Use of Guidance to Preserve and Protect Wetlands

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The Virginia Tidal Wetlands Program turned 40 in 2012 as the original Tidal Wetlands Act legislation was passed in 1972. Since that time, Tidewater Virginia has changed significantly. Population has grown by over 10% for each decade since 1970; growing from 4.6 million to over 8 million. Tidewater, which occupies just a little less than 30% of Virginia’s landmass, has consistently been subject to the greatest growth and is home for over 65% of Virginia’s population (United States Census Bureau, Decennial Census Data 2010). As a result, the status of Virginia’s tidal shoreline resources has changed too.

Historically considered a bane to humans, wetlands were lost to filling and dredging to create much of the landmass upon which sits many Virginia coastal cities, towns, roads and commercial shipping facilities. Communities with networks of boat canals were generally created from dredged tidal creeks and wetlands. It has been estimated that as much as half of the pre-colonial tidal wetlands in Virginia were lost through these processes. The Tidal Wetlands Act passage in 1972 certainly changed the way we look at tidal wetland resources.

The Tidal Wetlands Act codified the scientific thinking reflected in research conducted mostly at Virginia Institute of Marine Science (VIMS) and elsewhere in the 1960s and 70s. Natural historians and ecologist were starting to investigate the role of tidal wetlands in the ecology of coastal systems. This body of work established the evidence for ecosystem services of vegetated marshes including high rates of primary production (vegetative...
growth), sediment stabilization, sediment trapping, habitat, and nutrient cycling. The understanding from these early studies are reflected in the original authorizing language of the Wetlands Act that states “…Commonwealth’s tidal wetlands which are essential for the production of marine and inland wildlife, waterfowl, finfish, shellfish and flora; serve as a valuable protective barrier against floods, tidal storms and the erosion of the Commonwealth’s shores and soil; are important for the absorption of silts and pollutants; and are important for recreational and aesthetic enjoyment of the people and for the promotion of tourism, navigation and commerce. (Code of Virginia § 28.2-1301. http://lis.virginia.gov/cgi-bin/legp604.exe?000+cod+28.2-1301)

Fairly soon after the passage of the Wetlands Act, the Wetlands Guidelines were approved. Already mandated in the Virginia Code to be the Commonwealth’s advisor on coastal resources, VIMS was tasked with the responsibility to assist in the development of guidelines to administer the Act. The guidelines were based on the current scientific understanding of tidal wetlands at the time and provided decision-making criteria based upon 1970’s understanding.

In the early 1980s’ the Act was modified to include non-vegetated wetlands and to codify the scientific understanding of these habitats. Shortly afterward non-vegetated wetlands were added to the Guidelines.

In the 30 years since that time, science has continued to advance our understanding of the role of tidal wetlands in the estuarine ecosystem and the consequences of sea level rise and management decisions upon the sustainability of the resource. However, the original Wetlands Guidelines have not been updated to reflect advancements in the science.
It is critical that Virginia continues to use the current science as guidance in shoreline management in order “….to preserve and prevent the despoliation and destruction of wetlands while accommodating necessary economic development in a manner consistent with wetlands preservation.” (Code of Virginia § 28.2-1301).

Guidance Development

Two notable advancements in scientific understanding necessitate modernization of the guidance for tidal shoreline and wetlands decision-making.

- First is the understanding of the adverse system-wide effects of cumulative tidal wetlands losses. The adverse effects of wetland loss argues for a need to integrate shoreline decisions in order to maximize the benefits from the shorezone and promote the use of living shorelines, or natural infrastructure to address erosion.

- Second is the already occurring, and anticipated increase, in the loss of tidal wetlands due to sea level rise.

VIMS guidance and tools have continued to evolve to reflect the changing science under the Institutes advisory mandates. Current scientific understanding has been codified in Virginia policy with the passage of SB964, commonly referred to as the “Living Shorelines” bill. The bill re-iterates VIMS’ role in the development of shoreline guidance by mandating VIMS to develop comprehensive coastal guidance and participate in the development of integrated regulatory guidance and the development of a general permit for living shorelines.

The VIMS guidance reflects the Commonwealth’s preference for living shorelines from an integrated perspective. This perspective provides a public interest review that incorporates an analysis of risk, adverse impacts and benefits of shoreline actions. The VIMS approach identifies management options that maximize protection and preservation of the public trust resources- the wetlands, riparian and shallow water habitats- AND provides erosion protection. The use of the VIMS integrated guidance to shoreline management will prevent wetlands destruction and preserve wetlands by managing the resource through the lens of sea level rise and will ensure Virginia meets the intent of the Tidal Wetlands Act and the Living Shorelines Law.

Integrated Guidance Perspective

The application of integrated shoreline guidance to decision-making in Virginia is a win-win. Integrated guidance not only supports environmentally sustainable decisions that preserve and maintain ecosystem services, it also minimizes confusion, reduces duplication and increases the consistency of the administration of shoreline management actions.

All the advisory guidance produced by The Center for Coastal Resources Management at VIMS is based upon an approach that integrates information from the disciplines of ecology and social science within the coastal ecosystem. Water quality, habitat and erosion processes are the primary ecosystem service elements of the integrated guidance, while erosion control, land use, planning and infrastructure risk are some of the economic elements. Available science on the ecosystem processes of shorelines and the surrounding landscape provides the scientific rationale for the guidance.

The scientific tenets of integrated guidance form the basis for VIMS shoreline decision guidance as reflected in the following 3 guidance products:

1. Decision trees
2. Shoreline best management practices models being produced for the comprehensive coastal resources management portal (CCRMP), and
3. VIMS proposed criteria for the living shorelines general permit.
The Decision trees and the CCRMPs have been the subject of previous issues of Rivers and Coast (See http://ccrm.vims.edu/publications/pubs/rivers&coast/vol2_no1_int_guide.pdf, http://ccrm.vims.edu/publications/pubs/rivers&coast/vol5_no2decisiontrees.pdf, and http://ccrm.vims.edu/publications/pubs/rivers&coast/vol8_no1_2013ccrmp.pdf) So in this issue, we take a closer look at the Living Shorelines General Permit.

Living Shorelines General Permit

VIMS was mandated in the “Living Shorelines” legislation, SB964 2011, to assist the Virginia Marine Resources Commission (VMRC) in the development of the living shorelines general permit. A series of meetings of VIMS scientists was held in 2011 to develop a set of criteria for a living shoreline general permit. The proposed criteria were provided to the VMRC in the Fall of 2011 followed by a literature review on ecosystem processes and living shorelines management efforts in 2012.

This proposed criteria incorporates those elements that should be considered in the design of an integrated living shoreline project. An integrated living shoreline project is one wherein the trade-offs between riparian buffers, tidal wetlands and near-shore shallow waters are balanced in order to maximize the ecosystem services of the shoreline while providing the desired erosion protection. The criteria reflect the available science on shoreline erosion, water quality, and habitat as well as studies specific to the assessment of existing living shorelines projects. The parameters placed on the criteria are intended to meet the State’s mandate to promote the use of living shorelines—so the criteria more often would “allow” a project to fall within the permit conditions than fall outside of them.

There should be two categories of shoreline activities for this general permit. The categories reflect the relative environmental adverse effect due to project construction and potential for consequences due to failure. The first group is non-structural activities that have minimal direct or cumulative impacts associated with habitat conversion and shoreline habitat sustainability benefits. In this group are activities that improve growing conditions for wetlands and/or riparian buffer vegetation. Projects may also include the use of native oysters as part of erosion control projects. With minimal constraints, these projects should be allowed everywhere except within SAV habitat. The second group is for rock sills with tidal vegetated marsh. This type of activity is considered to have minor direct and cumulative impacts and provide for shoreline habitat sustainability.

Additional conditions for the permit are proposed to specifically address the potential impacts to existing vegetation while recognizing the need to impact tidal vegetated wetlands and/or riparian buffer vegetation in order to establish a living shoreline. No net loss of vegetated wetlands should occur and impacts to the riparian buffer should be mitigated accordingly.

Marsh vegetation provides habitat for many aquatic creatures, like the marsh snail, that are food for commercially important finfish and crabs.
Proposed Criteria

A. Group One: Non-Structural Activities.

1) Existing tidal marsh improvements, new marsh creation and/or beach nourishment. May include use of:
   a) Coir logs and/or coir mats. Following standard installation and maintenance guidelines.
   b) Sand fill. Sand will contain less than 10% very fine grain material (passes through 100mm sieve). Source of material shall be provided.

2) Native oyster shell contained by organic fiber or biodegradable polymer bags.
   a) Does not include concrete structures which incorporate oyster shell. Any oyster containment bag constructed out of a polymer (i.e. plastic) must be made of material that meets ASTM Method and Specification for biodegradation of plastic materials in the marine environment, i.e. polycaprolactone (PCL) and polyhydroxyalkanoate (PHA).
   b) Should not be placed in vegetated wetlands.

B. Group Two: Rock Sill With Tidal Marsh

1) The average minimum fetch (distance across waterway) is at least 0.5 mile.
2) The proposed sill is the only erosion protection structure for a particular shoreline section. The general permit shall not apply to projects with an existing or proposed bulkhead or revetment landward from and parallel to the sill. Group One activities can be included along the same or different shoreline sections.
3) An existing or created tidal marsh at least 8 feet wide must be included.
4) Maximum water depth at sill location -3 feet MLW, and/or a distance of no greater than 30 feet from Mean Low Water to landward side of sill.
5) Sill design specifications
   a) Sill not placed on vegetated wetlands or SAV
   b) Sill height 0 - +1 foot above Mean High Water.
   c) Trapezoidal shape. Channelward face of sill should have a slope no flatter than 2:1. End slopes should be 1.5 or 2:1.
   d) Filter cloth under the sill.
   e) Quarry stone. Broken concrete may be re-used for core material if it is already in place on the shoreline within the marine environment. Concrete core must be capped with stone on the channelward side of the sill. Concrete cannot include exposed re-bar or other demolition debris.
   f) Sill windows/gaps at least 5 feet wide for each 100 linear feet of sill. Window height no greater than half the full height of the sill.
   g) May include use of sand fill. Sand will contain less than 10% very fine grain material (passes through 100mm sieve). Source of material shall be provided.

Living shoreline diagram—Marsh sill with planted marsh
C. Additional Conditions

1) Riparian modifications. Activities such as bank grading, bank shaping, land disturbance, tree removal, and terracing should be allowed where necessary to establish wide, gradual slopes and an integrated wetland-upland vegetation buffer.
   a) Standard erosion and sediment control practices should be included.
   b) Water Quality Impact Assessments, formal landscape agreements and other requirements of local Chesapeake Bay Preservation Act (CBPA) programs should be included.

2) Vegetation Plan. Wetland and/or riparian buffer planting plan(s) shall be provided if needed, including plant species (natives preferred), quantity, relative location (plan view), elevations (cross-section), planting schedule, and fertilizer use. The plan should incorporate necessary species and planting densities to meet minimum standards for vegetated cover.

3) Vegetated Wetland Impacts. If impacts are proposed as part of the integrated project, there can be no net loss of areal extent of vegetated wetlands.

This marsh toe revetment is the type of project which should qualify for a general permit.
General Permit Exemptions

In addition to a set of criteria that must be met in order to qualify for the general permit, VIMS recommends development of a set of rationale that should be addressed in circumstances when an application is made for a conventional structure where a living shoreline should be feasible. VIMS comprehensive shoreline inventory data indicates that livings shorelines may be feasible for much of Virginia’s shoreline. Given this fact, and the intentionally inclusive proposed general permit criteria in support of State policy to promote living shorelines, criteria requirements to opt-out should be rigorous.

Four conditions may make the use of a living shoreline approach unfeasible:

1. High energy, sandy shorelines where breakwaters are appropriate. These portions of shoreline are found along the main Bay and River mouths and have fetch greater than 2 miles.

2. Significant infrastructure (houses, commercial buildings, well, septic) are immediately adjacent to the edge of the eroding upland. The immediate proximity prevents manipulation of the bank which is often required in proper design of an effective living shoreline project.

3. Navigation channel(s) proximal to the shoreline that prevents the required channelward encroachment associated with marsh creation and sill construction.

4. Nearshore depths are too deep to allow channelward encroachment associated with marsh creation and sill construction. Deep is defined to be greater than minus 3 feet at MLW at a distance 30 feet channelward from MLW.

The adopted criteria for the living shorelines general permit should directly enable Virginia to meet both the intent of wetland protection and preservation as stated in the Tidal Wetlands Act and the No Net Loss commitment. The proposed VIMS criteria, in conjunction with the CCRMPs and decision trees, provide an integrated approach that does meet the intent of the Tidal Wetland Act. Adherence to the guidance will promote the sustainability of Virginia’s tidal shoreline resources for the next 40 years.
§ 28.2-1100. Virginia Institute of Marine Science continued; duties. (circa 1950)

...5. Conduct hydrographic and biological studies of the Chesapeake Bay, its tributaries, and all the tidal waters of the Commonwealth and the contiguous waters of the Atlantic Ocean;

6. Engage in research in the marine sciences;

7. Conduct such special studies and investigations concerning these subjects as requested by the Governor;

8. Engage in research and provide training, technical assistance and advice to the Board of Conservation and Recreation on erosion along tidal shorelines, the Soil and Water Conservation Board on matters relating to tidal shoreline erosion, and to other agencies upon request; and

9. Develop comprehensive coastal resource management guidance for local governments to foster the sustainability of shoreline resources by December 30, 2012. The guidance shall identify preferred options for shoreline management and taking into consideration the resource condition, priority planning, and forecasting of the condition of the Commonwealth’s shoreline with respect to projected sea-level rise.

These studies shall include consideration of the seafood and other marine resources, such as the waters, bottoms, shorelines, tidal wetlands, and beaches, and all matters related to marine waters and the means by which marine resources might be conserved, developed and replenished.

Tidal Wetlands Law (circa 1972)


……C. In order to perform its duties under this section and to assist counties, cities, and towns in regulating wetlands, the Commission shall promulgate and periodically update guidelines which scientifically evaluate vegetated and nonvegetated wetlands by type and describe the consequences of use of these wetlands types. The Virginia Institute of Marine Science shall provide advice and assistance to the Commission in developing these guidelines by evaluating wetlands by type and continuously maintaining and updating an inventory of vegetated wetlands.

Living Shorelines Law (circa 2011)

§ 28.2-104.1. Living shorelines; development of general permit; guidance.

...B. The Commission, in cooperation with the Department of Conservation and Recreation and with technical assistance from the Virginia Institute of Marine Science, shall establish and implement a general permit regulation that authorizes and encourages the use of living shorelines as the preferred alternative for stabilizing tidal shorelines in the Commonwealth. In developing the general permit, the Commission shall consult with the U.S. Army Corps of Engineers to ensure the minimization of conflicts with federal law and regulation.

C. The Commission, in cooperation with the Department of Conservation and Recreation and with technical assistance from the Virginia Institute of Marine Science, shall develop integrated guidance for the management of tidal shoreline systems to provide a technical basis for the coordination of permit decisions required by any regulatory entity exercising authority over a shoreline management project. The guidance shall: (2011, c. 885.)

§ 15.2-2223.2. Comprehensive plan to include coastal resource management guidance.

Beginning in 2013, any locality in Tidewater Virginia, as defined in § 62.1-44.15:68, shall incorporate the guidance developed by the Virginia Institute of Marine Science pursuant to subdivision 9 of § 28.2-1100 into the next scheduled review of its comprehensive plan. The Department of Conservation and Recreation, Virginia Marine Resources Commission, and the Virginia Institute of Marine Science shall provide technical assistance to any such locality upon request.