Virginia Department of Conservation and Recreation (DCR), was established in 1980 to provide technical assistance to jurisdictions necessary to meet water quality standards and fully restore the Bay by 2025. The Phase III WIP multi-phased, continuing that progress pollution reductions from major sources of nitrogen, phosphorus, and sediment across the Bay. Virginia has made significant progress in reducing restoration plan for Virginia the Bay of 25% for nitrogen, 24% for phosphorus, and 20% for sediment. Specifically, the TMDL set annual limits of 185.9M pds of nitrogen, 12.5M pds of phosphorus, and 3.225M tons of sediment from across the Bay watershed. This equates to reductions in loading to the Bay for 25% for nitrogen, 24% for phosphorus, and 20% for sediment.

An Expert Panel of scientists was convened by the USEPA Chesapeake Bay Program to review all of the available science on the nutrient and sediment removal performance for shoreline erosion control BMPs (e.g., living shorelines) and develop protocols to estimate pollutant reduction credits associated with those BMPs. The Expert Panel’s Recommendations (originally approved in 2015, amended in 2017) establish basic qualifying conditions for BMPs to receive credits and four protocols to calculate the sediment and nutrient reduction credits.

In mid-2019, Virginia released the Phase III Watershed Implementation Plan (WIP), the final restoration plan for Virginia’s portion of the Chesapeake Bay and its tidal rivers. The Phase III WIP will guide local, state, and federal actions through 2025 and is designed to meet the Commonwealth’s commitments to reduce nutrient and sediment pollution and restore the health of the Bay. Virginia has made significant progress in reducing pollution since the Phase I (2010) and Phase II (2012) WIPs were released; continuing that progress necessitates accelerated and more deliberate action.

The Phase III WIP multi-sector blueprint details the BMPs necessary to achieve basin planning targets for nitrogen and phosphorus, including basin-level goals for implementing shoreline management BMPs (e.g., living shorelines).

The Shoreline Erosion Advisory Service (SEAS), a program of the Virginia Department of Conservation and Recreation (DCR), was established in 1980 to provide technical assistance to property owners, localities, and state and federal agencies experiencing shoreline erosion in Virginia. DCR-SEAS is working to identify shoreline management BMPs (e.g., living shorelines) across tidal Virginia that qualify for Chesapeake Bay TMDL WIP pollutant reduction credits, verify that installation of those BMPs meets the specifications set out by the USEPA, and quantify and report the earned pollutant reduction credits as part of the Commonwealth’s efforts to meet WIP goals.

### Background
According to the U.S. Geological Survey (2003, WRIR 03-4123), erosion of shorelines is a major source of sediment to the Chesapeake Bay, accounting for 57% of the sediment source loads. Tidal shoreline erosion is a natural ecosystem process and feeds the natural sediment demand of the Bay and its tidal rivers. Shoreline erosion is primarily caused by wind-driven waves and exacerbated by the rapid rate of sea level rise. Erosion of banks supplies sand to beaches and mudflats, helping them to keep pace with rising sea levels. However, excess sediment and associated nutrients can negatively affect submerged aquatic vegetation and overall water quality. Human activity, such as agriculture and urban development, can drastically accelerate the natural rate of shoreline erosion.

In 2010, the U.S. Environmental Protection Agency (USEPA) established the Chesapeake Bay Total Maximum Daily Load (TMDL), a comprehensive “pollution diet” to guide actions to restore clean water in the Bay, as well as the region’s streams, creeks, and rivers. The TMDL identifies the pollution reductions from major sources of nitrogen, phosphorus, and sediment across the Bay jurisdictions necessary to meet water quality standards and fully restore the Bay by 2025. Specifically, the TMDL set annual limits of 185.9M pds of nitrogen, 12.5M pds of phosphorus, and 3.225M tons of sediment from across the Bay watershed. This equates to reductions in loading to the Bay for 25% for nitrogen, 24% for phosphorus, and 20% for sediment.

### Methodology
**Parameters**
- Protected Shoreline Length (ft)
- VMRC permit database
- Planted Marsh Acrage (ac)
- VMRC permit database
- Bank Height (ft)
  - VGIR LIDAR DEMs (2009-2013)
- Erosion Rate (ft/yr)
- VIMS Shoreline Studies Program—actual historic erosion (1937-2009)
- Upland Land Use (agricultural, forest, or urban)

**Verification**
- VMRC-inspected and deemed ‘in compliance’
- VMRC Inspection Date = BMP ‘Installation Date’
- Not VMRC-inspected, but visible via aerial imagery = DCR-SEAS desktop verification
- Date of Image = BMP ‘Installation Date’
- Not VMRC-inspected and not visible via aerial imagery = DCR-SEAS field verification required
- Date of DCR field visit = BMP ‘Installation Date’

### Results

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Reported</th>
<th>Sites with</th>
<th>Plants</th>
<th>37.9</th>
<th>8,510</th>
<th>5,872</th>
<th>14,299</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum</td>
<td>988</td>
<td>21</td>
<td>37.9</td>
<td>8,510</td>
<td>5,872</td>
<td>14,299</td>
<td></td>
</tr>
</tbody>
</table>

**References**


### Contact Information

**Ashoreline Engineer**
Shoreline Erosion Advisory Service
PO Box 1425
Tappahannock, VA 22560
aaron.wendt@dcr.virginia.gov
http://www.dcr.virginia.gov/soil-and-water/seas