

Values of Nature Based Approaches



Are you ready for the next big storm?
A workshop for hardy Cape Codders

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WHY STUDY SALT MARSHES?

Salt marshes and other coastal wetlands

- **Ecosystem services**

- Erosion control, flood protection, nursery for commercial species, biodiversity protection, aesthetics, recreation, **carbon storage**, and nitrogen removal (water filtration)



WHY STUDY SALT MARSHES?



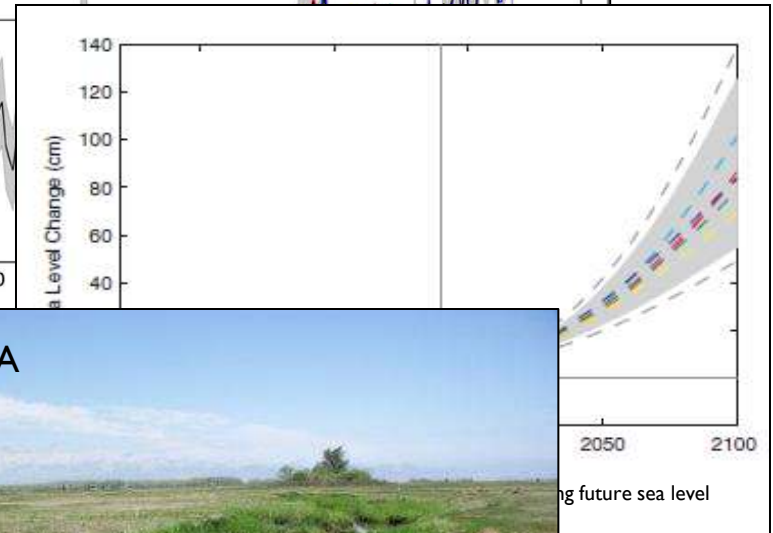
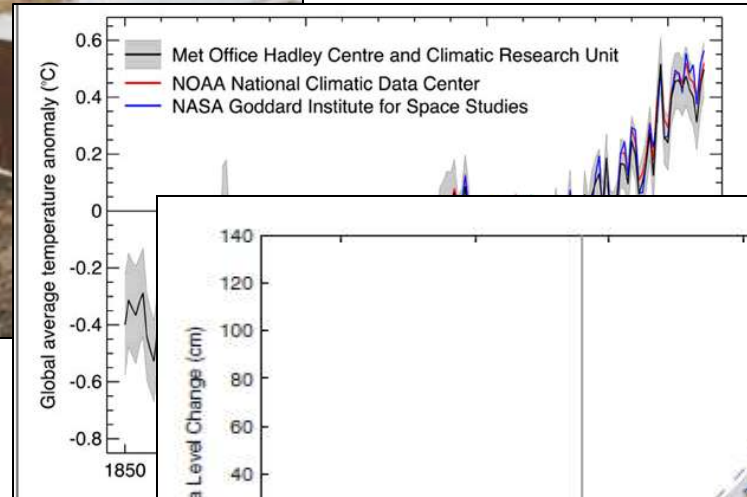
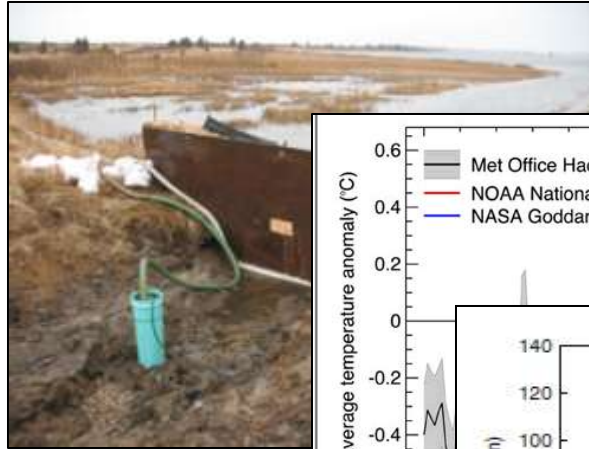
Damage from Hurricane Sandy

Areas with wetlands prevented an estimated \$600 million in property losses



Threats to Salt Marsh Resiliency

- Tidal restrictions
- Climate change & sea level rise
- Excess nitrogen loading



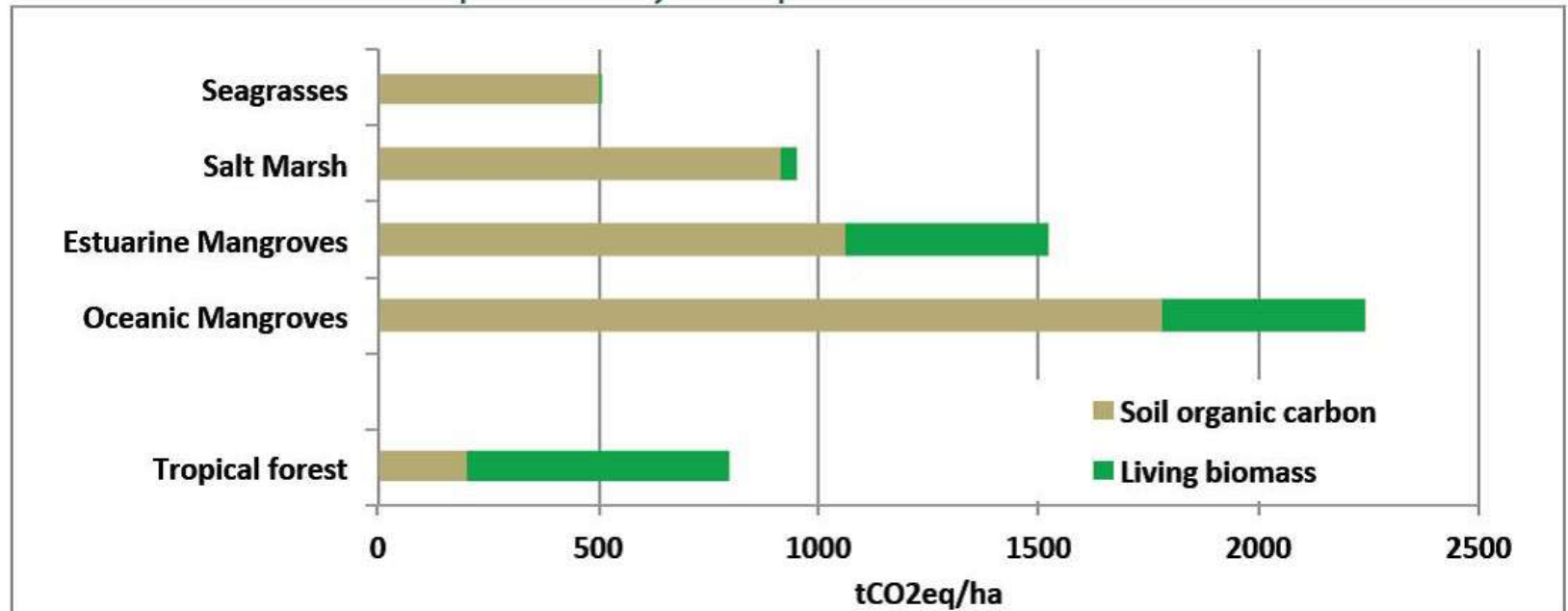
Plum Island, MA



Deegan, L. A. D. S. Johnson, R. S. Warren, B. J. Peterson, J. W. Fleeger, S. Fagherazzi, W. M. Wollheim. 2012. Coastal eutrophication as a driver of salt marsh loss. *Nature* 490:388-392.



Blue Carbon



*Data is per unit area, where tCO₂eq/ha is tons of carbon dioxide equivalents per hectare

Source: Murray, Brian, Linwood Pendleton, W. Aaron Jenkins, and Samantha Sifleet. 2011. Green Payments for Blue Carbon: Economic Incentives for Protecting Threatened Coastal Habitats. Nicholas Institute Report. NI R 11-04





NERRS SCIENCE COLLABORATIVE GRANT



Nitrogen and Coastal Blue Carbon



Source: NROC Living Shorelines Stacker;
<http://northeastoceancouncil.org/living-shorelines-stacker>



What are Living Shorelines?

Source: NROC Living Shorelines Stacker;
<http://northeastoceancouncil.org/living-shorelines-stacker>

What do **you love** about
living along the **shore?**



Source: NROC Living Shorelines Stacker;
<http://northeastoceancouncil.org/living-shorelines-stacker>

Would **you** like to continue to **enjoy** these
things while investing in the long-term
protection of your **property**:

From waves?

From storms?

From flooding?

The background is a stylized illustration of a coastal property. It features several houses with blue roofs and white walls, situated on a green hillside. A small boat is on the water, and a seagull is standing on the shore. The overall color palette is dominated by blues and greens, with a soft, hazy atmosphere.

Would **you** like to continue to **enjoy** these
things while investing in the long-term
protection of your **property**:

In a way that looks natural?

In a way that could save you money?

In a way that allows you access to your shoreline?

An illustration of a coastal scene. In the background, there are several houses with blue roofs and white walls. A small boat is on the water. In the foreground, a seagull stands on a grassy bank. The water is blue with some fish visible. The sky is blue with some clouds. The overall tone is peaceful and natural.

Living shorelines are an **eco-friendly**
option to keep **you connected** to
the water while helping to **protect** your
property from **erosion**.

Source: NROC Living Shorelines Stacker;
<http://northeastoceancouncil.org/living-shorelines-stacker>



There are many **terms** used to
describe **living shorelines**:

Green infrastructure

Nature-based protection

Bioengineering

Soft engineering

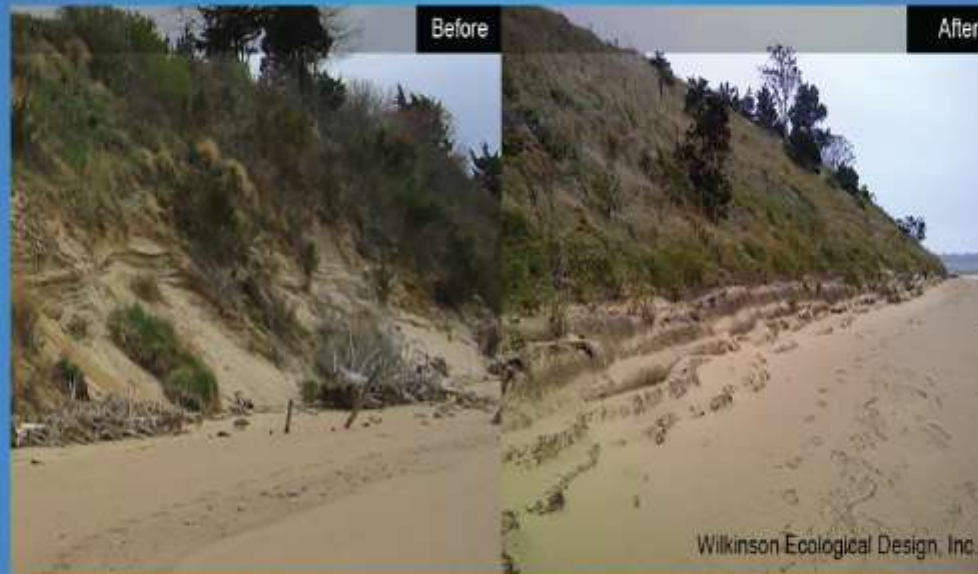
But they all point to the same concept.

Living shorelines are:



An alternative shoreline protection option to rock or concrete structures.

Living shorelines are:



Created using natural elements and materials
(sand, wetland plants, biodegradable materials, etc.)

Living shorelines are:



Source: MA CZM

An approach that allows you to access your shoreline,
benefits wildlife, and looks natural.

Living shoreline **design** often depends on specific site **conditions**. To know whether a **living shoreline** may make sense for **your** property, you should **consider**:

The slope of your shoreline

Tidal range

Waves

Ice cover in the winter

Waves



Waves and boat wake energy are important considerations for living shorelines. Smaller waves may make living shoreline projects easier to install.

Ice cover

Like waves, ice can scour shorelines.
If your shoreline experiences ice in the winter, you may need
some additional elements to protect your living shoreline.



Source: NROC Living Shorelines Stacker;
<http://northeastoceancouncil.org/living-shorelines-stacker>



Beyond the **characteristics** of your
property, there are other **considerations** to
help you determine whether a living shoreline
is **right for you...**

Source: NROC Living Shorelines Stacker;
<http://northeastoceancouncil.org/living-shorelines-stacker>

Costs of shoreline protection

	Living Shoreline	Rock Revetment
Construction	\$	\$\$\$
Maintenance	\$\$\$	\$

Upfront costs for living shorelines are low compared to other shoreline stabilization options. However, they may require more maintenance over time.

Neighboring properties

The approaches your neighbors use to protect their shoreline may impact your shoreline.

Working with your neighbors on a larger living shoreline project could save everyone money.

Professional help



- Successful living shorelines are designed by teams of engineers, landscape architects, and ecologists.
- Discuss your property conditions and characteristics with them (slope, ice cover, etc.).
- Ask them about their living shoreline experience.
- Your state coastal management office can help point you in the right direction.

Here are examples of permitted projects in New England:



Artificial dune and sand fencing for storm damage protection of a coastal bank.

Here are examples of permitted projects in New England:



Source: ME DEP

Flatten slope for salt marsh restoration.

Here are examples of permitted projects in New England:



Source: Jennifer Mattei and Sacred Heart University

"Reef balls" placed on the site to break waves, capture sediment, and help restore the salt marsh grasses planted behind them.

Living shoreline projects have been **completed**
throughout NewEngland—**ask** your state **coastal**
management office about one **near you!**

Source: NROC Living Shorelines Stacker;
<http://northeastoceancouncil.org/living-shorelines-stacker>

The background is a stylized illustration of a shoreline. On the left, there is a body of water in shades of blue. A path leads from the water towards the right, where several houses are situated on a green hill. The houses are simple, with blue roofs and windows. The overall scene is peaceful and suggests a residential area near the water.

So if **you're looking** for...

A cost-effective, shoreline protection
alternative to rock and concrete structures

An eco-friendly choice

An approach that will allow you
access to your shoreline

An illustration of a living shoreline. In the foreground, a grassy bank slopes down to a body of water. A small wooden boat is docked at a simple wooden pier. Behind the bank, several houses with large windows are visible. The sky is blue with a few clouds. The text "Then a living shoreline is the choice for you." is overlaid on the image.

Then a **living shoreline** is
the **choice for you.**

Source: NROC Living Shorelines Stacker;
<http://northeastoceancouncil.org/living-shorelines-stacker>



Put Green Infrastructure between Your Community and the Next Coastal Storm.

There are many benefits.

Tidal and Forested Wetlands

- Slow waves
- Filter and clean floodwaters
- Provide food and jobs

Green Streets

- Capture and clean stormwater
- Beautify streets and encourage economic development
- Provide pedestrian-friendly walkways

Oyster and Coral Reefs

- Slow storm surge
- Provide food
- Clean water

Sand Dunes

- Buffer waves as a first line of defense
- Build economy through tourism

Open Space and Parks

- Store floodwaters and recharge aquifers
- Increase property values

Urban Trees

- Reduce runoff and absorb floodwaters
- Shade and cool homes and businesses
- Provide clean air and water

Living Shorelines

- Slow waves and reduce erosion
- Protect property

Aesthetics of natural approaches



Photo: Tracy Skrabal, North Carolina Coastal Federation

Create Natural Shorelines

Create living shorelines using oysters, marsh grass, and other natural materials to absorb wave energy and reduce erosion.

How do we know it works? North Carolina properties that used natural shoreline protection measures withstood wind and storm surge during Hurricane Irene better than properties using seawalls or bulkheads.



<http://ccrm.vims.edu/livingshorelines/images/Vegetation%20Mgmt/NoMowGraphic250.jpg>



http://ccrm.vims.edu/livingshorelines/photo_gallery/index.html

Summary

- Coastal vegetation is highly valuable
 - Storm protection- slow wave energy
 - Absorb flood water, reduce erosion
 - Blue carbon resource
- Homeowners can protect their property and create habitat value with several tools
 - Living shorelines – marsh, dunes, seagrass, shellfish
 - Soften or remove hard infrastructure
- Storms happen- planning for impacts from personal to community and higher levels is: wise stewardship, cost effective and safer