Sea Grant
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New York Sea Grant Research: 2026 Ongoing Projects

A member of the NYSG field team samples young-of-year (born in the current year) northern pike in the wetlands of the upper St. Lawrence River in NY. SUNY ESF researchers are studying how juvenile pike are impacted by wetland habitat conditions. (Credit: Emily Arsenault)

Ben Spitz (a SUNY ESF graduate student and member of the NYSG field team) holds an adult northern pike captured in annual netting surveys by the Thousand Islands Biological Station in NY. (Credit: Emily Arsenault)

Characterizing Vegetative Zones as Functional Refugia to Improve Ecosystem Resilience and Fish Reproduction in Coastal Wetlands *(R/CE-36, Dr. Emily Arsenault, SUNY ESF)*

Coastal wetlands are an important part of both aquatic and terrestrial ecosystems, providing key resources like food and refuge for local fauna. In New York, these wetlands face threats from invasive aquatic plants and changes in precipitation, temperature, and dam regulation, which affect the water-mediated exchange of materials (hydrologic connectivity) with surrounding waterbodies. This research project seeks to investigate how wetland habitat conditions and invasive plants affect the diet, growth, and habitat use of juvenile northern pike in the St. Lawrence River, where pike are native, and in Cranberry Lake, where they are invasive. Determining how northern pike use habitats is crucial to understanding the environmental health of the complex food web present in many coastal wetlands. By evaluating how hydrology, invasive plants, and oxygen levels influence the behavior of pike in these different environments, researchers aim to gain a deeper understanding of how these fish impact the local ecosystem and how they are affected by changes in water quality, the growth of invasive aquatic plants, and interactions with other species. This project focuses on identifying juvenile pike habitat use and ecological characteristics in coastal wetlands to determine which conditions are most favorable; evaluating how wetlands help sustain coastal food webs by determining how much food young northern pike consume; and determining how seasonal flooding and invasive aquatic plants influence how low-oxygen conditions develop in safe (refuge) habitats. Researchers visited several wetland sites across two waterbodies and throughout the annual hydroperiod (the seasonal flooding period that many coastal wetlands experience in the spring, summer, and fall). During these visits, researchers collected fish, benthic invertebrates, and zooplankton samples; surveyed wetland vegetation; and logged water quality information. Analysis of collected data and data collection are ongoing. Early preliminary results identified a core reproductive habitat in Cranberry Lake for the first time. Other preliminary results suggest a shift in spawning to earlier in the spring in Cranberry Lake. Results of this research will benefit anglers and fishery managers.

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A researcher from the Chen Lab of Fisheries Science and Management at Stony Brook University holds a juvenile striped bass against the Hudson River in NY. Researchers are developing a model to understand the dynamics of the HRE-NYB ecosystem. (Credit: Natalia Castro)

Developing an End-To-End Ecosystem Model to Inform Management of Hudson River and New York Bight Ecosystem *(R/FBF-27, Dr. Yong Chen, Stony Brook University)*

The Hudson River Estuary (HRE) acts as a vital corridor linking critical habitats in the Hudson River and the New York Bight (NYB). As fisheries managers adopt Ecosystem-Based Fisheries Management (EBFM) approaches amid environmental and manmade stressors, managers must view the HRE and NYB as a single, integrated ecosystem. Understanding how these areas interact is vital for meeting management goals and avoiding ecological setbacks. This project is focused on developing and testing an end-to-end ecosystem model (EEM) that simulates the dynamics of the HRE-NYB ecosystem. An EEM with physical and biological processes like the one being developed in this project offers the ability to understand the complex dynamics of estuarine ecosystems. It can be used to explore how long-term changes in key environmental variables may influence ecosystem dynamics, providing methods for supporting ecosystem-based fisheries management and marine conservation in the HRE-NYB ecosystem. By analyzing data collected during the Hudson River Biological Monitoring Program, the researchers identified the key drivers and stressors that regulate ecosystem dynamics. The results will be used to develop an improved ecosystem model to track trophic shifts and interactions between low trophic level species (organisms that form the foundation of food webs) and high trophic level species (organisms near the top of the food webs). Researchers are working to compile the information and data to structure the model by identifying potential environmental drivers and distressors and developing a key species list. They are also identifying the statistical analyses needed for developing the proposed EEM. This ongoing process involves preparing data input for the model and consulting with the architects of a physical-biogeochemical model for ideas on coupling the two models together. The team is also developing an outreach program to demonstrate how this model could be used to improve fisheries management. The team plans to share their work with other researchers and policymakers once the model is ready. Preliminary results show that this EEM will be able to inform stock assessment for fisheries in both qualitative and quantitative ways using an ecosystem-based approach. This will benefit commercial and recreational fisheries.

A Queens, NY, road flooded after a heavy rainfall. Stony Brook University researchers are working to improve risk communication for similar coastal communities. (Credit: Martin Grillo)

Improving Risk Communication for Extreme Rainfall Events in Vulnerable Coastal Communities: A Case Study for Jamaica Bay *(R/CHD-20, Dr. Christine Gilbert, Stony Brook University)*

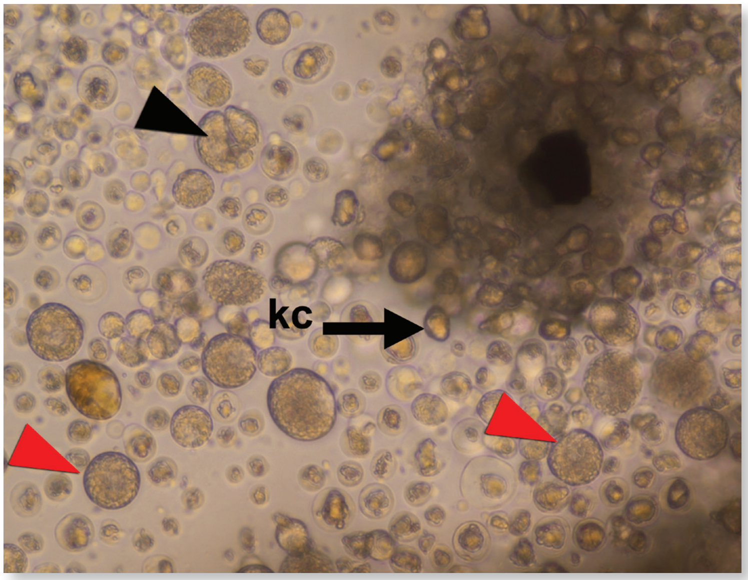
The Jamaica Bay region of New York has been historically vulnerable to the impacts of extreme weather. Flooding events (such as those caused by 2012's Hurricane Sandy) and flood risks from compound events (like the extreme rainfall coupled with storm surge seen during 2022's Winter Storm Elliott) are especially harsh on Jamaica Bay and similar coastal communities. Older or inadequate infrastructure, proximity to bodies of water, and lack of resources mean that coastal communities suffer excessive damage due to extreme rainfall, storm surges, or high tides.

While concerns may seem straightforward, it can be challenging to adequately communicate flood risk in a way that addresses the needs of the community and remains accessible. New communication strategies, particularly those co-developed in partnership with community members, are crucial for mitigating the risks to the public from future flood events. Improved and updated risk communication increases the possibility of communities being more prepared.

This project applies Jamaica Bay neighborhoods as a case study for examining how to accurately communicate hazards (such as flooding, infrastructure damage, and unsafe transportation) and how to improve communication strategies for coastal communities. Researchers are developing a combined approach that utilizes environmental modeling to build on a concept of risk communication called "storylines" — presenting problems and solutions as a human-centered narrative to inspire engagement and action.

So far, data collected from focus groups suggest that residents experience flooding as a part of everyday life in Jamaica Bay. Most participants already use multiple forms of technology to access weather information, including TV and the internet. Historically extreme storms such as Hurricane Sandy have a continued legacy in the area, with participants regularly using it as an example during discussions; this suggests that future extreme weather events may have a similar negative impact.

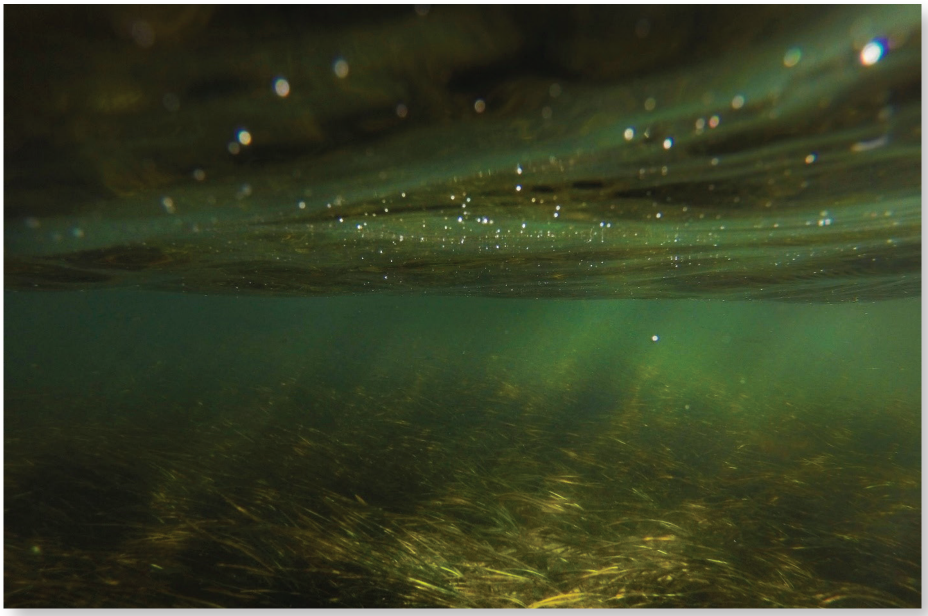
The research team continues to engage community stakeholders in Jamaica Bay to evaluate current knowledge around risk and develop risk communication strategies. Eventually, they will test and refine the storyline toolkit with the public, which will be done by working closely with the Jamaica Bay Community Advisory Board and interested residents. The final goal is to communicate findings through practical application, community outreach, and peer-reviewed publications.



Stony Brook University investigators are helping to identify risk factors associated with shellfish disease outbreaks such as the bay scallop Marosporida (BSM), an emergent parasite of adult bay scallop seen here in a mixture of crushed scallop kidneys. Red and black arrowheads represent single and dividing BSM, respectively. The notation "kc" refers to kidney concretions — also known as stones. (Credit: Emmanuelle Pales Espinosa)

Characterization and Dynamics of Bay Scallop Marosporida (BSM), an Emergent Parasite of Argopecten Irradians Irradians *(R/FBM-45, Dr. Emmanuelle Pales Espinosa, Stony Brook University)*

Adult bay scallop *(Argopecten irradians* subpsp. *irradians)* populations in Long Island's Peconic Estuary have suffered severe mass mortality events since 2019. These mortality events are now associated with annual outbreaks of a new class of apicomplexan parasite, dubbed bay scallop Marosporida (BSM), that disrupts the tissues of infected animals. So far, researchers know that exposure to heat promotes the growth of the parasite, accelerating the infection and subsequent death of the affected animal. However, since the ecology, biology, distribution, environmental dynamics, and transmission of this parasite are largely unknown, it is crucial to collect more information to understand how to mitigate the damage it causes and prevent its spread to unaffected regions. This project seeks to learn about the basic aspects of the biology and ecology of this emergent parasite. Researchers are studying key traits of how this parasite functions to understand how BSM outbreaks happen, how their effects might be mitigated, and how to prevent spread to uninfected scallops. To do this, the team must determine BSM distribution, environmental dynamics, and potential reservoirs; evaluate how temperature regulates disease dynamics and the persistence of the parasite in the environment; assess whether BSM can be directly transmitted from diseased to unaffected scallops; and characterize BSM's genetic diversity throughout its known range. Preliminary results suggest that the environment does not represent a source of infectious parasite cells capable of infecting unaffected scallops. However, there is evidence of successful transmission of BSM to uninfected scallops via exposure to infected kidney tissues. These initial findings support the idea that the main (and possibly sole) source of BSM in the environment is from infected scallops and not from any other external factors. Scallops from North Carolina showed a higher prevalence of positive testing for the parasite, which suggests that this scallop lineage may be more susceptible to the disease. Analysis is ongoing, and samples are still being processed. The results of this research will be beneficial to the scallop industry.



Eelgrass *(Zostera marina)* can be found in the Long Island South Shore Estuary. The seagrass canopy (made up of the leaves of the plants) soaks up CO2 from the water column as it photosynthesizes. A NYSG-funded research team is attempting to quantify the amount of CO2 that eelgrass stores over time. (Credit: Kaitlyn O'Toole)

Quantifying the Carbon Sequestration Stocks, Sources and Accumulation Rates of Eelgrass *(Zostera marina)* in the South Shore and Peconic Estuaries of Long Island *(R/CMC-22, Dr. Bradley J. Peterson, Stony Brook University)*

Eelgrass *(Zostera marina)* is a marine plant that grows in clusters underwater along shallow coastal areas. Eelgrass meadows not only serve as important habitats, nurseries, and a food source for marine fauna, but also have an important function in filtering the water. During the process of photosynthesis, eelgrass naturally removes carbon dioxide from the water and stores it. This natural process might offer solutions for marine challenges like ocean acidification, which is caused by excess carbon dioxide in the atmosphere dissolved into seawater. The objective of this project is to quantify the carbon sequestration rates of eelgrass found in both the South Shore and the Peconic Estuary system on Long Island, including stocks, sources, and accumulation. Through collecting, processing, and analyzing samples, the research team is working toward evaluating the carbon dynamics of eelgrass beds. By analyzing sediment core samples collected from 50 sites across the target area, researchers are attempting to quantify eelgrass meadow sediment carbon stocks and estimate the rates of carbon storage in eelgrass meadows. Preliminary results from the sediment core samples suggest organic carbon values close to what is expected from marine sediments, with some variation both geographically and across sediment depths. Researchers are continuing to examine potential abiotic and biotic environmental factors that may explain the variation between different sample sites. Lead-210 dating (sediment dating) is still in progress, but initial results suggest extremely low sediment deposition rates in large regions of the project's area. This might imply older stocks and slower carbon accumulation rates than anticipated, which may mean that researchers will have to use a different process (such as radiocarbon dating) that is more suitable for evaluating older material. The final results of the project will be useful to the NYSDEC for assessing the use of eelgrass meadows in ocean acidification mitigation.

Restoring cisco populations in Lake Ontario is the focus of an international (U.S./Canadian) collaborative effort. Recent NYSG research has provided critical information on cisco population genetics and current and potential breeding locations. (Credit: Ellen George)

Navigating Lake Ontario Coregonine Restoration: Analysis of Contemporary and Future Food Web Structures *(R/FBF-28, Dr. Lars Rudstam, Cornell University)*

Many factors threaten native species in aquatic ecosystems, including aquatic invasive species (AIS), habitat loss, and contaminant pollution. Restoring native species has the potential to mitigate both declines in primary production and disruption from invasive species, leading to improved food web function. However, this process and its potential repercussions have never been evaluated for Great Lakes ecosystems. This research project intends to use an innovative food web modeling approach, Linear Inverse Modeling (LIM), to quantify the potential food web effects of native species restoration in Lake Ontario. The proposed model would provide a visualization of what would happen to contemporary and future food webs if restoration were to move forward in the area. Specifically, the research team will use the modelling approach to test the food web effects of restoring native coregonine species (ciscoes).

So far, researchers have developed the preliminary Lake Ontario food web model structures, a process that involved identifying species for the model, evaluating food web data availability, and identifying key food web metrics. Now that this step is complete, researchers plan to create a future food web to visualize Lake Ontario post-restoration. They also formed a technical working group and a technical advisory panel to explore potential fishery management benefits from the application of the model. Keeping with the goal of engaging in outreach and communication about this project, researchers plan to present their work at workshops and to stakeholders both in the Great Lakes and across New York. These outreach efforts are intended to promote collaboration and engagement between different agencies and stakeholders, as well as raise awareness and interest in native species restoration. The team plans to potentially expand this project to explore the effects of restoring other native species. The results of the project are expected to benefit fisheries managers, recreational anglers, and the local communities that anglers visit.

New York Sea Grant (NYSG) is a partnership program of the State University of New York, Cornell University, and the National Oceanic and Atmospheric Administration that delivers science-based solutions for environmental stewardship, economic vitality, and resilience across New York's marine and Great Lakes regions.

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