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2025 Completed Projects

New York Sea Grant Research:

Results and Impacts

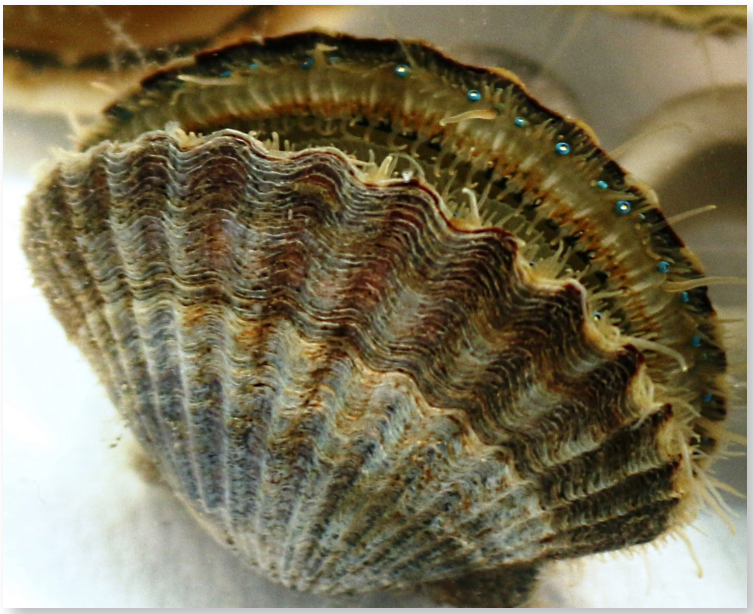
Against All Odds: Development of Bay Scallop Strains That Resist Temperature and Disease Stress *(R/XG-34, Dr. Bassem Allam, Stony Brook University)*

Over the past decade, adult bay scallop *(Argopecten irradians* subpsp. *irradians)* populations in eastern Long Island's Peconic Estuary have suffered mass mortality events due to an endemic apicomplexan (single-celled) parasite known as bay scallop Marosporida (BSM). Exposure to heat accelerates the animal's infection and subsequent death. The overarching objective of this research was to identify scallops that better resist infection by BSM and temperature stress to help restore local bay scallop populations.

To evaluate whether large-scale mortality events have resulted in survivorship being a heritable trait, the research team compared the performance of adult scallop offspring that had little exposure to mortality events with those that had. Offspring from both a high mortality and a no mortality strain were deployed in New York (Peconic Bay) and Massachusetts (Martha's Vineyard) and monitored for temperature changes and dissolved oxygen. At the same time, seed scallops from two New York aquaculture strains underwent temperature challenge experiments.

Researchers also worked to identify genetic markers associated with enhanced scallop performance. This was done through restriction site-associated DNA sequencing (RADSeq), which tracked how the genetic composition of wild and aquaculture groups changed over the course of a summer mortality event. This analysis showed significantly higher survivorship in wild scallops. Survivors from the aquaculture line were found to be genetically similar to wild survivors, indicating that, over time, all survivors develop a similar genetic resistance to BSM and environmental stressors.

Finally, researchers identified and collected scallop lines showing the highest field survivorship. Future yield will be evaluated to determine whether survivability is heritable and to develop resistant strains for future enhancement and aquaculture programs.



An adult bay scallop *(Argopecten irradians)* is set up for an experiment evaluating the effect of temperature on disease development and mortality in the Stony Brook University Marine Animal Disease Lab. A NYSG-funded project is trying to identify a scallop line resistant to both disease and heat stress. (Credit: Bassem Allam)

Research results showed that the Martha's Vineyard scallop line was particularly resistant to parasite infection. Scallops that were spawned in the fall experienced minimal disease and mortality levels. A key outcome was the identification of scallop stocks with high survivorship under stressful summer conditions. The research also identified genetic markers associated with survivorship, which will aid in targeted stock selection in the future. All findings offer renewed hope that strong, resilient scallop populations can recover in New York.

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Participants use VR headsets to escape a virtual rip current during a July 2025 event at the Long Island Aquarium in Riverhead, NY. Hofstra researchers are using new technology to improve Spanish-language materials on rip currents. (Credit: Jase E. Bernhardt)

Enhancing Rip Current Risk Communication in English and Spanish *(R/CHD-16, Dr. Jace Bernhardt, Hofstra University)*

Rip currents are one of the most dangerous hazards facing beachgoers. While there are a variety of educational materials on rip currents available in English, Spanish-language material is not as easily accessible. Existing materials translated into Spanish may not be accurate due to poor translation or inaccurate word choices, leading to limited comprehension and increased risk.

For this study, researchers evaluated the effectiveness of brochures and virtual reality (VR) simulations as tools for outreach. The team created and deployed a VR simulation to assess alternative, immersive methods for conveying rip current safety information to Spanish-speaking audiences. The team also examined how effective existing rip current public safety materials are in communicating with Long Island Latino populations. The researchers reviewed National Weather Service (NWS)-published safety brochures available in both English and translated into Spanish. The goal was to test how perceptions and comprehension of text and visual information were perceived by English and Spanish users. Then, the researchers collaborated with local Latino organizations to design a culturally relevant survey evaluating how participants perceived translated technical terms and literal translations in the brochures. Survey results were used to evaluate how rip current communication strategies can be improved in culturally relevant contexts. Researchers also examined how effective the VR simulations were in communicating rip current knowledge to Long Island Latino populations. The VR headset was used to present beach hazard information in a non-text-dependent way, potentially bridging any language or literacy difficulties.

Preliminary results show that the VR demonstrations have helped users understand both the dangers of rip currents and the steps beachgoers can take to escape them. Survey results indicated that both the English and Spanish versions of the NWS brochure were considered effective by participants, but could be improved further. Spanish speakers reported problems with the Spanish translation, especially when it came to terms related to rip currents. Safety hazards not being communicated as intended to non-English speakers was also identified as a problem. The results of this research were used by the NWS and other agencies to update their rip current safety brochures.

Anh Nyugen (a Ph.D. student with the Chen Lab of Fisheries Science and Management at Stony Brook University) measures juvenile fish. A research team is studying stock recovery methods for American shad in the Hudson River. (Credit: Natalia Castro)

Evaluating the Changing Biogeography of American Shad in a Changing Hudson River Ecosystem *(R/FBF-26, Dr. Yong Chen, Stony Brook University)*

The American shad is a significant species for both recreational and commercial fishing in the Hudson River Estuary (HRE). Once plentiful, the shad population had severely declined by the early 2000s, leading the New York State Department of Environmental Conservation (NYSDEC) to impose a fishing moratorium in 2010. Over a decade later, the stock has still not recovered.

This project studied the changes in the timing and location of American shad spawning in the HRE and how environmental conditions and fishing pressure may be affecting their recovery. The researchers compiled shad and environmental data from the Hudson River Biological Monitoring Program (HRBMP) and other sources. By monitoring shad egg and larvae distribution,

determining how environmental conditions affect them, and using modeling and simulations to determine shifts in salinity, researchers attempted to investigate how these factors affect stock recovery.

Project results showed a trend towards northward egg distribution and a shift towards laying eggs at shallower depths, with salinity being the most significant factor for these trends. Results also showed that key spawning areas are concentrated around river kilometer 200 and 245, with sandy, shallow habitats being particularly important. Model simulations of larval shad abundance suggest that external forces such as offshore fishing or ocean warming may play a larger role in shad population dynamics than previously thought. Simulations showed that even small increases in fishing pressure outside the HRE can sharply reduce the spawning potential of this already-declining population. This study underscores the importance of preserving sandy, shallow habitats and maintaining minimum fishing mortality outside the HRE to support the recovery of American shad stock. The results suggest that a moratorium on the American shad fishery in the HRE may not be enough to support stock recovery without also addressing fishing pressure outside the HRE.

In an effort to help prevent erosion, signage encourages beachgoers to keep off coastal bluffs. A NYSG-funded project is gathering information that will allow for improved prediction of bluff erosion that informs planning by coastal communities. (Credit: Cornell Extension Marine Program)

Erosion and Recession of Coastal Bluffs: Characterizing Erodibility of Bluff Materials under Various Land- and Sea-Based Conditions *(R/CCP-20, Dr. Ali Farhadzadeh, Stony Brook University)*

Bluffs – soft cliff formations along coastal areas – are a common feature of sandy beaches. Composed of soft layers of sediment, rocks, and boulders, bluffs help support coastal stability while providing a habitat for local flora and fauna. However, their composition means that they are prone to erosion, which can lead to bluff failure. Long Island's coastal bluffs are eroding rapidly, which poses a significant risk to public safety, especially for bluff-top and bluff-adjacent communities and properties. By understanding the technical reasons that might cause bluff failure, scientists and community members can better prepare for and prevent problems before they happen.

This project studied some of the processes and factors involved in bluff erosion. The project team identified and quantified some of the sea- and land-based processes that lead to coastal bluff erosion using laboratory experiments. The expected result is a modeling framework for more accurate predictions of coastal bluff recession. The team conducted geotechnical testing of soil samples from two bluff shorelines and conducted laboratory experiments to simulate daily wave movement, the heights reached during storms, and bluff behavior under certain water conditions. Meanwhile, the investigators tested soil properties to see how factors like density and geomechanical makeup could influence erosion. Researchers also used historical recession data collected from Long Island and Great Lakes bluffs to test the model. This included bluff recession measurements, wave and storm surge records, and soil property data.

Results showed that the mechanical behavior of soil, moisture content, and density are the highest predictors of erodibility. Bluffs made of poorly compacted sand eroded and receded much more quickly than those with greater density. Storm surges and increased wave activity increase the water content of bluffs, weakening them from the inside out. This offers potential evidence of how storms might accelerate or cause bluff failure in real-life scenarios. Attempts to pinpoint a process-based model to determine an erodibility parameter for soils are in progress, but need more time and study. This project also produced an easy-to-understand fact sheet offering guidance on reducing erosion risks and protecting bluff-top properties.

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.