

# BUILDING COASTAL RESILIENCY WITH LIVING SHORELINES

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## WHY IT MATTERS

Living shorelines are nature-based approaches for shoreline protection and are the default stabilization method for tidal shorelines in Virginia. In addition to stabilizing shorelines, they conserve and restore natural wetland habitats and provide valuable ecosystem services. Living shorelines use plants, sand, and sometimes rock to protect coastlines by mimicking natural shorelines. Unlike hard structures like riprap or bulkheads, living shorelines create habitats that enhance coastal resiliency, such as tidal marshes and oyster reefs. These features reduce erosion, filter pollutants, support biodiversity, and absorb wave energy, buffering communities from storm surges and flooding.<sup>1</sup>

There is a definitive, mutually beneficial relationship between ribbed mussels and living shorelines. Young ribbed mussels land on low marsh wetland grasses and nestle themselves into the root systems, filter nitrogen pollution from the water column, replenish the sediment, and stimulate wetland growth. This reduces the likelihood of excessive nitrogen in the water body, reducing opportunities for harmful algal blooms to thrive and creating healthier ecosystems. The byssal threads mussels use to anchor themselves into wetland grasses and oyster structures installed at living shorelines create strong webbing that reduces erosion. Erosion along fringe marshes is a key threat to wetlands throughout the coastal rivers of Virginia. Further research on their lifecycle and restoration potential will greatly benefit our capacity to enhance

shoreline resilience and ecosystem health.<sup>2</sup>

## CURRENT LANDSCAPE

There are technical and financial assistance programs available to residents to assist with the installation of living shorelines, but these programs are currently insufficient to meet the statewide need for implementing resilient practices to protect tidal shorelines.

The Virginia Conservation Assistance Program (VCAP) is a helpful program but is not available to all citizens. Landowners are only potentially eligible for funding if they live in a city or county with a participating Soil and Water Conservation District. The funding is also not available for sites with significant fetch, where wind can travel across open water to create large waves, limiting the types of projects that can be funded.

The Shoreline Erosion Advisory Service (SEAS) offers free technical assistance to private landowners and localities in Virginia with erosion problems. The work of SEAS staff had previously been focused on tidal areas of Virginia, however, SEAS services are now available in non-tidal areas of the state as well. The staffing levels at SEAS have remained the same in recent years even as their scope of work (including technical assistance, site investigations, written reports, plan review, and construction inspections) has increased. SEAS staff are critical to helping landowners make informed decisions on managing their shorelines and disseminating information on what is required under state law.

Berkeley Plantation Living Shoreline - Charles City, VA

Photo provided by James River Association



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Currently, there are two primary barriers to more use of ribbed mussels in shoreline restoration. One is the absence of mussel research and model projects. Secondly, there is no hatchery in Virginia where ribbed mussels can be sourced for living shoreline projects. Researchers at the Virginia Institute of Marine Science are in the early stages of creating a ribbed mussel hatchery that will need consistent financial support to complete this project.

## OPPORTUNITIES

A statewide Living Shoreline grant program for landowners seeking to install living shorelines to restore their marshes and protect their properties from erosion would help incentivize the rate of installation of living shorelines, fill the gap not covered by VCAP, and support implementation in vulnerable coastal communities that lack resources to finance shoreline stabilization solutions. Such a program would rely on state funding to fill existing funding gaps and focus on the implementation of large-scale flood resilience projects.

This program would greatly benefit from funding for ribbed mussel research by the Virginia Institute of Marine Science (VIMS) to quantify the phosphorus and nitrogen removal potential of mussels and support the development of a mussel hatchery to grow ribbed mussels for transplanting into living shorelines in Virginia. VIMS relies on state funding for such projects.

Two additional DCR-SEAS Full Time Employees (FTEs) would give dedicated capacity to the program to support property owners and further the use of living shorelines.

## ENDNOTES

1. Bilkovic, Donna M., Robert E. Isdell, Amanda G. Guthrie, Molly M. Mitchell, and Randolph M. Chambers, (2021) "Ribbed mussel *Geukensia demissa* population response to living shoreline design and ecosystem development" *Ecosphere* 12(3):e03402. 10.1002/ecs2.3402
2. Bilkovic, D. M., M. M. Mitchell, R. E. Isdell, M. Schliep, and A. R. Smyth, (2017) "Mutualism between ribbed mussels and cordgrass enhances salt marsh nitrogen removal," *Ecosphere* 8(4):e01795. 10.1002/ecs2.1795

## TOP TAKEAWAYS

Living shorelines are nature-based approaches for shoreline protection and are the default stabilization method for tidal shorelines in Virginia. They are enhanced by ribbed mussels that settle on low marsh wetland grasses, filter water pollution, and support shoreline resilience.

Virginia Conservation Assistance Program (VCAP) and the Shoreline Erosion Advisory Service (SEAS) provide funding and technical support for living shorelines.

A statewide Living Shoreline grant program would incentivize landowners to install living shorelines and fill the gap not covered by VCAP.