Lessons Learned from the Great Bay Living Shorelines Project

NH Climate Summit
September 29, 2022

New Hampshire Coastal Program
DEPARTMENT OF ENVIRONMENTAL SERVICES

SEAL OF THE TOWN OF DURHAM, N.H. 1732

University of New Hampshire

GREAT BAY NATIONAL ESTUARINE RESEARCH RESERVE

GREAT BAY STEWARDS

STRAFFORD Regional Planning Commission

PREP Piscataqua Region Estuaries Partnership

NFWF

NOAA

A large project team

NH Dept of Environmental Services: Kirsten Howard, Aidan Barry, Kevin Lucey

Univ of NH: David Burdick, Tom Ballestero

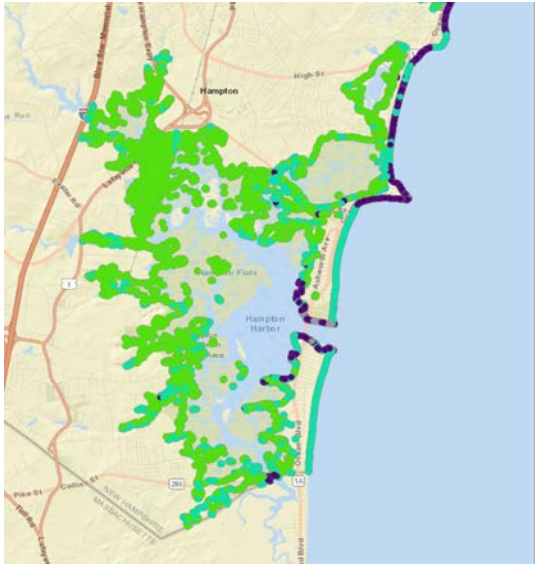
Piscataqua Region Estuaries Partnership: Trevor Mattera

Strafford Regional Planning Commission: Kyle Pimental, Liz Durfee

Great Bay National Estuarine Research Reserve: Cory Riley, Rachel Stevens, Chris Peter, Heather Ballestero, Lynn Vaccaro

Town of Durham: Todd Selig, Rich Reines

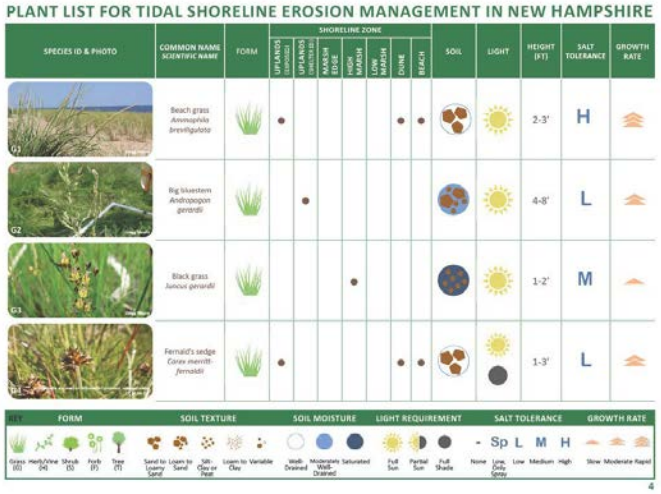
When we started



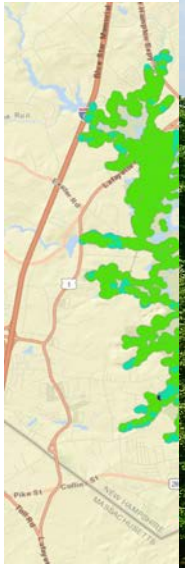
Living shoreline site suitability model

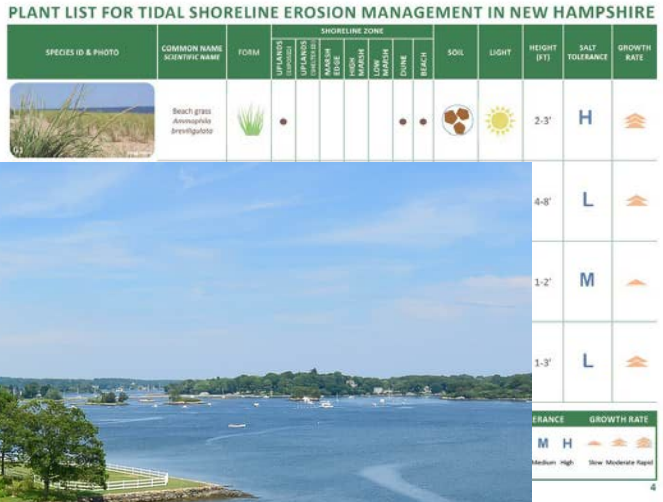
Table 2. Legend for interpreting the biophysical suitability index numbers.

Suitability Index Number	Living Shoreline suitability	Structural components	Visualization
6	Highly suitable for living shorelines	None	
5	Suitable for living shorelines	None to Minimal	
4	Suitable for living shoreline hybrid solutions	Minimal	
3	Suitable for living shoreline hybrid solutions	Moderate	
2	May be suitable for living shorelines with hybrid components and/or significant, site modification	Significant	
1	May be suitable for living shorelines with very significant hybrid components and/or site modification	Very significant	



When we started



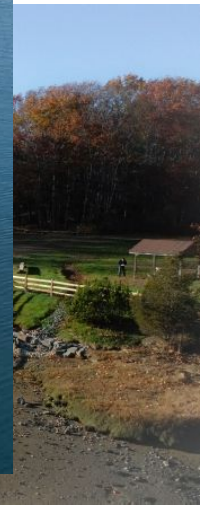


PLANT LIST FOR TIDAL SHORELINE EROSION MANAGEMENT IN NEW HAMPSHIRE

SPECIES ID & PHOTO	COMMON NAME / SCIENTIFIC NAME	FORM	SHORELINE ZONE: UPLANDS	UPLANDS (EXPOSED)	UPLANDS (SHELTERED)	BANK/BLUFF	FRESH MARSH	LOW MARSH	DUNE	BEACH	SOIL	LIGHT	HEIGHT (FT)	SALT TOLERANCE	GROWTH RATE
	Beach grass *Ammophila breviligulata*			•					•	•			2-3'	H	
													4-8'	L	
													1-2'	M	
													1-3'	L	

ERANCE: M Medium, H High — GROWTH RATE: Slow, Moderate, Rapid

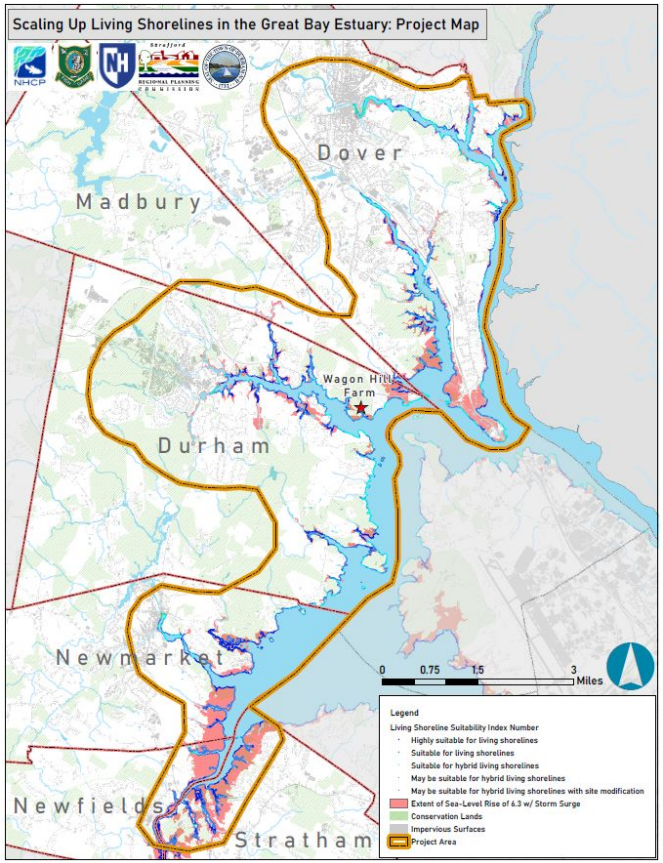
4



The Great Bay Living Shoreline Project

Goals:

1. Develop 50% designs for living shorelines at four diverse sites.
2. Provide practical training for consultants and professionals.
3. Share recommendations.



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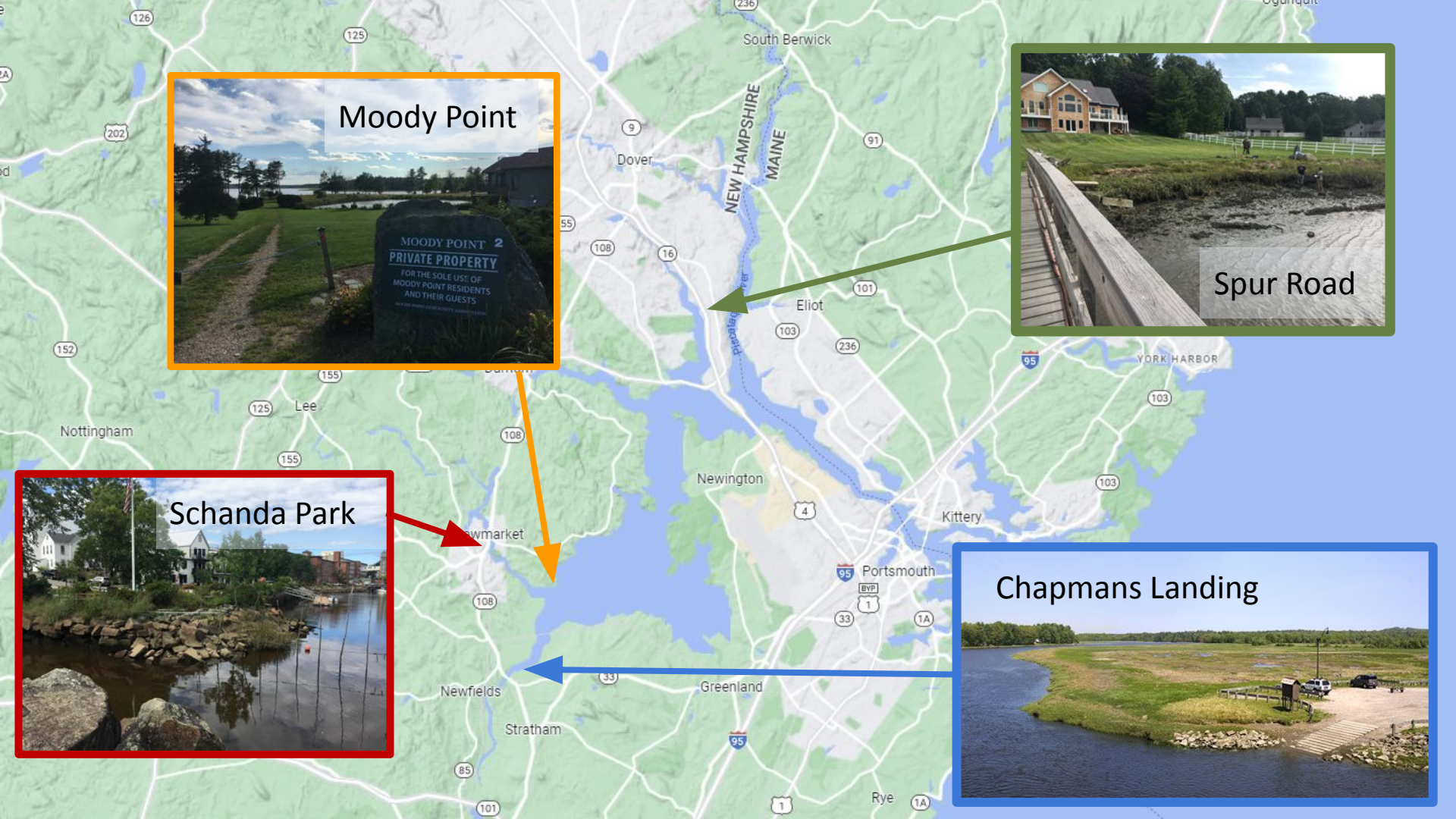
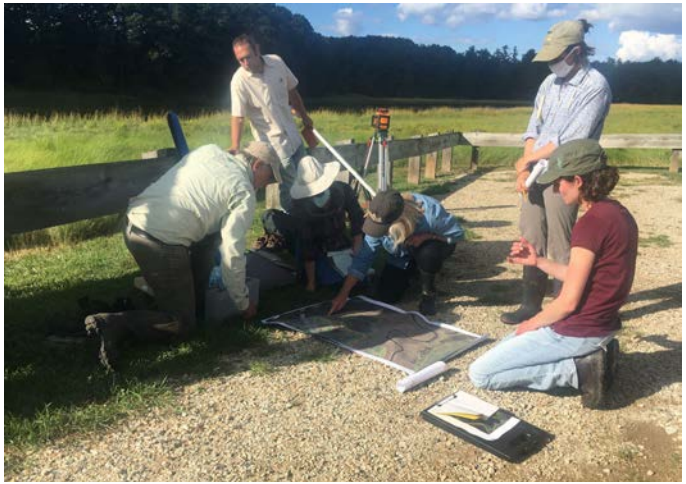

Moody Point
MOODY POINT 2
PRIVATE PROPERTY
FOR THE SOLE USE OF
MOODY POINT RESIDENTS
AND THEIR GUESTS
Spur Road
Schanda Park
Chapmans Landing
South Berwick
Dover
NEW HAMPSHIRE
MAINE
Eliot
YORK HARBOR
Nottingham
Lee
Newington
Kittery
Portsmouth
Newfields
Greenland
Stratham
Rye

24 natural resource professionals

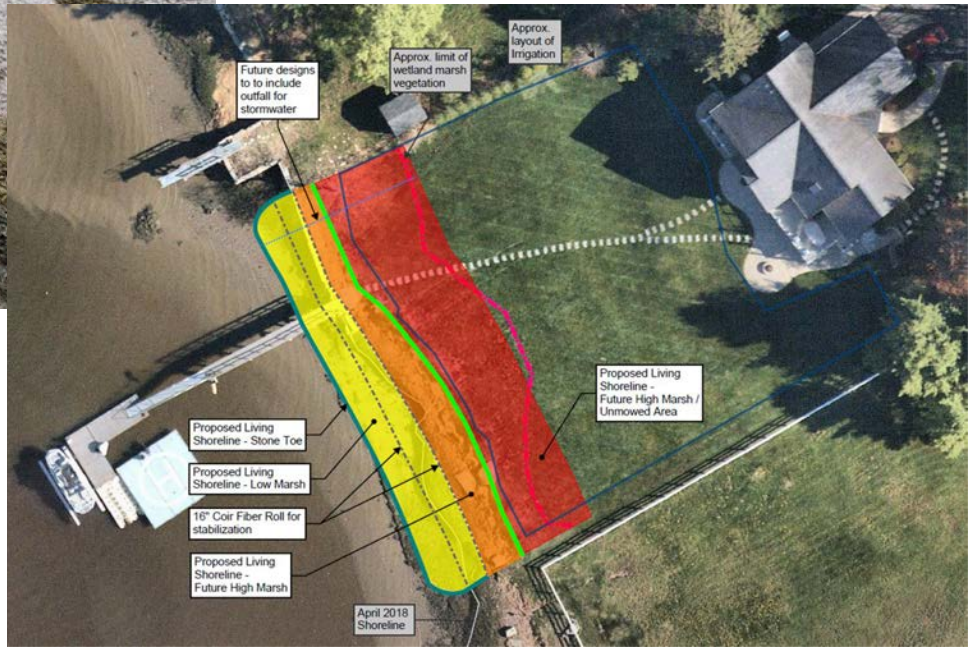
- Engineers – water resource and coastal expertise
- Landscape designers
- Wetland scientists
- Project and program managers

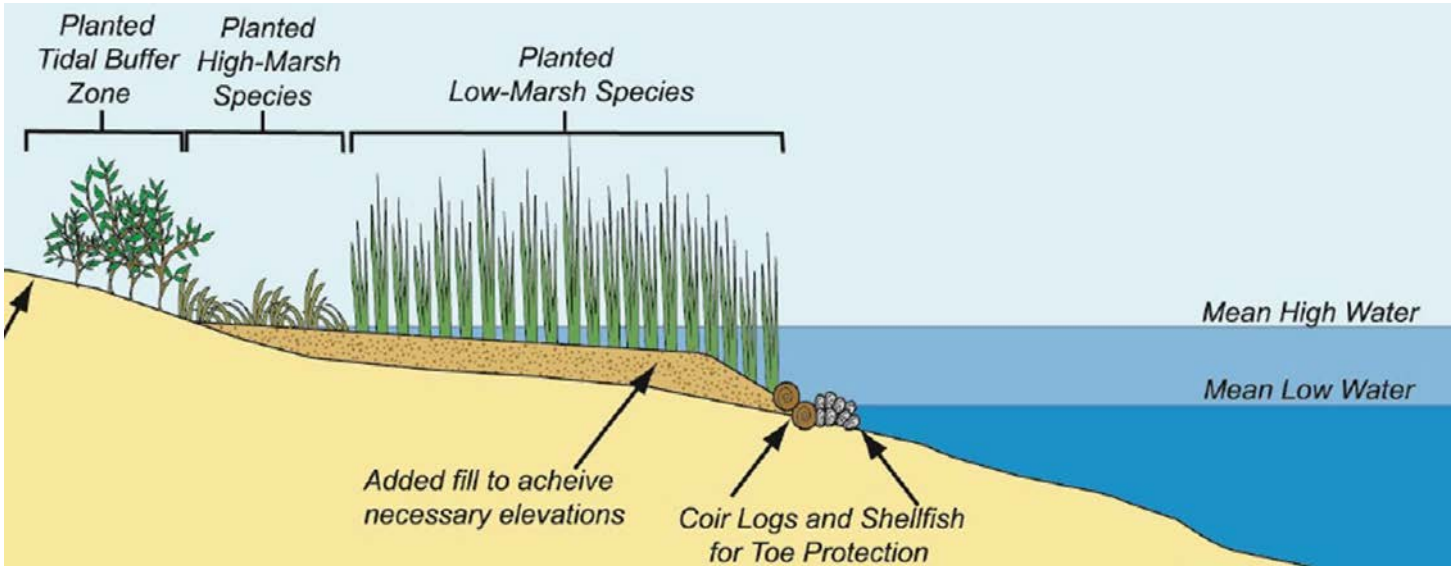


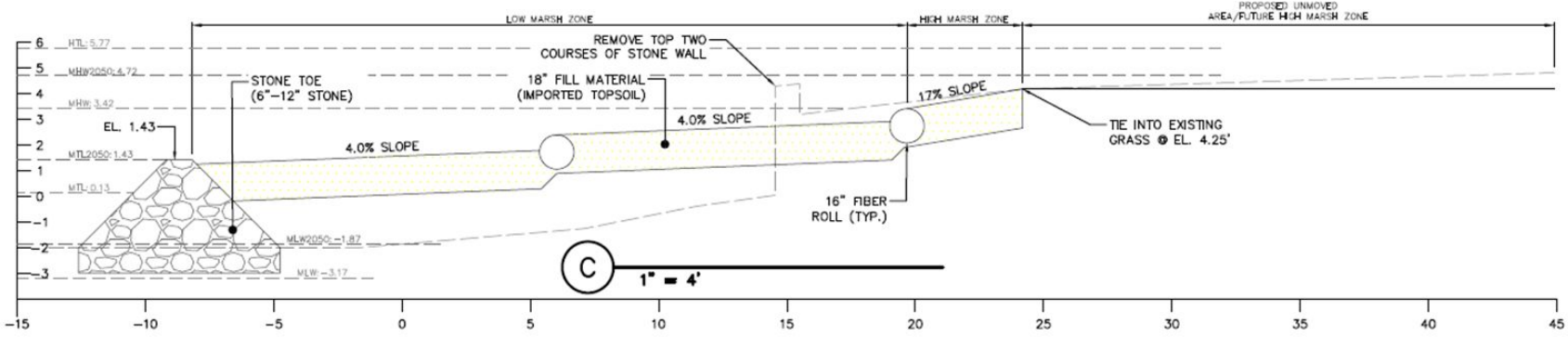
From:

- Normandeau Associates, Inc.
- Dubois & King, Inc.
- GZA GeoEnvironmental Inc
- Gomez and Sullivan
- Engineers, DPC
- Fuss & O'Neill, Inc.
- VHB
- Kleinfelder
- Jacobs
- The Harborkeepers
- Woods Hole Group
- Whole Systems Design
- Collective, LLC
- Ransom Consulting, LLC
- Tighe & Bond
- GM2 Associates, Inc.
- Stantec Consulting
- Osprey Ecological Services,LLC
- Halvorson | Tighe & Bond Studio
- Lonza

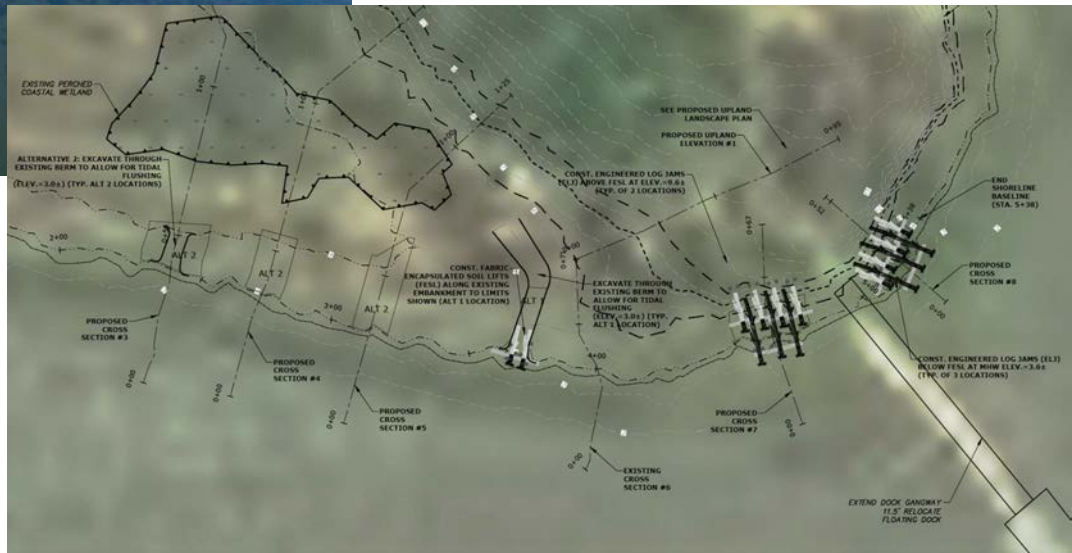
Spur Road
Dover




Planted Tidal Buffer Zone
Planted High-Marsh Species
Planted Low-Marsh Species
Mean High Water
Mean Low Water
Added fill to acheive necessary elevations
Coir Logs and Shellfish for Toe Protection

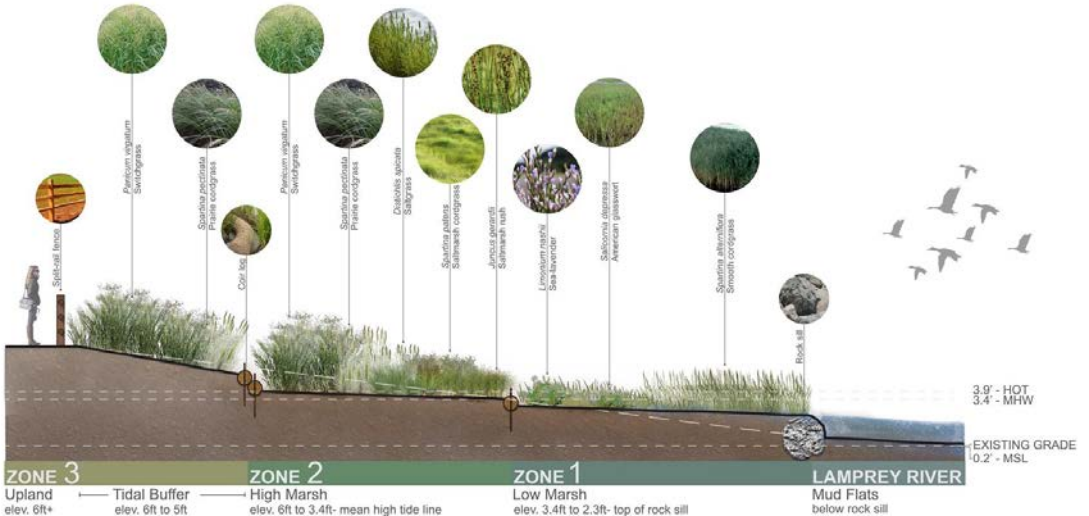

LOW MARSH ZONE
HIGH MARSH ZONE
PROPOSED UNMOVED AREA/FUTURE HIGH MARSH ZONE
REMOVE TOP TWO COURSES OF STONE WALL
STONE TOE (6"–12" STONE)
18" FILL MATERIAL (IMPORTED TOPSOIL)
EL. 1.43
4.0% SLOPE
4.0% SLOPE
17% SLOPE
TIE INTO EXISTING GRASS @ EL. 4.25'
16" FIBER ROLL (TYP.)
HTL: 5.77
MHW2050: 4.72
MHW: 3.42
MTL2050: 1.43
MTL: 0.13
MLW2050: -1.87
MLW: -3.17
C
1" = 4'

Moody Point
Newmarket




Gutters
Rain barrels
"Driveable grass"
Mulch path
Native Groundcovers/ low plants
Allow the plants to creep into this space.

Schanda Park Newmarket




PROPOSED LIVING SHORELINE
PRUNE AND LIMB UP EXISTING TREES TO EXPAND VIEWS TO THE LIVING SHORELINE
EXISTING PARK AREA TO REMAIN
PROPOSED CURB ALONG SOUTHERN EDGE OF PARKING LOT
PROPOSED RAIN GARDEN AND / OR SUBSURFACE SAND FILTER
CONSIDER OPPORTUNITIES FOR STORMWATER RUNOFF AND GREEN INFRASTRUCTURE ON MAIN STREET AND UPHILL FROM RIVER
RECONSTRUCT STONE RUBBLE WALL
KAYAK STORAGE
IMPLEMENT INVASIVE SPECIES MANAGEMENT PLAN AND PLANT RECOMMENDED NATIVE PLANTINGS
PROVIDE CONTINUOUS SPLIT-RAIL FENCE TO DETER PEDESTRIAN ACCESS FROM LIVING SHORELINE TO PROTECT AGAINST ADVERSE IMPACTS
PROMOTE PEDESTRIAN ACCESS TO KAYAK DOCKS VIA PATHWAY TO MINIMIZE IMPACTS ON LIVING SHORELINES
PROPOSED PERSONAL WATERCRAFT DOCK
PROPOSED CONCRETE PLANK BOAT RAMP
CREATE EXPANDED LIVING SHORELINE WITH STABILIZED SLOPE WHICH FOLLOWS THE NATURAL CURVE OF THE RIVER
REBUILD FIELDSTONE WALL ALONG TOP OF SLOPE
FISH WEIR TO BE SEASONALLY REMOVED AND STORED OFF SITE
REGRADE KNOLL SOUTH OF STREAM TO CREATE LIVING SHORELINE
CREATE NEW OVERLOOK WITH BENCHES AND INTERPRETIVE SIGNAGE ABOUT LIVING SHORELINE
EXISTING FLOATING DOCKS
1
2
3
4
A
B
C

Chapman's Landing
Stratham

Adaptation Pathways for Chapman's Landing (Option 4)

OBSERVE and MONITOR

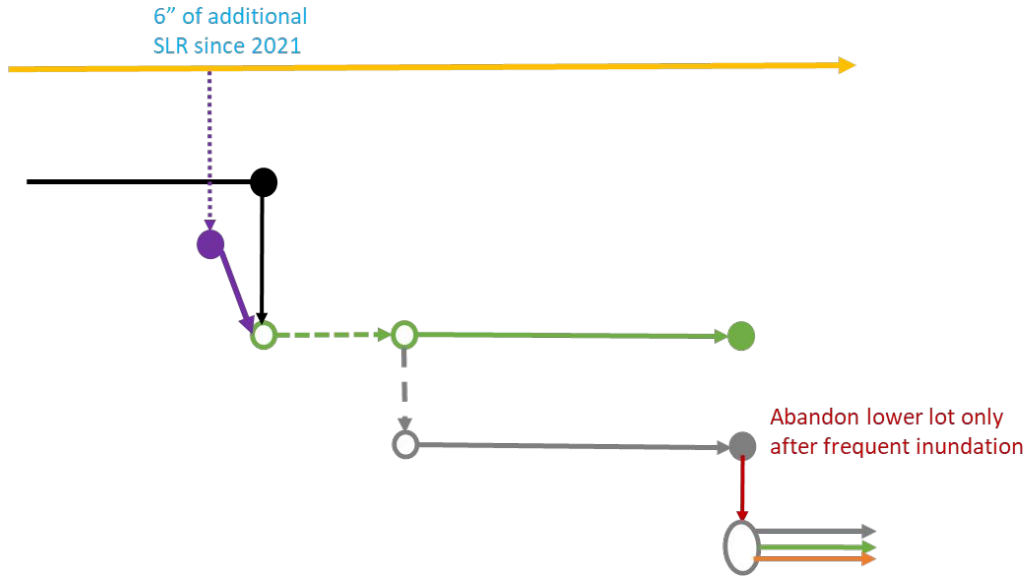
TIER 1:
Stand by (no shoreline intervention recommended)

As observed SLR/erosion increases, apply for grant funding (for toe sill/signage)

Implement shoreline stabilization;
rock/oyster "toe" edge protection
w/educational signage

WAIT…. then regrade/**upgrade boat ramp** **(TIER 2)**

WAIT…. then retreat from lower lot and add (TIER 3):
- new ramp; new boat turnaround in upper lot
- living shoreline in eroded marsh area
- boardwalk/overlook amenity?



Metric #1 >>

Observed sea level rise (depth above 2021 baseline)

Legend

- Design choice/transition opportunity
- End/abandon action
- Action taken
- Transition to new action or adapt current action

What we heard from participants

I had very little experience with the tidal projects previously. I **learned a lot about calculating tidal datums, target design parameters** such as slopes, the importance of getting the engineering design right to support planting etc.

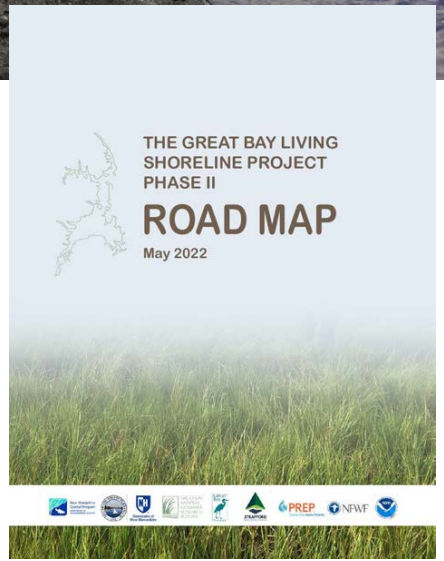
Beforehand the permitting process was overwhelming so now that I have a capable understand **I can bring this option to clients!**

Being involved with **this effort was like a taking a course,** I learned so much from experts in the field... very interesting and **worth all the time**.

This was an **amazing experience.** It was a design team of experts guiding us through and I am so grateful to be a part of the cooperative team process.

Wish list

- More design guidance
- Chance to visit more sites
- Networking opportunities with municipalities and clients
- More streamlined training program
- Better alignment between funding and permitting
- More options for small scale projects and private lands



THE GREAT BAY
LIVING SHORELINE PROJECT

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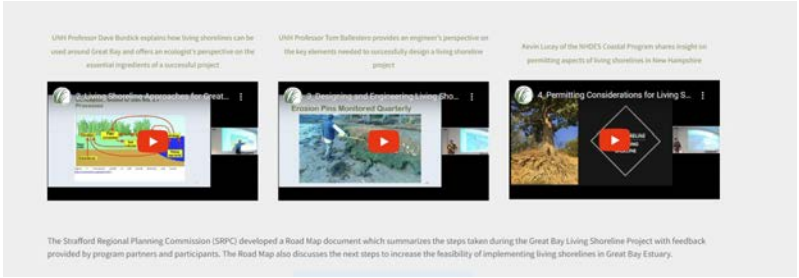

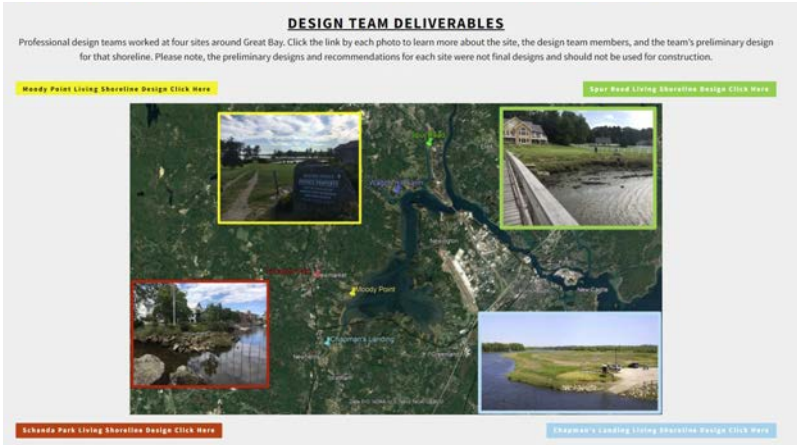

www.nhcaw.org/greatbaylivingshorelineproject