Module #9

Calculating Water Quality Index

Adapted and excerpted from Field Manual for Water Quality Monitoring: An Environmental Education Program for Schools by Mark M. Mitchell and William B. Stapp

Materials

Secchi disk

Background Information

from http://www.h2ou.com/h2wtrqual.htm a subsite of hach.com

Turbidity is a measure of the relative clarity of water: the greater the turbidity, the murkier the water. Turbidity increases as a result of suspended solids in the water that reduce the transmission of light. Suspended solids are varied, ranging from clay, silt, and plankton, to industrial wastes and sewage.

The American Public Health Association (APHA) defines turbidity as "the optical property of a water sample that causes light to be scattered and absorbed rather than transmitted in straight lines through the sample." In simple terms, turbidity answers the question, "How cloudy is the water?"

Light's ability to pass through water depends on how much suspended material is present. Turbidity may be caused when light is blocked by large amounts of silt, microorganisms, plant fibers, sawdust, wood ashes, chemicals and coal dust. Any substance that makes water cloudy will cause turbidity. The most frequent causes of turbidity in lakes and rivers are plankton and soil erosion from logging, mining, and dredging operations.

A. TURBIDITY Sampling Procedure

Turbidity can be measured using a simple device called a Secchi disk. A Secchi disk is an 8" diameter (23 cm.) black and white disk attached by a chain or rope that is marked in foot increments. Because Secchi disk measurements are based upon the disk being lowered until it disappears, it cannot be used in rivers which are shallow or have low turbidity. In these cases the Secchi disk reading may need to be estimated as accurately as possible.

It may be difficult to use the Secchi disk in fast river currents because the current will push the disk downriver, preventing an accurate measurement. A weight may have to be added to the disk in this situation.

B. TURBIDITY Testing Procedure

1. Lower the Secchi disk from a bridge, boat, or dock into the water until it disappears. It is important that the disk travels vertically through the water and is not "swung out" by the river current. Note the number of feet/inches on the chain or rope.
2. Drop the disk even further (until it disappears) and then raise it until you can see the disk again, Note the number of feet/inches on the chain.
3. Add the results of step I and step 2 and divide by two. This is your turbidity level using the Secchi disk.

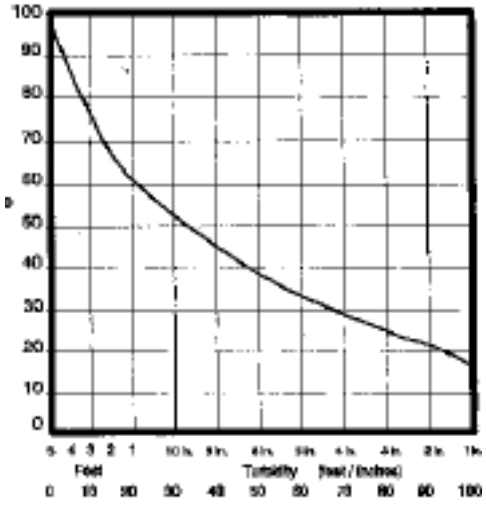
C. TURBIDITY Calculating the Results

To compute the Q-value for the turbidity, follow these steps:

1. Find the weighting curve chart (back);
2. Locate your test result on the bottom (horizontal or "x" axis) of the chart;
3. Interpolate the Q-value for your test result using the following steps;
4. From your test result value on the horizontal ("x") axis of the chart, draw a vertical line up until it intersects the weighting curve line;
5. From this point of intersection, draw a horizontal line to the left hand side (the vertical or "y" axis) of the chart;
6. Where this horizontal line intersects the vertical ("y") axis of the chart, read off the value. This is the Q-value for this test; it should be recorded in Column B on the WQI chart on the Calculating Water Quality Index (Module 10).

The Q-value for each test should then be multiplied by the weighting factor listed in the chart on the Water Quality Index page. Record the product of this calculation in Column D of the chart

Turbidity Weighting Curve Chart



Turbidity: NTU's/JTU's Note: If Turbidity > 100.00, Q=5.0