Part 9. Glossary

Why is this important to me? This glossary gives definitions according to the Glossaries of the Regional Supplements, which give priority to the following sources:

1. Corps Manual (Environmental Laboratory 1987 (http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf).

2. Field Indicators of Hydric Soils in the United States (USDA Natural Resources Conservation Service 2006b) (http://soils.lusda.gov/use/hydric/)

3. National Soil Survey Handbook, Part 629 (USDA Natural Resources Conservation Service)

Other terms are included with sources noted

Anaerobic. A situation in which molecular oxygen is virtually absent from the environment.

When the soil becomes saturated, air between soil particles is replaced by water. Because the rate of diffusion of oxygen through water is 1/10,000th that of the rate of diffusion through air, losses of oxygen in the wet soil cannot be replaced rapidly by diffusion of oxygen from the atmosphere. Instead, soil microorganisms quickly deplete the available oxygen and the soil becomes anaerobic.

Aquifer. A saturated, permeable geologic unit of sediment or rock that can transmit significant quantities of water under hydraulic gradients (National Soil Survey Handbook).

For wetland science an aquifer is usually the top-most layer of the groundwater that is under atmospheric pressure. The bottom of this layer is a lower soil horizon with markedly different storage and flow properties. Wetland aquifers are *unconfined* in that their top is under atmospheric pressure; they do not have a retarding or excluding layer on top i.e. they do not flow under artesian pressure. Plant roots penetrate down into them and extract water from them.

It is important to note the definition of *water table* below. The surficial aquifer has to be at least 6 inches (15 cm) thick and persist for more than a few weeks. The two-dimensional top of the three-dimensional aquifer is the 'water table.'

'Aquifer' is also used in its more general sense as a larger body of subterranean groundwater within a geologic stratum with consistent storage and flow properties. The uppermost aquifer, or wetland aquifer, is then called the *surficial aquifer* to distinguish it from deeper ones.

Aquitard. A layer of soil or rock that retards the downward flow of water and is capable of perching water above it.

For the purposes of this supplement, the term aquitard also includes the term **aquiclude**, which is a soil or rock layer that is incapable of transmitting significant quantities of water under ordinary hydraulic gradients (Regional Supplement Definitions). For wetland science, aquitards are usually deeper soil horizons or strata that transmit water much more slowly than the uppermost horizons. A typical example would be subsoil that has more clay and is denser than the topsoil. The topsoil transmits water more rapidly. Here the topsoil is the *aquifer* and the denser subsoil is the *aquitard*.

For hydrology aquitard is a relative term. A shallow shale bed could be an aquitard with respect to the overlying unconsolidated wetland soil but the same shale bed would be an aquifer with respect to an underlying bed of impermeable basalt. In soils aquitards are usually relatively leaky in that they have cracks and imperfect formation and continuity Overlying water can seep through. Typical soil aquitards are fragipans (Bx), some Ortstein (Bsm), some argillic horizons (Bt), dense glacial till (Cd), and thick clay subsoils.

***Capillary fringe*.** Zone immediately above the water table where the soil is saturated but under subatmospheric pressure (Soil Science Society of America).

Capillary fringes in natural, mineral soils reach a few inches above a water table depending on soil texture and porosity. The highest capillary fringes are present in organic soils, where pores can be effectively saturated for several inches above the free water surface.

Catchment. This term is used interchangeably with drainage area (DA), drainage basin, or watershed. It is frequently used in publications of British or Australian origin.

Drainage Area. The land from which the water runs off and is collected at a single point.

***Effectively drained*.** The condition where ground or surface water has been removed by artificial means to the point that an area no longer meets the wetland hydrology criteria. “Artificial means” often is a tile or drainage ditch. The area will not support a dominance of hydrophytes but hydric soil often persists. Immediately after a site is drained, some passage of time is required for evidence of the removal of wetland hydrology to be seen.

Endosaturation. The condition in which soil is saturated with water in all layers from the upper boundary of saturation to a depth of 200 cm or more from the mineral soil surface. (Glossary of Soil Science Terms)

Episaturation. Condition in which the soil is saturated with water at or near the surface, but also has one or more unsaturated layers below the saturated zone. The zone of saturation is perched on top of a relatively impermeable layer (Regional Supplement).

***Flooding*.** The soil surface is temporarily covered with flowing water from any source, such as overflowing streams or rivers, runoff from adjacent slopes, and inflow from high tides.

Growing season. See Section 4.2 in this Module.

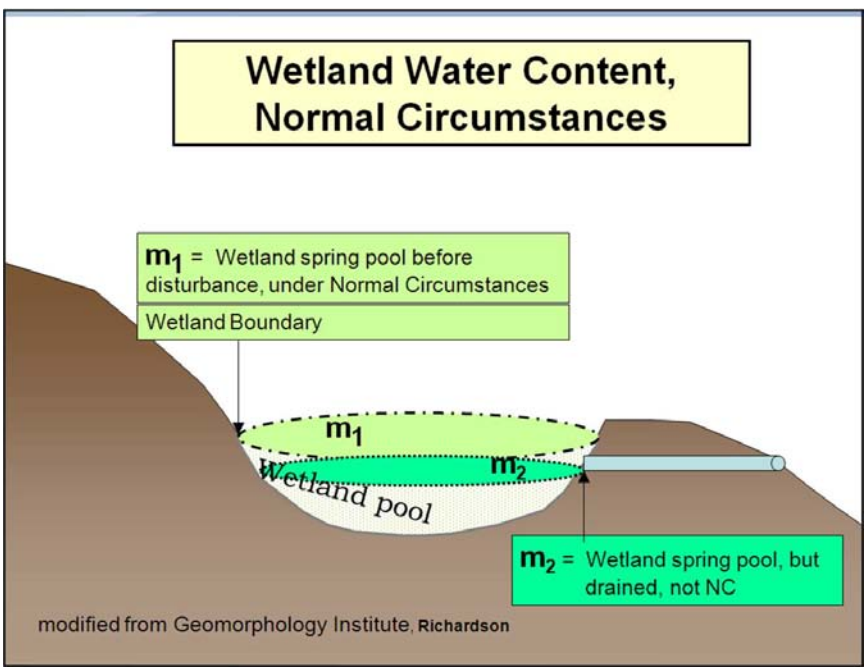
Hydroperiod. Seasonal pattern of water in a wetland.

Inundation. A condition in which water from any source temporarily or permanently covers a land surface. Two types of inundation are ponding and flooding.

Invert. The lowest part of the internal cross-section of a channel or culvert, sometimes referred to as a flowline.

***Lateral effect*.** The distance on each side of a tile or ditch in its longitudinal direction where the ditch or tile has an influence on the hydrology.

***Normal Circumstances (NC)*.** For the purposes of wetland hydrology, normal circumstances is the absence of factors such as ditches, subsurface drainage, blocked culverts, burial, excavation, regional water table draw down, etc., which would

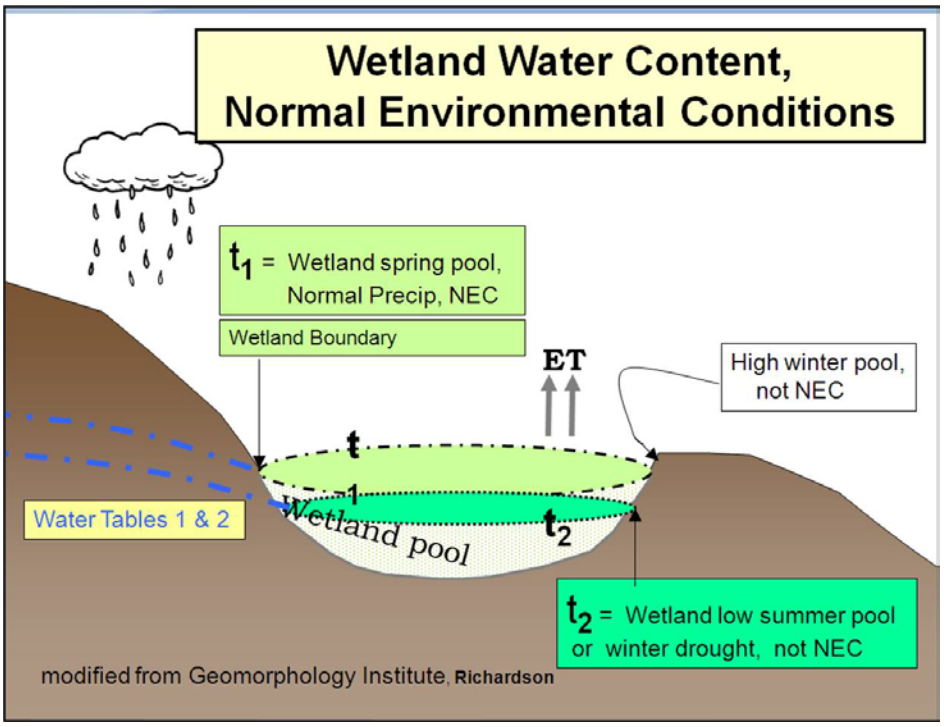


significantly alter the ability of water to rise to the ground surface within the wetland boundary . Most deviations from normal circumstances are physical disturbance of either surface or subsurface water flows to or from the wetland. After disturbance, Wetland Hydrology Indicators of inundation, shallow water tables, and shallow saturation no longer reflect the same hydrologic regimes that would have been found before the alteration. Non-normal circumstances can also be caused by natural events, such as inundation from an exceptional storm or flood. The figure here depicts both normal circumstances as well as a drained condition which is not normal circumstances.

Normal Environmental Conditions. Normal Environmental Conditions (NEC) occur when wetland inundation and shallow saturation are at critical threshold

levels at the boundary but not upslope in adjacent non-wetlands (Figure 18). In order to assess whether Normal Environmental Conditions prevail it is necessary to know how the hydrologic~~meteorologic~~ components of the water budget compare to long-term averages. For example, has precipitation been within the range of normal for the preceding months and seasons? Is snowmelt normal? Are deeper water tables at approximately normal levels so groundwater inputs and outflows are not aberrant? Are floods typical of the stream or river?

In much of the country the ideal time to conduct wetland delineations is early in the growing season of a spring that is neither wetter nor drier than normal. Water levels would be at their critical thresholds (but not higher into uplands), and any ephemeral hydrophytic vegetation would still be dominant before FACU and UPL species replace them as the dry summer progresses. Even some of the strongest hydric soil indicators are present only when the ground is saturated and reduced, such as Reduced Matrix and Hydrogen Sulfide Odor. Wetland delineations conducted under such conditions present the strongest evidence regarding where the wetland boundary is.



In the figure of NEC here, the extent of the wetland's pool is considered to be NEC in the spring after the growing season has begun. If the saturation or inundation is unusually high due to a wetter than normal winter, this is not NEC. When

evapotranspiration exceeds precipitation and the pool is low, this is seasonally affected and is not considered NEC. In a time of drought, the pool is likely to be at a lower elevation than NEC also.

Ocher . An earthy, pulverulent, red, yellow, or brown iron oxide that often precipitates at drainage line outlets and on hillside seeps (Glossary of Geology). In both cases, the

cause is anaerobic water carrying large amounts of reduced iron (Fe^{++}) coming into contact with air, at which point the ferrous iron precipitates into a soft, reddish mass, referred to in drainage engineering as ocher.

***Ponding*.** A condition in which water stands in a closed depression. The water is removed only by percolation, evaporation, transpiration or pumping.

Pool Area. The surface area of a body of water at its normal elevation (not in time of drought or flood)

Restrictive layer. A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The Soil Features table in Soil Survey Reports indicates the hardness and thickness of the restriction, both of which significantly affect the ease of excavation (Soil Data Mart). "Depth to top" is the vertical distance from the soil surface to the upper boundary of the restrictive layer. (Soil Data Mart).

The effectiveness of a restrictive layer in creating episaturated conditions is indicated in the Water Features Table (depth and nature of water table) and the Soil Physical Properties Table (Ksat – saturated hydraulic conductivity).

Saturated soil conditions. A condition in which all easily drained voids (pores) between soil particles in the root zone are temporarily or permanently filled with water to the soil surface at pressures greater than atmospheric (1987 Manual).

***Saturation*.** For wetland delineation purposes, a soil layer is saturated if virtually all pores between soil particles are filled with water (National Research Council 1995, Vepraskas and Sprecher 1997). This definition includes part of the capillary fringe above the water table (i.e., the tension saturated zone) in which soil water content is approximately equal to that below the water table (Freeze and Cherry 1979; Regional Supplement).

These definitions of *saturated conditions* and *saturation* contradict each other. The 1987 Manual excludes the capillary fringe from the definition of saturation whereas the Regional Supplements include it. The issue here is identifying the topmost boundary of the zone of anaerobic conditions that drive wetland processes and functions. This is where hydric soil processes are initiated and hydrophytic vegetation begins domination over FACU and UPL species.

Water table. The upper surface of groundwater, or that level below which the soil is saturated with water. It is at least 6 inches thick and persists in the soil for more than a few weeks (1987 Corps Manual).

This unusual definition of a water table prescribes a minimum thickness of the associated surficial aquifer to require that perched water tables have a practical minimal depth and thickness in order to limit Clean Water Act regulation to waters that persist long enough and are thick enough to significantly affect wetland ecosystem functions and maintain a hydrophytic plant community.

Watershed. This term is used synonymously with drainage area or catchment. See Drainage Area in these definitions.

Wetland Pool. This is the surface area of the water body associated with a wetland. It will fluctuate in size with weather and may at times extend outside the wetland boundary. In times of drought, it may disappear.

Zone of influence**.** The combined distance on both sides of a ditch or tile in its longitudinal direction where the drainage feature has an influence on the hydrology. The zone of influence length is usually twice the lateral effect distance.