

Great Bay Eelgrass Resilience Project

Research Updates



This is the first update about the recently launched Great Bay Eelgrass Resilience Project. Periodic updates like this one will help keep communities around Great Bay and others informed and engaged, and will be used to provide a preview of results as they begin to emerge. [Sign up here](#) to receive future updates.

~ Project Updates ~

New collaborative research project launched!

After nearly a year of planning, consultations, and proposal writing, the Great Bay Eelgrass Resilience Project was officially launched in fall of 2021. Here are the basics of the project.

- **Full project title:** Resilience and positive feedbacks: Water quality management and eelgrass health in the Great Bay Estuary, NH/ME
- **Project timeframe:** Fall 2021 - Fall 2024
- **Partners leading the project:** University of New Hampshire, Piscataqua Region Estuaries Partnership, and the Great Bay National Estuarine Research Reserve.
- **Funder:** NOAA via the [NERRS Science Collaborative](#)
- **Primary objectives:**
 - Improve understanding of what drives eelgrass health and resilience
 - Fill science gaps to help adaptively manage eelgrass and nitrogen in Great Bay.

The team has assembled a Project Advisory Committee that will provide input throughout the project to ensure results are relevant, trusted and useful. The group includes representatives from the towns around Great Bay as well as the agencies and organizations involved in protecting water quality and habitats. The current advisory committee membership is [here](#). If your town or organization would like to participate more actively in the project, please contact Lynn Vaccaro (contact info is at the bottom).

The Advisory Committee met in January to discuss the project's collaborative approach and plans for modeling water flow in Great Bay. The group will meet again on March 25 to discuss plans for the upcoming field season. We'll continue to share highlights of Advisory Committee meetings through Updates like this one; please reach out to the project team or an Advisory Committee member if you'd like more detail.

Project updates and final products will be posted on our [project webpage](#).

~ So What? ~

Why research eelgrass in Great Bay?

Seagrasses are a vital component of healthy estuaries here in New England and throughout the world. They are rooted, flowering plants that grow underwater and are typically submerged, even at low tide. Nearly all the seagrass beds found in Great Bay are composed of a single species commonly known as eelgrass, *Zostera marina*.

When healthy, eelgrass forms dense underwater meadows that provide essential habitat and oxygen for fish and shellfish. The roots of eelgrass plants hold sediment in place, while the long leaves slow waves and tidal currents, causing suspended sediments to settle out and helping prevent coastal erosion.

Unfortunately, eelgrass has been declining in Great Bay over the past 20 years, which is one of the factors that led EPA to develop the Great Bay Total Nitrogen General Permit in 2020. This [2 minute video](#) describes eelgrass trends locally, and this [1 minute video](#) visually compares healthy and less healthy eelgrass meadows in Great Bay.

Great Bay is not the only place struggling with these issues - eelgrass populations are declining in many parts of the US. While eelgrass can handle a wide range of temperatures, water depths and salinity levels, the plants, especially seedlings, need high light levels. In many coastal areas, excess sediments and nutrients alter water quality, limiting the amount of sunlight that can penetrate the water, which in turn slows or prevents the growth of eelgrass. Other factors, such as intense storms and diseases, can also damage eelgrass meadows.

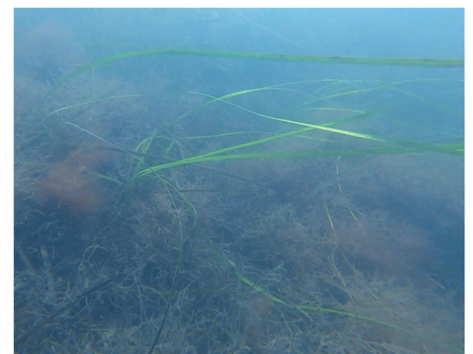
The Great Bay Eelgrass Resilience project will closely examine the connections between eelgrass health,

water quality and water flow patterns in Great Bay. The team will look at these relationships from two angles. First, by looking for spatial patterns and correlations between eelgrass health and different physical and chemical variables, we will try to tease out what factors seem to be impacting growth locally. Second, we will use state of the art approaches to measure how eelgrass can affect the water it lives in, potentially improving water quality and increasing its own resiliency. For example, to what extent does eelgrass stimulate denitrification in the sediment, promote the removal of nitrogen from the water, and improve water clarity.

Thanks to significant upgrades to wastewater treatment plants around Great Bay, nitrogen inputs to the Bay have been declining. With water quality improving, eelgrass may be better able to recover and expand, leading to further improvements in the Bay. Although we are not sure what this project will reveal, we are eager to collaborate closely with local and state decision makers to make sure we are learning from and contributing to the ongoing management of Great Bay. For example, we hope this research will spark new ideas for restoring eelgrass meadows, help prioritize future investments, and help adaptively manage the Bay's water quality.



A. A healthy eelgrass meadow



B. A sparse eelgrass bed with abundant seaweeds

Great Bay Estuary, NH. Credit: Chris Peter, GBNERP

Learn more about eelgrass in Great Bay

- [A Case for Restoration and Recovery of *Zostera marina* L. in the Great Bay Estuary](#)
- [Status of Eelgrass, State of the Estuary Report, 201](#)

~ Get to Know Our Team and Advisors ~



Project Lead: Bill McDowell, UNH

As project lead, Bill McDowell will provide overall scientific leadership for the Eelgrass Resilience project team. Bill is an ecosystem scientist and professor in UNH's Department of Natural Resources and the Environment. He also directs UNH's [Water Quality Analysis Lab](#). Bill and his lab group study water quality trends and biogeochemical cycles in streams, forests and watersheds, with a special focus on how people have impacted nitrogen cycling. He leads long term research programs in the Lamprey River in NH as well as in the Luquillo Experimental Forest in Puerto Rico. In his free time, Bill likes to bicycle ride, fish, and do small construction projects. For this project, Bill is most excited about using an ecosystem science perspective to understand how water quality and aquatic plants interact to protect an important habitat.



Project Advisor: Gretchen Young, City of Dover

As a member of the Project Advisory Committee, Gretchen Young will help this project stay connected to all the work that the cities and towns are doing to reduce the amount of nitrogen that flows into Great Bay. Gretchen has worked for the City of Dover's Community Services Department for 7 years, and currently serves as their Environmental Projects Manager. Gretchen also leads the Municipal Alliance for Adaptive Management (MAAM) and the Seacoast Stormwater Coalition (SSC), which help municipalities coordinate efforts to protect water quality. In her free time, Gretchen and her family like to take their three year old golden retriever on hikes and other adventures in the area. For this project, Gretchen is most excited about continuing to understand the connections between the health of the Great Bay and the community surrounding it, and then implementing plans of action that improve water quality in creative ways.

~ Stay Engaged ~

Attend the Bayview Lecture: *Eelgrass & the Nitrogen Cycle: Opening the Black Box in Great Bay Estuary*, presented by project team member Anna Lowien on March 23, 2022. You can learn more and [register here](#).

[Sign up here](#) to receive future Research Updates. If you have questions or ideas for the project, reach out to a member of the [Project Advisory Committee](#), or contact Lynn or Cory.

Lynn Vaccaro and Cory Riley

Co-collaborative leads for the Eelgrass Resilience Project

Great Bay National Estuarine Research Reserve

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