NWI+ Data and Wetlands One-Stop Web Mapper – New Information to Aid Wetland Conservation and Restoration in Delaware

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Brief Overview of the Delaware Wetland Mapping Project

Delivery of Geospatial Data via the Wetlands One-Stop Web Mapper
  - What’s on the Mapper

Possible Applications of the New Data
By 2007, Delaware wetlands data were 15 years old
- state wetland data from 1992
- FWS data from the 1980s
The FWS did a trends analysis from 1981/2-1992 (analysis covered ~60% of the state)
In 2008, Virginia Tech’s Conservation Management Institute began working on an update of the NWI data for Delaware (FWS-Sussex County; DNREC – other counties)
Project Objectives

- Produce 2007 wetlands inventory (more detailed than prior surveys)
- Identify other areas that may support wetlands based on prior soil surveys
- Generate landscape-level functional assessment of wetlands statewide
- Assess wetland trends from 1992-2007
- Produce a statewide inventory of potential wetland restoration sites
Sources for the Update/Enhancement

- 1980s NWI Data
- 1992 State Wetlands Data
- March 1992 CIR imagery
- 2007 digital imagery
- USGS topographic data (DRGs)
- USDA soils data
- USGS National Hydrography Data (NHD)
Produce a More Detailed Inventory
Updated and Enhanced NWI = NWI+

- Classify wetlands by Cowardin et al. (1979)
- Enhance classification
  - Add hydrogeomorphic (LLWW) descriptors
    - Landscape Position
    - Landform
    - Water Flow Path
    - Waterbody Type
    - Other Attributes

Dichotomous Keys and Mapping Codes for Wetland Landscape Position, Landform, Water Flow Path, and Waterbody Type Descriptors: Version 2.0
August 2011
Landscape Position

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

- Slope (>2%)
- Island
- Fringe
- Floodplain
- Basin
- Flat
Water Flow Path

- Bidirectional-tidal
- Bidirectional-nontidal
- Throughflow
- Outflow
- Inflow
- Isolated
Waterbody Types – More Specificity

- Estuary: Drowned River Valley, Bar-built;
  - Macrotidal, Mesotidal (6-12 ft tides), Microtidal
  - Circulation patterns – salt-wedge, homogenous, partially mixed
- Rivers/Streams: tidal, perennial, intermittent, dammed
- Lakes: natural, dammed (reservoir)
- Ponds: natural (woodland-wetland, woodland-dryland, sinkhole-woodland, sinkhole-prairie, Carolina bay, cypress dome, interdunal, floodplain, grady, other), dammed/impounded (aquaculture, agriculture, industrial, golf, stormwater, etc.), excavated (etc.), beaver
  - Note: Can add other types of interest – list is a first cut.
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)*
- Fragmented

*Applied to all NWI+ projects
Produce Other Wetland Data Layers

- **P-wet Areas**
  - Undeveloped hydric soil map units that were not mapped as NWI wetlands
  - Formerly called “H-wetlands” (DE report)

- **Potential Wetland Restoration Sites**
  - Former wetland areas (based on soils)
  - Impacted existing wetlands (e.g., impounded, partly drained, farmed, tidally restricted)

- **Landscape-level Functional Assessment**
  - Wetlands of Significance
Functional Assessment

- Use NWI and LLWW types to predict wetland functions
  - Correlate properties in database with functions
- Preliminary Landscape-level Assessment
  - Based on geospatial data
- Apply to watershed, coastal zone, county, or entire state
Coordinated Effort To Develop Correlations

- Reviewed literature
- Worked with wetland specialists in the Northeast
  - Maine Wetland Advisory Group
  - NYCDEP
  - Nanticoke Wetlands Study Group
  - DNREC biologists
  - FWS biologists
  - Others
- Should review prior to use in other geographic regions
  - Reviewed/revised for coastal Georgia, Wisconsin, and New Mexico
- User Adaptable (can modify functions of interest)
Preliminary Functional Assessment

- Surface Water Detention (inland wetlands)
- Coastal Storm Surge Detention
- Streamflow Maintenance
- Bank and Shoreline Stabilization
- Nutrient Transformation
- Carbon Sequestration
- Sediment and Other Particulate Retention
- Provision of Fish and Wildlife Habitat
  - Fish and Aquatic Invertebrates
  - Waterfowl and Waterbirds
  - Other Wildlife
- Provision of Habitat for Unique, Uncommon, or Highly Diverse Wetland Plant Communities (formerly Conservation of Biodiversity; based on mapped types not through field surveys)
Limitations of Landscape-level Assessment

- Preliminary assessment
  - Based on image/GIS analysis; not field checked

- Source data limitations
  - All wetlands not shown
  - Possible upland inclusions
  - All streams not shown
  - Accuracy of wetland classification
  - Age of data

- Enhanced wetland classifications based largely on photo and map interpretation plus merging with other databases (e.g., streams)
NWI+ Data and Reports Posted Online

- ASWM’s Wetlands One-Stop Mapping
- [http://aswm.org/wetland-science/wetlands-one-stop-mapping](http://aswm.org/wetland-science/wetlands-one-stop-mapping)
  - Look under:
    - NWI+ Mapper for display of results
    - NWI+ Reports for copies of summary reports
Wetlands One-Stop Mapper - Views

Examples
Opening Page - Footprints of Projects
Landscape Position (Default) with Map Contents Opened
Landscape Position with Map Options
NWI Types with Legend
Landscape Position with Legend
Landscape and “Wetland Code” Table
Landform with Legend
Water Flow Path with Legend
Function Map – Coastal Storm Surge Detention
Function Map – Provision of Waterfowl/Waterbird Habitat
Potential Restoration Sites – Both Layers On (Type 1 and Type 2 Sites)
Restoration Type 1 Site w Code Table
Potential Wet Areas (P-wet areas based on soil mapping; “H-wetlands”)
P-Wet Area with Soil Code and Potential Type 1 Restoration Layer also Open (CT)
Print Map – NWI Types (example)

NWI + Data - US Fish & Wildlife Service/Virginia Tech
NWI+ Mapper

Sources: USGS, FAO, NPS, EPA, ESRI, DeLorme, TANA, and other suppliers
Import Other Data Layers for Viewing

- NHD Data
- Presence of Hydric Soil Data
Created the most comprehensive statewide wetland database in the country

- Wetland Inventory and Characterization
- Areas that May Support Wetlands based on Soil Mapping
- Potential Restoration Sites
- Statewide Landscape-level Functional Assessment
- **Better Characterization of Wetlands**
  - Can use for describing wetland types in the area of interest and as aid in selecting sites for monitoring and research

- **P-Wet Areas**
  - Identify where wetlands may be located that were not recognized through photointerpretation

- **Opportunities for Restoration**
  - Type 1 – former wetlands
  - Type 2 – existing wetlands with some impairment
Landscape-level Assessment of Wetland Functions

- Preliminary
  - Current capacity of “area of interest” to provide functions
- Can use to assess possible effect of cumulative losses on wetland functions since “settlement” (e.g., Nanticoke)
- Can use to assess significance of wetland changes on wetland functions between time periods (e.g., DE report)
  - Increase in some types while other types decline will alter performance of certain wetland functions
- When applied to potential wetland restoration sites (former hydric soils with restoration potential), provides perspective on likely functions to be improved
Conclusion

- The Delaware wetland database provides a wealth of data to aid efforts to manage, conserve, restore, and monitor wetlands.
- Given the extensive nature of the data, it should be relative cost-effective to update:
  - To track wetland changes over time
  - To assess the impact of those changes on wetland functions
- While NWI+ data and the mapper are useful tools for wetland managers, it is important to remember that it is not intended to replace the need for site-specific assessments and investigations.
Questions?

Check out NWI+ Data on the web at “Wetlands One-Stop Mapping”
http://aswm.org/wetland-science/wetlands-one-stop-mapping