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## IZAAK WALTON LEAGUE OF AMERICA

### *Fact Sheet*

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### *Wetlands Ecology*

Because wetlands are often found at the boundary between land and water, these ecosystems have the characteristics of both terrestrial and aquatic landscapes. However, these characteristics can vary considerably—for example, some wetlands are constantly wet, and some are wet only during certain times of the year. A few examples of the types of wetlands that can be commonly found in the United States are swamps, marshes and bogs.

There are many different definitions of wetlands, some scientific and some legal, which affect wetland regulations and wetland protection. For example, in order to be protected under the Clean Water Act, a wetland must have: (1) a root zone (top 12-18 inches of soil) that is water-logged for at least 5% of the growing season; (2) soils that are classified as ‘wetland soils’; and (3) plants that are classified as ‘wetland plants.’ But the three main characteristics that are consistent among all wetland definitions are:

- (1) **Hydrology** (presence of surface water or water in the root zone)
- (2) **Hydric** soils (soils formed under waterlogged conditions)
- (3) **Hydrophytes** (vegetation that has adapted to living in wet conditions)

Countless variations of these characteristics often make it difficult to determine whether or not a particular area is a wetland. However, there are several clues to look for in the field. Dark water marks on tree trunks; blackened leaf litter; “drift lines” of sticks and debris; regular sediment deposits; and certain distinctive soil features are all standard indicators of a landscape that is periodically flooded by water.



Watermarks are good indicators of frequent flooding (IWLA).

### **Common Wetland Indicators**

**Hydrology** – One of the first signs that you are standing in a wetland, of course, is that your feet are getting wet! However, the presence of water is not always so easy to

determine. Sometimes wetlands appear to be dry for a significant period of time between periods of rain or snowmelt. In fact, a vernal pond is a type of wetland that is filled with water for only a few short months each year! But what all types of wetlands have in common is that the soil around the roots of the plants is saturated long enough that plants need to adapt to these wet conditions. There are many geological features that contribute to waterlogged soil. For example, many wetlands are located in depressions in the surrounding landscape, where rainwater and snowmelt can easily collect. Also, wetlands may have a layer of bedrock, or certain types of fine-textured soils, just below the surface of the ground that prevents water from soaking in.

For a wetland to develop, it needs a reliable source of water. But there are a variety of ways that wetland water levels get recharged. Some wetlands get their water exclusively from rainwater or melting snow. Some wetlands are fed by underground springs. Other types of wetlands are constantly replenished by nearby streams, rivers or oceans.



Forested wetland before and after rainfall (IWLA).

**Hydric soils** – Do you remember playing with mud as a child? If so, you probably have noticed that some types of soil make great “mud pies” and other soils just fall apart no matter how much water you add. Wetland soils tend to be made up of very small particles, like clay and fine silt, which do a great job of retaining water and therefore make excellent “mud pies”. An easy way to determine whether or not you have hydric soil is to examine the texture and color. Hydric soil can be classified as organic or



**Peat Soil**  
(MI Department of Environmental Quality)

inorganic. Organic hydric soils contain at least 20% dead or decaying plant matter. Since the soil is *anaerobic* (contains little or no oxygen), decay occurs over a very long period of time. Some organic hydric



**“Muck” soil**  
(S. Zinder, Cornell University)

soils have a high acidity level, which prevents the growth of many organisms that cause decomposition. These soils contain whole plant parts and are called “peats,” typically found in bogs and fens. Organic hydric soils that have decomposed to the point where you can’t identify individual plant parts are called “mucks,” which is an appropriate descriptive term since these soils are dark in color, with a greasy texture. Inorganic, or mineral, hydric soils



**“Gleyed” mineral soil**  
(D. Brown, University of Montana)



**Oxidized iron in mineral soil**  
(IWLA)

contain less than 20% organic material, and are composed mainly of clay, silt, sand and stones. The color of these soils tends to be gray, or “gleyed,” due to the iron being carried away by groundwater flow. If water levels in a wetland vary, this iron may periodically come into contact with oxygen and rust, which causes reddish streaks to appear in the soil matrix.

**Hydrophytic Vegetation** – Some plants have special adaptations that allow them to live in places where their roots are constantly submerged in water. Because wetland soils are almost always wet they contain very little oxygen, which means that plants that grow in these soils need a different method of “breathing.” Some hydrophytic plants, like water lilies, have given up on roots altogether, getting all their oxygen through tiny openings in their leaves. Others, like cattails and marsh grasses, have internal “air ducts” that



Cypress “knees”  
(IWLA)

transport oxygen from the leaves to the roots. The protruding “knees” of cypress trees is another method that plants use to get oxygen in a waterlogged environment. Because trees that grow in saturated soils tend to have roots that only penetrate into the upper, most oxygen-rich layer of the soil, another special wetland adaptation is a



Buttressed tree roots  
(IWLA)

“buttress,” or support structure, that keeps the tree standing during heavy rain or wind.

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