



PROGRAM FOR
THE STUDY OF
DEVELOPED
SHORELINES

Planning for Salt Marsh Migration on the Sengekontacket Pond Shoreline

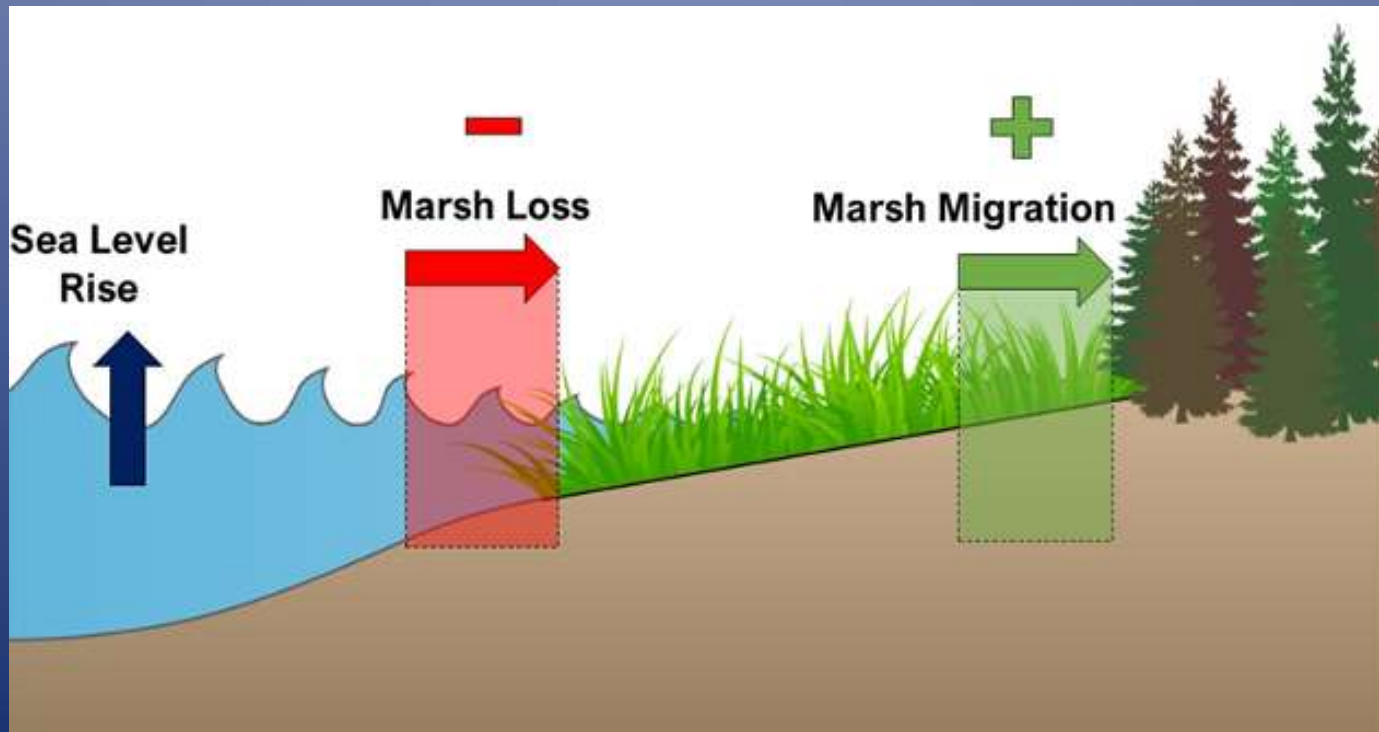
Rob Young PhD, PG



Many thanks to.....

- Village and Wilderness Project
- Marthas Vineyard Commission
- Liz Durkee
- Tom Chase
- Chris Seidel
- Adam Turner

Marsh Migration and Sea Level Rise





A photograph of a coastal marsh landscape. In the foreground, there is a field of green marsh grass. Several dead, bleached tree trunks (snags) stand in the grass. In the background, a dense line of green trees borders the marsh. The sky is blue with some white clouds.

make way for **MARSHES**

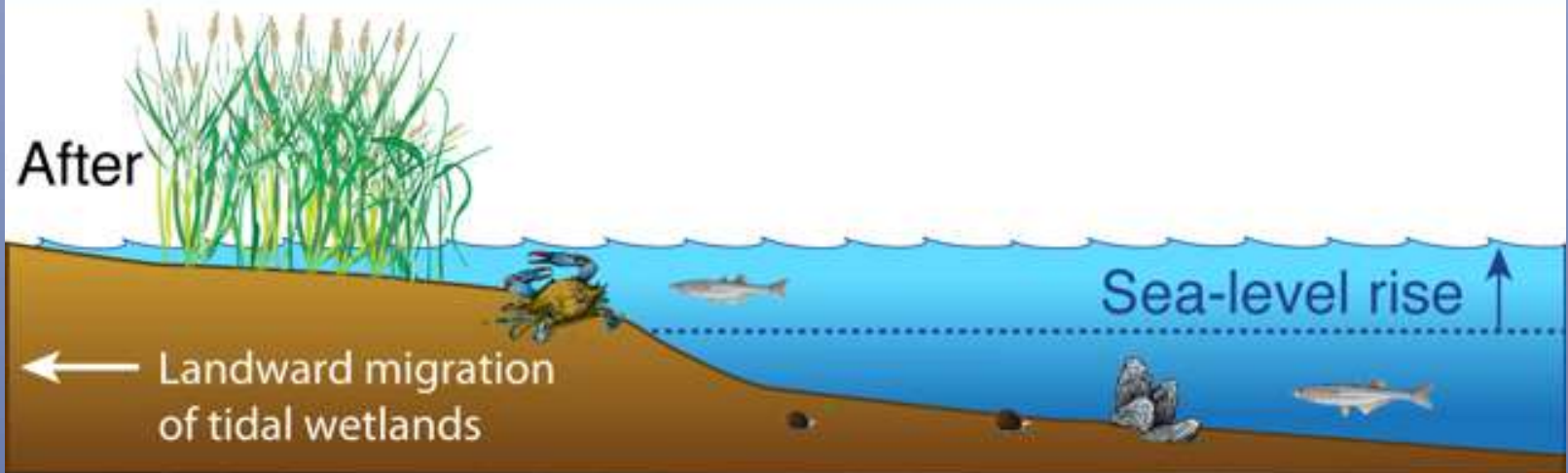
Guidance on Using Models of Tidal Marsh Migration
to Support Community Resilience to Sea Level Rise



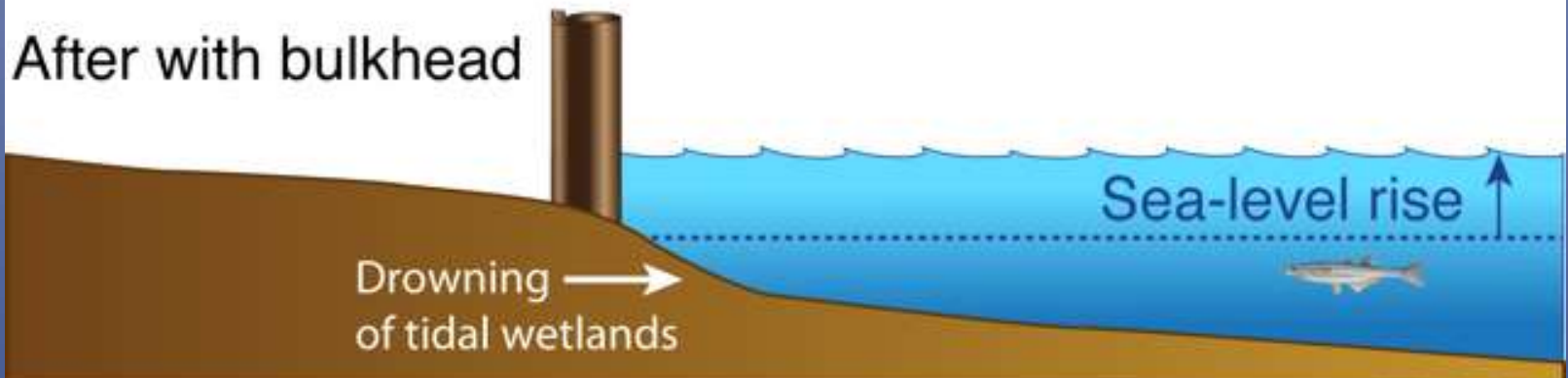
Before



After



After with bulkhead

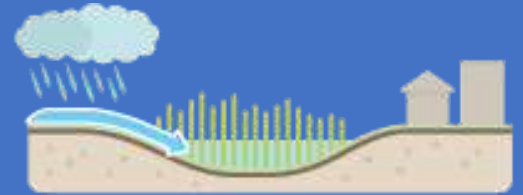




**MIGRATION
REST AREA**



FUN



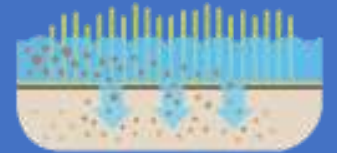
**FLOOD & EROSION
CONTROL**



HABITAT



FOOD



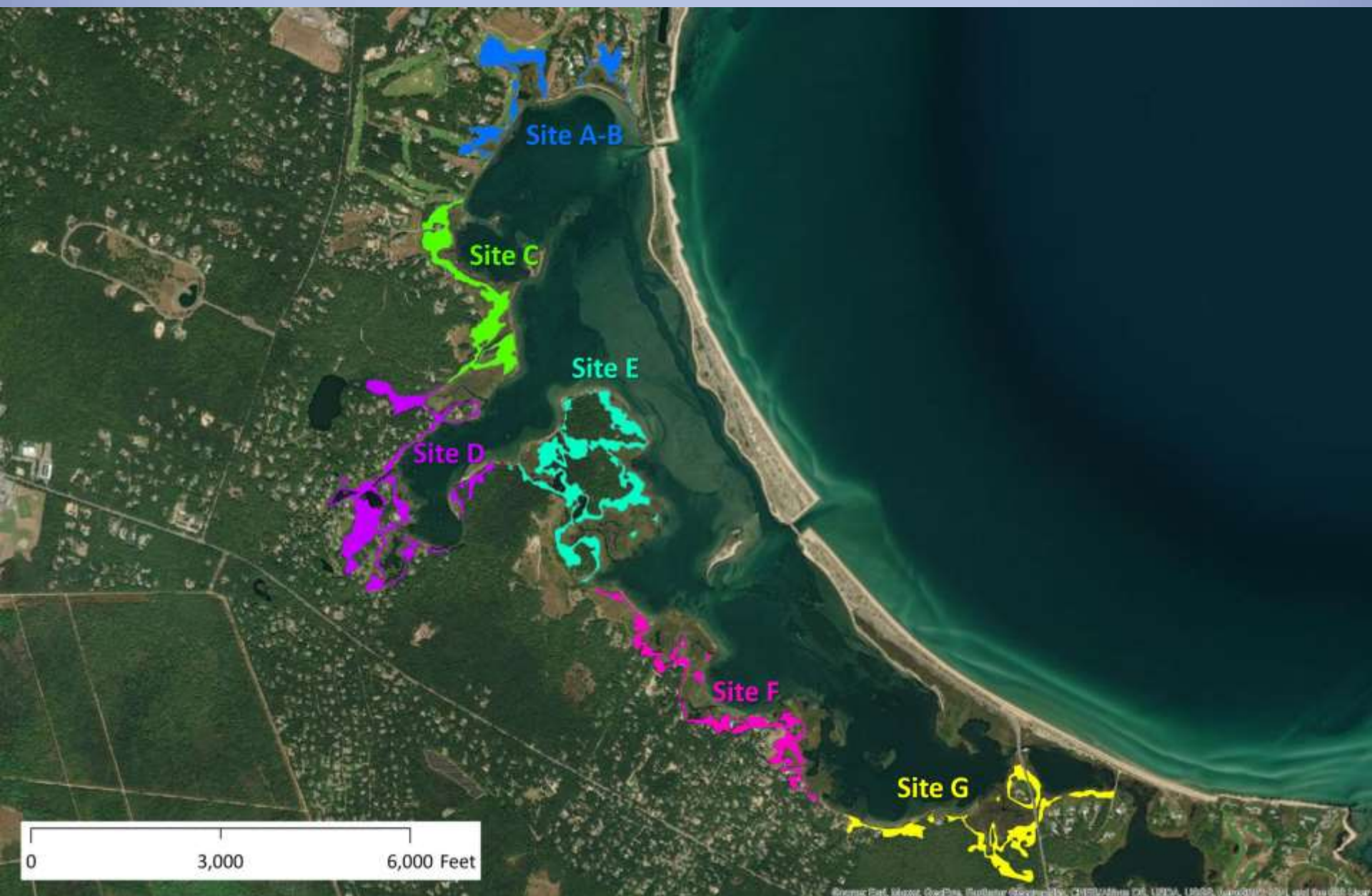
CLEAN WATER

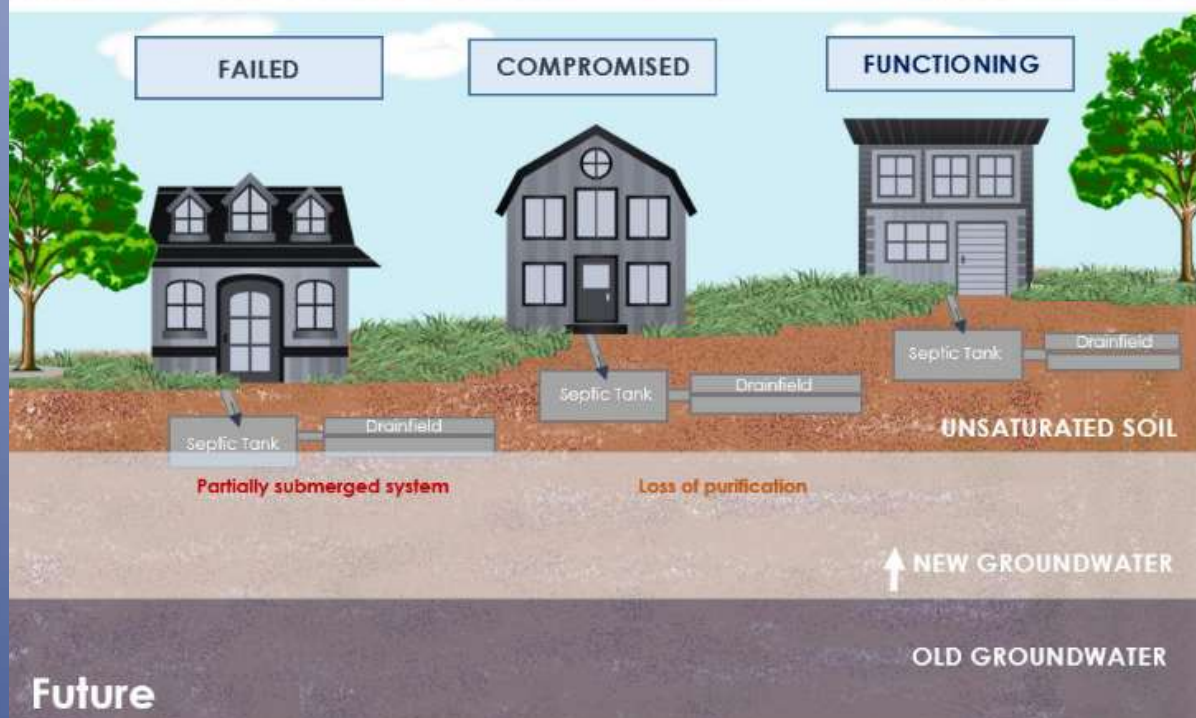
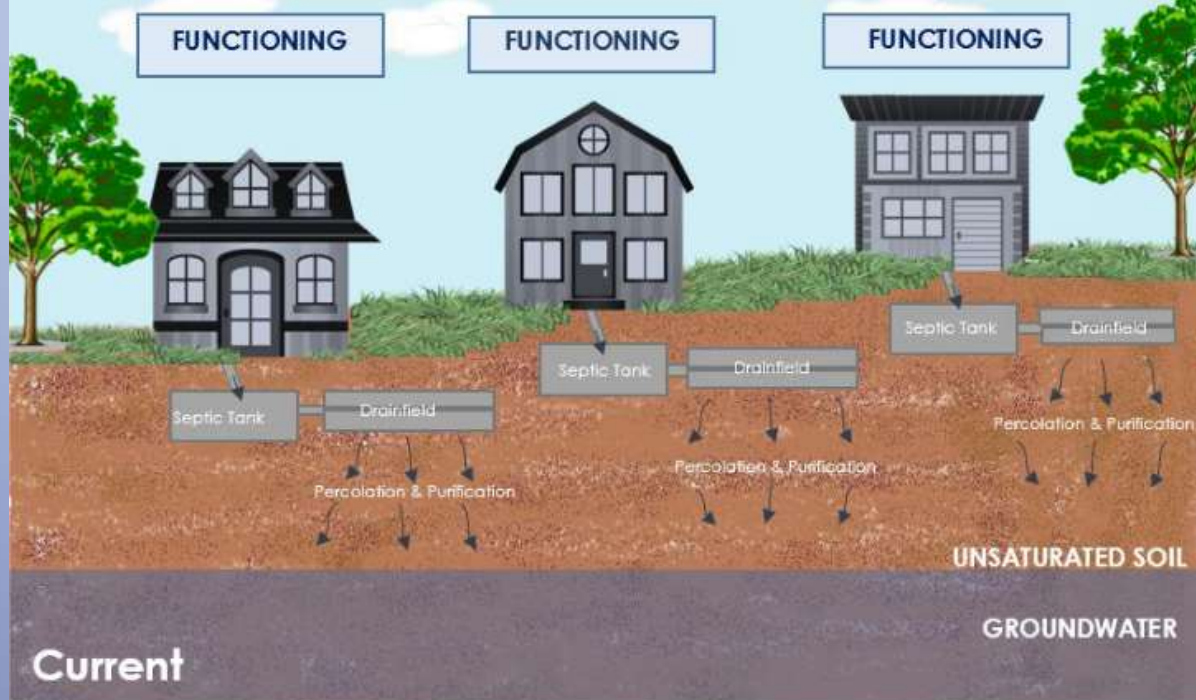


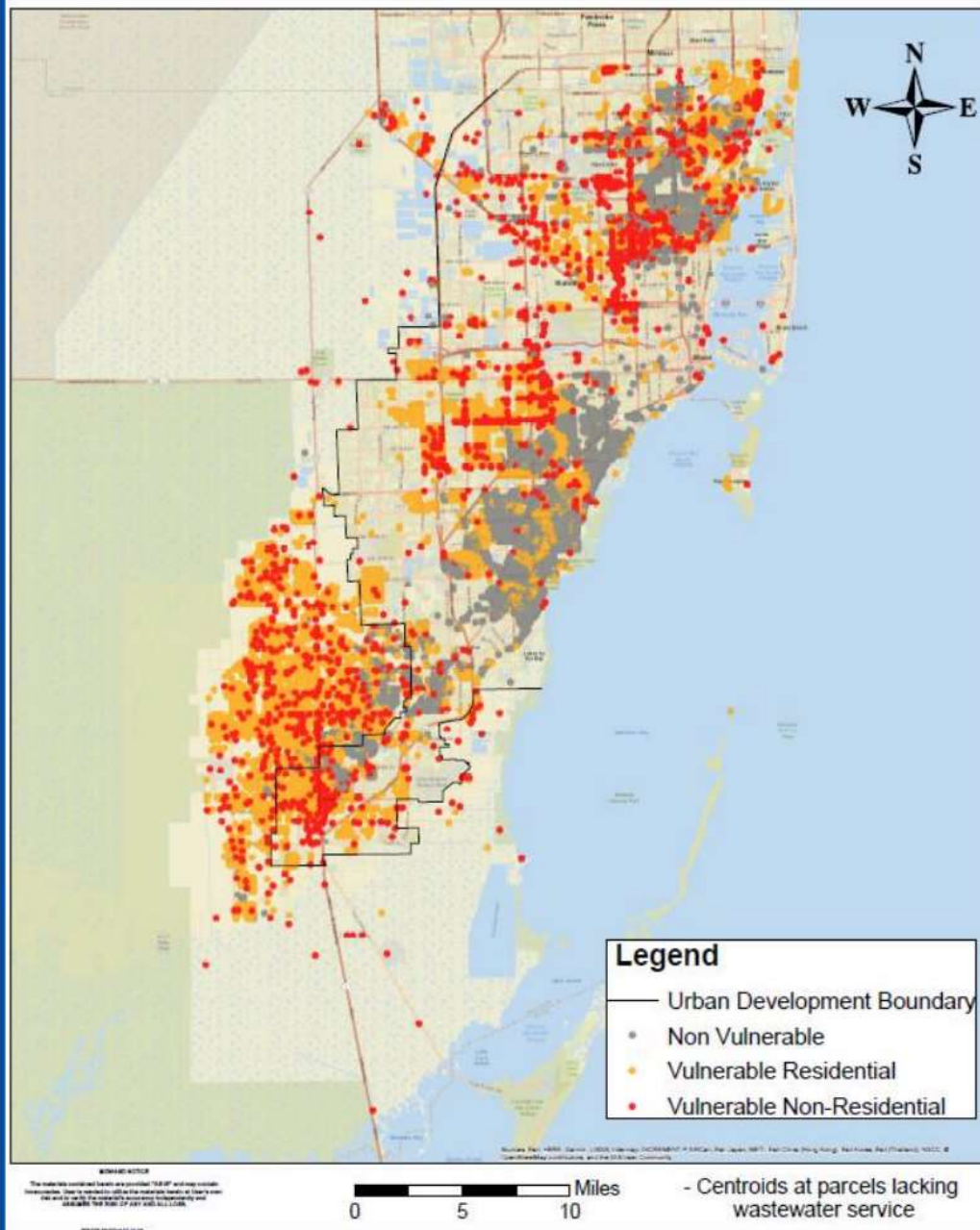
WATER SUPPLY











King Tides

Contamination is a real possibility.

As sea levels rise, the flooding during king tides will likely damage septic systems causing a real threat to human health and to drinking water.

[Read More](#) >









Bacteria outbreak after Ian tells a scary story about Florida's broken sewage systems

Spills happen all the time from overloaded plants and pipes, not just after a hurricane



CRAIG PITTMAN

OCTOBER 20, 2022 7:00 AM

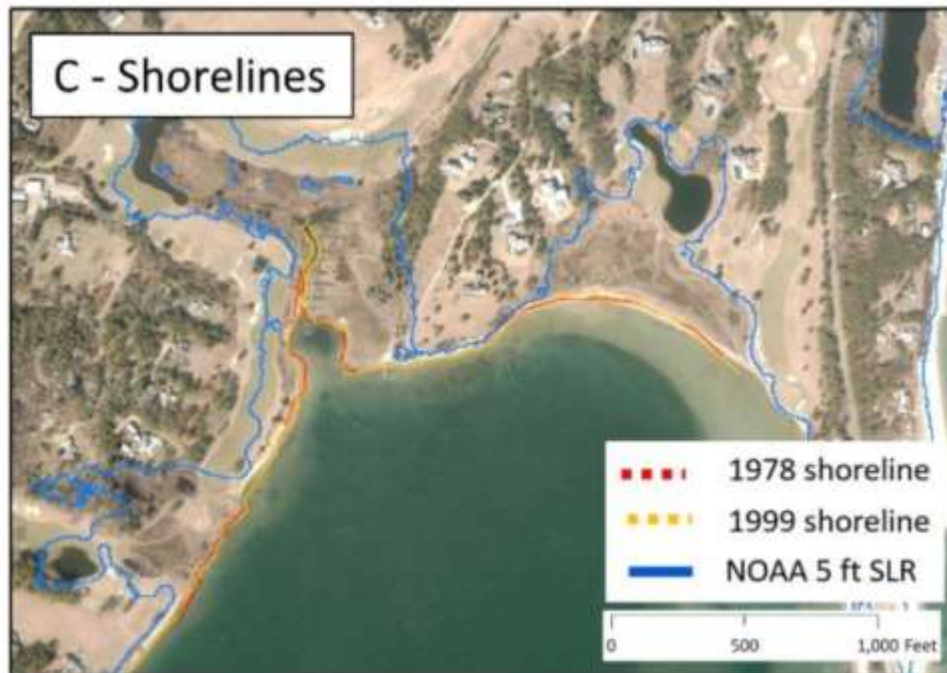




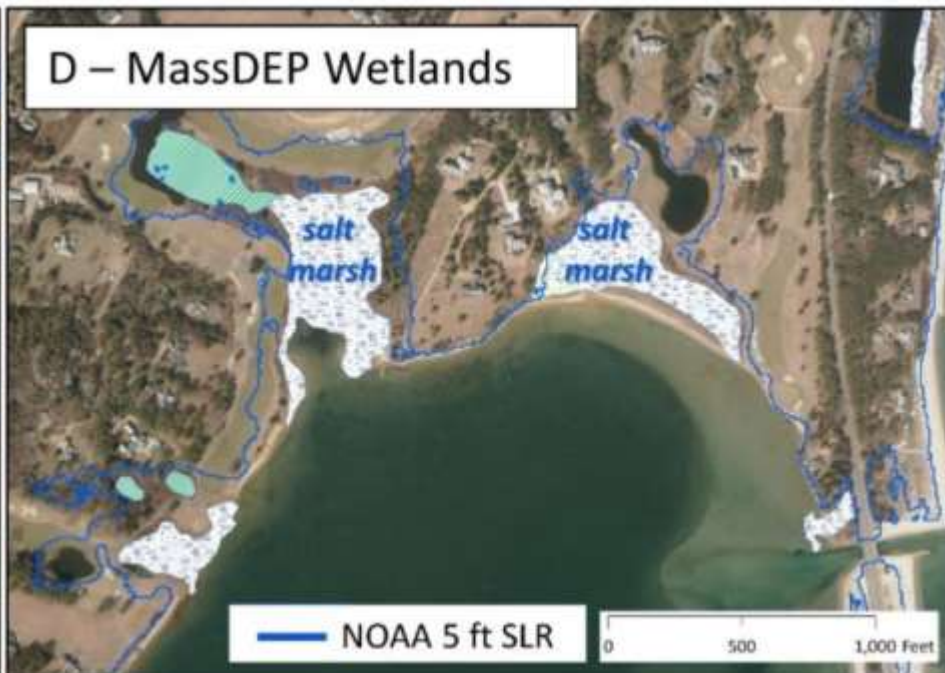
Table 1. *Primary data used in marsh change analysis.*

Year	Name (Source)	Obtained From
Aerial Imagery		
1978	Historic Black & White Aerial Imagery	MVC
1999	MassGIS Black & White Orthoimagery (Mass GIS)	MassGIS web mapper
2019	Massachusetts USGS Color Ortho Imagery (USGS, MassGIS)	ArcGIS Online
Marsh Data		
2015	Sea Level Affecting Marshes Model (Woods Hole Group)	Woods Hole Group
2005	MassDEP Wetlands (MassDEP)	MassGIS web mapper
2015	National Wetlands Inventory (USFWS)	MassGIS web mapper
SLR + Elevation Data		
2016	NGS TopoBathy LiDAR (NOAA NGS)	NOAA Data Access Viewer
2017	NOAA SLR Scenarios (NOAA)	NOAA SLR Viewer

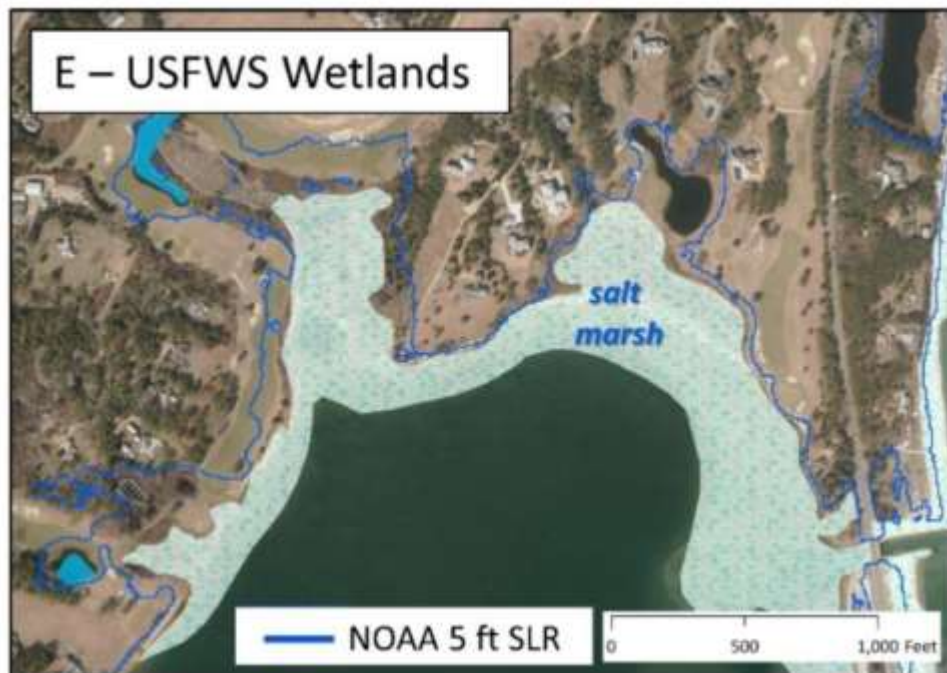
C - Shorelines



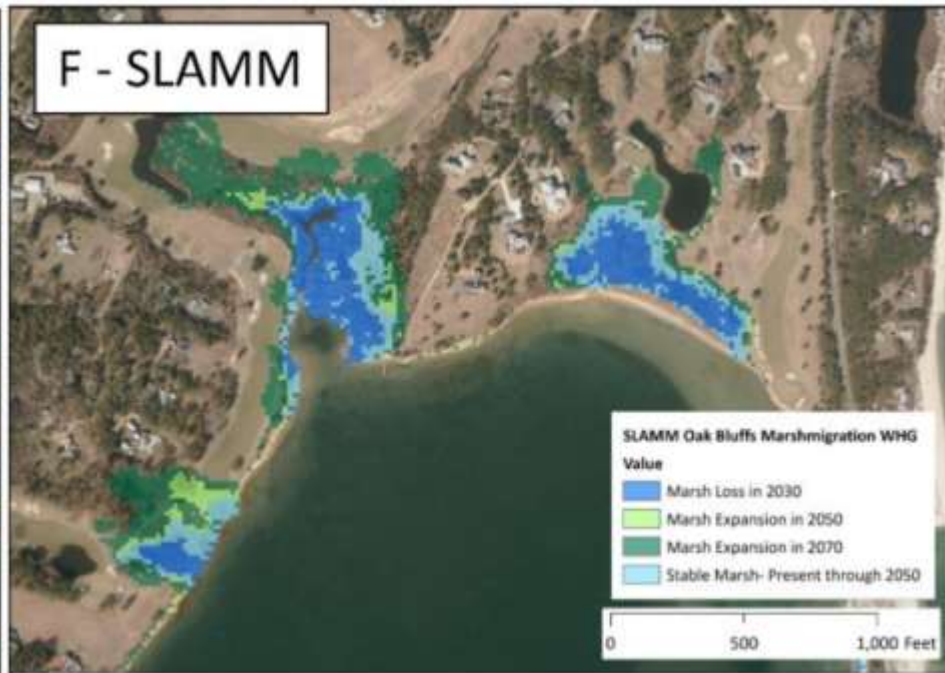
D – MassDEP Wetlands



E – USFWS Wetlands



F - SLAMM



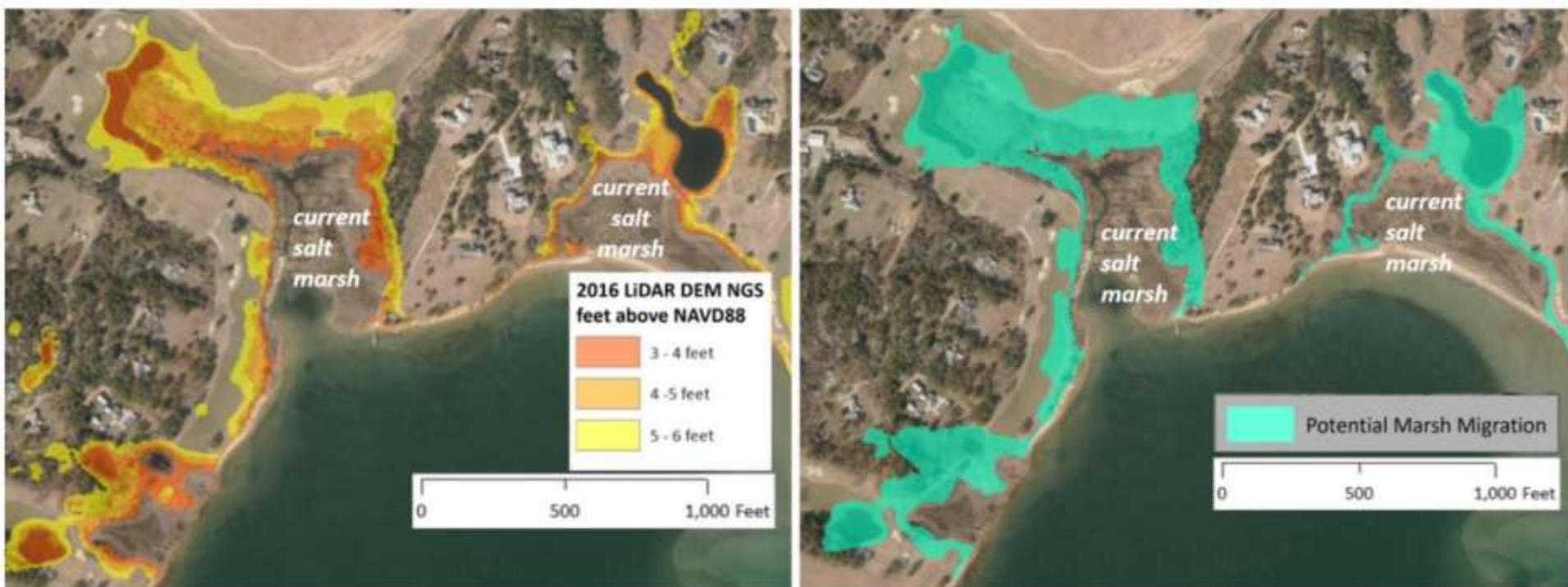
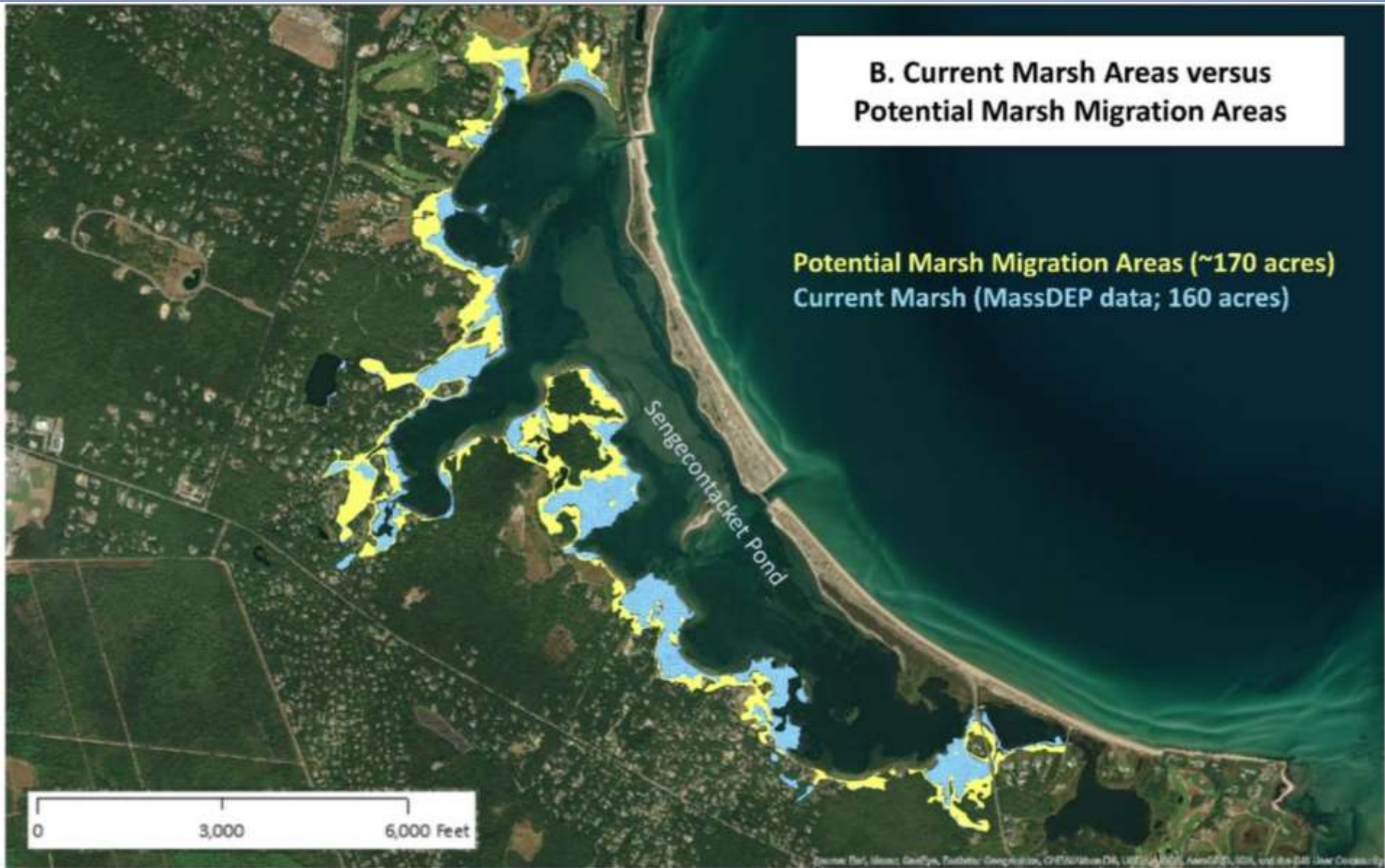


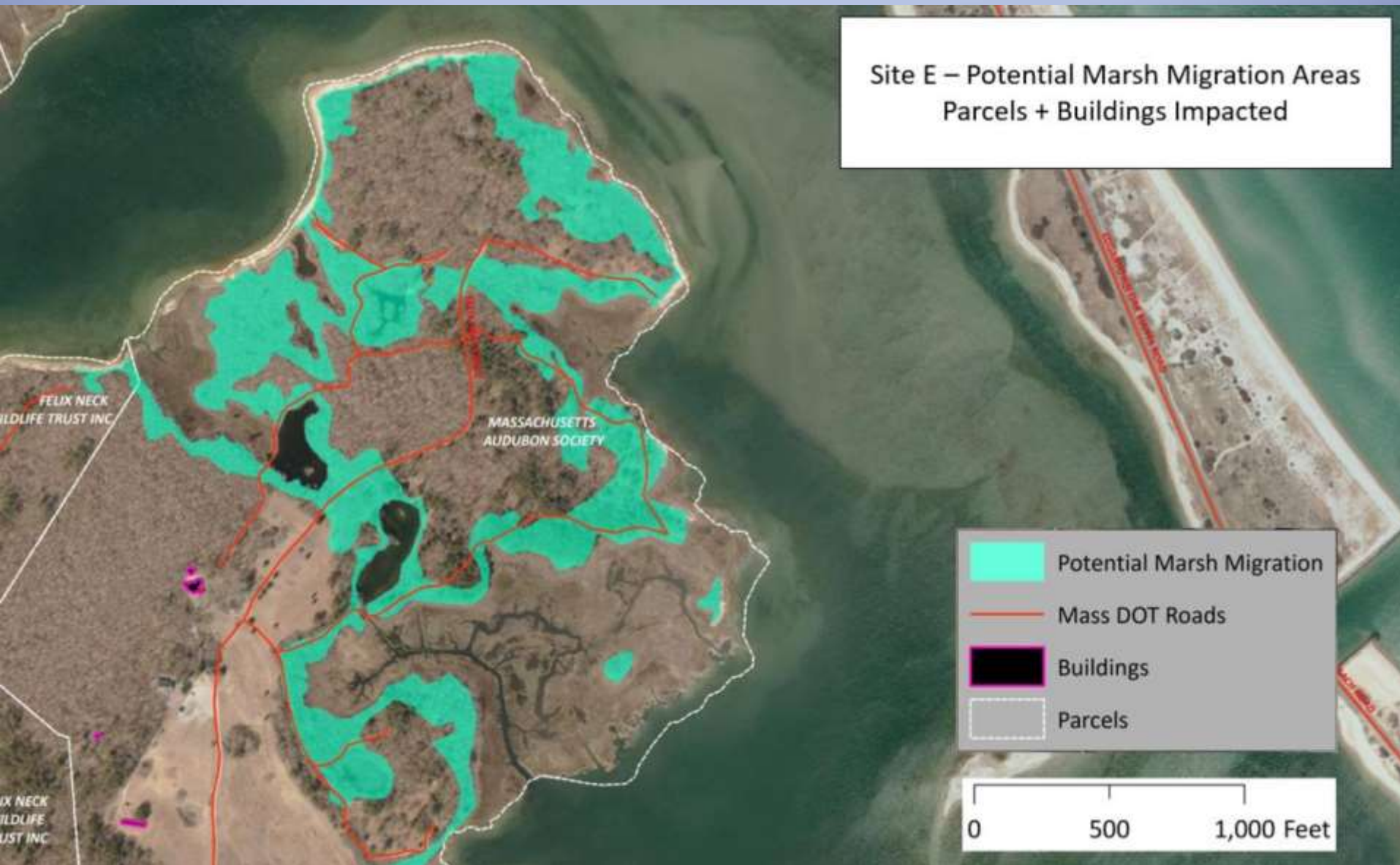
Figure 2. Example of elevation data (left) and digitized marsh migration zone (right) for the northern Sengekontacket Pond area.

B. Current Marsh Areas versus Potential Marsh Migration Areas

Potential Marsh Migration Areas (~170 acres)
Current Marsh (MassDEP data; 160 acres)



Site E – Potential Marsh Migration Areas
Parcels + Buildings Impacted



Site C – Potential Marsh Migration Areas Parcels + Buildings Impacted

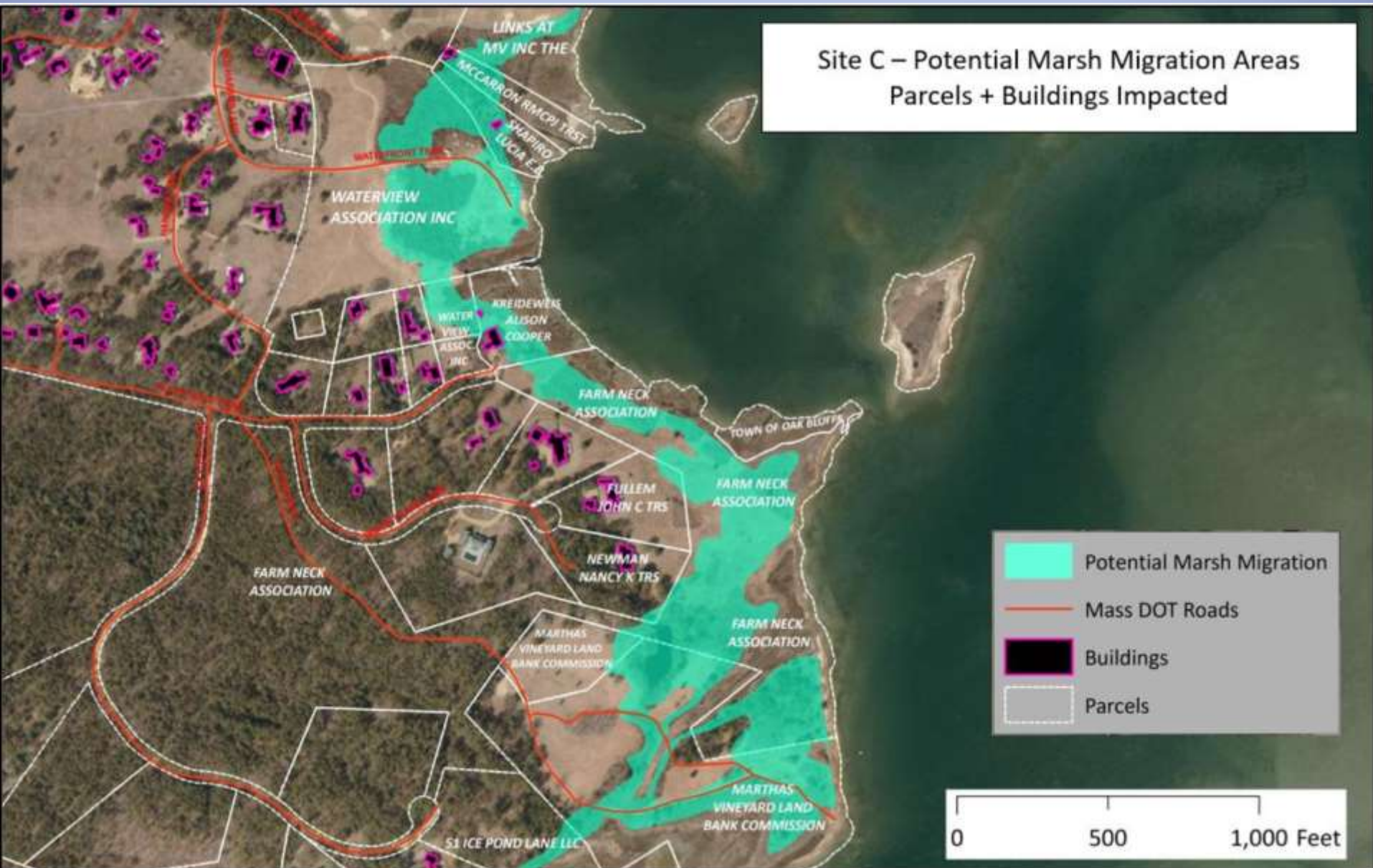


Table 2. Total potential annual property tax of parcels in each site that intersect the delineated marsh migration areas along Sengekontacket Pond. See Table 4 for full results.

Site	Total Prop. Value (2021)	Potential Annual Prop. Tax*	City
A	\$22,432,620	\$152,317	Oak Bluffs
B	\$11,993,420	\$81,435	Oak Bluffs
C	\$14,820,290	\$80,265	Oak Bluffs
D	\$114,808,698	\$542,165	Edgartown & Oak Bluffs
E	\$49,996,494	\$0	Edgartown
F	\$74,150,798	\$125,403	Edgartown
G	\$102,116,384	\$226,758	Edgartown
Total	\$390,318,704	\$1,208,344	

* Estimate of Annual Tax Bill based on FY22 Residential Tax Rates as published on <https://www.mvbuyeragents.com/mv-residential-tax-rates>. Edgartown Residential Tax Rate FY22 is \$3.03 per \$1,000.00; Oak Bluffs Residential Tax Rate FY22 is \$6.79 per \$1,000.00

Table 3. Total potential annual property tax of parcels with structures / buildings that intersect the delineated marsh migration areas along Sengekontacket Pond.

Site	Total Prop. Value (2021)	Potential Annual Prop. Tax*	City
C	\$1,855,300	\$12,597	OAK BLUFFS
C	\$559,400	\$3,798	OAK BLUFFS
F	\$2,278,650	\$6,904	EDGARTOWN
F	\$1,984,175	\$6,012	EDGARTOWN
F	\$1,282,489	\$3,886	EDGARTOWN
F	\$1,656,350	\$5,019	EDGARTOWN
F	\$2,262,550	\$6,856	EDGARTOWN
F	\$2,231,986	\$6,763	EDGARTOWN
G	\$2,139,100	\$6,481	EDGARTOWN
G	\$1,756,755	\$5,323	EDGARTOWN
G	\$1,819,975	\$5,515	EDGARTOWN
Total	\$19,826,730	\$69,154	

* Estimate of Annual Tax Bill based on FY22 Residential Tax Rates as published on <https://www.mvbuyeragents.com/mv-residential-tax-rates>. Edgartown Residential Tax Rate FY22 is \$3.03 per \$1,000.00; Oak Bluffs Residential Tax Rate FY22 is \$6.79 per \$1,000.00

Annual Benefit

Storm Damage Reduction: \$2,930/acre/year

Fisheries: \$6,471/acre/year

Water Quality: \$1,200/acre/year

*Total Annual Economic Benefits from Salt Marsh Ecosystem Services:
\$10,871/acre/year*

In our opinion, for Martha's Vineyard, these number probably overestimate the fisheries benefits a bit and underestimate the water quality benefits. However, they are reasonable and conservative for a New England salt marsh.

This results in approximately \$1.74 million a year in benefits to shoreline property owners and the larger community from the existing marsh.

Conclusions

- » Good news: Wetland migration can offset wetland loss over the next few decades
- » Ecosystem benefits outweigh lost tax revenue
- » Need to locate/map septic systems
- » Monitor groundwater

Options

- » Buyout all properties
- » Buyout properties with structures, protect open space
- » Easement purchase, donation or Bylaws
- » Septic plan