



Living Shorelines: Barriers and Promotions

Accomack County, VA

2019

Authors

Amy Belcher

Rhiannon Bezore*

Michelle Covi*

Wie Yusuf

*Virginia Sea Grant

Old Dominion University, Norfolk, VA

Acknowledgment of Funders

This RAFT product was created with funding from:

Virginia Environmental Endowment.

We are grateful to these funders for supporting various phases
of The RAFT from 2015-Present.

Anonymous

Environmental Resilience Institute at the University of Virginia

National Fish and Wildlife Foundation

National Oceanic and Atmospheric Administration*

School of Architecture at the University of Virginia

Virginia Coastal Zone Management Program*

Virginia Environmental Endowment

Virginia Sea Grant Climate Adaptation and Resilience Program

For more information visit The RAFT website: raft.ienvirginia.edu

** The RAFT implementation on the Eastern Shore, Task #92.03 was funded, in part, by the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA17NOS4190152 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended. The views expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Department of Commerce, NOAA, or any of its sub agencies.

The views expressed in The RAFT's various products are those of the authors and do not necessarily reflect the views of any of the funders mentioned above.

Key Recommendations to Promote Living Shorelines for Accomack County, Virginia

County Initiatives

- Presentations for elected/appointed officials (invite VIMS or Master Gardeners)
- Demonstration site on public land
- Distribute educational materials at demonstration site or other events
- Reduce landowner costs through grants and/or low interest rate loans

Advocacy Group (i.e. Master Gardeners)

- Educational information/classes
- Reach out to coastal landowners on a one-on-one basis
- Send promotional information/presentations to HOAs and community groups
- Recognition program, such as a yard flag
- Act as agent in the permit process for landowners
- Host a professional networking event for contractors, engineers, & landscapers
- Encourage a local certification program for contractors

Useful Resources (hyperlink and URL)

- [Northern Neck Living Shorelines Initiative](http://www.northernneck.us/living-shorelines-initiative/)
 - <http://www.northernneck.us/living-shorelines-initiative/>
- [Northern Neck Master Gardeners: "Protecting Your Shoreline from Erosion"](http://www.nnmg.org/shoreprotect.asp)
 - <http://www.nnmg.org/shoreprotect.asp>
- [VIMS CCRM: "Living Shoreline Implementation: Challenges and Solutions"](http://ccrm.vims.edu/publications/pubs/rivers&coast/RC914.pdf)
 - <http://ccrm.vims.edu/publications/pubs/rivers&coast/RC914.pdf>
- [VIMS CCRM: "Living Shorelines"](https://www.vims.edu/ccrm/outreach/living_shorelines/index.php)
 - https://www.vims.edu/ccrm/outreach/living_shorelines/index.php
- [NOAA Habitat Blueprint: "Guidance for Considering the Use of Living Shorelines"](https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf)
 - https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf
- [VCAP Living Shoreline Cost-Share Program](https://vaswcd.org/living-shoreline)
 - <https://vaswcd.org/living-shoreline>

Introduction

Shoreline erosion is an ongoing, pervasive issue for residential, commercial, and public shoreline property owners throughout the Chesapeake Bay region. The traditional solution for slowing erosion has been to use hard shoreline revetment methods, such as installing bulkheads, retaining walls or seawalls, or large boulders known as rip-rap, with the aim of reducing sediment loss and preventing erosion. Over the last two decades, however, environmental groups and researchers have developed nature-based methods of slowing and preventing erosion that also have beneficial environmental impacts. One approach, known as *living shorelines*, uses natural materials such as vegetation, sand fill, and oyster reefs to stabilize the shoreline. These nature-based stabilization methods work best in low wave energy environments such as in bays and rivers, whereas the traditional hard revetment methods are still best suited to high energy environments such as open ocean beaches. Living shorelines provide coastal habitats that support fisheries and estuarine biodiversity, can improve water quality, store carbon, and trap sediments, all of which allow for greater wetland and marsh sustainability. In 2011, the Virginia General Assembly enacted policy stating that living shorelines are the preferred option for tidal shoreline stabilization, officially recognizing the multiple environmental benefits of these soft-solution shorelines. While the use of living shorelines is gaining traction throughout many coastal and wetland regions, it is still an under-utilized technique, given its low cost and high yield results.

The purpose of this report is to emphasize some of the many benefits of living shorelines as well as to make recommendations for implementing the practice in Accomack County. Potential barriers to effective living shoreline project practices will be noted along with discussion of possible solutions to these barriers. Finally, successful and ongoing living shoreline projects from throughout Virginia will be highlighted to provide insight on realistic timelines, cost factors, and expected results from such projects.

Project Background

This project is a part of a broader regional project to promote coastal resilience action on the Eastern Shore of Virginia. The [Resilience Adaptation Feasibility Tool \(RAFT\)](http://raft.ien.virginia.edu) (raft.ien.virginia.edu) is a collaborative process and full-service tool developed to help Virginia's coastal localities improve their resilience to flooding and other coastal storm hazards while remaining economically and socially viable. The project was developed by an academic interdisciplinary collaborative core team, led by the University of Virginia Institute for Engagement and Negotiation, the William & Mary Law School Virginia Coastal Policy Center, and the Old Dominion University/Virginia Sea Grant Climate Adaptation and Resilience Program.

Accomack County was engaged in The RAFT process in 2018-2019 as part of the regional initiative. As part of The RAFT process, the county was assessed and scored, and subsequently a Resilience Action Checklist was developed to address areas for improvement at a regional workshop in August 2018. Amongst the one-year checklist items, the workshop participants identified increasing the use of living shorelines, including evaluating barriers and educating a variety of local stakeholders about living shorelines, as an important action item. This report is designed to provide practical information and resources that will assist in this action opportunity.

Living Shorelines as Shoreline Protection

Living shorelines projects can include a suite of techniques using natural materials and nature-based designs with the purpose of stabilizing shorelines. While many soft revetment elements are used, such as vegetation and sand, harder structures such as oyster reefs or rock sills can add protection, especially until vegetation becomes established. Unlike hard protection structures like sea walls or rip-rap, living shorelines can grow overtime, providing more protection and requiring less maintenance. In addition to providing shoreline protection, these nature-based shorelines purify water, buffer flood impacts, reduce erosion, and attract

wildlife. They have also been shown to protect shorelines better during storms than hard protection structures. In terms of cost, living shorelines can also be more cost-effective, both in installation and in maintenance costs, ranging from about \$1,000-5,000 per linear foot to install and generally less than \$1,000 per linear foot annually to maintain.

To begin the process of building a living shoreline, a site analysis is necessary to assess onshore and offshore environmental factors such as erosion rates, wave energy and direction, wind speed and direction, soil type, existing vegetation, and animal life within the site. The [VIMS Shorelines Management Model](#) online self-guided decision tool is designed to help determine whether living shorelines or hardening methods are more appropriate for specific shoreline stabilization projects. The use of this guidance may be limited when more complex situations are presented, but it provides insight into what factors are conducive to creating a living shoreline and may be a helpful resource in initial shoreline protection plans. Once the site assessment is complete, the necessary permits must be obtained, ensuring compliance with local, state, and federal regulations. The site must then be prepared for the installation, removing debris and any structural impediments. Depending on the preliminary assessment, installation will include the appropriate living shoreline features, such as vegetation, bio-logs, organic fiber mats, and oyster reefs. While the initial process to implement living shorelines requires time and due diligence, the maintenance process is relatively simple and inexpensive. This ongoing phase is primarily comprised of scientific monitoring, removing debris, adding more sediment fill, planting more vegetation as needed, and ensuring any structural materials are remaining in place.

Living shorelines are permitted in Virginia through a general permit process managed by the [Virginia Marine Resources Commission \(VMRC\)](#) which is designed to streamline the review process. Construction may be exempt from the local wetlands board permits provided a Living Shorelines General Permit 1 or 2 is applicable and obtainable. The Virginia Association of Soil and Water Conservation Districts incentivizes living shorelines through their [Virginia Conservation Assistance Program \(VCAP\)](#), making living shoreline projects eligible for reimbursement at 75% of total costs with a maximum payment of \$20,000 per parcel per year.

Locally, the [Middle Peninsula Planning District Commission](#) provides loans to assist homeowners installing living shorelines on their property in the Middle Peninsula.

Possible Barriers and Solutions to Implementing Living Shorelines

Reports by Virginia Institute of Marine Science, Virginia Coastal Policy Center, and agencies such as the North Carolina Division of Coastal Management have identified a lack of knowledge about living shorelines as one of the most significant barriers to wide adoption of the shoreline management techniques for erosion control. While 52% of waterfront homeowners who participated in a Water Words That Work survey online responded very positively when asked about living shorelines, the same survey had 33% of phone respondents reacting negatively to them, with the most negative reactions to the possibilities of having to obtain permits and the possibility of increased bugs and snakes on their properties. From homeowners holding misconceptions about the safety and feasibility of installing living shoreline features to contractors and landscapers lacking specialized knowledge regarding best practices, this issue can hinder the widespread use of living shorelines. In order to increase wide-spread knowledge of living shorelines and the best practices for implementing them, workshops for landscapers, master gardeners, and contractors should be held regularly and field training events should be offered locally. For example, the [Northern Neck Master Gardeners](#), part of the Virginia Cooperative Extension, offer services, such as advice and [shoreline evaluations](#) to local waterfront property owners about erosion control measures, including living shorelines. A certificated course could also be offered at a local community college, adding incentive for local business owners to participate in the program.

Advocacy by environmental groups is also useful in educating the public and private stakeholders about the benefits of protecting shorelines using natural methods. For example, the localities in Hampton Roads, through HR Green's [Bay Star Homes](#), the [Elizabeth River Project's River Star Homes](#), and [Lynnhaven River NOW's Pearl Homes](#) programs all have homeowner recognition programs that allow residents to post a flag outside of their homes



INSTITUTE for
ENGAGEMENT & NEGOTIATION
Shaping Our World Together



WILLIAM & MARY
LAW SCHOOL
VIRGINIA COASTAL
POLICY CENTER



OLD DOMINION UNIVERSITY
Resilience Collaborative

indicating their use of environmentally friendly practices, including living shorelines. Localities such as the City of Norfolk also promote living shorelines through [brochures](#) and their website.

Financial incentives for property owners can also be an effective motivation for implementing nature-based solutions, including start-up grants, low interest loans, tax exemption, tax reductions, and lower permitting fees. In contrast, financial disincentives could also guide property owners toward living shorelines, in which case there could be higher permitting fees for shoreline hardening projects completed in areas where living shorelines could be used. Other education and outreach initiatives such as live demonstrations of existing living shoreline sites and community workshops could also promote knowledge of and support for living shorelines, helping it become a well-known and widely implemented shoreline stability option.

Education efforts should include government agencies as well, since if local policy and decision makers are not familiar with living shorelines, they will be more likely to support permits requesting the use of hard structures where living shorelines might be more appropriate. The law that governs living shorelines in Virginia is Code § 28.2-104.1, [Living shorelines; development of general permit; guidance](#), which states that living shorelines are the *preferred* method for controlling shoreline erosion. However, the law also provides an exemption to use traditional hard shoreline erosion control options wherever conditions are not feasible for living shoreline methods, such as in high wave energy environments. Since the language indicates a preference rather than a requirement, there is no legal incentive for living shorelines to be considered over hard structure solutions. In addition, the federal regulatory system does not advocate for nature-based solutions, so unless state or local policies require living shorelines, traditional hardening will more commonly used, based mostly off of notoriety and past practices. For local permitting and regulation approvals, environmental groups and NGOs can act as an agent with the contractors and file permits to facilitate the process for willing property owners. Communities such as Northern Neck, Virginia have created [living shoreline initiatives](#) that offer information on creating living shorelines and [downloadable guides for obtaining general permits](#).



INSTITUTE for
ENGAGEMENT & NEGOTIATION
Shaping Our World Together



WILLIAM & MARY
LAW SCHOOL
VIRGINIA COASTAL
POLICY CENTER



OLD DOMINION UNIVERSITY
Resilience Collaborative

Furthermore, there are no local ordinances in Accomack County preventing implementation of living shorelines within county bounds, which will facilitate in the use of green, nature-based solutions. In fact, the [Accomack County Comprehensive Plan](#) explicitly states its compliance with state legislative policy that living shorelines are the preferred method for stabilizing shorelines in terms of future land use. There are also already established living shoreline projects within Accomack County already, such as [Ocohannock on the Bay](#), a living shoreline project developed with The Nature Conservancy and VIMS. The project uses a combination of cobble sill to protect the marsh fringe, stone revetment to protect the upland and access path, and stone sill to protect a low eroding marsh edge. This and other projects, such as those detailed below, can serve as valuable resources and guides for implementing new projects.

Successful Living Shoreline Projects

Chincoteague Bay Field Station Living Shoreline (Greenbackville, VA)

The Living Shoreline was started in 2012 by the Chincoteague Bay Field Station (CBFS) in conjunction with Shippensburg University, Shore People Advancing Readiness for Knowledge, The Nature Conservancy, Captain's Cove, Eastern Shore Land Trust, Accomack-Northampton PDC, Eastern Shore Environmental Education Council, Accomack County Public Schools, and community volunteers. The project is Accomack County's first living shoreline project, and it provides shoreline protection and serves as a monitoring site and public education demonstration site. Volunteers placed oyster castles along the shoreline to encourage oyster reef growth, removed invasive Phragmites and replaced them with native Spartina grasses, and helped launch the CBFS Integrated Coastal Observation Project to record water level, salinity, temperature, and barometric pressure. The living shoreline is also used for middle school and high school field trips.

VIMS Teaching Marsh (Gloucester, VA)

The Center for Coastal Resources Management (CCRM) at the Virginia Institute of Marine Sciences (VIMS) created a 1 acre living shoreline project in 1999 with the purpose of protecting marsh shoreline, improving water quality, increasing species habitat, and educating the public on these ecoservices. This project included grading shoreline banks, adding sand fill, and planting salt marsh vegetation. Over 12,000 plants were chosen and planted from the tidal wetlands species listed in the Tidal Wetlands Act. Excess fill that had been initially excavated from the marsh was then used to create berms along the marsh to separate the saltwater from the freshwater portion of the marsh. Public demonstrations are offered during Marine Science Day at the marsh, workshops regarding the logistics and benefits of living shorelines are held by appointment, and educational walking tours are available year-round by appointment.

Oyster Village/ Sunnyside Road Living Shoreline (Oyster, VA)

Starting in 2010, The Nature Conservancy (TNC) began a living shoreline project on Sunnyside Road, in Oyster, Virginia, with the goals of removing a dilapidated pre-existing bulkhead and creating a living shoreline demonstration site. TNC worked in conjunction with NOAA Chesapeake Bay Trust, U.S. Fish and Wildlife Service, VA Coastal Management Program, Keith Campbell Foundation for the Environment, and local volunteers in this \$130,000 project. In addition to removing the deterioration bulkhead, low-profile rock sill was placed along 450 linear feet of the shoreline, and sand was filled and graded behind the sill. Volunteers planted 16,000 square feet of land with native marsh grasses and upland plants. Oyster shells that were collected from the site were bagged and placed strategically along the shoreline to provide oyster habitat. The living shoreline is accessible to the community as an ongoing and successful example of nature-based shoreline protection.



INSTITUTE for
ENGAGEMENT & NEGOTIATION
Shaping Our World Together



LAW SCHOOL
VIRGINIA COASTAL
POLICY CENTER



OLD DOMINION UNIVERSITY
Resilience Collaborative

Conclusions and Recommendations

Living shorelines offer an effective and cost-efficient long-term solution for shoreline protection in low-energy environments such as wetlands and bays. While the use of these methods is gaining popularity nation-wide, there are certainly ways to increase the implementation of living shorelines. Increasing knowledge through trainings and workshops covering how and where to best utilize nature-based shoreline projects amongst homeowners, contractors, landscapers, and engineers is of the foremost importance in terms of increasing awareness of living shorelines as a viable alternative to traditional hard structure revetment projects. Reaching out to existing living shoreline project managers, such as those detailed in this report, can also provide valuable resources for the specificities of living shoreline project implementation, including cost and scope. Other resources include state-wide and regional agencies with experience and expertise in living shoreline projects such as the [Chesapeake Bay Landscape Professionals Directory](#), the [CCRM Living Shoreline Design Online Course](#), the [Living Shoreline Incentive Program](#), the [Living Shoreline Academy](#), and the [Habitat Blueprint-Living Shorelines](#). With help and guidance, living shorelines can provide valuable ecoservices as well as provide shoreline protection for both public and private lands.

References

- Accomack County. (2014). Respecting the Past, Creating the Future: The Accomack County Comprehensive Plan. Chapter Six: Future Land Use Plan.
<https://www.co.accomack.va.us/home/showdocument?id=2152>
- Antoine, C. (2018). Increasing living shoreline implementation in Virginia: Legal and policy recommendations. Virginia Coastal Policy Center.
<https://law.wm.edu/academics/programs/jd/electives/clinics/vacoastal/reports/livingshorelineimplementation.final2.pdf>
- Berman, M., Mason, P., Nunez, K., & Tomblason, C. (2018). Implementing sustainable shoreline management in Virginia: Assessing the need for enforceable policy. Virginia Institute of Marine Science, College of William & Mary.
- City of Norfolk. (2018). Living shoreline process.
<https://www.norfolk.gov/DocumentCenter/View/15450>
- Eastern Shore of Virginia Resource Conservation & Development ("Eastern Shore RC & D"). (2008). Shoreline Erosion Control Final Report (Project No. 2006-0100-017).
http://www.nfwf.org/finalreports1/4670_Final_Report.pdf
- Gavin, Barbara. (2018). VIMS Tidal Wetlands Workshop Residential-Scale Case Studies. Elizabeth River Project.
- Hardaway Jr, C. S., & Duhring, K. (2010). Living Shoreline Design Guidelines for Shore Protection in Virginia's Estuarine Environments.
https://www.deq.virginia.gov/Portals/0/DEQ/CoastalZoneManagement/FundsInitiativesProjects/tas_k92-02-16b.pdf?ver=2017-12-21-154205-260
- North Carolina Division of Coastal Management & North Carolina Division of Marine Fisheries ("NC Division of Coastal Management"). (2016). Living Shorelines Strategy Accomplishments Report.
- RAFT Resilience Action Workshop. (2018). Accomack Resilience Action Checklist.
<http://www.raft.iem.virginia.edu>
- Restore America's Estuaries. (2015). Living Shorelines: From Barriers to Opportunities. Arlington, VA.
https://estuaries.org/wpcontent/uploads/2018/08/RAE_LS_Barriers_report_final.pdf
- Rivers & Coast. (2012). Newsletter of the Center for Coastal Resources Management, 7(1).
- VIMS. Living Shorelines.
http://www.vims.edu/ccrm/outreach/living_shorelines/index.php.
- VIMS. Living Shorelines: Marshes and Oysters Story Map.
<http://vims-wm.maps.arcgis.com>
- VIMS. Shoreline Management Model.
<https://www.vims.edu/ccrm/ccrmp/bmp/smm>
- Water Words that Work (2017). Supporter and Waterfront Homeowner Survey Report. Prepared for Elizabeth River Project.