

Living Shorelines: Considerations for Advancing Coastal Resiliency

Elaine Mahoney¹, James Turek², Janine Harris³, and Karen
Greene⁴

¹NOAA Coastal Services Center, NY

²NOAA Restoration Center, Narragansett, RI

³NOAA Office of Habitat Conservation, Silver Spring, MD, and

⁴NOAA Office of Habitat Conservation, Highlands, NJ



NOAA Focus on Coastal Resiliency

NOAA is funding living shoreline applications and research post-Storm Sandy in Connecticut and New Jersey.

Living shorelines projects support NOAA's habitat conservation and resiliency goals where constructed along shorelines experiencing active erosion.

Projects will have greater resiliency to projected increases in sea-level rise when constructed adjacent to areas where existing fringe marsh or restored marsh is capable of landward migration.

How is NOAA involved in living shoreline projects?

- Regional Office of Habitat Conservation and Restoration Center staff have local knowledge and technical expertise to assist in the development of living shoreline projects.
- Most in-water activities including living shoreline projects require federal, state, and sometimes, local permits.
- A federal action such as a permit issuance generally triggers National Marine Fisheries Service (NMFS) consultation requirements under the MSA, FWCA and in some cases the ESA.

NOAA's Position on Living Shorelines

NOAA encourages the use of living shorelines techniques to preserve or improve natural intertidal habitat and the ecosystem services provide d while sustaining connectivity between the land and water interface.

Living shorelines are not a way to control flooding and storm surge. Even smaller storm surges inundate most living shorelines , and do not combat storm surge.

There is always the caveat that every site is unique and there may be reasons why a living shorelines is not appropriate for shoreline stabilization and erosion control – generally consider living shorelines along sheltered embayments rather than along ocean-facing coasts.

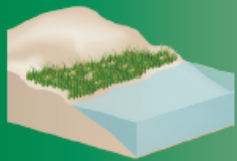
NOAA encourages shoreline protection practices that avoid or minimize seaward encroachment into subtidal areas and those that minimize use of hardened protective measures to protect against habitat trade-offs.

HOW GREEN OR GRAY SHOULD YOUR SHORELINE SOLUTION BE?

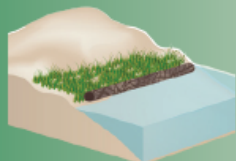
GREEN - SOFTER TECHNIQUES

GRAY - HARDER TECHNIQUES

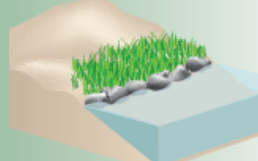
Living Shorelines



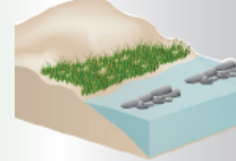
VEGETATION ONLY -
Provides a buffer to upland areas and breaks small waves. Suitable only for low wave energy environments.



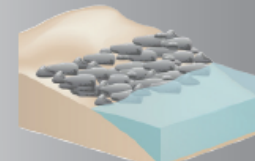
EDGING -
Added structure holds the toe of existing or vegetated slope in place.



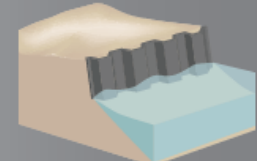
SILLS -
Parallel to existing or vegetated shoreline, reduces wave energy, and prevents erosion. Suitable for most areas except high wave energy environments.



BREAKWATER (vegetation optional) - Offshore structures intended to break waves, reducing the force of wave action, and encourage sediment accretion. Suitable for most areas.



REVETMENT -
Lays over the slope of the shoreline and protects it from erosion and waves. Suitable for sites with pre-existing hardened shoreline structures.



BULKHEAD -
Vertical wall parallel to the shoreline intended to hold soil in place. Suitable for areas highly vulnerable to storm surge and wave forces.

NOAA Roles and Capabilities Relating to Living Shorelines

- Lead by example on NOAA-supported properties
- Building and nurturing innovative partnerships (NERRS and NOAA Fisheries Restoration Center)
- JCNERRS partnering with NJDEP to develop construction and permitting standards for living shorelines
- NERRS webinar series from 2014
- Review federal and state actions (public notices, EA/EIS), perform field inspections, attend meetings and public hearings, and provide recommendations under NMFS authorities (e.g., Magnuson- Stevens Act, FWCA, Section 404 CWA, NEPA)
- Data on tides, currents and sea level rise and science applications (e.g., Digital Coast Sea Level Rise Tool)

What is the MSA?

Magnuson-Stevens Fishery Conservation and Management Act (MSA)

Amended 1996 Sustainable Fisheries Act

- Identify and describe Essential Fish Habitat (EFH) for each federally-managed fish species (through FMPs)
- Consultation requirements for federal agencies including USACOE, FEMA and others
- Encourages protection, conservation and enhancement of EFH

[http://
www.greateratlantic.fisheries.noaa.gov/
habitat/efh/efhoverview.html](http://www.greateratlantic.fisheries.noaa.gov/habitat/efh/efhoverview.html)

Winter flounder

Winterflounderenhancement.blogspot.com



EFH Designations for Managed Species in Noththeast (GARFO)

New England Fishery Management Council

- American plaice
- Atlantic cod
- Atlantic halibut
- Atlantic herring
- Atlantic salmon
- Atlantic sea scallop
- Haddock
- Monkfish (goosefish)
- Ocean pout
- Offshore hake
- Pollock
- Red hake
- Redfish
- Windowpane
- Winter flounder
- Witch flounder
- Yellowtail flounder
- Skates – 7 species (little, winter and clearnose)

Mid-Atlantic Fishery Management Council

- Atlantic mackerel
- Black sea bass
- Bluefish
- Butterfish
- Illex squid (short finned squid)
- Loligo squid (long finned squid)
- Ocean quahog
- Scup
- Spiny dogfish
- Summer flounder
- Surf clam
- Tilefish

South Atlantic Fishery Management Council

- Spanish mackerel
- King mackerel
- Cobia

Agency Consultation

Federal agencies are required to consult with NOAA Fisheries on any action or proposed actions which they authorize, fund or undertake, and that *may adversely affect* EFH.

State agencies are not required to consult, but NOAA Fisheries can provide EFH conservation recommendations for state actions through existing or new coordination procedures.

Essential Fish Habitat and Permit Consultation

NMFS Consultation Guidance 50 CFR Part 600

- “Waters” include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and *aquatic areas historically used by fish*, where appropriate (e.g., potential utilization areas).
- “Substrate” includes sediment, hard bottom, structures underlying waters and associated biological communities.

Bay scallops
Source: Littlefield



What is an “adverse effect” ?

NMFS Consultation Guidance 50 CFR Part 600

“...any impact which reduces quality and/or quantity of EFH.”

- Direct (e.g., physical alteration or contamination)
- Indirect (e.g., loss of prey, reduction in fecundity)
- Individual, cumulative, or synergistic impacts



River herring
Source: Prezioso, NOAA

Habitat Areas of Particular Concern

Habitat Area of Particular Concern (HAPC) is a subset of EFH that:

1. provide important ecological functions;
2. are sensitive to human-induced environmental degradation;
3. are rare; and,
4. may be affected by development activities must represent a current or potential stress for the habitat.



Scup and eelgrass bed
Source: NewEnglandBoating.com

Example: Eelgrass beds

It is not just about EFH

- Other Authorities

- Fish and Wildlife Coordination Act
- National Environmental Policy Act
- Federal Power Act

What this means:

Numerous living marine resource species have to be considered in project development including diadromous species, shellfish, and forage species



Striped bass
Source: New England Aquarium



River herring
Source: Turek, NOAA

How does this relate to a living shoreline project?

- General support for softer, living shorelines.
- Recognize the value of wetlands, as fishery forage, refuge, spawning and nursery habitats.
- When sited properly, a living shoreline can limit the amount of erosion, and (to the extent practicable) maximizes the value of the habitat restored



Living shoreline, MD
Source: Takacs, NOAA

Trade-offs and balancing

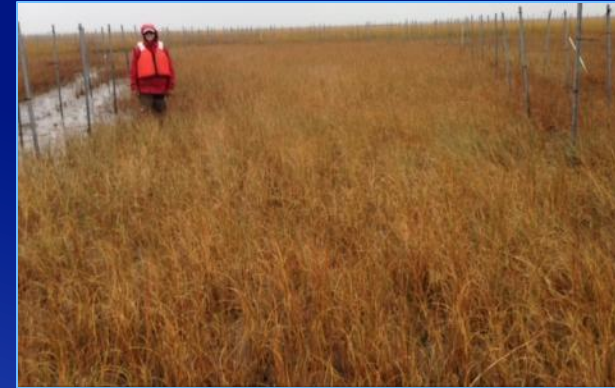
Considerations:

- Existing habitat at the project site.
 - Is it a Special Aquatic Site, HAPC?
 - SAV, shellfish, gravel and cobble, spawning area?
 - What species using site now?
- What type of habitat is being proposed?
 - What are the functions and values of the proposed habitat?
 - Will the project increase value of the area as fishery habitat?



Trade-offs and balancing

- NOAA Fisheries Habitat Program focus is on habitat benefits
- EFH is important, but is not a roadblock
- Consultation is not an acre-for-acre balancing act
- Value judgment based upon the specifics of the site
- Applies to all, equally – ACOE, USFWS, or NOAA funded projects
- Because each project site presents its own unique issues, case-by case review often provides the most effective means of achieving mandated resource protection requirements



Jamaica Bay marsh restoration,
Rockaway, NY
Source: Turek, NOAA



Lordship Pt reef ball installation,
Stratford, CT
Source: Turek, NOAA

But there are ways to make the process easier:

- NOAA Fisheries habitat staff has worked with many of our federal and state partners to streamline permits and consultations.
- Coordination and consultation is upfront on a programmatic level.
- Includes Nationwide Permits, Regional General Permits, Statewide General Permits.
- Projects designed to meet these conditions and the regulatory process is expedited.

Simplifying and Expediting Permitting

Some examples of permits developed for living shoreline projects:

- Regional General Permits (RGPs):
 - Norfolk District – VA
 - Alabama/Mobile District – ALG09-2011 and ALG10-2011
- State Programmatic General Permits (SPGPs) – Joint federal/state authorization
 - Maryland/ Baltimore District - MDSPGP-4
- State General Permits (GPs)
 - NJ General Permit 29
 - Several other states considering GPs

More Ways NOAA Can Help

- Early coordination with NOAA Fisheries Habitat and Restoration Center staff can speed consultations and permitting
- Can provide advice on design, timing, information needs, sensitive habitats.
- NOAA is developing a document to assist entities interested in living shorelines and to clarify NOAA's position on these types of construction.

Living shoreline, Save the Bay,
Providence, RI
Source: Turek, NOAA



NOAA's Cross-Line Office Living Shoreline Strategies

- Providing expertise and skills of NOAA planning and regulatory staff and scientists to assist stakeholders in addressing coastal resiliency
- Developing a NOAA Living Shorelines Guidance to help others navigate NOAA's living shorelines regulatory framework
- Developing a website to house NOAA living shorelines resources, database, and other information
- Developing a NOAA facilities policy to provide opportunities to lead by example on NOAA properties
- Led by NOAA scientists, developing a synthesis of living shorelines information for publication

SAGE: Systems Approach to Geomorphic Engineering

Interagency and non-governmental collaboration promotes a hybrid engineering approach integrating soft or 'green' natural and nature-based measures, with hard or 'gray' structures at a landscape scale. These stabilization solutions include living shoreline approaches using living components such as plantings with structural techniques such as seawalls or breakwaters.

Living shorelines can achieve multiple goals:

- Stabilizing shorelines and reducing current rates of shoreline erosion and storm damage;
- Providing ecosystem services (such as habitat for fish and other aquatic species) and increasing flood storage capacity; and
- Maintaining linkages between land and water environments to enhance resiliency.



Thanks for Attending and Listening!



Photo Sources: Currin, Harris, Takacs, NOAA