Regulatory Challenges and Opportunities for Living Shorelines in New England

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- Casco Bay Estuary Partnership
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- Great Bay National Estuarine Research Reserve
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- Sacred Heart University
- The Nature Conservancy
- University of Connecticut
- University of New Hampshire

Given the ongoing COVID-19 pandemic, appropriate steps were taken to protect public health of the project team and others interviewed about their experiences permitting living shoreline projects in New England.

Cover photos: from upper left to lower right:
Stratford Point, CT (J. Mattei); Collins Cove, Salem, MA (MA CZM); Maquoit Bay Conservation Lands, Brunswick, ME (P. Slovinsky); Rose Larisa Park, East Providence, RI (RI CRMC); Maquoit Bay Conservation Lands, Brunswick, ME (P. Slovinsky); Rose Larisa Park, East Providence, RI (RI CRMC); Collins Cove, Salem, MA (MA CZM); Wagon Hill Farm, Durham, NH (NH DES); Maquoit Bay Conservation Lands, Brunswick, ME (P. Slovinsky); Stratford Point, CT (J. Mattei); Collins Cove, Salem, MA (MA CZM); Wagon Hill Farm, Durham, NH (NH DES)

Executive Summary

Regulatory Challenges and Opportunities for Living Shorelines in New England

Functioning coastal ecosystems in New England, and the habitats within them, such as dunes, wetlands, salt marshes, shellfish reefs, and seagrass meadows, provide critical ecosystem functions and services to humanity. These habitats slow coastal erosion, reduce flooding, regulate flows of nutrients, energy, and water, improve water quality, serve as critical habitat for fisheries species, and enhance biological diversity. Concentrated human populations near the coast, and the development associated with human activities, have transformed coastal landscapes. As a result of increased human activity and vulnerability to coastal hazards, shoreline hardening is increasing

Nature-based solutions (NBS) provide alternative options to balance the need for coastal protection and ecosystem function. Living shorelines are one such NBS as they use or mimic natural processes to reduce coastal flooding and erosion, provide community resilience to coastal hazards and the effects of climate change, and have the capacity to offer additional ecosystem functions and services ('co-benefits') that typical engineered solutions (e.g., seawalls) do not provide.

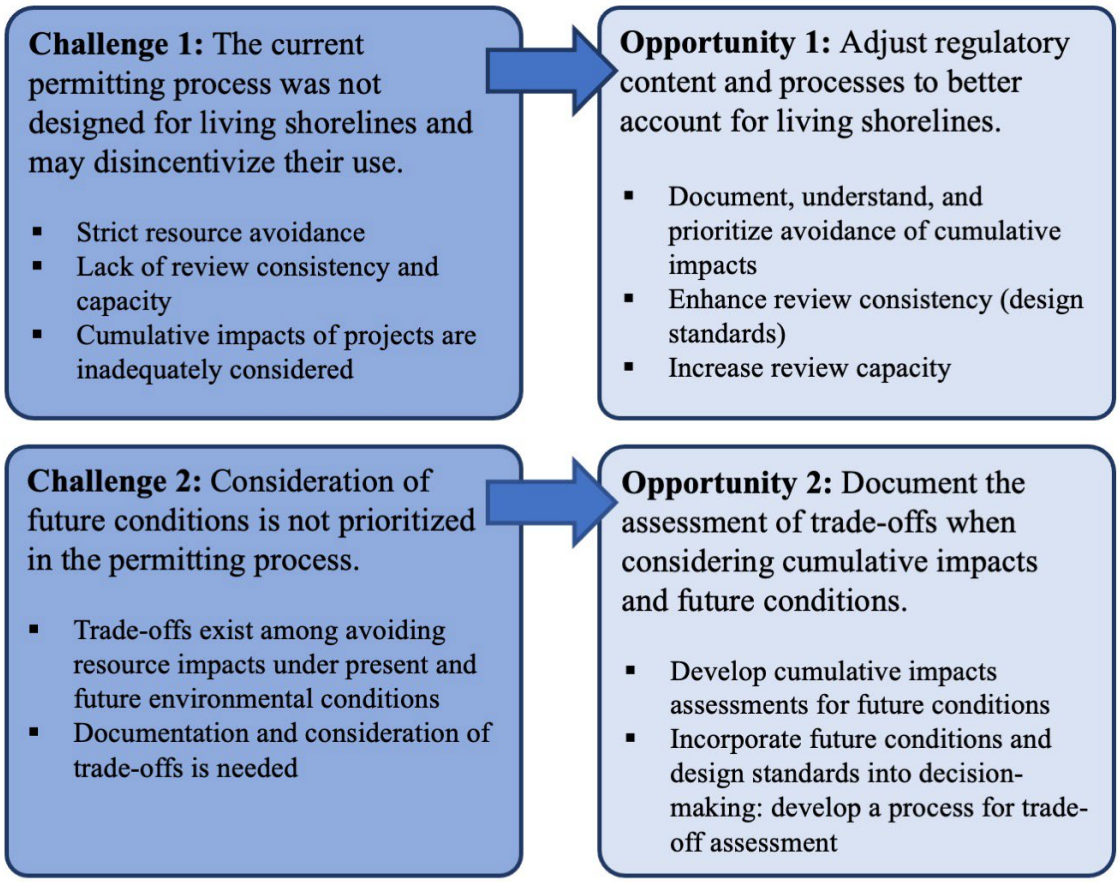
Living shorelines are increasing in frequency in some regions of the United States, while adoption of living shorelines in New England lags in comparison. This report outlines how the regulatory environment surrounding living shorelines is limiting the advancement and more widespread adoption of living shorelines in New England and presents challenges and opportunities related to permitting of living shorelines.

Often, living shorelines approaches are regulated using the same processes applied to other development projects, including those with commercial goals, rather than goals in the public interest (like climate resilience). Living shorelines, and other nature-based solutions, are designed to mitigate or balance impacts to ecological conditions with the need to protect existing infrastructure. The regulatory process for living shorelines subjects them to a high degree of scrutiny, which is important to ensure the best possible projects are implemented. However, living shorelines are regulated and permitted using a process that was designed to minimize direct impact to protect resources, which in some cases is inappropriate when considering living shoreline approaches.

A key feature of a living shoreline is its maintenance of a dynamic land-water interface, which is critical to the function of a living shoreline. Yet, certain methods used to construct functioning living shorelines, like deposition of sediment and/or work below the state or coastal jurisdictional boundary, can make permitting more challenging given a strong regulatory preference to avoid resource impacts under current environmental conditions. In contrast, traditional hard structures can be constructed above the jurisdictional boundary (e.g. seawalls), and avoid resource impacts under current conditions. A strong regulatory preference to avoid resource impacts may be unintentionally making living shorelines more difficult to permit than hard structures and incentivizing traditional hard structures, even though hardened shorelines are more likely to place resources at risk when cumulative impacts and future environmental conditions are considered. Careful permitting that avoids unnecessary impacts to intertidal areas

is critical to protect sensitive and valuable resources, but this incentive structure may advance coastal squeeze as sea levels rise.

Two key regulatory challenges and opportunities to better support the application of living shorelines where appropriate are summarized below.



Without prioritizing and supporting the appropriate use of living shorelines as a response to coastal hazards, it is unlikely that coastal ecosystems will be protected and maintained given the pace and scale of climate change impacts, in turn leaving coastal communities more vulnerable to coastal hazards.

To increase coastal community climate resilience, using nature-based solutions, it is important to continue discussions with federal and state regulatory agencies to document how topics like habitat conversion, future environmental conditions (e.g., climate change), and cumulative impacts are considered in regulatory decision-making.

Table of Contents

Acronyms

ACEC	Area of Critical Environmental Concern
CJL	Coastal Jurisdiction Line
CRG	Coastal Resilience Grant
CT DEEP	Connecticut Department of Energy and Environmental Protection
CWA	Clean Water Act of 1972
EFH	Essential Fish Habitat
GARFO	Greater Atlantic Regional Fisheries Office (of NOAA/NMFS)
GP	General Permit
HAT	Highest Astronomical Tide
HESD	Habitat and Ecosystem Services Division (of NOAA/NMFS/GARFO)
Mass DEP	Massachusetts Department of Environmental Protection
Maine DEP	Maine Department of Environmental Protection
MHW	Mean high water (also known informally as the high tide line)
MLW	Mean low water
NBS	Nature-based solutions
NEPA	National Environmental Policy Act of 1969
NHDES	New Hampshire Department of Environmental Services
NMFS	National Marine Fisheries Service (NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration
NROC	Northeast Regional Ocean Council
PCN	Pre-Construction Notification
RI CRMC	Rhode Island Coastal Resources Management Council
RIDEM	Rhode Island Department of Environmental Management
SLR	sea level rise
TNC	The Nature Conservancy
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WQC	Water Quality Certification

Introduction

Functioning coastal ecosystems in New England, and the habitats within them, such as dunes, salt marshes, shellfish reefs, and seagrass meadows, provide critical ecosystem functions and services to humanity. These habitats slow coastal erosion, reduce flooding, regulate flows of nutrients, energy, and water, improve water quality, and serve as critical habitat for fisheries species, and enhance biological diversity. (Barbier et al. 2011, Powers and Boyer 2014, Martin et al. 2016). For instance, natural wetlands attenuate waves, capture and accrete sediment, and hold water (Morgan et al. 2009, Spalding et al. 2014a, Gittman et al. 2014a, Pontee et al. 2016), thereby increasing community resilience to climate change impacts by reducing erosion and mitigating storm surge.

Concentrated human populations near the coast and the development associated with human activities have transformed coastal landscapes (Doyle et al. 2008, Bulleri and Chapman 2010), and led to degradation of these habitats (Bertness et al. 2002, Moser et al. 2012). Degraded coastal habitats increase vulnerability of coastal communities and natural resources to present-day erosion and flooding hazards, which will be exacerbated by climate change (Dolan and Walker 2006, Arkema et al. 2013, Spalding et al. 2014b).

As a result of increased human activity and vulnerability to coastal hazards, shoreline hardening is increasing (Jackson 1966, Douglass and Pickel 1998, NRC 2007, Gittman et al. 2015). There has been a long practice of armoring the shoreline to hold static the shore/sea interface, resulting in engineered shorelines covering greater than 50% of some urban coastlines (Gittman et al. 2015). Within this meta-analysis of shoreline hardening across the Atlantic and Pacific coasts, including both open ("directly exposed to the ocean") and sheltered ("connected to a bay, sound, lagoon or tidally influenced river") coasts, the City of Boston stands out with > 75% hardening of both open and sheltered coasts (Gittman et al. 2015, fig. 2). Hardened shorelines have been used to protect property and infrastructure, yet they bring well-known negative environmental consequences. Instead of preventing erosion, which is a natural process, hardened structures redirect it elsewhere, leading to the steepening and shortening of shallow intertidal habitat and shorelines over time (Douglass and Pickel 1999, Dugan et al. 2008), the loss of sandy beach (Jackson 1996), and many other known alterations to sediment dynamics within coastal systems (Ruggiero 2010). Hardened structures may also lead to seaward scour during storm events, hastening tidal wetland loss as sea levels rise (Doody 2004). They can also increase storm surge height, and exacerbate beach loss and home damage during hurricanes (Pillet et al. 2019, Zhang and Li 2019, Smith and Scyphers 2019). Shoreline hardening also leads to losses of biodiversity, habitat degradation and loss, and shifting species composition (Gittman et al. 2016). For example, replacement of natural shoreline vegetation, like fringing marshes, with hardened structures reduces filtration of runoff (Kemp et al. 2005) resulting in coastal water quality degradation, alters habitat for shoreline-associated nekton (Jennings et al. 1999, Bilkovic and Roggero 2008), and removes detritus (a basal energy source) from near-shore food webs (Burkholder and Bornside 1957, Teal 1962).

Nature-based solutions (NBS) provide alternative options to balance the need for coastal protection and ecosystem function (Pontee et al. 2016). Living shorelines are one such NBS as they use or mimic natural processes to reduce coastal flood and erosion (Pontee et al. 2016), provide community resilience to coastal hazards and climate change, and have the capacity to offer additional ecosystem functions and services ('co-benefits') that typical engineered solutions

(e.g. seawalls) do not provide. In this report, living shorelines are defined as "…a set of coastal erosion control practices, ranging from non-structural vegetated approaches to hybrid hard structural/restorative natural methods, that address erosion and inundation in a manner that improves or protects the ecological condition of the coastline. Living shorelines are a coastal subset of a larger group of green infrastructure practices, which include a greater range of nature-based techniques for inland areas that address storm water control, nutrient retention, and habitat enhancement in place of hard infrastructure" (Living Shorelines in New England: State of the Practice Report 2017).

Living shorelines represent a newer technology that has not been widely adopted in the Northeast U.S. than hardened approaches (e.g. revetments, bulkheads, seawalls). Given their relative newness compared to hardened approaches and the variety of designs they represent, living shorelines do not yet have a uniform definition, even among practitioners, regulators, and other stakeholders. The preferred terms and definitions for living shorelines vary across agencies and practitioners and are subject to change over time (Living Shorelines in New England: State of the Practice Report 2017). Our selected definition is in line with definitions of living shorelines developed by NOAA:

> *"Living shoreline is a broad term that encompasses a range of shoreline stabilization techniques along estuaries, bays, tributaries, and other sheltered shorelines. Living shorelines are not typically used on beaches on the open ocean. A living shoreline has a footprint that is made up mostly of native material. It incorporates natural vegetation or other living, natural 'soft' elements alone or in combination with some type of harder shoreline structure, like oyster reefs, rock sills, or anchored large wood for added stability. Living shorelines connect the land and water to stabilize the shoreline, reduce erosion, and provide ecosystem services, like valuable habitat, that enhances coastal resilience*." – *NOAA Habitat Blueprint*

> *"Living shorelines maintain continuity of the natural land-water interface and reduce erosion while providing habitat value and enhancing coastal resilience."* – Guidance for Considering the Use of Living Shorelines

Living shorelines should be designed to meet functional goals, minimize negative environmental impacts, and provide co-benefits for site-specific conditions (see Living Shorelines in New England: State of the Practice Report 2017 for more details on siting and selecting a living shorelines project, including an applicability index for 8 different project types). Such project types can include dune restoration (with a natural or engineered core), beach nourishment, coastal bank protection (with a natural or engineered core), natural marsh creation or enhancement (with or without toe protection) living breakwaters, and/or any combination of these approaches (Living Shorelines State of the Practice Report 2017). Living shorelines have been shown to perform as well as, if not outperform, conventional methods for erosion control when designed to match site characteristics (Gittman et al. 2014b, Smith et al. 2017, 2020, Herbert et al. 2018, Polk and Eulie 2018, Morris et al. 2019, 2021, Safak et al. 2020, Polk et al. 2022). Co-benefits offered by living shorelines include water quality improvement, enhancement of biodiversity, and habitat provision for nearshore organisms, which include recreationally and commercially important species (Scyphers et al. 2011, 2015, Grabowski et al. 2012, Sutton-Grier et al. 2015, Gittman et al. 2016a, Bilkovic et al. 2016, Davenport et al. 2018). In addition to

meeting site-specific conditions, living shorelines are designed to preserve or reconnect the land-water interface in the environmentally sensitive intertidal zone.

The connection between land and water is critical to maintain hydrology, nutrient and sediment supplies, and to allow for the natural landward migration of coastal habitats with rising seas (O'Meara et al. 2015, Ward et al. 2020). For example, salt marshes have a high capacity to resist erosion during storm activity and have predictable erosion rates during moderate events (Leonardi et al. 2016), making them an important component of many functional living shorelines. Salt marshes are maintained on gently sloping platforms by reinforcing biophysical feedbacks: they slow down tidal waters, encouraging sediment deposition, and the growth of their vegetation accumulates organic matter that contributes to elevation gain (Kirwan et al. 2016b, Ladd et al. 2019, Langston et al. 2020). However, many marshes along developed coastlines have had their sediment supplies cut-off, leaving them sediment-starved and unable to accrete sediment and maintain (or gain) elevation (Langston et al. 2020), a critical factor in the face of sea-level rise. Such sediment-starved marshes in New England include but are not limited to: Plum Island Estuary, Massachusetts (Morris et al. 2013), Headquarters Marsh in Little Narragansett Bay, CT (Warren and Niering 1993), and Narragansett Bay, RI (Donnelly and Bertness 2001). When working to reconnect the land-water interface, using fill, and working below the jurisdictional boundary may be necessary. For example, creating or enhancing a fringing marsh in a sediment-starved system is likely to require fill and the planting of marsh grasses in the intertidal zone (Living Shorelines in New England: State of the Practice Report 2017).

While critical to the function of living shorelines, the reestablishment of the land-water interface may create permitting challenges in today's regulatory environment. The Clean Water Act of 1972 (CWA) is a bedrock environmental law that is intended to prevent environmental degradation to waters of the U.S. created by development. Its regulatory framework is structured around the idea that development brings negative environmental impacts, and these impacts should be avoided by preventing development in environmentally sensitive areas. The Clean Water Act and U.S. Army Corps of Engineers (USACE) regulations have guided decision-making to prevent environmental degradation by requiring careful review for projects with potential impacts below the state or federal jurisdictional boundary (e.g. mean high water [MHW], highest astronomical tide [HAT] or the coastal jurisdiction line [CJL]), and requiring that activities avoid and minimize adverse effects ('resource avoidance').

The current regulatory environment around the CWA is important to protect natural resources in environmentally sensitive areas from development and maintain good water quality. However, nature-based solutions such as living shorelines, have different goals from development projects. Living shorelines aim to increase coastal resilience and actively protect and restore coastal resources that are at risk due to prior development, environmental degradation, climate change impacts, or other stressors that were not imagined when the Clean Water Act was conceived.

The demand for shoreline stabilization projects will increase as climate change hastens sea level rise (Doyle et al. 2008, Sutton-Grier et al. 2018), and with these projects, long-term impacts may accumulate within coastal systems (*Mitigating Shore Erosion along Sheltered Coasts* 2007). Environmental management practitioners, regulators, scientists, and engineers need to understand how these additional projects will restructure the intertidal zone at large scales, like entire embayments (Douglass and Pickel 1999, *Mitigating Shore Erosion along Sheltered Coasts* 2007), and have subsequent effects to the ecosystems in which they are

constructed (Gittman et al. 2016b). Shoreline stabilization using hard structures can have cumulative impacts on sheltered coasts, including altering of sand supplied to the intertidal zone, steepening of shoreline faces, and loss of intertidal zones and critical habitats (*Mitigating Shore Erosion along Sheltered Coasts* 2007). Ecological responses to cumulative impacts of shoreline development are less well understood, though evidence exists for cumulative impacts on nearshore ecology: while fish species richness increased associated with individual riprap structures, the community assemblage shifted in response to cumulative effects of multiple projects (Jennings et al. 1999), and benthic assemblages shifted toward rocky shore species as artificial hardened structures were added to coastal landscapes (Chapman and Bulleri 2003, Bulleri et al. 2004, Airoldi et al. 2005). Climate change and associated sea level rise compound the threats to coastal communities and coastal ecosystems already stressed by shoreline hardening.

Sea level rise will exacerbate 'coastal squeeze', the contraction of tidal wetlands and prevention of their landward migration due to physical barriers (Leo et al. 2019), compounded by the reduction of sediment supply caused by hardened structures. Without upland barriers (such as development or steep uplands) to impede them, wetlands are known to migrate landward as sea levels rise (Kirwan et al. 2016a, 2016b, Ladd et al. 2019). Increased storm frequency and severity with climate change, combined with sea level rise, pose additional hazards to coastal communities and coastal habitats, further necessitating mitigation efforts like living shorelines. Further, natural system responses to cumulative impacts (i.e. the impacts of multiple hard structures and/or climate change impacts like sea level rise) may be greater or less than the sum of individual stressor responses (Côté et al. 2016, Rees 1995, Hollarsmith et al. 2021). Therefore, maintaining the resilience of natural resources within ecosystems subject to multiple stressors (e.g. shoreline hardening, sea level rise, etc.) requires managers to account for potential cumulative effects of these stressors in decision-making at spatial scales as relevant to ecological (Hollarsmith et al. 2021) and coastal geomorphological (Airoldi et al. 2005) processes.

Living shorelines are increasing in frequency in some regions of the United States, while adoption of living shorelines in New England lags in comparison. Environmental conditions in New England, including shorter vegetation growing seasons, ice and associated scour, and large (2 meter) tide ranges pose challenges for appropriate project design, though plenty of viable options are available (O'Donnell 2017). There is a dearth of completed projects and subsequently sparse data and information on project performance and long-term impacts in the region. With few projects constructed, demand from coastal property owners is low and skepticism about their function in New England is high, so there are few projects slated for construction, few construction firms specializing in and promoting living shorelines to would-be clients, and a regulatory framework that sometimes disincentivizes living shorelines over the more familiar

hardened approaches (O'Donnell 2016, Hilke et al. 2020). These conditions have perpetuated a reinforcing feedback cycle, maintaining relatively few living shoreline projects in the region (Figure 1). Given the increasing frequency and need for shoreline stabilization projects, it is imperative investments are made in natural and nature-based coastal infrastructure and incorporate ecosystem protection and restoration into project decision- making (Sutton-Grier et al. 2015). The limited application of living shorelines in New England presents a challenge for climate resilience to coastal hazards in this region, given their function as shoreline stabilization and their potential for environmental benefits (either through positive environmental impacts, or avoiding negative impacts). The potential role of the regulatory environment in this feedback cycle is lesser known (Figure 1), though previous efforts suggest it is another limiting factor (O'Donnell 2017), and targeted regulatory preferences and efforts have served to advance the application of living shorelines (Box 1). To ensure all coastal resilience options are available to communities at risk from coastal hazards, there is a critical need to identify all components of the feedback cycle limiting the application of living shorelines in New England.

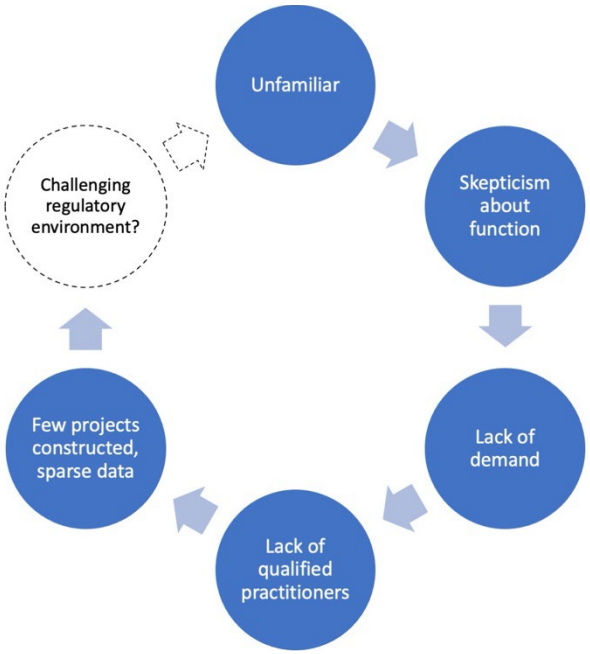


Figure 1. Reinforcing feedback cycle of known (blue circles) and hypothesized (dashed circle) challenges limiting the application and advancement of living shorelines in New England

Purpose and scope of this document

This report outlines how the regulatory environment surrounding living shorelines is limiting the advancement and more widespread adoption of living shorelines in New England. To achieve this goal, The Nature Conservancy along with the Northeast Regional Ocean Council, the coastal zone management programs in New England, and partners have collaborated to build and/or support monitoring of several living shoreline demonstration projects in each New England state (2017-2022). From the experiences of the project team, this document has been developed, with the three-fold purpose to:

- Document the regulatory permitting process for living shorelines in New England inclusive of federal and state requirements,
- Synthesize challenges faced by the project team with the regulatory framework in New England, and
- Propose opportunities to examine and improve the regulatory process and lessen barriers.

The contributors to this document are the project team from the NOAA Coastal Resilience Grant, including coastal resource managers from each of the five coastal New England states and partners. To document the experiences of the project team with environmental permitting, a set of interview questions was developed and asked of the project team members most closely associated with obtaining the environmental permits for each living shoreline funded (in part or in whole) by the NOAA CRG project (Appendix 1). Primarily, this document lays out the challenges the project team faced during project permitting and identifies opportunities to address them. This document is also focused on identifying relevant regulations for most living shorelines projects and connecting project proponents with appropriate resources to help them permit projects (Appendix 2). Given the variability among living shoreline projects and their components, as well as the complexity of environmental permitting, this guidance cannot cover every permit necessary for every project that incorporates a living shoreline approach. Regulatory professionals for each state can help identify all permitting required (listed in Appendix 2).

The audience for this document is anticipated to be project proponents from the coastal New England states. Project proponents and regulators from government agencies at all levels are most likely to benefit from this guidance and the challenges addressed by the project team. Property owners considering living shorelines for resilience to coastal erosion and flooding are also likely to gain insight into the permitting processes in the various New England states from this document.

Box 1. Setting regulatory preferences to advance the use of living shorelines.

Prior to the popularization of living shorelines in some regions, the most common response to shoreline erosion has been to 'hold the line' with engineered approaches and shoreline hardening (NRC 2007). Replacing these familiar strategies has been slow. Engineering design and construction firms have experience with the design, technology, and expected performance of hardened approaches, leading landowners to expect hardened approaches are the best solutions (NRC 2007). However, this practice has consequences that may be less familiar: hardened shorelines may lead coastal residents to underestimate the risk of coastal hazards (Kimura 2016), require more costly maintenance and repair than natural shorelines (Smith et al. 2017), and their failure can have devastating consequences if protection from all disasters is assumed, but not realized (Sutton-Grier et al. 2015). Shoreline hardening also neglects cumulative environmental impacts of shoreline hardening, including loss of ecosystem services and sediment in a system (NRC 2007), damaging public resources. Balancing consequences with public interest is a priority of permitting processes (e.g. USACE permitting), particularly when important consequences may be unfamiliar. In these situations, stated regulatory incentives and preferences can help ensure that the public interest is prioritized in regulatory decision-making.

The cost and specialized skills required to develop living shoreline projects are a limiting factor that may be alleviated with targeted options. New Hampshire has conducted a Living Shoreline Site Suitability Assessment (L3SA) to help interested stakeholders identify suitable sites for living shoreline approaches. Additionally, New Hampshire Department of Environmental Services (NHDES) offers lower permit fees if projects meet certain criteria, and offered a planning grant to fund the Wagon Hill Farm demonstration project ($20,000 [US 2017], matched 1:1 by the Town of Durham, and an additional $28,332 with match requirement waived).

Some New England states have stated regulatory preferences for living shorelines where they are appropriate. In Connecticut, new structural stabilization is not allowed. With a statutory change in 2012, hard structures are allowed when they are used for coastal protection or enhancing coastal resources. However, guidelines are needed to clarify how these hard structures can be incorporated into living shorelines. In Rhode Island, Coastal Resources Management Council (CRMC) regulations prohibit new structural shoreline protection measures on barrier islands and spits including those classified as undeveloped, moderately developed, and developed), as well as on shorelines adjacent to tidally influenced waters categorized as conservation areas. Additionally, preferences for living shorelines are also stated in their Special Area Management Plans (SAMP) for the Salt Ponds and Shoreline Change (Beach). In Massachusetts, structural coastal bank stabilization can only be used on banks to protect structures present before 1978, and applicants must demonstrate that no other method is feasible (Softening our Shorelines 2020). Maine's Coastal Sand Dune Rules (Chapter 355) prohibit any new shoreline stabilization structures in the regulated coastal sand dune system. Existing stabilization structures can be replaced in kind, or of a different design if they are shown to be less damaging to the coastal sand dune system.

Outside of New England, the State of Maryland passed the Living Shorelines Protection Act (formalized in 2013), that prioritizes the use of nonstructural stabilization techniques over shoreline hardening, requiring homeowners to obtain waivers to harden their shorelines. Further, state- and NGO-funded grant programs and low to no interest loans exist from several public and private sources to fund nonstructural approaches from several sources in Maryland and Virginia. These measures, as well as others from outside of the New England region (summarized in Softening Our Shorelines 2020), could be recommended to advance living shorelines practice in New England.

Regulatory Successes, Challenges, and Opportunities

Successes and recent regulatory changes and advances

The success of living shoreline projects associated with this project is a result of the hard work of the project team and collaboration and cooperation of regulators at federal, state, and local levels. Although the current regulatory environment in New England is challenging to navigate, several states have regulatory preferences for living shorelines **(Box 1)**, and [several demonstration projects funded by this project were successfully permitted], offering opportunities for learning from examples in each state. These demonstration projects would not have been possible without the thoughtful input from regulators, and project applicants noted that projects were more rigorous after completing the permitting processes in their states. Pre-application meetings with regulatory agencies (i.e., USACE and/or state environmental resource agencies) were very helpful to ensure project proponents were aware of permitting requirements. For example, project applicants in Rhode Island brought their demonstration project concept to the USACE and Rhode Island Division of Environmental Management (RIDEM) early on to establish a line of communication and gather advice on what permitting would be needed. For several of the projects, representatives from resource agencies or municipalities served as the project applicants to leverage their existing relationships with regulators to help break the reinforcing feedback cycle that may be keeping unfamiliar projects from being considered. For example, the application of living shorelines in Maine is very new, so any living shoreline project would require learning and adaptative management, making permitting a challenge if the project goal was strictly to mitigate coastal hazards. With a Maine resource agency as the applicant, the project could be structured as a research effort. This allowed for performance monitoring and research to be an explicit project goal and therefore had a clear permitting pathway.

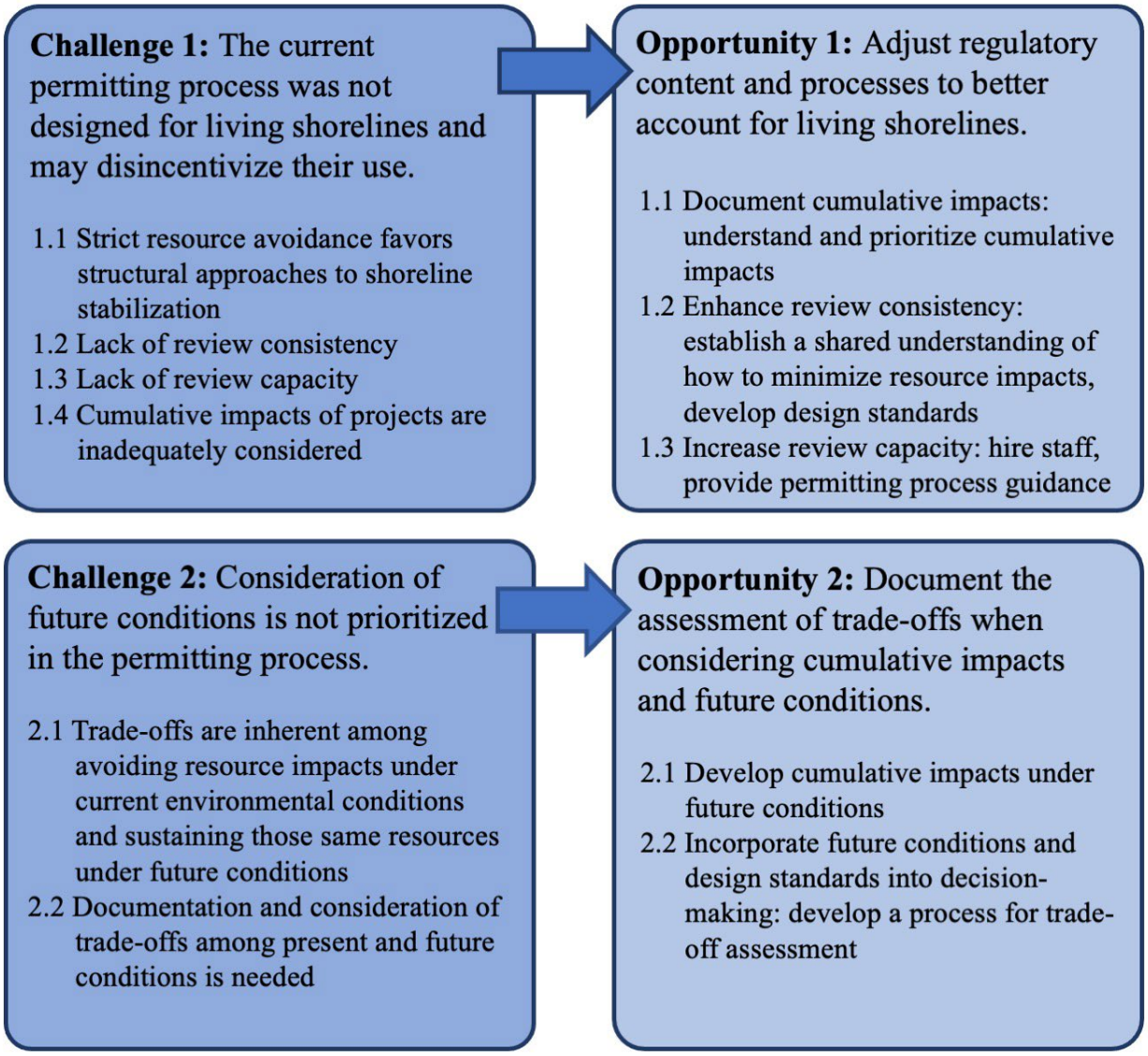
Substantial progress has been made since the onset of this project, and there have also been recent regulatory changes (changes by state and permit are included in Appendix 2) since the demonstration projects were permitted (~ 2017-2020). Maine is working to identify regulations that need to be updated to take sea level rise into account (Bill LD 1572 - Resolve to analyze the impact of Sea Level Rise), and the USACE Programmatic General Permits in Maine are also relatively new (2021) and include a specific reference to living shorelines (GP 7: Bank and shoreline stabilization including living shorelines, Programmatic General Permits for Maine). In Massachusetts, amendments to 2016 MEPA regulations (Massachusetts Environmental Policy Act) include draft protocols for reducing greenhouse gas emissions and building resilience to the effects of climate change. The New Hampshire Coastal Rules (Env-Wt 600) underwent a substantial rewrite in 2019 to incorporate living shorelines, including establishing techniques and design plans, in accordance with "Guidance for Considering the Use of Living Shorelines" (NOAA 2015). Further, the USACE Programmatic General Permits for New Hampshire are being updated for 2022, including potential updates that incorporate changes for living shorelines to match the recently updated NHDES rules (Env-Wt 600). The NOAA Fisheries Greater Atlantic Regional Fisheries Office (GARFO) has developed programmatic consultations with the U.S Army Corps of Engineers to reduce the number of projects that are

reviewed on an individual basis by programmatically issuing conservation recommendations for those actions that may adversely affect Essential Fish Habitat (EFH).

Challenges and Opportunities

Interviews with living shorelines project proponents, along with meetings with state and federal regulators (see Appendix 1), and desktop research and synthesis identified several challenges and opportunities for advancing the use of living shorelines in New England. **Challenges** include environmental and/or social barriers presented by the regulatory process that may be limiting uptake of living shorelines for mitigating coastal erosion and flooding where they would otherwise be a viable approach. **Opportunities** are areas where regulatory or review processes could be streamlined or advanced to lessen these challenges. Opportunities may include identifying and resolving areas that need attention with further discussion, analysis, and/or research. Two overarching challenges and opportunities were identified are presented below (Figure 2).

Figure 2. Summary of permitting challenges and opportunities for living shorelines in New England.



Challenge 1. The current permitting process was not designed for living shorelines and may disincentivize their use

When sited and designed appropriately, living shoreline projects can provide resilience to coastal hazards, balance temporary impacts to nearshore resources with longer-term benefits, and help prevent longer-term negative impacts. Temporary resource impacts such as the placement of fill below the jurisdictional boundary, that may result in habitat conversion, trigger an extensive water quality permitting process, which can unintentionally incentivize hardened shoreline stabilization options that avoid this requirement. Navigating the regulatory process for living shorelines is onerous for both the project applicant and resource agencies and requires much communication. This may originate from the relative newness of some living shoreline project

types (see State of the Practice Report 2017 for a summary of project types) in New England compared to traditional hardened approaches as well as a mismatch between the intent of living shorelines and the bedrock environmental laws and associated regulations that govern them. Several challenges experienced by the project team help to illustrate this mismatch.

Challenge 1.1: Strictly avoiding resource impacts and habitat conversion favors structural approaches to shoreline stabilization

Appropriately sited, designed, and constructed living shorelines can reduce erosion and flooding. Project designs can include reconnecting or maintaining a dynamic land-sea interface, and alter the shoreline by placing sediment that can result in temporary impacts at tidal elevations below jurisdictional boundaries (e.g. MHW, HAT). Impacts, even temporary, below jurisdictional boundaries trigger more extensive permitting than if temporary impacts can be avoided. In contrast, hardened shoreline projects, like riprap revetments, can be placed completely above this boundary, avoiding such temporary impacts below the boundary, and subjecting them to less onerous permitting. Jurisdictional boundaries, coinciding with the intertidal zone, come from the Clean Water Act of 1972, Section 404 regulations. Section 404 grants the USACE the authority to regulate the discharge of dredge and fill material into navigable waters (later defined by Congress as "waters of the United States"). USACE regulations for Section 404 define a landward limit of its jurisdiction using a state and/or federal jurisdiction line (e.g. MHW, HAT) in coastal waters (*Mitigating Shore Erosion along Sheltered Coasts* 2007).

Working in proximity to protected resources (e.g. seagrass, salt marsh, and shellfish reefs) or below jurisdictional boundaries is often needed to maintain or re-establish connections between upland and aquatic habitats, a key factor in living shorelines. Yet, regulations requiring avoidance of impacts to regulated resources make it comparatively more difficult to permit projects below the jurisdictional boundary than above it, and this steers applicants to work above it, due to a simpler permitting process. For example, USACE permits for projects in New England coastal states shift from authorization under General Permits to needing an Individual Permit (a more complex and time-consuming process) when certain volumes of fill or work below jurisdictional boundaries are exceeded in coastal habitats. Further, for projects to be permitted under General Permits by USACE, they must meet all General Conditions (GCs) included in the GPs (Appendix 2). GPs for each New England state include a similar GC: "Mitigation (Avoidance, Minimization, and Compensatory Mitigation)" (GC 3: NH, MA, RI, and CT; GC 9:ME). While the language differs slightly, this overarching concept, referred to here as 'sequential minimization' is a strong regulatory preference for avoiding all temporary or permanent impacts (followed by minimization then mitigation), which inadvertently prioritizes stabilization structures placed outside of the resource instead of living shorelines. While this avoids direct impact, it results in eventual impacts and/or loss of the resource due to cutting off the sediment supply and coastal squeeze. For example, project proponents have pointed out that relatively onerous permitting is required for beneficially using material resulting from bluff regrading as fill to mimic natural bluff erosion, even though such natural bluff erosion performs the same function and is vital to habitat maintenance.

Strong environmental permitting that protects coastal resources is appropriate. For example, the disposal of fill, like dredge spoils, in the intertidal could be an environmental nuisance, damaging sensitive coastal habitats, resources and water quality, and is rightfully

difficult to permit under Clean Water Act regulations. However, in the case of living shorelines, fill placement is not disposal: it is an intentional and strategic use of material to gain the elevation needed for project success, including supporting nature-based elements like planted tidal vegetation. Onerous permitting is required for fill to be used to create fringing marshes, even though erosion from a naturally eroding bluff performs the same function. Treating strategic actions in the public interest, like using fill to support living shorelines, the same as disposal of pollutants is holding back living shorelines from providing benefits to the very resources that regulatory processes are aiming to protect. Bedrock environmental laws, like the Clean Water Act, were written to prevent environmental degradation before nature-based projects that can provide public benefits while improving environmental conditions, like living shorelines, were conceived.

The regulatory incentive to avoid onerous permitting below the jurisdiction line, combined with inflexibly in the interpretation of the Clean Water Act and its regulatory framework (i.e., resource avoidance) may unintentionally lead project proponents to construct hard infrastructure. This serves to reinforce the feedback cycle that limits the application of living shorelines in New England by creating a challenging regulatory environment (Figure 1). Applying an inflexible regulatory framework to projects in the public interest (that aim to prevent damage and/or promote community resilience), is ill-fitted to regulate living shorelines, and is holding them back from providing benefits to the very resources environmental regulations are aiming to protect.

Challenge 1.2: Lack of review consistency

Project team partners experienced decisions and requirements that were inconsistent or unpredictable across projects during permit review. This may be a result of relying on individual reviewer discretion, especially given the mismatch in regulatory intent and NBS intent. Strict interpretation of the regulations (to avoid immediate and direct resource impacts) would logically lead someone to a different conclusion than a more flexible interpretation of the regulations that prioritizes avoiding longer-term impacts. A lack of design standards, and inefficient communication among partner or consulting agencies may also be compounding the challenge of inconsistent review.

There are not currently design standards for living shorelines in New England nor tools to assess trade-offs among short-term versus long-term resource impacts and project functions. Project proponents received requests from regulators to use unexpected alternative designs or switch to designs with an unclear connection to the project goals, and mentioned they could not always predict the outcomes or timing of interagency consultations (e.g. USACE and National Marine Fisheries Service [NMFS] consultations on essential fish habitat [EFH] assessments). During pre-application planning and permit review, a project proponent was asked to switch their construction materials, but this switch represented a trade-off between habitat and wave attenuation performance that was not acknowledged in the feedback. Another project proponent received substantial comments on their project design from NMFS consultation, but it was received long after submission, engaged leadership review, and delayed the project by initiating additional communications between state and federal resource agencies. Without design standards, unexpected design suggestions, and recommendations that do not account for trade-offs among project functions (e.g. habitat or wave attenuation) are more likely. Given a reliance

on individual discretion, the turnover of permit issuing agency staff may have further contributed to inconsistency in many aspects of permitting.

Communication among partner or consulting agencies was a challenge for most project proponents in our study, sometimes leading to long wait times between communications causing permitting to become an unexpected time sink, or confusion around some agency roles. Project partners experienced confusion around which federal agency would coordinate National Environmental Policy Act (NEPA) review. For example, federal lead agency designation for the NEPA review process swapped back and forth among two federal agencies, leading to a several-month delay in project permitting. Project proponents also experienced [missing signals to identify the end] a confusing end to the consultation process, and feedback that was too sparse for project proponents to efficiently change designs to ensure permitting success. In one example, a project proponent was given the responsibility of interagency coordination, which was an unexpected role that required a substantial time investment and was only possible given their familiarity with environmental permitting as a resource manager.

A reliance on individual reviewer discretion may lead to inconsistency in permit review among states and within a single state, especially in cases where rigidity or flexibility in interpreting the regulations may lead to alternative outcomes. Conversations with federal agencies about design standards, decision-making processes and tools, and agency leadership are an important next step to advance the permitting of living shorelines.

Challenge 1.3 Lack of review capacity

The effective permitting of living shorelines requires regulator staff time and regular communication among permit applicants and regulatory and consulting agencies. Project team experiences suggest that review capacity is a substantial challenge. It should be noted that the project proponents in our study were state employees and/or environmental professionals, so the challenges they faced may be influenced by their familiarity with permitting processes and/or staff in their states.

Limited federal reviewer capacity led to additional burdens on project proponents. Communication burdens to satisfy federal requirements for public meetings were placed on some project proponents rather than being provided by USACE. Significant back and forth communication, punctuated by long wait times, occurred among state and federal permit issuing agencies to get to an acceptable/permittable project and led to delays in project initiation.

Pre-application meetings are required or suggested for living shorelines projects and led to design improvements and increased project success. However, as interest in living shorelines and nature-based solutions increases, pre-application meetings will likely be hindered by limited staff time. For example, a single living shorelines project led to almost three dozen meetings over four years; this is an extensive time investment in one project for staff from all sectors (regulatory, consultant and public) that is unsustainable to move living shorelines projects forward at the pace required to adapt climate change and provide coastal resilience. Even through project proponents in this study were largely state resource management professionals, even they were not always sure where to begin the application process or what to bring to a successful pre-application meeting, suggesting that others less familiar with environmental permitting may require even more guidance during the pre-application process, and potentially demanding more staff time.

If staff capacity to guide project proponents through living shorelines permitting is limited (and further complicated by delays and additional communication burdens), this may contribute to the regulatory disincentive against living shorelines, leading project proponents to choose hardened structures (above the jurisdictional boundary) for easier and faster permitting.

Challenge 1.4: Cumulative impacts of projects are inadequately considered, but needed to assess trade-offs

Understanding the cumulative impacts of project impacts, such as direct habitat conversion, and how to weight them in relation to longer term impacts, is critical to protect natural resources during project permit review.

Environmental permitting is designed to minimize negative impacts on protected natural resources from individual projects. As a result, there is usually no accounting for potential cumulative impacts of projects within an ecosystem. However, trade-offs exist between avoiding direct impacts to resource areas (i.e., "resource avoidance") and strategically impacting resources (e.g. habitat conversion) in a limited capacity to ensure system continuity that supports holistic ecosystem function and persistence. Such trade-offs are inherent among the impacts of living shorelines and hardened shorelines on intertidal resources. Hardened shorelines have known negative, indirect impacts to intertidal resources, such as redirecting erosion, increasing scour, and impacting biodiversity. When these are assumed to be minor at the scale of an individual project, they are generally accepted and, in most cases, do not require extensive documentation despite their known contributions to cumulative impacts across projects (e.g. sediment and biodiversity loss). Living shorelines may also negatively impact protected resources, particularly with direct impacts over short time scales. For example, they may result in habitat conversion, such as a mudflat being partially converted to a vegetated fringing marsh. The placement of fill within the intertidal zone can potentially cause sedimentation to intertidal habitats. However, when living shorelines are sited and designed appropriately, these impacts are intended to be temporary, balanced by other environmental benefits, mitigate environmental damage, and/or minimize future impacts to resources. Hardened shorelines may avoid direct resource impacts (settling the "no impact" requirement of a lot of regulations), but living shorelines can be designed to avoid the types of cumulative environment impacts that are likely with multiple hardened shorelines (e.g. sediment and biodiversity loss), and provide resilience against cumulative impacts (i.e. the impacts of multiple hard structures and/or climate change impacts like sea level rise). Neither approach maximizes all benefits or minimizes all impacts, leading to a trade-off in environmental permitting among project-level and cumulative impacts to different resources over short and longer-term timescales.

Trade-off assessment tools, with defined metrics and spatial scales that identify unacceptable cumulative impacts, can be used to weigh cumulative negative and positive impacts of all shoreline protection options (including both hardened and living shoreline approaches) in a system. Without these tools to define and assess cumulative impacts, reaching consensus among regulators on whether a project may contribute to unacceptable cumulative impacts, and making the process by which they are determined explicit, is difficult. For example, strict regulatory interpretation of resource avoidance, while intended to protect resources, inadvertently pushes for stabilization structures to be placed outside of the resource. While this practice avoids direct, immediate impact, it does not weigh the potential for cumulative impacts, including the loss of or damage to the resource due to cutting off the sediment supply. This is risky for the long-term

sustainability of resources. Indeed, many areas in New England have cumulatively lost significant amounts of wetland habitat due to hard shoreline armoring, but federal and state review agencies may at the same time push back against direct habitat conversion (e.g. mudflat to marsh), considering it a loss of mudflat habitat. A lack of consistency in assessing cumulative impacts may also unintentionally prevent consideration of sequential minimization during federal permitting, meaning only to project-scale impacts, rather than cumulative impacts, are avoided. Without accounting for cumulative impacts, a permitting process which aims to avoid or minimize impacts to regulated natural resources may unintentionally be an impediment to more widespread adoption of living shorelines that may ultimately protect and/or enhance those regulated resources.

The need to understand cumulative impacts of potential projects in decision-making is recognized in the USACE General Permits (GPs), which mention and define cumulative effects for each coastal New England state. The very first paragraph includes cumulative impacts, explaining that the GPs are used to authorize specific projects that will cause "no more than minimal individual and cumulative adverse environmental effects" (CT, ME, MA, and RI GPs). Indeed, several state GPs define cumulative impacts as: "The changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual 1) discharges of dredged or fill material, or 2) structures. Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such piecemeal changes can result in a major impairment of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems. See 40 CFR 230(g)." (CT, ME, and MA GPs). New Hampshire GPs define them as "The impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7)." (NH GPs). Each of these definitions demonstrates a recognition that environmental impacts accumulate across projects but stops short of describing a method by which to assess cumulative effects. A few individual GPs specify a total impacted area (MA GP 9 and 10, CT GP 6), though the specific criteria apply to each "single and complete project", suggesting these metrics are not relevant to cumulative impacts across projects. This guidance lacks key elements of cumulative impacts assessments: multiple explicit spatial scales of observation (e.g., project-level impacts and impacts across multiple projects) and metrics with which to assess if cumulative impacts are acceptable at those scales. Without these key elements, consistent review of whether projects contribute to cumulative impacts, or inclusion of cumulative impacts in sequential minimization, is unlikely.

To identify appropriate spatial scales and metrics for cumulative impacts assessment, monitoring and synthesis of the function and impacts of living shorelines, positive and negative, and at project and larger scales, are needed for standard living shoreline designs (refer to Living Shorelines in New England: Site Characterization and Performance Monitoring Guidance).

Ecological monitoring is currently not required for hardened shorelines in several New England states, and monitoring requirements generated by the federal permitting process are uneven between living shorelines and gray infrastructure. There is no federal monitoring required for seawalls that fit under GPs, just a check to ensure the seawall is in good condition. Most states found that permitting of living shorelines requires much more monitoring to demonstrate they are functioning and minimizing negative impacts on regulated resources over short and long timelines (which can lead to higher overall costs for living shoreline projects

compared to gray approaches, a further disincentive). The potential for positive impacts to resource areas and time to realize them (or reduced negative impacts relative to hardened alternatives) from living shorelines are not considered, though scientific evidence exists (Piazza et al. 2005, Scyphers et al. 2011). NEPA regulatory reviews provide a framework for assessing cumulative impacts at different scales, and guiding decision-making toward projects that maximize public benefits while still achieving their goals. However, this style of review is only required at the federal level for projects that are funded by federal funds. Massachusetts and Connecticut have similar processes in place for state-funded projects. The establishment of frameworks and/or tools to estimate cumulative impacts at explicit spatial and timescales, along with living shoreline project design standards, are needed to better understand and weigh environmental impacts, and can also make review more consistent and efficient (challenges 1.2 and 1.3).

Opportunity 1: Adjust regulatory content and processes to better account for projects intended to provide public benefits, like living shorelines

Environmental permitting that supports the appropriate application of living shorelines requires: an advanced understanding of cumulative environmental impacts from all projects, an interpretation of regulatory priorities that considers cumulative impacts where appropriate, consistent review (bolstered by design standards), and added staff capacity to guide applicants. Together, these adjustments to the regulatory content and processes can address some of the unintended living shorelines permitting barriers.

Considering both project-level and cumulative impacts is an important step to help regulators avoid the most potential impacts to managed resources during the permitting process.

Opportunity 1.1: Understand and prioritize cumulative impacts in sequential minimization of impacts

To better understand how shoreline stabilization projects, including hardened shorelines and living shorelines should be prioritized to minimize overall project impacts, the assumption that placing a structure outside of, but proximal to, the resource, is acceptable and has minimal impact to the resource must be challenged. A critical tool to challenge this assumption is to assess their potential for cumulative environmental impacts. Cumulative potential impacts from projects can then be used to inform sequential minimization schemes.

Cumulative impact assessments use a variety of tools to systematically analyze and evaluate cumulative environmental change and have a rich history in biodiversity assessment, conservation planning and resource protection (Spaling and Smit 1993, Spaling 1994, Smit and Spaling 1995, Rees 1995, Chen et al. 2015, Hollarsmith et al. 2021). Impacts to nearshore ecosystems from individual hardened shorelines are currently assumed to be minimal and/or not unreasonable. However, cumulative impacts assessments are not conducted, despite steady calls for assessing the cumulative impacts of shoreline stabilization projects (*Mitigating Shore Erosion along Sheltered Coasts* 2007, The Nature Conservancy 2017, Hilke et al. 2020). Given the propensity for ecosystems to operate with nonlinear dynamics, projects need to be considered within the context of all existing and proposed projects in an ecosystem. For example, the percent of shorelines that are hardened within an embayment (even if hardening is not placed within the resource), or the amount of loss or gain of certain habitats in a state (e.g., amount of

salt marsh loss per state), and the consequences of these cumulative impacts on system function and sustainability, should be used to inform the balance of project types within that embayment. A cumulative assessment can fulfill this need and help regulators determine the potential impact of a project on the health of the system in which it is proposed, moving beyond considering only impacts from individual projects. Further, benefits may accrue from the application of many small-scale nature-based solutions, and without an accounting of all impacts, these positive impacts are also not considered in permitting.

Cumulative impacts assessments can help support a consistent and explicit consideration of potential impacts on resources, and be used to clarify how cumulative impacts are considered in regulatory decision-making, such as how they are prioritized during sequential minimization. To provide consistent assessment of cumulative impacts, a determination of whether cumulative impacts are relative to a single project (perhaps with multiple parts), or multiple projects together, is needed. Additionally, spatial (i.e. the area of a single project, a defined ecological system, or a specific spatial area) and temporal scales of assessment are needed, and specific metrics to use during assessment need to be defined. For example, Maine 480D mentions an "unreasonable" soil erosion impact, but leaves "unreasonable" open to interpretation, whereas regulations that reference specific metrics (e.g. as ≥ 1,000 square feet of impacted shoreline along 500 linear feet of a 4th order stream) are much easier to interpret. This information needs to be synthesized with existing assessments of coastal ecosystems to better understand how projects will impact them and perform their intended function. This process may also identify where long-term monitoring of both hardened and living shorelines is needed to inform a cumulative impacts assessment. With explicit guidance on how to measure and assess cumulative impacts, a regulatory limit could be defined and used to guide decision-making, including sequential minimization and trade-offs assessment.

Comparison of proposed projects to other alternatives is another powerful way of assessing project trade-offs and includes an assessment of their relative environmental impacts. Another bedrock environmental law, the National Environmental Policy Act of 1969 (NEPA), is a regulatory review process that intentionally examines the environmental impacts of multiple alternatives (including a no-action scenario) for a federal action that may have a significant environmental impact. NEPA reviews are designed to guide decision-making among alternatives by requiring an accounting of all reasonable positive and negative impacts from each alternative, and recent regulatory updates have included requirements for examining climate impacts and conducting cumulative impact assessment. The NEPA, or state equivalent, process incorporates environmental assessment and development of multiple project alternatives in line with this recommendation Incorporating this style of environmental impact analysis has tremendous value for choosing the best projects among a set of alternatives for larger projects, like those that require a federal Individual Permit. This is particularly relevant for areas that require some erosion and flood mitigation to protect critical infrastructure, and for which a no-action option is not possible.

The NEPA process is not required for projects that do not spend federal (or state) funds, and can take time and be highly involved, so another process is needed for smaller projects. One potential model for centering cumulative impacts during project permitting is the USACE, FEMA and USFWS Road Stream Crossing Programmatic Consultation for Maine (links here). In this example, an Environmental Impact Statement (EIS) is conducted for the programmatic permit at set spatial and temporal scales, and projects that fit the design criteria and stay within

the total limit of cumulative impacts are covered by the GP. After that limit is met, the GP must be re-authorized, including a new EIS, and cumulative impact assessment.

Opportunity 1.2: Enhance review consistency

Several key actions can increase the consistency of permit reviews for living shorelines, including establishing a shared understanding of how sequential minimization of impacts is determined, documenting guidance on actions that are acceptable (e.g. design standards) and information needs to determine acceptability, clear permitting process goalposts, and a plan for coordination and communication across agencies.

First, regulators and project proponents need a shared understanding of how resource impacts and/or benefits are prioritized when trade-offs among options exist. This is particularly important given the mismatch between the intent of the bedrock environmental laws that govern development in the intertidal zone, and the purpose of living shorelines projects. Bedrock environmental laws seek to limit development in the intertidal, whereas living shorelines seek to strategically alter intertidal zones to mitigate damaging impacts of development and/or other environmental stressors, and provide resilience to coastal hazards. Tiered approaches to permitting based on the expected degree of project impacts, as found in most USACE Programmatic General Permits (GPs) for qualifying projects in New England coastal states, help to provide applicants and agencies more clarity around how projects are interpreted by reviewers, but these GPs also need to incorporate an assessment of cumulative impacts across projects, and include these cumulative impacts in sequential minimization. An explicit and shared understanding of how impacts to avoid are prioritized by the sequential minimization process, that includes clearly defined cumulative impacts (see opportunity 1.1), will help codify how decisions are made, and lessen the dependence on individual reviewers' interpretations, increasing the likelihood of consistency across projects and states.

In addition to a consistent assessment of cumulative impacts (opportunity 1.1), guidance on what activities are acceptable under certain conditions (e.g. design standards) can be developed and promoted to relieve the burden of figuring out an acceptable solution on project proponents. The USACE has made substantial changes in the acceptance of NBS to address coastal hazards (e.g. Nationwide Permit 54: Living Shorelines [example of regulations and presentation] and the Engineering With Nature initiative and the recent International Guidelines on NNBF for Flood Risk Management), though an important next step is to create design standards for living shorelines in New England, such as adding living shorelines to an update of the Engineering and Design Coastal Engineering Manual, possibly building upon the design concepts developed by the *State of the Practice Report (2017)*. Design standards **(Box 2)** can be accompanied by site suitability assessments, such as those provided at the state-wide scale by New Hampshire and Maine, or developed to support coastal restoration at an embayment scale, to help determine appropriate locations for each type of design. Design standards developed with both regulating and engineering (i.e. engineering, design and construction firms) communities will

Box 2. Design standards can ease permitting and ensure consistency.

The need for engineering and design standards has long been recognized as vital to coastal engineering projects. Living shorelines are missing from USACE's Coastal Engineering Manual, despite the existence of a nationwide permit for living shorelines (New England states have instead adopted General Permits). Some states have developed their own design standards, often with assistance from academic researches (e.g. New Jersey, Virginia). USACE Engineer Manuals have existed and been substantially updated since the 1950s, including guidance for both manmade structures and nonstructural alternatives (e.g. planting salt marshes and seagrasses), though guidance for combinations of these approaches, as would be applicable to living shorelines, is lacking. In their own words, according to the Coastal Engineering Manual, Chapter I-4-1: "The USACE traditionally is responsible for constructing and maintaining United States Federally authorized coastal civil works projects including harbor entrance channels, navigation channels and structures, coastal storm damage reduction and shore protection projects. Therefore, the USACE is primarily responsible for developing the principles of coastal engineering as they are practiced in the United States." **These principles are exactly what we need to advance the practice, effectiveness, and regulatory permitting of living shorelines.** Design standards would help improve the overall predictability of designing, permitting, constructing, and monitoring living shoreline projects in New England.

The International Guidelines on NNBF for Flood Risk Management, developed by over 40 international partners and initiated under the USACE Engineering With Nature (EWN) initiative, demonstrate an important step in assessing the performance and application of natural and nature-based features. Information including system conceptual models, objectives and metrics, designs, implementation, adaptive management, monitoring, and operation and maintenance from many case studies, including living shorelines, can be used to inform development of design standards specific to New England.

help provide project proponents with more tangible and consistent guidance for designing and building the appropriate living shorelines to fit each site and project goal. At the same time, design standards could remove capacity burdens from the regulating community and alleviate long review times and enhance reviewer capacity (Opportunity 1.2) with a consistent tool to which all can refer. Within such design standards, living shorelines must be clearly defined, definitions must be reviewed across regulating and consulting agencies, and prioritization among approaches offered under certain environmental conditions (e.g., wave action, scour, tidal range, etc.). Defined information gaps to inform these design standards should accompany them, as well as the specific research needed to meet them and make informed decisions. With this information, state agencies can tackle these or get support to do them from academics or consultants looking to improve the application of living shorelines in New England**.** The current engineering and design standards manual discusses monitoring and repair; however, adaptive management is not discussed and is a key tool to allow for the growth and development of a living shoreline technology. Filling data gaps and collection of monitoring data can also be helpful for opportunity 1.3 (develop cumulative impacts assessments).

Information needs for current federal and state review also need to be made explicit to project proponents. For example, NOAA GARFO has updated EFH worksheets that identify the information used to guide EFH consultations and climate impacts assessments (for details, see Regionwide Environmental Permitting for Living Shorelines, Appendix 2). Finally, clear goalposts of the permitting process are needed, such as clear communication around what constitutes a project change that requires further review, so project proponents can predict when the permitting process will end. Making the information needed for federal (and state) review explicit, documenting its interpretation in decision-making, and clarifying the goalposts of the review process can support a more consistent review process for living shorelines.

A plan for communication and coordination among the agencies consulted in the USACE permitting review process (especially USACE and NMFS) should be clearly laid out, and coordination provided among all entities (regulating and consulting agencies, and Tribes) required in permitting for all projects. For federal permitting, establishing this plan could be part of the pre-application process. Consistent communication is important to ensure consistent and timely review.

Supporting a community of practice is one option to help professionals from many sectors share information and lessons learned as the practice of designing, permitting, installing and maintaining living shorelines in New England continues to advance. Within the community of practice, a certification program for architects and engineers may advance professional development in these communities toward nature-based solutions and assist project proponents to identify and connect with qualified practitioners for help.

Adopting Nationwide Permit 54 in the New England region may also help promote consistency in regulatory review, as it establishes some expectations for living shorelines designs (e.g. “A living shoreline has a footprint that is made up mostly of native material.”), and allows for the use of fill (with limitations on its amount and placement) and work below the coastal jurisdictional boundary (with limitations on tidal elevation) where warranted (example NWP 54 regulations for Virginia). Achieving consistency will also require cumulative impacts assessment and trade-off tool development, as well as increased capacity to support these efforts.

Opportunity 1.3: Increase review capacity

To increase review capacity, more staff are needed at USACE, and other state and federal agencies required for pre-application meetings and lengthy review processes. With enhanced staff capacity, the pre-application meeting process could also be clarified and streamlined to help ease burdens on current staff and permittees. Clear documentation that lays out the first steps in permitting and how to connect with key regulators to get started would be helpful to applicants. In addition, the definitions of living shorelines, their benefits, and considerations, and where to get help with design and conceptualization from a community of practice would be helpful in this documentation.

Providing clear guidance on how to assess and weigh cumulative impacts (opportunity 1.1) and project design standards (opportunity 1.2) will also not only make the review process more consistent, but it can also ease the burdens on individual regulators and relieve some of the stress on existing staff capacity. Additional staff capacity will also help accomplish opportunity 1.1 (develop cumulative impacts assessments).

With the clarification suggested above (opportunity 1.1) on how regulatory agencies define and prioritize living shorelines among other approaches to mitigate coastal erosion and flooding as well as how applicants are expected to begin the pre-application process, the process of interagency coordination can also be more streamlined and provided directly between agencies.

Challenge 2. Consideration of future conditions is not prioritized in the permitting process to meet the pace and scale of climate change impacts

The regulatory framework around protecting resources must allow for the consideration of how future environmental conditions, particularly climate change, will influence coastal resources. Where future conditions are considered, they may not be given the weight in decision-making that is needed to meet the pace and scale of climate change impacts or community resilience needs. To best balance the protection and sustainability of coastal natural resources and the resilience of coastal communities, the impacts of climate change must be acknowledged, and projects designed to function within both current and future conditions.

Challenge 2.1: Trade-offs are inherent among avoiding resource impacts under current conditions and sustaining those same resources under future conditions.

Coastal hazard mitigation practices vary in their relative resource avoidance and impacts among present and future conditions, inducing trade-offs among options. For example, erosion control interventions made of hard structures above the jurisdictional boundary, such as riprap revetments, may avoid direct impacts to adjacent natural resources (satisfying the regulatory preference of ‘resource avoidance’). Without accounting for future conditions, ‘resource avoidance’ may indirectly contribute to ‘coastal squeeze:’ the contraction of tidal wetlands and prevention of their landward migration due to physical barriers, and exacerbated by sea level rise (Leo et al. 2019). As hardened shorelines accumulate in a system, they can also negatively influence the sediment budgets that these resources need to survive by cutting off the natural supply of sediment from the upland to wetlands and other sedimentary intertidal habitats.

Permitting impermeable structures like seawalls and riprap revetments above coastal jurisdictional boundaries may have few direct resource impacts under current conditions, but it may have unintended, and potentially severe, negative consequences on natural resources under

future sea level rise scenarios. Hard structures at current coastal jurisdictional boundaries fix these boundaries with a defense, and as the low water mark migrates landward with sea level rise, there is no room left for coastal ecosystems like salt marshes, seagrasses, and oyster reefs to migrate shoreward (Leo et al. 2019). Those hard structured that used to be at or above jurisdictional boundaries are now in the intertidal zone. Permitting hardened structures above jurisdictional boundaries may help avoid direct impact to resources in the short term, but in the longer term, it reduces the likelihood of their survival. In contrast, living shorelines may have more direct resource impacts to current resources, but when designed and sited properly, could help remove or avoid barriers to marsh migration, helping coastal fringing marshes persist as sea levels rise. Thus, shoreline stabilization projects that prioritize the reduction of direct impacts to resources in the present are often at odds with the future sustainability of these same protected resources.

Avoiding resource impacts under current conditions is often interpreted as a preferred option during federal project permitting. It may be easier to permit hardened shorelines above the coastal jurisdictional boundary, particularly through USACE General Permits, as they avoid direct, near-term resource impacts. In a 2018 workshop for this project, the USACE mentioned hearing criticism that the Clean Water Act 404(b)(1) guidelines are biased toward upland projects and argued against this: "…that is not true as USACE has flexibility for evaluating living shorelines projects." However, several guidelines for projects to move forward were also expressed, including: "Applications will fare better if they explain why a hard structure above the [high tide line] is not practicable / preferable and identifies the environmental / social impact of such alternative." Instead of assuming projects above and below the high tide line may each have benefits and drawbacks, this suggests that living shorelines are held to demonstrating why they are the best fit, whereas structural approaches above the high tide line are not held to this standard. The current regulatory structure (sequential minimization that prefers resource avoidance) often favors hardened structures by virtue of the strong preference to completely avoid direct impacts to a resource in the near term. While this preference does not prevent the use of living shorelines, it serves to disincentivize them as they typically do not avoid direct impacts to the resource. Trade-offs among what is best for a resource under current and future conditions are underrepresented in decision-making when resource avoidance is prioritized.

Challenge 2.2: Documentation and consideration of trade-offs among present and future conditions is needed to ensure sustainability of coastal resources

The sustainability of coastal resources under future climate / sea level rise conditions is not given enough weight in decision-making processes, and guidance on how to balance trade-offs among the relative importance of protecting the resources under present and future resources is not established. For example, future conditions and resource sustainability in a changing climate are missing from a long list of USACE Individual Permit review considerations (Guide for Permit Applicants: "Evaluating an Individual Permit" on page 11), suggesting that considering future conditions is not a high. This may pose a considerable challenge under future climate conditions because Individual Permits are generally required for projects with larger potential resource impacts (See Appendix 2: "Regionwide environmental permitting for living shorelines", this volume, for more information on USACE permits in New England). An assessment of cumulative impacts to protected resources, both positive and negative, under

future climate scenarios is needed to fully understand the trade-offs inherent in regulatory decision-making.

Given climate change and rising sea levels, choosing a proposed project necessitates a trade-off assessment of how the project will impact coastal resources and perform coastal resilience functions under current and future conditions. Without assessing all potential positive and negative impacts from a proposed project, these trade-offs may be ignored, leading to a higher likelihood that a project will not succeed, or may become harmful to resources in the future.

Conflicts also occur over trade-offs among projects based on different user group preferences. For example, oysters provide natural hard structure and other co-benefits, but conflicts with aquaculture and recreational resource users led to requests to remove oysters from oyster reef balls. In this case, a holistic state-wide push to use oysters in restoration prevented their removal. However, the value provided by the oysters in erosion control, in addition to the other co-benefits they provide (i.e., enhanced water quality, fisheries habitat, and more) should play a key role in regulatory decision-making.

Opportunity 2: Adjust regulatory content and processes to incorporate trade-offs among project options under current and future environmental conditions

Identification and assessment of trade-offs among projects and their potential impacts under present and future conditions can help regulators balance avoiding impacts to coastal resources with the future sustainability of these resources. Assessing and incorporating the trade-offs among resource impacts under current and future conditions in decision-making can help modernize resource avoidance and sequential minimization practices. Considering cumulative impacts and future conditions can help regulators avoid the most potential impacts to managed resources during the permitting process. Instead of avoiding current impacts only, an updated approach to sequential minimization of resources impacts can intentionally examine and balance project-based and cumulative impacts, as well as present and future conditions, to find the most sustainable outcome for resources and coastal resilience. Recognizing and accounting for differences across projects in their capacity to avoid current vs. future resource impacts is also likely to alleviate unintentional regulatory disincentives against living shorelines and other nature-based solutions. Applying design standards will also ease impact and trade-off assessment, as impacts, and their potential contribution to cumulative impacts and trade-offs among current and future conditions, may be consistent among standard designs.

Opportunity 2.1: Develop cumulative impacts assessments for future conditions

To ensure resource sustainability, an understanding of the cumulative impacts from each project needs to incorporate multiple spatial scales as well as a comparison of these ecosystem conditions under current and future climate scenarios. For example, the percent of shorelines that are hardened within an embayment, or the amount of loss or gain of certain habitats in a state (e.g., amount of salt marsh loss per state), along with the risk of future loss or impact under future climate change scenarios should be used to inform the balance of project types within that embayment. Additionally, applying a holistic approach that accounts for present and future conditions in an ecosystem or embayment can help identify projects that are best at sustaining

coastal resources, and help decision-makers move beyond individual project approvals and into considering the health of the ecosystem.

Centering co-benefits and future resource conditions may also help resolve conflicts among resources and resource-users. Demonstrating a full suite of co-benefits to the public can enhance buy-in and acceptance of NBS; especially when resource users have high connectedness to place and expected future impacts of coastal hazards is high (Anderson et al. 2021). Thus, conducting and communicating the results of a cumulative impacts assessment under current and future environmental conditions that also incorporates co-benefits may help encourage buy-in from resource users. In the example where resource users conflicted over oyster colonization of wave attenuation devices caused local user conflicts, a clearly documented method of assessing all the positive and negative aspects of a project, including their co-benefits, may help the public recognize the benefits they get from nature-based solutions projects, and make them more likely to accept them.

Opportunity 2.2: Incorporate future conditions and design standards into decision-making

When potential project impacts under future conditions are weighted against the avoidance of current resource impacts, unintentional regulatory disincentives against living shorelines can be removed. While the sequential minimization of project impacts is intended to protect natural resources from harm in current environmental conditions, it needs an update to ensure the sustainability of resources under future environmental conditions. Incorporating cumulative impacts and impacts under future conditions in the sequential minimization scheme can help provide this update and help achieve its intent (to protect resources) in a changing climate. This approach can be particularly powerful when combined with design standards and tiered permitting based on the potential for impacts.

Documentation and consideration of trade-offs among project alternatives, given their differing potential to contribute to project and cumulative impacts under current and future environmental conditions is needed to ensure regulatory preferences center the long-term sustainability of resources. NEPA (and related state-level acts in Massachusetts and Connecticut) provide regulatory precedent for this approach and require consideration of sea level rise and other climate change impacts when comparing project alternatives. Extension of tiered environmental assessments, including cumulative impacts and future conditions, to projects with a substantial likelihood of environmental impacts, that are not funded by federal (or state) funds, would help to incorporate this decision-making into more projects. For example, requiring examination of project impacts on ecosystems in present and future conditions can help prioritize and/or incentivize projects that allow for lateral (landward) migration of resource areas and maintain coastal processes (like sediment migration, water exchange and filtration, and more) that sustain resource areas. Several states also have processes in place for consideration of climate impacts **(Box 3)**.

Box 3. Considering climate impacts in project decision-making

Several New England states have, or are developing, methods or requirements to consider climate impacts in project decision-making. In Maine, LD 1572 - Resolve to analyze the impact of Sea Level Rise, serves as an update to regulations that needed to be updated to take sea level rise into account. This resolution culminated from work and recommendations from the Maine Climate Council, which adopted that the State of Maine manage for 1.5 feet of sea level rise by 2050, and 4 feet by 2100. LD1572 required Maine's regulatory, resource, and commenting agencies to identify those regulations which need to be updated to meet this new requirement.

In Massachusetts, longer time horizons are expected for the functional life of gray infrastructure than nature-based solutions. Nature-based projects are expected to function over a 30-year timeframe, whereas gray infrastructure, are expected to last 50 to 100 years, which is important as gray infrastructure has no capacity for migration as sea levels rise; its resilience to climate change is determined only as it is built.

For projects with fewer expected environmental impacts, tiered permitting similar to the example used in Opportunity 1.3 (USACE, FEMA and USFWS Road Stream Crossing Programmatic Consultation for Maine; links here) could be amended to ensure resource sustainability under future conditions. A Programmatic Environmental Impact Statement (EIS) conducted for a Programmatic General Permit for living shorelines could incorporate cumulative impacts under a few potential climate scenarios, and identify living shorelines based on design standards that center sequential minimization of cumulative impacts under present and future conditions.

Establishing processes that assess cumulative present and future impacts of projects in permitting decision-making is paramount as coastal managers will be asked to permit more projects to stabilize shorelines and reduce coastal flooding as sea levels rise. It would be helpful to establish discussions between the regulatory permitting community and the scientific community during the development of such a process to ensure the best available science serves as the basis for the process, and data gaps and opportunities for monitoring and adaptive management are considered **(Box 4)**.

Box 4. Adaptive management to encourage technological development

Monitoring and adaptive management serves as an important tool to try new projects and learn from them when impacts are unknown. Establishing an intent to perform monitoring and adaptive management up front can allow flexibility for permitting projects that represent technological developments that may not currently be under consideration.

An adaptive management workgroup is under consideration in New Hampshire to evaluate living shoreline monitoring results and let permittees know what maintenance is required for their projects. So far, this has been conducted for mitigation projects, but could be applied to other projects given the recent updates to the coastal rules to incorporate living shorelines and establish techniques and design plans.

Conclusion and Next steps

Without prioritizing and supporting the appropriate use of nature-based solutions in response to coastal hazard management, it is unlikely that coastal ecosystems will be protected and maintained given the pace and scale of climate change impacts. Given the focus of available and emerging state and federal funds on enhancing coastal infrastructure and ecosystems, now is the time to address the identified challenges and opportunities in furthering the use of living shorelines and nature-based solutions. Prioritizing nature-based solutions to coastal hazards, like living shorelines, offers a once in a generation opportunity to support nature-based infrastructure. In contrast, continued use of infrastructure funding to further harden shorelines may create more damage to our coastal ecosystems and further impair their capacity to deal with sea level rise and other climate change stressors.

Nature-based solutions represent a relatively new technology for mitigating the impact of coastal hazards in New England. Many of the challenges faced in the permitting and adoption of living shorelines are consistent with those challenges faced by other nature-based solutions (e.g., dam removal, road stream crossings, fish passage, marsh platform building, and habitat restoration) when compared to more familiar (mainstream) approaches. NBS may require extensive regulatory consultation, experience longer timelines to permitting, extensive data to demonstrate feasibility and function, and expensive monitoring to document no negative impacts. Implementing the opportunities above may help natural resource regulators gain confidence and experience at regulating nature-based approaches. Similarly, the regulatory process can be updated to become a tool to approve better small projects with few potential (cumulative, current, and future) resource impacts, and guide larger projects to maximize their coastal resilience function while also protecting the environment to the maximum extent possible and contributing to continual learning and improvement through monitoring and adaptive management. This way, the regulatory process can help advance the technology behind nature-based solutions to achieve public benefits.

To achieve needed regulatory and process improvements, the best possible science should be used to guide regulatory decision-making, including an understanding of the potential cumulative impacts at project and larger spatial and temporal scales, under current and future environmental conditions. Design standards should be developed and used to guide project development and provide consistency. Focused monitoring and adaptive management are needed to periodically update our understanding of the functioning and impacts of nature-based solutions (e.g., living shorelines). With this information, regulations should be improved to include living shoreline approaches in a sequential minimization scheme, and this scheme updated to explicitly consider cumulative impacts under both present and future conditions and updated as our understanding develops. Tiered regulatory decision-making, which is both familiar and effective, can be updated to meet these needs. Increasing climate resilience is not optional to protect life and livelihoods, and nature-based solutions, in tandem with monitoring and adaptive management to continually improve their design and function, can provide powerful and important tools to achieve it. Without improving our regulation and understanding of nature-based solutions, there is a high risk of incentivizing alternative solutions that bring further environmental damage for which permitting is more familiar, like hardened shorelines.

Often, NBS approaches are regulated using the same processes applied to other development projects, including those with commercial goals, rather than goals in the public

interest (like climate resilience). Living shorelines, and other nature-based solutions, are designed to improve ecological conditions, or balance impacts to ecological conditions with the need to protect existing infrastructure. The regulatory process for living shorelines subjects them to a high degree of scrutiny, which is important to ensure the best possible projects to be approved. However, living shorelines are regulated and permitted using a process that was designed to minimize direct impact to protect resources, which is inappropriate when considering living shoreline approaches.

The opportunities and challenges presented here represent the findings of this project and represent the experiences of the project team. Though they are similar in structure to recommendations offered by previous studies (O'Donnell 2016, Hilke et al. 2020) and reports, this report discusses specifically how the challenges impacted project permitting and permittee experiences, and relate each opportunity to easing those challenges. Given project team members are established environmental professionals and many work in regulatory environments, their experience with the permitting process will vary compared to those of project proponents outside of state agencies. For example, the focus of these findings on federal environmental permitting processes may reflect the familiarity of project applicants with state processes. Where project proponents are not from state agencies, their experiences interacting with state processes may uncover other challenges and opportunities to improve local or state-level processes for permitting living shorelines. A critical next step is to engage with the federal regulatory community on their experiences with the living shorelines permitting process, document the challenges and opportunities they identify, and understand their perspective on the opportunities offered in this document. Another important next step for enhancing the use of living shorelines where appropriate would be to ask project proponents for a variety of shoreline stabilization approaches (e.g. living shorelines and hardened approaches) from the private sector about their experiences with the permitting process in each New England coastal state. Questions could address their experiences with permitting, project design and performance, as well as their motivation for mitigating shoreline erosion and coastal flooding to better understand their perspectives and decision-making processes around coastal resilience.

Next Steps

To continue to address climate resilience with nature-based solutions, and advance their application, it is important to continue discussions with federal regulatory agencies, to document how they consider topics like habitat conversion, climate change and cumulative impacts in their regulatory decision-making, and identify the sequential minimization scheme they apply to living shorelines, especially when there are trade-offs among potential impacts on short and long-term time scales. Next steps could include:

- Engage with the USACE (including New England District regulators, the Engineering with Nature initiative, and the Engineer Research and Development Center) and other federal agencies on permitting living shorelines. Identify how agencies consider the following in their decision-making:
    - Permitting of projects that require fill
    - Habitat conversion (and other negative impacts to resources) where trade-offs are present among resource impacts under current and future conditions
    - Balance between temporary direct and indirect negative effects on resources and the potential for longer term benefits

    - Project selection considering coastal resilience and climate change
- Further investigate models where regulatory permitting has been updated and better fits NBS projects (e.g. USACE/USFWS/FEMA Programmatic stream crossing, dam removal). Engage in discussions with the parties behind them
    - Understand and document changes in regulatory process as a result of this adjustment
    - Understand relationships between demand (mainstreaming and increasing familiarity and comfort with newer technologies), design standards, and regulatory processes
- Interview living shorelines project proponents form the private sector in each New England state to document their experiences with the permitting process and identify challenges they encountered
    - Questions could address their experiences with permitting, project design and performance, as well as their motivation for mitigating shoreline erosion and coastal flooding to better understand their perspectives and decision-making processes around coastal resilience
    - Compare their experiences with those of the project team
- Update challenges and opportunities with this information

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Appendix 1: Interview Questions, Methods, and Contributors

Interview and research methods

Interviews of project team members most closely associated with project permitting (Table S1) were conducted via zoom during September and October 2021. First, the interviewer introduced the goals of the deliverable, and outline information sought form each interviewee. Then, questions (listed below) were asked to guide interviewees in recounting their process for permitting the living shorelines projects (including federal, state, and local permits), identify any monitoring and adaptive management measures or corrective actions taken, ask for ideas on how to develop this deliverable, and offer open-ended time to discuss their perspectives on the permitting process. Interviewees were asked to describe the challenges they faced in permitting projects, while opportunities to address them came up at the interviewee's behest.

Additional desktop research was conducted to document the permitting process at each of the five coastal states in New England, using a snowball approach. To find this information, a web-based search engine was used to find further information on the permits mentioned in practitioner interviews, State agency websites were searched for their applicant information on environmental permits. From all environmental permits, those related to coastal construction were examined more closely to determine if they were likely relevant to living shorelines projects. Given many of the permits share dependencies on other permits at the state and federal level (e.g. federal USACE and NEPA, CZM, and state level NEPA and CZM laws), these dependencies were noted to ensure further examination of the related laws and permits. Next, federal government websites for the National Environmental Policy Act (NEPA) and Coastal Zone Management Act were searched for information relevant to living shorelines permitting. The USACE website for the New England district was then pursued for information on environmental permitting in each state. As a secondary measure to ensure the right websites were found, the list of permits was double checked with those listed as dependent on USACE review.

The challenges and opportunities identified from the interviews were then combined to identify common themes across states. Finally, the insights from the interviews and permitting processes were synthesized to identify common themes among the challenges, and opportunities to address the challenges using advances in environmental permitting for living shorelines. Drafted challenges and opportunities were reviewed by the project team to ensure the synthesis was effective before further refinement.

Following initial interviews and information synthesis, several project team members met with representatives from NOAA GARFO. Arranging this meeting was a contribution to this deliverable as part of the cooperative agreement between the NOAA Office for Coastal Management (OCM), The Nature Conservancy, the Northeast Regional Ocean Council, and all sub-awardees, in carrying out this scope of work for this Coastal Resilience Grant. Attendees are listed in Table 2.

Table 2. List of document contributors and their affiliations. Individuals present during interviews, project applicants, and role changes are demarcated.

Sector	Name	Title and Affiliation
Academic	Tom Ballestero, Ph.D.	Associate Professor, Civil and Environmental Engineering, Ocean Engineering, and Director, UNH Stormwater Center, University of New Hampshire
Academic	Kim Bradley	Project Specialist, Connecticut Institute for Resilience & Climate Adaptation (CIRCA), University of Connecticut
Public – private partnership	Curtis Bohlen, Ph.D.	Director, Casco Bay Estuary Partnership at University of Southern Maine
NGO	Alison Bowden	Director of Conservation Science and Strategy, The Nature Conservancy Massachusetts
Academic	David Burdick, Ph.D.	Research Associate Professor, Interim Director, School of Marine Science and Ocean Engineering, University of New Hampshire
State – RI	Caitlin Chaffee	Policy Analyst°, RI Coastal Resources Management Council
State – NH	Steve Couture	Administrator, NH Department of Environmental Services Coastal Program
Public – private partnership	Matt Craig	Program Coordinator, Casco Bay Estuary Partnership
NGO	Theresa Davenport*	Coastal Sustainability Fellow, The Nature Conservancy Massachusetts
State – RI	Leah Feldman	Coastal Policy Analyst, RI Coastal Resources Management Council
State – RI	Janet Freedman	Coastal Geologist°, RI Coastal Resources Management Council
NGO	Brianna Group	Coastal Conservation Coordinator, The Nature Conservancy New Hampshire
Federal – NOAA	Adrianne Harrison	Senior Coastal Management Specialist, NOAA Office of Coastal Management
State – NH	Kirsten Howard	Resilience Program Coordinator, NH Department of Environmental Services Coastal Program
State – CT	Sue Jacobson	Supervisor, Regulatory Division, CT Department of Energy and Environmental Protection
NGO	Steve Kirk*	Coastal Program Manager, The Nature Conservancy Massachusetts Ocean Program
State – MA	Julia Knisel	Coastal Shoreline and Floodplain Manager, MA Office of Coastal Zone Management, MA Executive Office of Energy and Environmental Affairs

Federal – state partnership	Joan LeBlanc	Coordinator, Northeast Regional Ocean Council
State – ME	Kathleen Leyden	Director, Maine Coastal Program, State of Maine Department of Marine Resources
Academic	Katie Lund	Director of Engagement, Connecticut Institute for Resilience & Climate Adaptation (CIRCA), University of Connecticut
State – ME	Margot Mansfield	Coastal Hazards & Climate Specialist, MA Office of Coastal Zone Management, MA Executive Office of Energy and Environmental Affairs
Academic	Jennifer Mattei, Ph.D.	Professor of Biology, Sacred Heart University
Federal – state – local partnership	Steve Miller	Coastal Training Program Manager, Great Bay National Estuarine Research Reserve
Academic	Jim O'Donnell, Ph.D.	Professor, Department of Marine Sciences, and Director, Connecticut Institute for Resilience and Climate Adaptation, University of Connecticut
Federal – state – local partnership	Cory Riley	Manager, Great Bay National Estuarine Research Reserve
NGO	Eric Roberts	Global Climate Risk and Resilience Program Manager at The Nature Conservancy
State – ME	Peter Slovinsky	Marine Geologist, Maine Geological Survey
State – CT	Brian Thompson	CT Department of Energy and Environmental Protection, Land and Water Resources Division
State – RI	Jeff Willis	Executive Director, RI Coastal Resources Management Council
State – CT	Harry Yamalis	Environmental Analyst, CT Department of Energy and Environmental Protection
NOAA GARFO meeting attendees		
Federal- NOAA GARFO	Chris Boelke	New England Branch Chief, Habitat and Ecosystem Services Division (HESD), NOAA/NMFS/GARFO
NGO	Alison Bowden	Director of Conservation Science and Strategy, The Nature Conservancy Massachusetts
State – RI	Caitlin Chaffee	Policy Analyst°, RI Coastal Resources Management Council
Federal- NOAA GARFO	Lou Chiarella	Assistant Regional Administrator for Habitat Conservation, NOAA/NMFS/GARFO
NGO	Theresa Davenport	Coastal Sustainability Fellow, The Nature Conservancy Massachusetts
state – RI	Leah Feldman	Coastal Policy Analyst, RI Coastal Resources Management Council

Federal – NOAA OCM	Adrianne Harrison	Senior Coastal Management Specialist, NOAA Office of Coastal Management
Federal – NOAA GARFO	Mike Johnson	Regional Climate and Resilience Coordinator, NOAA/NMFS/GARFO, Habitat and Ecosystem Services Division (HESD)
NGO	Steve Kirk	Coastal Program Manager, The Nature Conservancy Massachusetts Ocean Program
Federal – state partnership	Joan LeBlanc	Coordinator, Northeast Regional Ocean Council
Federal – NOAA OCM	Becca Newhall	Coastal Management Liaison, NOAA OCM
Federal – NOAA OCM	Betsy Nicholson	North Regional Director, NOAA Office for Coastal Management
Federal – NOAA GARFO	Sabrina Pereira	Marine Resource Management Specialist, NOAA/NMFS/GARFO
Federal – NOAA GARFO	Kaitlyn Shaw	Marine Resources Management Specialist, NOAA/NMFS/GARFO
State – ME	Pete Slovinsky	Marine Geologist, Maine Geological Survey

* Interviewer

° Former affiliation at the time of project permitting and construction

Interview Questions

NOAA CRG- Living Shorelines Permitting guidance deliverable
Agenda and Interview Questions

State:
Date and Time:
Attendees and affiliations:
Zoom link:

Introductions and goal setting (5 min)

- Introductions: name, agency / organization, role at organization, role in the LS project
- The information we discuss today is going to be used to develop the final deliverable for the NOAA CRG that documents the permitting pathway for a LS project in each state.
- **Outcome**: From our conversation today, I am seeking:
    - your knowledge of the permitting pathway for your demo project(s) and any available informational resources on the pathway
    - any recent or proposed changes to the pathway you may know of
    - monitoring requirements for your demo project(s)
    - your experience with and perspective on the process from the CRG living shorelines projects, as well as your broader experience.
    - your recommendations to improve the permitting pathway

*Permitting process **for your demonstration / match projects**: (20 min)*

- How were you involved in the permitting process for your living shoreline demonstration project?
    - was there one permit for all projects in your state? or multiple permits?
    - were there others in your agency, or elsewhere, that were your primary contacts, that I should also be interviewing?
- Let's walk through your process for permitting your living shoreline demonstration projects.
    - How did the project start? How did you first become involved?
        - is there a resource available that you were able to follow?
    - Federal: At the federal level, what are the statues, regulations, and programs involved in permitting, and what agencies are responsible for this coordination?
        - is there a known sequence for each entity to be brought into the project?
    - State: At the state level, what are the statues, regulations, and programs, and what agencies are responsible for this coordination?
        - is there a known sequence for each entity to be brought into the project?
    - Local: are there statues, regulations, or programs in place at the local level in your state?
        - is there a known sequence for each entity to be brought into the project?
    - Approximately how long did the permitting process take:
        - during initial project design
        - during final project design, if applicable
        - from filing to receiving a permit
- Were some stages much longer or shorter than others? what aspects of project design made the project take longer?

    - What is a cost estimate for your permitting process?
    - What are some major challenges in the permitting process for your **demo project**?
    - Were there any significant changes in design based on the permitting process (either from discussions during permitting or the final permit)?
        - Did you purposefully design the project to avoid a jurisdiction or a permit that was overly challenging?
        - If so, what was it? How did it change your project (e.g. avoid areas with protected resources or T&E species, even though the project may have functioned better in these areas)
    - What could have changed to make the process easier?

*Permitting process – **other living shoreline projects**:* (30 min)

- Are there consistent challenges in the permitting process for living shorelines in your experience?
    - Have you changed projects because of permitting and review?
        - What changes did you make (e.g. avoid areas with protected resources or T&E species)?
        - What motivated the changes (e.g. improved engineering or design, avoided regulatory roadblocks, etc.)?
    - Do you regularly design projects to avoid a jurisdiction or a permit that is overly challenging? Are there design trade-offs that take place (if so, please name examples)?
- What can be done to make the process easier, or more consistent?
- Does the permitting process allow you to follow best practices for engineering and design?
- What do you think are the benefits and strengths of the permitting process?
- How do these processes compare to permitting for other shoreline erosion control techniques (e.g. complexity or technical difficulty of permitting, technical difficulty, number of steps or consultations required, etc)?
- Any further information to share based on your experiences with other projects?

*Assessment, Monitoring and Corrective Actions in your **demo / match project permits*** (10 min)

- What types of monitoring are required by your permit? e.g. as built, performance monitoring (e.g. physical or ecological function)
    - what is the frequency and duration of each of these types of monitoring?
- What is a cost estimate for your required monitoring? Do monitoring results trigger an intervention or corrective action? (e.g. maintenance or adaptive management)
    - If so, did this require additional permitting? additional costs?

*Assessment, Monitoring, Corrective Actions and permitting – **other living shoreline projects*** (10 min)

- Have you done a project for which monitoring results triggered an intervention or corrective action (e.g. maintenance or adaptive management)?
    - If so, did this require additional permitting? additional costs?

- Any other information you'd like to share about the permitting process for monitoring/ corrective actions?

Guidance for creating the permitting guidance deliverable from the CRG award (5 min)
- Is there a specific style of presenting permitting information that would be particularly helpful to you or other stakeholders?
    - Do you know if the permitting pathway is already documented and easily accessible?
- Are there any recent or proposed changes to the permitting pathway in your state?
    - When were these proposed?
    - When are these proposed to go into effect?
- Any remaining thoughts to ensure the deliverable produces what you need?

Perspective on the process / personal narrative. (10 min)
- Do you have recommendations to improve the project permitting process based on your personal experience?
- Is there anyone else you can think of whose perspective I should gather for this project?
- Any final details you would like to share about what we discussed today, or other topics related to permitting for living shorelines (e.g. public perception of the LS projects or their co-benefits, funding challenges)?

Meeting Agenda: CRG Project Team representatives and NOAA GARFO

Agenda: NROC/TNC/NOAA **Living Shorelines Coastal Resilience Grant – Environmental Permitting Discussion** Monday, November 22, 2021 | 10:30 AM – 12:30 PM | Videoconference Meeting Join with Google Meet meet.google.com/yqs-ktho-ajk Join by phone (US) +1 574-404-7613 (PIN: 124936783)	
10:30 AM	**Welcome, Review of Agenda** *Adrianne Harrison, NOAA and Theresa Davenport, TNC*
10:35 AM	**Overview and Introductions** *Theresa Davenport, TNC and Adrianne Harrison, NOAA* NROC and TNC context for today's discussion: • Living shorelines Coastal Resilience Grant (CRG) project status • Monitoring and Environmental permitting deliverables status • Overview of regulatory challenges • NROC / TNC goals for the CRG project and beyond
10:50 AM	**Permitting Discussion** *Adrianne Harrison, NOAA and Theresa Davenport, TNC* • NOAA GARFO context for today's discussion:

	○ Progression of EFH reviews ○ Relationship with USACE ○ interagency coordination • Reflection on CRG living shoreline projects' experiences • Outstanding questions: ○ **Design standards:** How are projects judged (what determines a good and bad proposal)? Are there design standards, policy frameworks, or benchmarks for judging projects? What criteria are usually agreed upon, what are the sources of judgment? ○ **State of play:** What sort of projects are received from project proponents? What's the balance of good or bad proposals? ○ **Monitoring and pilot projects:** How is the review process benefitting from pilot projects and monitoring? ○ **Current process:** What is the review process? ○ **Pre-application meetings:** How have these altered project designs? ○ **Information needed:** Is more, or specific, information needed to evaluate living shorelines projects? How is project performance or monitoring data used to inform future reviews?
11:35 AM	**Future Opportunities** *Adrianne Harrison, NOAA and Theresa Davenport, TNC* Discussion of next steps and future discussions. • Future conditions: How do mandates consider future conditions of resource areas? • Habitat conversion: what are the current conversations around habitat conversion?
12:15 PM	**Closeout / Discuss Next steps**
12:25 PM	**Meeting Adjourns**

Appendix 2: Regulatory processes and guidance for living shorelines in New England, USA

Below is a description of environmental regulatory requirements most likely to be relevant to living shorelines projects, including permits, licenses, certifications, and reviews. Requirements are listed by jurisdiction: federal, regionwide, and each coastal state (Connecticut, Maine, Massachusetts, New Hampshire, and Rhode Island). Each section is structured to direct potential project applicants to the key regulatory agencies and contacts in their states, and offer a brief overview of relevant permits, processes or policies, and their relationship to living shorelines. For each permit, you will find:

- A description of the regulatory rationale, authority (laws and responsible agency/ies), and activities that are regulated, and how they relate to living shorelines
- A description of the permit requirements and any major differences if there are multiple permit types
- Key relationships with other permits, or details related to the order of the permitting process
- Recent or proposed changes to the permit, process, or policy.
- How to start the application process.
- References for more information, including links to agency websites, regulatory language, FAQs, applications, and guidance documents.

Federal environmental regulatory requirements for living shorelines

National Environmental Policy Act (NEPA) Review

The National Environmental Policy Act (NEPA) is the United States' national environmental policy, and a process to implement it (Citizens Guide to NEPA). Section 101 declares the policy, and section 102 contains procedures for federal agencies to carry it out. The intent and rationale of NEPA are summarized in Section 101: "...to use all practicable means and measures, including financial and technical assistance, in a manner calculated to create and maintain conditions under which man and nature can exist in productive harmony, and [to] fulfill the social, economic, and other requirements of present and future generations of Americans" (42 U.S.C. 4331(a)).

NEPA procedures require federal agencies to conduct an environmental review process that considers the effects of agency decision-making on the environment. NEPA review does not require particular outcomes but encourages better decision-making by requiring agencies to consider the environmental effects of their proposed actions. To satisfy their NEPA requirements, federal agencies must evaluate the environmental effects of, and alternatives to, a proposed action or program.

The Council on Environmental Quality, which was created in 1970 along with the enactment of NEPA, is responsible for consulting with Federal agencies on procedures to implement NEPA's procedural requirements and has updated their regulations directing agencies on fundamental NEPA requirements. Many federal agencies have established offices that are

dedicated to overseeing NEPA policy and programs. The Environmental Protection Agency's (EPA's) Office of Federal Activities also conducts NEPA oversight as it reviews environmental impact statements (EISs) and some environmental assessments (EAs) issued by Federal agencies (Citizens Guide to NEPA). The most recent Citizens guide to NEPA was updated in 2021 to help citizens and organizations effectively participate in federal agency reviews under NEPA.

With respect to living shorelines, when they are proposed on federally owned lands, using federal funds, or requiring certain federal permits, they may be subject to NEPA review. Where relevant, NEPA is conducted first in the environmental permitting process since its outcome determines a project's structure.

The NEPA Process is based on the likelihood of environmental effects of a proposed project to be significant (for a handy process flow chart, and further explanations of these levels of review within the NEPA process, see Citizens Guide to NEPA starting on page 8). There are three levels of review for federal agencies to assess environmental impacts: Categorical Exclusions (CE), Environmental Assessment (EA), and Environmental Impact Statement (EIS). A CE is issued for a project that does not normally have a significant impact on the human environment, e.g., making minor facility renovations or reconstruction of hiking trails on public lands. If an agency determines that a CE applies to a proposed action and verifies that no extraordinary circumstances exist that may cause the action to have a significant effect, this can satisfy agency NEPA requirements (Citizens Guide to NEPA). An EA is needed if a CE is not applied. An EA includes: the purpose and need for the proposed action, alternative courses of action to the proposed project to meet the agency's objective(s), the environmental impacts of the proposed action and alternatives. If the agency determined with the EA that there are no significant impacts, following an EA, the agency drafts a FONSI (finding of no significant impact) that documents why the agency has concluded there are no significant environmental impacts, and satisfies the agency's NEPA requirements. If there are significant environmental impacts, an EIS process is initiated, and includes a public project scoping process, development of a draft EIS, a public comment period, the final EIS, and a Record of Decision (ROD), a document that captures the final decision, alternatives considered, and discusses mitigation plans, among other contents.

To begin NEPA submission, contact the lead agency or department NEPA coordinator for your proposed project. For the most recent updates to NEPA, visit the CEQ webpage for NEPA, for current proposed rules and past NEPA rulemaking. For instance, in October 2021, CEQ published Phase 1 Notice of Proposed Rulemaking, which proposes to restore provisions that were in effect for decades before changes were made in 2020.

References for More information:

- Information for this summary comes from the Citizens guide to NEPA, 2021, with a handy NEPA process flow chart on page 8
- NEPA law, full text: 42 U.S.C. 4321-4347
- CEQ NEPA Regulations
- CEQ website with links to MEPA office, FAQ, and more from CEQ
- Environmental Permitting in Coastal Massachusetts Section 2: National Environmental Policy Act

Regionwide environmental permitting for living shorelines

U.S. Army Corps of Engineers Permit

Federal Environmental Permit for compliance with federal environmental laws, including: Rivers and Harbors Act (Section 10 Permit), Clean Water Act (Section 404 Permit), Marine Protection, Research and Sanctuaries Act (Section 103 Permit)

Regulated activities, regulatory authorities, regulatory rationale and jurisdiction: The U.S. Army Corps of Engineers (USACE) has been regulating activities in the nation's waters since 1890. Historically, the primary purpose of regulation was to avoid impeding navigation. Since the 1960's, new laws and court decisions have reshaped the purpose of this regulation and given the USACE regulatory authority to protect the physical, chemical, and biological integrity of the nation's waters. Therefore, the current regulatory program considers the full public interest for both the protection and use of water resources (Guide for Permit Applicants).

Three laws govern the USACE permitting process, and each regulate specific activities. Projects that include any of the listed activities require a permit and must comply with a state's Programmatic General Permit, or (for a larger project) the conditions of an Individual Permit.

- Rivers and Harbors Act of 1899 (Sections 9 and 10): 33 U.S.C. §§ 401-413, 33 CFR 322: Permits for Structures or Work Affecting Navigable Waters of the United States.
    - **Regulated activities:** Work, construction, and placement of structures in, below, or above navigable waters, including excavating, dredging and maintenance activities, waterward of mean high water.
- Clean Water Act (Section 404)
    - **Authorities**: Section 404: 33 U.S.C. §1251 et seq.: Federal Water Pollution Control Act; 33 CFR 323: Permits for Discharges of Dredged or Fill Material into the Waters of the United States.
    - **Regulated activities:** Discharge of dredged or fill material into navigable waters and lakes, rivers, streams, and wetlands. For tidal waters: waterward of the high tide line. For other waters: waterward of the ordinary high-water mark. For wetlands: the whole wetland.
- Marine Protection, Research and Sanctuaries Act (Section 103)
    - **Authorities**: Section 103: 33 U.S.C. §1401 et seq.: Marine Protection, Research and Sanctuaries Act; 33 CFR 324: Permits for Ocean Dumping of Dredged Material.
    - **Regulated Activities:** Transportation of dredged material for the purpose of disposal in ocean waters. (Unlikely for living shorelines)

The USACE is the federal agency with regulatory responsibility for issuing environmental permits (including general and individual permits) for compliance with the above federal laws. The USACE also coordinates compliance with related federal laws, and interagency consultation is required for their permits. USACE consults with other federal agencies with jurisdiction over water-based resources, including USFWS and NOAA, and with state agencies responsible for environmental permitting. For a list of related laws, see 33 CFR 320.3. Additional related laws include but are not limited to: §401 and §402 of the Clean Water Act, §307(c) of the Coastal Zone Management Act of 1972, the National Historic Preservation Act of 1966, the Endangered Species Act, the Fish and Wildlife Act of 1956, the Marine Mammal Protection Act of 1972, the Magnuson-Stevens Fishery Conservation and Management Act, and §7(a) of the Wild and Scenic Rivers Act.

The regulation of construction and other work in navigable waterways under the laws above is intended to consider and protect the full public interest in these waterways by balancing

favorable impacts of the proposed projects against the detrimental impacts. USACE permits are intended to offer this "public interest review", which is intended to reflect and balance concerns for both the protection and utilization of important water resources.

USACE permits relate to waters of the U.S., as defined in 33 CFR 328. These waters include more than navigable waters of the U.S. and are the waters where permits are required for the discharge of dredged or fill material pursuant to §404 of the CWA. Waters of the U.S. include jurisdictional wetlands (Guide for Permit Applicants).

Permit types and permitting thresholds: As projects that are typically constructed on shorelines that abut coastal property to protect them from erosion, and may involve fill, construction, and/or other impacts to navigable waters of the US, living shorelines require USACE permits. The USACE permitting process includes multiple levels, to ease permitting burdens for projects with limited environmental impacts. **Individual permits** are needed for larger projects with greater potential for environmental impacts. **General permits** are available for a specific set of projects with lesser environmental impacts and can be regional or nationwide. The local USACE offices coordinate with state natural resource agencies for this permitting (regardless of the permit type).

In the New England District, the nationwide permits have been suspended and replaced by separate **Programmatic General Permits (PGP)**, for each state. The purpose of General Permits is to protect the aquatic environment and the public interest while authorizing activities that have no more than minimal adverse environmental effects. Each New England state has their own set of activities permitted under a suite of General Permits, their own General Conditions that need to be met for a project to meet the requirements of a General Permit, and set their own thresholds to determine which permits apply to potential projects. Activities authorized under a GP must meet the set of General Conditions set by each state's PGP to qualify.
The total temporary and permanent impact area is used to determine if a single and complete project is eligible for the General Permit, either with self-verification (SV) or a preconstruction notification (PCN), or if it requires an individual permit (IP). Self-Verification (SV) is appropriate for activities with limited environmental impacts that comply with the General Permit and don't require regulatory review by USACE. Projects must be reported to USACE on a written notification form found in the General Permit. USACE will acknowledge receipt after they have reviewed the application, after which no further review is needed. Preconstruction Notification (PCN) is required before starting work for activities that do not quality for self-verification (or are listed as requiring a PCN), but otherwise comply with the General Permit. PCNs are reviewed by several agencies including state resource management agencies, USFWS, and NOAA. USACE will then determine whether the PCN activity qualifies for authorization under the General Permit. Requirements, and where to find them for each General Permit (and how they vary by SV and PCN) are discussed below for each state. Living shorelines are typically eligible for General Permits, though eligibility among SV and PCN permitting processes will vary.

If the proposed project has the potential to cause more than minimal adverse environmental impacts (i.e., it does not fall under the size or impact thresholds and/or does not meet all the General Conditions of a Programmatic General Permit in the state in which it is located), an Individual Permit is required. This process involves detailed and project-specific review, interagency coordination (and consultation), and a public notice process. An Environmental Impact Statement (see the NEPA section for details on an EIS) may also be required. Individual Permits are also subject to review for consistency with the Coastal Zone

Management Act; activities in a state's coastal zone must comply with state coastal zone management programs (Guide for Permit Applicants).

Public hearings are infrequently needed to complete the decision process (Guide for Permit Applicants). Public hearings are held to gather information in connection with a permit application or a federal project. The USACE can conduct their own hearings or participate in joint public hearings with state or other federal agencies. A public hearing can also be requested by any member of the public during the public comment period, though specific reasons for a hearing must be provided.

Application process: While the application process differs by project type (Table 3), project proponents are encouraged to contact the USACE with questions at any time, *including for guidance toward an appropriate permitting process*. Pre-application meetings (see 33 CFR 325.1(b)) are highly encouraged to facilitate the review of projects, streamline the permitting process, and identify concerns that may arise during project evaluation; contact the USACE at (800) 343-4789 or visit the USACE web site at www.nae.usace.army.mil. Project proponents can submit information, including a brief project description, vicinity map, site plan, and detailed plan view to the USACE to determine if the proposed activity is authorized under a general permit (note that for some PGPs, the USACE relies on state application processes). For a detailed guide to the permit application process, information to submit, and the application forms, see the Guide for Permit Applicants page 9.

Table 3. USACE permit types and application process.

Permit types	**General Permits**		**Individual Permit** Project does not meet either set of the GP thresholds, and/or does not meet at GCs
	Self- Verification (SV) Project meets the SV threshold criteria in the relevant state GPs and all GCs	**Preconstruction Notification (PCN)** Project meets the PCN threshold criteria in the relevant state GPs and all GCs	
Where to start	Verify that the activity will comply with all applicable terms and conditions of the relevant GPs, and ensure that a PCN is not required. It is best to contact the USACE to request confirmation that either an SV or a PCN is sufficient.		Before beginning this application, consult a USACE representative to arrange a pre-application meeting.
Key links for applicants	The Permit Guide for Applicants contains information for both General and Individual Permits, including application forms, permit types, evaluation procedures, and more. General Permits are specific to each state and are updated every 5 years: Maine: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Maine-General-Permit/ New Hampshire: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/New-Hampshire-General-Permit/		The Permit Guide for Applicants contains information for both General and Individual Permits, including application forms, permit types, evaluation procedures, and more.

	Massachusetts: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit/ Connecticut: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Connecticut-General-Permit/ Rhode Island: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Rhode-Island-General-Permit/		
Timelines	Once this is submitted, and after the USACE confirms receipt of the SVNF and issues a permit by email or hard copy, project work can begin	The USACE will issue a General Permit verification letter within 60 days of receipt of a PCN application. Upon receipt, work can begin.	Individual permits typically take over 180 days, and permits must be received before work can begin

References for more information:

- For a full list of application materials, see the Guide for Permit Applicants for individual permits, or the state's General Permits (GPs) for General Permits.
- Regulations and Guidance, including links for:
    - Statutory Authorities (Rivers and Harbors Act of 1899, Clean Water Act of 1972, Section 404, Marine protection Research and Sanctuaries Act of 1972)
    - Regulatory Program Regulations (33 CFR Part 320 – 334)
    - Related Regulations
    - Related Laws
    - Selected Related Code of Federal Regulations
    - Presidential directives and Executive Orders
    - Appeals

Connecticut environmental permitting for living shorelines

To install a living shoreline in Connecticut, you will need a combination of the following permits and/or regulatory reviews, depending on the details of your proposed project. For guidance identifying the specific permits required for your proposed living shoreline project in Connecticut, start by reaching out to the Connecticut Department of Energy and Environmental Protection (CT DEEP, pre-application assistance) and the U.S. Army Corps of Engineers New England District (USACE, Regulatory/Permitting Division contacts) for pre-application / pre-filing consultation meetings. For a compilation of environmental regulations and their role in the project permitting process, refer to the CT DEEP's guide to User's Guide to Environmental Permits.

Note that the permits outlined below do not represent an exhaustive list of every possible permit you may need, as living shorelines projects are highly variable, and tailored to individual sites. For this reason, it is imperative to speak with regulatory professionals at CT DEEP and USACE as you plan and design a project; these professionals may be able to help you select a project that is appropriate to your location and reduces environmental impacts and permitting burdens. Note that applications often have nominal application fees in addition to the costs of preparing an application and constructing your project. Application fees for different permits can be viewed in CTDEEP Permitting.

Section 404 and Section 401 Water Quality Certification

If your living shoreline project involves fill in a 'Waters of the United States', the project will need a Section 404 water quality certification (WQC) from the USACE and a corresponding Section 401 WQC from CT DEEP. The 404 and 401 WQCs may need to be processed through Individual permit applications at both the state and federal levels, or the project may be eligible for approval under the Department of the Army Regional General Permits for the State of Connecticut (GP), effective December 15, 2021. Living shorelines are covered under GP #9. Smaller projects may be eligible for Self-Verification or Pre-Construction Notification (PCN). More complicated, larger projects beyond the scope of the General Permit would require review under an Individual WQC. See section above, **"**U.S. Army Corps of Engineers Permit**"** for details. Coordinate with staff at both the USACE and CT DEEP to determine the review process for your project. For project eligibility criteria under GP9, refer to page 28 of the CT GP found here: CT GPs The state WQC approving this GP is found here: 401 Water Quality Certification: updates to CT GPs and relationships with WQC; as of Nov 01, 2021.

For living shoreline projects that are not GP eligible at either the state or federal level, you will need an Individual WQC. For projects in non-tidal waters, start with a pre-filing request form for the state Individual WQC. Application Form L is necessary for an Individual WQC or a PCN from the state for projects in non-tidal waters. For projects in tidal waters, the state 401 WQC is incorporated into one of CT DEEP's coastal permitting programs explained below.

References for more information:

- 401 Water Quality Certification: An Environmental Permitting Fact Sheet
- Application form, instructions, and additional information: https://portal.ct.gov/DEEP/Permits-and-Licenses/Land-and-Water-Resource-Division-LWRD-Applications

Coastal / Tidal Waters: Certificate of Permission

Coastal/tidal waters permits regulate dredging and the erection of structures and the placement of fill, and work incidental thereto, in the tidal, coastal, or navigable waters of the state waterward of the coastal jurisdiction line. For eligible activities, this permit may be obtained through a short permit process, i.e., Certificates of Permission (COP). Activities eligible under this program are listed in CGS section 22a-363b and include: substantial maintenance and minor alterations or amendments of authorized or pre-jurisdiction structures, fill, obstructions and encroachments; maintenance dredging of maintained permitted dredged areas; removal of derelict structures and vessels; and other enumerated minor activities (Short Permit Process Fact Sheet).

Most living shoreline projects should qualify for this shortened 45-90 day permit review process. Certificates of Permission (COP) are certificates issued for certain minor activities involving dredging, erection of structures, or fill in any tidal, coastal or navigable waters of the state in accordance with sections **22a-359 through 22a-363h** of the Connecticut General Statutes.

Application Form D is necessary for a COP. If your project is not eligible for a COP, follow the permitting process below (Structures, Dredging and Fill and Tidal Wetlands).

- Application process: where to start
    - Licenses for Activities in Tidal Waters: https://portal.ct.gov/DEEP/Permits-and-Licenses/Land-and-Water-Resource-Division-LWRD-Applications#tidalwaters
    - Forms C and D; guidance
    - EZ-file coming soon

Coastal / Tidal Waters: Structures, Dredging & Fill and Tidal Wetlands

This program applies to work being proposed waterward of the Coastal Jurisdiction Line in tidal, coastal, or navigable waters of the state, including dredging and the placement of structures or fill material. If it is determined that a living shoreline project is not eligible to satisfy the coastal/tidal waters regulatory requirement with a Certificate of Permission (COP) due to its siting or scope, the activity would need to be reviewed through this more involved regulatory process which may take approximately six months or longer if a hearing is requested. The timeframe includes a public notice comment period (average processing time for coastal permits). This review includes the consideration of feasible alternatives to the original proposal. If alternatives are available, LWRD recommends authorization for only that alternative with the least adverse impact and/or the least encroachment waterward of the **coastal jurisdiction line** (Coastal Permits Fact Sheet). The application requires pre-submission consultation with several groups including municipal commissions.

- Authorizing Statutes
    - Sections 22a-359 through 22a-363f of the **Connecticut General Statutes** (CGS) (Structures, Dredging and Fill)
    - CGS Sections 22a-28 through 22a-35 (Tidal Wetlands): CGS Sections 22a-90 through 22a-112 (Connecticut Coastal Management Act)
- Application process: where to start

    - Licenses for Activities in Tidal Waters: https://portal.ct.gov/DEEP/Permits-and-Licenses/Land-and-Water-Resource-Division-LWRD-Applications#tidalwaters
    - Application Form C is necessary for a Structures, Dredging & Fill and Tidal Wetlands permit
    - Forms C and D; guidance
- EZ-file coming soon
    - https://portal.ct.gov/DEEP/Permits-and-Licenses/Permitting-Factsheets/Short-Permit-Process-Fact-Sheet#COP
    - Licenses for Activities in Tidal Waters:
        - application form, instructions, and additional information

Maine environmental permitting for living shorelines

To install a living shoreline in Maine, you will need a combination of the following permits and/or regulatory reviews, depending on the details of your proposed project. For guidance identifying the specific permits required for your proposed living shoreline project in Maine, start by reaching out to the Maine Department of Environmental Protection (Maine DEP, pre-application assistance) and the U.S. Army Corps of Engineers New England District (USACE, Regulatory/Permitting Division contacts) for pre-application / pre-filing consultation meetings. A compilation of permits, licenses and certifications issued by Maine DEP can be found here.

Note that this is not an exhaustive list of every possible permit you may need, as living shorelines projects are highly variable, and tailored to individual sites. For this reason, it is imperative to speak with regulatory professionals at Maine DEP and USACE as you plan and design a project; these professionals may be able to help you select a project that is appropriate to your location and reduces environmental impacts and permitting burdens. Note that there may be application fees in addition to the costs of preparing an application and constructing your project; see the fee schedule for details.

Programmatic General Permits for Maine (USACE "Corps" permit)

Permits from the U.S. Army Corps of Engineers are required for the construction of any new structure in navigable waters of the US, excavating or dredging from, or depositing of resulting materials in such waters, or any other work that affects the course, location, condition, or capacity of such waters. USACE permits ensure compliance with the Clean Water Act (Section 404), as well as the Rivers and Harbors Act of 1899 (Sections 9 and 10), and the Marine Protection, Research and Sanctuaries Act (Section 103), as well as other related laws (see Regionwide environmental Permitting, U.S. Army Corps of Engineers Permit, above). Projects that include these activities require a permit; they can either comply with the Maine General Permits or will require an Individual Permit. There are 23 General Permits (GPs) in Maine, which permit specific activities as long as they match the activities, meet the General Conditions, and are below the thresholds for each activity (e.g. in size, environmental impact, etc.) as laid out in the Department of the Army General Permits for the State of Maine (hereafter "ME GPs"). Living shorelines are often compliant with the Maine General Permit; in October 2020, GP 7 was updated to explicitly include Living Shorelines. Permits most relevant to living shorelines will include General Permit 5: Dredging, Disposal of Dredged Material, Beach Nourishment, and Rock Removal and Relocation; General Permit 7: Bank and Shoreline Stabilization Including Living Shorelines; and General Permit 21: Habitat Restoration, Establishment and Enhancement Activities. The total temporary and permanent impact area is used to determine if a single and complete project is eligible for self-verification (SV), a preconstruction notification (PCN), or an individual permit (IP). SV, PCN, and IP requirements for each General Permit can be found on the USACE Maine ME GPs.

Permitting requirements and thresholds: There are 45 General conditions in Maine that projects must meet to be eligible under a General Permit. For example, projects: must be designed to avoid and minimize negative impacts (GC 9), must not jeopardize the existence of threatened or endangered species (GC 16), must protect Essential Fish Habitat (EFH; GC 17), must not substantially disrupt the necessary life cycles of aquatic life, including migratory

species (GC 18), avoid spawning and breeding areas and seasons (GC 19), and must remove temporary fill (GC 26). GC 28: Bank and Shoreline Stabilization Including Living Shorelines, is for projects involving construction or repair, replacement, and maintenance of shoreline stabilization features including living shorelines within Corps jurisdiction. These projects must be designed to minimize environmental effects, effects to neighboring properties, scour, etc. to the maximum extent practicable (GC 28). For the full list of the activities included on a General Permit, and the conditions that must be met for projects to be covered under a general permit, see Maine GPs. Each activity authorized under one of the 23 General Permits has its own set of thresholds to determine which permitting requirements apply. Explanations of thresholds for each activity that are eligible for self-verification (SV), or require a pre-construction notification (PCN), are explained in the additional terms for each GP on pages 23-35 of the ME GPs (see pages 28-35 for projects in navigable waters). Projects may be authorized by General Permit (GP) if they meet the GCs and remain under the thresholds outlined for that activity. Projects that do not meet these conditions or remain under thresholds will require an individual permit.

Review Process and Forms: Project proponents are encouraged to schedule pre-application meetings to identify concerns that may arise during project evaluation. Proponents who believe their projects qualify for self-verification must ensure their projects conform to all General Conditions defined in Section IV of the Maine General Permit. Qualifying projects may proceed with project activities upon submission of a Self-Verification Notification Form (Section VI, page 36 of ME GP) and after the Corps confirms receipt of the SVNF and issues a permit by email or hard copy; however, living shorelines are infrequently permitted through self-verification. Projects that do not qualify for self-verification require a preconstruction notice (PCN) application (Section VII of ME GP). Applicants must submit a Corps ENG Form 4345 (pages 40-42 of ME GPs) application and all relevant information pertaining to the General Conditions requiring PCN submission. The Corps will send a complete copy of the PCN application to appropriate state, local, and federal resource agencies; agency comments on potential aquatic impacts will inform the Corps review. The Corps will issue a General Permit verification letter within 60 days of receipt of a PCN application.

Additional considerations for PCNs that are of particular relevance to living shorelines include: a) Compliance is required with the National Historic Preservation Act (36 CFR 800.00) to avoid adverse impacts to properties on, or potentially eligible for the National Register of Historic Places (GC 15). b) Essential fish habitat (EFH) is protected from adverse impacts of greater than minimal sedimentation or turbidity by the Magnuson-Stevens Fishery Conservation and Management Act (50 CFR 600.00). Prospective permittees may be required to describe and identify potential adverse effects to EFH, and should refer to the NOAA Fisheries EFH Mapper and EFH Assessment Worksheet. The USACE will determine whether consultation with NOAA National Marine Fisheries Service (NMFS) is required (NOAA Fisheries - Programmatic Consultations; NOAA/NMFS Consultations for EFH). (c) The Corps will consult with both the U.S. Fish and Wildlife Service (USFWS) and NOAA NMFS when permitting a project that may affect an Endangered Species Act (50 CFR 17.00) listed species or designated critical habitat. (d) Permittees shall satisfy any water quality conditions imposed by the State of Maine and EPA, where applicable, in their Clean Water Act Section 401 Water Quality Certification (314 CMR 9.00; ME GPs). A Water Quality Certification may be necessary (See Section VIII of the ME GPs for contact information), and the USACE may require additional water quality management measures **(e)** Permittees shall satisfy any additional coastal management conditions imposed by the State of Maine (Maine Coastal Program) in their Coastal Zone Management Act (CZMA) of

1972 concurrences for these GPs, or in any Individual CZM consistency concurrence (ME GPs). The Corps may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements (ME GPs).

For information about Individual Permits for projects not eligible under a General Permit, see "U.S. Army Corps Permit" in the Regionwide Permitting section of this volume.

Relationships with other permits: Apply for a USACE permit before state permits, as some state permitting processes (e.g. water quality certification with a NRPA Permit) depend on whether or not a federal permit is needed. The permittee must obtain relevant state approvals, when applicable, prior to the commencement of work, including water quality certification and Coastal Zone Management consistency (GC 4). Projects that do not qualify under either SV or PCN require an individual USACE permit and individual federal consistency review by the Maine Coastal Program.

Recent or proposed changes and updates: The General Permits for Maine were last updated in October 2020 and are reviewed every 5 years. The current GPs will expire in October 2025.

References for more information on USACE General Permits in Maine:

- USACE Permit Guide for Applicants in New England; application form on page 13
- Maine general permits for USACE, and linked PDF: "DEPARTMENT OF THE ARMY GENERAL PERMITS FOR THE STATE OF MAINE" (ME GPs)
- USACE permit regulations language
- General information on New England District Corps permitting

Natural Resources Protection Act (NRPA) permits

The Natural Resources Protection Act (NRPA) recognizes the significance of coastal wetlands and sand dunes, freshwater wetlands, great ponds, rivers, streams and brooks, fragile mountain areas, and significant wildlife habitat to the State of Maine, in terms of their recreational, historical, and environmental value to present and future generations. NRPA governs proposed activities in these areas, and intends to prevent any unreasonable impact to, degradation of, or destruction of these resources, and to encourage their protection or enhancement (Issue Profile: NRPA). Regulated activities include dredging, bulldozing, removing or displacing soil, sand, vegetation or other materials, filling (including adding sand or other material to a sand dune), construction or repair of a permanent structure, and more .

A NRPA permit is required when an "activity" will be:

- Located in, on or over any protected natural resource, or
- Located adjacent to (A) a coastal wetland, great pond, river, stream or brook or significant wildlife habitat contained within a freshwater wetland, or (B) certain freshwater wetlands.

An "activity" is (A) dredging, bulldozing, removing or displacing soil, sand, vegetation or other materials; (B) draining or otherwise dewatering; (C) filling, including adding sand or other material to a sand dune; or (D) any construction, repair or alteration of any permanent structure (see "activity" on NRPA site). Living shorelines projects typically require a NRPA permit given their locations and activities. The Maine DEP has statutory authority for permits under the NRPA.

There are several permitting options, including permit by rule, or a tier 1, 2, or 3 or individual permit application. Permit By Rule (Chapter 305; "PBR") is a simplified permitting process for certain activities approved by Maine DEP that will not significantly affect the environment if carried out in accordance with this chapter, and generally have less of an impact on the environment than an activity requiring an individual permit. Only specific activities, including shoreline stabilization, that meet specific criteria can be permitted via PBR; see Chapter 305 for a complete list of activities and criteria). For shoreline stabilization (Chapter 305, Section 8), the standards discuss slope requirements for the use of riprap by slope (i.e. vegetation must be used below a slope of 33% except in special cases), extent of riprap (no higher than 2 feet above normal high water), prevention of soil or fill erosion, use of new soil and soil amendments (based on slope, vegetation and more) and origin of rocks (i.e. not from the shoreline). For sand dune restoration or construction, a PBR may be obtained, and the activity must meet the standards of Chapter 305, Section 16. For the complete list of standards, see Chapter 305, section 8. A PBR satisfies the Natural Resources Protection Act (NRPA) permit requirement and Water Quality Certification requirement.

For projects not subject to PBR, the size of the proposed impact determines which application is required. Tier 1 Freshwater Wetland Alteration permits are for projects that alter 0 to 14,999 sq. ft. of freshwater wetlands. Tier 2 Freshwater Wetland Alteration permits are for projects that alter 15,000 to 43,560 sq. ft. of freshwater wetlands. Individual and Tier 3 wetland alteration permits are for projects that alter greater than 43,560 sq. ft. of freshwater wetland or any other protected natural resource alteration or adjacency (this is relevant to living shorelines not covered under PBR). Tier 2 and 3 activities are subject to Chapter 310: The Wetlands and Waterbodies Protection Rules. Coastal wetland alterations are generally considered unreasonable unless it can be demonstrated that the activity qualifies as a shoreline stabilization project or a project that will result in the restoration or enhancement of the functions and values of the wetland. Additionally, beach nourishment activities are subject to review under the Coastal Sand Dune Rules, Chapter 355. A full explanation of the eligibility criteria and standards, as well as instructions and application forms for these projects are found in the NRPA Application information booklet. Additionally, a handy flow chart of the processing of applications can be found on page 5 of the booklet.

DEP permits do not incorporate or supersede any other State, federal or local permits, although Water Quality Certification, required under the Clean Water Act, is issued concurrently with a NRPA permit (Issue Profile: "How do NRPA permits ... relate to other permits ..."). A PBR satisfies both NRPA and Water Quality Certification (below).

To apply for a NRPA permit, start with a pre-application meeting. The Maine DEP manages the NRPA permitting process (for an overview, see "What is the permitting process"), offers pre-application meetings (see "Process" to set up a pre-app meeting) and manages applications (fillable application, and application information booklet; PBR application form).

References for more information:

- Natural Resources Protection Act (NRPA) main page
    - For rules (e.g. Chapter 305, 310, 355, and more) pertaining to specific systems, see "Rules" on this page

- Issue Profile: Natural Resources Protection Act (NRPA) for background information on NRPA
- Issue Profile: Natural Resources Pre-application meetings
- Issue Profile: Permit by Rule (NRPA). Some FAQs for Permit by Rule:
    - What activities are subject to PBR process
    - How do I find a PBR application form, and what activities are subject to this process?
- Statutory language for the NRPA: Title 38 (Maine Revised Statute Title 38, Chapter 3, Sections 480-A to 480-Z. Waters and Navigation), Chapter 3, Subchapter 1, Article 5-A: Natural Resources Protection Act, and definitions of protected natural resources: 38 MRSA 480-B

Municipal shoreland zoning ordinances: Maine Mandatory Shoreland Zoning Act

The Mandatory Shoreland Zoning Act (MSZA) requires municipalities to establish land use controls for all land areas within the shoreland zone (Mandatory Shoreland Zoning). The law's intent is (1) to protect water quality, wildlife habitat, wetlands, archaeological sites and historic resources, and commercial fishing and maritime industries; and (2) to conserve shore cover, public access, natural beauty, and open space (Issue Profile: Mandatory Shoreland Zoning Act). The MSZA requires municipalities to adopt, administer, and enforce local ordinances that regulate land use activities in the shoreland zone (Mandatory Shoreland Zoning). The shoreland zone is comprised of all land areas within 250 feet, horizontal distance, of the

- normal high-water line of any great pond or river,
- upland edge of a coastal wetland, including all areas affected by tidal action, and
- upland edge of defined freshwater wetlands; and
- all land areas within 75 feet, horizontal distance, of the normal high-water line of certain streams. (source: Mandatory Shoreland Zoning)

The Mandatory Shoreland Zoning Act is likely to apply to living shorelines projects as it permits a municipality to regulate structures that extend or are located over the water or are placed on land lying between high and low waterlines or within wetlands. Living shorelines often include structures in these locations.

Each municipality has its own zoning codes, so requirements will vary with each municipality. Maine DEP has provided minimum guidelines for Municipal Shoreland Zoning Ordinances (Mandatory Shoreland Zoning; Chapter 1000), but encourages municipalities to consider local planning documents and other special local considerations, and to modify the example ordinance into one that meets the needs of the particular community (Chapter 1000). The Act requires... “that municipalities adopt shoreland zoning ordinances consistent with, or no less stringent than, those minimum guidelines” (Chapter 1000). Relevant to living shorelines, the example ordinance includes requirements for piers, docks, wharves, bridges, and other structures and uses extending over or below the normal high-water line of a water body, or within a wetland, and shoreline stabilization, such as limits on the amount of vegetation that can be cleared, as well as limited dimensions and quantity of structures. Municipalities are empowered to adopt, administer, and enforce their own shoreland zoning ordinance and map. The Maine DEP provides technical assistance in the adoption, administration, and enforcement of these local

ordinances, and will adopt the model ordinance for a municipality that has not adopted its own shoreland zoning ordinance.

Projects that have been received a Natural Resources Protection Act (NRPA) permit still require a shoreland zoning permit from the municipality. To determine if your proposed activity is subject to shoreland zoning, reach out to your local Code Enforcement Officer or Planning Staff.

References for more information:

- For specific questions about a municipality's shoreland zoning ordinance, please contact the local code enforcement officer. For questions for MDEP's Shoreland Zoning Unit, contacts are listed here
- Mandatory Shoreland Zoning, Maine DEP
- Issue Profile: Mandatory Shoreland Zoning Act
- Mandatory Shoreland Zoning Act: Title 38, Chapter 3, §§ 435-449
- FAQ pages of interest:
    - Determining the
    - How do I know what activities are subject to shoreland zoning?

Section 401 Water Quality Certification

Water quality certifications regulate compliance with state water quality standards. Activities that may result in a discharge to a navigable water of the United States must supply the federal licensing authority (typically the USACE, for living shorelines projects) with a certification from the State that any such discharge will comply with State water quality standards. Maine DEP is the certifying agency for issuing Section 401 water quality certifications. If the activity is wholly within areas under Land Use Planning Commission (LUPC) jurisdiction and permitting review, then LUPC is the certifying agency.

Dependencies and application process: Water quality certification may be needed for projects that require a federal permit (i.e., a USACE permit). The USACE permit may not be issued until water quality certification has been issued or resolved. Water quality certifications may be processed as a combined decision with a state permit that already requires compliance with state water quality standards. For living shorelines, this is likely to be a NRPA permit; follow the NRPA links for materials. In this case, the issuance of the order approving the project constitutes both the state permit and the water quality certification (Maine DEP Water Quality Certification).

References for more information:

- Maine DEP Water Quality Certification, including contact information for general questions

Massachusetts environmental permitting for living shorelines

To install a living shoreline in Massachusetts, you will need a combination of the following permits and/or regulatory reviews, depending on the details of your proposed project. For guidance identifying the specific permits required for your proposed living shoreline project in Massachusetts, start by reaching out to the Massachusetts Department of Environmental Protection (MassDEP, permitting assistance contacts) and the U.S. Army Corps of Engineers New England District (USACE, Regulatory/Permitting Division contacts) for pre-application / pre-filing consultation meetings. For a compilation of environmental regulations and their role in the project permitting process, refer to the Massachusetts Office of Coastal Zone Management guide to Environmental Permitting in Coastal Massachusetts.

Note that this is not an exhaustive list of every possible permit you may need, as living shorelines projects are highly variable, and tailored to individual sites. For this reason, it is imperative to speak with regulatory professionals at MassDEP and USACE as you plan and design a project; these professionals may be able to help you select a project that is appropriate to your location, and reduces environmental impacts and permitting burdens. Note that there may be application fees in addition to the costs of preparing an application and constructing your project; see the fee schedule for details. Once a site is selected and any environmental design restrictions are considered, the permitting process for construction may begin. Note that project impact area will dictate the permits and certificates required; not all of the following may be required for every project.

Massachusetts Environmental Policy Act (MEPA) Review

MEPA review is a regulatory review process intended to provide an opportunity for public review of the potential environmental impacts of projects that require state agency action (e.g. use state funding) and helps state agencies satisfy their obligation to avoid damage to the environment (and minimize or mitigate damage to the maximum extent practicable). The MEPA Office administers MEPA on behalf of the Secretary of Energy and Environmental Affairs (EEA). A project falls under the provisions of MEPA if it requires a state agency action (permit, license, funding) and equals or exceeds thresholds outlined in 301 CMR 11.03: Review Thresholds. Living shorelines projects in MA that are funded by state funds or supported by state personnel and meet the inclusion criteria (see thresholds below) are subject to MEPA. To determine if your project requires MEPA review, see the MEPA review thresholds and see the MEPA office and Guide to determine whether my project requires MEPA review for more information.

Regulatory Summary: The purpose of MEPA review is to identify the potential environmental impacts of a project and measures to avoid, minimize, and mitigate those impacts. The review will inform project proponents and state agencies of potential adverse environmental impacts while a proposal is still in the planning stage. The proponent, through the preparation of one or more review documents, identifies required state agency actions, and describes the means by which the proposal complies with applicable regulatory standards and requirements. All relevant state agencies are required to identify any aspects of the proposal that require additional description or analysis prior to completion of the agency action, most commonly issuance of an environmental permit. MEPA review is not a permitting process and occurs before permitting agencies act to ensure they are fully aware of the environmental consequences of a project.

Review Process/Forms: Project proponents are encouraged to schedule a pre-filing meeting with the MEPA Office to determine any review thresholds the project may meet or exceed and potential agency action it may require. Proponents of projects that require state action (permit, license, funding) and that meet or exceed MEPA review thresholds (301 CMR 11.03) must file an Environmental Notification Form (ENF) and an associated Public Notice of Environmental Review (301 CMR 11.05 and 11.15). The public notice and ENF are published in the semi-monthly Environmental Monitor. The ENF review period is 30 days from the publication date of the Monitor, of which the first 20 days is available for public and agency comments. Within the last 10 days of the ENF review, the EEA Secretary issues a certificate stating whether an Environmental Impact Report (EIR) (301 CMR 11.07) is required and what its scope will be. The EIR review period is 37 days from the publication date of the Monitor, of which the first 30 days are available for public and agency comment. Within the last seven days of the EIR review, the Secretary issues a certificate stating whether the EIR adequately complies with MEPA. No state permits can be issued until the Secretary certifies that the EIR complies with MEPA by fully describing all environmental impacts and all necessary plans to avoid, minimize, and mitigate adverse effects.

Relationship to other permits: MEPA review is conducted prior to other permitting applications and processes if required.

Additional Considerations: (a) On behalf of the Secretary of Energy and Environmental Affairs, the Department of Conservation and Recreation (DCR) administers the ACEC Program (301 CMR 12.00), which intends to preserve, restore, and enhance critical environmental resources and resource areas of statewide significance. Any project proposed in an ACEC is subject to a heightened regulatory review: MEPA thresholds are reduced; the Wetlands Protection Act (WPA) performance standard is raised to "no adverse effects" except for maintenance/improvement dredging and ecological restoration projects; and Chapter 91 regulations limit new structures and prohibit new fill and dredged material disposal except for beach nourishment, dune construction or stabilization. Applicants can check the DCR ACEC Online Viewer or ACEC Designations pages to determine whether a project falls within an ACEC.

(b) The Massachusetts Historic Commission (MHC) administers the National Historic Preservation Act (NHPA). Under state law, project proponents have an affirmative responsibility to avoid, minimize, and mitigate any adverse impacts to properties on the State Register of Historic Places (950 CMR 71.00). Applicants who believe their project falls within a property on the Register must submit a Project Notification Form to the MHC. The MHC also reviews and comments on MEPA ENF filings during public comment periods. The MHC will assess any potential effects and issue a Memorandum of Agreement listing measures to avoid, minimize, or mitigate adverse effects.

Recent or proposed changes: Climate change impacts are part of all MEPA reviews, with the new MEPA Interim Protocol on climate change adaptation and resilience relevant to all ENFs and EENFs as of October 1, 2021. Additional recent updates include two draft protocols regarding environmental justice effective January 1, 2022, an amended Environmental Notification Form as of January 1, 2022, and amendments to NEPA regulations as of December 23, 2021.

How to apply: reach out to the MEPA office for a pre-filing meeting at MEPA@mass.gov.

References for more information on MEPA Review

- Environmental Permitting in Coastal Massachusetts Section 1: Massachusetts Environmental Policy Act
- MEPA office and forms

- Guide to determine whether my project requires MEPA review
- M.G.L. c. 30, §§ 61-62H: Massachusetts Environmental Policy Act; 301 CMR 11.00: MEPA Regulations.

Order of Conditions (Massachusetts Wetlands Protection Act)

The Order of Conditions regulates the development of wetlands and other resources areas (including the riverfront area, salt ponds, fish runs, and the ocean, and more), to protect wetlands and the public interests they serve. Local Conservation Commissions and the Massachusetts Department of Environmental Protection (MassDEP) administer the Wetlands Protection Act (WPA). A project falls under the provisions of WPA if it falls within or near a wetland resource, including a bank, freshwater wetland, coastal wetland, beach, dune, tidal flat, marsh or swamp bordering on the ocean, estuary, creek, river, stream, pond, lake, or certified vernal pool; land under any of these water bodies; land subject to tidal action, land subject to coastal storm flowage, or land subject to flooding; riverfront areas in the Commonwealth; and land within a 100-foot buffer zone around any of the listed resources. Given the function of living shorelines and the areas in which they are placed, they are almost always overlapping wetlands and/or wetland resource areas. Proposed work must meet standards around the type and extent of work allowed in resource areas. The purpose of WPA review is to protect Massachusetts wetlands resources and to ensure that the beneficial functions of these resources are maintained. The resources identified are protected because they fulfill the public interest to protect public and private water supply, groundwater supply, wildlife habitat, fisheries and land containing shellfish; provide flood control; and prevent storm damage and pollution. These interests are protected by a "no net loss of wetlands" policy. Projects that affect wetlands are required to avoid impacts where possible, minimize unavoidable impacts, and mitigate for unavoidable impacts. Performance standards define the levels of environmental impacts that cannot be exceeded. The final Order of Conditions serves as the Water Quality Certification for a project if the project is a beach nourishment or ecological restoration project, is less than 5000 square feet, and/or involves dredging that is less than 100 cubic yards. Otherwise, a 401 Water Quality Certification may be required (see below).

Review Process/Forms: Proponents of projects in any of the resources listed above must apply for an Order of Conditions from their municipal Conservation Commission by submitting a Notice of Intent (NOI). Applicants should check with Conservation Commission officials to determine if there are any applicable local wetlands by-laws in addition to WPA requirements.

Additional Considerations: Applicants need to check for Endangered, Threatened, or Special Concern species (Massachusetts Endangered Species Act: 321 CMR 10.00; see resources below). If the proposed project area is within NHESP Priority Habitats of Rare Species, a determination is required from the Natural Heritage and Endangered Species Program (NHESP; 310 CMR 10.11, and a Conservation and Management Permit may be required to satisfy the Massachusetts Endangered Species Act: M.G.L. c. 131A; 321 CMR 10:00). This determination should be submitted with the NOI and will recommend any changes or conditions that are necessary to ensure the project will have no adverse effect on the habitat. Permanent Restriction Orders have been placed on selected wetlands to prohibit certain activities in advance of any

work being proposed. Applicants can check the MassDEP Communities with Previously Registered Wetlands page for relevant restrictions.

References for more information

- Environmental Permitting in Coastal Massachusetts Section 14: Massachusetts Wetlands Protection Act and Rivers Protection Act
    - Section 17: Massachusetts Endangered Species Act
- Wetlands Protection Act guide: Protecting Wetlands in Massachusetts
- Regulation language: https://www.mass.gov/doc/310-cmr-1000-the-wetlands-protection-act/download
- Wetlands permitting forms, including application form: https://www.mass.gov/lists/wetlands-permitting-forms

Public Waterfront Act: Chapter 91 (Waterways License)

Chapter 91 regulates activities on coastal and inland waterways to preserve and protect the rights of the public to access and use tidelands and waterways. The Waterways Regulation Program of the Massachusetts Department of Environmental Protection (MassDEP) administers the Chapter 91 Public Waterfront Act. A project falls under the provisions of Chapter 91 if it involves dredging, placement of structures, change in use of or alteration of existing structures, and placement of fill in the following publicly-owned trust lands: flowed tidelands seaward of the mean high water (MHW) line and within the 3-mile limit of state territorial waters; filled tidelands outside Designated Port Areas (DPAs) up to the first public way or 250 feet from the MHW; and filled tidelands inside DPAs between the present and historic MHW. Living shorelines are likely to include the activities described above on publicly-owned trust lands, so they often require this permit.

Regulatory Summary: The purpose of Chapter 91 review is to protect and promote public interest in Commonwealth waterways and tidelands for water-dependent uses and to ensure that areas in jurisdiction are maintained for public use and enjoyment when privately developed. A Simplified Chapter 91 Waterways License is available for certain proposed or pre-existing structures. Water-Dependent Chapter 91 Waterways Licenses cover all new or unauthorized water-dependent use projects that are not eligible for the Simplified License, including shore protection structures, and last for 30 years. Work that does not involve fill or structures, such as dredging and beach nourishment, may apply for a Chapter 91 Waterways Permit. The term of a Permit is 5- 10 years.

Review Process/Forms: Proponents are encouraged to submit a Request for Determination of Applicability (RDA) to MassDEP to determine whether a project falls within Chapter 91 jurisdiction. If a project exceeds MEPA thresholds, a copy of the ENF and EIR (if required) forms must be submitted with Chapter 91 application. Applicants file a Chapter 91 Waterways License or Simplified License application and publish a notice of the application in a newspaper of general circulation. The notice is subject to a 30-day public comment period. MassDEP will issue a written determination that is subject to a 21-day appeal period. The Chapter 91 License must be recorded at the Registry of Deeds within the property's chain of title within 60 days of issuance. Finally, the applicant must request a Certificate of Compliance within 60 days of project completion.

- References for more information
    - Environmental Permitting in Coastal Massachusetts Section 9: Public Waterfront Act (Chapter 91)
    - Waterways Program (Chapter 91); Chapter 91, The Massachusetts Public Waterfront Act overview and process and permitting guide
    - Chapter 91 regulations
    - Application Form
    - **Authorities:** M.G.L. c. 91: Public Waterfront Act; 310 CMR 9.00: Waterways Regulations.

Programmatic General Permits for Massachusetts (USACE "Corps" permits: Section 10 Permit, Section 404 Permit, Section 103 Permit)

Permits from the U.S. Army Corps of Engineers are required for the construction of any new structure in navigable waters of the US, excavating or dredging from, or depositing of resulting materials in such waters, or any other work that affects the course, location, condition, or capacity of such waters. USACE permits ensure compliance with the Clean Water Act (Section 404), as well as the Rivers and Harbors Act of 1899 (Sections 9 and 10), and the Marine Protection, Research and Sanctuaries Act (Section 103), as well as other related laws (see Regionwide environmental Permitting, U.S. Army Corps of Engineers Permit, above). Projects that include these activities require a permit; they can either comply with the Massachusetts General Permits or will require an Individual Permit. There are 23 General Permits (GPs) in Massachusetts, which permit specific activities as long as they match the activities, meet the General Conditions, and are below the thresholds for each activity (e.g. in size, environmental impact, etc.) as laid out in the MA GPs. Living shorelines are often compliant with the Massachusetts General Permit. Permits most relevant to living shorelines will include General Permit 5: Dredging, Disposal of Dredged Material, Beach Nourishment, and Rock Removal and Relocation; General Permit 7: Bank and Shoreline Stabilization; and General Permit 23: Aquatic Habitat Restoration, Establishment and Enhancement Activities. The total temporary and permanent impact area is used to determine if a single and complete project is eligible for self-verification (SV), a preconstruction notification (PCN), or an individual permit (IP). SV, PCN, and IP requirements for each General Permit can be found on the Corps Massachusetts General Permit (MA GP).

Permitting requirements and thresholds: There are 44 General conditions in Massachusetts that projects must meet to be eligible for a General Permit. For example, projects: must be designed to avoid and minimize negative impacts (GC3), must protect Essential Fish Habitat (EFH) and fish and wildlife resources (GC9), must not jeopardize the existence of threatened or endangered species (GC10), must remove temporary fill (GC 14, 15), and use materials that are suitable and free from toxic pollutants (GC27). For the full list of the activities included on a General Permit, and the conditions that must be met for projects to be covered under a general permit, see Department of the Army General Permits for the Commonwealth of Massachusetts (hereafter "MA GPs"). Each activity authorized under one of the 23 General Permits has its own set of thresholds to determine which permitting requirements apply. Explanations of thresholds for each activity that are eligible for self-verification (SV), or require a pre-construction notification (PCN), are explained for each GP on pages 4 - 18 of the MA GPs.

Projects may be authorized by General Permit (GP) if they meet the GCs and remain under the thresholds outlined for that activity. Projects that do not meet these conditions or remain under thresholds will require an individual permit.

Review Process and Forms: Project proponents are encouraged to schedule pre-application meetings to identify concerns that may arise during project evaluation. Proponents who believe their projects qualify for self-verification must ensure their projects conform to all General Conditions defined in Section IV of the Massachusetts General Permit. Qualifying projects may proceed with project activities upon submission of a Self-Verification Notification Form (Section V of MA GP) and after the Corps confirms receipt of the SVNF and issues a permit by email or hard copy; however, living shorelines are infrequently permitted through self-verification. Projects that do not qualify for self-verification require a preconstruction notice (PCN) application (Section VI of MA GP). Applicants must submit a Corps ENG Form 4345 application and all relevant information pertaining to the General Conditions requiring PCN submission. The Corps will send a complete copy of the PCN application to appropriate state, local, and federal resource agencies; agency comments on potential aquatic impacts will inform the Corps review. The Corps will issue a General Permit verification letter within 60 days of receipt of a PCN application.

Additional considerations for PCNs that are of particular relevance to living shorelines include: a) Compliance is required with the National Historic Preservation Act (36 CFR 800.00) to avoid, minimize, and mitigate any adverse impacts to properties on the National Register of Historic Places (Section IX of MA GP). b) Essential fish habitat (EFH) and/or fish and wildlife resources are protected from adverse impacts of greater than minimal sedimentation or turbidity by the Magnuson-Stevens Fishery Conservation and Management Act (50 CFR 600.00). The Corps will employ NOAA's EFH Mapper and EFH Assessment Worksheet to determine whether consultation with NOAA National Marine Fisheries Service (NMFS) is required (NOAA Fisheries - Programmatic Consultations; NOAA/NMFS Consultations for EFH). (c) The Corps will consult with both the U.S. Fish and Wildlife Service (USFWS) and NOAA NMFS when permitting a project that may affect an Endangered Species Act (50 CFR 17.00) listed species or designated critical habitat. **(d)** A 401 Water Quality Certification (314 CMR 9.00) may be necessary should an Order of Conditions not be sufficient water quality certification, such as for projects that require dredging more than 100 cubic yards of material, that result in the loss of more than 5000 square feet of wetlands, that alter salt marshes, or that discharge dredged material or fill into an ACEC. Proponents submit a Water Quality Certifications, Dredging Projects Form by mail to file with MassDEP. MassDEP may condition the Certification to ensure that state surface waters are not harmed by the project. **(e)** The Massachusetts Office of Coastal Zone Management (CZM) must conduct a Federal Consistency Review (301 CMR 20.00) on any project requiring a PCN to ensure the project is consistent with MA CZM state policies (GC 31; MA GPs).

For information about Individual Permits for projects not eligible under a General Permit, see "U.S. Army Corps Permit" in the Regionwide Permitting section.

Relationships with other permits: Apply for a USACE permit before state permits, as some state permitting processes (e.g. water quality certification with a Wetlands Permit) depend on whether or not a federal permit is needed. The permittee must obtain relevant state approvals, when applicable, prior to the commencement of work. These include water quality certification (WQC; see GC 30 of MA GPs) and Coastal Zone Management consistency (CZM Consistency Concurrence; see GC 31). Projects that do not qualify under either SV or PCN require an individual USACE permit and individual federal consistency review by MA CZM.

Recent or proposed changes and updates: The General Permits for Massachusetts were last updated in 2018 (and suspended the use of NWP 54 for living shorelines in Massachusetts), and are reviewed every 5 years. The current GPs will expire in April 2023.

References for more information on USACE General Permits in Massachusetts:

Environmental Permitting in Coastal Massachusetts Section 10: U.S. Army Corps of Engineers Permits
Massachusetts General Permits (MA GPs)
USACE Permit Guide for Applicants in New England; application form on page 13
General information on New England District Corps permitting
USACE permit regulations language

401 Water Quality Certification (for Dredging and Fill/Excavation)

The 401 Water Quality review process regulates the discharge, creation, and disposal of dredged material (> 100 cubic yards) within Massachusetts waters. It is intended to protect public health and protect surface water quality by ensuring that dredge, fill, or excavation projects avoid or minimize water quality impacts. The federal Clean Water Act gives states "the authority to review projects that result in a discharge of dredged material or fill, dredging, and dredged material reuse or disposal in waters of the United States, including wetlands" (Environmental Permitting in coastal Massachusetts, Section 11). Any activity that requires federal licenses or permits by the U.S. Army Corps of Engineers (USACE), Federal Energy Regulatory Commission, or other federal agency and results in a discharge of dredged material, dredging, or dredged material disposal greater than 100 cubic yards to waters subject to regulation (including submerged land or salt marshes, or projects that may impact rare species) is subject to 401 Water Quality Certification review (Environmental Permitting in coastal Massachusetts, Section 11). The 401 review ensures that activities that propose dredge, fill, or excavation do not violate the Massachusetts Surface Water Quality Standards, and otherwise avoids or minimizes individual and cumulative impacts to waters of the United States within the Commonwealth (Environmental Permitting in coastal Massachusetts, Section 11). In Massachusetts, The Wetlands and Waterways Program of the Massachusetts Department of Environmental Protection (MassDEP) administers the 401 Water Quality Certification Program (Environmental Permitting in coastal Massachusetts, Section 11).

There are three categories of water quality certifications for dredging projects: Major Projects (5,000 cubic yards of dredging or more), Minor Project (less than 5,000 cubic yards of dredging), and Amendments of Certification for Dredging (Environmental Permitting in coastal Massachusetts, Section 11).

If a federal water quality permit (e.g. a USACE Individual Permit) is required and the project includes ≥ 100 cubic yards of dredging or dredged material re-use or disposal, a water quality certification is required. Activities that comply with the USACE General Permits (through Self Verification or Pre-Construction Notification) are considered 401 certified (Environmental Permitting in coastal Massachusetts, Section 11). Living shorelines are likely to use fill, though will only require this certification if they require an Individual federal permit. For projects subject to more than one state permitting process, applicants can choose to submit a combined application for Chapter 91, Wetlands, and/or a 401 Water Quality Certification (REF).

References for more information

- Environmental Permitting in Coastal Massachusetts Section 11: 401 Water Quality Certification (for dredging and fill/excavation)
- Water quality certification regulations
- Water Quality Certification Forms

New Hampshire environmental permitting for living shorelines

To install a living shoreline in New Hampshire, you will need a combination of the following permits and/or regulatory reviews, depending on the details of your proposed project. For guidance identifying the specific permits required for your proposed living shoreline project in New Hampshire, start by reaching out to the New Hampshire Department of Environmental Services Wetlands Bureau (NHDES, project technical assistance) and the U.S. Army Corps of Engineers New England District (USACE, Regulatory/Permitting Division contacts) for pre-application / pre-filing consultation meetings. A compilation of water resources subject to permitting and regulation in New Hampshire, including wetlands and coastal waters, can be found here. In 2019 there was a substantial re-write of the coastal rules (Env-Wt 600) to incorporate living shorelines, including establishing techniques and design plans, in accordance with "Guidance for Considering the Use of Living Shorelines" (NOAA 2015).

Note that this is not an exhaustive list of every possible permit you may need, as living shorelines projects are highly variable, and tailored to individual sites. For this reason, it is imperative to speak with regulatory professionals at NHDES and USACE as you plan and design a project; these professionals may be able to help you select a project that is appropriate to your location, and reduces environmental impacts and permitting burdens. Note that there may be application fees in addition to the costs of preparing an application and constructing your project; see the schedule of fees for details.

Programmatic General Permits for New Hampshire (USACE "Corps" permit; Section 404 permit)

The Programmatic General Permit from 2017-2022 was relevant to the living shoreline projects in New Hampshire supported by this grant. This Programmatic General Permit expires on August 18, 2022. Potential updates include incorporation of changes for living shorelines to match the recently updated NHDES rules (Env-Wt 600). See USACE public notices for 2022 for the new Programmatic General Permits for 2022-2027 once they are finalized.

Permits from the U.S. Army Corps of Engineers are required for the construction of any new structure in navigable waters of the US, excavating or dredging from, or depositing of resulting materials in such waters, or any other work that affects the course, location, condition, or capacity of such waters. USACE permits ensure compliance with the Clean Water Act (Section 404), as well as the Rivers and Harbors Act of 1899 (Sections 9 and 10), and the Marine Protection, Research and Sanctuaries Act (Section 103), as well as other related laws (see Regionwide environmental Permitting, U.S. Army Corps of Engineers Permit, above). Projects that include these activities require a permit; they can either comply with the New Hampshire General Permits or will require an Individual Permit. There are 23 General Permits (GPs) in New Hampshire, which permit specific activities as long as they match the activities, meet the General Conditions, and are below the thresholds for each activity (e.g. in size, environmental impact, etc.) as laid out in the NH GPs. Permits most relevant to living shorelines will include General Permit 7: Dredging, disposal of dredged material, beach nourishment, and rock removal and rock relocation; General Permit 9: Bank and Shoreline Stabilization; and General Permit 10: Aquatic habitat restoration, establishment, and enhancement activities. Living shorelines can be compliant with the New Hampshire General Permit, and are mentioned as an example in GP 9,

which also explicitly does not authorize breakwaters, groins and jetties, and mentions that soft stabilization measures, such as bioengineered fiber roll revetments or equivalent, should be used whenever practicable (NH GPs). The total temporary and permanent impact area is used to determine if a single and complete project is eligible for self-verification (SV), a preconstruction notification (PCN) (Major/Minor), or an individual permit (IP). SV, PCN, and IP requirements for each General Permit can be found on the USACE NH GPs. The Corps will review activities according to the State of New Hampshire classification of SV (Minimum), PCN (Minor/Major) per the State of New Hampshire Wetland Rules Env-Wt 100 – 900. The Corps review thresholds are typically the same as the State's thresholds but may differ. For example, the non-tidal wetland fill thresholds for a SV (Minimum) are < 100 SF (Corps)]; PCN (Minor/Major) [no new fill, per Env-WT 302.01(a) (State); fill area <1 acre (Corps), NH GPs]. For certain NHDES thresholds projects are elevated to PCN (Major) which impact sensitive or special wetlands. For example, any impact to a bog or tidal wetland is classified as PCN (Major; NH GPs).

Permitting requirements and thresholds: There are 40 General conditions in New Hampshire that projects must meet to be eligible under a General Permit. For example, projects: must be designed to avoid and minimize negative impacts (GC 3), must protect Essential Fish Habitat (EFH; GC 11), not jeopardize the existence of threatened or endangered species (GC 13), must remove temporary fill (GC 18), avoid spawning and breeding areas and seasons (GC 24), and minimize adverse impacts on environmental functions and values (GC 26). GC 21: Bank and Shoreline Stabilization, is for projects involving construction or reconstruction/maintenance of bank stabilization structures, and mentions they should minimize environmental effects, optimize the natural function of the shoreline, and must use the least intrusive method to stabilize the bank, following the details at Env-Wt 609 Criteria for Shoreline Stabilization (NH GPs). It also lays out the following sequential minimization process: diversion of water, vegetative stabilization, stone-sloped surfaces, and walls (for further details, see GC 21, NH GPs). For the full list of the activities included on a General Permit, and the conditions that must be met for projects to be covered under a general permit, see New Hampshire GPs. Each activity authorized under one of the 23 General Permits has its own set of thresholds to determine which permitting requirements apply. Explanations of thresholds for each activity that are eligible for self-verification (SV), or require a pre-construction notification (PCN, Minor/Major), are explained in the additional terms for each GP (NH GPs, Appendix A pages 1-23).

Review Process and Forms: *Note that the process, forms, and criteria are being updated to meet the NHDES 2019 Rules Env-Wt 600.* Project proponents are encouraged to schedule pre- application meetings to identify concerns that may arise during project evaluation. Proponents who believe their projects qualify for self-verification must ensure their projects conform to all General Conditions and eligibility requirements (page 4) defined in the NH GPs. Applicants must submit the information in Appendix B, which includes the Corps Secondary Impacts Checklist (NH GPs). For convenience, Appendix B is also attached to the NHDES Wetlands Bureau applications and Permit by Notification forms. The Corps will review this information for all projects to assess direct, indirect, secondary, and cumulative impacts. Qualifying projects may proceed if the Corps decides that, as proposed, the project will have no more than minimal environmental impacts, and the project may proceed after authorization from the NHDES Wetlands Bureau. Projects that do not qualify for self-verification may be eligible for a preconstruction notice (PCN) application (for full eligibility criteria, see NH GPs page 5), and written approval form the Corps, as well as an application to and written authorization from the State, before they can begin. To begin an application process for projects qualifying as PCN

(Minor/Major), the applicant will send the original State application package (including Appendix B mentioned above, which is included in the NHDES Wetland Bureau application) to the NHDES Wetlands Bureau, which makes documentation available to the Corps (NH GPs). For a full explanation of the permitting process for a PCN, see NH GPs page 5. The applicant must wait for written authorization from the Corps; if they do not hear from the Corps within 30 days, they should call the Corps to inquire about the status of their application (Contact info is on NH GPs page 6).

Additional considerations for PCNs that are of particular relevance to living shorelines include: a) Compliance is required with the National Historic Preservation Act (36 CFR 800.00) to avoid adverse impacts to properties on, or potentially eligible for the National Register of Historic Places. b) Essential fish habitat (EFH) is protected from adverse impacts of greater than minimal sedimentation or turbidity by the Magnuson-Stevens Fishery Conservation and Management Act (50 CFR 600.00). Prospective permittees may be required to describe and identify potential adverse effects to EFH, and should refer to the NOAA Fisheries EFH Mapper and EFH Assessment Worksheet. The Corps will employ these tools to determine whether consultation with NOAA National Marine Fisheries Service (NMFS) is required (NOAA Fisheries - Programmatic Consultations; NOAA/NMFS Consultations for EFH). The USACE will determine whether consultation with NOAA National Marine Fisheries Service (NMFS) is required, and/or if compliance may be satisfied by a Programmatic Agreement or Programmatic Consultation (New England District PAs and PCs). **(c)** The Corps will consult with both the U.S. Fish and Wildlife Service (USFWS) and NOAA NMFS when permitting a project that may affect an Endangered Species Act (50 CFR 17.00) listed species or designated critical habitat. (d) Permittees shall satisfy any water quality conditions imposed by the State of New Hampshire, NHDES Watershed Management Bureau, where applicable, in their Clean Water Act Section 401 Water Quality Certification (314 CMR 9.00). The NHDES has granted q Water Quality Certification (WQC) for the activities in these GPs, provided that the permittee obtains all other applicable permits and approvals including the required state wetlands and Alteration of Terrain approvals and complies with the conditions in the NH GPs. document. Under condition E-3 of the WQC, GP activities shall be subject to NHDES review to determine if additional conditions are needed and if an individual 401 Certification application is necessary to ensure compliance with surface water quality standards. **(e)** The NHDES administers the NH Coastal Program (NHCP; NH GPs). The NHCP has determined that any project in the NH Coastal Zone that is authorized under the SV (Minimum), PCN (Minor/Major) categories of these GPs is consistent with the NHCP and does not require additional CZMA Federal consistency review.

For information about Individual Permits for projects not eligible under a General Permit, see "U.S. Army Corps Permit" in the Regionwide Permitting section of this volume.

Relationships with other permits: If a Wetlands Bureau (Dredge and Fill) permit is required for a project to be authorized under a PCN, apply for the Wetlands Bureau permit first, as the Bureau will inform the Corps about your application. As the need for some state permits or certifications, such as a 401 water quality certification, depends on the federal permitting process, applicants should start a Corps permit before proceeding to a water quality certification. The permittee must obtain relevant state approvals, when applicable, prior to the commencement of work, including water quality certification and Coastal Zone Management consistency (NH GPs Section III., "Approvals"). Projects that do not qualify under either SV or PCN require an individual USACE permit and individual federal consistency review by the New Hampshire Coastal Program.

Recent or proposed changes and updates: The General Permits for New Hampshire were last updated in August 2017 and are reviewed every 5 years. The current GPs will expire in August 2022.

References for more information on USACE General Permits in New Hampshire:

- USACE Permit Guide for Applicants in New England; application form on page 13
- New Hampshire general permits for USACE, and linked PDF: "Department of the Army General Permits for the State of New Hampshire" (NH GPs)
- USACE permit regulations language
- General information on New England District Corps permitting
- Stormwater manual Volume 3 Chapter 2: Regulation and Permitting; with a handy permitting flow chart on page 8

NHDES Wetlands Bureau Dredge and Fill Permit (RSA 482-A)

The Fill and Dredge in Wetlands Act (RSA 482-A) prevents activities located in wetlands and surface waters, such as excavation, removal, fill, dredging, or construction of any structures in or on any bank, flat, marsh, or swamp in and adjacent to any waters of the state without a permit from the NHDES Wetlands Bureau (NH 482-A:3). It is found to be for the public good and welfare of the State of New Hampshire to protect and preserve both tidal and fresh waters and its wetlands (including lakes, ponds, rivers, streams, marshes, forested wetlands, and peatlands) from unregulated despoliation because of the important functions and values that these aquatic resources provide, such as:

- Absorbing flood waters.
- Treating stormwater.
- Recharging groundwater supplies.
- Providing habitat for fish and wildlife.
- Providing economic and recreational value. (source: NHDES - Wetlands)

The Wetlands Administrative Rules (Env-Wt 100-1000) address activities in both tidal wetlands and waters and freshwater bodies. Activities located in wetlands and surface waters (above bullets) generally require review and approval from the Wetlands Bureau in accordance with the Fill and Dredge in Wetlands Act (RSA 482-A), unless otherwise specified by rule or law (NHDES - Wetlands).

Permit types: The laws do not include a minimum threshold of size for wetlands or impacts under the act; therefore, most dredge or fill impacts require a wetlands permit from the NHDES Wetlands Bureau, regardless of the size of the impact (Stormwater manual Volume 3 Chapter 2: Regulation and Permitting). The Wetlands Bureau classifies projects according to the potential impacts: minimum, minor, or major (Stormwater manual Volume 3 Chapter 2: Regulation and Permitting). The NHDES Wetlands Rules outline how to apply for authorizations, registrations, notifications, or permits available to the public to legally impact wetlands and other jurisdictional areas protected under RSA 482-A (NHDES Wetlands Forms). Several of these processes may be relevant to living shorelines activities depending on the project type and expected impacts (source: NHDES Wetlands Forms):

- Permit-by-Notification (PBN) Application Form: Twenty-two minimum impact projects *may* qualify for a PBN. Applicants must use the PBN application form when filing the required notification for any of these projects. For additional guidance, please refer to the optional PBN Project-Specific Checklist(s) applicable to your project.
- Expedited (EXP) Minimum Impact Wetlands Permit Application Form: Minimum impact projects *may* be permitted through an EXP. For additional guidance with EXP applications, please consult the EXP Project Classification Guidance Document, developed to provide a summary of projects that meet minimum impact project criteria.
- Standard Dredge and Fill Wetlands Permit (Standard) Application Form: For additional guidance with standard applications, please consult the optional Standard Application Project-Specific Worksheet(s). The Wetlands Rules: Index of Project-Specific Information for Standard Applications Guidance Document will guide you to the correct worksheet(s).
    - If your project does not qualify for an Emergency Authorization, RRMR, registration, PBN, or EXP, it may qualify for a standard permit. If you have any questions, please contact the Wetlands Bureau at (603) 271-2147.

Existing beach renourishment is the most likely project related to living shorelines to be permitted via the PBN process. The EXP process may be relevant for living shorelines that replace existing stabilizations, and/or can be constructed fully exposed at low tide. Other projects may require a standard permit; contact the Wetlands Bureau with questions about your project.

Recent changes or updates: Living shorelines have been recently (adopted 10/2020) added to the NH Administrative Rule "CHAPTER Env-wt-600 COASTAL LANDS AND TIDAL WATERS/WETLANDS." Sections 609.04-06 are dedicated to living shorelines, including "Techniques for Tidal Shoreline Stabilization (609.04)" which includes a stated preference for living shorelines unless not practicable (Env-wt-609.04(a)), a list of living shorelines techniques (Env-wt-609.04(b)), conditions under which living shorelines are required (Env-wt-609.04(c)). Living shorelines design plans are covered next (609.05), in accordance with "Guidance for Considering the Use of Living Shorelines", NOAA (2015). The rules were also updated to create an incentive for the creation of Living Shorelines. For example, mitigation is not required for these projects and the projects are classified as minimum impact if fully exposed at low tide (See Env-Wt 609.10).

Wetlands permitting applications, and a contact address and phone number can be found here. NHDES also offers wetlands permit assistance and technical assistance for planning projects that will impact a jurisdictional resource.

References for More Information:

- Forms and instructions for Wetlands permit application; application forms
- Wetlands permit assistance
- NHDES: Wetlands
- Stormwater manual Volume 3 Chapter 2: Regulation and Permitting; with a handy permitting flow chart on page 8

Shoreland Water Quality Protection Act (RSA 483-B) Shoreland Permit

The Shoreland Water Quality Protection Act (SWQPA; RSA 483-B) and its associated rules (Env-Wq 1400) establish, and regulate land use impacts on, the state's "protected shoreland": those lands located within 250 feet of the reference line (Ordinary water mark in Rivers, or Highest Observable tide line in coastal waters) of public waters, measured horizontally from the reference line (Protected Shoreland). The Act establishes permit requirements for many new construction, excavation, vegetation removal, and filling activities to ensure activities protect water quality (NHDES Shorelands Forms, Protected Shoreland). The NH Shoreland Permit is issued by the NHDES Shoreland Program (Protected Shoreland), with permit requirements that include minimum standards for the subdivision, use, and development of shorelands adjacent to (NHDES Shorelands Forms). [protected shoreland] The protected shoreland is an area close to public waters within which vegetation removal, excavation, fill, and development is regulated. Within the protected shoreland, excavation, fill and construction typically require a shoreland permit. However, if development occurs within the bank of a waterbody, a wetland permit may be required instead of a shoreland permit.

A Shoreland Permit is required whenever a project proposes construction, excavation, or filling within the protected shoreland. Permits may be obtained through Shoreland Permits-by-Notification for smaller projects and Shoreland Permit Applications for larger projects (NHDES Shorelands Forms). A PBN can be used for:

1. Projects that impact less than 1,500 square feet in total, with a net increase in impervious area, if any, of no more than 900 square feet.
2. Projects proposed for the purpose of stormwater management improvements, erosion control, or environmental restoration or enhancement.
3. Projects for the maintenance, repair, and improvement of public utilities, public roads, and public access facilities.
4. Projects that consist of geotechnical borings, test wells, drinking water wells or is a site remediation project and meets the requirements of Env-Wq 1406.05. (Source: Shoreland Permit by Notification (PBN) online form)

Other projects involving excavation, fill, or construction within protected shorelands will require a Shoreland Permit Application.

Certain activities, like water access structures, may require both Shoreland and Wetlands permits, depending on their location (Protected Shoreland FAQ). The Protected Shoreland rules were updated in December 2019, including changes to the rules regulating accessory structures close to public waters, such as water access structures like beaches, patios, sheds, and docks (Narrated video: Wetlands and Shoreland Rules- Water Access Structures).

To determine if you need a shoreland permit, use the LRM Shoreland Program Permit Guidance tool, and answer a set of questions about your proposed project. You can also contact the Shoreland Program with questions about development within the protected shoreland by email or by phone (contact info: Protected Shoreland).

References for More Information:

- NHDES Protected Shoreland program
- Protected shoreline FAQ
- Guidance tool: Do you need a shoreland permit?

- NHDES Shorelands Forms for a Shorelands Permit application
- Stormwater manual Volume 3 Chapter 2: Regulation and Permitting; with a handy permitting flow chart on page 8

NH Alteration of Terrain permit

The NH Alteration of Terrain permit is issued by the Alteration of Terrain (AoT) Bureau within NHDES Land Resources Management (NHDES AoT Forms). This permit is intended to protect New Hampshire surface waters, drinking water supplies and groundwater by controlling soil erosion and managing stormwater runoff from developed areas (NHDES AoT Forms).

An Alteration of Terrain permit is required whenever a project proposes to disturb more than 100,000 square feet of contiguous terrain (50,000 square feet, if a portion of the project is within the protected shoreland) or disturbs an area having a grade of 25 percent or greater within 50 feet of any surface water (NHDES AoT Forms). Disturbances include dredging, excavating, placement of fill, and more: "Any person proposing to dredge, excavate, place fill, mine, transport forest products or undertake construction in or on the border of the surface waters of the state, and any person proposing to significantly alter the characteristics of the terrain, in such a manner as to impede the natural runoff or create an unnatural runoff, shall be directly responsible to submit to the department detailed plans concerning such proposal and any additional relevant information requested by the department, at least 30 days prior to undertaking any such activity. The operations shall not be undertaken unless and until the applicant receives a permit from the [New Hampshire] department [of Environmental Services]" (source: Chapter 485-A; Section 485-A:17**)**. In addition to these larger disturbances, the AoT Permit by Rule applies to smaller sites (NHDES AoT Forms). This permitting program applies to industrial, commercial, and residential developments as well as to earth moving operations, such as gravel pits. Permits are issued by NHDES after a technical review of the application.

AoT permits do not modify or limit other permits such as those required by the Fill and Dredge in Wetlands Act, RSA 482 and RSA 482-A (Chapter 485-A; Section 485-A:17). See the Alteration of Terrain Permit Forms and Applications page in the NH Online Forms portal to help determine if you need a permit, and contact the NHDES Land Resources Management AoT Bureau with questions. AoT amendment request forms, start and stop construction forms, and tools and guidance are also available here."

References for More Information:

- NHDES Land Development
- Title L Water Management and Protection, Chapter 485-A; Section 485-A:17 Terrain Alteration.
- Stormwater manual Volume 3 Chapter 2: Regulation and Permitting; with a handy permitting flow chart on page 8

401 Water Quality Certification

Water quality certifications regulate compliance with state water quality standards to protect surface water quality and uses (e.g., swimming and aquatic life). Surface waters include

lakes, ponds, rivers, streams, wetlands and tidal waters, and other bodies of water, natural or artificial (NHDES Water Quality Certification). Activities that may result in a discharge to a navigable water of the United States must supply the federal licensing authority, such as the U.S. Army Corps of Engineers (USACE) for most living shorelines projects, with a certification from the State that any such discharge will comply with the State's water quality standards. The NHDES Water Quality Certification Program is authorized by New Hampshire RSA 485-A:12, III and IV. Water quality certification for federal National Pollutant Discharge Elimination System (NPDES) permits are administered by the NHDES Wastewater Engineering Bureau. All other water quality certifications are administered by the NHDES Watershed Management Bureau. Water quality certifications typically include enforceable conditions, including monitoring requirements, to ensure compliance with surface water quality standards.

Water quality certification is required for any activity that requires certification under §401 of the federal Clean Water Act (CWA). Unless the water quality certification is waived, §401 of the CWA requires an applicant for a federal license or permit for any activity that may result in a discharge into waters of the United States (33 USC §1341) to provide the federal licensing or permitting agency a water quality certification to ensure that the discharge complies with applicable water quality requirements. Activities that are covered under general federal permits, such as the USACE §404 General Permits for New Hampshire, do not need to submit an Application for 401 Water Quality Certification unless notified by NHDES because NHDES has already issued a water quality certification for activities covered under those USACE General Permits. However, activities that require an USACE Individual Permit do require a water quality certification that is specific to the activity before the federal permit can be issued. When a water quality certification is issued, NHDES is certifying that, with reasonable assurance, construction and operation of the activity will not violate New Hampshire surface water quality standards specified under New Hampshire Code of Administrative Rule Env-Wq 1700.

Prior to submitting an Application for a §401 Water Quality Certification, NHDES recommends applicants contact NHDES (contact info is on NHDES' Water Quality Certification website) to discuss the project and application requirements and determine if a pre-application meeting is necessary.

References for more information:

- NHDES' Water Quality Certification website, including FAQs
- Application for 401 Water Quality Certification, NHDES
- NH Revised Statute, Title L: Water Management and Protection, Chapter 485-A, Water Pollution and Waste Disposal. RSA 485-A:1-22
- Env-Wq 1700 Surface Water Quality Regulations

Rhode Island environmental permitting for living shorelines

To install a living shoreline in Rhode Island, you will need a combination of the following permits and/or regulatory reviews, depending on the details of your proposed project. For guidance identifying the specific permits required for your proposed living shoreline project in Rhode Island, start by reaching out to the Rhode Island Coastal Resources Management Council (RI CRMC, contact information) and the U.S. Army Corps of Engineers New England District (USACE, Regulatory/Permitting Division contacts) for pre-application / pre-filing consultation meetings. RI CRMC regulations and programs also provide a series of guidance documents and information about areas under specific management plans (i.e. Special Area Management Plans).

Note that this is not an exhaustive list of every possible permit you may need, as living shorelines projects are highly variable, and tailored to individual sites. For this reason, it is imperative to speak with regulatory professionals at RICRMC and USACE as you plan and design a project; these professionals may be able to help you select a project that is appropriate to your location, and reduces environmental impacts and permitting burdens. Note that there may be application fees in addition to the costs of preparing an application and constructing your project; see the schedule of fees for details.

Programmatic General Permits for Rhode Island and Lands Located within the Boundaries of the Narragansetts Land Claim Settlement (USACE "Corps" permits: Section 10 Permit, Section 404 Permit, Section 103 Permit)

The Programmatic General Permit from 2017-2022 was relevant to the living shoreline projects in Rhode Island supported by this grant. This Programmatic General Permit expires on March 3, 2022. See USACE public notices for 2022 for the new Programmatic General Permits for 2022-2027 once they are finalized.

Permits from the U.S. Army Corps of Engineers are required for the construction of any new structure in navigable waters of the US, excavating or dredging from, or depositing of resulting materials in such waters, or any other work that affects the course, location, condition, or capacity of such waters. USACE permits ensure compliance with the Clean Water Act (Section 404), as well as the Rivers and Harbors Act of 1899 (Sections 9 and 10), and the Marine Protection, Research and Sanctuaries Act (Section 103), as well as other related laws (see Regionwide environmental Permitting, U.S. Army Corps of Engineers Permit, above). Projects that include these activities require a permit; they can either comply with the Rhode Island General Permits or will require an Individual Permit. There are 21 General Permits (RI GPs Appendix A) in Rhode Island, which permit specific activities as long as they match the activities, meet the General Conditions (RI GPs Appendix B), and are below the thresholds for each activity (e.g. in size, environmental impact, etc.). Living shorelines are often compliant with the Rhode Island General Permit. Permits most relevant to living shorelines will include General Permit 7: Dredging, transport and disposal of dredged material, beach nourishment, rock removal, and rock relocation; General Permit 9: Bank and Shoreline Stabilization (which includes living shorelines in the description); and General Permit 10: Aquatic habitat restoration, establishment, and enhancement activities. The total temporary and permanent impact area is used to determine if a single and complete project is eligible for self-verification (SV), a

preconstruction notification (PCN), or an individual permit (IP). SV, PCN, and IP requirements for each General Permit can be found on the Corps Rhode Island General Permit (RI GP).

Permitting requirements and thresholds: There are 37 General conditions in Rhode Island that projects must meet to be eligible for a General Permit (Appendix B, RI GPs). For example, projects: must be designed to avoid and minimize negative impacts to the extent possible (GC3), must not jeopardize the existence of threatened or endangered species (GC 11), must remove temporary fill (GC 16), and projects involving construction or maintenance of bank stabilization within Corps jurisdiction should be designed to minimize environmental effects, effects to neighboring properties, scour, etc., and bulkheads can only be used where reflected wave energy can be tolerated (GC 18). For the full list of the activities included on a General Permit, and the conditions that must be met for projects to be covered under a general permit, see Department of the Army General Permits for the state of Rhode Island and lands located within the boundaries of the Narragansett Land Claim Settlement Area (hereafter "RI GPs"). Each activity authorized under one of the 21 General Permits has its own set of thresholds to determine which permitting requirements apply. Explanations of thresholds for each activity that are eligible for self-verification (SV), or require a pre-construction notification (PCN), are explained for each GP in Appendix A of the RI GPs. Projects may be authorized by General Permit (GP) if they meet the GCs and remain under the thresholds outlined for that activity. Projects that do not meet these conditions or remain under thresholds will require an individual permit.

Review Process and Forms: Project proponents are encouraged to schedule pre-application meetings to identify concerns that may arise during project evaluation. Proponents who believe their projects quality for self-verification must ensure their projects conform to all General Conditions defined in Appendix B of the Rhode Island General Permit. Qualifying projects that have obtained a Water Quality Certificate or waiver from the state are not required to submit a Self-Verification Notification Form; the Corps will review CRMC Public Notices and determine jurisdiction and type of authorization needed. Projects that do not qualify for self-verification require a preconstruction notice (PCN) review; the Corps will contact the applicant if further information is required. The Corps will coordinate PCN review with an interagency review team of relevant federal and state agencies and will issue General Permit authorization to eligible projects after all required CRMC authorizations have been granted. Projects that do not qualify for PCN authorization require submission of an Individual Permit Application Form and associated materials.

Additional considerations for PCNs that are of particular relevance to living shorelines include: a) Compliance is required with the National Historic Preservation Act (36 CFR 800.00) to avoid, minimize, and mitigate any adverse impacts to properties on the National Register of Historic Places; consultation with the Corps and/or outside experts such as the State Historic Preservation Office and any appropriate Indian tribes is recommended when there is a likelihood of the presence of resources of concern (RI GPs section II: Review Process). b) Essential fish habitat (EFH) and/or fish and wildlife resources are protected from adverse impacts of greater than minimal sedimentation or turbidity by the Magnuson-Stevens Fishery Conservation and Management Act (50 CFR 600.00). The Corps will employ NOAA's EFH Mapper and EFH Assessment Worksheet to determine whether consultation with NOAA National Marine Fisheries Service (NMFS) is required (NOAA Fisheries - Programmatic Consultations; NOAA/NMFS Consultations for EFH). (c) The Corps will consult with both the U.S. Fish and

Wildlife Service (USFWS) and NOAA NMFS when permitting a project that may affect an Endangered Species Act (50 CFR 17.00) listed species or designated critical habitat.

For information about Individual Permits for projects not eligible under a General Permit, see "U.S. Army Corps Permit" in the Regionwide Permitting section. Note that a 401 Water Quality Certification may be required by the section 404 of the Clean Water Act (33 CFR 323.00) to ensure compliance with the State Water Quality Regulations, for any projects not covered under the General Permits. Contacts for Rhode Island general permitting, including USACE and state contacts, are available in Appendix C of the RI GPs.

Relationships with other permits: Apply for a USACE permit before state permits, as some state permitting processes (e.g. water quality certification) depend on whether or not a federal permit is needed. The permittee must obtain relevant state approvals, when applicable, prior to the commencement of work (under GC 1, and RI GPs Section II: Review Process). These include water quality certification (WQC) and Coastal Zone Management consistency (RI GPs Section II: Review Process). Section 307 of the Coastal Zone Management Act of 1972, as amended, requires applicants to obtain a permit, federal consistency certification or waiver from RI CRMC that the activity complies with the state's CZM program for activities affecting the state's coastal area (RI GPs, Section II: Review Process).

Recent or proposed changes and updates: The General Permits for Rhode Island were last updated in 2017 and are reviewed every 5 years. The current GPs will expire in March 2022. At the time of writing this guidance (February 2022), a public notice has been issued with draft revised GPs (for 2022-2027). The draft is open for public comment from February 1 – February 28, 2022.

References for more information on USACE General Permits in Rhode Island:

- Rhode Island General Permits for 2017-2022, that were in effect during this project
- USACE Permit Guide for Applicants in New England; application form on page 13
- General information on New England District Corps permitting
- Public notice and draft RI GPs for 2022-2027

RI Coastal Management Program Council Assent

The Rhode Island Coastal Resources Management Council (CRMC; R.I.G.L. c. 46-23) administers the Coastal Management Program (CMP), in accordance with the Coastal Resources Management Program, aka "Red Book" (CRMP; 650 RICR 20-00-1). The purpose of the CRMP is to manage the coastal resources of the state and to provide for the protection of natural resources, promotion of reasonable coastal-dependent economic growth, and the improved protection of life and property from coastal hazards. Generally, a permit is required for any construction or alteration in the coastal region or tidal waters of Rhode Island (RI CRMC Applications and Forms). Further, permits (Council Assents) are required for work within 200 feet of the mean high water (MHW) mark, within 200 feet of a coastal feature or has a reasonable probability of conflicting with CRMC goals, and more as described in Section 320 of the CRMP (RI CRMC Applications and Forms). Coastal features include coastal beaches and dunes; barrier beaches; coastal wetlands; coastal cliffs, bluffs, and banks; rocky shores; and manmade shorelines. For a full list of situations requiring a Council Assent, see the Red Book, Section 1.1.3 Requirements for Applicants.

Types of Permits: There are two types of permits, Category A and Category B Council Assents. Category A applications include routine matters and categories of construction and maintenance work that may be fulfilled by administrative review and do not require review by the full Council. Category B applications require full Council review and formal notice provided to all interested parties. For a full description of the types of activities that require each type of Council Assent, see the Red Book, Section 1.1.3 "Requirements for Applicants", and Section 1.1.4, "Alterations and Activities that require an Assent from the Coastal Resources Management Council." The types of activities that can be permitted with each type of Council Assent (A or B), or are prohibited (P) or not applicable (n/a) are listed by water use category (water use categories are defined for each municipality, and can be viewed in the Maps of Water Use Categories), in Red Book Section 1.1.5 "Review Categories and Prohibited Activities in Tidal Waters and on Adjacent Shoreline Features" (Red Book pages 36-56). Red book Section 1.3.1.G – Stabilization is likely to be relevant to living shoreline projects, and sets up a clear Council preference for nonstructural shoreline protection methods (e.g. vegetation and beach nourishment), followed by hybrid shoreline protection, riprap over vertical structures, and requires the owner exhaust all reasonable and practical alternatives to structural shoreline protection (Red Book page 161-162).

How to apply: Proponents unsure of whether their project requires Category A or Category B Assent should submit a Pre-Application Meeting form to schedule a meeting with CRMC. Review categories can also be found in the Red Book (650 RICR 20-00-1.1.5; under "Regulation") for each Rhode Island Water Type (Types 1-6). Assent is required for any alteration or activity in/on tidal waters, shoreline features, and contiguous areas; certain inland areas; critical coastal areas; and freshwater wetlands in the vicinity of the coast. Category A applicants must complete a CRMC Assent Application. If applications receive no objections, administrative review will be completed within 20 days of staff report filing. If grounds for a substantive objection exist, a Council member will recommend review by the full Council for Category B Assent. In addition to completing a CRMC Assent Application, Category B applicants must prepare an environmental assessment. Application prerequisites and informational requirements are provided in the Red Book (650 RICR 20-00-1.3.1; under the "Regulation" tab). For projects requiring federal permits, applicants must submit a copy of their completed Army Corps of Engineers application for CRMC federal consistency review. All Category B applications are put out to public notice; a public hearing is scheduled if any substantive objections are filed within 30 days of notice. If no objections are filed, the Council will provide a response within another 30 days of confirmation that all application requirements have been met. **Additional Considerations: (a)** CRMC has developed Special Area Management Plans (SAMPs) to address specific regional issues within watersheds of poorly flushed estuaries and critical coastal areas. SAMPs are ecosystem-based management strategies consistent with CRMC's legislative mandate to preserve and restore ecological systems (650 RICR 20-00-1.1.4C). Proponents should check CRMC's Special Area Management Plans page to determine whether their project falls within a SAMP. **(b)** CRMC solicits recommendations from the RI Historical Preservation and Heritage Commission (RIHPHC) regarding proposed actions that may adversely impact properties listed on the National Register of Historic Places as historically or archaeologically sensitive. Structural shoreline protection facilities may be permitted Type 1 Waters if deemed necessary to protect a property listed on the National Register of Historic Places (650 RICR 20-00-1.2.3). Proponents should check the RIHPHC National Register: Rhode Island Properties page determine whether their project falls

within a protected property. If necessary, proponents should submit a cover letter, maps, project plans, and photographs to RIHPHC to initiate a project review.

Relationship to other permits and latest updates: For projects requiring federal permits, applicants must submit a copy of their completed Army Corps of Engineers application for CRMC federal consistency review. The Red Book was last refiled on January 4, 2022 (Red Book: Overview).

References for more information:

- RI CRMC regulations, programs, and guidance documents
- RI CRMC regulations, aka "Red Book", accessible under the "Regulation" tab
- RI CRMC Maps of Water Use Categories
- RI CRMC Application forms and fees
- RI Shoreline Change Special Area Management Plan
- Salt Pond Region Special Area Management Plan website and regulations
- RI CRMC information on Coastal Erosion

401 and State Water Quality Certification

The Rhode Island Department of Environmental Management (RIDEM) Office of Water Resources (OWR) administers the Water Quality Certification (WQC) Program, authorized by the Rhode Island General Laws, Water Pollution: R.I.G.L. c. 46-12 (and governed by Water Quality Regulations: 250 RICR 150-05-1). The purpose of the WQC Program is to restore, preserve and enhance the physical, chemical, and biological integrity of Rhode Island state waters. The review process intends to protect surface waters from pollutants such that they are available for designated public uses including public water supply, propagation of fish and wildlife, recreation, and navigation. This program is responsible for fulfilling the requirements of Section 401 of the Clean Water Act (The Act) and ensuring compliance with the State Water Quality Regulations for projects that impact inland and coastal waters (401 and State WQC). The Act requires the State to certify all projects that require a Federal permit for activities which involve a discharge that may result from dredging or filling as well as some coastal projects associated with marinas (401 and State WQC). Activities include dredging and dredged material disposal, filling of waters of the state, and flow alterations.

Relationship to other permits: A WQC decision is relevant to projects that require an Individual Permit from USACE (see "Programmatic General Permits for Rhode Island and Lands Located within the Boundaries of the Narragansetts Land Claim Settlement"), or projects that are not subject to a federal permit, but have the potential to result in discharge of pollutants into Waters of the State. A WQC may be incorporated into a separate permit decision, such as marine dredging and dredged material disposal review.

How to Apply: See the WQC Application Instructions & Required Enclosures for application procedures and requirements for various project and activity types. Since a WQC is included in several other permits, it is important to check with RI CRMC to determine if this certification is required.

References for More Information:

- 401 and State Water Quality Certification, including links to the application, application instructions and required enclosures, and additional resources
- DEM regulatory documents; Water Quality Regulations (250-RICR-150-05-1)