Francisco Bay NERR.

marshes in the San Francisco Bay and elsewhere around the world.

The accurate measurement of suspended sediment concentration (SSC) is key to understanding tidal marsh dynamics. However, monitoring programs lack well tested and effective approaches to sampling within marshes, and instead tend to rely on samples collected from areas of open tidal water.

This team is addressing that gap by testing modifications to a sampling method piloted by the United States Geological Survey (USGS) across a variety of systems. They will enter the data from these tests into models used to predict levels of marsh accretion to assess how SSC data collected in marshes through the modified protocol changes the predictive outputs generated by these models. Ultimately, their goal is for the information generated at the study sites to inspire wider use of the new protocol throughout the NERR System and the communities it serves.

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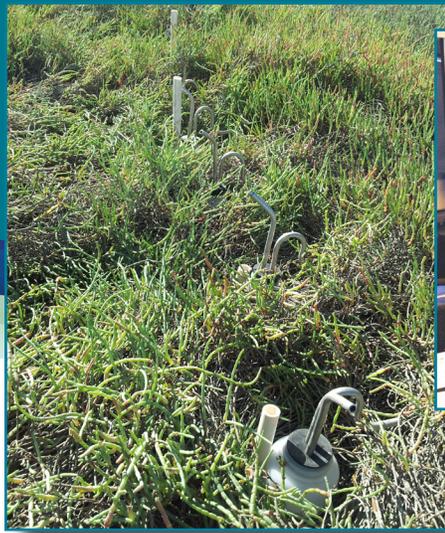
About the funder

The NERRS Science Collaborative puts Reserve-based science to work for coastal communities coping with the impacts of land use change, stormwater, non-point source pollution, and habitat degradation all in the context of a changing climate. Our threefold approach to connecting science to decision making includes:

- Using a competitive RFP, we fund projects that incorporate collaboration and applied science to address coastal management problems identified as priorities for Reserves and their communities.
- Transfer of knowledge: Through our transfer program, the science we fund is shared throughout the NERRS and the communities they serve.
- Graduate education: Through TIDES (Training for the Integration of Decision Making and Ecosystem Science), a non-thesis Master's degree program hosted by the University of New Hampshire, we train the next generation of professionals to link science to coastal decision making.

The program operates by a cooperative agreement between the University of New Hampshire (UNH) and the National Oceanic and Atmospheric Administration.

Learn more at....
[nerrs.noaa.gov/
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Stakeholders participate in hands-on activities and discussion at a kick-off workshop (above). Researchers conduct a trial run of sampling with bottle deployment at China Camp, San Francisco Bay NERR (left).

How will this project work?

The project team will develop, test, and share a standardized suspended sediment concentration sampling protocol in support of more effective marsh management as sea levels rise. To ensure the method will be widely accepted, implemented, and readily understood, the team is including members of the regional and national scientific and tidal marsh management communities in protocol development.

The project is organized into a technical team of applied scientists who are engaged in testing the modified protocol, monitoring, and modeling; stakeholders that include local and regional decision makers and landowners; and a collaboration team that links stakeholder needs and perspectives with the applied science process.

The project team is using a collaborative decision making process that incorporates elements of joint fact finding to engage stakeholders. This process has been designed to ensure sustained communication and incorporate stakeholder expectations and recommendations into protocol design and development, monitoring implementation, and modeling application. The project is organized in four phases:

- Phase 1: Hold a workshop to gather stakeholder input on the modified siphon sampling protocol, establish

working groups, and review sampling locations in marsh plains at the NERR study site;

- Phase 2: Working groups will gather to advise on key questions for implementation. These include sampling height and intensity, testing of the data in the three marsh accretion models, and technical report development;
- Phase 3: Produce a technical report that reviews modeling strategies and interprets model results so as to inform management decision making;
- Phase 4: Hold a final workshop to review the technical report and decide how best to share final results.

Ultimately, the team will generate an analysis of the effects of spatially variable SSC data on marsh accretion model outputs; a comparison of results from three models using a single set of input data; and a technical report intended to serve as a spring board for encouraging widespread protocol use, both around the NERRS and beyond. These products will help marsh managers and monitoring programs at local, regional, and national levels to determine when and where to apply the new protocol and will show how resulting data can be used to predict the future distribution of tidal wetlands under projections of sea level rise.