# Sea Level Rise and the Conservation of Coastal Wetlands

## LOCAL SOLUTIONS: Northeast Climate Preparedness Conference

May 20, 2014

R. Hancock

NOAA

C R M C
Coastal Resources Management Council

Narragansett Bay Research Reserve

Coastal Resources Center
University of Rhode Island

The Nature Conservancy

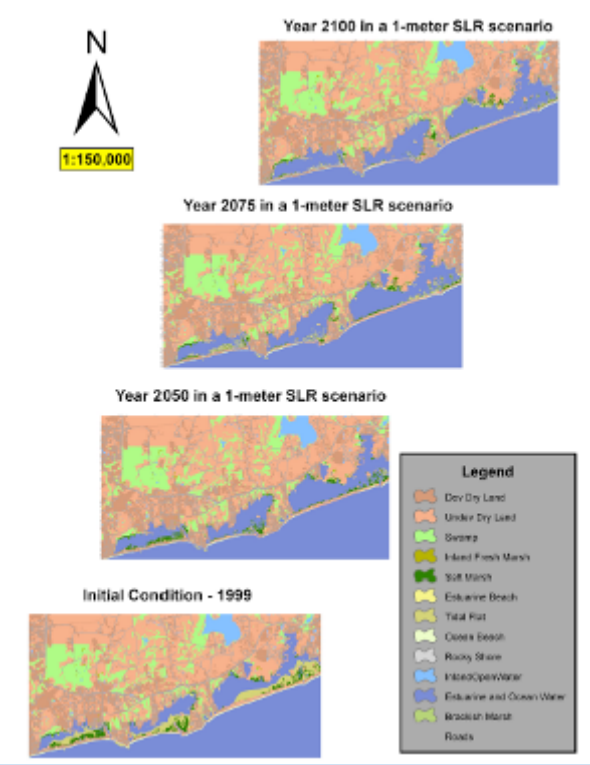
SAVE THE BAY.
NARRAGANSETT BAY

Sea Grant
Rhode Island

Marine Affairs Institute

# Why does it matter?

RI has lost 53% of its salt marshes over the last 200 years due to man-made alterations (Bromberg and Bertness, 2005)



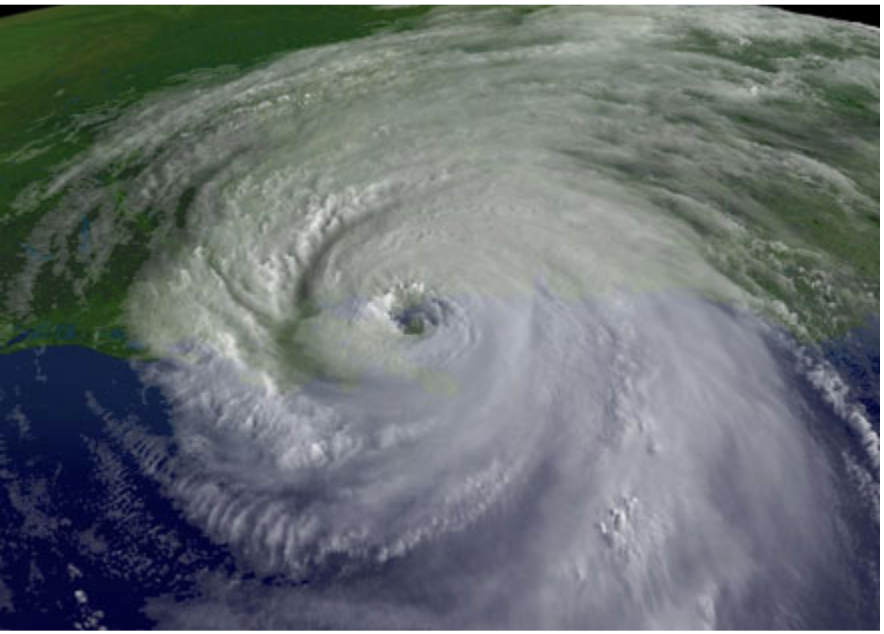

Hancock 2009

# Why is Salt Marsh Important?

**Forage and nursery habitat**
**Nesting and migratory sites**
**Carbon sink**

- $6,471/acre/yr for maintaining fisheries (US East Coast)
- $75 M in commercial fishery landings (RI)
- $150 M recreational fishery (RI)

# Why is Salt Marsh Important?




**Reduces storm damage**

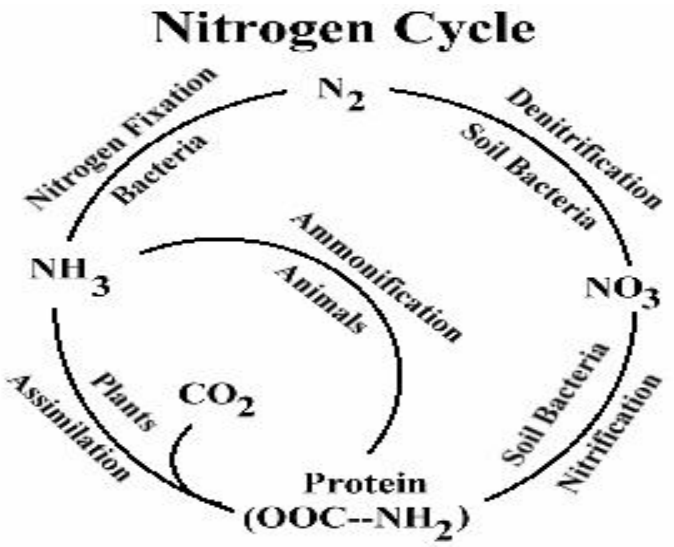
$2,931/acre/year (RI)

Costanza et al., 2008

$5 billion of Rhode Island property protected by coastal habitats by 2100

Arkema et al., 2013

# Why is Salt Marsh Important?




**Clean water:**

**trap sediments, sequester nitrogen**

$780-$15,000/acre/yr for <u>water purification</u>

STB's 10 years of restoration monitoring has shown that conditions can change rapidly in tidally restricted marshes

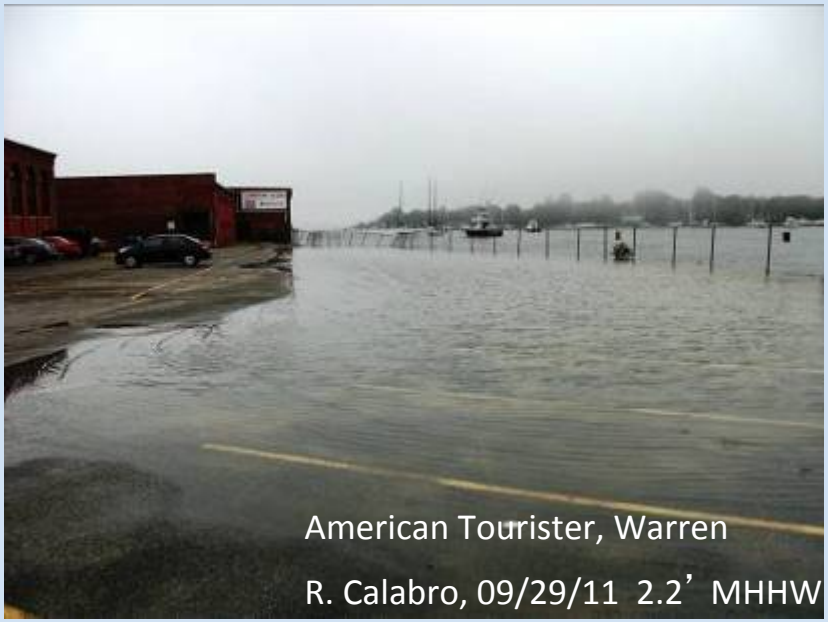
Recently, similar degraded conditions have been observed in marshes with no tidal restrictions



# High Tides Affect our Communities Today

South Shore Ave., Warwick

W. Ferguson, 06/04/12 2.4’ MHHW



American Tourister, Warren

R. Calabro, 09/29/11 2.2’ MHHW

Bold Point Park East Providence

J. Boyd, 10/27/11 2’ MHHW


North Avenue, Jamestown

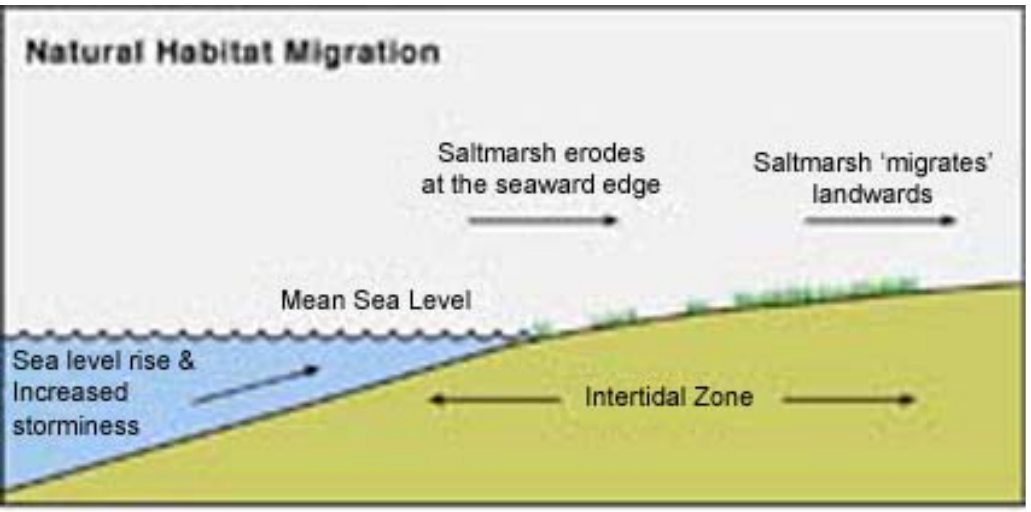
R. Calabro, 06/03/12 2’ MHHW

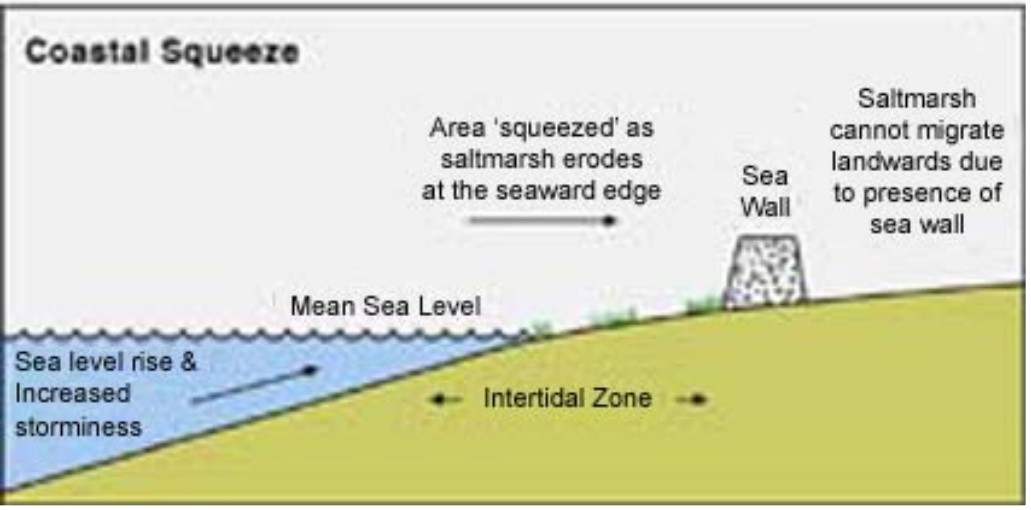
# Impediments to Coastal Marsh Migration

# Project Framework

1. Develop marsh migration modeling results
2. Identify existing vulnerable wetlands
3. Identify upland parcels where wetlands will likely migrate
4. Develop new state coastal program adaptive strategies, policies and standards
5. Increase local capacity to proactively incorporate adaptation policy for wetlands (comprehensive plans, zoning codes, etc.)

# Opportunities for Upland Migration and Restoration




With the proper conditions, salt marsh can migrate upland

We can model *likely* future habitat

# Model Inputs - Each area is unique

## SLAMM Subsites

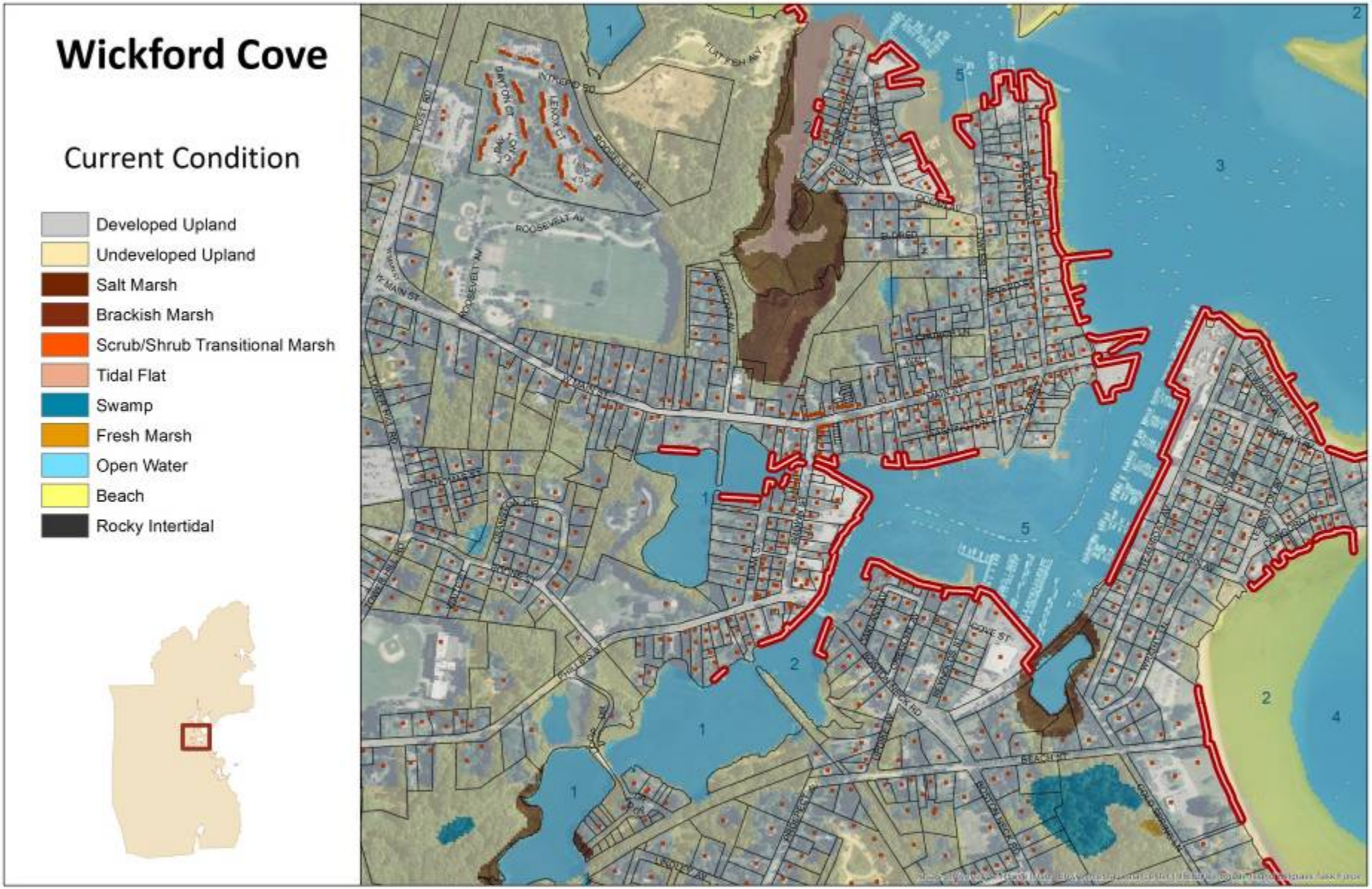
- ACOE Tidal Data Stations
- NOAA Tidal Stations


SLAMM Variables:

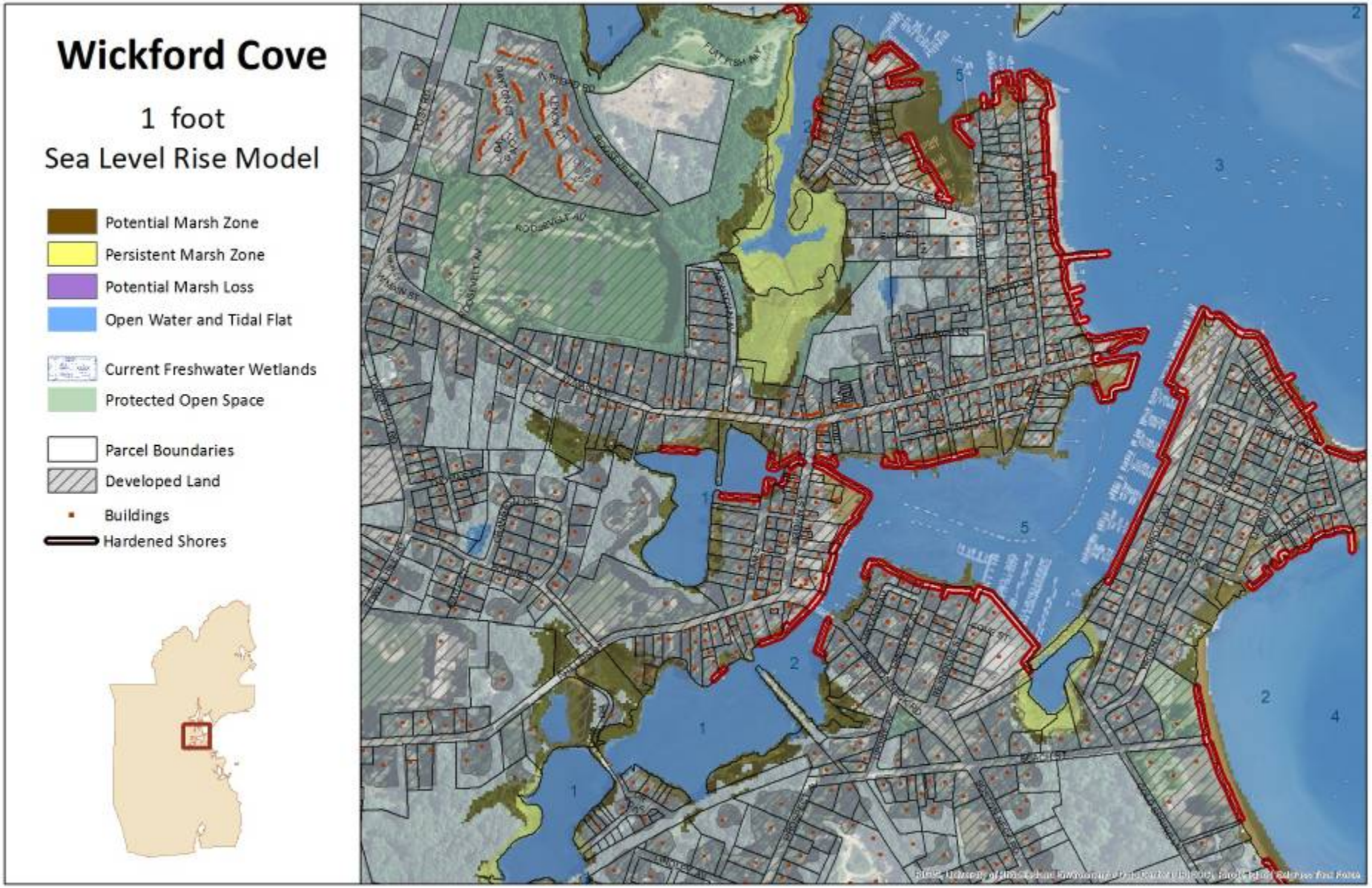
direction offshore
MTL-NAVD88
accretion rates
erosion rates
salt elevation
sedimentaion rate
storm frequency

| site | diurnal_range |
|---|---|
| RI Coast | 0.8 |
| LNB | 0.94 |
| LN-E | 0.94 |
| W-W | 0.645 |
| Q | 0.68 |
| NW | 0.27 |
| NN | 0.27 |
| PP-N | 0.351 |
| GH | 0.16 |
| BI South | 0.991 |
| BI Harbor Pond | 0.86 |
| BI GSP | 0.89 |
| PJ-N | 1.11 |

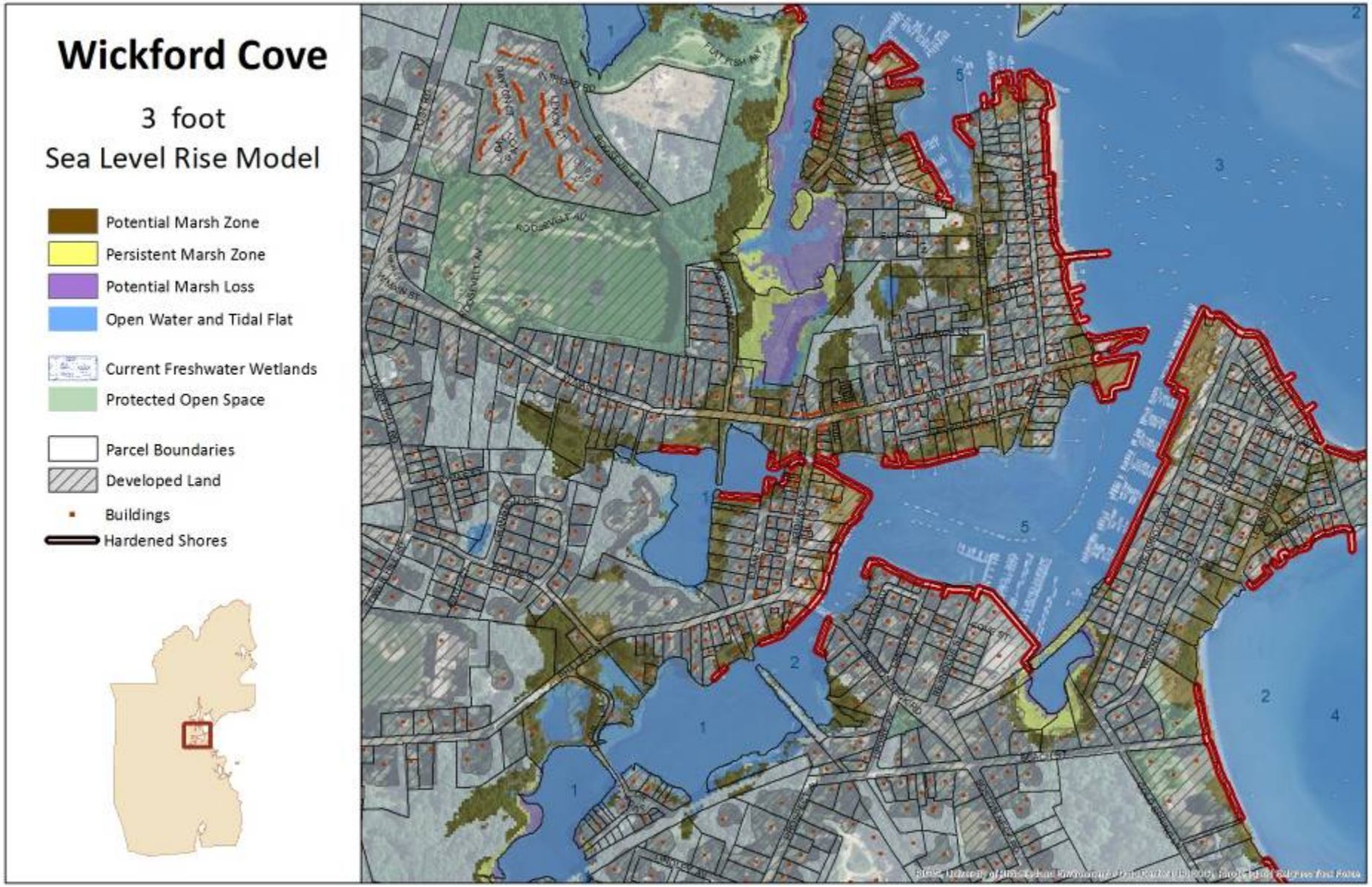
# Modeling – Current Conditions



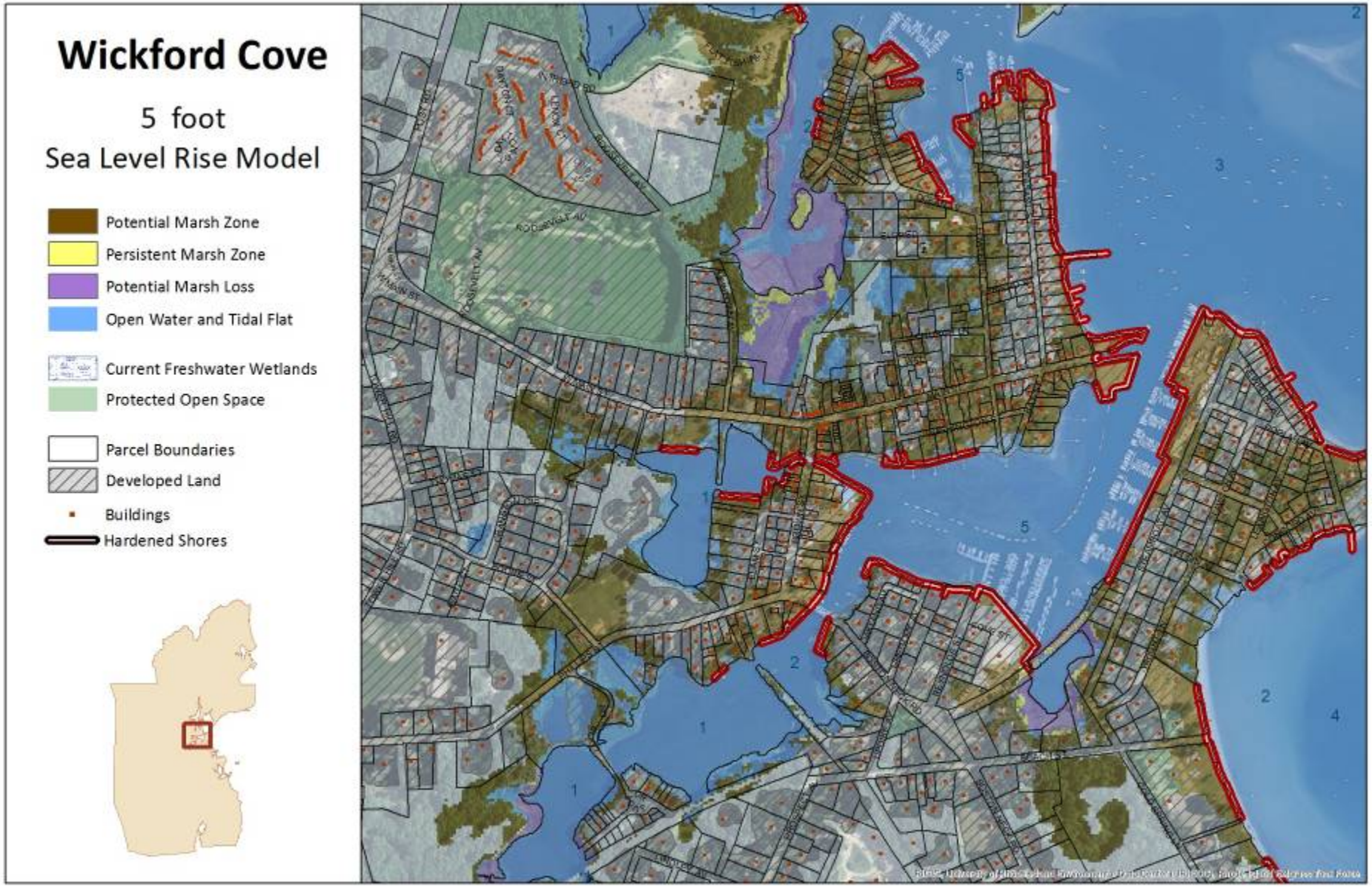
# Model Results – 1’ SLR



# Model Results – 3’ SLR

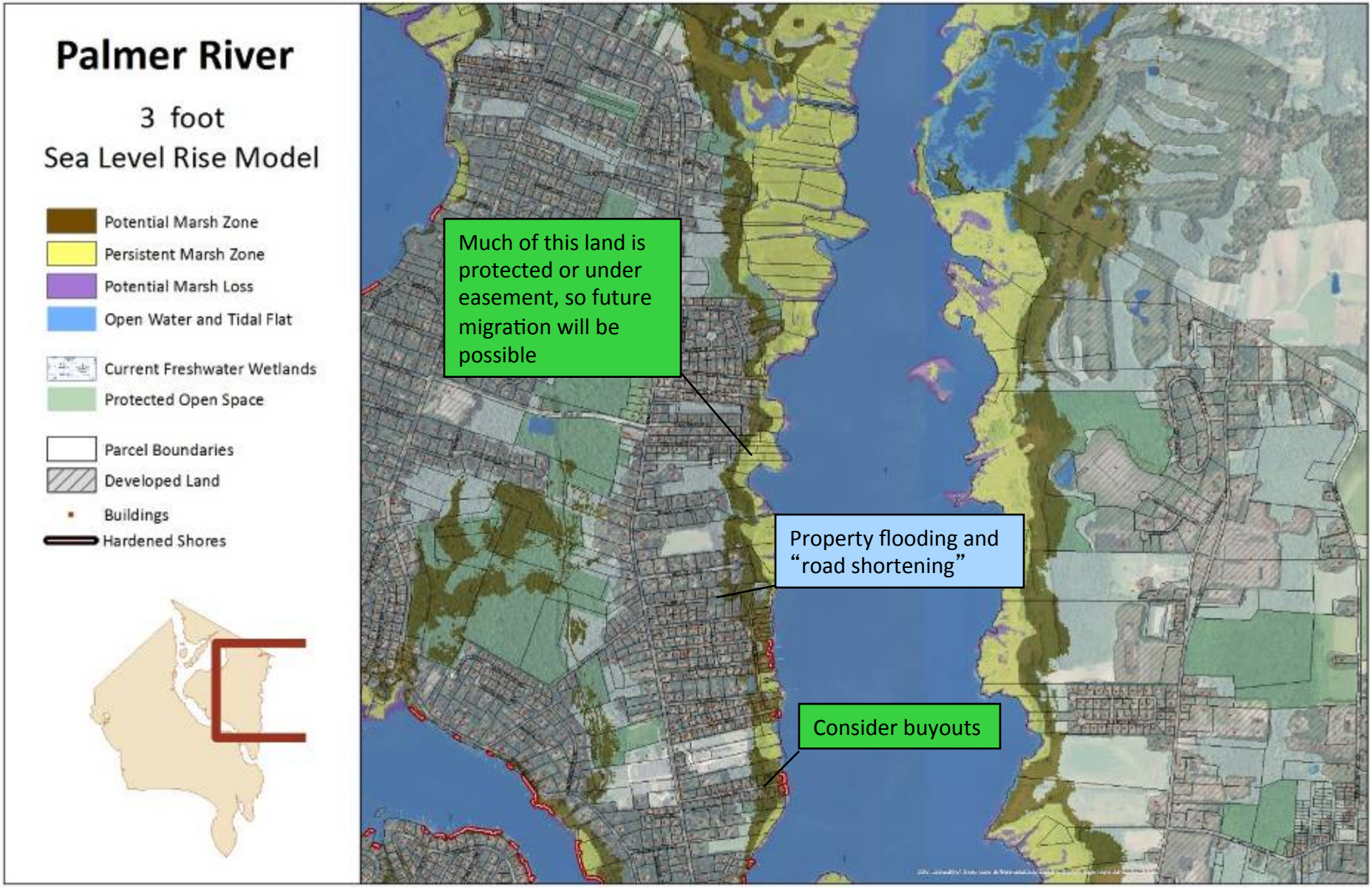


# Model Results – 5’ SLR

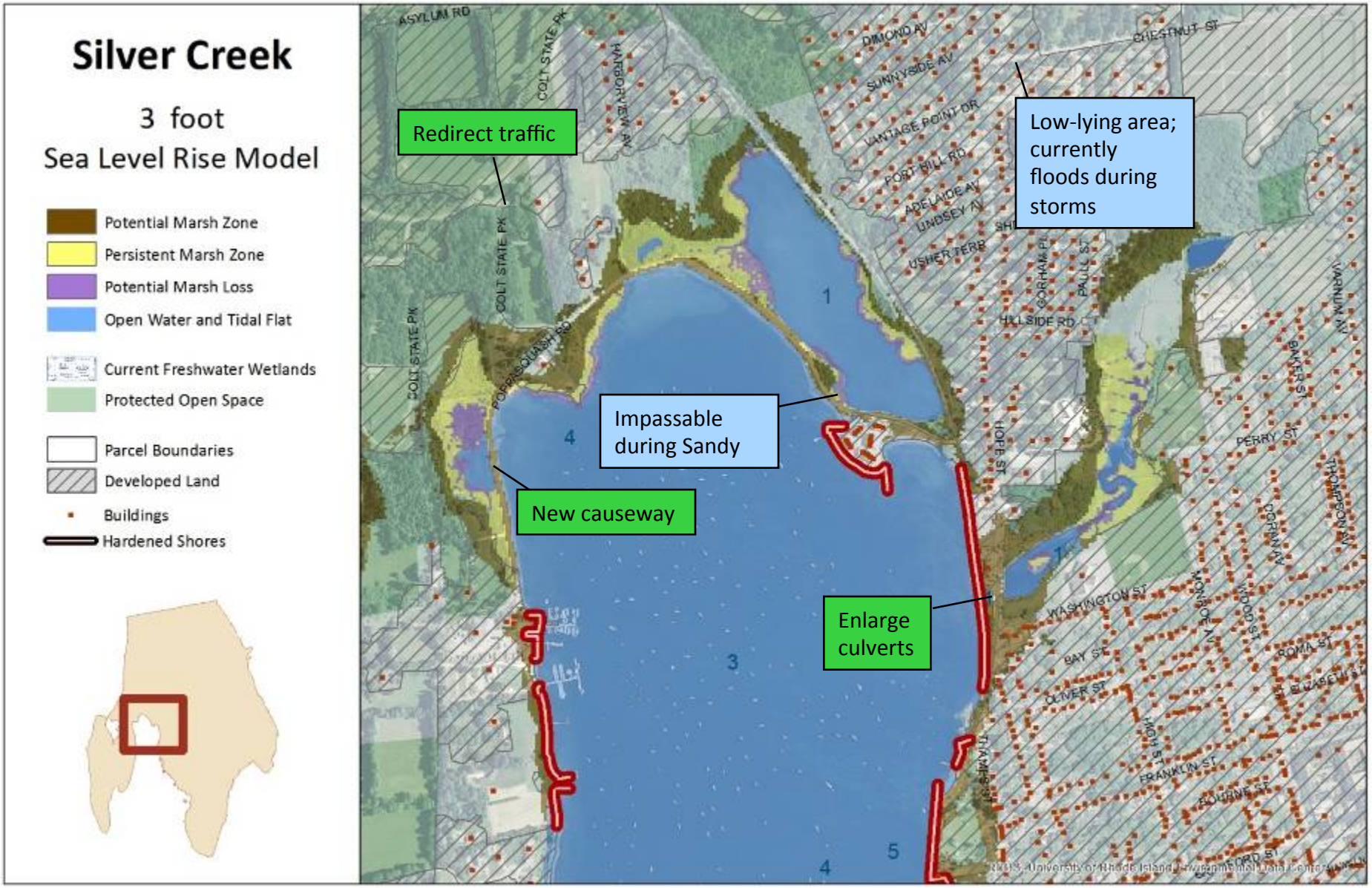


# Municipal Work Sessions: Identifying Issues & Opportunities

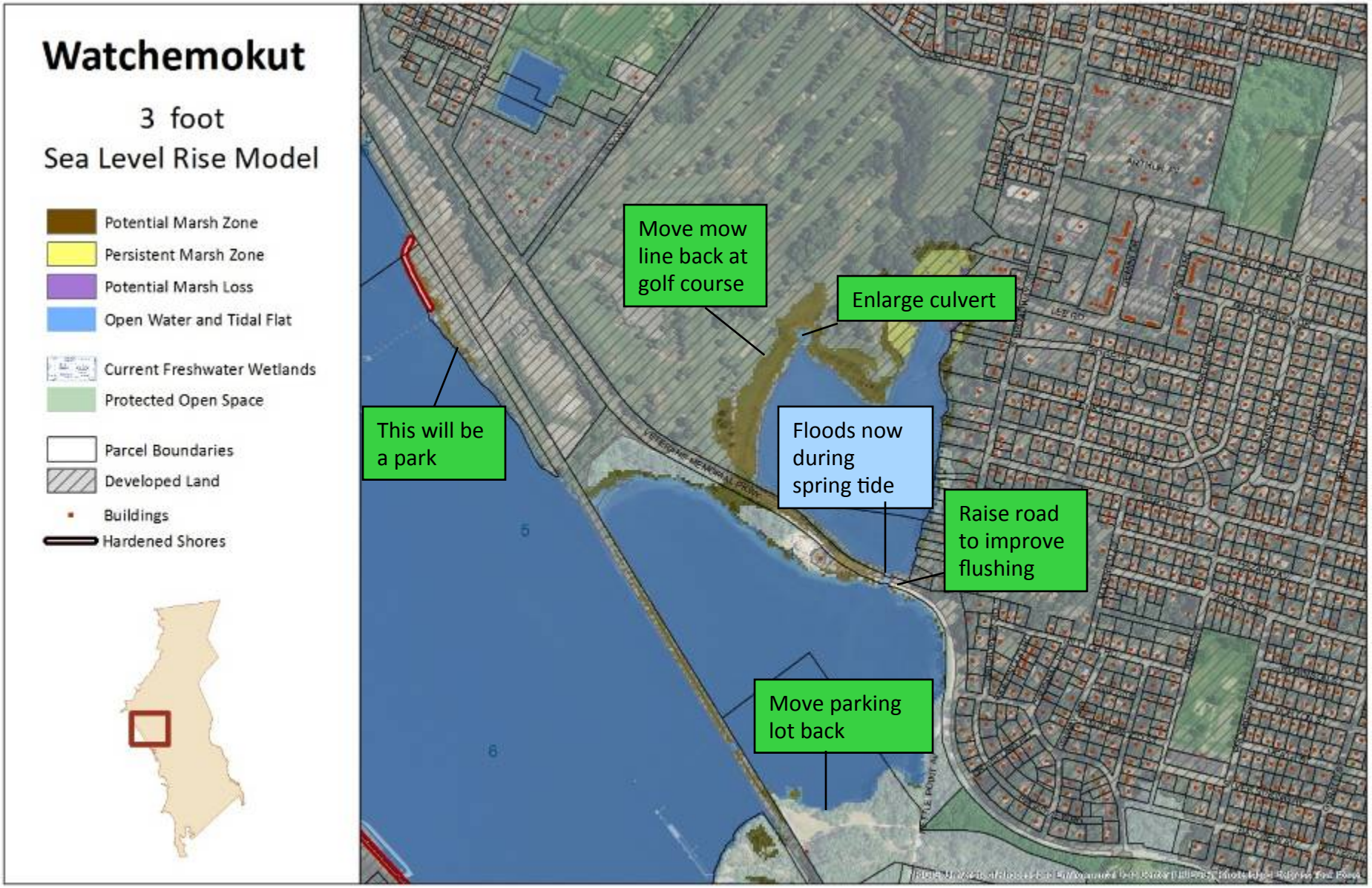
# Barrington


Palmer River
3 foot
Sea Level Rise Model
Potential Marsh Zone
Persistent Marsh Zone
Potential Marsh Loss
Open Water and Tidal Flat
Current Freshwater Wetlands
Protected Open Space
Parcel Boundaries
Developed Land
Buildings
Hardened Shores
Much of this land is protected or under easement, so future migration will be possible
Property flooding and "road shortening"
Consider buyouts

# Bristol

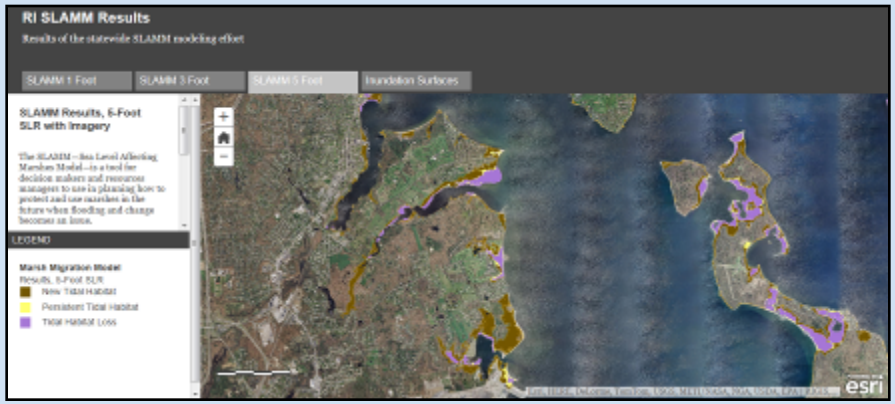

Silver Creek
3 foot
Sea Level Rise Model
Potential Marsh Zone
Persistent Marsh Zone
Potential Marsh Loss
Open Water and Tidal Flat
Current Freshwater Wetlands
Protected Open Space
Parcel Boundaries
Developed Land
Buildings
Hardened Shores
Redirect traffic
Low-lying area; currently floods during storms
Impassable during Sandy
New causeway
Enlarge culverts
ASYLUM RD
COLT STATE PK
HARBORVIEW AV
DIMOND AV
SUNNYSIDE AV
VANTAGE POINT DR
FORT HILL RD
ADELAIDE AV
LINDSEY AV
USHER TERR
CHESTNUT ST
GORHAM PL
PAUL ST
HILLSIDE RD
POPPASQUASH RD
HOPE ST
PERRY ST
BAKER ST
WARREN AV
THOMPSON AV
CORNAY AV
WASHINGTON ST
MONROE AV
WOOD ST
BAY ST
OLIVER ST
ROMA ST
HIGH ST
FRANKLIN ST
FORD ST
1
3
4
5

# East Providence



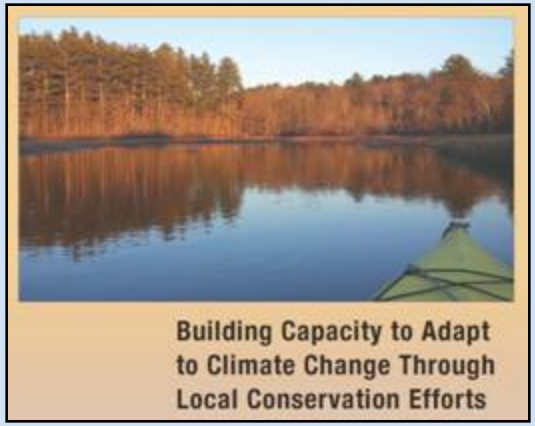
# Local Considerations

## Planning





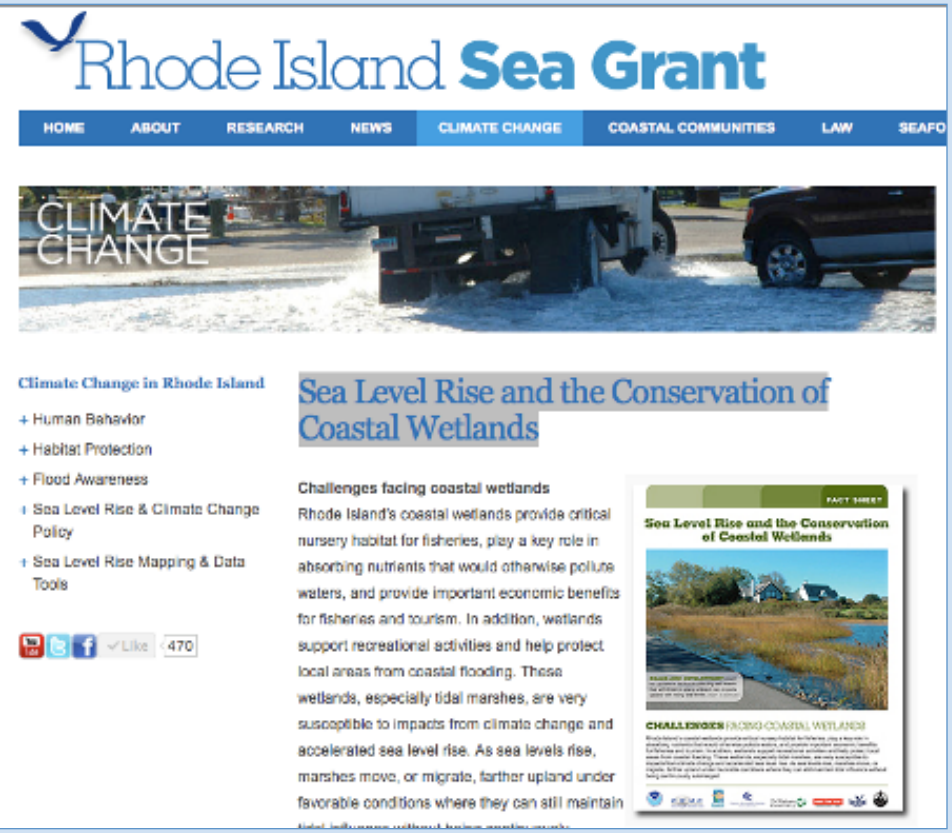

## Conservation

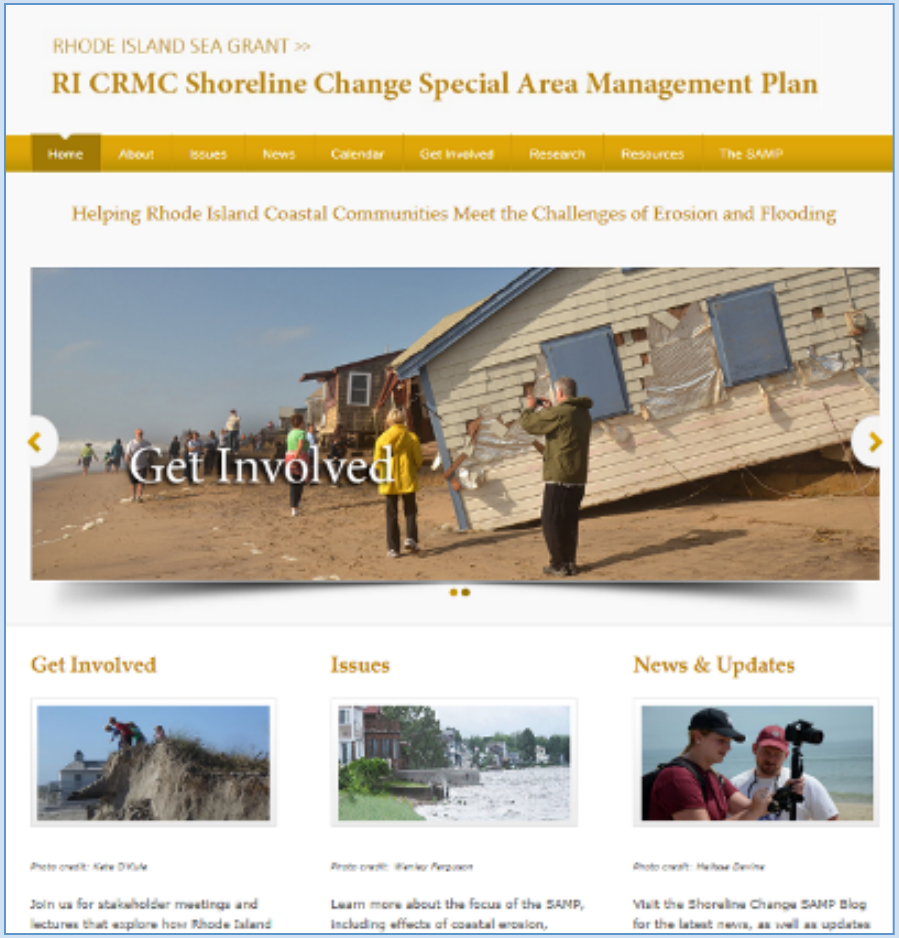




## Infrastructure

## Operations

# Work Underway…




http://seagrant.gso.uri.edu/climate/habitat.html

www.beachsamp.org

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THE UNIVERSITY OF RHODE ISLAND
Geological Survey

# Questions?