



Wetland Hydrology

In North Carolina



THE BASICS

An ocean is always full of water. Where we live is a place that's usually dry. Wetlands are different though. They can be both wet and dry at different times!

Wetlands are places where water collects. Sometimes that water sticks around, and sometimes it comes and goes. The water in wetlands can come from a lot of different places! How much water there is, how quickly it moves around, or how long it stays determines what type of wetland we are in. It will also determine what can live there.

WANT TO KNOW MORE?

Hydrology is the study of how water moves around, and that is important to wetlands.

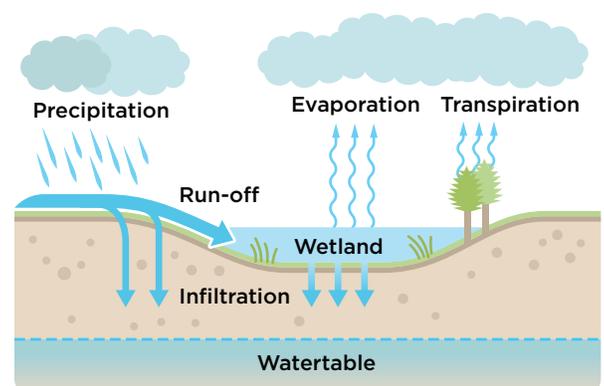
Water in a wetland can come from many places. It might come from a stream or river, precipitation like snow or rain, seasonal floods, or ocean tides. If water comes often enough and stays long enough to change the soil chemistry, then we will find a wetland. Wetlands like swamps and marshes usually have a lot of water, either right at the ground surface or above it. Other types of wetlands, like vernal pools, might dry out for part of each year, but there is still plenty of groundwater hiding just beneath the surface. These wet conditions provide just the right habitat for wetland plants to grow.



Cypress Swamp at Merchants Millpond State Park



Watermark on trees, Roanoke River wetlands



Wetland water cycle



LET'S GET TECHNICAL

Wetland water comes from a variety of sources:

A wetland's water may come from one main source or a combination of sources. Primary water sources are precipitation and groundwater. Precipitation can directly fill a wetland, or soak in and become groundwater. Ultimately, almost all waters above the ground surface are an expression or extension of that groundwater. Waters above the ground surface include streams, ranging from little trickles that dry up after rains to huge rivers like the Cape Fear or French Broad. Other examples of surface water include water bodies like ponds or lakes, where the edges are shallow enough to allow wetland plants like rush or cattail to thrive. Precipitation, groundwater, streams, lakes, the ocean, and floods and tides from those waters are all sources of water for wetlands.

Water levels fluctuate in wetlands

Did you know that you might not see water in some wetlands? A wetland's water level may fluctuate due to precipitation, *evapotranspiration*, drainage, natural flow of water across the landscape, or tides. Many wetlands have surface water year-round. But sometimes water is only visible on the surface after heavy rainfalls. Other times, these wetlands are kept wet enough by groundwater below the surface. Wetlands that are saturated or inundated periodically are classified as "temporary" or "seasonal" wetlands. However, to be legally classified as a wetland area, the water level must remain within 12 inches of the ground's surface continuously for a minimum of five percent of the growing season.

Hydrologic indicators in wetlands

When determining whether an area is a wetland, scientists may use a monitoring well to observe the water levels in the wetland if they have time, or they may look at historic records, stream gauge data, and flood predictions. They will also evaluate the land for *hydrologic indicators*, or signs of water, like soil saturation or inundation, sediment deposition, watermarks on trees, water-stained leaves, mottled soil, and hydrophytic vegetation. They can also look at historical aerial photography of the area to see if it has been inundated with water in the past.

The importance of water in wetlands

The amount, duration, and chemistry of the water can alter the chemistry of the soil in an area. A wetland can exist in an area when sufficient alteration of the soil chemistry has occurred. The amount of water and resultant soil and water chemistry then influence the types of plants that can live there and also determine the type of wetland. (See ncwetlands.org wetland soil factsheet for more information on how water changes soils in wetlands.)

Classification of Hydrologic Zones ¹ in Nontidal Areas			
Zone	Description	Duration ²	Comments
I ³	Permanently inundated	100%	Inundation > 6.6 ft mean water depth
II	Semipermanently to nearly permanently inundated or saturated	>75% — <100%	Inundation defined as ≤ 6.6 ft mean water depth
III	Regularly inundated or saturated	> 25% — 75%	
IV	Seasonally inundated or saturated	> 12.5% — 25%	
V	Irregularly inundated or saturated	≥ 5% — 12.5%	Many areas having these hydrologic characteristics are not wetlands
VI	Intermittently or never inundated or saturated	< 5%	Areas with these hydrologic characteristics are not wetlands

1 Zones adapted from Clark and Benforado (1981).
 2 Refers to duration of inundation and/or soil saturation during the growing season.
 3 This defines an aquatic habitat zone.

Reproduced from Environmental Laboratory. (1987). "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

SUPPLEMENTAL LINKS

Glossary: <http://www.ncwetlands.org/wp-content/uploads/NCWetlands-Glossary-of-wetland-terms.pdf>

Factsheet: Wetland Soils

Curriculum: 5.P.2, EEn.2.3

CITATION

North Carolina Division of Water Resources
www.ncwetlands.org



Produced by the NC Division of Water Resources with funding from US Environmental Protection Agency.