IN THE WETLANDS ITS ALL ABOUT THE FLOW PART 4
TIME FOR THE ANNUAL PHYSICAL
By Larry Eichert

This month we were scheduled to look at the wetlands as a biological super market. However to know what to put into the basket we need to see if we need to change our diet. By the time this article is printed the test results should be completed from the "wetland physical" and the needed changes in the wetland management program should be being put into place based on the test results. The question is; What's involved in the physical. Each type of wetland area should be considered as an individual organism made up different systems similar to our respiratory, digestive, and excretory systems with specific nutritional needs that give off specific waste products. A variety of tests can be done to see if these needs are being met or if there is too much.

The following basic tests and measurements are conducted in order to determine the conditions that exist within the wetland area. Since so much of the flow of nutrients in a wetland occur within the body of water itself we will examine that specific area. Other tests can be conducted on the soil or substratum, plant populations & density, carrying capacity of: plankton, bacteria, plant, animal, protozoan, populations etc.

Some basic water tests:

1. Dissolved oxygen measurement: Water bodies require adequate oxygen levels in order to provide for aerobic life forms. As dissolved oxygen (D.O.) levels in water drop below 5.0 mg/l, aquatic life is put under stress. The lower the concentration, the greater the stress. Low oxygen levels can result in large fish kills. Plants give off the O2 during photosynthesis and fish consume it giving off CO2 during respiration.

2. Secchi Disc (a black & white disc is lowered into the water until the white quarters become dark, the depth is then measured) is used to determine the turbidity of a body of water. It is related to the cleanliness of the water. Waters with low concentrations of *total suspended solids* (TSS) are clearer and less turbid than those with high TSS concentrations.
   A. Turbidity can be caused by high concentrations of biota such as phytoplankton, or by loading of abiotic matter such as sediments.
   B. Turbidity is important in aquatic systems as it can alter light intensities through the water column, thus potentially effecting rates of photosynthesis and the distribution of organisms within the water column. (lowered rates of photosynthesis may in turn effect the levels of dissolved oxygen available in a given body of water, thus effecting larger populations such as fish.)

   High turbidity can cause sedimentation deposit to form.

   Summary: Generally the more turbid a wetland is, the less biota it will be able to support. Turbid waters inhibit light from penetrating deeply into the water column and therefore negatively affect primary productivity and dissolved oxygen available to support other organisms. In general, lower turbidity is associated with cleaner, healthier water.

3. Nitrogen Ammonia: If Ammonia is present in significant quantities, that can indicate that the water column does not have sufficient oxygen to oxidize ammonia to Nitrite (NO2) and Nitrate (NO3) and can be toxic to fish and other animals.

The level of toxicity is based on the total ammonia concentration, pH, and temperature. When levels are high it is likely that the pond is being exposed to unusual discharges. In our community that would come from fertilizer run off from lawns and the golf course and from the sewage systems from the street gutters. In such case, multiple management strategies may be required to reduce Ammonia levels. Low ammonia concentrations significantly help to limit plant and algae growth in low phosphorus wetlands . Reduced fertilizer applications near shorelines can sometimes help prevent increases in this and other nutrient levels. In some lakes it is from the aging of the lake and poor drainage and In this case it is usually recycled from the sediment.

4. pH. (*paper of hydration*) The pH value of a body of water expresses its tendency to donate or accept hydrogen ions on a scale of 0 (very acidic) to 14 (very basic). Natural waters generally range from pH 6.5 to pH 8.5 but can vary. Areas with calcium carbonate substrates tend to have higher or more basic pH levels; such is the case with many Florida ponds and lakes. pH levels can also fluctuate throughout the day in response to respiration rates (which lowers pH) and photosynthesis rates (which increases pH). Any major pH deviations over time for a given water body could indicate the onset of intrusion of strongly acidic or alkaline wastes In our area. It could actually be coming from the ponds themselves due to the limestone content from decomposing shells on the bottom of the lakes.

   A. Alkalinity: The result of this test indicates the water's buffering capacity.
      Water with adequate buffering capacity can limit dangerous pH swings caused by the introduction of highly acidic substances, such as acid rain and pollution, the effects of which can be compounded by the subsequent loss of plant, algal, and other aquatic life.
   B. Hardness/Alkalinity: Total hardness is defined as the concentration of calcium and magnesium in the water. Calcium is necessary for proper fish egg and fry development. Closely related to alkalinity and pH, sufficient hardness levels can help decrease ammonia and pH toxicity.

5. Phosphate: Total phosphorus (TP) refers to all the various forms of phosphorus in the water, while phosphate (PO4, PO3-) refers specifically to the dissolved form of phosphorus in the water column. Phosphate is the most biologically active form of phosphorus. Phosphate levels are expected to range from 0.01 to 0.05 mg/L for healthy freshwater systems.
   When you see algae blooms, water lettuce, duckweed, or money wart covering the surface of the water it indicates an excess of nitrogen of phosphate products. The type of nitrogen or phosphate will indicate the source of the problem. Example: one form of phosphate comes from fish detritus and the other is from decomposing plant matter.

6. The Alum jar test. It is used to determine turbidity and nutrient removal in the wetland to simulate a full scale water treatment process in order to determine which treatment chemical will work best on the tested area.

When these tests are completed a report should be presented to the C.D.D. board by the wetland management company explaining the results and a plan of action to be taken to correct any problems that were identified. How much that will be corrected will be determined by budgetary constraints.