

INCREASING RESILIENCE TO SEA LEVEL RISE IN COASTAL MARYLAND

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The 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

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What's happening?

Investigators from the University of Maryland have partnered with the Chesapeake Bay National Estuarine Research Reserve (NERR) in Maryland and others to increase the resilience of coastal marsh and communities on the Deal Island Peninsula in the face of sea level rise. With a \$598,645 grant from the NERRS Science Collaborative, the team is using the Collaborative Learning methodology to identify which services provided by marshlands are highly valued by local communities, understand how current management practices impact the marshes' ability to provide these services, and develop a process for stakeholders to work together to conserve and restore marshes for the future. In the process, the team will conduct economic, anthropological, and ecological research to better understand coastal marsh systems and their surrounding communities, develop a strong regional network for future collaboration, and test a model for engaging a range of stakeholders in ecosystem science and decision making.

Why this project?

As sea levels rise along Maryland's coast, marshlands are degraded and lost, taking with them vital services—such as protection from storm surges and inundation—and placing surrounding communities at risk. This vulnerability is intensified by the impacts of historic land use practices. For example, wetland ditching—used from the



This project integrates anthropological, economic, and ecological research approaches to provide information needed to better manage coastal marsh systems and their surrounding communities.

1930s to the 1950s to ostensibly control mosquito-borne disease—may limit the ability of marshes to grow vertically in response to sea-level rise.

While there is an urgent need to address this problem, key stakeholders from different sectors and levels of government lack the collaborative, problem-solving partnerships needed to create cost effective, efficient solutions that optimize the social and environmental tradeoffs between different management choices. These stakeholders also need science-based information about how the marsh's ecological systems function in relationship to the surrounding communities, and what the outcomes of different approaches to marshland management might be.

This project will use restoration of ditch-drained marshes on the Deal Island Peninsula as a case study for conducting the necessary science, developing partnerships, and testing a stakeholder-driven process for developing management strategies that protect the resilience of marshlands and the communities that depend on them.

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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 in the context of a changing climate. Our threefold approach to connecting science to decision making includes:

- **Funding:** We award an average of \$4 million annually to projects that incorporate collaboration and applied science to address a coastal management problem.
- **Transfer of knowledge:** We are committed to sharing the knowledge generated by the local, place-based research we fund. If you're interested in following this project, contact cindy.tufts@unh.edu.
- **Graduate education:** We support TIDES, a Master's of Science program at UNH that provides the skills needed to effectively 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.

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Detailed field-scale investigations will explore the ecological processes controlling the ability of marshlands to provide services that are important to a wide range of stakeholders.

How will this project work?

This project will build on years of work from key stakeholders and groups like the Coastal Wetlands Initiative Workgroup, which coordinates regional efforts to restore ditched-drained marsh ecosystems. From this foundation, the project team will use collaborative learning techniques so that the perspectives of a range of stakeholders will guide the research and outreach processes. The collaborative learning activities will include workshops, stakeholder participation in science, and experiential learning. The workshops will be designed so that the project team and stakeholders can iteratively learn from each other about the social and ecological services provided by marsh ecosystems and the risks and benefits of various options to restore marshes.

The applied science investigators will conduct anthropological, economic, and ecological analyses of how disturbances such as sea-level rise impact the resilience of the integrated social and ecological systems of the Deal Island Peninsula. They will collect intensive ecological field data on marsh hydrology, vegetation, mosquitoes, fish, birds, and soils. They will develop cultural models using interviews, surveys, and

workshops to better understand the relationships between social and ecological services and resilience. The economics research will use a benefit and risk-ranking assessment to explore priorities for investment of resources that promote resilience.

The team will work with stakeholders to identify social and ecological services to study through the collaborative learning process. Then they will use integrated anthropological, economic, and ecological research to explore the current and historic status of these services, how they vary across diverse marshes and communities, how they are impacted by marsh management and restoration, and how they are expected to be affected by sea-level rise. These investigations will examine options to adapt decision making related to marsh management, restoration, and conservation to improve the system's ability to provide these services.

At a final conference, the team will present research results and recommendations to sustain the relationships built throughout the project and the long-term resilience of the Deal Island Peninsula.