Integrating Sea Level Rise into Conservation Planning

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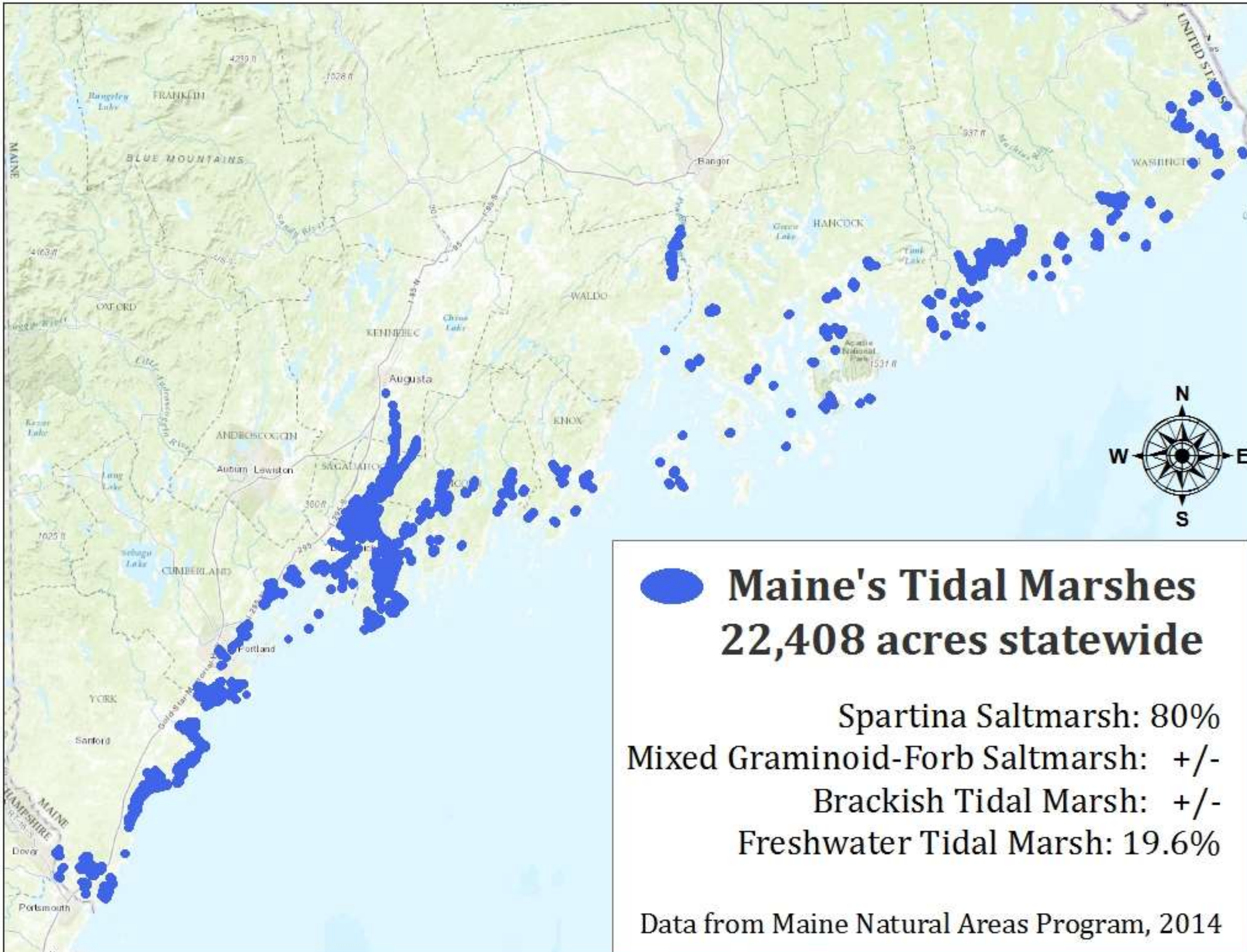
With thanks to:


Outline
• Marshes Present
• Marshes Future
• Marshes in planning


Maine's Tidal Marshes
22,408 acres statewide
Spartina Saltmarsh: 80%
Mixed Graminoid-Forb Saltmarsh: +/-
Brackish Tidal Marsh: +/-
Freshwater Tidal Marsh: 19.6%
Data from Maine Natural Areas Program, 2014
N
S
E
W
Augusta
Bangor
Portland
Auburn Lewiston
FRANKLIN
OXFORD
KENNEBEC
ANDROSCOGGIN
CUMBERLAND
YORK
WALDO
KNOX
HANCOCK
WASHINGTON
BLUE MOUNTAINS
Sanford
Dover
Portsmouth

Tidal Marshes

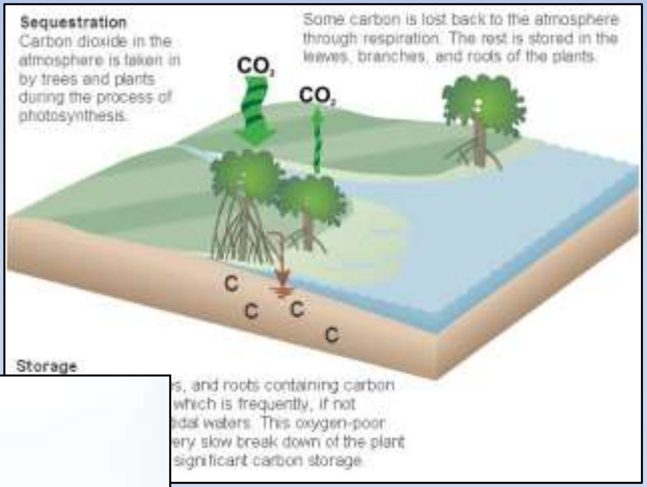
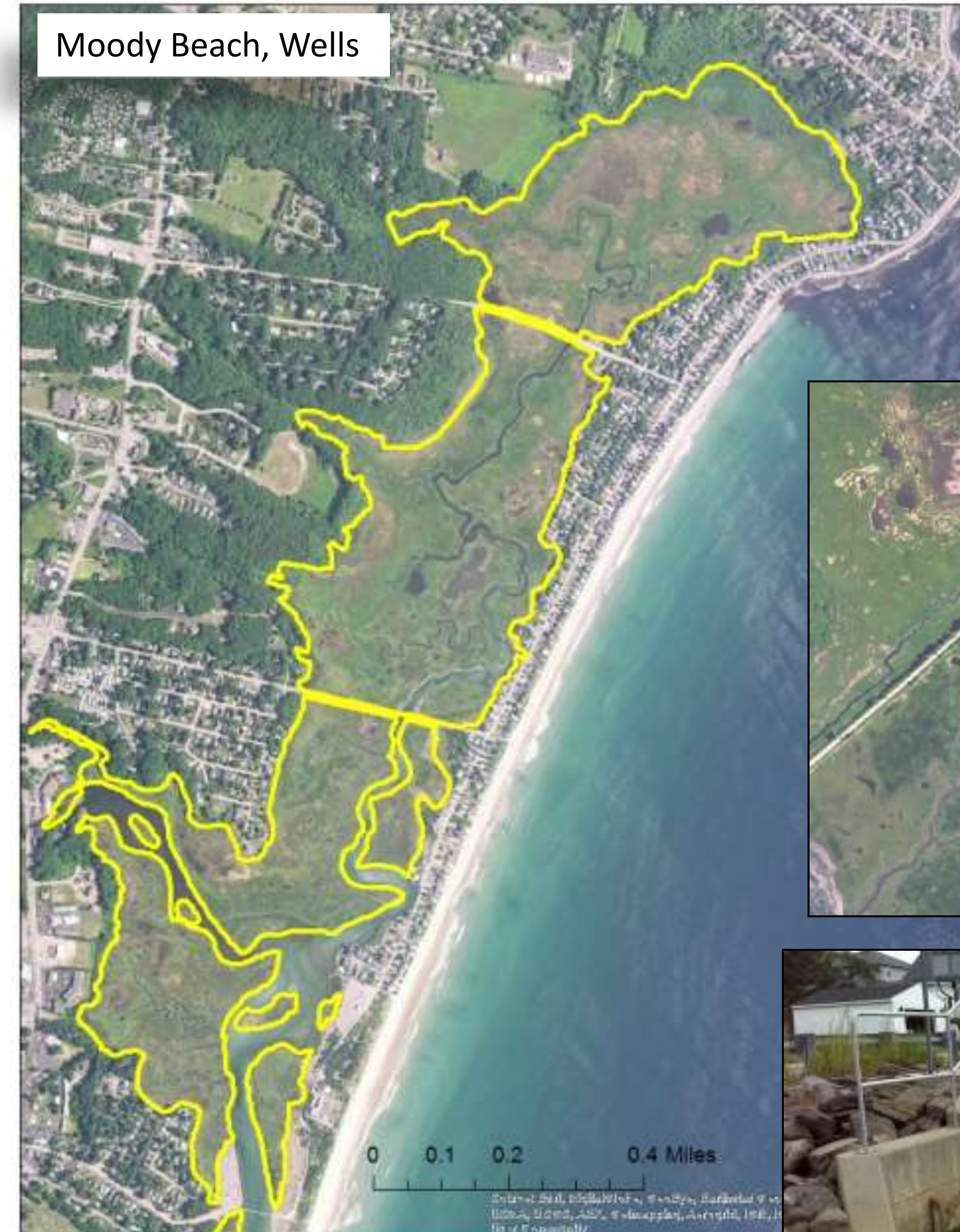
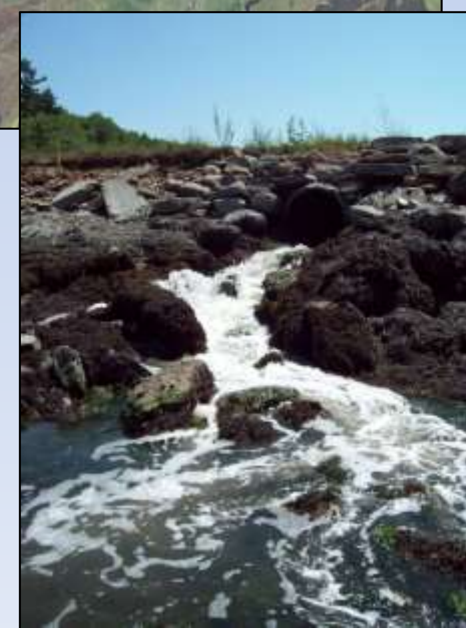
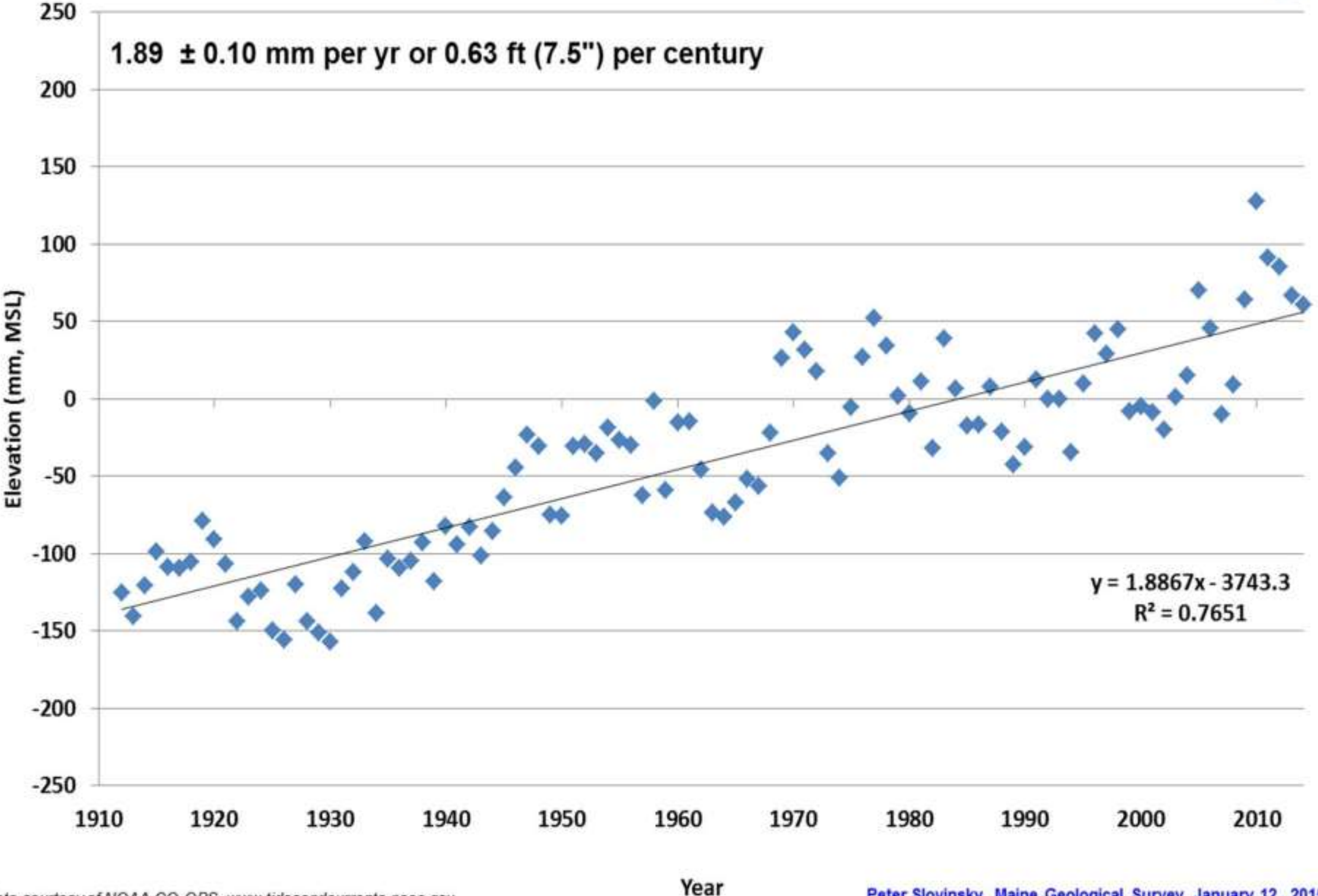


Photo credits: Audubon, Shutterstock, NOAA, MNAP


Moody Beach, Wells
0
0.1
0.2
0.4 Miles



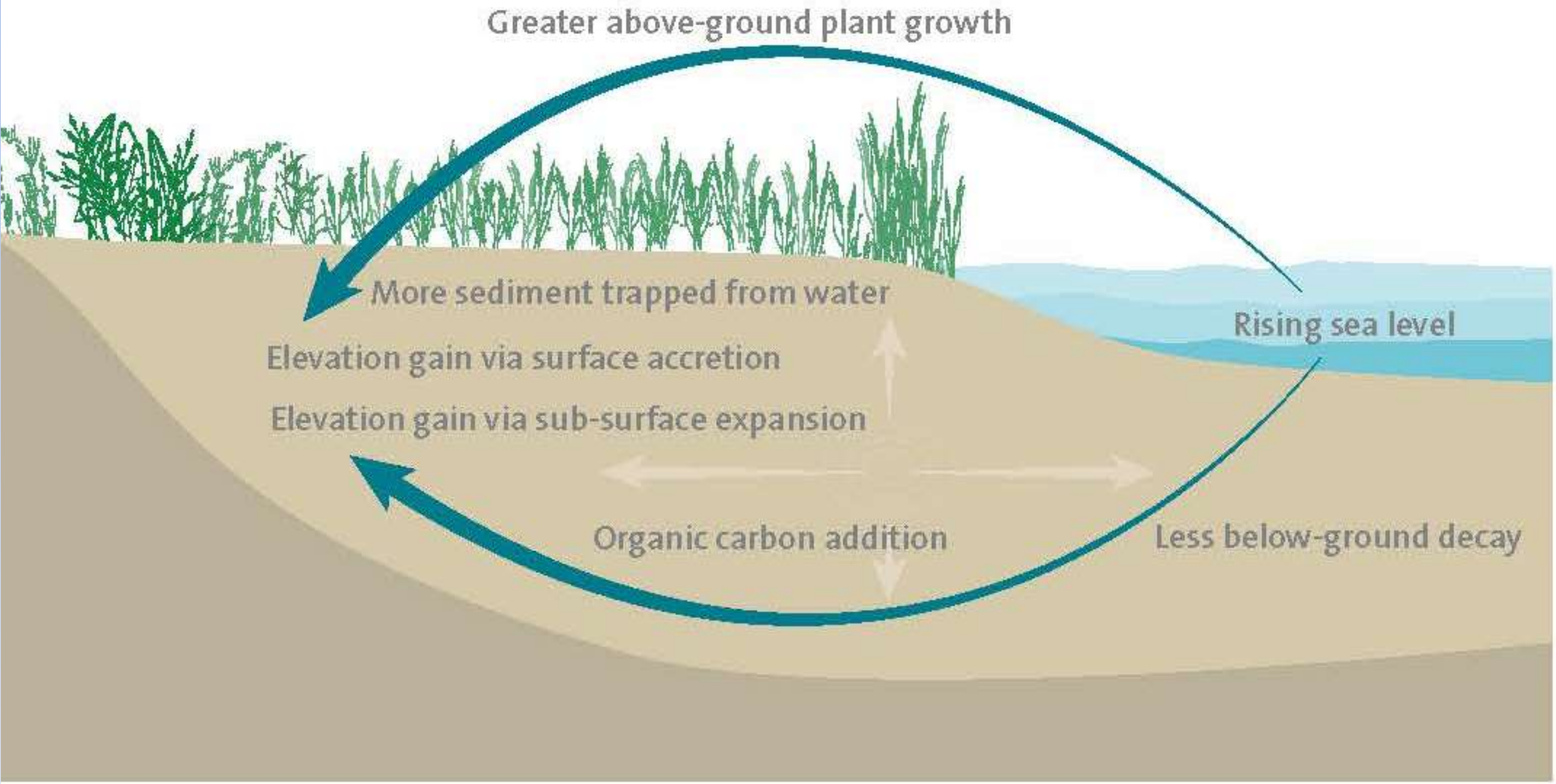
Sea Level, Portland, Maine
1912-2014 (through December 31, 2014)



Data courtesy of NOAA CO-OPS, www.tidesandcurrents.noaa.gov

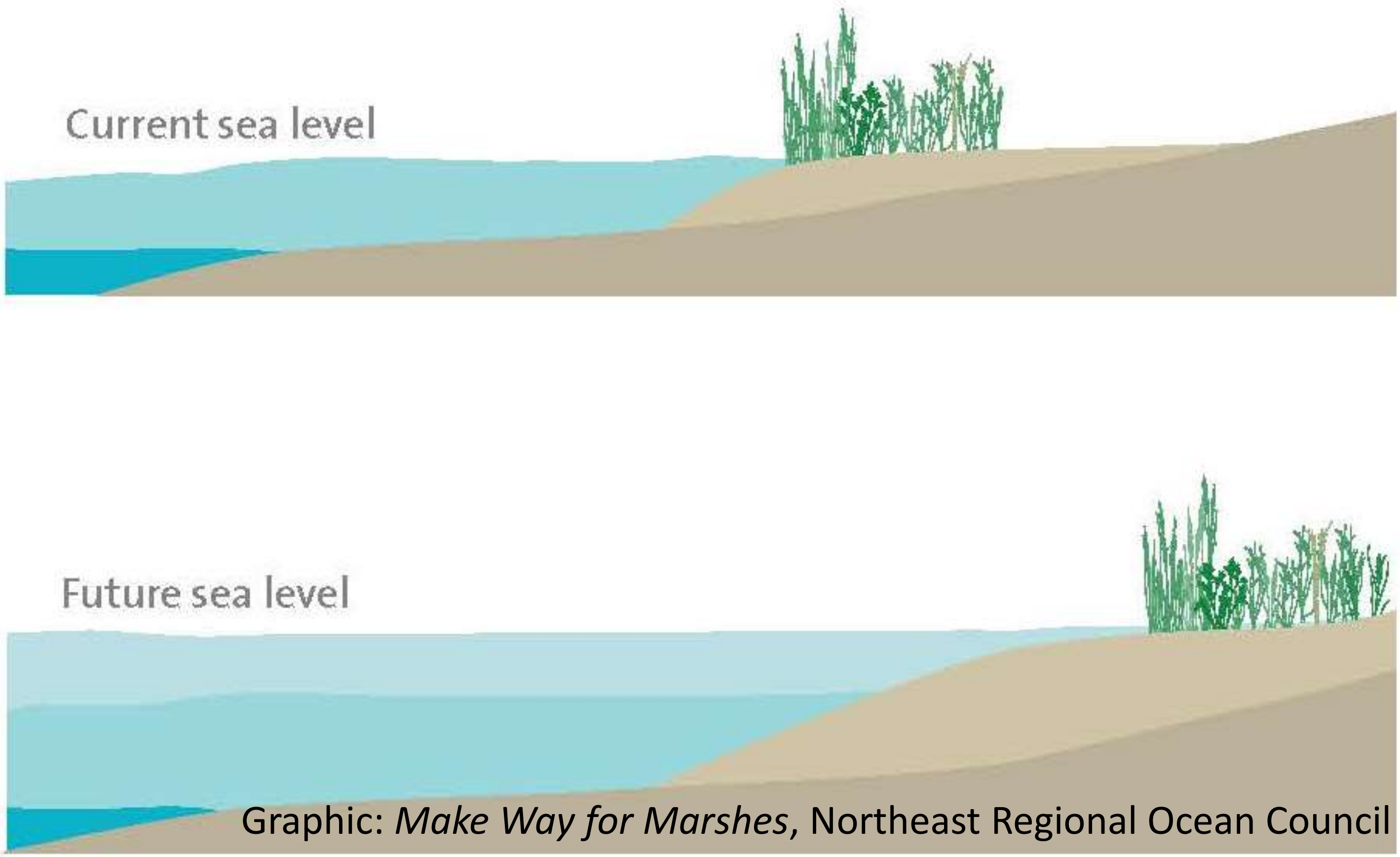
Peter Slovinsky, Maine Geological Survey, January 12, 2015

INCREASE IN MARSH SURFACE ELEVATION



Graphic: *Make Way for Marshes*, Northeast Regional Ocean Council

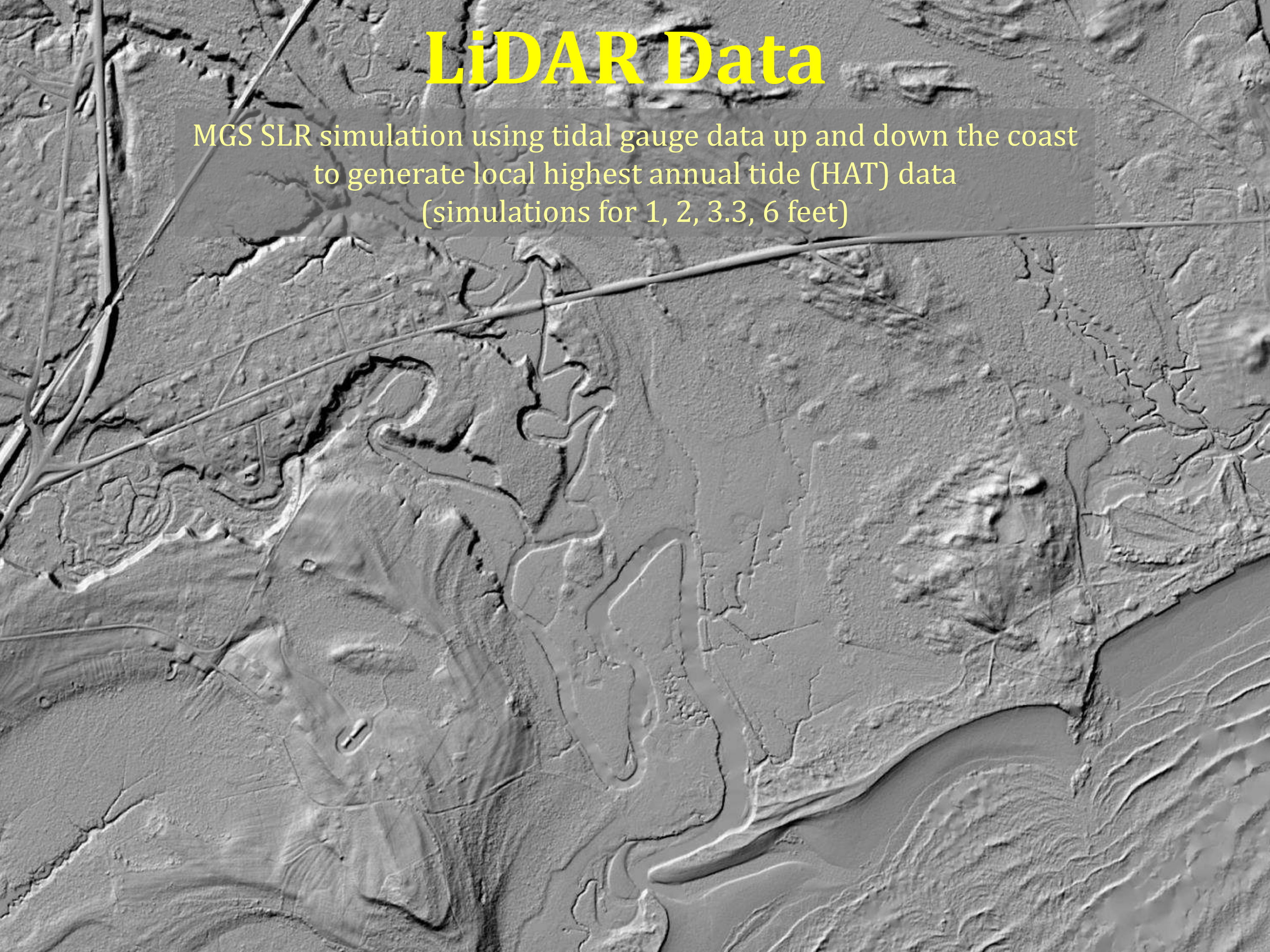
SLR Simulation	% Marsh Replacement
1 ft	17%
2 ft	30%
3.3 ft (1m)	46%
6 ft	77%
Maine Natural Areas Program, 2014	



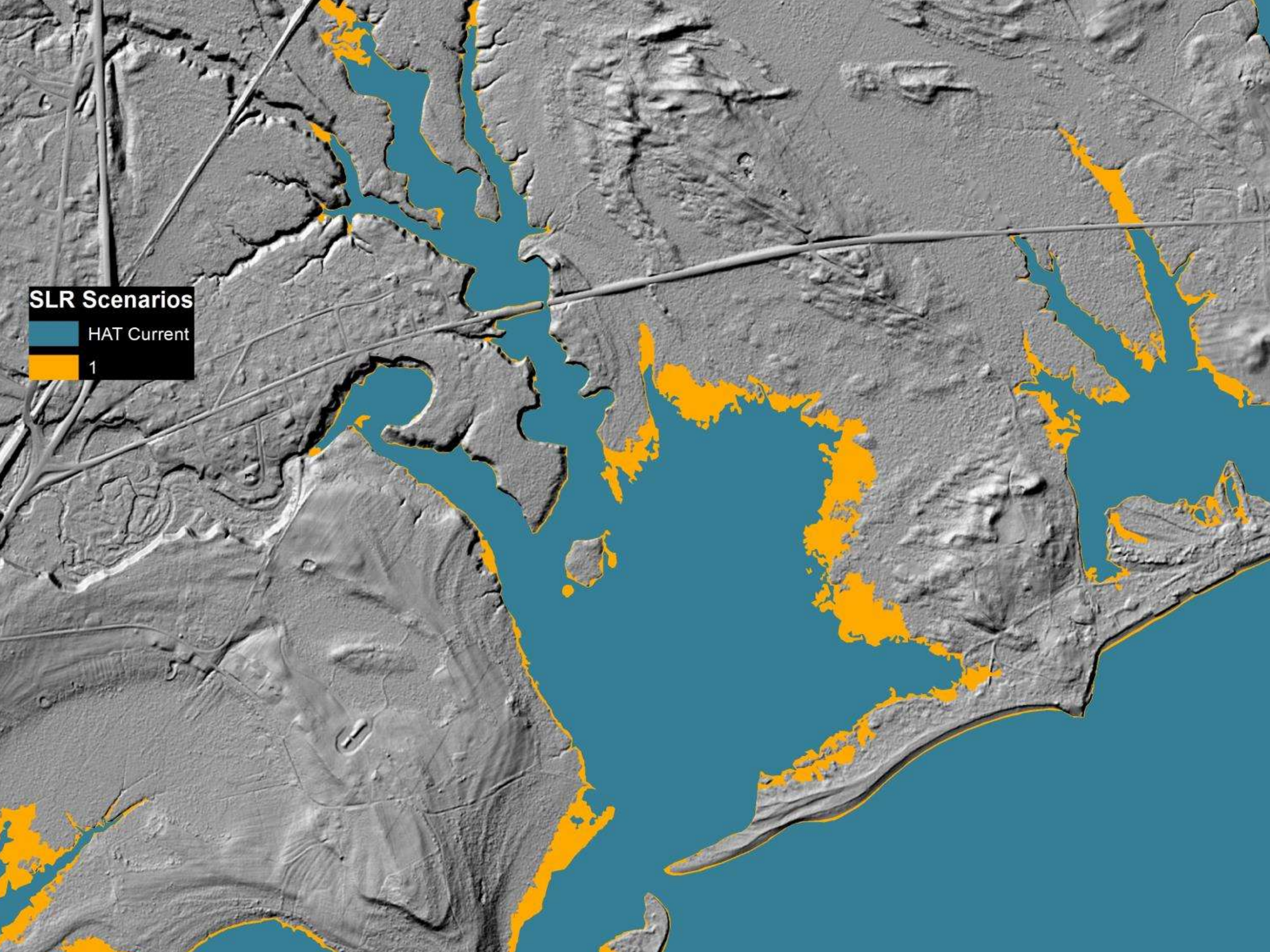
Graphic: *Make Way for Marshes*, Northeast Regional Ocean Council

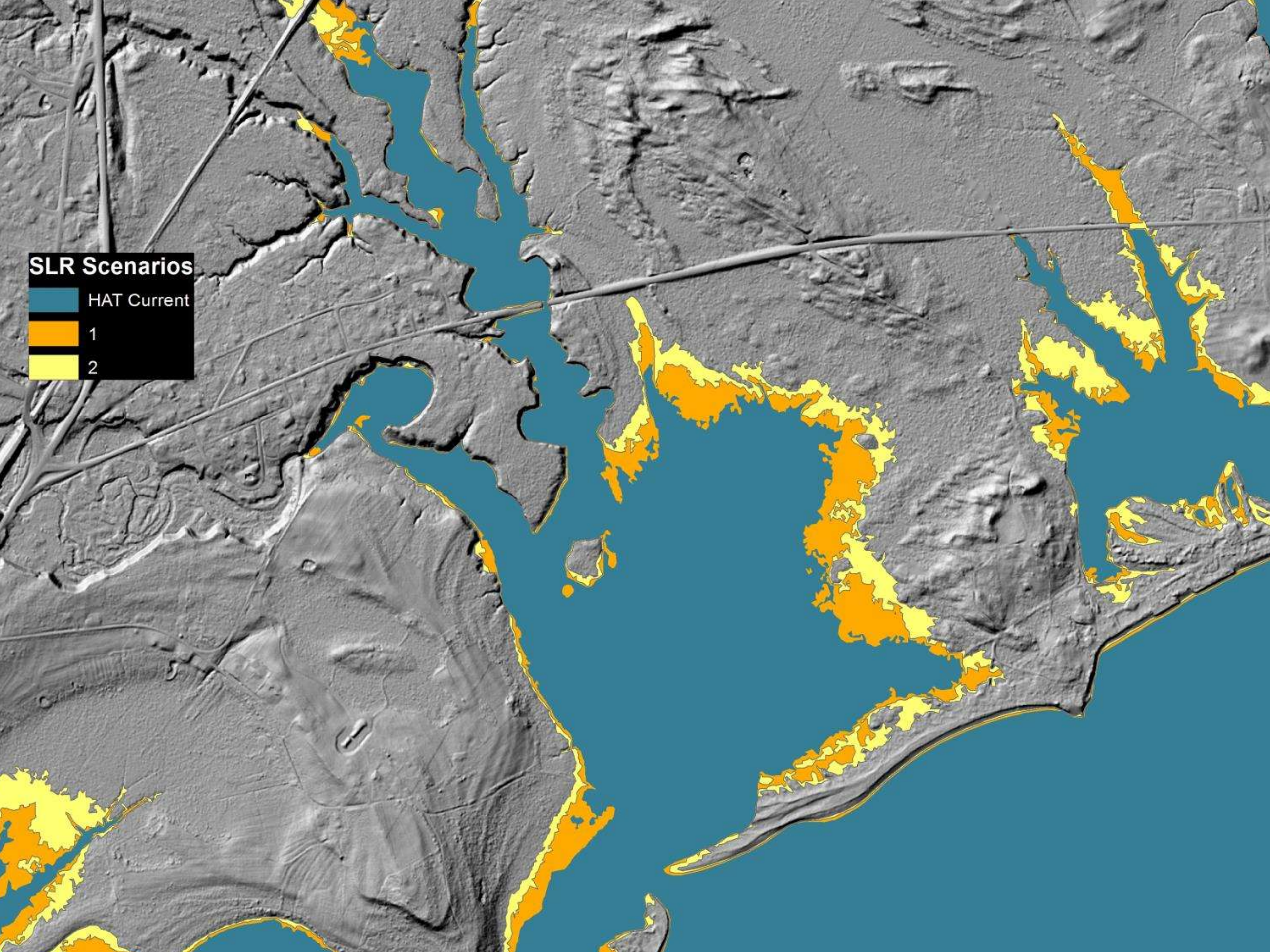
LiDAR Data

MGS SLR simulation using tidal gauge data up and down the coast
to generate local highest annual tide (HAT) data
(simulations for 1, 2, 3.3, 6 feet)

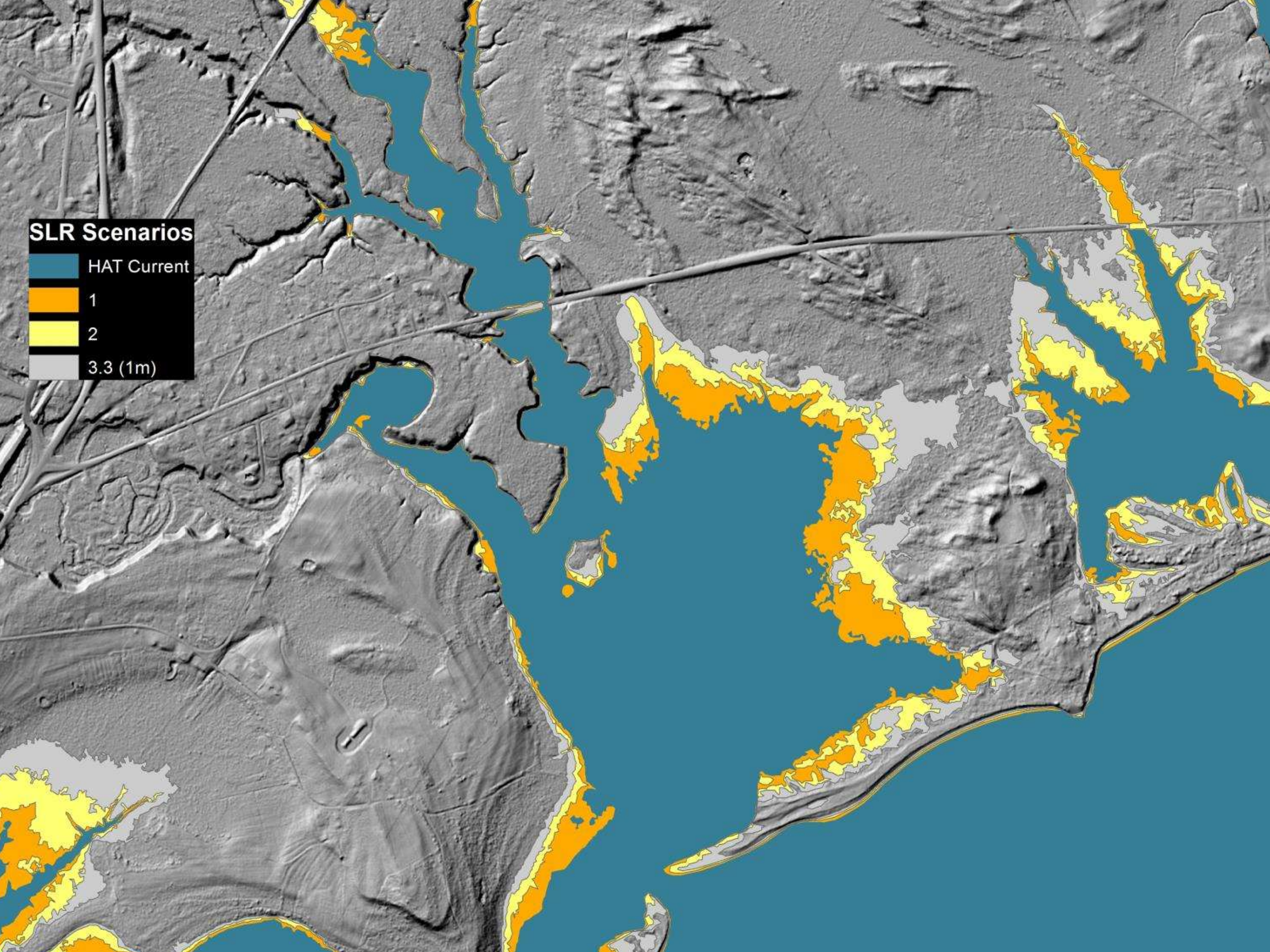


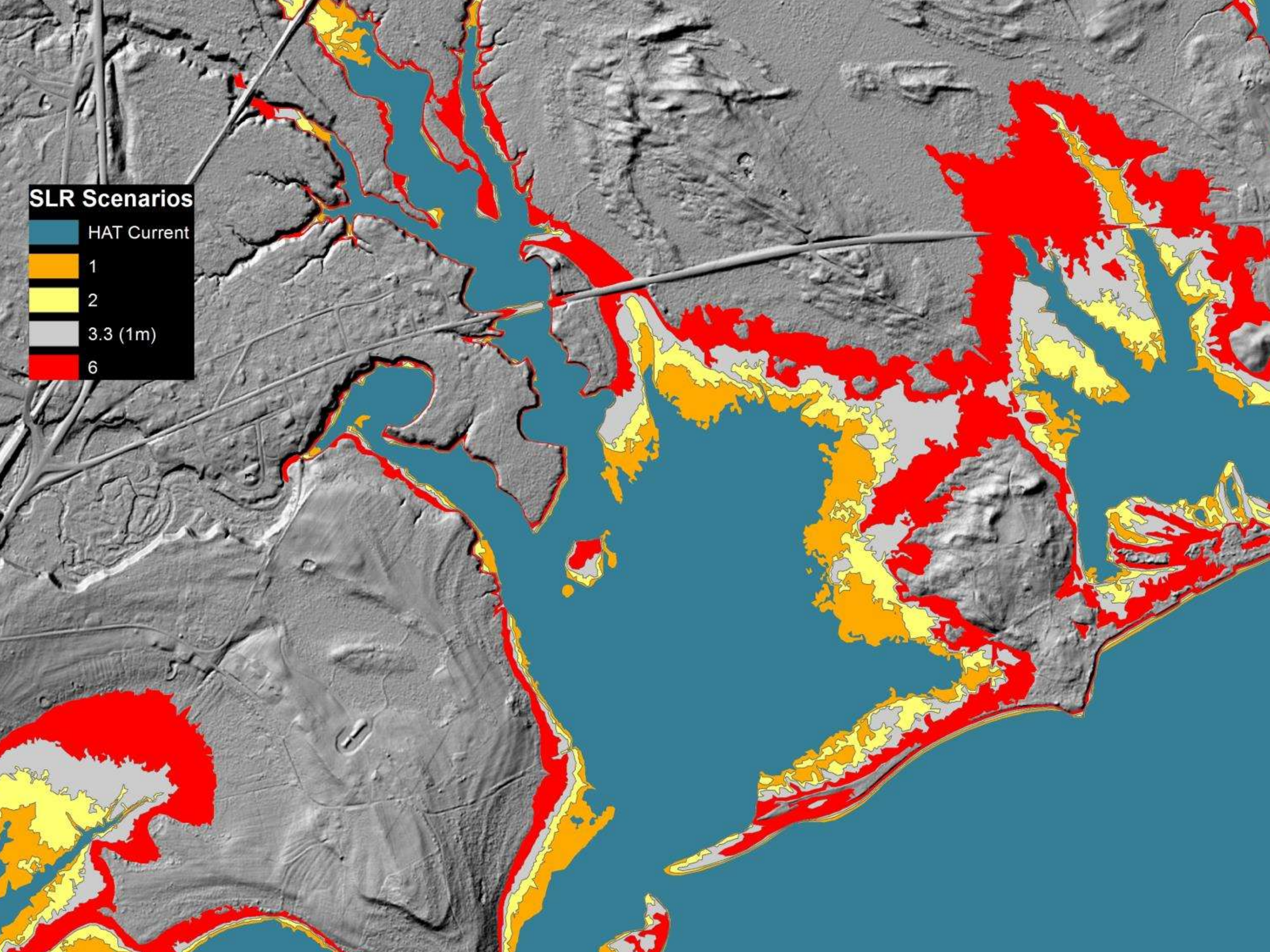

SLR Scenarios
HAT Current


SLR Scenarios
HAT Current
1

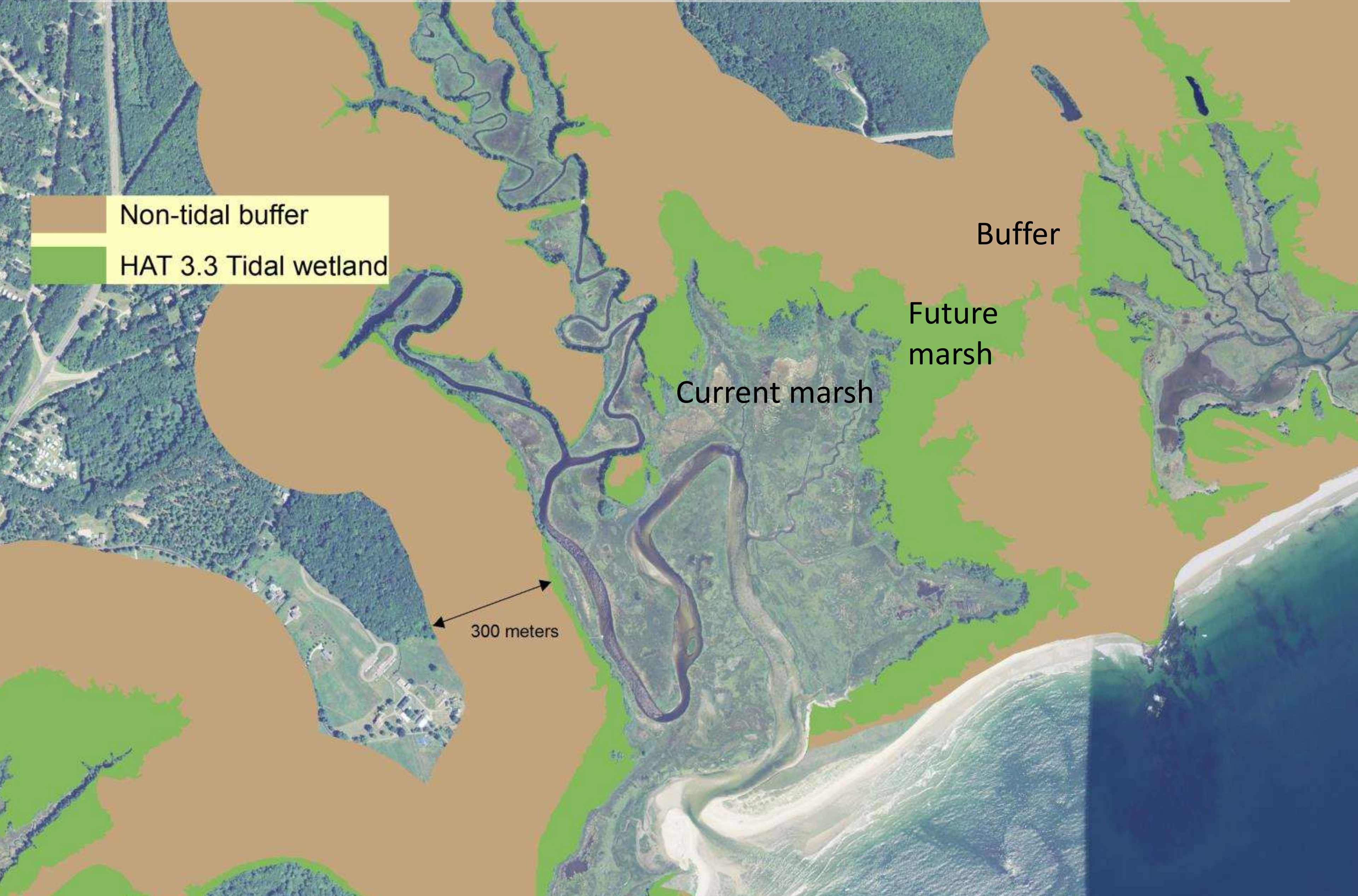


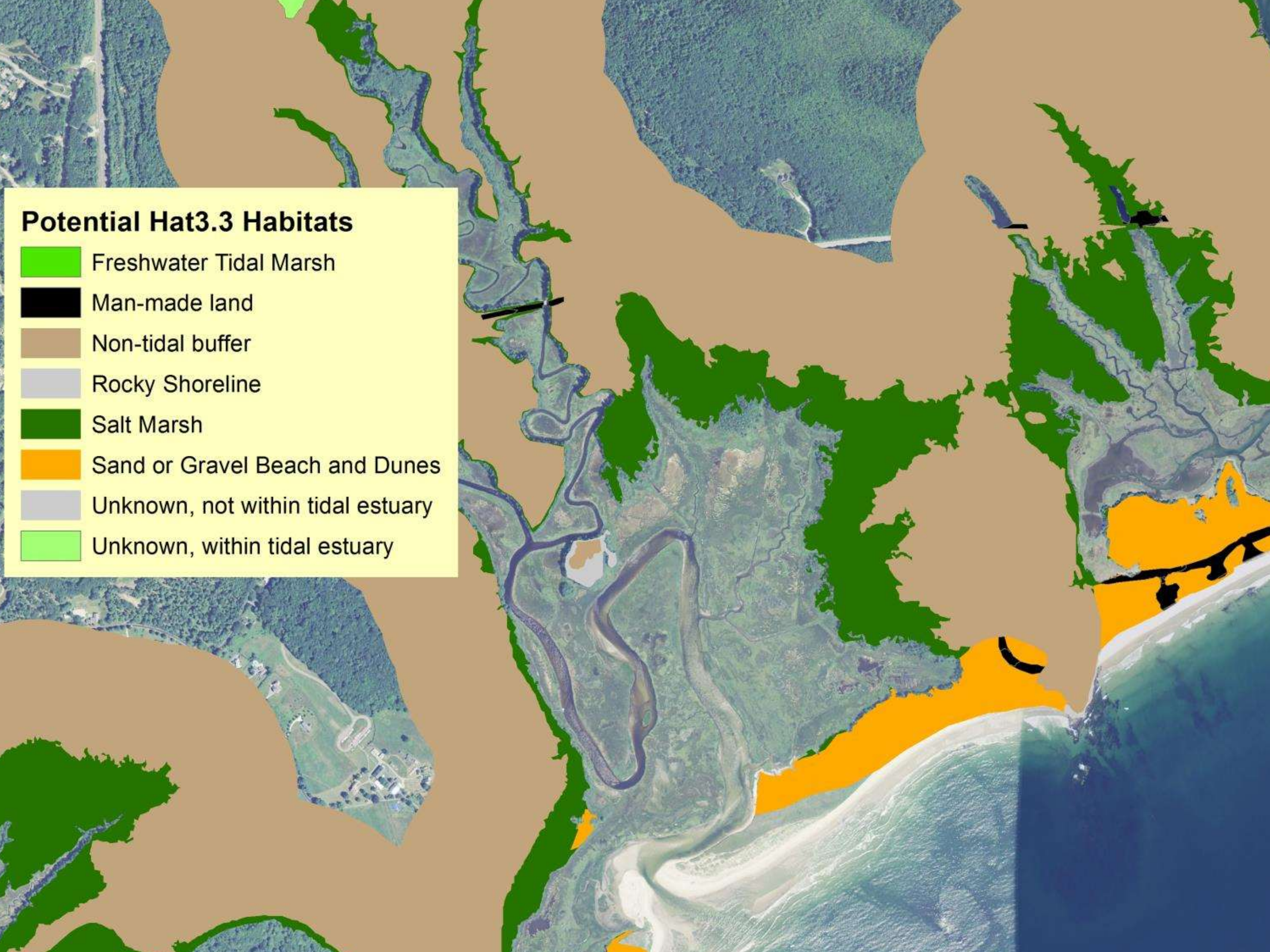
SLR Scenarios
HAT Current
1
2


SLR Scenarios
HAT Current
1
2
3.3 (1m)

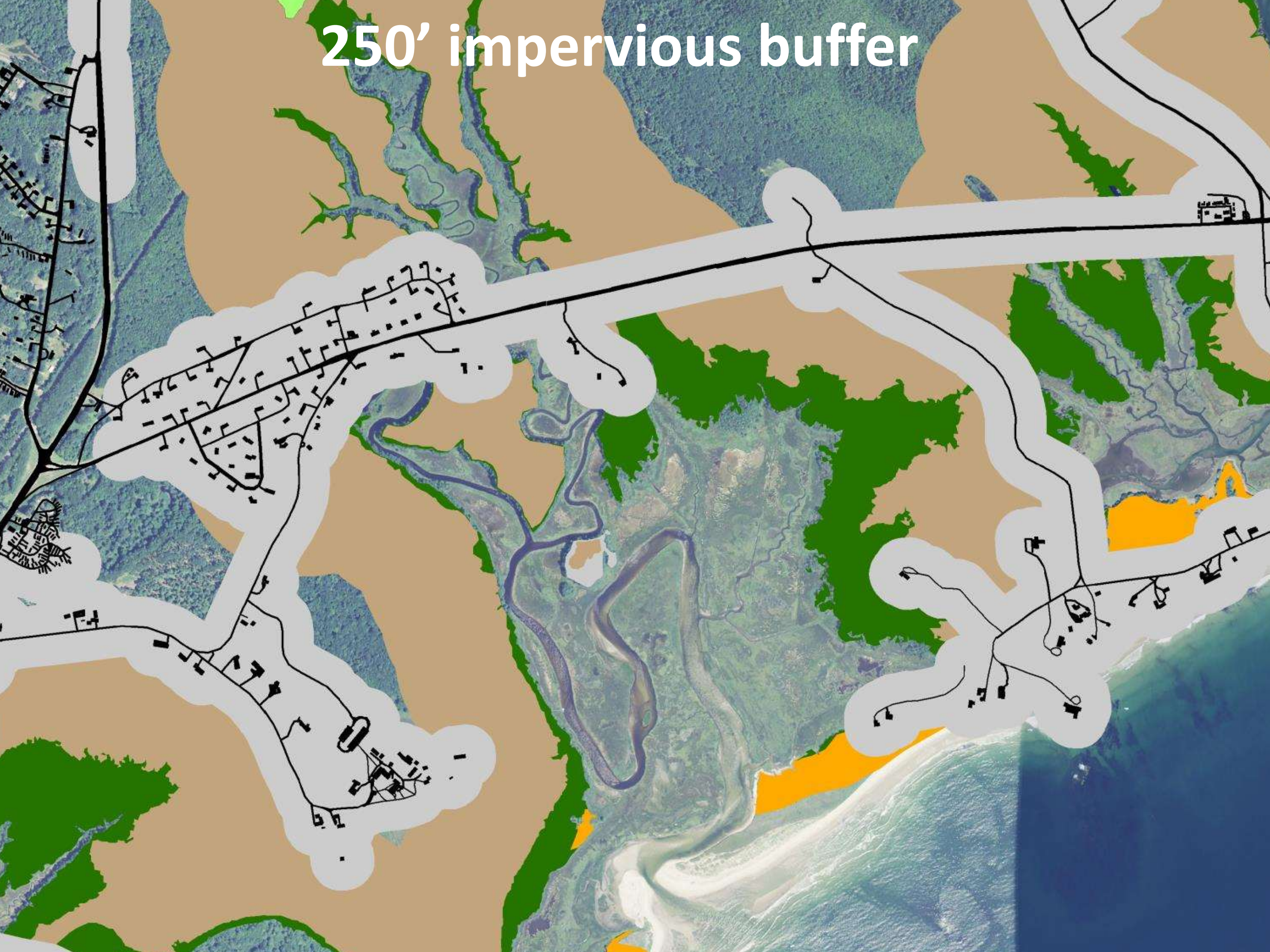

SLR Scenarios
HAT Current
1
2
3.3 (1m)
6

Coastal Undeveloped Blocks: 1m SLR




Potential Hat3.3 Habitats
Freshwater Tidal Marsh
Man-made land
Non-tidal buffer
Rocky Shoreline
Salt Marsh
Sand or Gravel Beach and Dunes
Unknown, not within tidal estuary
Unknown, within tidal estuary

250’ impervious buffer



Marshes in Planning

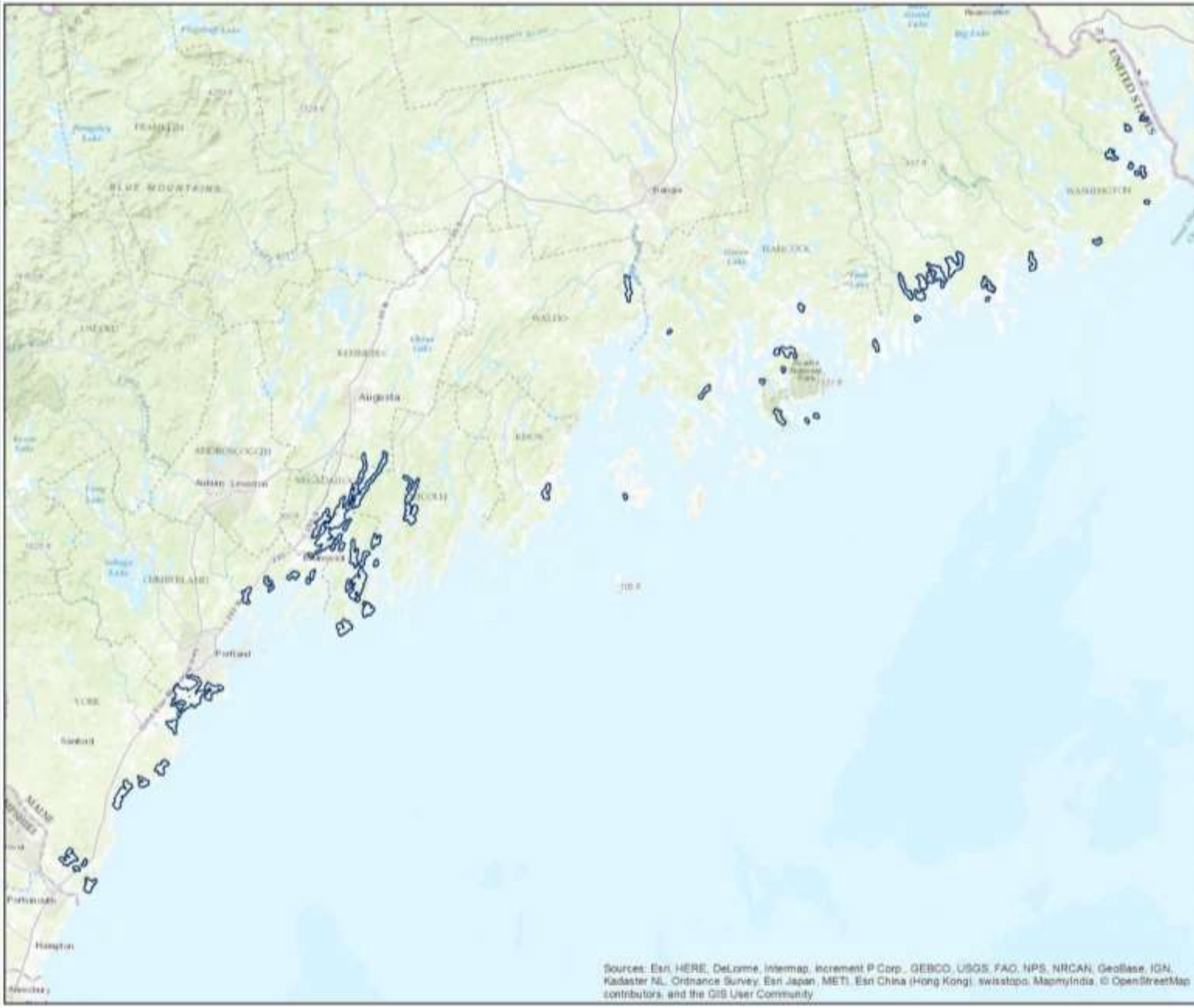
What the SLR and marsh migration models can show:

- Intersection of SLR with infrastructure (C/R nexus)
- Large, connected areas of future marsh and buffer (preventing stressors, providing habitat, ecosystem services)
- Stratification of sites statewide

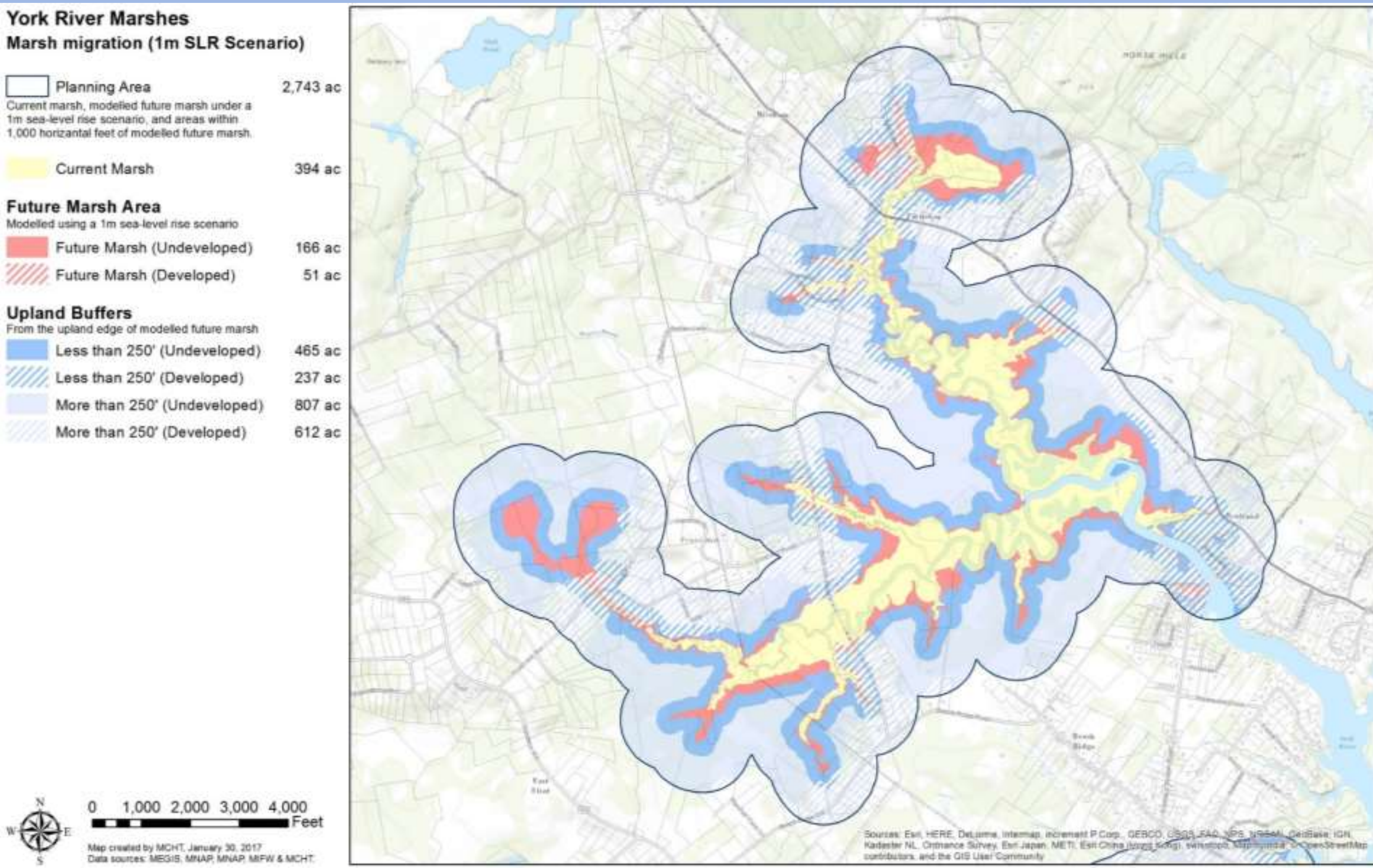
Marshes in Planning

How the models are being used:

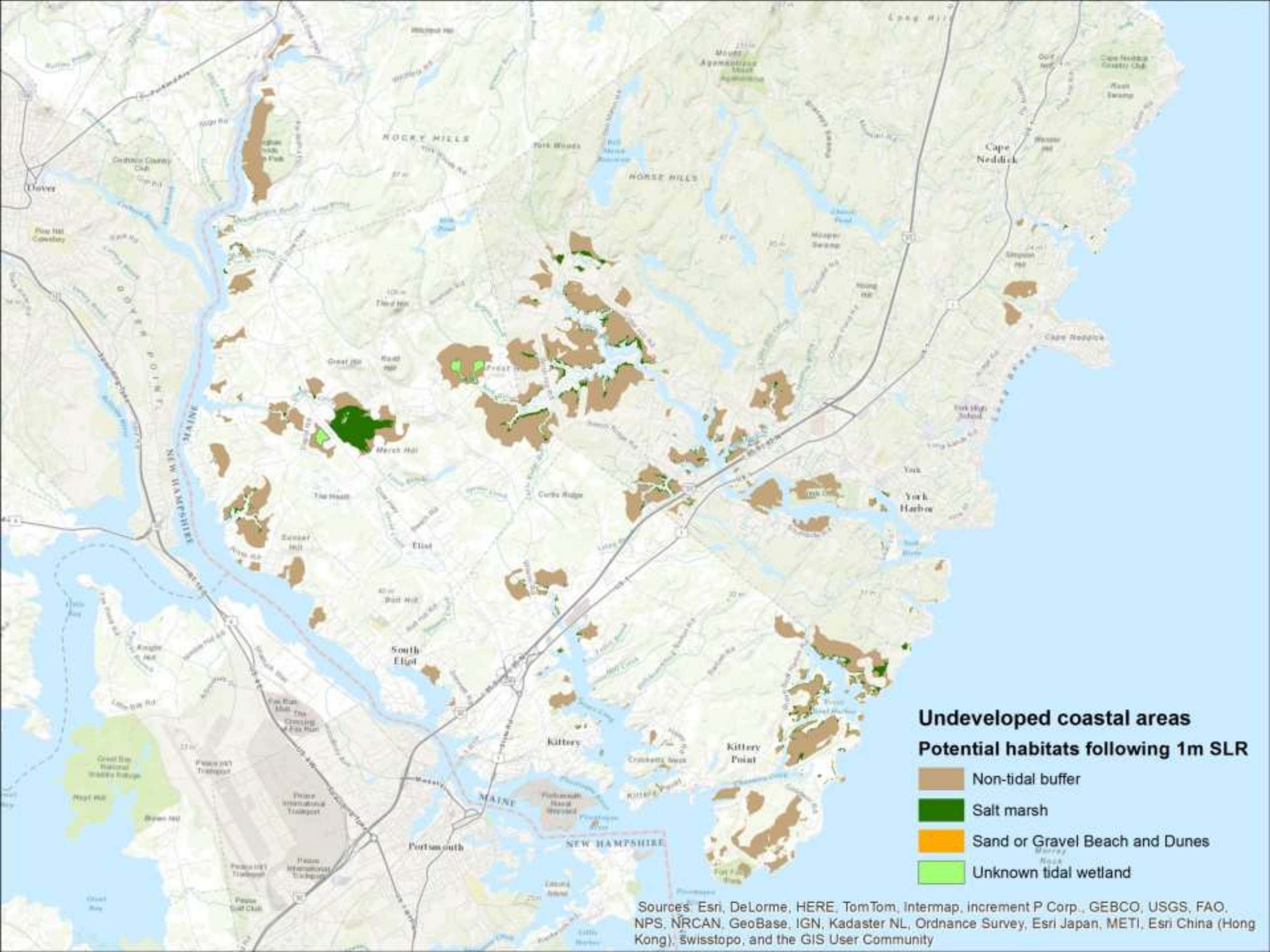
- ~~One size fits all~~
- Part of decision making toolkit…Planning horizon, various conservation values, funding, landowner opportunity…
- Application across multiple scales (examples)

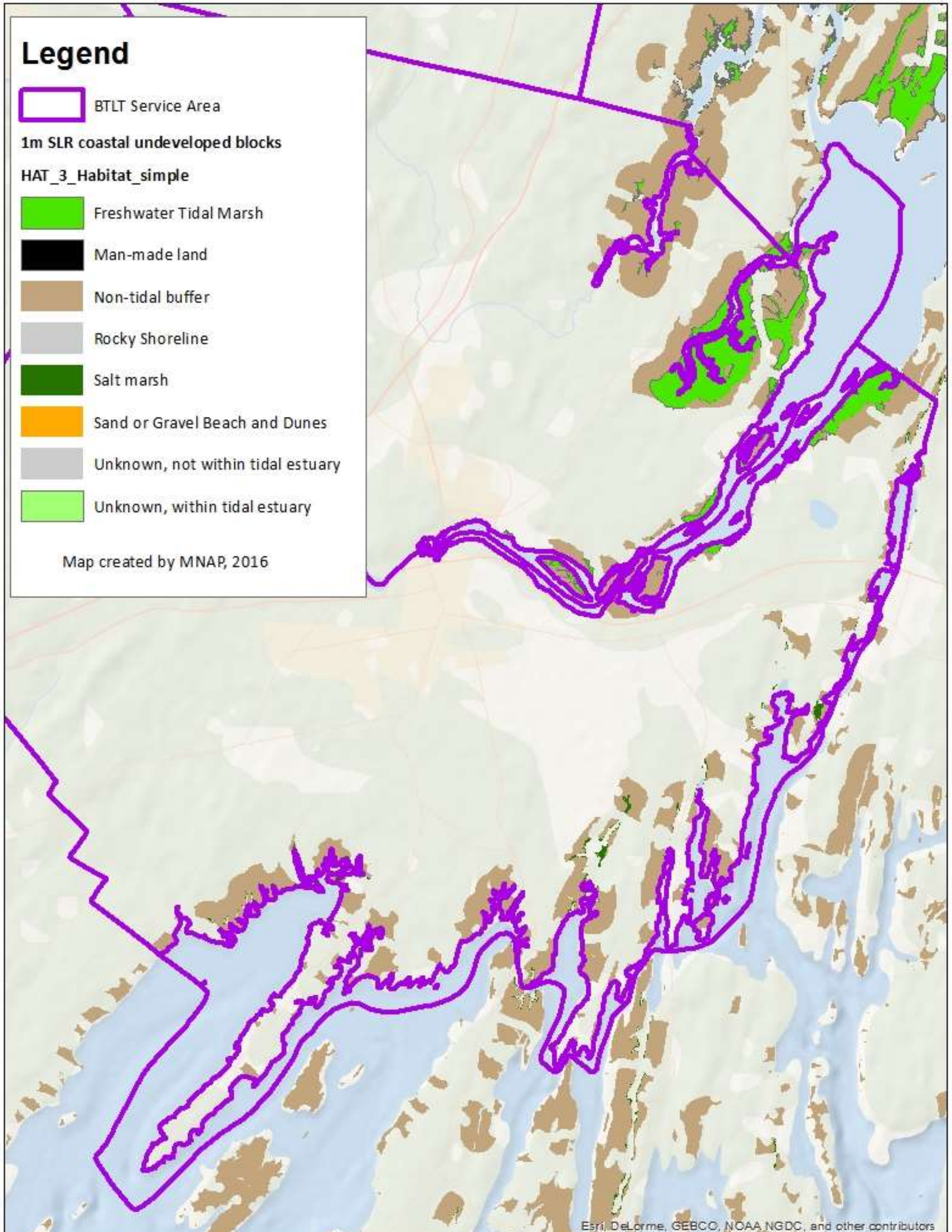


Marsh migration planning areas slide credit: MCHT



Marsh migration planning areas slide credit: MCHT


Undeveloped coastal areas
Potential habitats following 1m SLR
Non-tidal buffer
Salt marsh
Sand or Gravel Beach and Dunes
Unknown tidal wetland
Sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community
ROCKY HILLS
HORSE HILLS
Dover
Cape Neddick
York Harbor
Eliot
South Eliot
Kittery
Kittery Point
Portsmouth
MAINE
NEW HAMPSHIRE


Legend
BTLT Service Area
1m SLR coastal undeveloped blocks
HAT_3_Habitat_simple
Freshwater Tidal Marsh
Man-made land
Non-tidal buffer
Rocky Shoreline
Salt marsh
Sand or Gravel Beach and Dunes
Unknown, not within tidal estuary
Unknown, within tidal estuary
Map created by MNAP, 2016
Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors

Marshes in Planning

How the models are being used:

- ~~One size fits all~~
- Part of decision making toolkit…Planning horizon, various conservation values, funding, landowner opportunity…
- Application across multiple scales (examples)
- Viewers and decision support tools

Thank you!

Special thanks to:

Maine Coast Heritage Trust, Maine Dept. Inland Fisheries and Wildlife, Maine Geological Survey, NOAA, Municipal Planning Assistance Program, The Nature Conservancy, USFWS, USEPA, Maine Outdoor Heritage Fund

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Additional resources:

http://www.maine.gov/dacf/mnap/assistance/coastal_resiliency.html