

ENHANCING THE NATIONAL WETLAND DATABASE FOR LANDSCAPE-LEVEL WETLAND FUNCTIONAL ASSESSMENT

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National Wetland Database

- U.S. Department of the Interior
Fish & Wildlife Service
- National Wetlands Inventory Program
(NWI)



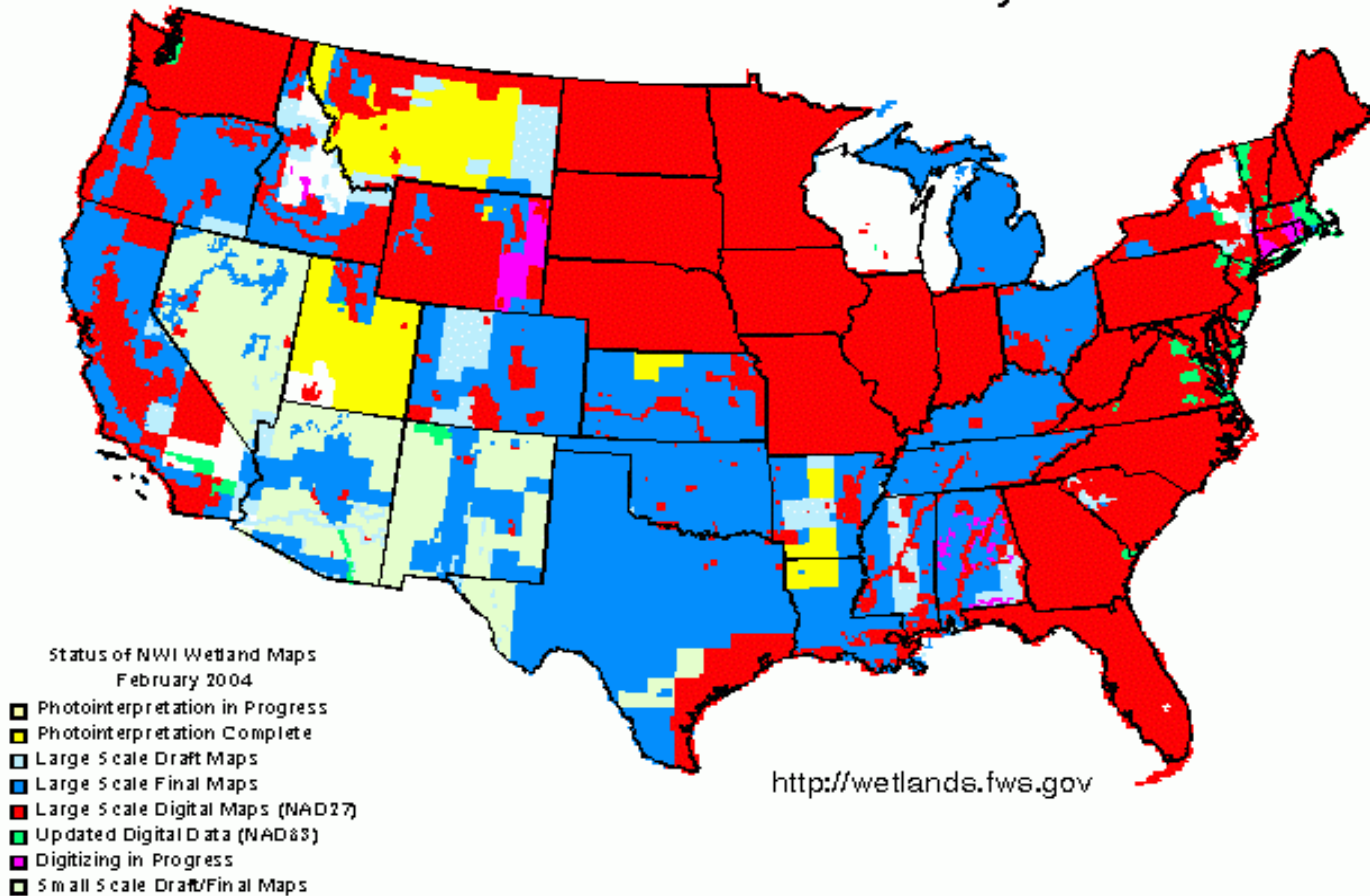
NWI Products

- NWI maps
 - 91% of conterminous U.S.
 - 35% of Alaska
- NWI digits (**the National Wetland Database**)
 - 40% coterminous U.S.
 - 18% of Alaska
 - Access: <http://wetlands.fws.gov>
- Reports



Status of NWI Maps/Digits

National Wetlands Inventory Status



FWS Classification System

- Characteristics Emphasized
 - Vegetation
 - Hydrology
 - Salinity
 - Soils and substrates
 - Human impacts



Conterminous U.S. Wetlands 1997

- **95% of wetlands = Palustrine (100.2M)**
 - 51% Forested
 - 25% Emergent
 - 18% Scrub-Shrub
 - 6% Pond
- **5% = Estuarine (4.6M)**
 - 74% Emergent
 - 13% Scrub-Shrub
 - 13% Nonvegetated



Some Questions

How many wetlands are there?

How much and how many

- occur along rivers? Along streams?
In lake basins?
- are isolated?
- are sources of streams?
- have inflow but no outflow?



FWS Classification Shortcomings

- Shortcomings
 - No landscape position
 - No landform
 - No water flow direction
 - Features important for assessing many functions
- Most of these features can be interpreted from the maps



Needs for Enhancing the NWI Database

- Better characterization of wetlands for national wetland database
- Perform landscape-level functional assessments
- Help assess significance of wetland losses
- Predict functions expected from potential wetland restoration sites



Add New Descriptors to the NWI Database

LLWW Descriptors

- Landscape Position - relationship between a wetland and an adjacent waterbody or not
- Landform - shape or physical form
- Water Flow Path –directional flow of water
- Waterbody Type



Landscape Position

- **Marine** – along ocean shores
- **Estuarine** – in an estuary
- **Lotic** - in or along rivers and streams or on floodplain
- **Lentic** - in or along lakes
- **Terrene** – completely surrounded by upland or nearly so; not flooded by rivers or streams



Marine



Estuarine



Lentic



Lotic



RIVER



STREAM

Terrene



Landforms

- Slope
- Island
- Fringe
- Floodplain (basin, flat)
- Interfluve (basin, flat)
- Basin
- Flat



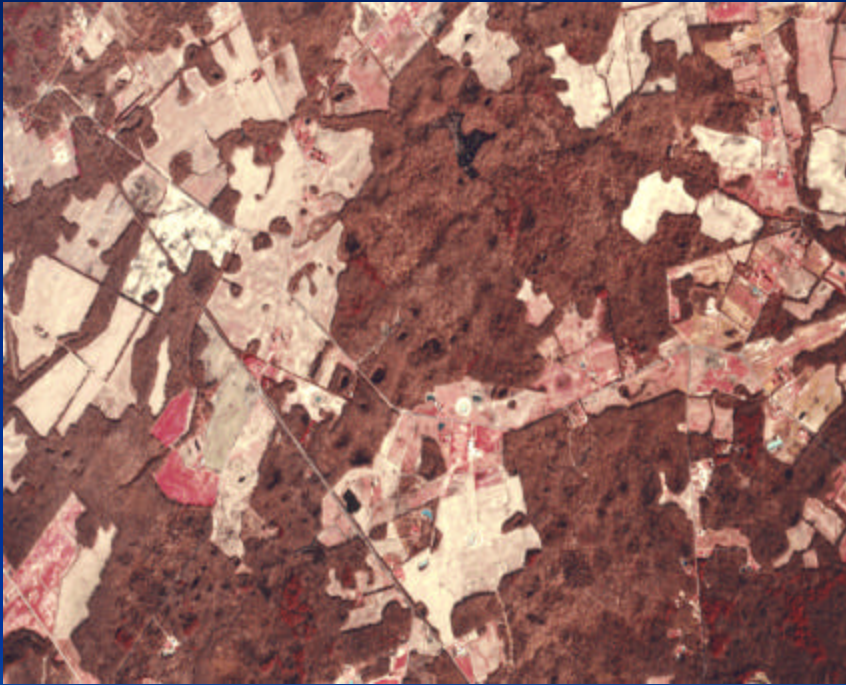
Fringe



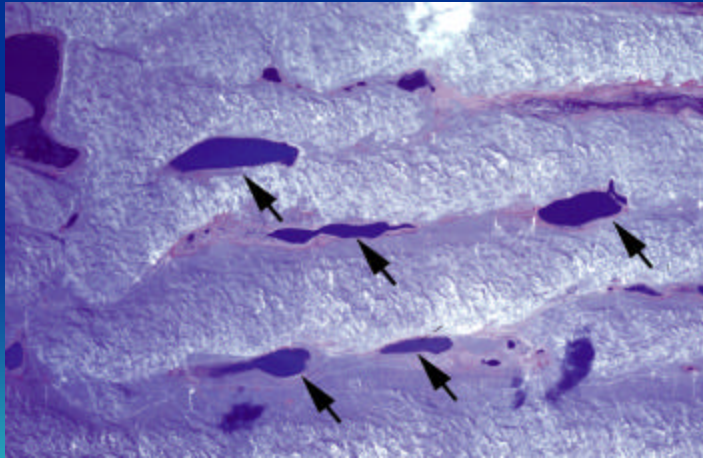
Floodplain



Interfluve Flat



Basin



Water Flow Path

- Bidirectional Tidal
- Bidirectional Nontidal
- Throughflow (intermittent, entrenched, artificial)
- Outflow (artificial)
- Inflow
- Isolated
- Paludified



Mostly Map Interpretation



Waterbody Types

- River and Stream Gradients (tidal, dammed, intermittent, high, middle, and low)
- Lakes (e.g., natural, dammed river valley-reservoir, other dammed, excavated)
- Ponds (e.g., natural, artificial, beaver, sinkhole, farm, golf, prairie pothole, vernal)
- Estuary (e.g., drowned river valley, bar-built)
- Ocean (e.g., open, reef-protected, atoll, fjord)



Preliminary Functional Assessment

- Possible Functions
 - Surface Water Detention
 - Streamflow Maintenance
 - Shoreline Stabilization
 - Nutrient Transformation
 - Coastal Storm Surge Detention
 - Sediment Retention
 - Fish and Wildlife Habitat



Developing Functional Correlations

- Correlate Functions with Characteristics
 - Some emphasize LLWW descriptors
 - Surface Water Detention
 - Streamflow Maintenance
 - Some only use NWI
 - Nutrient Transformation
 - Habitat for Other Wildlife
 - Others rely on NWI + LLWW
 - Shoreline Stabilization
 - Sediment Retention
 - Habitat for Fish and Shellfish
 - Habitat for Waterfowl and Waterbirds



Coordinated Effort To Develop Correlations

- Reviewed literature
- Worked with wetland specialists in the Northeast
 - Maine Wetland Advisory Group
 - NYCDEP
 - Nanticoke Wetlands Study Group
 - FWS biologists
 - Others



Data for Watershed-based Wetland Assessments

- **Primary Source Data**
 - NWI Digital Data
 - USGS Digital Hydro Data (1:24K)
- **Other Sources**
 - USDA Digital Soil Survey Data
 - State Wetland Digital Data
 - More Detailed Hydro Data
 - Aerial Photos



Steps

1. Update NWI digits (**improve the data**)
2. Build wetland database for study watershed
3. Classify LLWW (**expand the data**)
4. Review and edit LLWW classifications
5. Apply functional correlations to database (**interpret the data**)
6. Review stats/working maps
7. Produce draft report/maps (CD format) (**generate new data**)
8. Peer review
9. Produce final report/maps (CD format)



Study Areas

- Casco Bay Watershed (ME)
- New York City Water Supply Watershed
- Small watersheds (NY)
- Coastal Bays Watershed (MD)
- Nanticoke River Watershed (MD/DE)
 - 1998 and Pre-settlement analyses
- Pennsylvania Coastal Zone

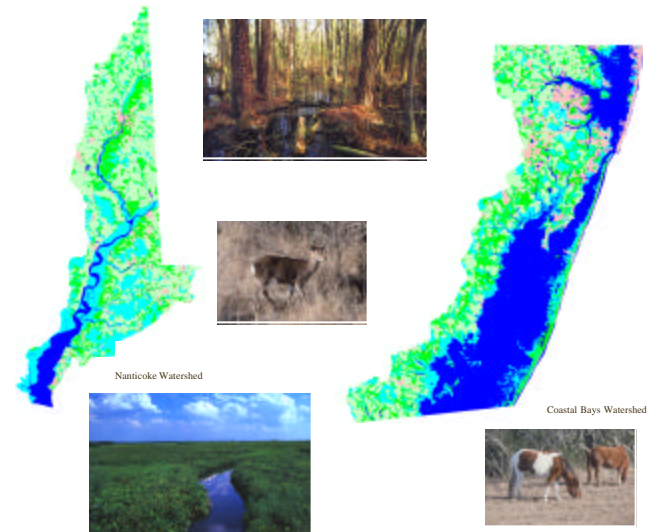


Web-based Watershed Report

- CD Version
- View on Internet at:
wetlands.fws.gov

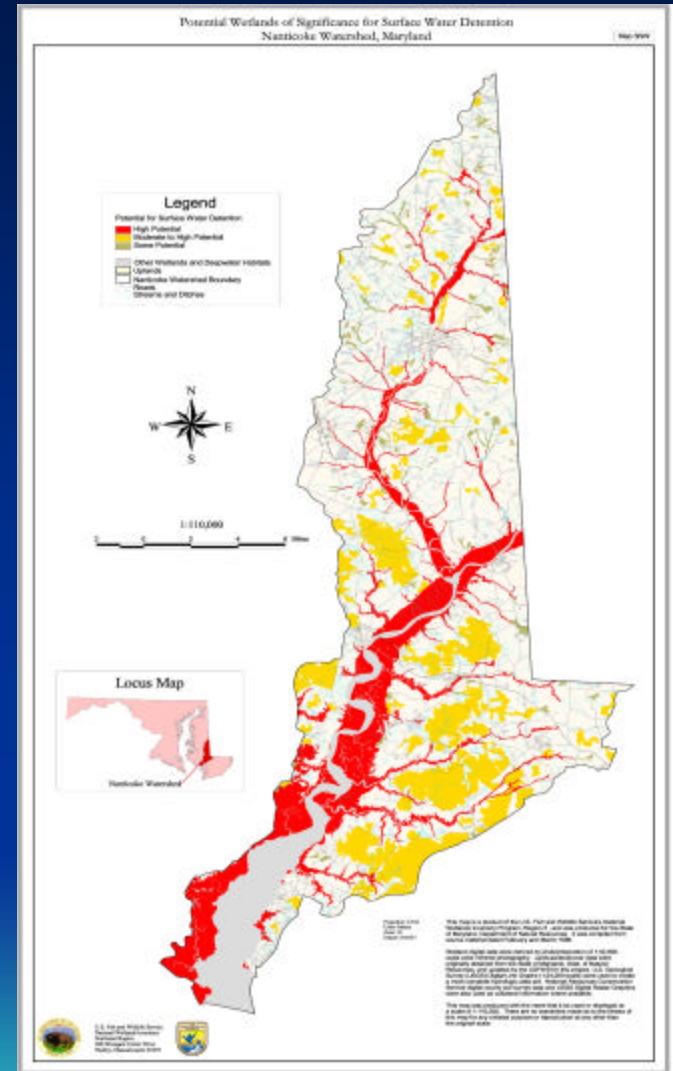
National Wetlands Inventory

Watershed-based Wetland Characterization for Maryland's Nanticoke River and Coastal Bays Watersheds:
A Preliminary Assessment Report



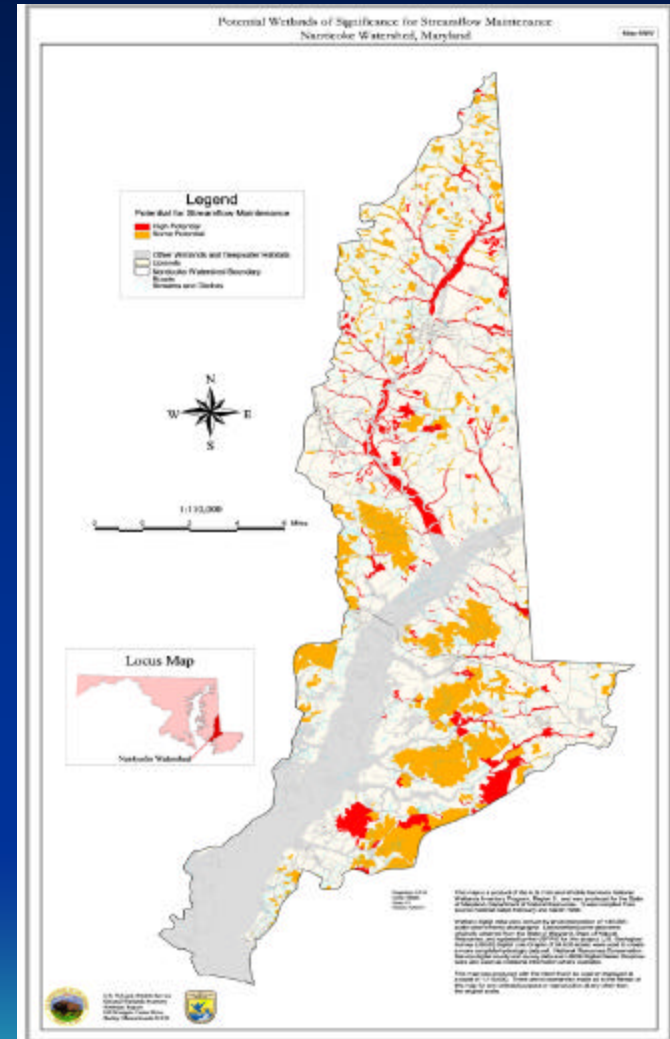
Nanticoke Watershed - Surface Water

28% High
69% Moderate
(97% of all wetlands)



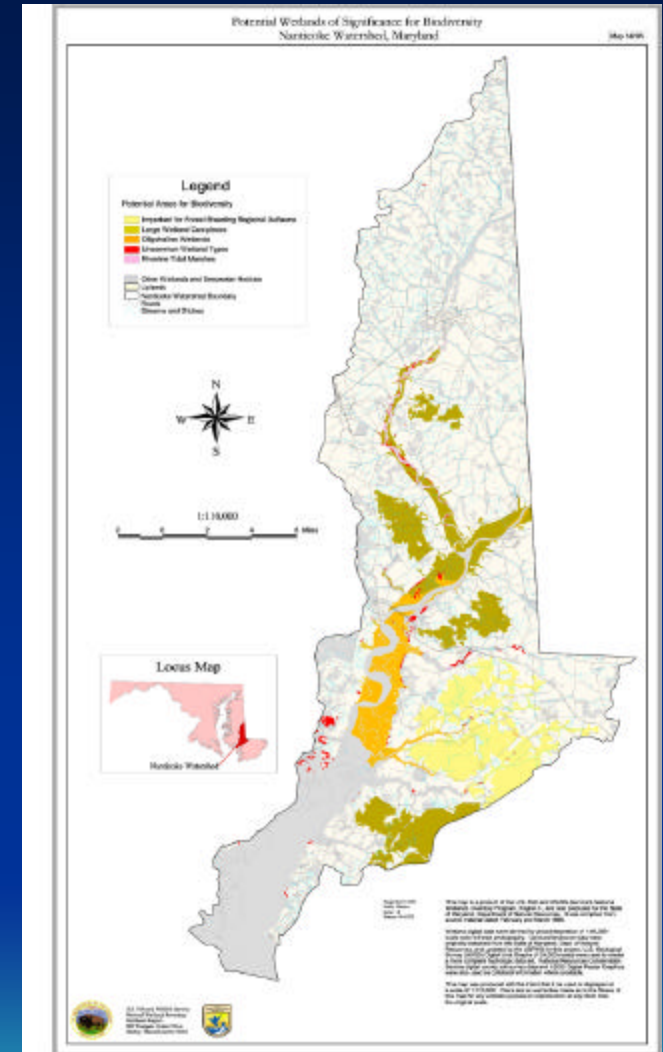
Nanticoke Watershed - Streamflow Maintenance

17% H
58% M
(75%)



Nanticoke Watershed - Biodiversity

25%

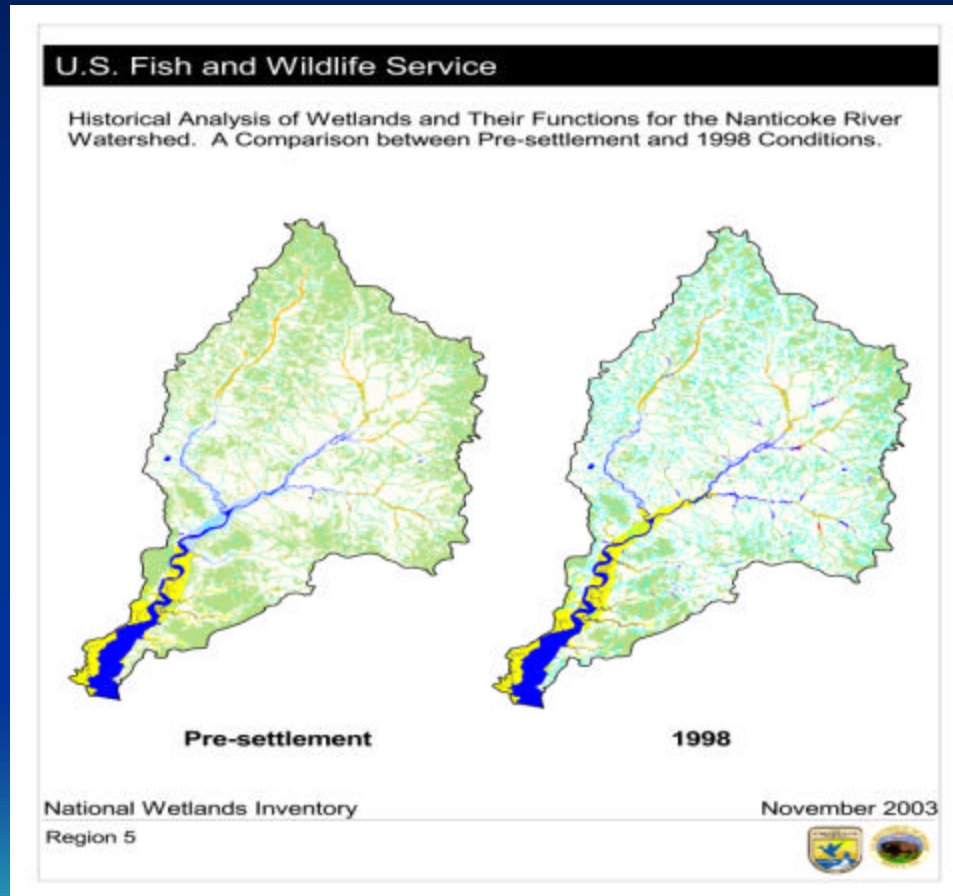


Limitations of Landscape-level Assessment

- First approximation
- Source data limitations
 - All wetlands not shown
 - Possible upland inclusions
 - All streams not shown
 - Age of data
- LLWW wetland classifications based largely on map interpretation (field review variable)
- Correlations between functions and characteristics = work in progress (report available for Northeast US)



Historical Analysis – Cumulative Impacts



Pre-settlement vs. 1998 Nanticoke River Watershed

Pre-settlement

- 230,000 acres
- 2,809 wetlands
- 72% = interfluve outflow wetlands
 - Aver. Size = 433 a

1998

- 142,000 acres (=62%)
- 5,810 wetlands
- 43% decrease in interfluve outflow type
 - Aver. Size = 44 a
- Palustrine -40%
- Estuarine -28%



Functional Losses for Nanticoke

- Surface Water Detention -36%
- Streamflow Maintenance -64%
- Nutrient Transformation -47%
- Sediment Retention -46%
- Coastal Storm Surge Detention -23%
- Fish/Shellfish Habitat -28%
- Waterfowl/Waterbird Habitat -30%
- Other Wildlife Habitat -41%



Uses of Enhanced NWI Data

- Watershed characterization of wetlands
- Landscape-level wetland functional assessments
- Functional loss assessments as part of wetland trend studies
- Restoration planning



Bottomline

- By adding **LLWW descriptors** to wetland data you gain a powerful tool to begin reporting status and trends of wetland functions for large geographic areas.



For Additional Information

To view sample watershed report:

<http://wetlands.fws.gov>

For most recent information:

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