

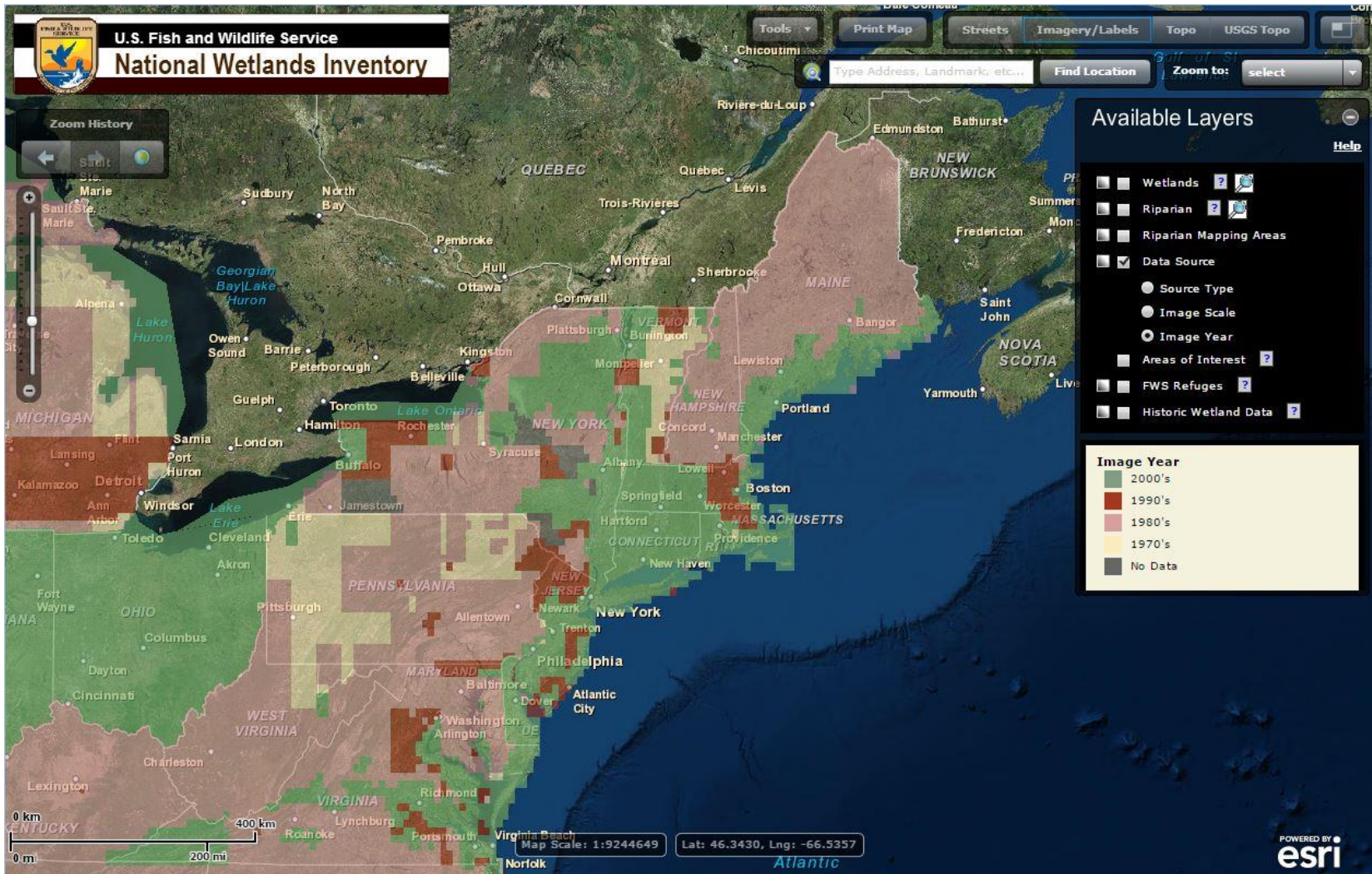
# Monitoring Change in Coastal Wetlands through the Region's National Wetlands Inventory Program

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# National Wetlands Inventory

- Mapping wetlands since the late 1970s
- Products:
  - Maps/Digital Data
  - Trends (National and Local Reports)
  - Special Studies

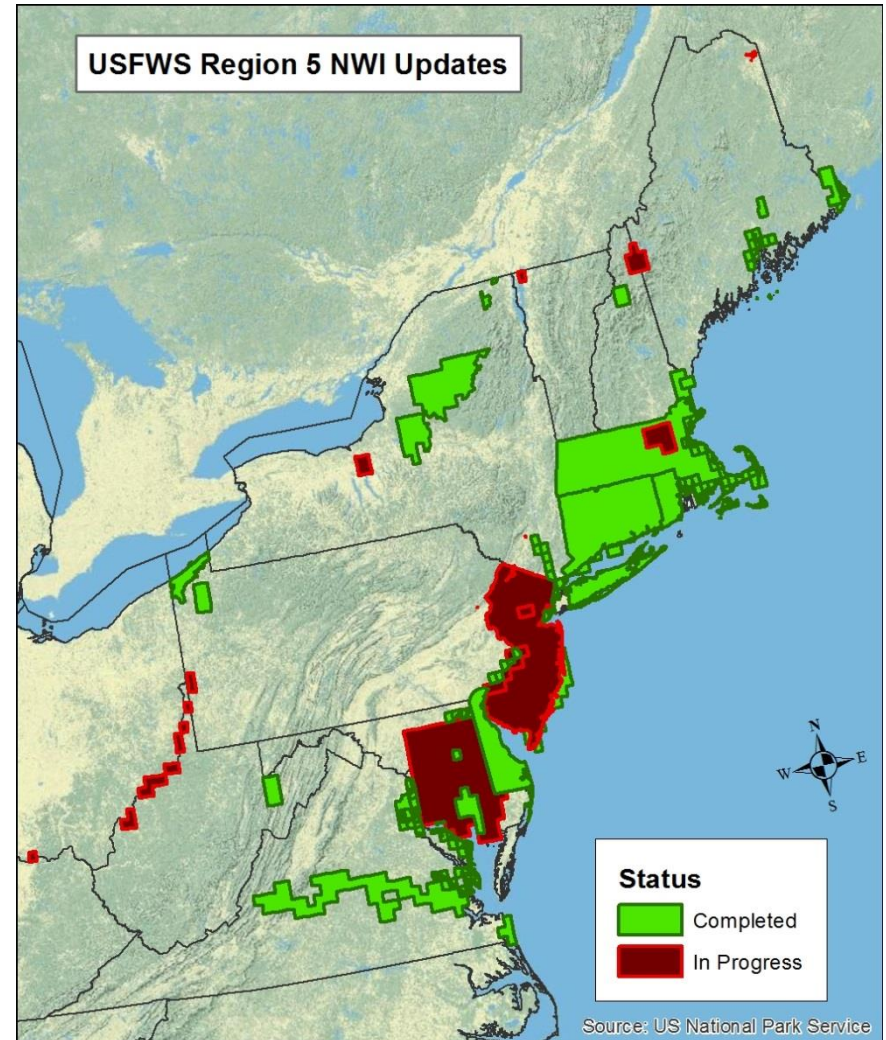
# NWI Status



# Status of Recent Mapping

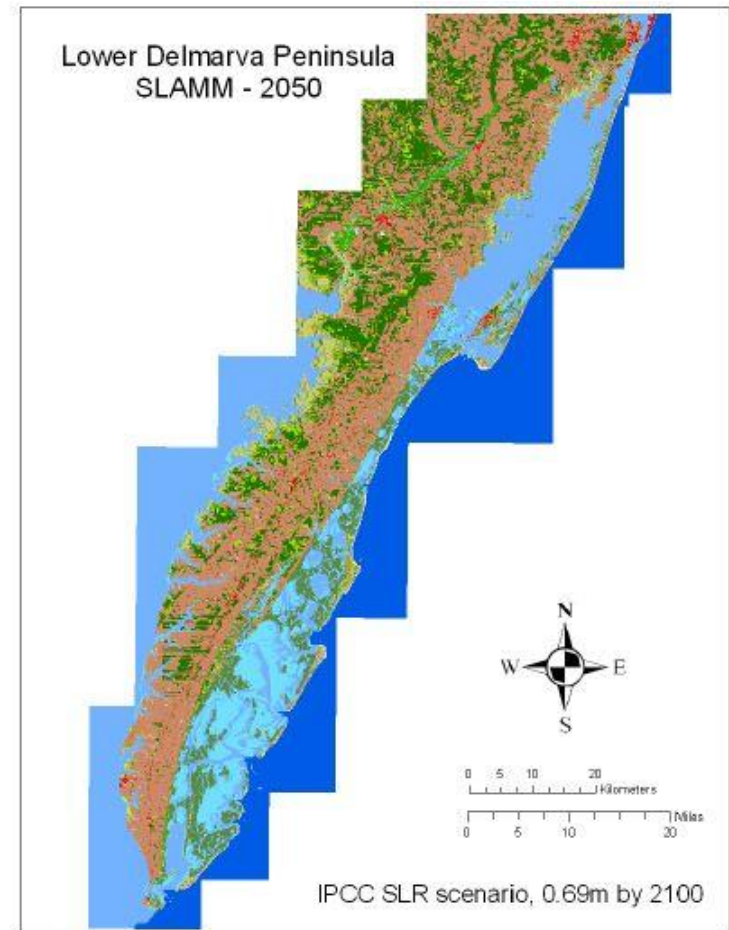
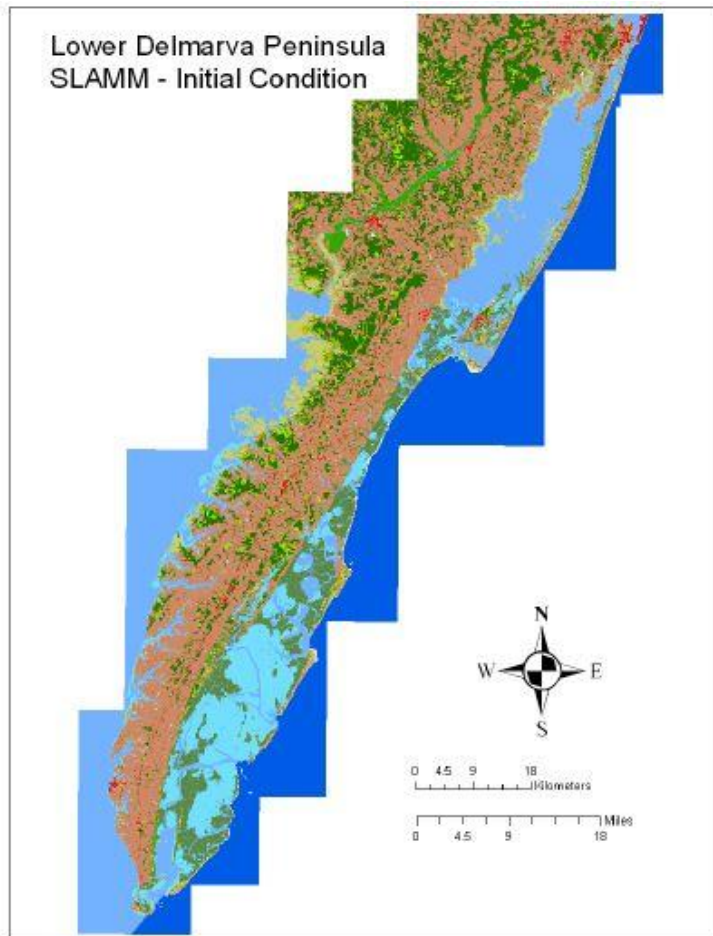
## Focus on Coastal Work

- Coastal “Rapid” Updates
  - Science Program
- Recent Data
  - CTDEEP: Connecticut
  - PADEP: Delaware River Estuary
  - NWI/DNREC: Delaware
  - NWI: LI, New York; Maryland, James River (VA)
  - Refuges I&M: Select coastal refuges





# Geospatial Data Used for SLAMM

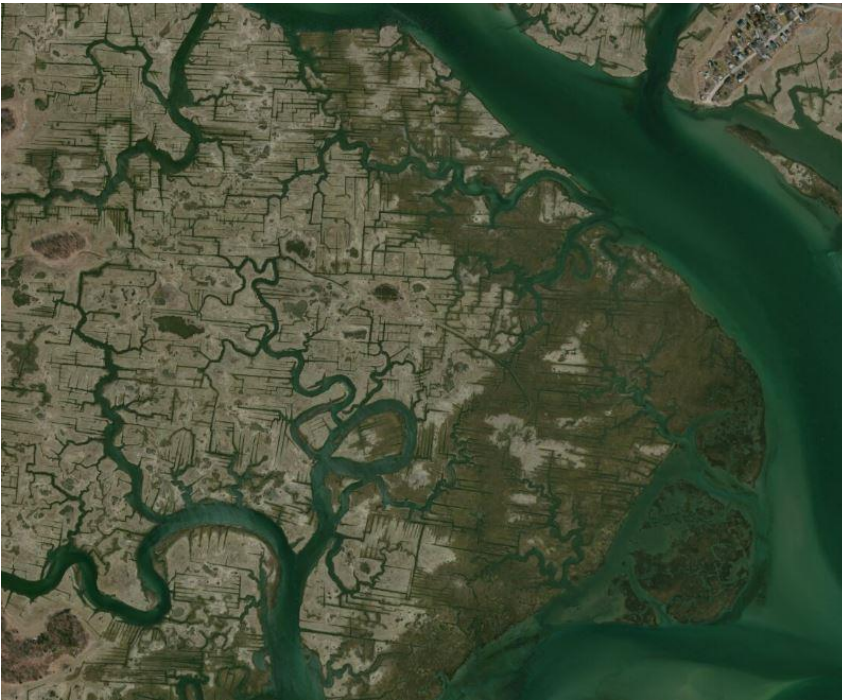


# Issues for Modeling

- Mapping of high vs. low marsh
- What really is the low marsh?
  - Regularly flooded zone vs. Irregularly flooded zone
  - *Spartina alterniflora* tall form and short form vs. *Spartina patens*/*Distichlis*, etc.
  - *Spartina alterniflora* short form – low marsh or lower high marsh

# Imagery Issues – Tide Stage

2010



1998





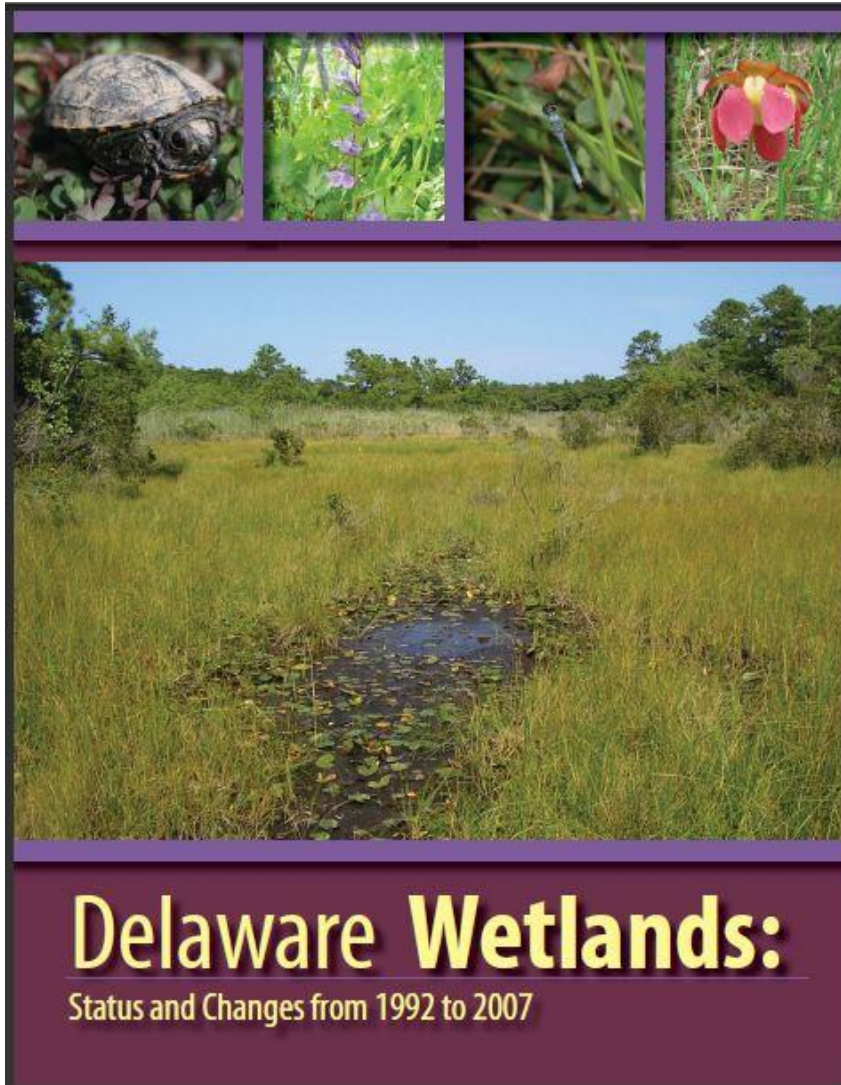




# Monitoring Coastal Change

- Aerial imagery: NWI trends analysis with map updates
  - Full quads
  - Statistical sampling – 4-sq. mile plots
- On the ground – permanent plots at NWRs and partner's conservation areas

# Trends Analysis Reports



## **DELAWARE: 1992-2007**

- Cooperative FWS-State Effort
- 580 acres of estuarine marshes lost – 482 to open water and 56 to tidal flats
- 341 acres gained – 328 from open water
- Net loss = 239 acres (0.3% of estuarine tidal marshes)

# Other Coastal Marsh Trends

Connecticut: 1990-2010

- E2EM = -11.0
- E2SS = +7.9
- E2US = -25.1
- Net loss = -28.2 acres (0.2%)

LI, New York: ~1900-2004

- 50% loss
- Did not document causes

Dorchester County, MD:  
1982-1989

- ~1000 acres of dying pine forest along salt marsh; 34 acres became salt marsh
- Salt marsh to open water = 17 acres

# Ches Bay Trends – In Progress

- EPA funded effort
- Approximately 70 USGS quads
- Two time eras: ~1995/6-2005 and 2005-2011/12



# Documenting Marsh Migration



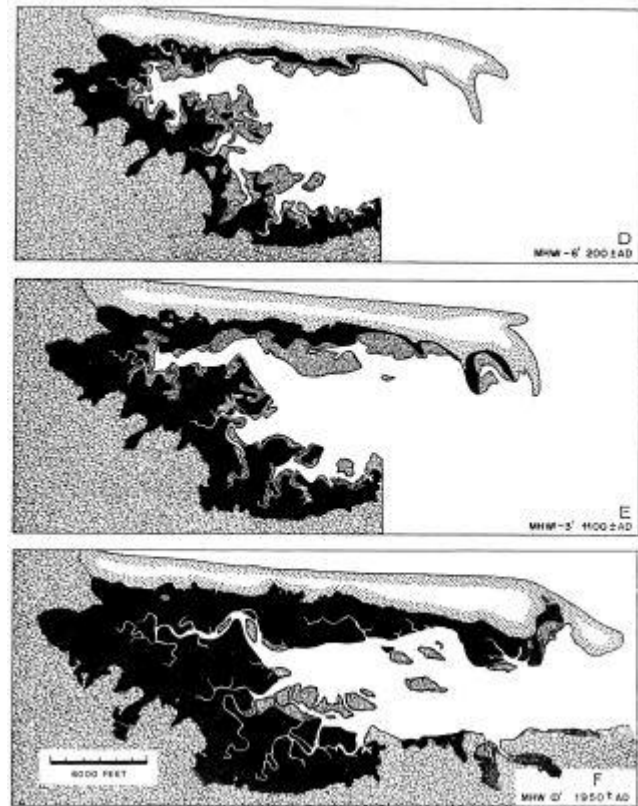
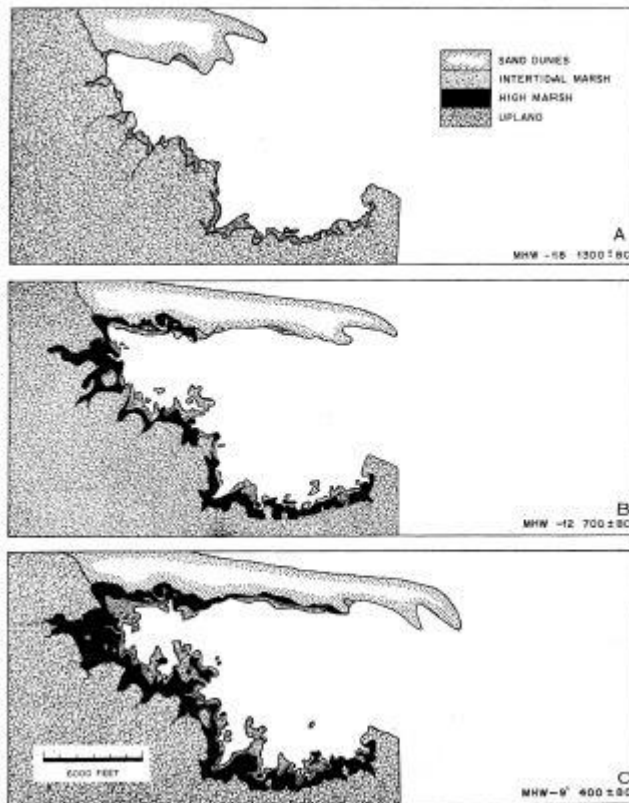
# Marsh Resilience

- Ability to recover from Hurricane damage
  - What were the specific impacts of concern?
  - How to address them?
- Ability to adapt to rising sea-level due to climate change
  - How to maintain the tidal marsh ecosystem in the long-term?

# Marsh Development

**Resilience –the ability of the marsh system to adapt to rising sea-level**

**Redfield 1965/1972  
Barnstable Marsh, Cape Cod, MA  
1300 BC to 1950 AD**



# Marsh Migration into Lowland Forest: Delmarva Peninsula





# Monitoring Marsh Migration at NWRs+

- Document advance of marsh into lowland forests
- Establish permanent plots along +/- transects
  - From high marsh into forested wetland or upland forest
- Document baseline conditions and re-evaluate every 5- to 10-years (and ideally after major hurricane)
- Cooperators: NWRs, TNC, States of NH and CT

# Study Areas

- Forsythe NWR – 3 areas (20 plots)
- Cape May NWR and vicinity – 4 areas (13)
- Great Bay NWR and vicinity – 2 areas (17)
- Rachel Carson NWR – 2 areas (16)
- Barn Island WMA (CT) – 2 areas (9)
- Chincoteague NWR – 3 areas (22)
- Wallops Island NWR – 2 areas (10)

# First Monitor Step Completed for Forsythe NWR – Nov 12-13, 2014

- Hurricane Sandy hit area in late October 2012
- Significant changes found based on plot assessment
- Biggest change:
  - Jobs Creek Atlantic White Cedar Swamp
    - Virtually all trees in plot now dead
    - With open canopy, changes in herb layer

9/20/2010





9/6/2013



# Jobs Creek Transect

**2009**



**2013**





# Tree Canopy – JC1

November 13, 2014



- Working up report on findings for Forsythe
  - Expected completion by end of January
- May establish a plot or two further inland in cedar swamp, if any healthy stands remain

# Other NWI Data of Interest

- Inventories of potential wetland restoration sites
  - Tidally restricted wetlands
    - Road
    - Railroad
    - Development
  - Old fill sites (not developed)





U.S. Fish & Wildlife Service

## Potential Wetland Restoration Sites for Connecticut: Results of a Preliminary Survey

*May 2013*



- Connecticut
- Long Island, NY
- PA Del River Estuary
  - Nearly complete
- Ches Bay (select areas)
  - In progress

# Region's NWI Program

- Produced 2000-era geospatial data for modeling
- For select areas:
  - Evaluated historic/recent trends
  - Inventoried potential wetland restoration sites
  - Collaborated with refuges and others to establish permanent plots for monitoring marsh migration

