Shoreline Decision Support Tools Improved

Center for Coastal Resources Management, Virginia Institute of Marine Science.

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Shoreline Decision Support Tools - New & Improved

Since the 1970s, the Center for Coastal Resources Management has provided information and tools to support decision-making for the management of tidal wetlands, beaches and dunes. This ongoing effort includes workshops, training, presentations, plus print and digital publications that translate the most current estuarine and coastal science into usable information for shoreline decision-makers. Guidance development for wetlands board members, regulatory agency staff and shoreline property owners is one particular focus area. These guidance products have included decision trees, map viewers, and digital web-based information.

Changes to legislation and program policies are another reason why shoreline management tools need to be updated periodically.

Two new and improved shoreline management decision tools are the focus of this issue of Rivers and Coast:

1) Shoreline Management Handbook
2) Shoreline Decision Support Tool

There are several factors making improvements to previous guidance tools possible. Among them, scientific advancements in the understanding of shoreline habitats and ecosystem services; such as climate change resilience, water quality improvement, erosion control, flood mitigation, habitat and socio-economic provisions. Virginia’s General Assembly also passed recent legislative amendments that granted authority to change how the shoreline regulatory program is administered. New digital platforms and user interface software make it easy to design and serve the tools online onto fixed and mobile screens of different sizes.

Adaptive management is an iterative process to monitor and improve resource management programs. CCRM supports adaptive management of Virginia’s shoreline programs with ecological research, tracking program performance, updating guidance, and providing recommendations for program improvements. Developing new tools and data updates in existing tools are part of this process to ensure that shoreline management decisions are based on the best available science.

Main Reasons for Tool Improvements

- Advancements in scientific understanding of shoreline habitats and ecosystem services
- Recent legislative changes to tidal shoreline regulatory program
- New digital platforms for web browsers and mobile devices
Virginia has established policy and made commitments to manage and preserve shoreline resources for two primary reasons:

1) Shoreline features provide services valued by society, including water quality, erosion control, flood buffering, primary production in support of the estuarine food web including commercially and recreationally important fisheries, recreational opportunities, and aesthetics.

2) Tidal wetlands, beaches and dunes have been adversely impacted by development with significant losses. Ongoing development and sea level rise contribute to continued stress and resource losses.

Constitution of Virginia, Article XI, Section 1 - Natural Resources and Historical Sites of the Commonwealth

“. . . To the end that the people have clean air, pure water, and the use and enjoyment for recreation of adequate public lands, waters, and other natural resources, it shall be the policy of the Commonwealth to conserve, develop, and utilize its natural resources, its public lands, and its historical sites and buildings. Further, it shall be the Commonwealth’s policy to protect its atmosphere, lands, and waters from pollution, impairment, or destruction, for the benefit, enjoyment, and general welfare of the people of the Commonwealth.”

Guidance documents produced over time assisted with making day-to-day decisions required to balance development requests with these established policies and commitments. Two popular and heavily-used hard copy products included a three-ring binder referred to as the Wetland Management Handbook produced about 30 years ago and another resource on legal matters regarding wetland violations produced in 2000. These useful tools were cumbersome to access, costly to reproduce, and focused mostly on tidal wetlands.

Recent improvements focused on migrating these tools to a digital resource, while also updating the contents to reflect the current regulatory framework. The title was changed to Shoreline Management Handbook to capture objectives for integrated shoreline management across riparian, wetland and shallow water habitats. The main target audience for the new, digital Shoreline Management Handbook are citizen regulators on local wetland boards, but the material is relevant and useful for regulatory agency staff, policy analysts, coastal resource managers and the general public.

The development of the new Handbook was a collaboration project between CCRM, the Virginia Coastal Policy Center, William & Mary School of Law, and Clay Bernick Environment & Sustainability, LLC, with support from the Virginia Coastal Zone Management Program.
Shoreline Management Handbook - New Format and Content

The new digital Handbook is currently served from CCRM’s web site under the Wetlands Management section (https://www.vims.edu/ccrm/wetlands_mgmt/handbook). The contents range from broad concepts behind the passage of the original tidal wetlands protection legislation in 1972 to contemporary details of the shoreline permit application and approval process. What it means to serve on a Wetlands Board, how public hearings are conducted, and how shoreline management relates to larger restoration goals are also covered.

Shoreline Management Handbook Contents

- Background & Purpose
- Laws & Jurisdictions
- Permit Information
- Being on a Board
- Conduct a Hearing
- Decision Support & Technical Assistance
- Restoration for Resilience
- Compliance & Other Legal Information
- Know Your Resources

**Background & Purpose**

This section provides the rationale for tidal shoreline protection that prompted the passage of the Tidal Wetlands Act and the Coastal Primary Sand Dunes and Beaches Act from the Virginia perspective. Wetland and shoreline habitat protection measures are also supported by the Constitution of Virginia and Virginia’s Chesapeake Bay Program Commitments.

**Laws & Jurisdictions**

The confusing landscape of overlapping jurisdictions and applicable laws is illustrated and explained in this section, including laws, legal definitions, official guidelines and local government policy examples.
Shoreline Management Handbook - New Format and Content

**Permit Information**

The differences between general permits and individual permits are explained. The information required for a permit application to be considered complete and ready for public hearing advertisement is provided. Web site links are available to the joint permit application forms and public permit record databases.

**Being on a Board**

This section covers the important roles of volunteer citizen advisory boards and what it means to serve on a local wetlands board, including information about pre-requisites, responsibilities, terms, board structure and more. Meeting times and contact information by locality are also provided.

**Conduct a Hearing**

The permit review process and a description of what constitutes a public hearing is included here. So is information about how and why to hold an Executive Session (or closed meeting), and how to conduct a violation hearing for unpermitted actions or actions not in compliance with approved permits. A set of document templates is available to address all matters of notification from communicating a board decision to a restoration order. These templates may be used as written or customized to suit local program needs.

**Decision Support & Technical Assistance**

Links to several different tools and map viewers designed to inform shoreline management decision-making can be found here, including the Comprehensive Coastal Resources Management Portals (CCRMPs), the Shoreline Management Model and self-guided decision tools. Contact information for technical experts and links to technical reports about tidal resource ecosystem services and policy issues are also here.

**Restoration for Resilience**

This section looks at tidal shoreline resources from the perspective of restoration, creation or rehabilitation. What does it mean and what does it take to restore wetlands where they once were, or add newly created vegetated marsh area to an existing feature? Special considerations for permit decisions related to these project types are explained. Cost-share and grant program information for coastal resilience projects is provided.

**Compliance & Other Legal Information**

Once a permit is issued, what happens next? Resources on the compliance process are found here, including monitoring and inspections, stop work and restoration orders, and penalty options. Other legal resources include brief summaries of relevant court cases and Attorney General opinions.

**Know Your Resources**

The final section contains quick links to some of the most common administrative matters. Frequently Asked Questions, a glossary of common terms, and a table of contents (site map) for the entire Handbook are provided for quick reference.
Shoreline Decision Support Tool

Another new tool to help shoreline managers is the Shoreline Decision Support Tool. This is an online, interactive tool that provides recommended shoreline management practices on-the-fly based on shoreline characteristics entered by users.

Original Decision Tree Series

A series of self-guided decision trees was produced in 2010 to transfer a best professional judgment process used by shoreline scientists into a format that anyone could use. Static decision tree flow diagrams were produced for undefended shorelines and different types of currently defended shorelines. Separate guidance documents were generated to accompany the decision tree series. Although popular and widely used, the original decision trees were often used alone without reference to the accompanying guidance materials to help the user understand how to work through the decision flow diagrams.

Shoreline Management Model

In 2011, Virginia’s shoreline regulations were amended to establish living shorelines as the preferred alternative for tidal shoreline erosion stabilization. CCRM was directed to provide guidance to localities to assist with implementation of this policy. A Shoreline Management Model (SMM) was developed in response to that mandate. The SMM uses geospatial analysis, available GIS data, and decision tree logic models to map where specific erosion control strategies are most suitable along the shoreline. The SMM output gives preference for living shoreline practices wherever the conditions suggest they will be effective. This model was refined and updated several times to accommodate more shoreline types and the current version has been run for all coastal localities (SMM version 5.1 https://www.vims.edu/ccrm/ccrmp/bmp/smm/index) The SMM has great value for developing management strategies across large shoreline areas where conditions along the shoreline are not uniform. A limitation of this model is that keeping the data current can be time consuming and cost prohibitive.

New Shoreline Decision Support Tool

A new interactive tool is now available that combines the utility of the original self-guided decision trees with the automated logic of the Shoreline Management Model (v. 5.1). This tool uses the same logic and decision pathways as the SMM, but does not depend on available GIS data. The advantages over the static decision trees include the tool is easier to use, ecological and sociological conflicts are identified up front, and the order of questions asked by the tool depends on previous answers. Guidance and readily accessible definitions are embedded within the tool as well.

This new user-driven decision support tool is perfect for small-scale shoreline evaluations where conditions are relatively consistent along the entire shoreline length. The target audiences include regulators reviewing permit applications, shoreline professionals providing advice to clients, and property owners seeking alternatives for shoreline erosion stabilization on their own.

The Shoreline Decision Support Tool was developed with funding from the NOAA RESTORE Science Program, which is dedicated to supporting ecosystem sustainability in the Gulf Coast region. The goal was to make this Virginia tool exportable to any coastal region with similar shoreline management programs and to serve the largest audience possible.
This interactive tool provides recommended shoreline erosion control strategies based on the user’s answers to a series of questions that help characterize the shoreline condition. The Shoreline Decision Support Tool is served from a dedicated web site (https://cmap2.vims.edu/LivingShoreline/DistrictSupportTool/index.html).

A landing page provides project and partner information as well as intended applications. This is not a project design tool. Design specifications for any project should be done in consultation with regulatory authorities, technical advisors and contractors. A ‘How To’ section explains how the tool works and what the icons mean.

Tool Features

Flexible Americans with Disabilities Act (ADA) compliant and accessible with adjustable screen size.

Query-Based Users are prompted by a sequential series of Yes/No or multiple-choice questions that only appear based on answers to previous questions. The questions cover basic shoreline conditions that can be observed or measured.
Shoreline Decision Support Tool - New Format and Content

**Helpful** Each question has an embedded help section.

Click “?” to open explanations, examples and graphics to guide selection of the best answer to the question.

**On-the-Fly** After all questions are answered, clicking ‘Submit My Answers’ will open a summary window that describes the recommended strategy, reviews the answers provided, and offers pictures to illustrate examples of the recommended practice.

**Capture and Reset** The recommendation summary window can be captured using a print feature. A link to Regulatory Resources by state is also provided. Close the summary window to return to the list of questions and to change any answers for a revised recommendation by clicking . When finished, click ‘Reset’ to start over with a new query.
Real World Applications - *using the improved decision support tools*

**Wetlands Board Members**

What information is most important for new Wetlands Board members to get started? Start with the Handbook’s **Know Your Resources** section where you can review **Frequently Asked Questions**, a shoreline management **Glossary**, and an outline of the entire **Handbook’s Contents**. Then review information about **Being on a Board**.

Do proposed projects automatically qualify for expedited General Permits? No. The Wetlands Boards and VMRC jointly determine if projects qualify for a general permit. Find general permit qualifying criteria and the determination process under the Handbook’s **Permit Information** section.

What is wetland compensation and when is it required? Actions that replace permitted wetland losses are explained in VMRC’s Mitigation-Compensation Policy. Find it in the Handbook under **Laws & Jurisdictions > Local & State: Tidal Wetlands Act > Guidelines**. More information about each type of compensation can be found under **Conduct a Hearing > Hearing Procedures > Permit Decision**.

**Government Staff**

How should permit applications be reviewed before public hearings are scheduled? Check for application completeness and determine jurisdictional boundaries using information under the Handbook’s **Permit Information** and the **Decision Support & Technical Assistance** sections. During site visits, compare proposed projects to the recommendations provided by the Shoreline Decision Support Tool.

When and how should Stop Work Orders be issued for illegal activities? Legal resources to enforce tidal shoreline laws can be found in the Handbook’s **Compliance & Other Legal Information** section.

What support is available for shoreline restoration projects? Go to **Restoration for Resilience** in the Handbook for information about different restoration practices, project funding & incentives, and project examples in story maps and a Resiliency Project Database.

**Property Owners & Shoreline Professionals**

A client has a failing bulkhead, but they don’t want to replace it with another bulkhead. What are other possible alternatives? Work through the **Shoreline Decision Support Tool** and visit the **Decision Support & Technical Assistance** section in the Handbook.

What do I need to know before hiring a shoreline professional? Work through the **Shoreline Decision Support Tool** to see what recommendation best fits your shoreline situation. Look up **Who Do I Ask?** to seek objective expert advice before hiring professionals. Property owners are ultimately responsible for obtaining and complying with all necessary permits. Review the Handbook’s **Permit Information** section.

**Decision Tool Adaptive Management**

Feedback about these new and improved shoreline decision tools is an important part of the adaptive management process. Try out the new tools and share your comments and suggestions.

Shoreline Management Handbook – Pamela Mason mason@vims.edu
Shoreline Decision Support Tool – Marcia Berman marcia@vims.edu