



Living Shorelines Primer

Introduction

"Living Shorelines" are a shoreline management practice that restores, enhances, maintains or creates natural coastal or riparian habitat, functions, and processes and also functions to mitigate flooding or shoreline erosion through a continuous land-water interface (Figure 1). Coastal and riparian habitats include but are not limited to intertidal flats, tidal marsh, beach/dune systems, and bluffs. Living shorelines may include structural features that are combined with natural components to absorb, or attenuate, wave energy and currents but that do not sever the natural processes and connections between uplands and aquatic areas.



Figure 1. Different types of Living Shorelines

Background

For millennia, the processes of erosion and accretion have sculpted Connecticut's coastal landscape, creating and modifying its beaches, dunes, wetlands, and river channels. Historically, shoreline development has attempted to resist these dynamic processes by utilizing "hard" structures, like seawalls and stone revetments, for shoreline protection and to address shoreline erosion. However, such structures can be ineffective and actually increase rates of erosion, as well as the damage encountered from storm events (Figure 2). Hardened shorelines can also interrupt sensitive coastal habitats and their functions.

Living shorelines are a relatively recent approach for combatting shoreline erosion. They involve "soft engineering" techniques that incorporate ecological principles and achieve a more natural aesthetic. Living shorelines preserve vulnerable shoreline habitats by enhancing their natural components and protecting them by buffering wave energy. Recent legislation in Connecticut, has enabled the Department of Energy and Environmental Protection (DEEP) to investigate and encourage the implementation of living shoreline techniques, in lieu of traditional hard measures, to address shoreline erosion problems.

Advantages of Living Shorelines

- ❖ They absorb rather than reflect wave energy, decreasing uneven and unnatural rates of erosion
- ❖ They complement the natural shape and aesthetic of the shoreline while preserving natural sand movement and coastline dynamics
- ❖ They create more stable shallow water habitat to support aquatic species
- ❖ They aid in filtration of sediments and pollution to improve water quality
- ❖ They can provide ease of shoreline access for wildlife
- ❖ Their costs may be proportionate to "structural" or "hard" shoreline management techniques



Figure 2. Photo of coastal storm damage taken by DEMHS on 08/30/2011 following Tropical Storm Irene

Regulatory Principles

Connecticut's Coastal Management Act (CCMA) establishes [goals and policies](#) to preserve and manage navigation, water-dependent uses, and coastal resources. CCMA also includes a policy that coastal planning consider the potential impact of flooding and erosion patterns on coastal development and a policy for areas within the coastal boundary to maintain the natural relationship between eroding and depositional coastal landforms and promote nonstructural mitigation measures to minimize the adverse impacts of erosion and sedimentation. Accordingly, CCMA policy identifies several criteria that must be met in order for structural solutions to be permissible "where there is no feasible, less environmentally damaging alternative and where all reasonable mitigation measures and techniques have been provided to minimize adverse environmental impacts."¹

CCMA was amended in 2012 by [P.A.12-101](#), "An Act Concerning the Coastal Management Act and Shoreline Flood and Erosion Control Structures," which introduced the implementation of living shorelines in coastal management. The act includes living shorelines [techniques](#) that maintain or restore coastal resources and habitat as a "feasible, less environmentally damaging alternative" for sedimentation and erosion control, and it excludes any activity, including [living shorelines](#) projects, for which the primary purpose or effect is restoration or enhancement of tidal wetlands, beaches, dunes, or intertidal flats, from the definition of a shoreline flood and erosion control structure ([Figure 3](#)).^{1,2} Living shorelines are also identified as an innovative and low-impact approach to shoreline protection and adaptation to sea level rise in Connecticut General Statutes (CGS) section [22a-363h](#), which was established by this act.

Permit Process

CCMA specifies that to be considered a less environmentally damaging alternative, living shoreline techniques must maintain or restore coastal resources and habitat in addition to providing shoreline protection. Consistent with the [goals and policies](#) of CCMA, review of proposed living shoreline projects requires consideration of their effect on:

- Naturally eroding shorelands
- Longshore sediment transport
- Patterns of shoreline erosion and accretion

- Intertidal flats
- Existing tidal wetlands
- Wildlife, finfish & shellfish habitat
- Public access
- Navigation

Therefore, the [permit process](#) for living shorelines varies, depending on circumstances of the site, since all projects and potential sites are unique. Pre-application coordination with DEEP Land & Water Resources Division (LWRD) [staff](#) is still strongly recommended.

Living shoreline projects that are proposed waterward of the Coastal Jurisdiction Line (CJL) or within tidal wetlands in Connecticut require authorization from LWRD. New living shoreline projects that provide shoreline protection and maintain or restore coastal resources and habitat, including their functions and process, or are proposed to replace existing “hard” shoreline structures that were either previously authorized or completed prior to January 1, 1995, may be eligible for expedited approval through the Certificate of Permission (COP) authorization process pursuant to CGS sections [22a-363b](#) and [22a-363h](#). A COP application is processed within 90 days or less, and the process does not include public notice or hearing requirements.

A Structures, Dredging and Fill and Tidal Wetlands (SDF/TWSD) permit process pursuant to CGS sections [22a-361](#) and [22a-32](#) may be warranted in cases where a living shoreline is proposed by multiple property owners or the potential for adverse impacts to coastal resources, navigation, or aquaculture requires more extensive evaluation. The SDF/TWSD application is more comprehensive than the COP application; thus, it requires more time to process than a COP. Processing times and level of coordination are contingent on the size, complexity and scope of the intended project.

Coordination & Review

Any activity proposed within an SDF/TWSD application, including living shorelines, requires consultation with the Bureau of Aquaculture within the Department of Agriculture and several local commissions, including Harbor, Shellfish, and Conservation commissions, prior to submission of the application to DEEP. The application process also requires certification of a public notice of the application from the applicant upon submission to DEEP and a subsequent public notice of tentative determination from DEEP, which includes a public comment period. If the primary purpose or effect of a proposed living shoreline is to provide tidal wetlands or other coastal resource restoration or enhancement, the DEEP Commissioner may waive or reduce any application fee at their discretion in accordance with CGS section 22-361(a)(2).

A living shoreline installation proposed waterward of the CJL typically requires a [Section 404 Permit](#) from the U.S. Army Corps of Engineers (USACE). The work may be eligible for authorization under one of the USACE’s [General Permits](#) for the State of Connecticut. If USACE authorization is required, the State’s Section 401 Water Quality Certificate (WQC) is integrated into the COP and SDF/TWSD authorization process. For a USACE jurisdiction determination regarding Section 404, the applicant should consult directly with the [USACE](#). For questions on DEEP’s regulatory review process, contact LWRD [staff](#). Local permitting may also be required for projects proposed waterward of the CJL. Contact the appropriate local municipal planning office for guidance.

Municipal Guidance

Coastal municipalities review coastal site plans for living shoreline projects located fully or partially within the coastal boundary and landward of mean high water in accordance with CCMA requirements.^{2,3,4} The term “[living shoreline](#)” is not included in the legal definition of a shoreline flood and erosion control structure ONLY when its **primary purpose or effect** is the restoration or enhancement of tidal wetlands, beaches, dunes or intertidal flats ([Figure 3](#)). Therefore, to be consistent with CGS section 22a-109(c)(2) a living shoreline must:

- Principally restore or enhance natural coastal or riparian habitat features, functions, and processes;
- Maintain the natural processes and connections between uplands and aquatic areas;
- Not have the primary purpose or effect of controlling flooding or erosion from tidal, coastal, or navigable waters; and,
- Not be used to retain, expand, or create yard space or developable land.

Living Shoreline vs. Flood & Erosion Control Structure

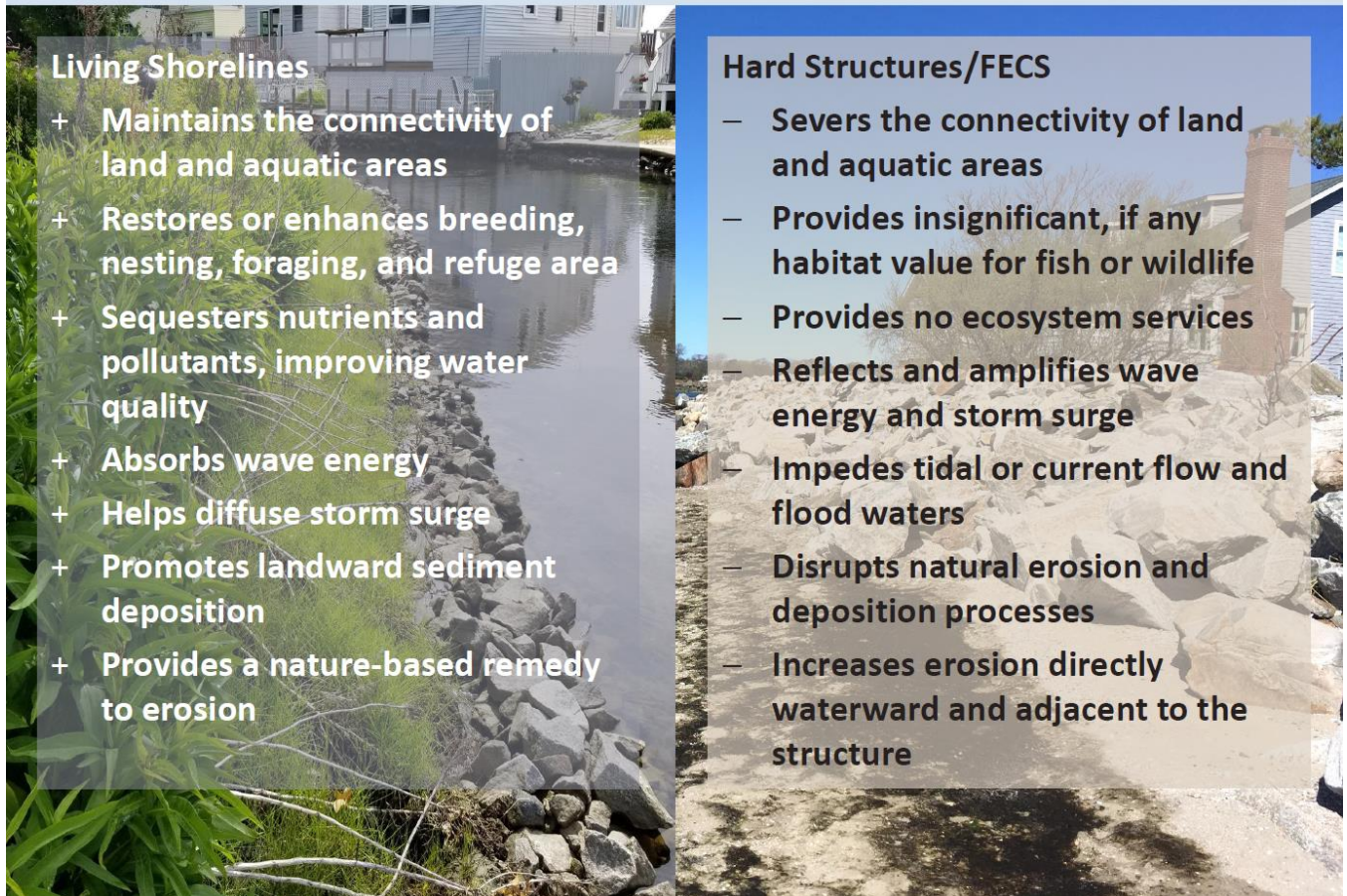


Figure 3. Functional differences between a living shoreline and a flood & erosion control structure

If a proposed living shoreline does not meet all of the resource restoration or enhancement criteria, then in accordance with CGS sections 22a-109(a) and 22a-109(d), the coastal site plan:

1. Shall be referred to DEEP and consideration given to any comments and recommendations that DEEP submits in response before final action is taken; and,
2. Shall be approved only if the record demonstrates and the commission makes specific written findings that:
 - a. such structure is necessary and unavoidable for the protection of:
 - i. infrastructural facilities, cemetery or burial grounds,
 - ii. water-dependent uses being fundamental to habitability or the primary use of such property; or,
 - iii. inhabited structures or structure additions constructed as of January 1, 1995;
 - b. there is no feasible, less environmentally damaging alternative; AND,

- c. all reasonable mitigation measures and techniques are implemented to minimize adverse environmental impacts.

If DEEP determines that a living shoreline project approved landward of CJL does not specifically meet the resource restoration or enhancement criteria as required, then the DEEP Commissioner may appeal the municipal decision pursuant to CGS section [22a-110](#).

Furthermore, coastal site plans for proposed living shorelines must include methods of construction in accordance with CGS section 22a-105(c), which detail the use, type, location, and storage of construction components and equipment, temporary flood and erosion control measures, and any other incidental work. If construction methods require any such use, placement, storage, or incidental work waterward of CJL, then the project also requires DEEP authorization as specified in the [Permitting Process](#) section. If a living shoreline project installed landward of CJL involved any construction activities occurring waterward of CJL without authorization from DEEP, then DEEP may consider the installment to be a public nuisance and seek to enjoin or abate any such nuisance pursuant to CGS section [22a-362](#).

To avoid potential legal conflicts, DEEP LWRD [staff](#) should be consulted on **any** proposed living shoreline project prior to submitting the project plan to either municipal zoning or DEEP for approval.

Contemplating a Living Shoreline?

Property owners should carefully consider the following:

- * A Living Shoreline is not a panacea; it won't be appropriate for every site;
- * They're most successful in protected, low-energy areas;
- * They may not be effective or feasible on a single property (e.g., beach nourishment);
- * They typically require regular monitoring and maintenance;
- * They most likely require DEEP and municipal authorization;
- * Its purpose cannot be to retain, expand, or create yard space or developable land or to impede flood waters;
- * Unless its principal purpose is coastal resource restoration or enhancement, which encompasses coastal habitat features, functions, and processes, it is categorized as a shoreline flood and erosion control structure; and,
- * If in doubt, it's probably not a living shoreline!



Connecticut Department of Energy and Environmental Protection

To learn more about living shorelines, see the [Techniques](#) and [Projects](#) links and visit the Connecticut Institute for Resilience & Climate Adaptation (CIRCA) webpage on [Green Infrastructure and Living Shorelines](#) and The Northeast Regional Ocean Council (NROC) [Living Shorelines Group](#).