Hydrogeomorphic Wetland Classification

HGM classification for wetlands of the Mid-Atlantic Region, USA

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PLEASE READ BEFORE USING THIS WETLAND CLASSIFICATION SYSTEM:

No classification system can effectively capture the inherent variability in natural systems, nor can it provide a foolproof determination given the different experiences of users. This wetland classification system for the Mid-Atlantic region is designed to distinguish among major wetland types with recognizable differences. It also purports to serve both the needs of the regulatory community where certainty is preferred, and the science community that grapples with variability in ecological systems. Given that dual function, it is critical that users consider the landscape and hydrologic contexts of each wetland. How large an area is being classified? A river channel and the associated floodplain on both sides of the channel, or just the wetland associated with a property on the upland edge of a floodplain. Context does matter, and should be carefully and succinctly documented.

When seeking to classify a wetland, the most fundamental question the user must ask is, “How was the wetland formed?”, which can be stated as, “What is the origin of the wetland?”. If this question is thoughtfully answered and described in a brief narrative, then the actual label assigned to the wetland matters less, because the user will have considered where and how the wetland fits in the landscape and hydrologic setting. Obviously, this is more relevant for regions where wetlands do not form the dominant matrix of a landscape (e.g., coastal salt marshes, bottomland hardwood forests).

For example, is it a depression that is isolated during drier times of the year but located in a floodplain setting? Or is it isolated from all riverine influences, and receiving a combination of groundwater and precipitation? Clearly, these wetlands are distinctively different in many of their attributes and functions, but they could have the same morphometric dimensions. Either wetland also could have some characteristics of yet another type, warranting a dual label (e.g., depression/slope) just as NWI mapping recognizes mixed vegetation classes (e.g., forested/scrub-shrub, FO/SS). Thus, it is important to recognize these distinctive elements and document the reasons for labeling the wetland as a specific type. This is especially important when addressing wetlands that occur along a broad hydrologic gradient and when a group of microhabitats occur in a cluster. Thoughtful selection of classes supported by careful documentation will make any classification system more consistent among users.

Cover photographs provided by: David Goerman

Key for selecting among tidal and nontidal hydrogeomorphic wetland types in the Mid-Atlantic Region of the U.S. Descriptions and definitions are based on Cowardin et al. (1979), Brinson (1993), Cole et al. (1997). Classes and subclasses are in **bold**.

1.	Wetland found along tidal fringe of a marine ecosystem (ocean, beach, rocky shore)	**2**
1.	Wetland not associated with marine ecosystem	**3**
2.	Continuously submerged littoral zone	**Marine subtidal** (MF1)
2.	Alternately flooded and exposed to air	**Marine intertidal** (MF2)
3.	Wetland associated with shallow estuarine ecosystem (Mixture of saline and freshwater)	**4**
3.	Wetland not associated with shallow estuarine ecosystem	**7**
4.	Wetland not impounded	**5**
4.	Wetland impounded	**Estuarine impounded** (EFh)
5.	Wetland continuously submerged	**Estuarine subtidal** (EF1)
5.	Wetland alternately flooded and exposed to air	**6**
6.	Wetland regularly or irregularly flooded by semidiurnal, storm, or spring tides	**Estuarine lunar intertidal** (EF2l)
6.	Wetland flooding induced by wind	**Estuarine wind intertidal** (EF2w)
7.	Wetland associated with freshwater stream or river	**8**
7.	Wetland not associated with freshwater stream or river	**11**
8.	Wetland associated with permanent flowing water from surface sources	**9**
8.	Wetland dominated by ground water or intermittent flows	**10**
9.	Wetland associated with low gradient tidal creek (see Estuarine types 3)	
9.	Wetland associated with low gradient and low velocities, within a well-developed floodplain (typically >3rd order)	**Riverine lower perennial** (R2) *
9.	Wetland part of a mosaic dominated by floodplain features (former channels, depressions) that may include slope wetlands supported by ground water (see Slope 17)	**Riverine floodplain complex** (R2c) *
9.	Wetland associated with high gradient and high velocities with relatively straight channel, with or without a floodplain (typically 1st - 3rd order)	**Riverine upper perennial** (R3) *
10.	Wetland part of a mosaic of small streams, depressions, and slope wetlands generally supported by ground water	**Riverine headwater complex** (R3c) *
10.	Wetland associated with intermittent hydroperiod	**Riverine intermittent** (R4) *

Note:	* For any riverine type that is impounded, distinguish between:	
	Wetland impounded by beaver activity	**Riverine...beaver impounded** (R...b)
	Wetland impounded by human activity	**Riverine...human impounded** (R...h)
11.	Wetland fringing on a lake or reservoir	**12**
11.	Wetland not fringing on lake or reservoir	**14**
12.	Wetland inundation controlled by relatively natural hydroperiod	**13**
13.	Wetland inundation is permanent with minor fluctuations (year round)	**Lacustrine permanently flooded** (LFH)
13.	Wetland inundation is semipermanent (growing season)	**Lacustrine semipermanently flooded** (LFF)
13.	Wetland inundation is intermittent (substrate exposed often)	**Lacustrine intermittently flooded** (LFJ)
12.	Wetland inundation controlled by dam releases	**Lacustrine artificially flooded** (LFK)
14.	Wetland water source dominated by precipitation and vertical fluctuations of the water table due to low topographic relief	**15**
14.	Wetland differs from above	**16**
15.	Wetland substrate is primarily of mineral origin	**Flat mineral soil** (FLn)
15.	Wetland substrate is primarily of organic origin	**Flat organic soil** (FLg)
16.	Wetland water source is primarily ground water and has unidirectional and horizontal flows	**17**
16.	Wetland forms a depression	**18**
17.	Water source for wetland derived from structural geologic discontinuities resulting in discharge of groundwater from distinct point(s) on slope	**Stratigraphic slope** (SLs)
17.	Water source for wetland accumulates at toe-of-slope before discharging	**Topographic slope** (SLt)
Note:	For any slope type, distinguish between: Wetland substrate is primarily of mineral origin	**...slope mineral soil** (SL...n)
	Wetland substrate is primarily of organic origin	**...slope organic soil** (SL...g)
18.	Wetland with frequent surface connections conveying channelized flow	**Depression perennial** (DFH) **
18.	Wetland with infrequent surface water connections conveying channelized flow	**Depression seasonal** (DFC) **
18.	Wetland with no surface outlet, often perched above water table	**Depression temporary** (DFA) **
Note:	** For any depression type that is impounded or excavated distinguish between:	
	Wetland is impounded by human activities	**Depression...human impounded** (DPh)
	Wetland is excavated by human activities	**Depression...human excavated** (DPx)
	Wetland is impounded by beaver activities	**Depression…beaver impounded** (DPb)

Mid-Atlantic Wetland Classification (most relevant to freshwater wetlands in Pennsylvania are **bold**):

Classes
- Subclasses
  - Modifiers

Marine
- subtidal
- intertidal

Estuarine
- subtidal
- lunar intertidal
- wind intertidal
- impounded

Riverine
- **lower perennial**
- **floodplain complex**
- **upper perennial**
- **headwater complex**
- **intermittent**
  - **beaver impounded**
  - **human impounded**

Lacustrine (fringe)
- **permanently flooded**
- **semipermanently flooded**
- **intermittently flooded**
- **artificially flooded**

Flat
- Flat mineral soil
- Flat organic soil

Slope
- **Stratigraphic**
- **Topographic**
  - **mineral soil**
  - **organic soil**

Depression
- **perennial**
- **seasonal**
- **temporary**
  - **human impounded**
  - **human excavated**
  - **beaver impounded**

The HGM classification key was adapted from the original work cited as follows:

Brooks, R. P., M. M. Brinson, K. J. Havens, C. S. Hershner, R. D. Rheinhardt, D. H. Wardrop, D. F. Whigham, A. D. Jacobs, and J. M. Rubbo. 2011. Proposed hydrogeomorphic classification for wetlands of the Mid-Atlantic Region, USA. Wetlands 31(2):207-219.

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Cole, C. A., R. P. Brooks, and D. H. Wardrop. 1997. Wetland hydrology as a function of
hydrogeomorphic (HGM) subclass. Wetlands 17:456-464.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRue. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, Washington, DC, USA.