Creating a Resilient Connecticut

Municipal Resilience Planning Assistance Project

HUD Community Development Block Grant
Disaster Recovery Program

CT DOH/DEEP
Grantee# 6201

Connecticut Department of Energy and Environmental Protection

Connecticut Department of
ENERGY & ENVIRONMENTAL PROTECTION

Tracking Connecticut's Coast Using Aerial Photography with GIS

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CIRCA Forum on Science, Planning, Policy & Law
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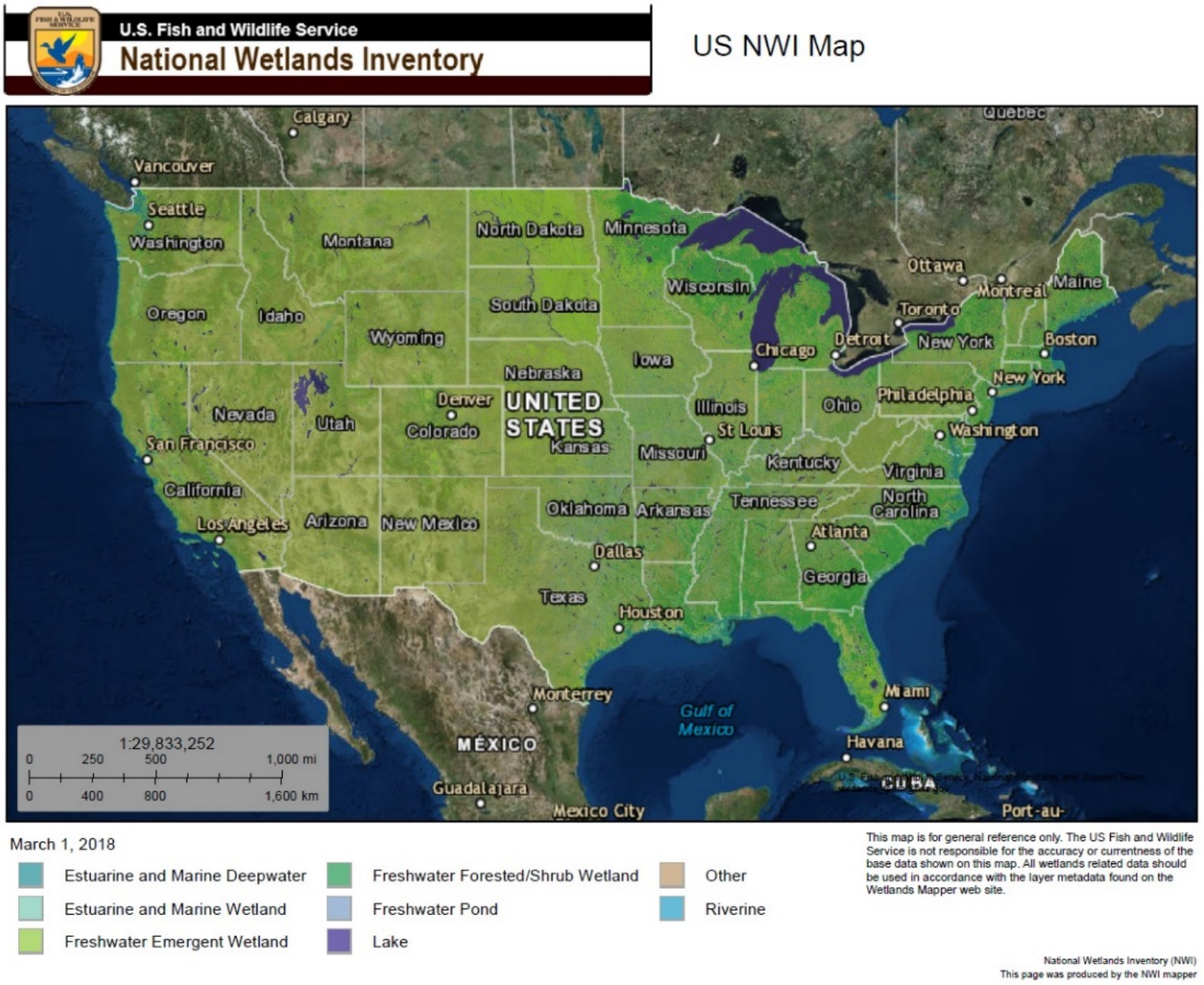
Municipal Resilience Planning Assistance Project Task 1

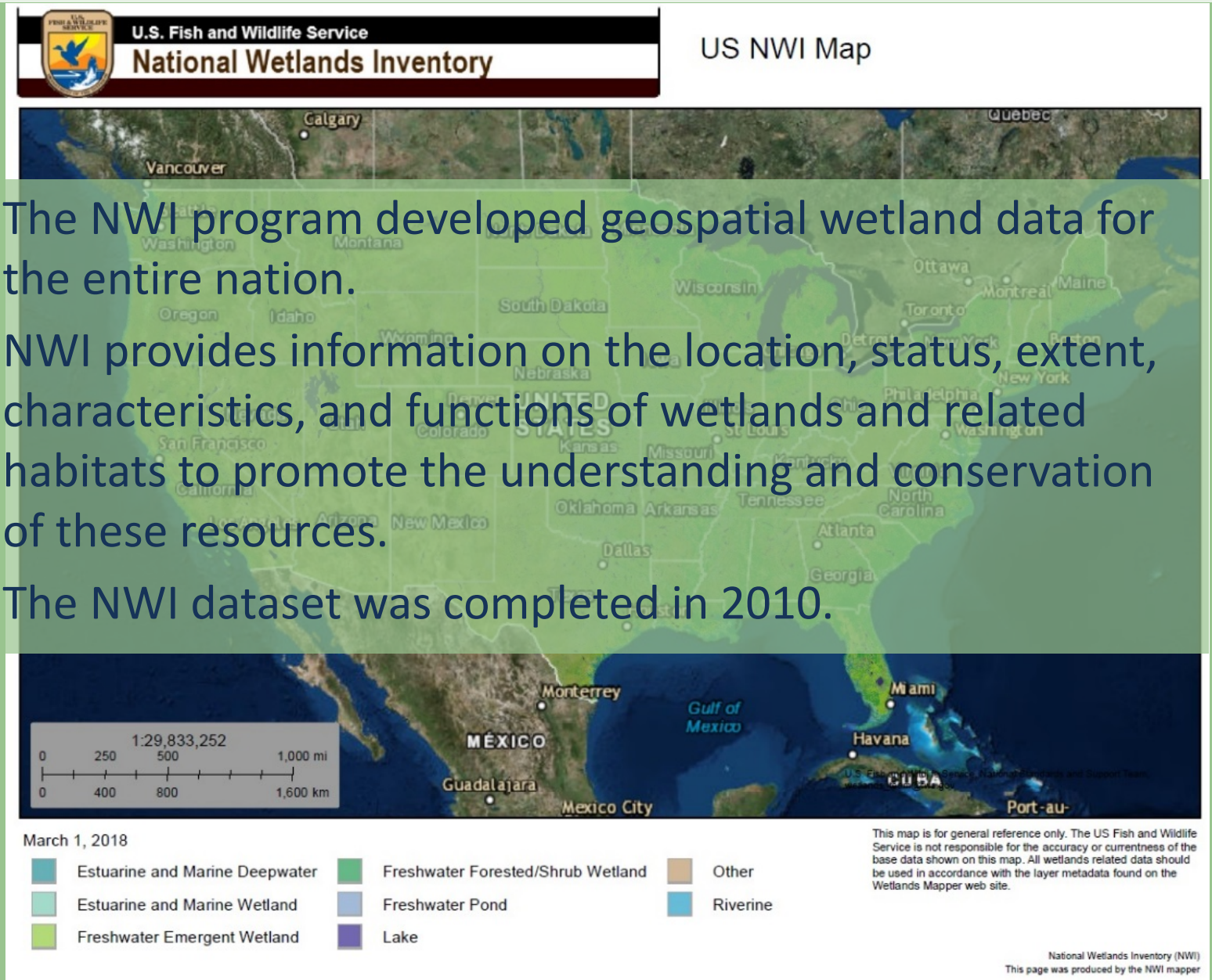
Tidal Wetlands Feature Enhancement in GIS Mapping

- Conduct a coastal aerial photo flight to acquire infrared orthoimages for a means of inventorying and assessing current environmental and human-use conditions along Connecticut's coast and tidal rivers;
- Examine the coastal aerial photos to assess areas of tidal wetlands for internal water features; and,
- Digitize these features within a new GIS layer by comparing the photographs with U.S. Fish & Wildlife Service National Wetlands Inventory data.

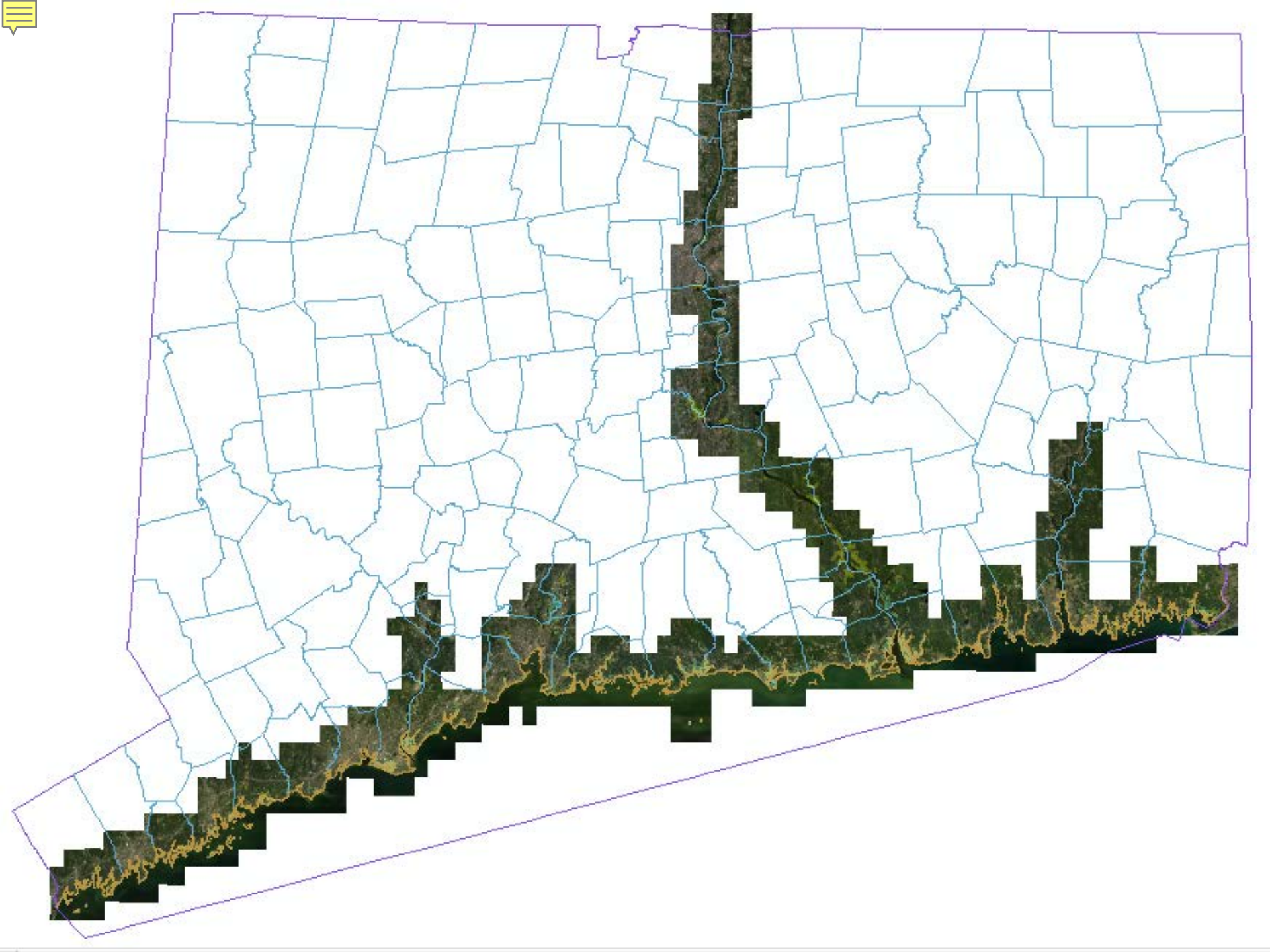
Background of the Data

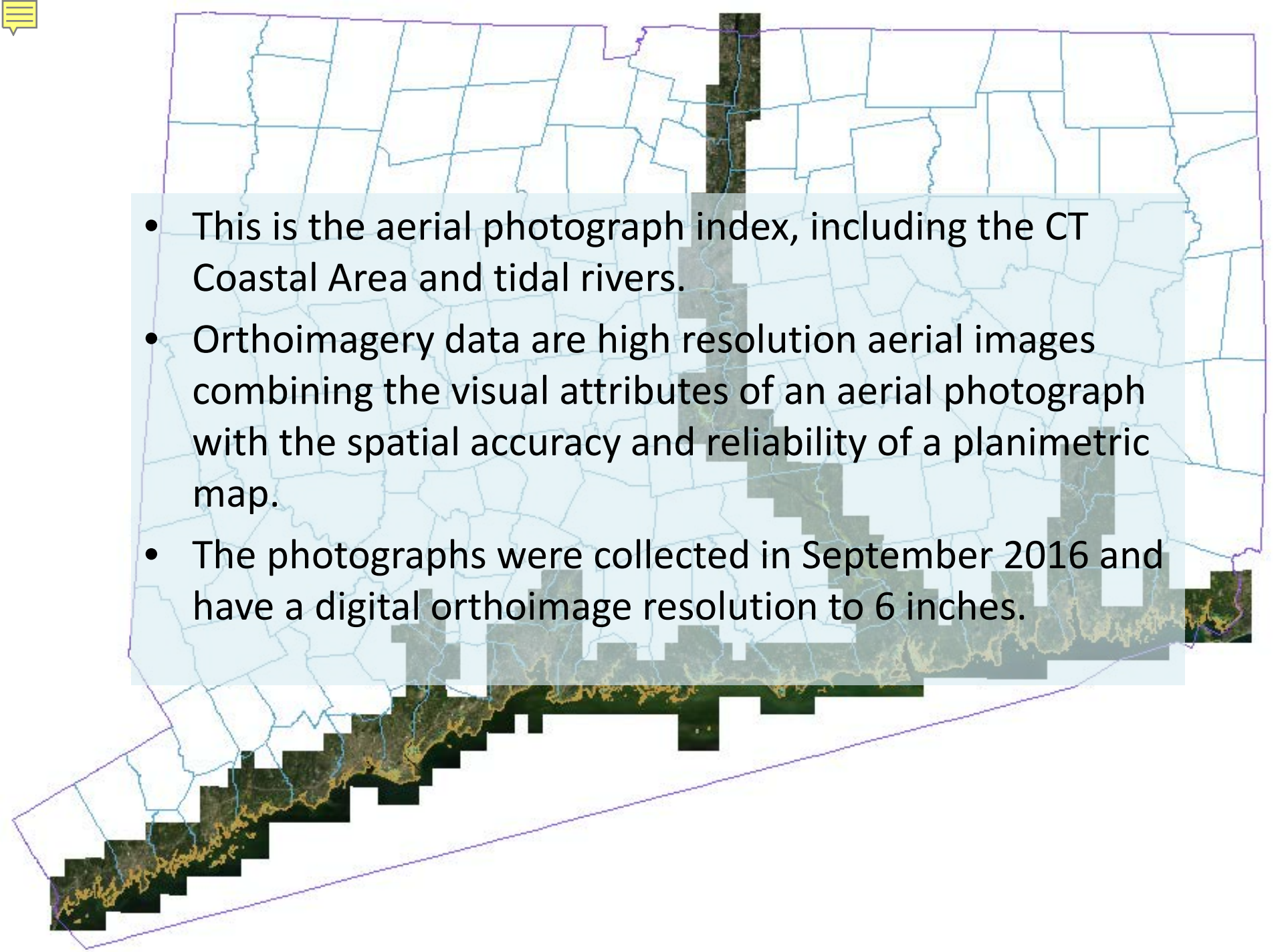


Background of the Data

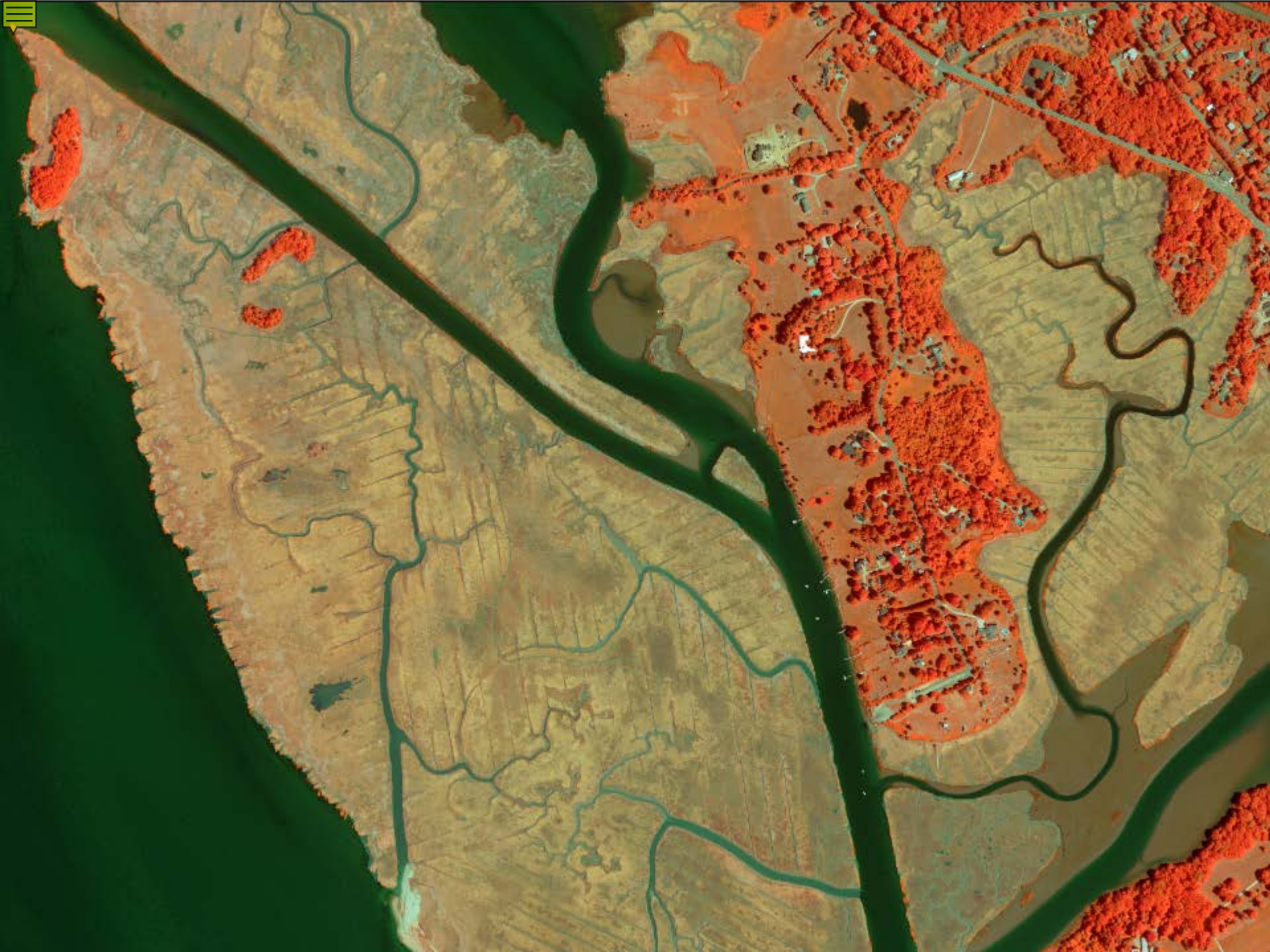


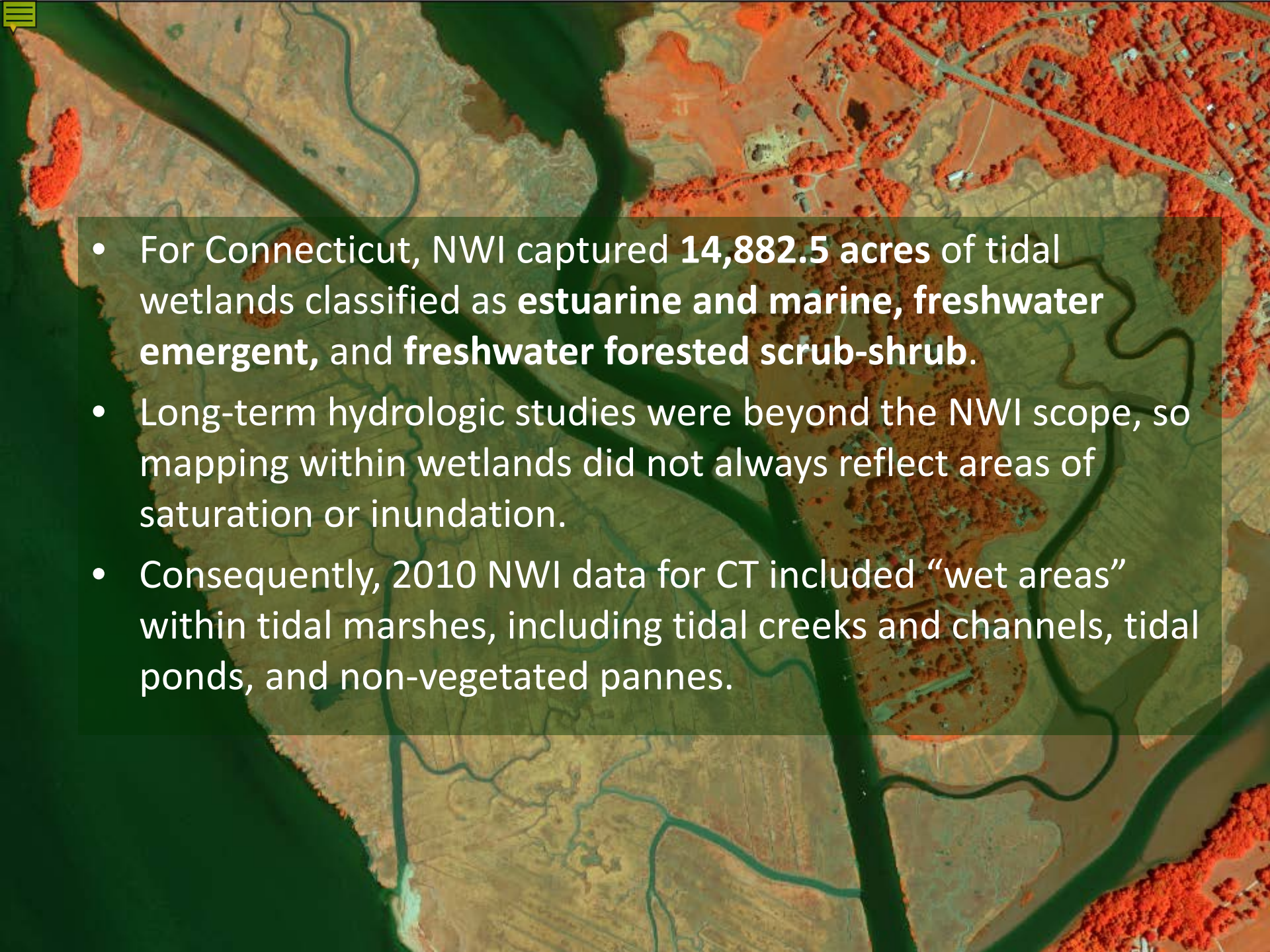
- The NWI program developed geospatial wetland data for the entire nation.
- NWI provides information on the location, status, extent, characteristics, and functions of wetlands and related habitats to promote the understanding and conservation of these resources.
- The NWI dataset was completed in 2010.



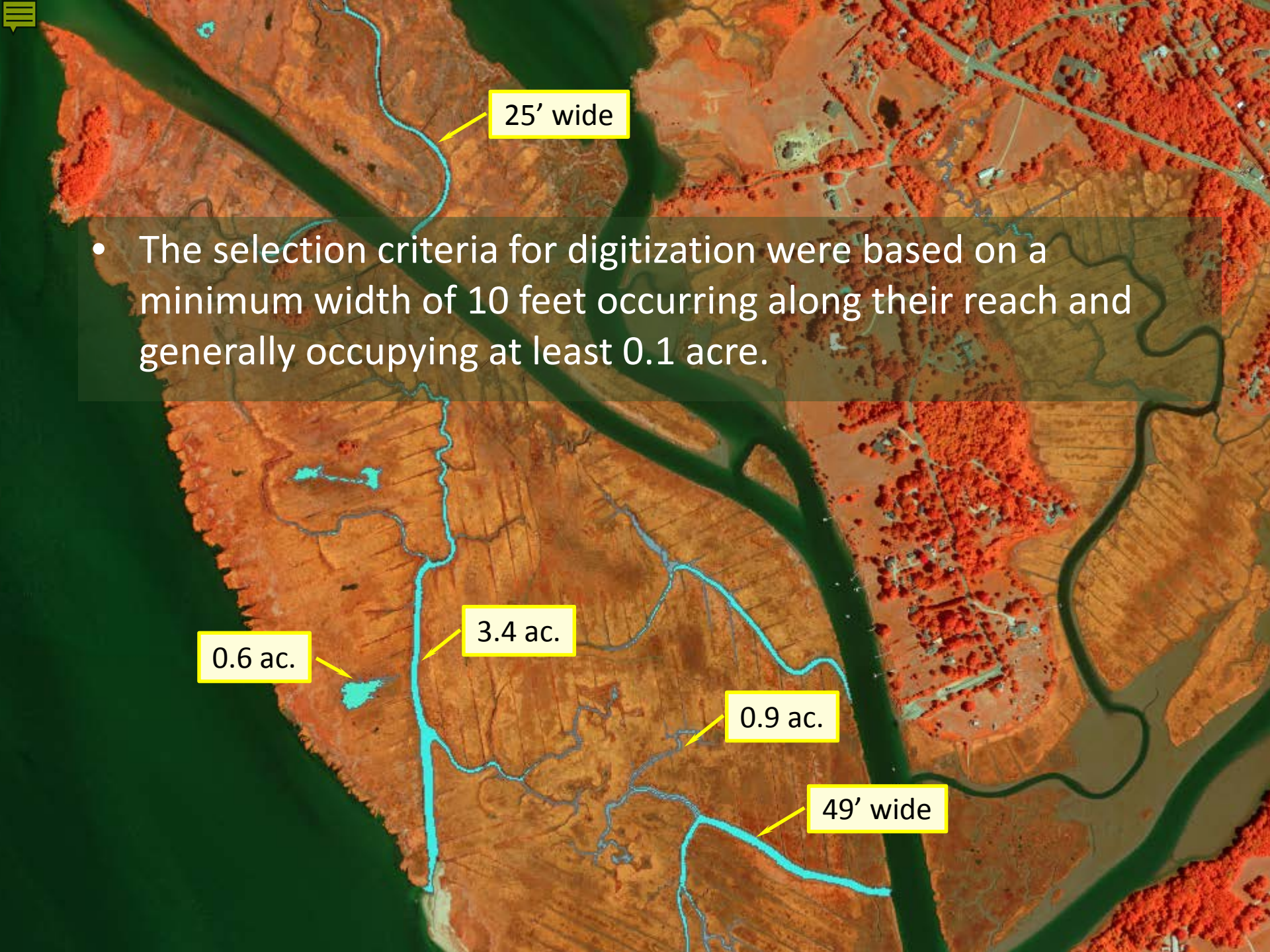


- This is the aerial photograph index, including the CT Coastal Area and tidal rivers.
- Orthoimagery data are high resolution aerial images combining the visual attributes of an aerial photograph with the spatial accuracy and reliability of a planimetric map.
- The photographs were collected in September 2016 and have a digital orthoimage resolution to 6 inches.

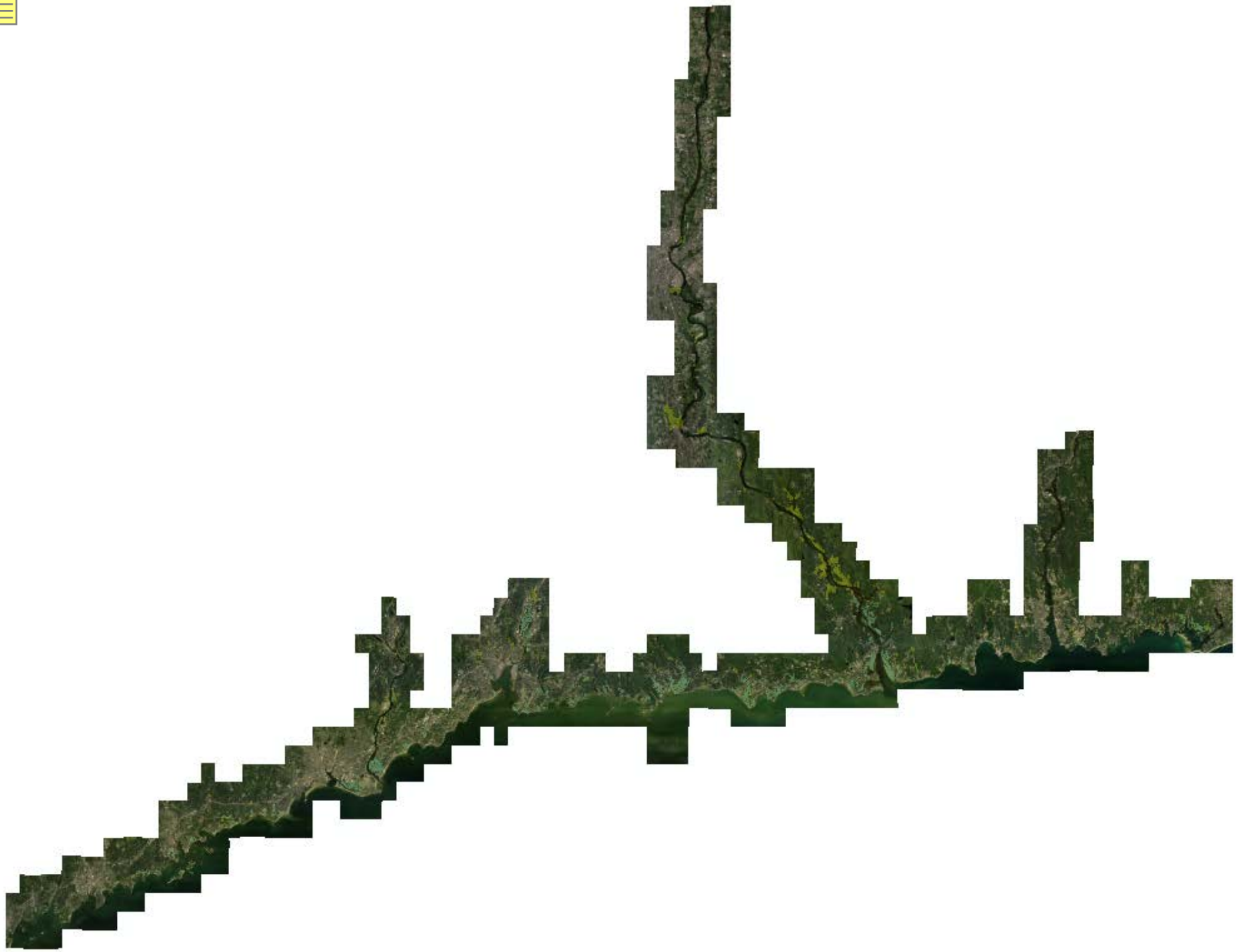


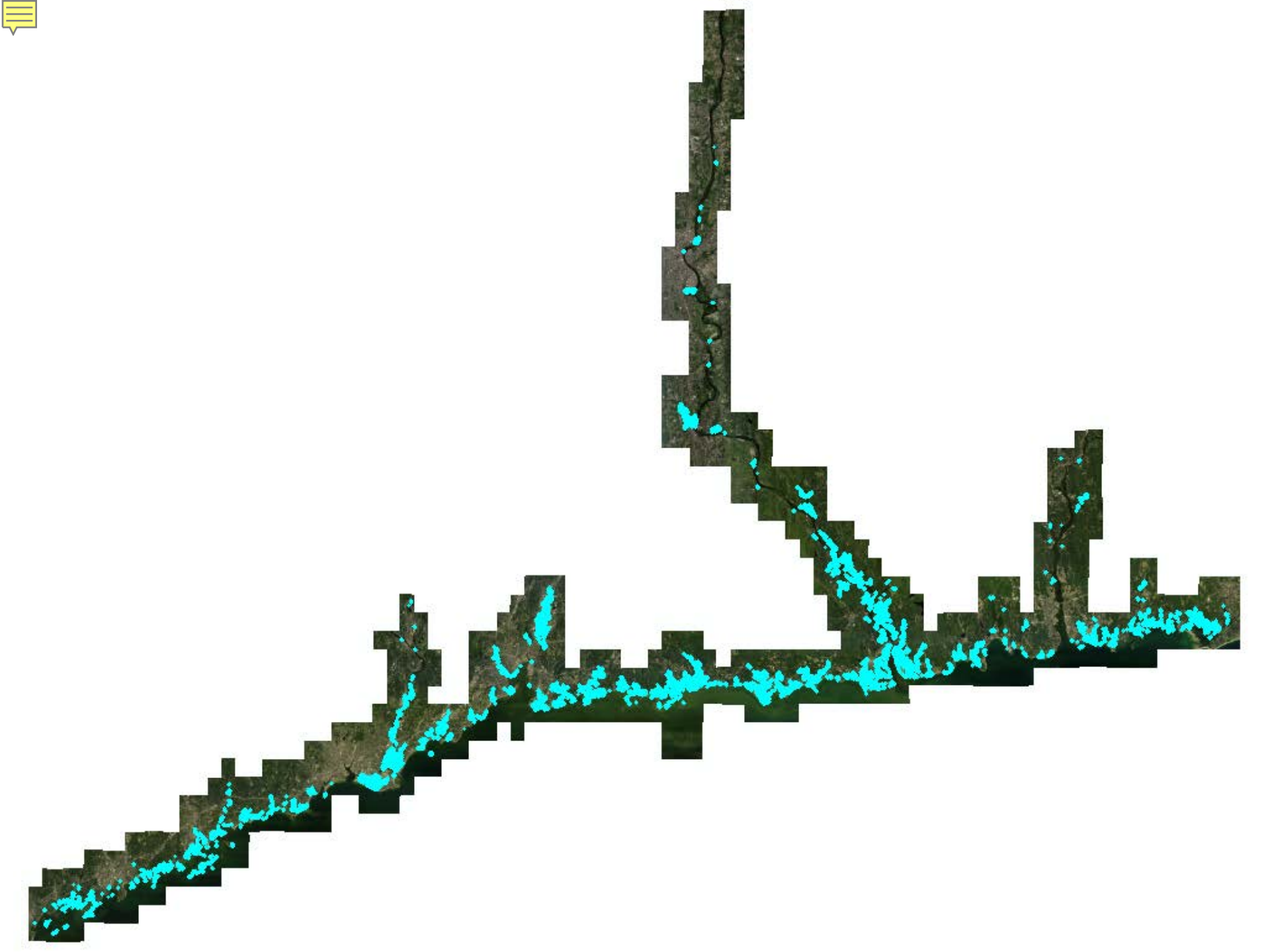


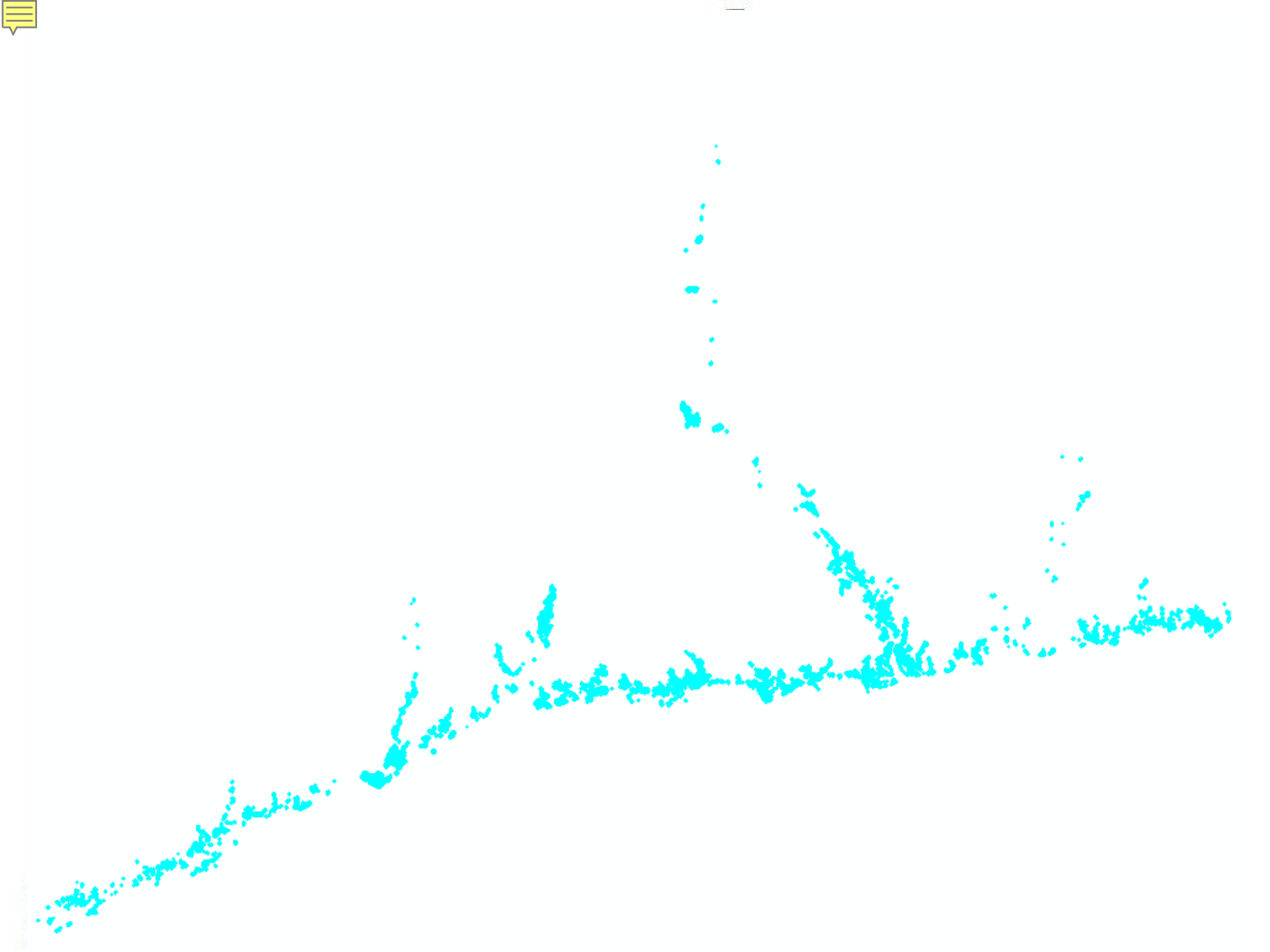
- For Connecticut, NWI captured **14,882.5 acres** of tidal wetlands classified as **estuarine and marine, freshwater emergent,** and **freshwater forested scrub-shrub**.
- Long-term hydrologic studies were beyond the NWI scope, so mapping within wetlands did not always reflect areas of saturation or inundation.
- Consequently, 2010 NWI data for CT included “wet areas” within tidal marshes, including tidal creeks and channels, tidal ponds, and non-vegetated pannes.

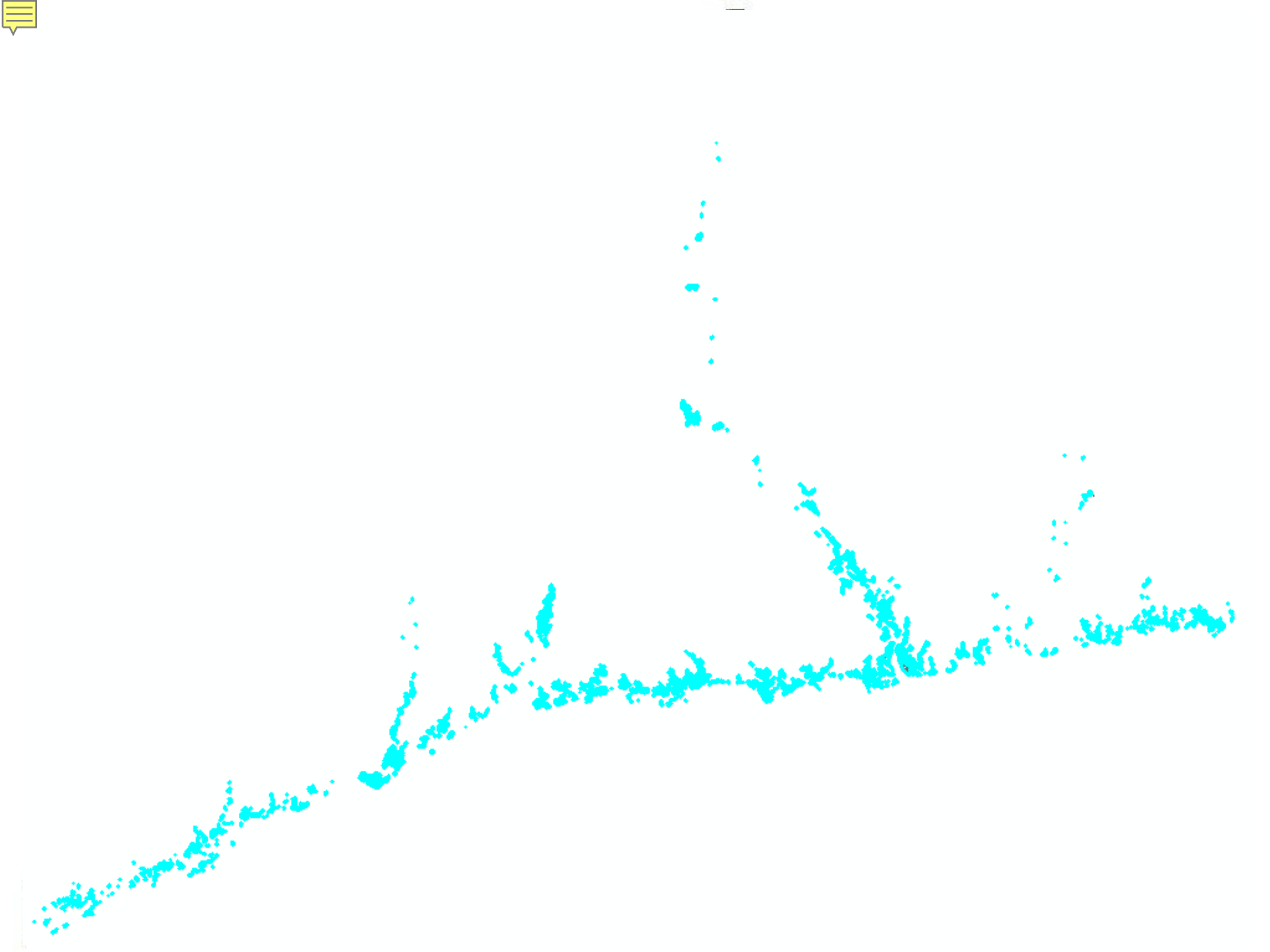


- The selection criteria for digitization were based on a minimum width of 10 feet occurring along their reach and generally occupying at least 0.1 acre.

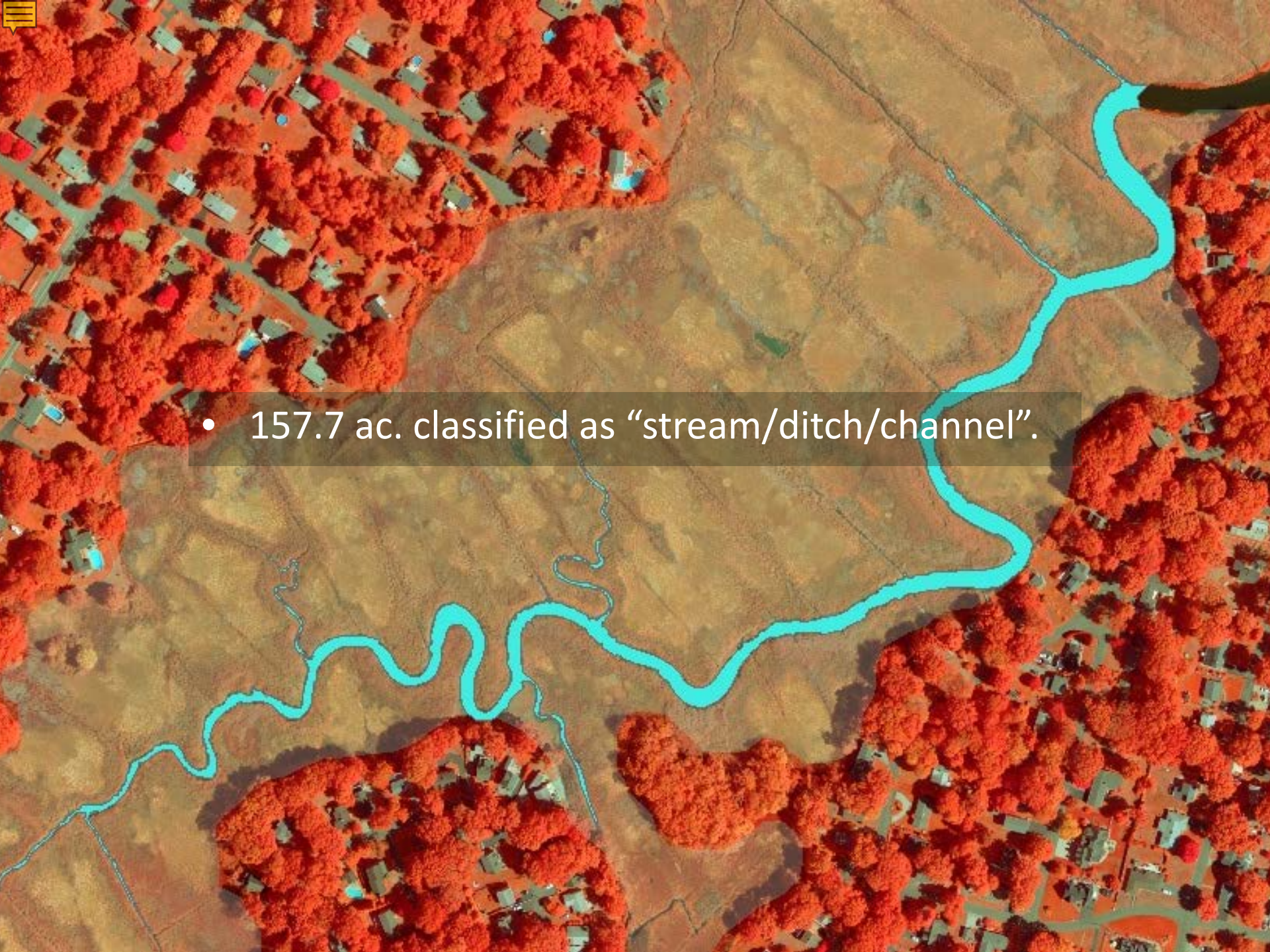


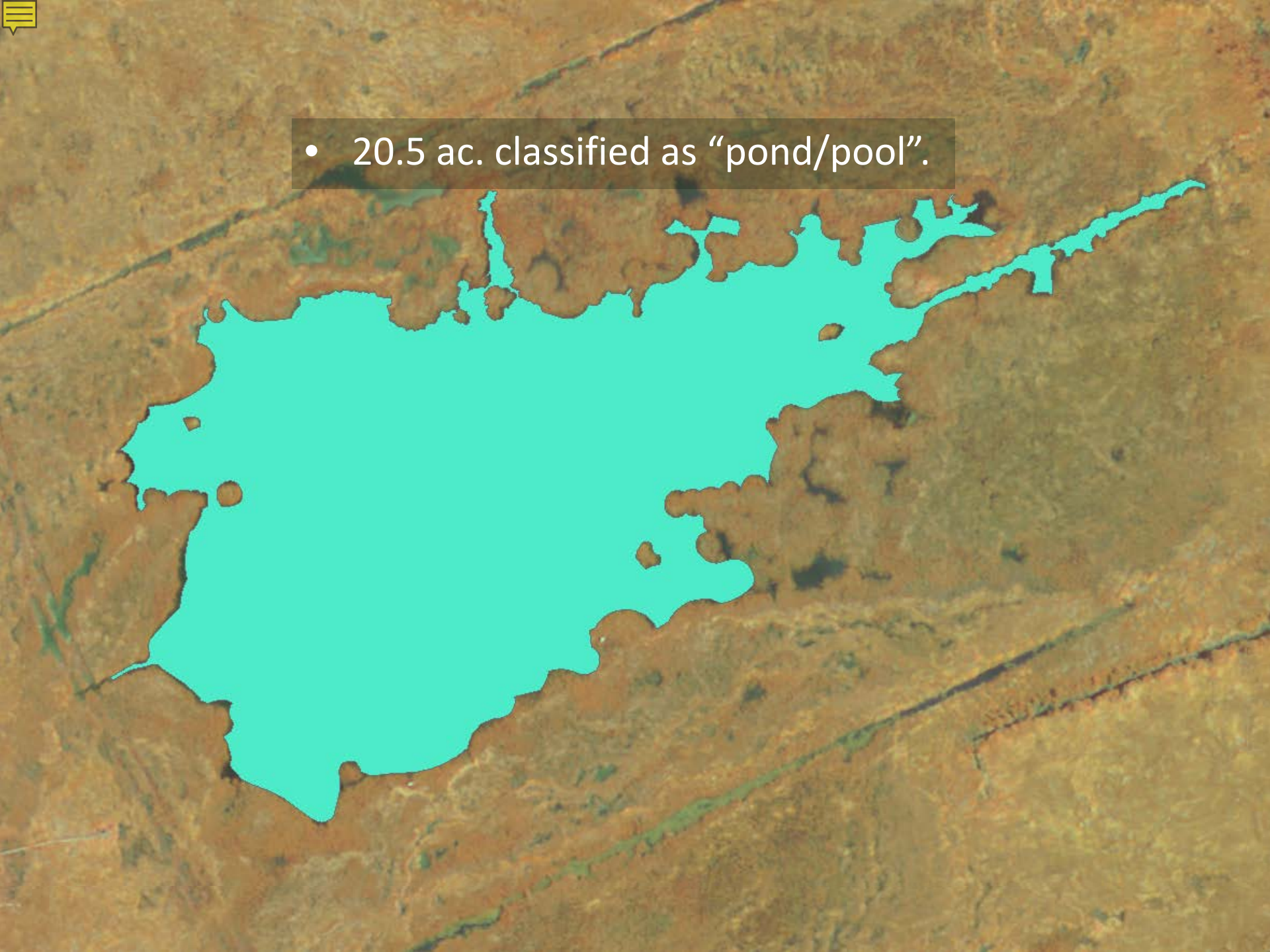






- 512.2 acres of internal features were digitized.
- Equates to 3% of the overall tidal wetlands inventory.


• 157.7 ac. classified as “stream/ditch/channel”.

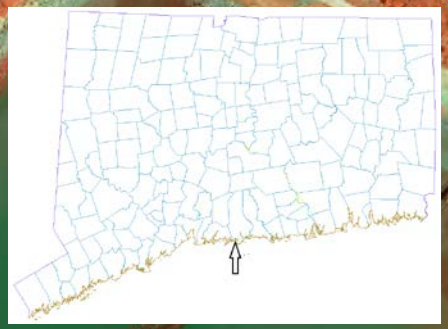

• 20.5 ac. classified as “pond/pool”.

- 0.9 ac. classified as “upland island”.

- 333.1 ac. classified as “saturated (non-vegetated) wetland”.

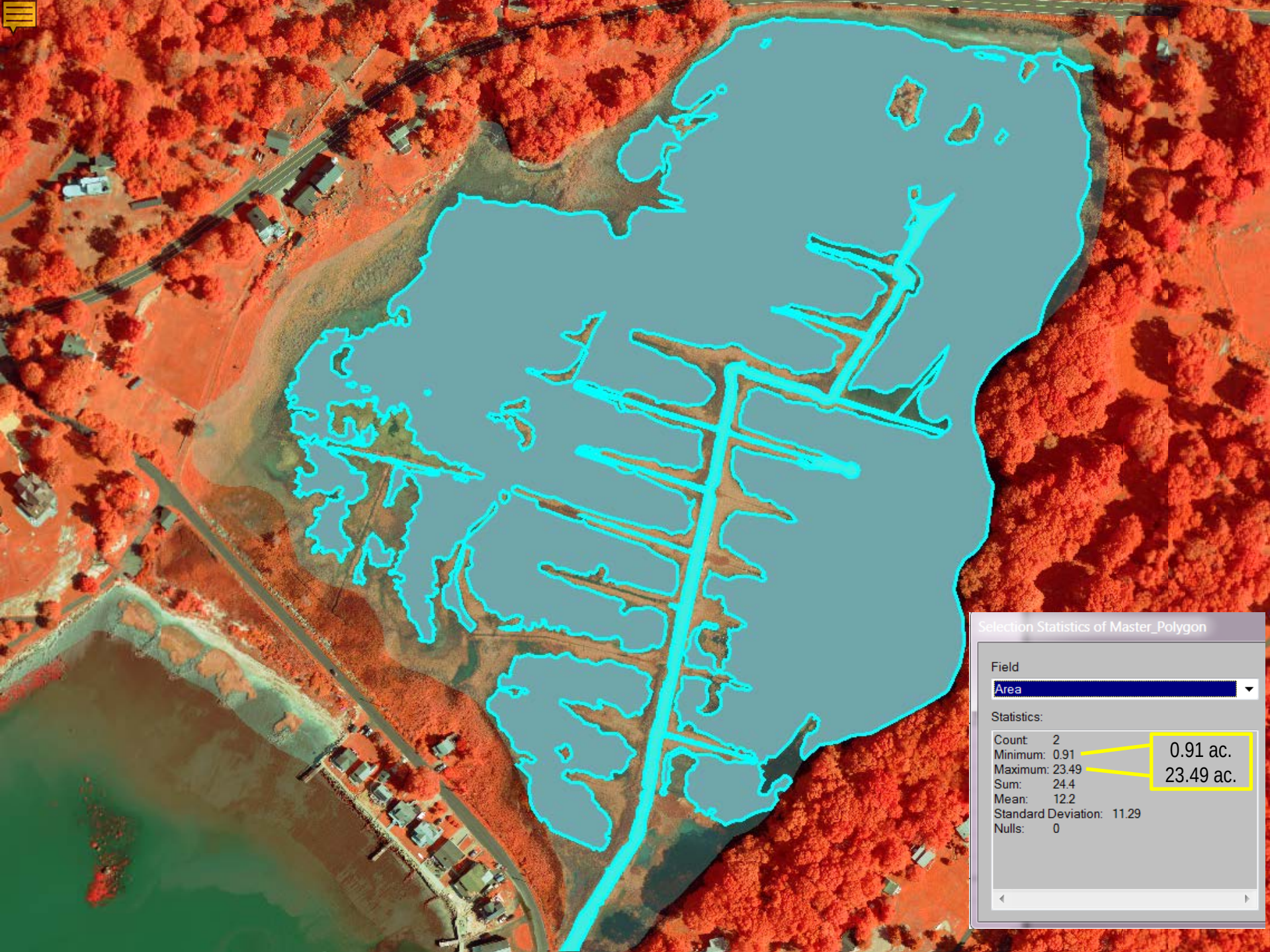
Applicability of the Data

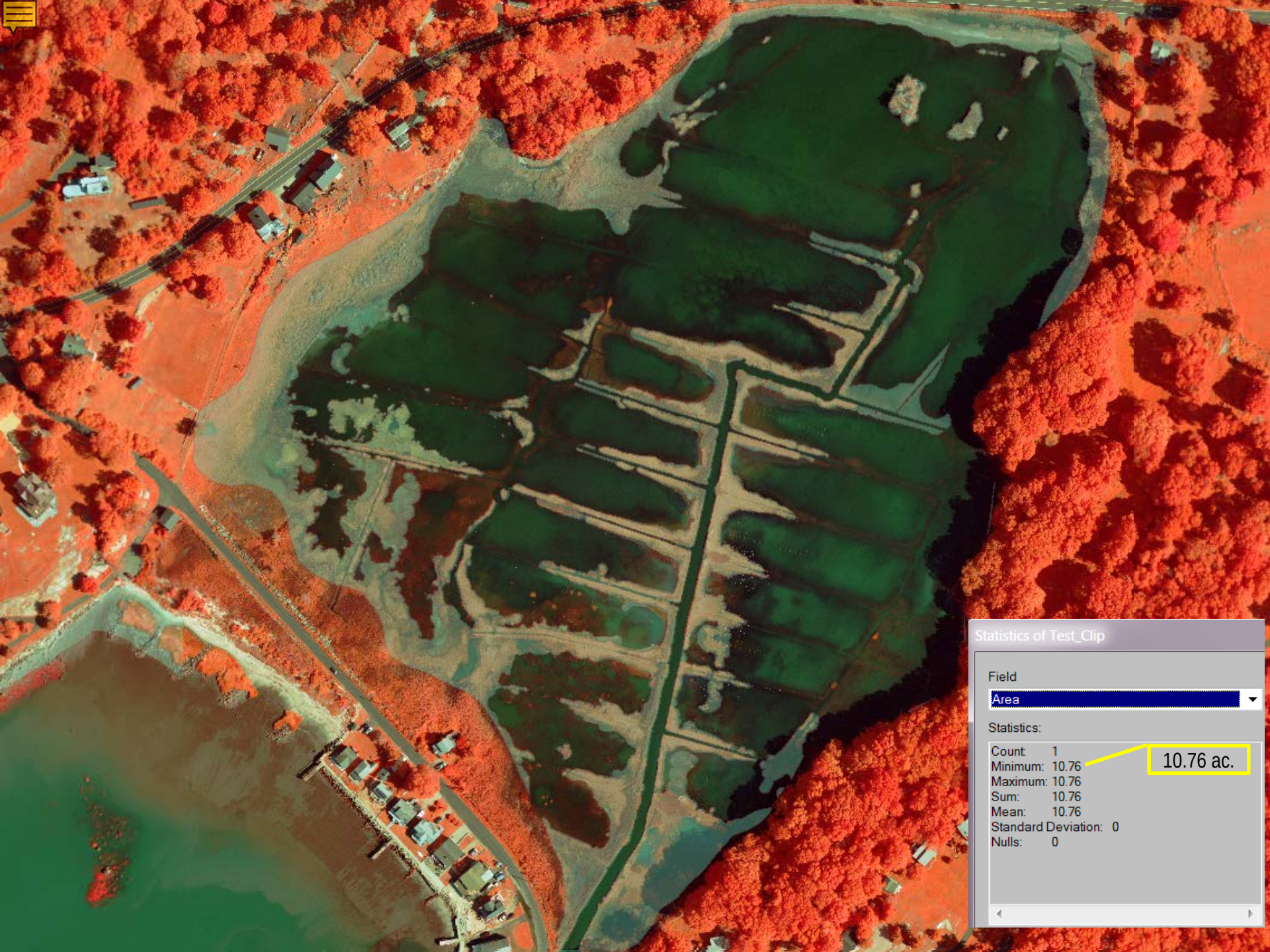
- Purpose: to provide more accurate values for the overall area of vegetated tidal wetlands, using comparative quantitative analysis.
- These values are useful for examining periodic changes in tidal wetlands in order to develop strategies for their continued preservation and protection.
- Quantifying functioning tidal wetlands in combination with other GIS data can facilitate future policy development in part with other resilience measures.



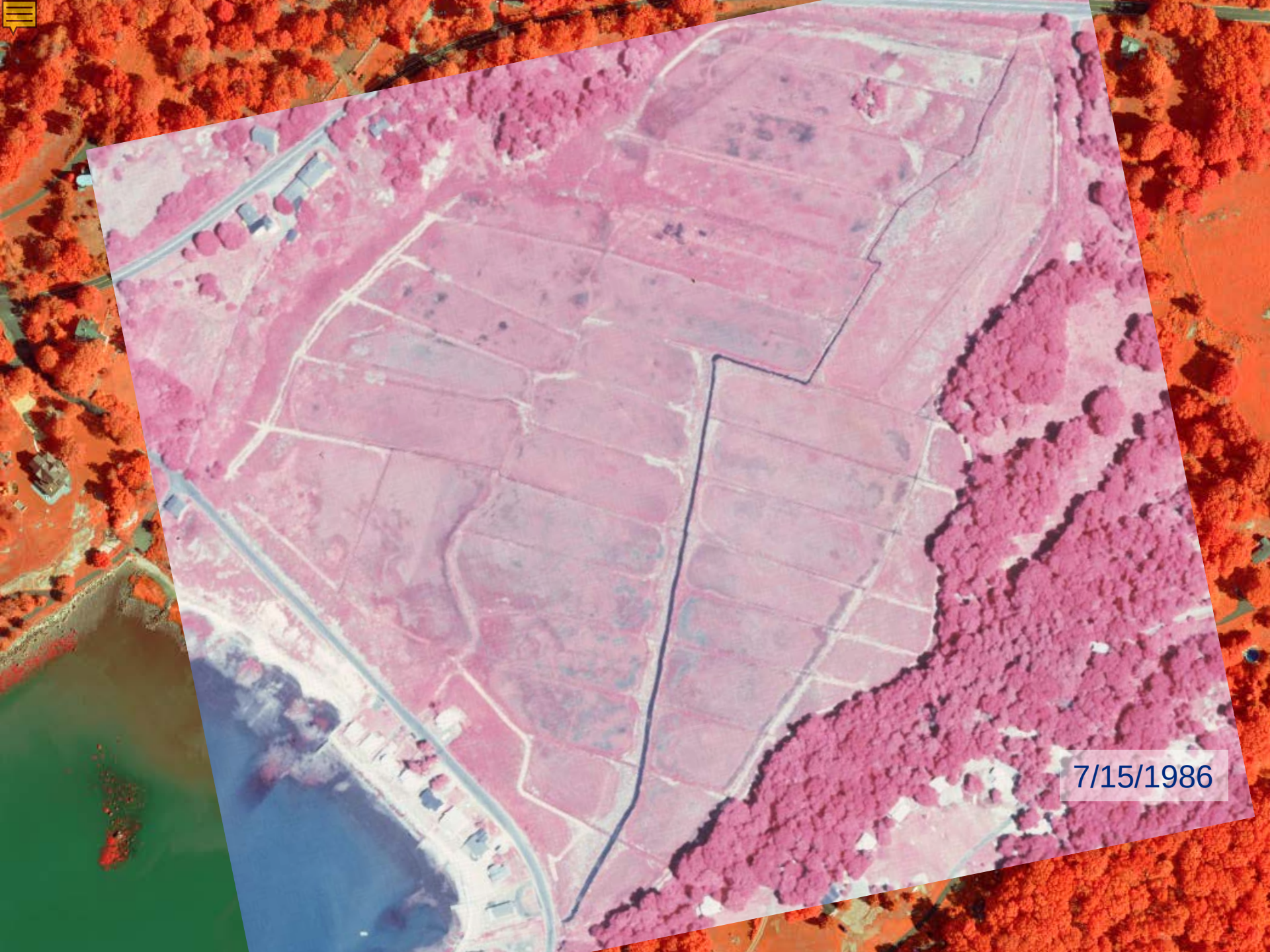
Leetes Island Marsh
Guilford


Selection Statistics of CT_2010_NWI_TidalWetlands
Field
Acres
Statistics:
Count: 2
Minimum: 2.822343
Maximum: 32.337683
Sum: 35.160026
Mean: 17.580013
Standard Deviation: 14.75767
Nulls: 0
35.16 ac.


Selection Statistics of Master_Polygon
Field
Area
Statistics:
Count: 2
Minimum: 0.91
Maximum: 23.49
Sum: 24.4
Mean: 12.2
Standard Deviation: 11.29
Nulls: 0
0.91 ac.
23.49 ac.


Statistics of Test_Clip
Field
Area
Statistics:
Count: 1
Minimum: 10.76
Maximum: 10.76
Sum: 10.76
Mean: 10.76
Standard Deviation: 0
Nulls: 0
10.76 ac.


9/6/2016


7/15/1986


7/3/1990


8/8/1995


9/6/2000


7/12/2005

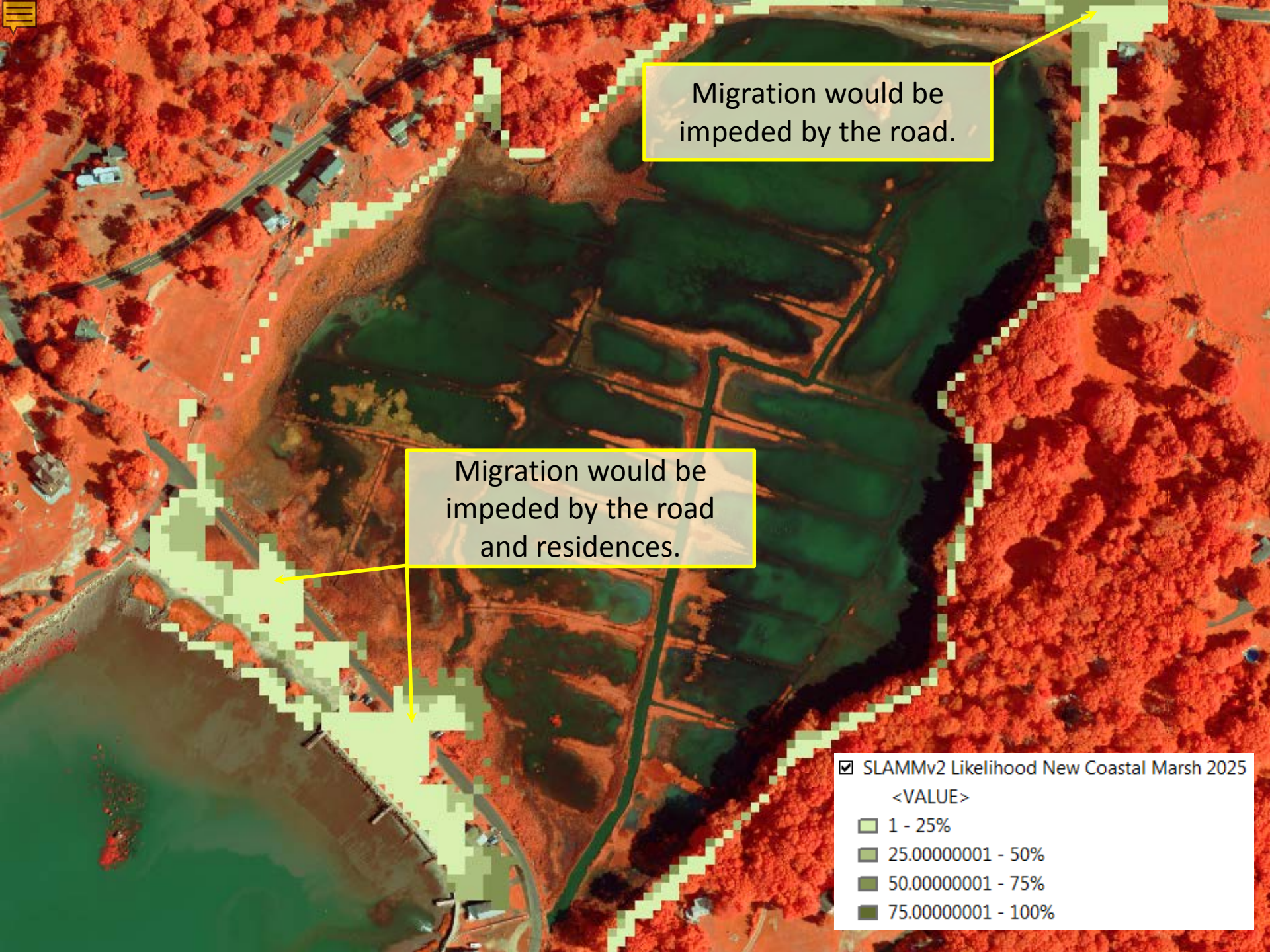

8/14/2010

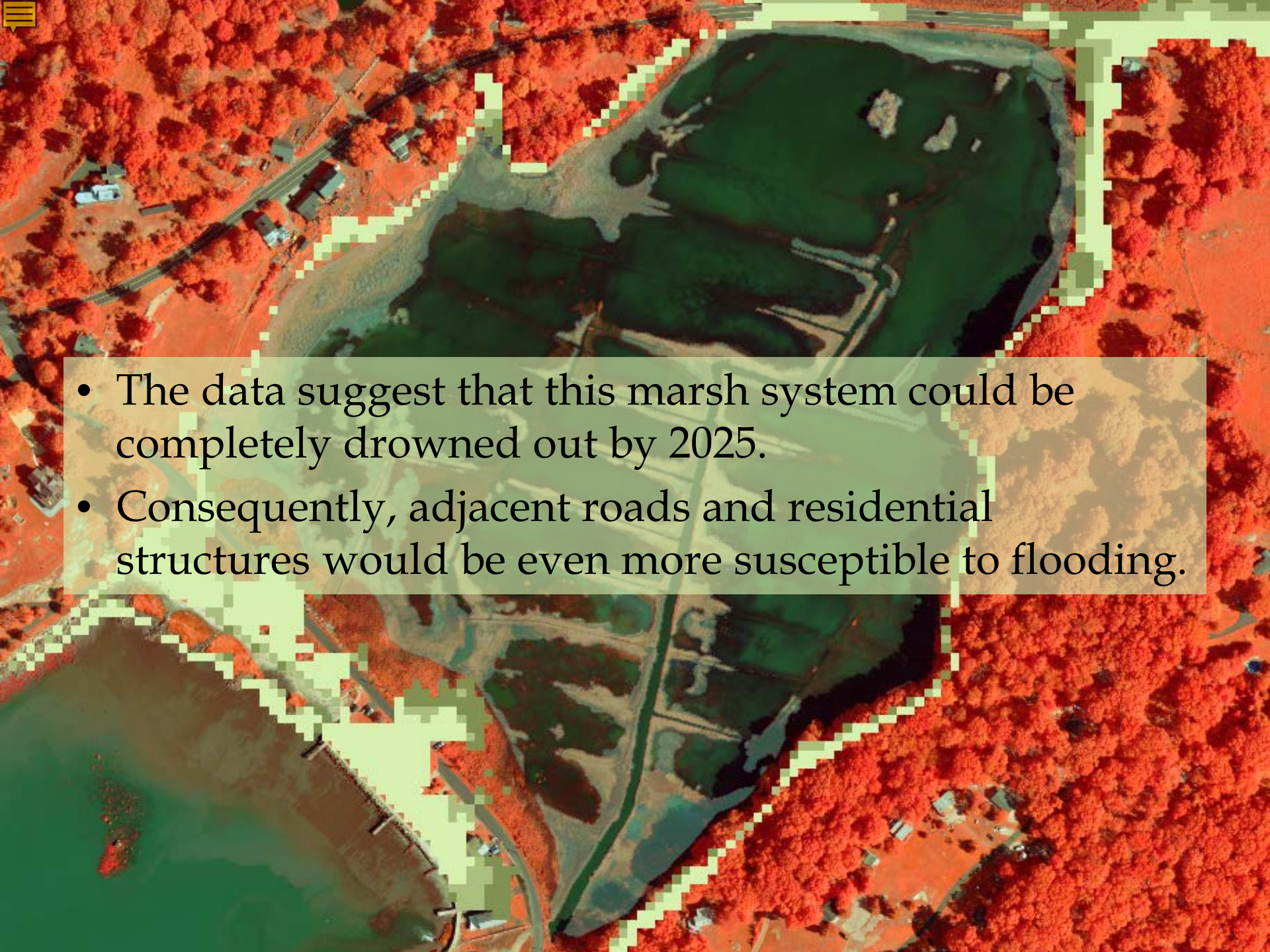

9/6/2016


SLAMMv2 Likelihood New Coastal Marsh 2025
<VALUE>
1 - 25%
25.00000001 - 50%
50.00000001 - 75%
75.00000001 - 100%


Higher land elevation
Wider tide range
Sea level rise
SLAMMv2 Likelihood New Coastal Marsh 2025
<VALUE>
1 - 25%
25.00000001 - 50%
50.00000001 - 75%
75.00000001 - 100%

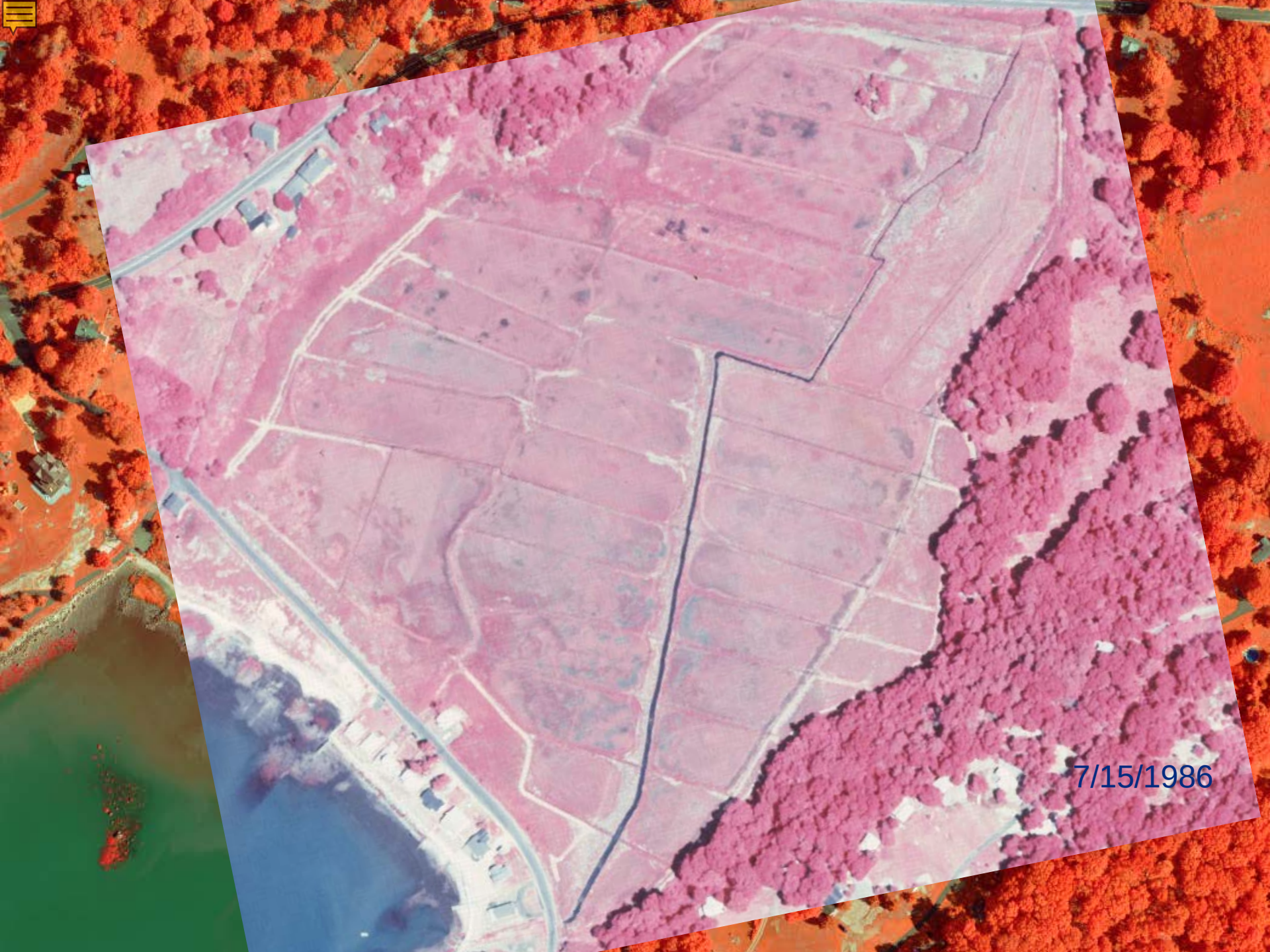

SLAMMv2 Likelihood New Coastal Marsh 2025
<VALUE>
1 - 25%
25.00000001 - 50%
50.00000001 - 75%
75.00000001 - 100%


Migration would be impeded by the road.
Migration would be impeded by the road and residences.
SLAMMv2 Likelihood New Coastal Marsh 2025
<VALUE>
1 - 25%
25.00000001 - 50%
50.00000001 - 75%
75.00000001 - 100%



- The data suggest that this marsh system could be completely drowned out by 2025.
- Consequently, adjacent roads and residential structures would be even more susceptible to flooding.


8/8/1995


7/15/1986

Section 22
Connecticut

Wetlands Restoration Investigation
Leetes Island Salt Marsh
Guilford, Connecticut

March 1994

US Army Corps
of Engineers
New England Division

Wetlands Restoration Investigation
Leetes Island Salt Marsh
Guilford, Connecticut

An emerging problem for tidal wetlands throughout the U.S. is the apparent increased rate at which sea level is rising. In marshes where there is an imbalance between rising sea level and vertical peat growth, subsidence and loss of vegetation occurs. Recent studies have shown significant changes in the vegetation of southeastern Connecticut salt marshes which are most likely due to accelerated sea level rise. In southwestern Connecticut, the loss of extensive areas of Salt Marsh Cordgrass is believed to be the result of sea level rise.

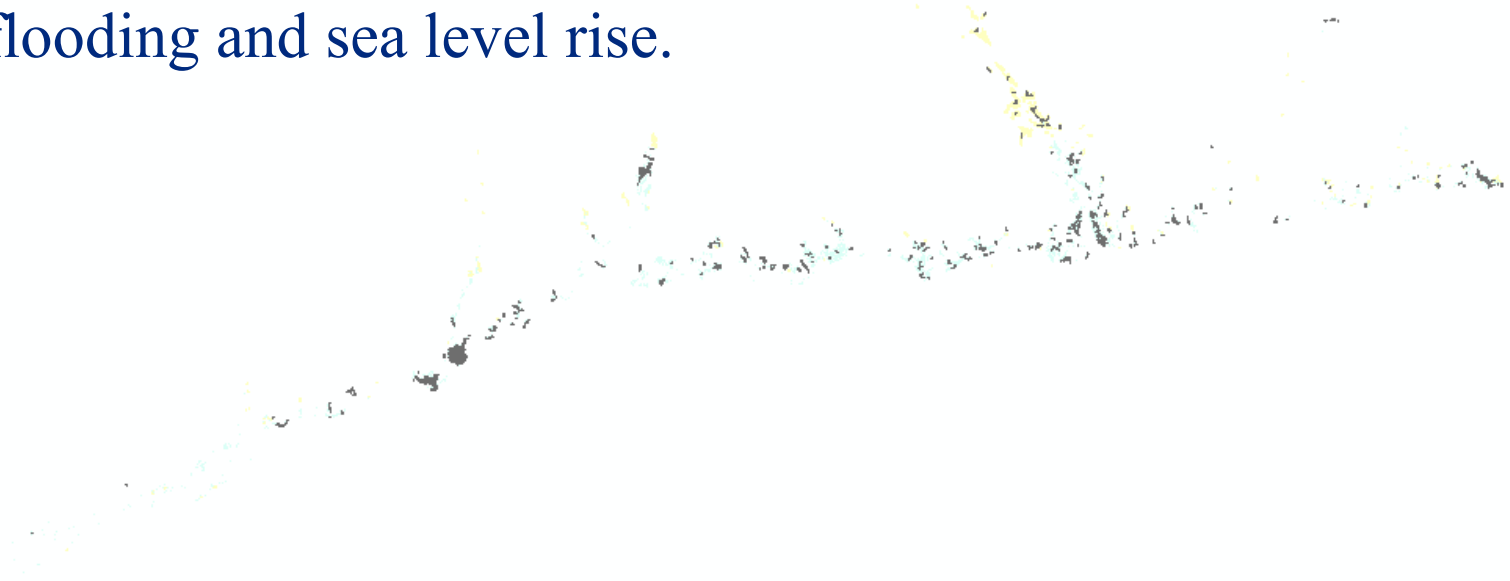
Sea level rise impacts are of particular concern in drained and subsided marshes such as Leetes Island where there has been a major imbalance between sea level rise and vertical accretion.

March 1994

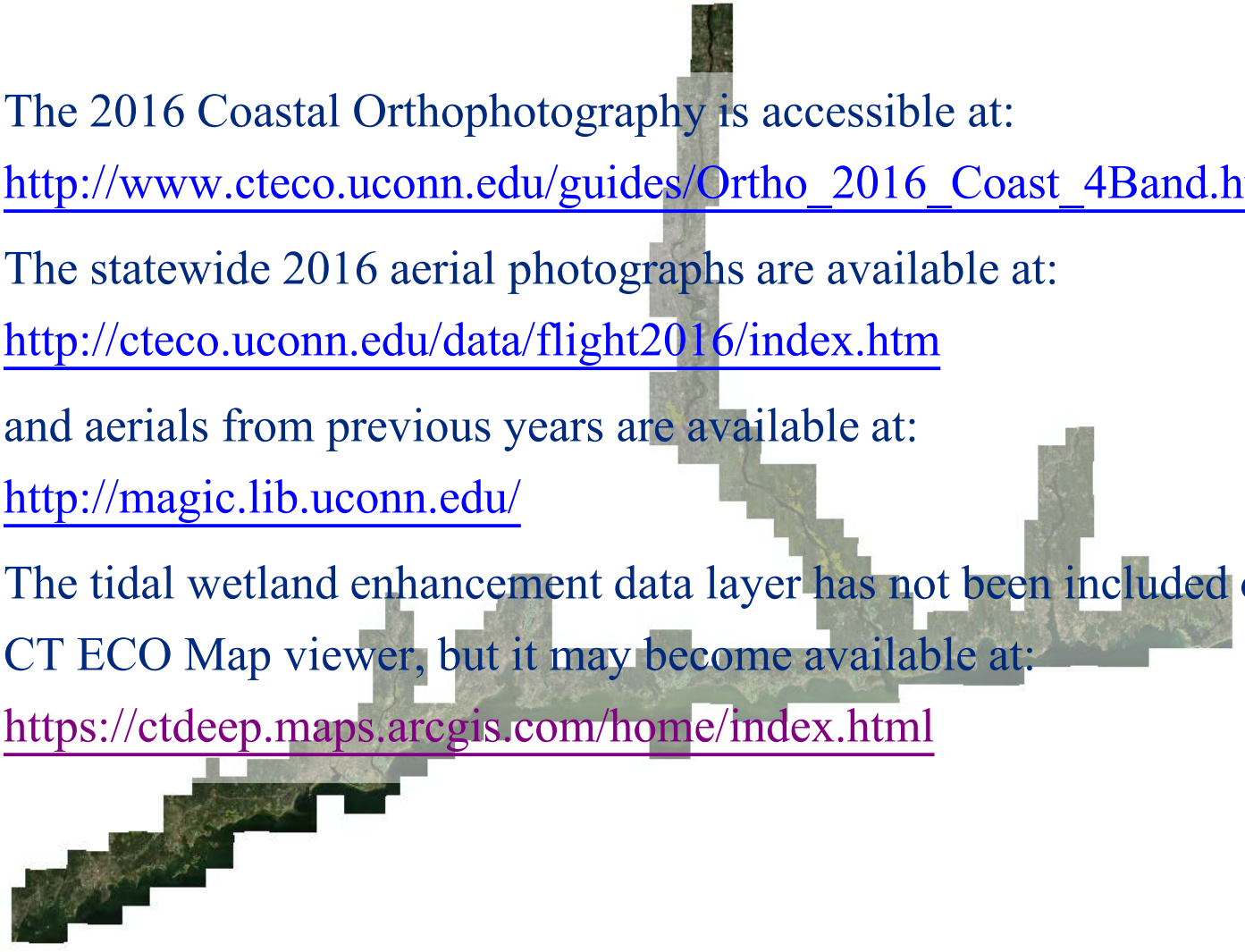
US Army Corps
of Engineers
New England Division

Conclusion

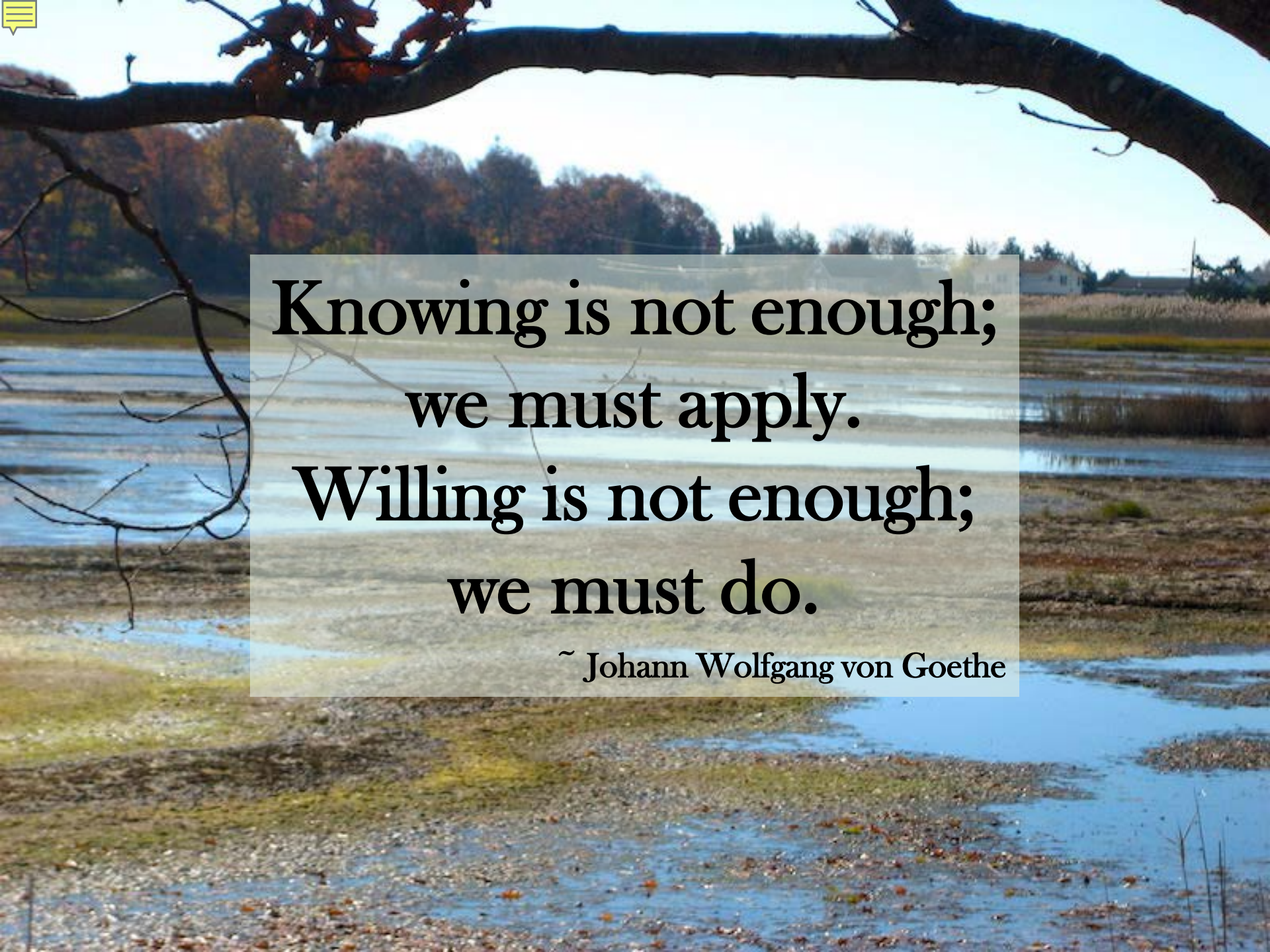
Quantifying areas of functioning tidal wetlands and areas of wetland loss using aerial photography and GIS can support development of resilience measures in response to coastal flooding and sea level rise.



Accessing the Data



- The 2016 Coastal Orthophotography is accessible at: http://www.cteco.uconn.edu/guides/Ortho_2016_Coast_4Band.htm
- The statewide 2016 aerial photographs are available at: http://cteco.uconn.edu/data/flight2016/index.htm
- and aerials from previous years are available at: http://magic.lib.uconn.edu/
- The tidal wetland enhancement data layer has not been included on CT ECO Map viewer, but it may become available at: https://ctdeep.maps.arcgis.com/home/index.html


Knowing is not enough;
we must apply.
Willing is not enough;
we must do.
~ Johann Wolfgang von Goethe

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