

Conclusions and Next Steps



Photo credit: Karen Duhring, VIMS

Living Shorelines in the Chesapeake Bay: Needs and Recommendation for Future Activities

Audra E. Luscher¹, Jana L. D. Davis², and Shep Moon³.

¹Department of Natural Resources, Coastal Zone Management Program, Taylor Ave, Annapolis, MD 21401, aluscher@dnr.state.md.us; ²Chesapeake Bay Trust, 60 West St. Suite 405, Annapolis, MD 21401, jdavis@cbtrust.org; ³Virginia Department of Environmental Quality, Virginia Coastal Zone Management Program, East Main Street, Richmond, VA, Henry.Moon@deq.virginia.gov

INTRODUCTION

The Living Shoreline Summit brought together marine contractors, policy-makers, scientists, land owners, marine engineers, regulators, and others to discuss the past, present, and future of nonstructural erosion control methods in the Chesapeake Bay. These disparate groups together identified gaps and ideas for future actions to promote living shoreline activities in the region, focusing on 1) Outreach and education; 2) Incentives; 3) Data and tools; 4) Research; and 5) Planning, policy, and regulation. The recommendations by these groups identify mechanisms to better promote living shoreline practices Bay-wide; improve coordination and streamline activities throughout all levels of government; and identify opportunities to increase funding and incentives for design and construction.

These recommendations emerging from the Living Shoreline Summit will support and help shape additional activities that are ongoing or had already been planned over the next five years throughout the Chesapeake Bay Region. For example, the Coastal Programs in Maryland and Virginia, prior to the Summit, had allocated significant financial and staff support to the issue of living shorelines. Both Programs have included living shoreline activities as a priority in their Coastal Program Enhancement Strategies and available for funding through the National Oceanographic and Atmospheric Administration. Anticipated Bay wide activities and products include waterfront property owner's guidebooks, living shoreline design guidelines, contractor training on living shoreline designs, further research and monitoring, and improved Geographic Information System (GIS) data and decision support tools. Virginia also intends to revise wetland guidelines, while the Maryland Coastal Program will assist counties with building their capacities to be more involved with regulating shoreline development and modifying the sequencing of the state and local permits. These programs will build on information from the Living Shoreline Summit in preparation of their materials and programs.

In addition to Coastal Program activities, NOAA Restoration Center, Chesapeake Bay Trust, Chesapeake Bay Foundation, Eastern Shore RC&D, and River Keepers have become highly engaged in the last five years on this issue by providing funding and/or constructing projects through community and volunteer based efforts. These organizations are providing the much needed on the ground support in order to fill some of the incentive gaps when promoting living shoreline design implementation to property owners. These groups are also making strides towards developing monitoring protocols and conducting assessments on the effectiveness of living shoreline designs for erosion control and their ecological benefits/impacts. Academics are also important in this effort, as the Virginia Institute of Marine Science and University of Maryland are both focusing significant research time and funds towards determining the affects of human alterations to shorelines in natural systems. Recommendations and information from the Summit will help guide these programs as well.

OUTREACH AND EDUCATION

Currently, the majority of waterfront property owners, especially individual private landowners, receive their technical advice directly from marine contractors, who are often their first point of contact on shore-

line issues. Since at present most contractors do not know about or use living shorelines techniques, these options are not being readily considered during the interactions between contractors and homeowners. Several suggestions were provided to address this issue and include: increasing awareness of these practices to homeowners through an outreach campaign, providing technical training courses and certifications for contractors on living shoreline designs, and identifying mechanisms to disseminate information through realtors/home sales transactions as well as local commissioning bodies that make local land use decisions.

Developing a clear and simple message on the benefits of living shorelines is an important outreach need. Government and nonprofit organizations should move towards social marketing as a mechanism for changing behaviors and attitudes about shorelines. Concerned citizens can help by emphasizing this issue to elected officials to increase the awareness of living shorelines, their benefits, and the appropriate conditions for their use.

Some additional products requested during the session included: 1) developing a guide on how to conduct maintenance, emphasizing all types of shoreline protection, including bulkheads, revetments, and living shorelines; and 2) creating a living shorelines website to act as a “one-stop shop” for information on this subject.

Recommendations

1. ***Initiate efforts to use social marketing concepts to promote living shorelines in the Chesapeake Bay-*** Social marketing is becoming more common in environmental communications. This social psychology concept shows that attempts to change people’s behavior are most successful when they are carried out at the community level and when they involve direct contact. Social marketing could assist the promotion of living shorelines by identifying the barriers that prevent shoreline property owners from specific behaviors such as selecting a more natural erosion protection technique. Use of a marketing technique could further the effort to identify solutions to these barriers and develop a message to promote the new behavior.
2. ***Incorporate Living Shorelines into the (Networked Education for Municipal Officials) NEMO curriculum -*** Networked Education for Municipal Officials (NEMO) was recently established in the Chesapeake Bay to help local officials with natural resource planning. NEMO draws on partnerships with nonprofit organizations and government agencies to offer a slate of workshops on the issues that most concern local officials. NEMO has demonstrated in other areas of the country that local officials respond with interest when regional resources are made accessible in a way that is both organized and responsive to their immediate needs. Living shorelines must be a resource priority in NEMO with curricula created for local government decision makers who become interested in this topic area.

INCENTIVES

A full discussion of the available incentives was covered by a comprehensive panel session during the conference and is discussed in depth as a topic paper in these Proceedings (1). Some additional ideas include: 1) investigate how storm water utility fee can be used for the restoration fund and a source of funds for these restoration projects; and 2) investigate how to link living shoreline activities to water quality in order for local government to use these in zoning tools to meet Total Maximum Daily Load (TMDL) standards and how to get credit for these activities.

Recommendations

3. ***Identify existing or new financial incentives opportunities to promote the implementation of living shorelines over hard stabilization options -*** Many financial incentives already exist for property owners in Maryland, and to a lesser extent, in Virginia (1). These incentives include both grant and loan programs for both public and private property owners, and should be more widely publicized and expanded, where needed. These types of assistance are highly effective at increasing the

interest in these projects, although they should be paired with other incentives such as technical support in design and construction as well as regulatory incentives like lower permit fees or wait times for living shoreline designs.

RESEARCH

As discussed elsewhere in this volume, there are many gaps in knowledge in the field of living shorelines, including large-scale sediment budget issues and more specific questions about design and function of living shoreline practices. Filling these gaps with research is imperative to moving the field of nonstructural erosion control forward. The Cooperative Institute of Coastal and Estuarine Technology (CICEET) has recognized these needs and has initiated a new program to address some of the gaps identified in the National Academies report on mitigating erosion in sheltered coasts (2).

Some of the specific research needs were identified throughout the Living Shoreline Summit. The question of whether the Bay is sand-starved (as opposed to smaller-grained sediment starved) has been raised in the context of dwindling sandy Bay resource areas from the potential combination of sea level inundation and loss of sediment supply from stabilization activities. The 2006 National Academies report on shoreline erosion (3) emphasizes that regional sediment budgets are an important issue that should be addressed before regional shoreline erosion control plans can be formulated (2).

Recommendations

4. ***Promote research on the design of living shorelines, on quantification of habitat and water quality benefits of living shorelines, on impacts of sea level rise on living shorelines, and on impacts of living shorelines on property values.***- In order to strengthen the case for living shorelines, more information is needed for various types of environments and should include: 1) studying the performance of various design options and identification of optimum conditions (low, medium, high energy) for each; 2) developing more technical engineering specifications to assist contractors without a design background; 3) determining the effects of rising sea level on project longevity and success; 4) identifying how living shorelines affect the value of shoreline property; and 5) elucidating the sediment dynamics in the Bay and how shoreline protection is affecting these processes.
5. ***Determine sediment budgets for the Chesapeake Bay, its tributaries and the coastal bays.***- Managers and scientists should further investigate and differentiate between clays/silts and sandy sediment processes in the Bay. Techniques to track transport and determine source areas for sediments in the Bay need to be identified or developed. Information on sediment source areas and discrete littoral cells needs to be linked to the regulatory process in an effort to minimize secondary and cumulative impacts on adjacent shorelines. This knowledge will move us towards developing regional sediment and shoreline management approaches. Partnerships also need to be enhanced to achieve this goal and investigate the role the Chesapeake Bay Program has with coordinating multiple state and federal programs to achieve the study goals by leveraging funds and technical support.

DATA AND TOOLS

The Summit showcased the availability of a wide range of GIS data available to assist with planning and determine suitability for living shorelines to address erosion and restore shorelines. Some of the digital products include Shoreline Situation Reports and Comprehensive Inventory, Living Shorelines Suitability Tool, as well as web-based mapping products like Shoreline Managers Assessment Kit (SMAK) for Virginia and the Maryland Shorelines Online (MSO) web portal (4). Although technical tools are becoming available, their promotion needs to be enhanced. More training and promotion of the existing online tools is needed especially for homeowners and local bodies like Wetland Planning Boards or Shoreline Commissions. Concerns expressed in regards to the tools related to the validation of results with ground-

truthing, determining limitation of the tools use due to the accuracy and scale of the data, and maintaining the data and tools on a routine basis.

Recommendations

6. *Use existing monitoring and effectiveness studies to validate GIS-based suitability models and planning tools* - Comparing projects suggested by suitability models to projects actually implemented for a given waterway would be highly informative and would validate model results. Studies of implemented projects to determine effectiveness are ongoing (see papers in this volume). If these effectiveness studies show that specific project types are working well in a given area, these project types should be part of the suitability model recommendations. If the project types are not working, they should not be recommended in the suitability model, and reasons for failure noted.

DESIGN AND EFFECTIVENESS

Design and effectiveness information will lead to improved project selection and design criteria for specific energy regimes. More specifically, the effectiveness of living shorelines in medium energy areas and threshold designs for protection, while still maintaining/maximizing habitat, is required. Uniform standards/protocols involved in the assessments to determine effectiveness of living shoreline projects are also needed to allow for the comparison of projects implemented throughout the Chesapeake Bay. Specific gaps in technical information included: 1) determining the width of sill windows to effectively flush and provide access for fauna and the implication on submerged aquatic vegetation (SAV) success; 2) determining optimum height of sills and other structures in various energy regimes; 3) measuring the impact of fetch on project success; 4) understanding the use of oysters and oysters shell rubble to protect shorelines; 5) increasing demonstration sites for more innovative habitat designs using offshore sand bars, oyster reefs, and living breakwaters; and 6) determining the effectiveness of coir fiber logs in different energy regimes and develop specifications and installation requirements.

Recommendations

7. *Improve existing project selection and design criteria to reflect the recent science-based assessments and modeling* - The criteria and standards for design that currently exist are relatively general, with information collected by practitioners shared in a relatively informal way. Recent monitoring efforts designed to measure project success in variable energy regimes offer a chance to fine-tune these criteria. For example, projects in low fetch areas designed for low fetch systems sometimes fail. In some of these cases, at least, the fetch may indicate low energy area, but boat wakes cause the energy to be much higher than anticipated. Determining reasons for failures will assist in the process to develop more clear design standards or at least understand specific case studies where the selection criteria may not be applicable.

PLANNING, POLICY, AND REGULATION

Increasing opportunities to improve coordination and communication among implementers of living shorelines in Maryland and Virginia was a major theme of the Summit. To start, common definitions and terminology related to living shorelines are needed to improve uniformity between the states and to improve communication on this topic nationwide. Different regions of the country have much to share on this topic, and while other regions may not yet discuss their activities in the context of “living shorelines,” projects in regions such as Pensacola Bay (e.g., the Green Shores project), other areas of the Gulf Coast, the Puget Sound, and North Carolina can provide insights on design, science, and regulatory issues.

In the Chesapeake region, even within states, a lack of coordination on regulatory activities exists between local and state/federal permitting staff and among staff of different counties. Some permit process-based activities such as permit sequencing between agencies may need to be refined in order to allow

counties to be more involved in shore erosion control projects and to ease the process for property owners. Currently, the joint state/federal permit in Maryland is often applied for and issued before local building permits are sought. In such cases, it is often difficult for local governments to request or require a living shoreline approach when a state/federal permit for a structural project has already been obtained. However, this situation does sometimes occur, prolonging the process for property-owners who may have felt they already had permission to begin construction.

Staffing limitations appear to play a role in the review process and in lack of ability for state and local government agencies to play a more robust role in offering nonstructural solutions to erosion issues. A more science- and data-intensive regulatory review for secondary and cumulative impact in the permit review process cannot occur at present due to staffing limitations and limited access to data. More specifically, permits continue to be made on a case by case basis and are not reflective of regional processes or impacts. Virginia currently has better capabilities to incorporate a greater suite of data tools in its review activities with the participation of Virginia Institute of Marine Science staff and the generation of automated reports.

With respect to local government land use authorities, comprehensive plans that guide land use decisions need to include a greater suite of natural resources considerations. More specifically, Virginia's Chesapeake Bay Preservation Act needs to improve protection of Resource Protection Areas (RPA) when conducting shore erosion reviews and require living shoreline projects to be considered.

Another way for local and state governments to promote living shorelines, in addition to streamlining or "green-taping" the regulatory process, is to lead by example. It can be difficult to require citizens to implement living shorelines if governments' own lands do not exemplify this practice to the maximum extent possible. Many local, state, and federal lands offer opportunities to implement nonstructural shoreline erosion projects.

Recommendations

8. *Develop a regulatory framework to allow for regional shoreline management and be more proactive by utilizing shoreline management plans to guide future development activities-* Few cases exist in which shorelines are managed in the context of regional shoreline management plans and regulation. Those cases in which they do exist are often along ocean coasts where littoral cell boundaries and the regional units can be identified. Regional Sediment Management (RSM) has been successful in the Mobile Bay region (5) and has resulted in cutting costs, allowing the use of natural processes to solve engineering problems, moving away from case-by-case decisions, which allow the environmental integrity of a system to be maintained. As a management method, RSM includes the entire environment, from the watershed to the sea and accounts for the effect of human activities on sediment erosion as well as its transport in streams, lakes, bays, and oceans. To move forward on this issue in the Chesapeake Bay, managers should investigate the role of State Coastal Programs and the use of 309 Enhancement Strategies and funding to advance regional shoreline management activities.
9. *Encourage government lands to lead by example, and install living shorelines where appropriate.*

SUMMARY

The Living Shoreline Summit was designed to bring together a diverse array of groups including managers, regulators, policy-makers, scientists, contractors, nonprofit organizations, and homeowners to discuss shoreline management issues in the Chesapeake Bay. The sessions were targeted to cover multiple topics such as design case studies, monitoring/assessments, policy/regulatory issues, and incentives that concluded in a final panel discussion. This format allowed the groups to share their work, while also identifying issues and opportunities to continue to promote, study, and implement living shoreline projects.

The recommendations showed that although living shorelines are gaining momentum, some hurdles do exist that prevent broad scale implementation by most property owners in favor of traditional riprap

structures. These hurdles often relate to issues of risk and liability, lack of knowledge about alternative options and their benefits, and aesthetic issues - perceptions that natural shorelines are not “tidy.” Efforts to train marine contractors are also underway, but need to continue at a greater level and may need to be formal and involve a certification program.

Beyond changing homeowner and marine contractor behaviors and preferences, there exist some policy issues that must also be addressed. These issues center mainly on staff limitation preventing adequate time for site visits and more technical assistance with property owners. Coordination and process-based issues with permit sequencing between state and local are also problems that should be addressed. Working together more cohesively through a bi-state perspective could help the community overcome some of these hurdles listed above. Living shoreline practices are beginning to gain acceptance and offer a compromise for property owners trying to address erosion, while also continuing to assist managers with protection the services that natural shorelines provide to the Chesapeake Bay ecosystem. Instituting the recommendations from the Living Shoreline Summit will accelerate this shift.

REFERENCES

1. Davis, J. and A. Luscher. 2008. Incentives to Promote Living Shoreline Techniques in the Chesapeake Bay. In: S. Erdle, J.L. Davis, and K.G. Sellner (eds.). *Living Shoreline Summit Proceedings*. CRC Contrib. 08-164, VIMS, Gloucester Point, VA. pp. 111-116.
2. Roberts, S. 2008. The National Academies Report on Mitigating Shore Erosion Along Sheltered Coasts. In: S. Erdle, J.L. Davis, and K.G. Sellner (eds.). *Living Shoreline Summit Proceedings*. CRC Contrib. 08-164, VIMS, Gloucester Point, VA. pp. 3-6.
3. National Research Council. 2007. *Mitigating Shore Erosion on Sheltered Coasts*. The National Academies Press, Washington DC. 174 pp.
4. Luscher, A. 2008. Maryland Shorelines Online: A Web Portal and Geospatial Tool for Shoreline Planning and Management in Maryland. In: S. Erdle, J.L. Davis, and K.G. Sellner (eds.). *Living Shoreline Summit Proceedings*. CRC Contrib. 08-164, VIMS, Gloucester Point, VA. pp. 93-97.