Chapter 2

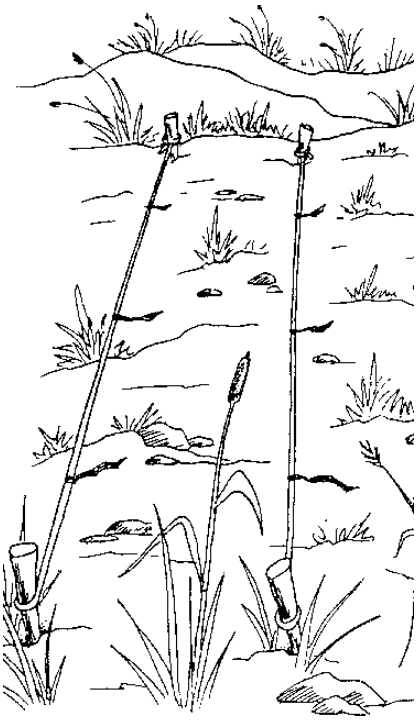
CONDUCTING THE VISUAL SURVEY FOR SOIL, VEGETATION AND HYDROLOGY

Vegetation, soils, and the hydrology of a wetland tell you about the transition from aquatic to upland habitats. Noting the plants, soil and hydrology can help **delineate** or define the border of the wetland. Fill out the visual data sheets provided at the end of this chapter so that you can become familiar with current and changing conditions of your wetland. Completing the data sheets will help you assess the general characteristics of the adopted wetland. The visual survey notes dominant vegetation cover, color and texture of the soils, and water depth and conditions. Make note of wildlife sighted or signs of wildlife.

For groups just getting to know their wetland, *surveying once a month* is a good idea. This will familiarize you with the ever-changing wetland habitat and hydrology. Monthly variations in the water level may be drastic or barely noticeable. After you feel well acquainted with your site, **visual surveys should be done quarterly** (once every 3 months or once each season).

To consistently gather information from the same area, your group should set up a **transect** (a line) along which you will collect the vegetation, soils, and hydrological data. As a rule, the transect should run from an upland point to the water source (if the wetland is associated with a body of water) or into an area of the wetland that contains all the wetland indicators (if the wetland is palustrine). The length of the transect and the number of stations along the transect can vary depending on the size of your Adopt-A-Wetland group and the amount of time your group can commit to the visual survey. The transect should contain at least one upland station, one wetland station and one transitional station. If the wetland is large or contains a variety of conditions that cannot be assessed along one transect, you may want to run several parallel transects.

Setting Up A Transect



1. Stake out a starting point on the upland side of your adopted wetland. The stake may be metal, treated wood, or PVC pipe.

2. Use twine or measuring tape to run a straight line from the upland, into the wetland. Use a compass to get a heading of the transect (example: north 20 degrees). Be sure to include representative sites or zones in the wetland. Remember that you want the transect to cover the transition from upland to wetland. Stop the transect at running or deep water, or when you are sure you are well into the wetland.

3. Measure the length of your transect.

4. To set up survey stations, divide the transect length by a desired number of stations (such as 3, 5 or 10) *minus one* (don't forget your starting point!). The resulting quotient will be the length between stations.

Example:

- Length of transect is 60 feet
- Number of stations desired is 3, so 60 ft /2 = 30 ft
- A survey station will be placed every 30 feet along the transect
- Name the stations (1, 2, 3, etc.). For this transect there will be 3 stations—the starting point, ending point, and halfway in between.

At each survey station, measure an area of 5 ft. radius, using the point on your transect as the center. Take your soil, vegetation and hydrology data from within this 5 ft. radius for each survey station. Use the information below as directions to fill out the data forms. There are also sample data forms following the blank data forms in this manual.

Vegetation Survey

Certain plants have adapted to life in wetland soils. These plants are called **hydrophytes** or water-loving vegetation. They have developed certain modified characteristics over time to aid in the movement of oxygen to plant parts, which are either underwater or in soil that has little or no oxygen. Oxygen is necessary for plants to carry out metabolic processes. Examples of adaptations include aerenchyma tissue, water roots, and the ability to pump oxygen to the roots forming a rhizosphere. **Aerenchyma** tissue has air or pore spaces in plant roots and stems. This allows the

diffusion of oxygen from aerial portions to the roots. Some hydrophytes may produce water roots, or roots that are produced above the soil line, growing in the water. These roots have greater contact with dissolved oxygen in the water column than those roots in the soil. Root growth is facilitated by having an area around the tip which is oxidized - the **rhizosphere**.

For the vegetation survey, consider three general plant layers for your tally: trees, shrubs, and the herbaceous layer. Trees are woody perennials which usually have a main stem or trunk, while shrubs are woody perennials with several stems branching from the base. The herbaceous layer will consist of all other vegetation, such as vines, grasses and soft-stemmed plants.

Look at these three layers within your 5 ft. radius survey station. Identify the three most abundant species in each layer and estimate the percent dominance of each. Record the names of these plants and the % dominance on your data form.

Vegetation can also be classified as obligate wetland, facultative wetland, facultative, or upland. The classification indicates the frequency with which you can expect to find a species of plant in a wetland.

- Obligate wetland - found in wetlands 99% of the time
  Example - *Taxodium distichum*, baldcypress
- Facultative wetland - occurs in wetlands 67% - 99%
  Example - *Fraxinus pennsylvanica*, green ash
- Facultative - equally likely to be found in wetland and nonwetland
  Example - *Pinus palustris*, longleaf pine
- Obligate upland - found 99% of time in upland
  Example - Quercus alba, white oak

Note: Some plants which are found only in uplands in one region of the country may be found in wetlands in other regions of the country.

Below is a sample list of Georgia plants and their wetland indicator status. Common names will vary. For the complete list of wetland plants and their wetland indicators, go to the Fish & Wildlife Service National Wetland Plant List at www.nwi.fws.gov/

Characteristic Plants for Salt Marshes

Common Name	**Scientific Name**	**Wetland Indicator**
Saltmarsh cordgrass	*Spartina alterniflora*	OBL
Saltmeadow cordgrass	*Spartina patens*	FACW
Blackgrass	*Juncus gerardii*	FACW+
Virginia glasswort	*Salicornia virginica*	OBL

Characteristic Plants for Freshwater Marshes		
Common Name	**Scientific Name**	**Wetland Indicator**
Soft-stem bulrush	*Scirpus validus*	OBL
Cattail	*Typha spp.*	OBL
Arrow-head	*Sagittaroria spp.*	OBL
Buttonbush	*Cephalanthus occidentalis*	OBL

Characteristic Plants for Wet Meadows		
Common Name	**Scientific Name**	**Wetland Indicator**
Wool grass	*Scirpus cyperinus*	OBL
Jewelweed, Touch-me-not	*Impatiens capensis*	FACW
Soft rush	*Juncus effusus*	FACW+
Sensitive fern	*Onoclea sensibilis*	FACW+

Characteristic Plants for Forested Wetlands		
Common Name	**Scientific Name**	**Wetland Indicator**
Red maple	*Acer rubrum*	FAC
Black willow	*Salix nigra*	OBL
Green ash	*Fraxinus pennsylvanica*	FACW
Spice bush	*Lindera benzoin*	FACW
Swamp azalea	*Rhododendron viscosum*	FACW+
Chinese privet*	*Ligustrum sinense*	FAC
Cinnamon fern	*Osmunda cinnamomea*	FACW+

Characteristic Plants for Forested Wetlands		
Royal fern	*Osmunda regalis*	OBL

Characteristic Plants for Shrub Swamps		
Common Name	**Scientific Name**	**Wetland Indicator**
Buttonbush	*Cephalanthus occidentalis*	OBL
Pepperbush	*Clethra alnifolia*	FACW
Common alder	*Alnus serrulata*	FACW+
Skunk cabbage	*Symplocarpus foetidus*	OBL
Marsh fern	*Thelypteris thelypteroides*	FACW+

Characteristic Plants for Bogs and Fens		
Common Name	**Scientific Name**	**Wetland Indicator**
Sphagnum moss	*Sphagnum spp.*	OBL
Pitcher plant	*Sarracenia spp.*	OBL
Slash pine	*Pinus elliottii*	FACW
Toothache grass	*Ctenium aromaticum*	FACW

** exotic or invasive plants which may be found in wetlands*

What do these wetland plants look like?

There are several excellent wetland plant identification guides available - just check out your local bookstore for guides with good descriptions and pictures. Also check out our website, which has links to many wetland sites: www.riversalive.org/aas.htm.

Soil Survey - Getting the Soil Sample

Wetland Soils

Soils have a distinctive look to them when they have been regularly flooded with water, even for only a short period of time. **Hydric soils** are defined as soils characterized by, and showing the effects of, the presence of water. Some of these characteristics include a soil's color. Even if the soil is not wet at the time you sample, if it has been flooded long enough for the oxygen to have been used up by microbes and wetland plants (become anaerobic), the color will be changed. Taking soil samples at upland, wetland and transitional stations will help you learn to recognize the difference between an upland and a hydric soil.

Using a sharp shooter or small shovel, dig a hole about 18 inches deep. Make a smooth, clean surface along the inside of the hole so you can note the changes in the soil from the surface down to the bottom. Using the soil chart from the visual survey packet, identify the soil colors. Feel the texture and determine if the soil is sticky and smooth like clay, gritty like sand, or somewhere in between. Some wetland soils **ribbon** or stick together, oozing between your fingers in a ribbonlike strand when squeezed. Does the soil smell like rotten eggs? Sulfur gas and methane are sometimes formed in anaerobic atmospheres and give off this distinctive smell. Also note the degree of wetness. Does water drip from the soil when you squeeze it? Is there standing water in the hole? Can you determine whether the soil is organic or mineral? Note this information on the data sheets provided.

If there is standing water on the soil, gently bring the spade to the surface with the soil sample resting on the blade and observe.

Major Wetland Soil Type	**Characteristics**
Organic- soils contain more than 10% of partially decomposed plants within at least 1.5 feet of the ground's surface.	Black muck or black to dark brown peat
Mineral- soils that contain little or no organic material	gleyed - neutral gray, greenish, or bluish gray mottled - soil has splotches of brown, orange, red or yellow

Considering the Hydrology

Hydrology is the study of the behavior of water in the atmosphere, on the earth's surface, and underground. The **hydroperiod** in a wetland is the seasonal and cyclical pattern of water in a wetland. It also helps designate into which wetlands classification an area will be placed (lacustrine, palustrine, etc.). Landscape position and hydrology determine water depth, flow patterns, and the duration and frequency of flooding or saturation in a wetland. Topography, proximity to other bodies of water, and depth to the water table are all factors that influence wetland hydrology.

The frequency, depth and duration of flooding in a wetland are defining factors in the area's characteristics of vegetation, soils, and wildlife. A wetland with deep, slow-moving or stagnant waters will have markedly different vegetation and habitat from a wetland with shallow, fast-moving water.

Water may enter a wetland in several ways, including:

- Direct precipitation
- Surface water runoff from brooks, streams, and rivers
- Springs or seeps-- places where the water table intersects with the land surface
- Flood waters from upstream and adjacent surface water bodies such as rivers, ponds, and lakes
- Tidal flow and storm surges in coastal areas
- Underground water sources such as groundwater or springs

In low-lying areas, groundwater may lie just below the soil surface (high water table), keeping soils saturated from below.

Complete the hydrology survey form by measuring the depth of the water at each of the stations. If water is not present, note the hydrologic indicators. DO NOT WADE INTO DEEP OR SWIFTLY-MOVING WATER. If your transect survey station is at the edge of deep water, take your depth measurement there.

When is water present at your site – in all four seasons or just spring? How long is the water there? What is the likely source? All of these are questions that will help you understand the ecology of your wetland.

Drawing Conclusions

Since wetlands are so diverse in their appearance and apparent quality, you will need to draw conclusions about your adopted wetland's overall health based on its wetland classification type. For example, saltwater intrusion in an estuarine wetland may not be considered poor quality, as this is typical for some marshes at high tide. On the other hand, saltwater intrusion into a freshwater marsh following a storm event may change the wetland's original quality, as vegetation which is not adapted to brackish water dies. If this change results in a severe loss of habitat or erosion, it may be considered lower in quality. However, not all changes are negative. Some are natural and expected

fluctuation in wetland characteristics. Most decreases in wetland quality will be the result of man-made disturbances such as road building, dredging, or filling.

Using information in this manual and the resources listed in the Index, you will continue to learn more about your wetland.

Send Results

As you collect your data for your group, be sure to make copies for your local partners, Regional Training Center, local government, and Georgia Adopt-A-Wetland. Many people will be interested in your educational and informative experiences. Send your survey results to Georgia Adopt-A-Wetland once a quarter.

Litter Pick Up

Although frequently wetlands are not easily accessible to people who aren't trying to get there, trash and debris from nearby communities may be littering your area. Removing this litter is a quick and easy way to instantly make a difference in wetland quality and aesthetics.

Bring trash bags with you during your quarterly visual surveys and pick up litter. Your group may be split up into several teams (e.g. a litter team, vegetation team, soils team, etc.). If there are items too large for your group to safely handle, contact your local city or county public works or fire department and ask if they can assist your group. Always be careful of sharp objects - wear gloves to protect your hands!

Public Outreach

It is very important for your group to let the community know what you are doing to protect and preserve their resources. Give at least one presentation during the course of your project. Contact the local newspaper or television station and invite them along for a visual survey. Write articles for a school newspaper or newsletter and be sure to keep a scrapbook of your activities to show off at environmental fairs! Many groups from canoe clubs to civic organizations have newsletters and are interested in water stewardship. Each time you give a presentation or write an article, please keep track of it and let us know! We also keep a scrapbook of activities.