

Updating and Expanding National Wetlands Inventory Data for Connecticut

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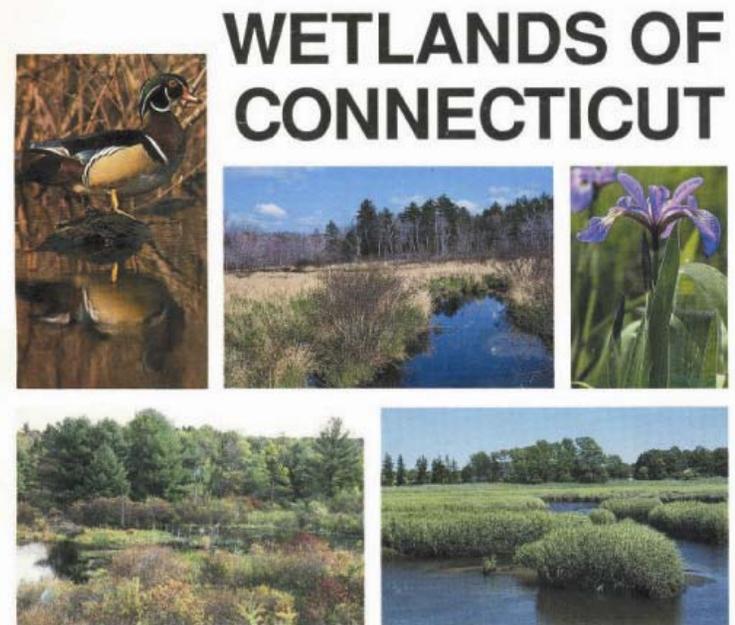
Presented at the 14th Annual Meeting of the Connecticut
Association of Wetland Scientists. "Striking the Ecological
Balance: What's New in Wetland Science?"

February 23, 2011, North Haven, CT

Current NWI Data

- Based on 1980-81 imagery
 - Some mid-70s (MA and RI border areas)
 - 1:80K photos with 1:12K as collateral
- Target mapping unit = 1 acre
- Completed in mid-1980s
- Published state report
 - CTDEP/FWS report (Metzler and Tiner 1992)
 - Posted online at:

<http://www.fws.gov/wetlands/documents/gOther/WetlandsConnecticut.pdf>



by Kenneth J. Metzler & Ralph W. Tiner

State Geological and Natural History Survey of Connecticut
in Cooperation with the U.S. Fish and Wildlife Service
National Wetlands Inventory

1980s Findings

- 172,548 acres of wetlands
- Occupy 5.5% of the state
- Mostly freshwater wetlands (88%)
 - Forested types dominate (67% of FW wetlands)
- Estuarine wetlands = 11%
 - Mostly marshes (64%); rest = flats
- Most abundant in New London County, followed by Windham, Litchfield, and Hartford Counties (each with >20,000 acres)

Connecticut Updates

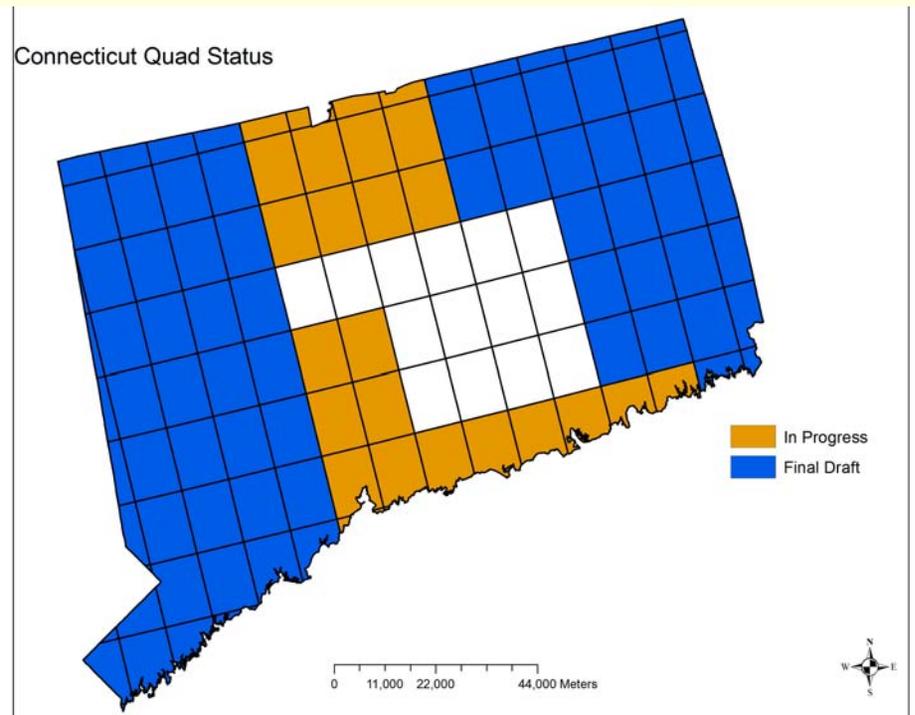
- Funded by CTDEP
- Includes the following:
 - Basic update of NWI mapping
 - More detailed
 - Enhanced mapping = NWIPlus
 - Preliminary assessment of wetland functions
 - Analysis of recent wetland trends
 - Inventory of potential wetland restoration sites
 - Summary Reports

Updated Mapping

- Using 2008 CIR imagery supplemented with leaf-off 2004 B&W photos
 - Target mapping unit = ½ acre
 - Consistent with Federal Geographic Data Committee's federal wetland mapping standard
 - Applying Cowardin et al. classification
 - Includes potential wetland areas based on hydric soil mapping units – undeveloped but lacking a reliable wetland photo-signature (“H-wetlands”)
 - Adding abiotic descriptors to expand information in the geospatial database

Work is done in phases

- Phase 1
 - Update standard NWI
 - Status – draft data for about 2/3s of the state
- Phase 2
 - Enhance NWI data (NWIPlus Database)
- Phase 3
 - Finish other analyses
 - Prepare reports



Enhanced Classification = NWIPlus

- Abiotic Descriptors (LLWW descriptors)
 - Landscape Position – the relationship of a wetland to a contiguous waterbody
 - Landform – the physical shape of the wetland
 - Water Flow Path – the directional flow of water related to the wetland
 - Waterbody Type – more descriptive of lakes, ponds, estuaries, rivers, and streams

NWIPlus

- Expanded classification allows for
 - Better characterize wetlands
 - Further classify wetlands into more specific groups
 - Predict wetland functions for large geographic areas using NWI data
 - Preliminary landscape-level assessment

Landscape Position

- Relationship between a Wetland and a Waterbody
 - MARINE
 - ESTUARINE
 - LOTIC
 - LENTIC
 - TERRENE

Marine (ocean shores)



Estuarine (salt and brackish tidal wetlands)



Lentic (wetlands in lake basins)



Lotic (wetlands overflowed by rivers and streams)



Terrene

(isolated, source of streams, or decoupled from waterbody)

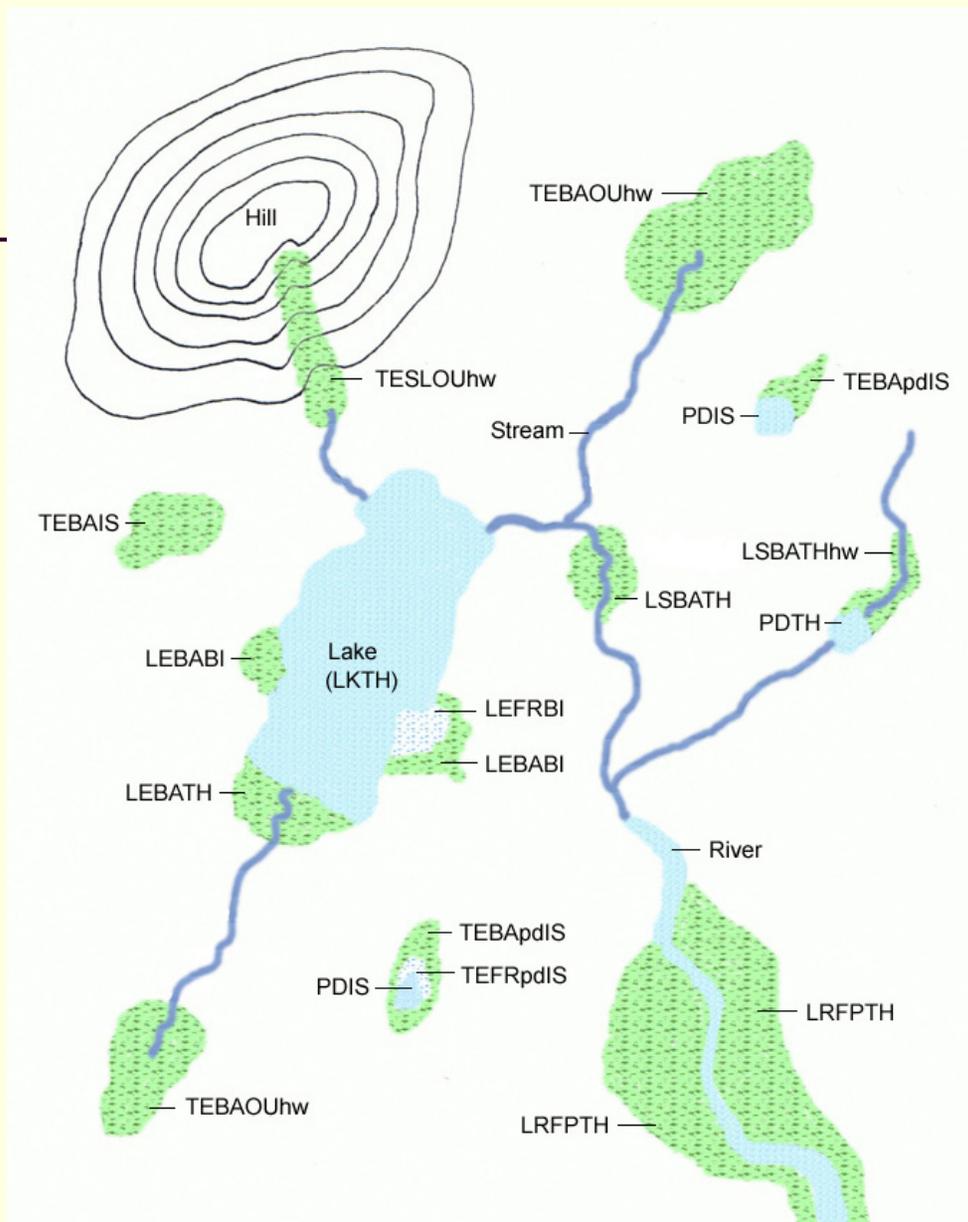


Landforms

- Slope (>2%)
- Island
- Fringe
- Floodplain (basin, flat, island)
- Basin
- Flat

Water Flow Path

- Bidirectional-tidal
- Bidirectional-nontidal
- Throughflow
- Outflow (perennial, intermittent, artificial)
- Inflow
- Isolated (no channelized surface water connection)



Waterbody Types

- More specific types:
- Estuary: Drowned River Valley, Bar-built;
 - Macrotidal, Mesotidal (6-12 ft tides), Microtidal
 - Circulation patterns – salt-wedge, homogenous, partially mixed
- Rivers/Streams: gradients, dammed
- Lakes: natural, dammed (reservoir)
- Ponds: natural (woodland-wetland, woodland-dryland, sinkhole-woodland, sinkhole-prairie, Carolina bay, cypress dome, vernal-woodland, interdunal, floodplain, grady, other), dammed/impounded (aquaculture, agriculture, industrial, golf, stormwater, etc.), excavated (etc.), beaver

Other Descriptors - Examples

- Headwater*
- Floating mat
- Drainage divide*
- Partly drained*
- Coastal island
- Freshwater wetland discharging directly into an estuary*
- Overwash
- Tidally restricted (road or railroad)*

*typically applied

NWIPPlus for Functional Assessment

- Landscape-level Assessment
- Preliminary
 - Based on existing geospatial data
- Apply to watersheds
- Match descriptors in NWIPPlus database with wetland functions

Preliminary Functional Assessment

- Surface Water Detention (nontidal)
- Streamflow Maintenance
- Shoreline Stabilization
- Nutrient Transformation
- Carbon Sequestration
- Coastal Storm Surge Detention
- Sediment and Other Particulate Retention
- Fish and Wildlife Habitat
 - Fish and Shellfish
 - Waterfowl and Waterbirds
 - Other Wildlife
- Habitat for Unique, Uncommon, or Highly Diverse Wetland Plant Communities (formerly Conservation of Biodiversity)

Coordinated Effort To Develop Correlations

- Reviewed literature
- Worked with wetland specialists in the East
 - Maine Wetland Advisory Group
 - NYCDEP
 - Nanticoke Wetlands (MD/DE) Study Group
 - FWS biologists
 - Georgia Coastal Scientists
 - Others
- Correlation Report
- [Review prior to use in other geographic regions](#)



Developing Functional Correlations

- Correlate Functions with Characteristics
 - Some emphasize LLWW descriptors
 - Surface Water Detention
 - Streamflow Maintenance
 - Some only use general wetland type/water regime
 - Nutrient Transformation
 - Habitat for Other Wildlife
 - Others rely on general wetland type/water regime + LLWW
 - Shoreline Stabilization
 - Sediment Retention
 - Habitat for Fish and Shellfish
 - Habitat for Waterfowl and Waterbirds
 - Habitat for Unique, Uncommon, or Highly Diverse Wetland Plant Communities

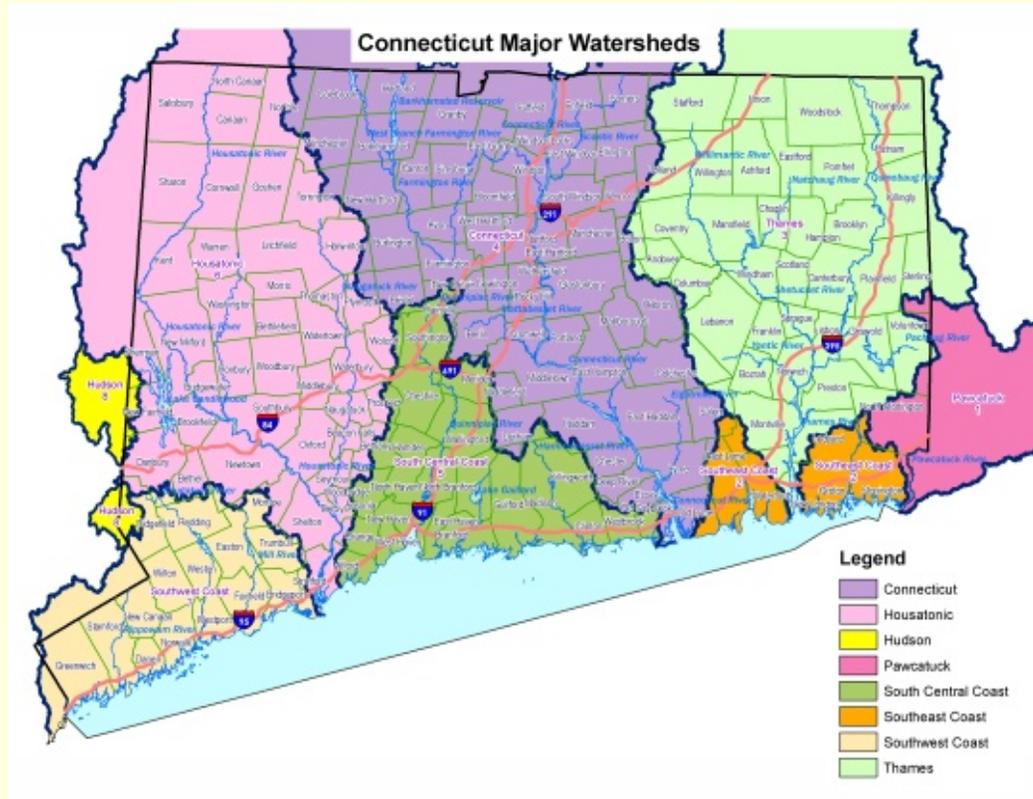
Limitations of Landscape-level Assessment

- First approximation
- Source data limitations
 - All wetlands not shown
 - Possible upland inclusions
 - All streams not shown
 - Age of data (not an issue if done with updated data!)
- Enhanced wetland classifications based largely on photo and map interpretation plus merging with other databases (e.g., streams)
- Correlations between functions and characteristics (regional variations)

Example of Watershed Report Using NWIPlus Database

Type of Reports that will be produced for Connecticut

- Assessment of Wetland Functions for Major Watersheds



Hackensack River Watershed

Characterization and Functional Assessment

By Ralph W. Tiner
and Herbert C. Bergquist
National Wetlands Inventory
Program
Ecological Services
U.S. Fish and Wildlife Service
Northeast Region
300 Westgate Center Drive
Hadley, MA 01035

Produced by the U.S. Fish and
Wildlife Service
National Wetlands Inventory
Program
Ecological Services,
Northeast Region
Hadley, MA

September 2007

U.S. Fish & Wildlife Service

The Hackensack River Watershed, New Jersey/ New York:

*Wetland Characterization,
Preliminary Assessment of
Wetland Functions, and Remotely-
sensed Assessment of
Natural Habitat Integrity*

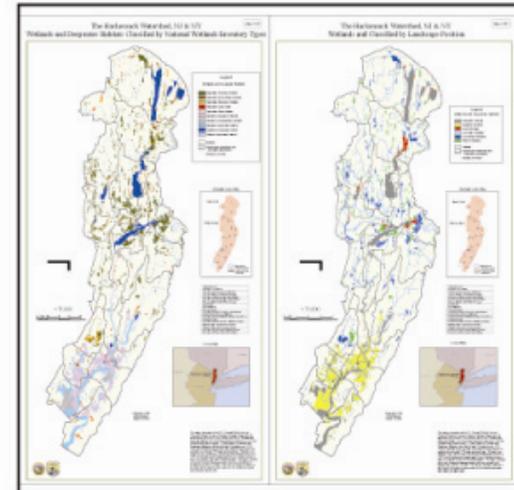


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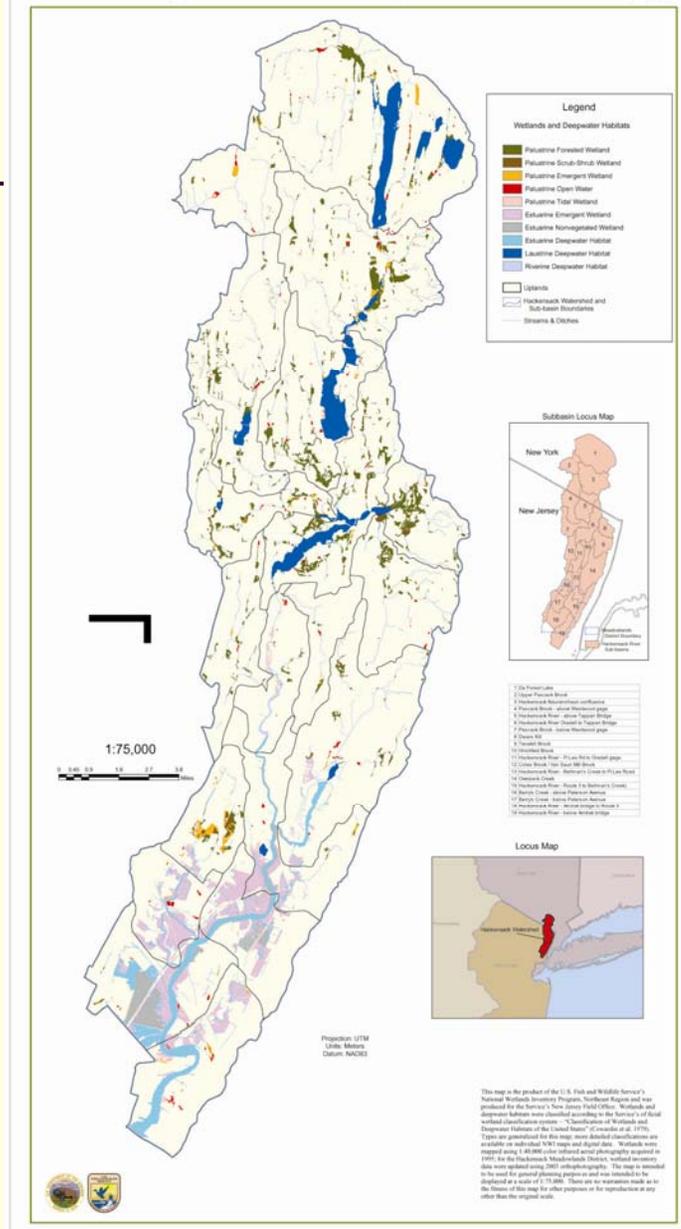
Watershed Stats

Wetland Characterization

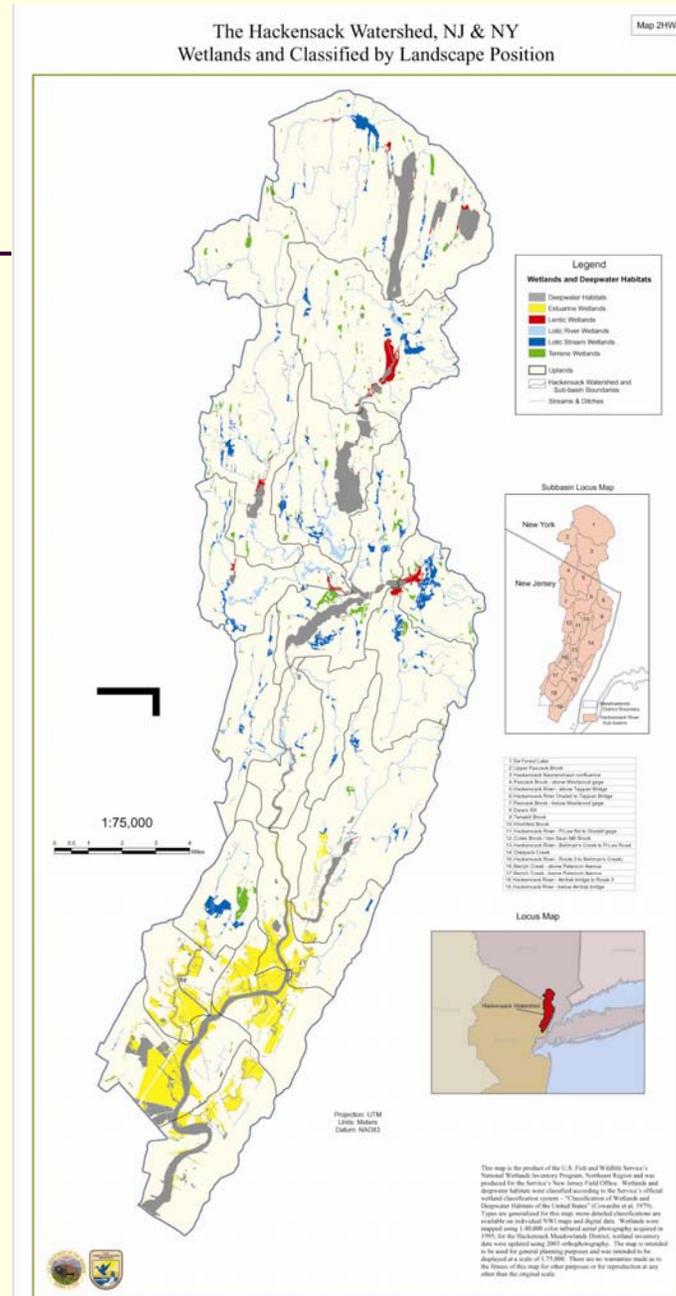
- 9,650 acres
- 42% estuarine emergent
- 33% palustrine forested
- 13% estuarine unconsolidated shore
- 25% lotic
- 5% lentic
- 11% terrene
- 4% ponds
- 61% tidal
- 25% throughflow
- 7% outflow
- 5% isolated
- 2% bidirectional-nontidal

Thematic Maps: NWI Types - wetlands and deepwater habitats

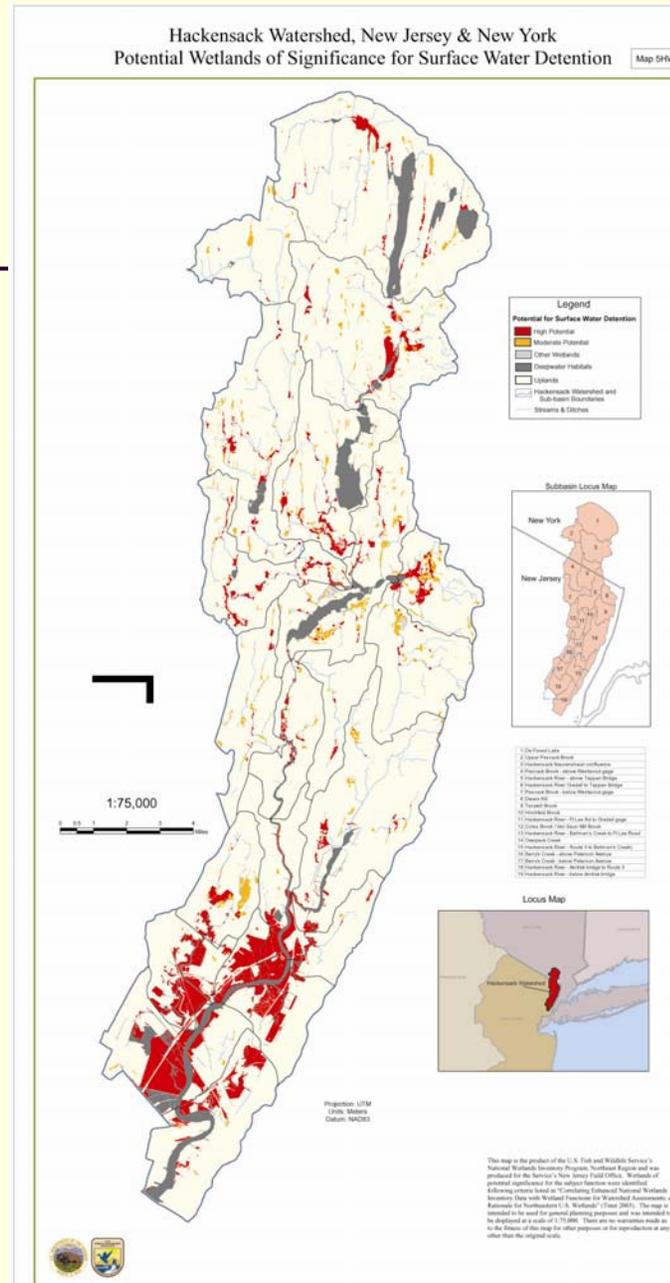
The Hackensack Watershed, NJ & NY
Wetlands and Deepwater Habitats Classified by National Wetlands Inventory Types



Landscape Position: Estuarine Lotic Lentic Terrene

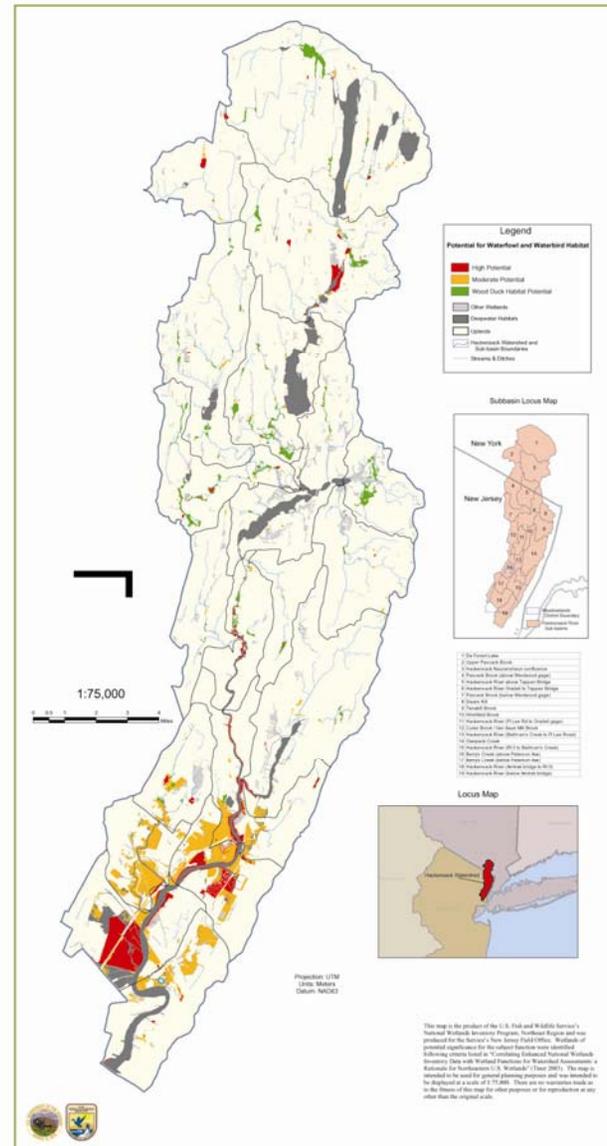


Wetland Functions: Surface Water Detention



Waterfowl & Waterbird Habitat

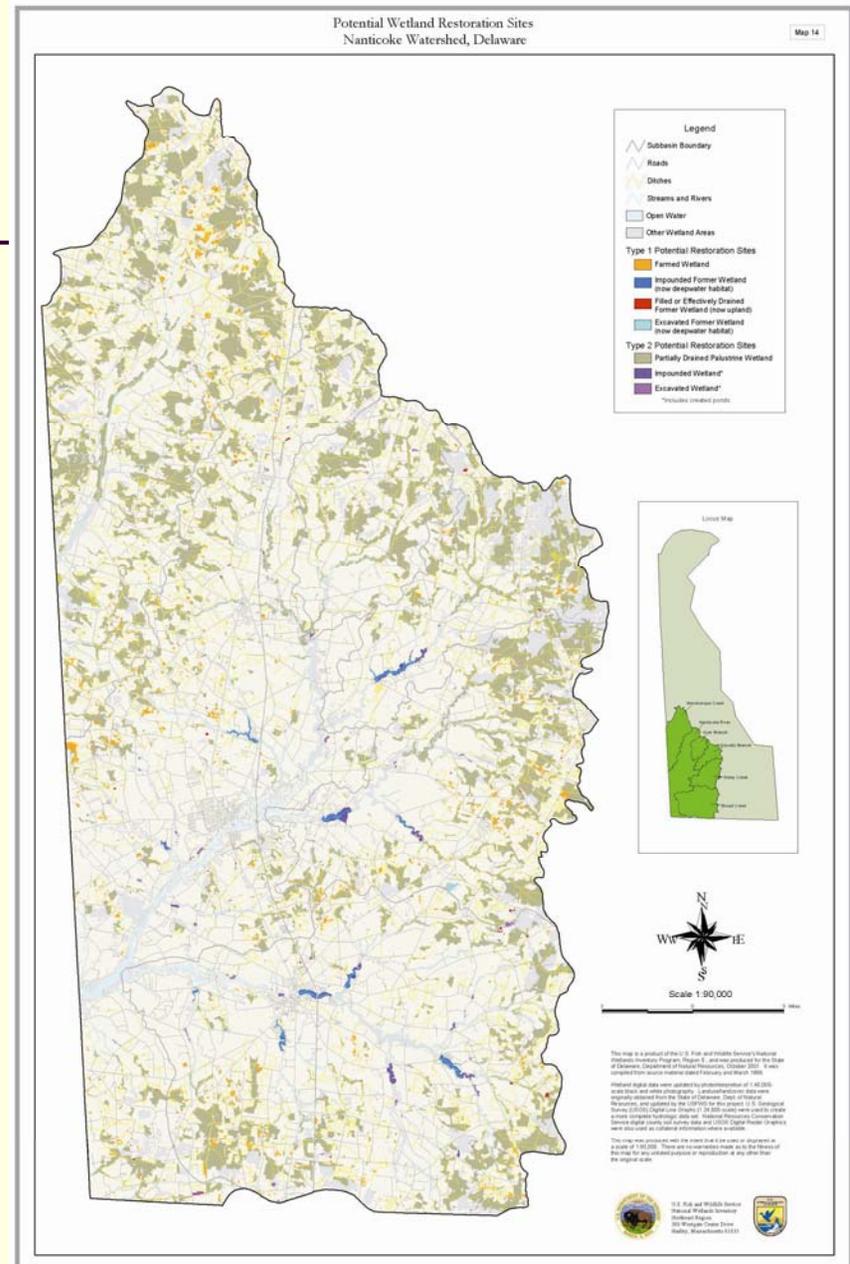
Hackensack River Watershed, New Jersey/New York
 Potential Wetlands of Significance for Waterfowl and Waterbird Habitat



Other Aspects of Connecticut Project

- Recent wetland trends (2008 vs. early 1980s)
 - Image to image comparison
- Inventory of potential wetland restoration sites
 - Hydric soil mapping units not mapped as wetland and in land use suitable for restoration
 - Type 1 (former wetlands – effectively drained, filled, or impounded water)
 - Type 2 (existing impaired wetlands – diked, partly drained, farmed)

Inventory of Potential Wetland Restoration Sites



Reports

- State Summary Report
 - Status
 - Recent Trends
 - Potential Wetland Restoration Sites
- Watershed-based Wetland Characterization and Preliminary Functional Assessment Reports
 - Major watersheds
- Expected completion – early 2012

Soliciting Help for Draft Data Review

- Interested in volunteering?
- Send me via email:
 - Letter of interest outlining
 - Your current work
 - Your technical skills (experience in wetland delineation, botanical and/or soil coursework, specialized training, etc.)
 - Geographic area of interest (ideally what 2-4 USGS quads you'd be interested in reviewing)
- Email: ralph_tiner@fws.gov

Questions?

