




***Adapting NWI for Preliminary  
Assessment of Wetland Functions***






## ***Background***

- **NWI maps exist for about 90% of coterminous U.S. and 30% of Alaska; digits for 40%**
  - **FWS classification (1979)- vegetation, hydrology, salinity, soils, and impacts**
  - **FWS classification shortcomings - no separation by hydrogeomorphology which is impt. for determining certain functions**
  - **Brinson's HGM classification system (1993) - hydrologic and geomorphic controls influencing wetland functions**
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## ***Background (cont'd)***

- **HGM approach will develop models or functional profiles of certain types for use in functional assessment.**
  - **HGM shortcomings - labor intensive, data rich.**
  - **Availability of profiles in future will be an asset.**
  - **In meantime, more detailed classification of wetlands into types similar to or easily correlated with HGM types may provide means for preliminary assessments.**
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## ***Needs***

- **Preliminary watershed-based assessment of wetland functions**
  - **Better characterization of wetlands for national wetland database (enhance NWI)**
  - **Begin to answer the “so what” question in terms of assessing the significance of wetland losses**
  - **Preliminary assessment of functions to be expected from potential wetland restoration sites including mitigation bank wetlands**
  - **Another use of existing NWI maps/digital data**
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## ***Merging HGM with NWI***

- **Since about 40% of NWI maps are digitized, adding an additional set of descriptors for HGM-types could be easily accomplished.**
  - **Descriptors for landscape position and landform would enhance NWI information and allow use of HGM functional profiles in future.**
  - **These descriptors would also permit the functional capacity of wetland systems in individual watersheds to be determined based on existing knowledge of wetland functions.**
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## ***Landscape Position and Landform Descriptors***

- **The FWS developed descriptors initially for use in assessing potential functions of wetland restoration sites in selected MA watersheds; also applied or applying to other areas--MD, VA, and NY.**
  - **Landscape Position - to describe the relationship between a wetland and an adjacent waterbody or not (isolated).**
  - **Landform - to describe the shape or physical form of wetlands (e.g., basin, flat, slope, island, etc.).**
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# ***Landscape Position***

- **Terrene - wetlands not along a waterbody (may have stream entering or exiting, but not through it)**
  - **Lotic - wetlands in or along rivers and streams (HGM's Riverine)**
    - **Gradients: Tidal Gradient, High Gradient, Middle Gradient, and Low Gradient**
    - **Separate Rivers from Streams**
    - **Modifiers for Perennial, Intermittent, Headwater, and Channelization (excavated/modified stream course)**
  - **Lentic - wetlands in or along lakes**
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## ***Landscape Position (cont'd)***

- **Estuarine - wetlands in estuaries**
- **Marine - wetlands along ocean shorelines**







# ***Inland Landforms***

- **Slope Wetland**

- Paludified, Isolated, Inflow, Outflow, and Throughflow
- Modifiers for inflows and outflows: Channelized (stream or river) and Nonchannelized (contiguous wetland or suspected subsurface flow to downslope wetland)

- **Island Wetland**

- Delta, River, Stream, Lake, and Pond

- **Fringe Wetland**

- River Island, Stream Island, River, Stream, Lake, Barrier Island, and Barrier Beach

- **Floodplain Wetland**

- Basin, Oxbow, and Flat; Former Floodplain Basin, etc.
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# ***Inland Landforms (cont'd)***

- **Interfluve Wetland**

- Basin and Flat
- Regional Types: Carolina Bay, Pocosin, and Flatwood

- **Basin Wetland**

- Regional Types: Carolina Bay, Interdunal, Woodland Vernal Pool, Sinkhole, and Pond; Prairie Pothole, Playa, West Coast Vernal Pool, Cypress Dome, and Polygonal
- Isolated (including Interdunal), Inflow, Outflow, and Throughflow
- Modifiers: Beaver, Human-created, Partly Drained, Headwater, Drainage Divide; for inflows and outflows-- Channelized (stream or river), Non-channelized (contiguous wetland or suspected subsurface flow to neighboring wetland); pond types (farm, forest, mine, residential, stormwater detention, etc.)



## ***Inland Landforms (cont'd)***


- **Flat Wetland**

- **Regional Types: Salt Flats (Great Basin)**
- **Paludified, Isolated, Inflow, Throughflow, and Outflow**
- **Modifiers: Partly Drained; for inflows and outflows--  
channelized (stream or river) or nonchannelized  
(contiguous wetland or suspected subsurface flow to  
neighboring wetland)**





# ***Coastal Landforms***

- **Island Wetland**
    - Delta, River, and Bay
  - **Fringe Wetland**
    - Barrier Island, Barrier Beach, Bay, Bay Island, Coastal Pond, Coastal Pond Island, River, River Island, Ocean Island, and Headland (Modifier for Overwash)
  - **Basin Wetland**
    - **Modifiers: Human-induced (managed fish and wildlife area, salt hay, tidally restricted-road, tidally restricted-railroad, road crossing (significant tidal restriction not suspected), railroad crossing, and others to be determined)**
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# ***Classification of Major U.S. Wetland Types***

- **Prairie Potholes - Terrene Basin Wetlands (Isolated, Outflow, Throughflow, Inflow; Partly Drained modifier; could add “Pothole” modifier)**
  - **Playas - Terrene Basin Wetlands (Isolated, etc.; could add “Playa” modifier)**
  - **Pocosins - Terrene Interfluve Basin Wetlands (Partly Drained modifier)**
  - **Carolina Bay - Terrene Interfluve Basin Wetland or Terrene Basin Wetland (with Carolina Bay designation)**
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## ***Classification of Major U.S Wetland Types (cont'd)***

- **Nontidal Marshes - many possibilities depending on whether isolated (Terrene) or along a waterbody (river/stream-Lotic; lake-Lentic)**
  - **Fens - same as for nontidal marshes**
  - **Bogs - many possibilities (may add modifiers for types of bogs such as raised bogs, lake-fill bogs, plateau bogs, etc.)**
  - **Muskegs/Wet Tundra - probably Terrene Paludified Slope or Paludified Flat Wetlands (may need category for Paludified Basin Wetlands)**
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## ***Classification of Major U.S. Wetland Types (cont'd)***

- **River Swamps and Floodplain Wetlands - Lotic Low or Middle Gradient Floodplain Basin or Flat Wetlands**
  - **River Marshes - Lotic Low or Middle Gradient River Fringe or River Island Fringe Wetlands**
  - **Flatwoods - Terrene Interfluvial Flat Wetlands (may include Basin Wetlands)**
  - **Cypress Domes - Terrene Basin Wetlands (could add modifier for Cypress Domes)**
  - **Riparian Wetlands - Lotic Low or Middle Gradient River Fringe Wetlands**
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# ***Classification of Major U.S. Wetland Types (cont'd)***

- **Salt and Brackish Tidal Marshes**

- **Estuarine Fringe Wetlands (different types designated such as Barrier Island Fringe, Barrier Beach Fringe, Bay Fringe, River Fringe, Coastal Pond Fringe, Headland Fringe, Bay Island Fringe, etc.; modifier for overwash areas), or**
- **Estuarine Basin Wetlands (where impounded purposely or where sheet flow is interrupted by roads/railroads; designate Human-induced modifiers for managed fish/wildlife areas, salt hay, tidally restricted, road crossing, etc.)**







## ***Classification of Major U.S. Wetland Types (cont'd)***

- **Mangrove Swamps - Estuarine Fringe Wetlands and Estuarine Basin Wetlands (designate diff. types like Bay Fringe, River Fringe, etc.)**
- **Freshwater Tidal Marshes and Swamps - Lotic Tidal Gradient Fringe or Floodplain Wetlands**



# ***Functional Assessment Potential***

- **Preliminary Assessment (without field verification)**
- **Consider Possible Functions**
  - **Ground Water Discharge**
  - **Ground Water Recharge**
  - **Flood Water Storage**
  - **Stream Flow Maintenance**
  - **Water Quality Renovation (Nutrient Cycling/Accumulation of Sediment)**
  - **Export of Detritus**
  - **Provide Habitat for Wetland Biota**
- **Categorize for Each Wetland Type**



## ***Variables for Assessing Wetland Functions - Examples\****


- **Ground Water Discharge** - presence of seeps and springs, slope wetlands, basin wetlands with high permeability soils (sand/gravel), basin wetlands on till (seasonal discharge), lotic wetlands, wetlands with E water regimes, and lentic fringe wetlands
- **Ground Water Recharge** - basin wetlands with perennial inlet/no outlet, basin wetlands (raised bogs), and riverine wetlands in arid regions

**\*Data mostly from Hollands and Magee (1994)**





## ***Examples (cont'd)***

- **Storm and Flood Water Storage - very high in Lotic Low or Middle Gradient Floodplain Wetlands and Throughflow Basin Wetlands, moderate (short term) in Lotic River Fringe Wetlands and Lentic Fringe Wetlands, virtually none in Slope Wetlands**
  - **Water Quality - very high potential in Lotic Low Gradient Floodplain and Fringe Wetlands, Lentic Fringe Wetlands, and Wetlands with high OM soils, moderate in Lotic Throughflow Basin Wetlands and Terrene Basin Wetlands (especially E and F water regimes), less in Slope Wetlands**
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## ***Examples (cont'd)***

- **Export of Detritus - Very high in Lotic Floodplain Wetlands and Lotic or Lentic Fringe Wetlands, high in Basin and Slope Wetlands with perennial stream outlets; less in wetlands with intermittent outlets and none if no outlet**
- **Supports Wetland Biota - Very high in wetlands with wetter water regimes, lower in drier types; fish spawning/nursery grounds=Lentic, Lotic, Estuarine Fringe Wetlands, and for some species Lotic Floodplain Wetlands**



## ***Other Information Gained***

- **Wetland Juxtaposition**
  - **Drainage Divide Wetland (serving 2 watersheds)**
  - **Isolated Wetlands**
  - **Wetlands associated with Streams & Rivers**
  - **Wetlands in Lake Basins**
  - **Floodplain Wetlands**
  - **Overwash Wetlands**
  - **Special types of Wetlands - Carolina Bay, Pocosin, Prairie Pothole, Vernal Pool**
  - **Different Pond Types**
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## ***Information Gained (cont'd)***

- **Headwater Wetlands that are sources for streams**
- **Separation of stream-associated wetlands by stream gradients**
- **Linking of Wetlands to Functions**
- **Possible identification of likely vegetation community and associated wildlife**
- **Better handle on the actual number of individual wetlands in a given area**
- **Develop a watershed perspective of the integrated wetland ecosystem**



***To Order A Copy of the Keys to  
HGM-type Descriptors***

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