



Flood Management

RISE is looking for innovative approaches to realizing flood management solutions for rural coastal communities. Living shorelines are a key component to Virginia's coastal flood protection strategy, and any solution proposed should consider that. In addition, another flooding source is from runoff from the land across the landscape, through ditches and to the bay. Nutrients in this runoff make keeping the stormwater management infrastructure clear of plant growth very challenging.

Below are two areas of interest related to Flood Management, and specific problems in need of solutions:

1. Living Shoreline Vegetation Production

The Problem:

Nature-based approaches such as strategic land conservation, wetland restoration, and living shorelines have greater potential to address water quality and to aid in flood management solutions in rural coastal Virginia.³ They also protect shorelines from erosion by absorbing wave energy.

"Living shoreline" means a shoreline management practice that provides erosion control and water quality benefits; protects, restores, or enhances natural shoreline habitat; and maintains coastal processes through the strategic placement of plants, stone, sand fill, and other structural and organic materials. When practicable, a living shoreline may enhance coastal resilience and attenuation of wave energy and storm surge.⁴ The Middle Peninsula Planning District Commission (MPPDC) manages a Living Shoreline Incentive Program, (LSIP), a low interest loan and grant program available to residents seeking to install living shorelines on their property. Living shorelines are also Tax Exempt by statute.⁵

Production of sufficient plants for this need throughout Virginia's coastal region is beyond current farming resources. For example, one living shoreline project MPPDC is working on requires more than 65,000 plants. There are over 1,000 miles of shoreline in Virginia that could require living shoreline applications in Virginia alone.

This Challenge will demonstrate approaches to sustainably provide (produce and transport) vegetation for living shorelines being implemented in rural coastal communities.

The Pain Points in Current Solutions

In rural coastal Virginia, nurseries are generally growing plants that exist in freshwater non-floodplain environments. Access to valuable wetlands to grow plants is difficult. The Virginia Coastal Resilience Master Plan is increasing demand for nature-based solutions which, in turn, is exacerbating the bottleneck. For other coastal locations, this will be a limiting problem too.



Solutions Being Sought

RISE is seeking solutions to living shoreline vegetation production that:

Identify suitable plants for local living shoreline implementations as well as sustainable means of production and transportation.

1. Identify suitable plants for local living shoreline implementations as well as sustainable means of production and transportation.
2. Identify new plants (and/or existing species that need to be farmed more widely) and/or production methods for living shoreline vegetation.
3. Demonstrate new business models to ease the bottleneck that vegetation production introduces in living shoreline implementations region-wide and scalable to other coastal states.

Additional Information Available Upon Request

- [Living Shoreline definitions, Virginia Marine Resources Commission](#)
- The Living Shoreline [Group 1](#) and [Group 2](#) General Permits.
- [USACE publications](#)
- [FEMA Nature-based Solutions](#).

2. Rural Drainage Improvement

The Problem(s)

Drainage and maintenance of roadside ditches is a major struggle for rural coastal communities. Current ditch designs rely on gravity for flow, which does not work in many rural coastal communities at low elevation. In addition, nutrients in run-off lead to ditches becoming overgrown, requiring greater maintenance to keep them working.

Ditches need enhanced water flow to let the land dry thereby preserving the property value. Without suitable drainage, a community may see significant losses in taxable property values. For example, between 2010-2016, Mathews County received approximately \$6M in FEMA Hazard Mitigation Grants to elevate homes damaged from storms⁶, and lost \$75M in taxable property value in their last assessment.

This Challenge will re-imagine rural stormwater management and drainage systems.

⁶ Hubbard, F. December 26, 2016. Mathews shoreline threatened while officials debate planning. Daily Press <https://www.dailypress.com/news/gloucester/dp-nws-evg-sea-level-mathews-20161223-story.html>

The Pain Points in Current Solutions

There are current drainage solutions, including roadside ditches, in place in the Middle Peninsula region, and there have been for many years. These public roadside ditches are maintained by the Virginia Department of Transportation, which is a cost to them in manpower, time, and expense.

Rainfall runoff produces flooding due to poor drainage, and results in nutrients running off the surrounding landscape. This runoff can also reach the Chesapeake Bay. Tidal backflow can produce flooding as water from the bay flows into the drainage system at high tides.

Some of the problems with these current solutions are:

- Zero grade stormwater ditch system often has standing water - low/no flow and reduced capacity resulting in poor drainage and flood prevention.
- These ditches are also expensive to maintain and clean.
- Tidal backflow into the drainage system results in further flooding introducing brackish or saltwater.
- There are levels of nitrogen and phosphorus in the runoff and soil - damaging ditches and being introduced into the Chesapeake Bay.

RISE is seeking innovative solutions that:

1. Are effective in low/zero grade environments thereby mitigating local flooding threats and enhance the region's resilience.
2. Protect properties from flooding produced by tidal backflow.
3. Reduce nutrient runoff being deposited in the bay.
4. Reduce maintenance and operation costs incurred by Virginia Department of Transportation, municipalities and/or governments.

This Challenge topic requires a **Design-Build** solution. Successful awardee(s) will be required to build, install, and demonstrate their solutions.