

# Sea-level Rise and LIS' (Connecticut) Coastal Marshes

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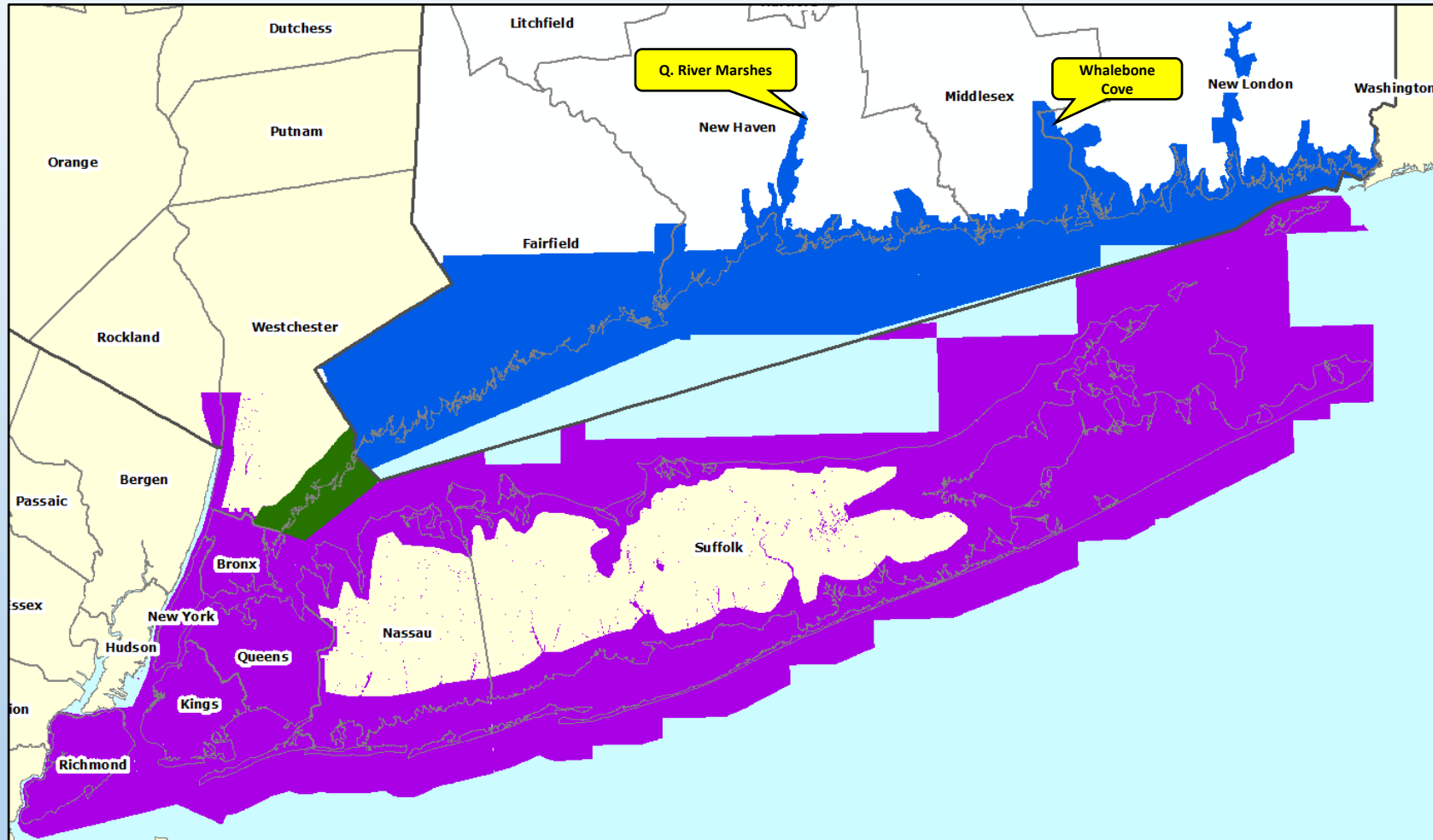


Oxecossett Creek, Stonington

# Objectives/Key Questions

- **Fate of LIS' marshes in near (2050s) and long(er) term (2100)?**
- **Fate of LIS' marshes under moderate and extreme SLR?**
- **Which** marsh systems **more** (or less) **sustainable?**
- **Which** marsh systems sustainable thru **active management?**
- **Which** marsh systems **sustained by migration?**

# LIS SLAMM Study Area (< 5 m MTL)



- **Blue** : LISS (CT)
- **Green** : LISS (NY - Westchester)
- **Purple** : NYSERDA (NY – coastal Long Island & lower Hudson River)

# How was SLR's Affect on LIS' Coastal Assessed?

- SLR Affecting Marsh Model (SLAMM)\*

*SLR scenarios for reported time-steps relative to base year (2002)*

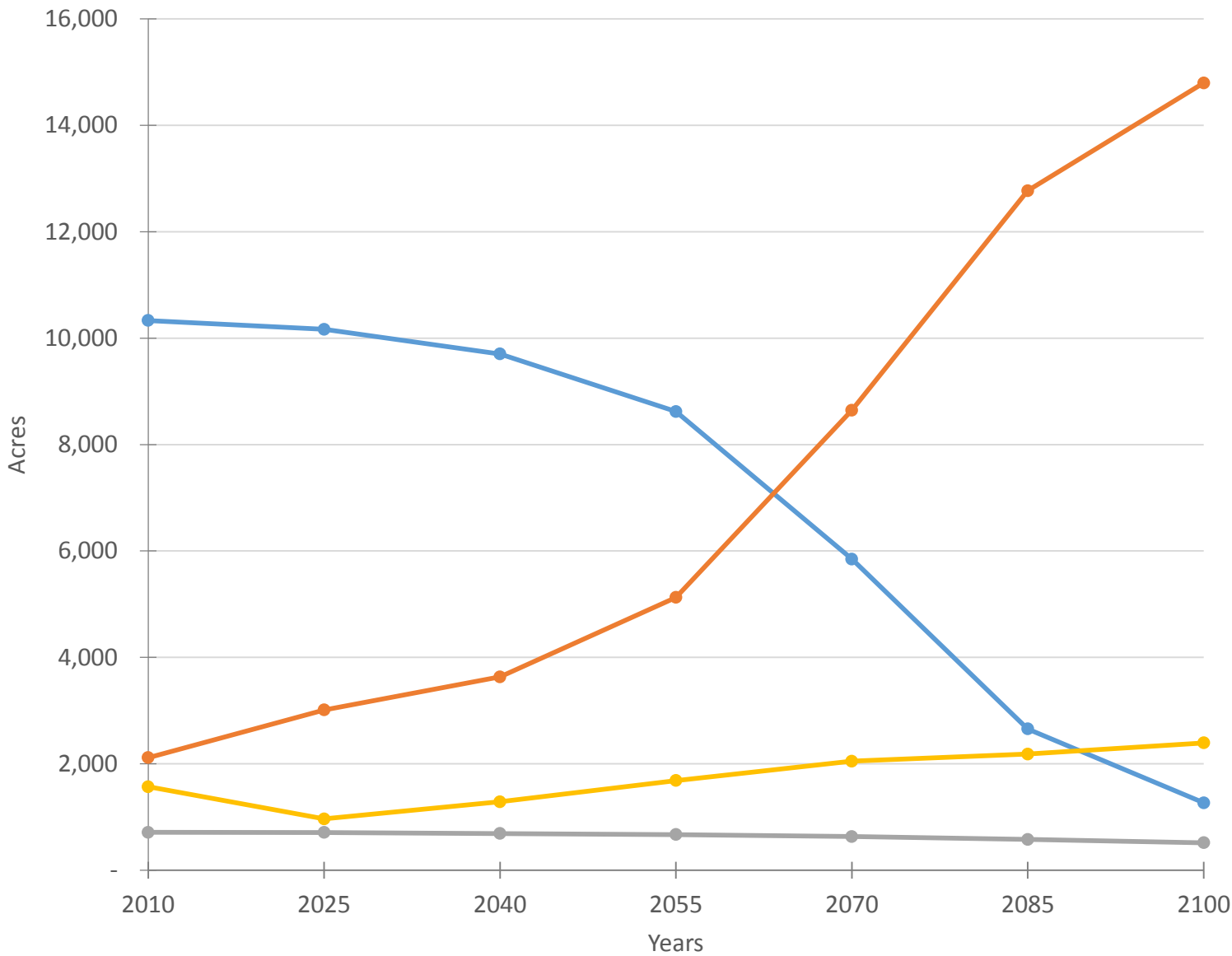
Scenario	2025 (m/ft)	2055 (m/ft)	2085 (m/ft)	2100 (m/ft)
Global Climate Model Maximum	0.13/0.4	0.31/1.0	0.58/1.9	0.72/2.4
1 m by 2100	0.13/0.4	0.43/1.4	0.81/2.7	1.0/3.3
Rapid Ice Melt Minimum	0.13/0.4	0.48/1.6	1.0/3.3	1.3/4.3
Rapid Ice Melt Maximum	0.25/0.8	0.74/2.4	1.4/4.6	1.72/5.6

- Predictions  $f$ : 1. land elevation( $\Delta$ ); 2. local tide range (14) ; 3. land cover; 4. SLR
- Monte Carlo simulations to reflect uncertainty of model inputs

# LIS SLAMM Data

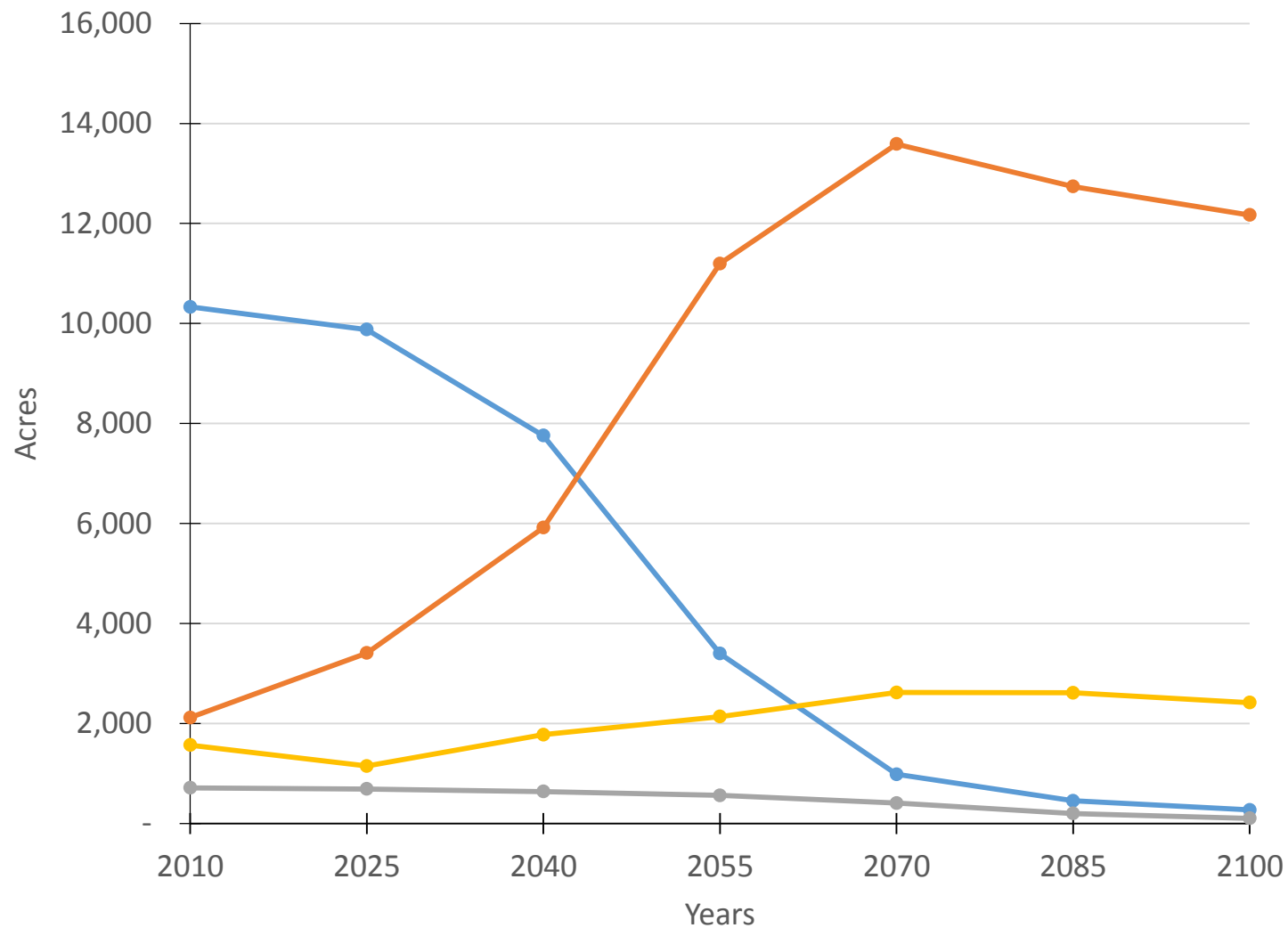
Type of Data	Sources	Used for
Digital elevation data	Assorted local high-resolution LIDAR data by FEMA, ACOE; USGS National Elevation Data	Creating a high resolution model of the ground surface
Dikes, impoundments, and hydrologic features	USFWS, FEAM, ACOE, CTDEEP	Creating the best available representation of water and water-flow paths along the ground surface
National Wetlands Inventory Data	USFWS (2014)	Land cover classifications
Impervious Surface Data	USGS	Land cover classifications
SLR scenarios	NYSERDA	Inundation levels and time-steps
Tide Ranges	NOAA	Marsh response to SLR, wetland boundaries
Accretion rates	Previous field studies provided by local academic research efforts	Marsh response to SLR
Erosion rates	CTDEEP/SeaGrant/UCONN	Marsh response to SLR

RESULTS: CT Coastal Marsh Change: *1m by 2100*



Irregularly Flooded Marsh Regularly Flooded Marsh  
Tidal Fresh Marsh Transitional Salt Marsh

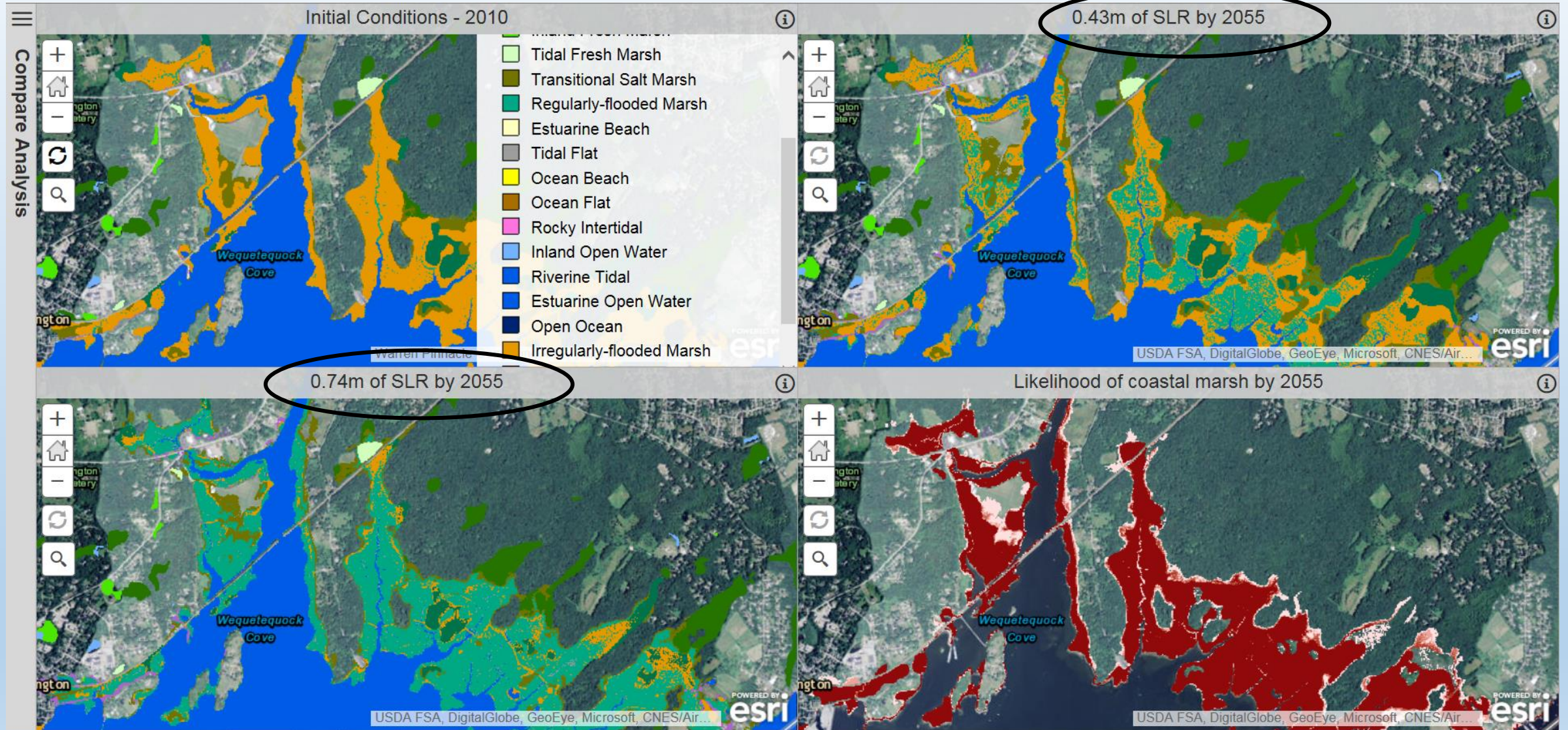
**RESULTS: CT Coastal Marsh Change: *RIM Max (1.72 m by 2100)***



Irregularly Flooded Marsh Regularly Flooded Marsh  
Tidal Fresh Marsh Transitional Salt Marsh



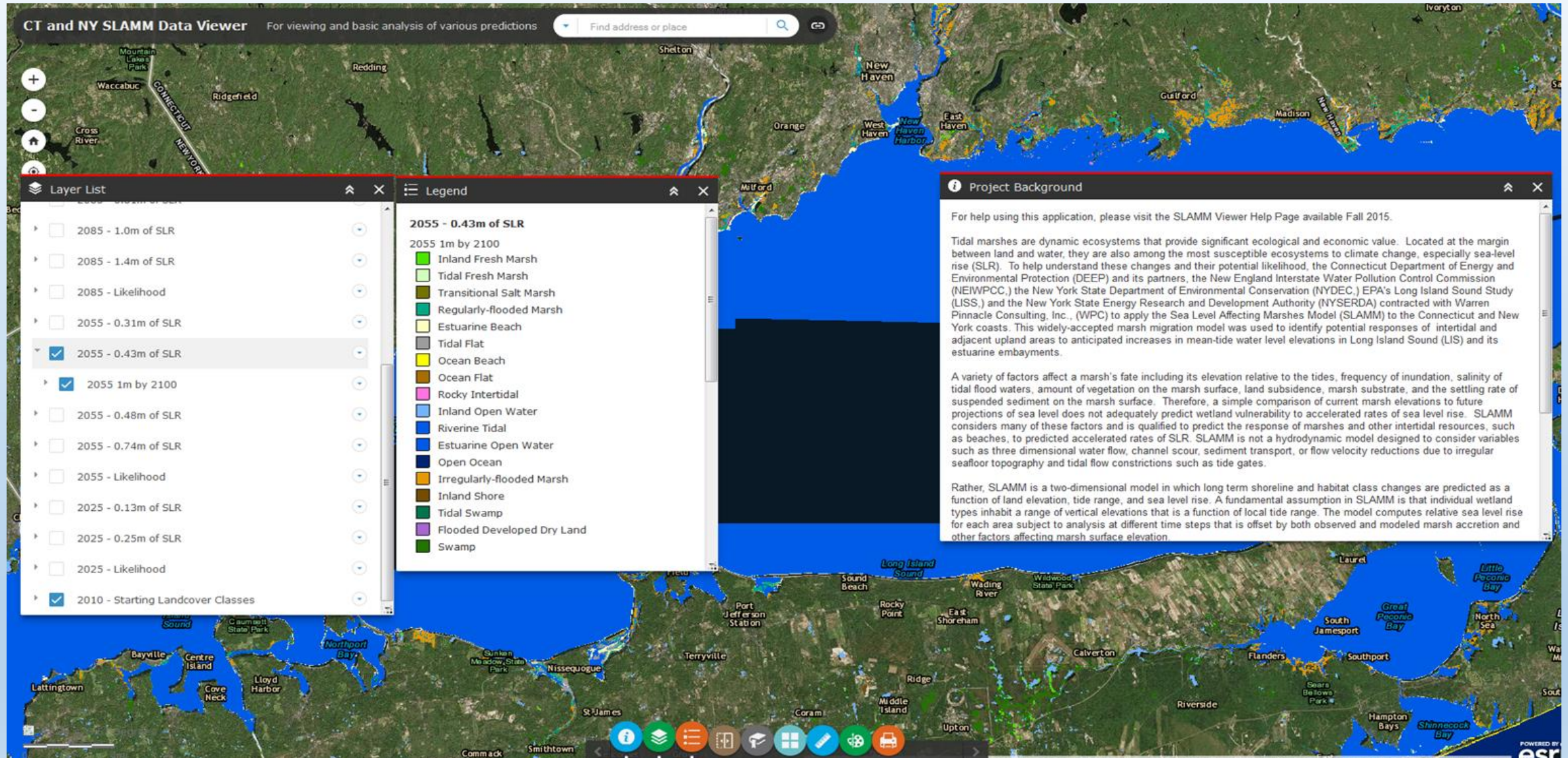
# Tools You Can (soon) Use - LIS SLAMM Simple Viewer



Allows easy-to-see comparisons of moderate to severe SLR scenarios, plus uncertainty . One viewer each for 2055 and 2100.



# Tools You Can Use- LIS SLAMM Advanced Data Viewer



Allows users access to all project data and provides interactive tools for visualization, analysis, and printing.

# Why LIS SLAMM II?

Marsh migration pathway obstructions not fully considered by SLAMM . . .

## Questions:

- Which **factors most contributing to ‘overly-optimistic’ results** and how can they be better controlled?
- What’s the **affect of roads, infrastructure and other developed land cover** (seawalls) on marsh migration?
- How did **different land cover** (30 m) and **elevation** (5 m) **resolutions** affect SLAMM’s ability to accurately determine marsh migration pathways?
- Are the **shoreline erosion rates realistic** and how can they be improved?
- What’s the **affect of increasing salinity on high marsh** elevations (peat collapse)?

# SLAMM II- Goals

- Enhance marsh migration pathway accuracy:
  - More precise roads and infrastructure elevation
  - Additional shoreline armoring data
  - More complete culvert data (esp. for barriers not currently subject to tidal flow)
- ID new areas of potential hydraulic connections suitable for marsh migration
- ID potential effect of increasing salinity on high marsh elevation
- Effect of increasing sea-level on tidal and storm flooding of roads and critical infrastructure (e.g., frequency of road inundation)
- Identify opportunities for saltmarsh expansion associated with road and other infrastructure flood-proofing enhancements
- Updated Monte Carlo simulations uncertainty analyses



# LIS SLAMM Data Release

## **Currently Available:**

LIS Viewers:

- <http://tinyurl.com/CTNYSLAMMCompare-2055>  
(Simple)
- <http://tinyurl.com/CTNYSLAMMCompare-2100>  
(Simple)
- <http://tinyurl.com/CTNYSLAMM-DataViewer>  
(Advanced)

WPC LIS Project Site (data, reports, supporting info):

- <http://warrenpinnacle.com/prof/SLAMM/LISS/>
- <http://warrenpinnacle.com/prof/SLAMM/NYSERDA/>
- CT LIS SLAMM Executive Summary/peer-reviewed evaluations of SLAMM available today

## **\*\*Coming Soon\*\*:**

EPA LISS hosting LIS SLAMM Project Web site January 2016

(See <http://longislandsoundstudy.net/> for details)



CT DEEP-Office of Long  
Island Sound Programs