



WETLAND SURVEYS

Review the **three** types of Adopt-A-Wetland surveys used in environmental monitoring and answer the questions that follow.

1. VISUAL SURVEY

Human activities can impact a wetland. A visual survey is conducted quarterly (4 x's per year) to document wetland conditions and track changes in an area.

Wetland Condition/Appearance:

Plants are an important indicator of wetland condition. Marsh grass and other plants change naturally with the seasons. The usual pattern is that bright green marsh grass will turn brown in the winter and new growth will occur in the spring and fall. We expect “browning” during the winter, but if the brown color stays all year, there may be reason for concern. A visual survey will help determine whether there is an abundance or absence of wetland organisms, like mussels, snails, crabs and fish.

Soils:

Large areas without plants (except for salt pans) may be a warning sign that something is not right. These areas of the marsh will consist mostly of mud. Monitoring can reveal whether a muddy area without plants is increasing or decreasing.

2. BIOLOGICAL SURVEY

A biological community is a naturally-occurring group of organisms that live together and interact as a unit. A salt marsh community may consist of fiddler crabs, periwinkle snails, marsh clams, mussels, mud crabs, and/or stone crabs. **Biodiversity** refers to the number of different species in a community.

Biodiversity depends on **species richness** and **species evenness**.

- Species richness refers to the *number of species* present;
- Species evenness refers to the *distribution of individuals among the species present*. (For example, if all species have about the same number of individuals, evenness is high.)

Tools/methods used for biological surveys:

D-Net – The net is used to scrape along the mud and organic debris (5 times on either side of a 1-meter transect) and then sort, count and identify the organisms captured in the net. Record the information on a biological survey data sheet.



Box survey – Create a wetland transect and then use meter (or yard) sticks to form boxes along the transect. Within each box, sift through the debris to sort, identify and count the organisms observed. Identify plants present and record any organisms found on the vegetation. Measure the height of 15 individual *Spartina* grasses and calculate the average for each survey station.

Hester-Dendy colonizing plates – A stack of plates is suspended 6-12” under the surface of the water for one month. When retrieved, both sides of each disk are scraped into a bucket of salt water. Use a sieve or strainer to sort similar organisms into separate pans. Use a guide to identify organisms and record them on a survey form.

3. PHYSICAL SURVEY

Estuaries are a transition zone between fresh and salt water. The composition of plants and animals in the surrounding salt marsh depends on environmental conditions such as water depth, salinity, temperature, tidal fluctuations, dissolved oxygen, turbidity and pollution.

Key parameters in a physical survey:

Temperature affects the chemical and biological processes of an aquatic system, including dissolved oxygen levels, water density and distribution of organisms. Temperature differences between surface and bottom water produce vertical currents that help distribute nutrients and oxygen throughout the water column. Water temperatures change seasonally with air temperatures and are influenced by storms, winds and tides.

pH refers to whether a solution is acidic or basic (alkaline) and is recorded on a scale from 0 to 14, with 7.0 considered neutral. Solutions with pH below 7.0 are acidic and those between 7.0 and 14.0 are basic. The pH scale is logarithmic, so every one-unit change in pH (for example, 7.0 to 8.0) represents a ten-fold change in acidity. Abnormally low or high pH levels can adversely affect egg hatching, stress fish, or cause fish kills.

Dissolved oxygen is a measurement of the oxygen available in the water, a critical factor for determining the health of an aquatic system. Oxygen is required for respiration in animals and plants and is used in the decomposition of organic matter. Oxygen enters the water through atmospheric diffusion, plant/algae photosynthesis and wave action. Natural shifts in dissolved oxygen occur throughout the day due to the presence or absence of sunlight available for photosynthesis.

Salinity is a measure of how salty the water is. Over time, rocks and mountains wear away and minerals and particulate material are carried by creeks and rivers to the ocean. A combination of elements and salts, like chloride, sodium, sulfate, magnesium, calcium and potassium, make up the salinity concentration of a water body.

Turbidity is a measurement of water clarity. Weather conditions and suspended particles can affect turbidity. Phytoplankton, detritus, and other organic matter also affect turbidity. The higher the turbidity of the water, the less light penetrates to the lower depth regions, causing a decrease in phytoplankton or plant growth.

