

## **E. Turbidity**

### **I. Why is this test important/What does it measure**

Turbidity is a measure of the relative clarity of water: the greater the turbidity the murkier the water. The amount of suspended matter in water will reduce the penetration of light into the water. As light decreases, so does photosynthesis by plants. That decreases the plant growth for food for herbivores and also results in decreases in oxygen production. High turbidity can also make it difficult for predators that use sight to see and capture their prey. A rain event leading to high turbidity can also lead to bad fishing until the water clears back up again. High turbidity may be caused by soil erosion, waste discharge, urban runoff, abundant bottom feeders (such as carp) that stir up bottom sediments or algal growth. Sediment in the water also can carry phosphorus and other contaminants. High turbidity can also mean there is a lot of stream erosion going on and unstable river banks.

### **II. Water Quality Standards**

The drinking water standards for turbidity are .5 JTUs, although most drinking water providers strive for less than .1 JTU. Michigan does not have a set surface water standard for turbidity, but “settable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10% from the seasonally established norm for aquatic life”. That means that the water should not reduce light penetration by more than 10% of what is “normal”

### III. How to conduct the test

This test compares the turbidity (or clarity) of the water from the river with the clarity of distilled water. This test works by adding a substance to the distilled water to make it “dirtier” or cloudier. The readings are made by looking down through the water at a black dot. The amount of turbidity in the water will make it more difficult to see the dot.

1. Fill one Turbidity column to the 50 mL line with the sample water. If you cannot see the dot when looking through the water, pour out the water until you reach the 25 mL line.
2. Fill the second turbidity column with an amount of turbidity free water (distilled, deionized, or reverse osmosis water) equal to the amount being sampled.
3. Place the tubes side by side and notice the difference in clarity. If both tubes are equally clear, the turbidity is zero.
4. Shake the Standard Turbidity Reagent vigorously. **DO NOT FORGET TO SHAKE IT UP.** Add .5mL of Standard Turbidity Reagent to the “clear water” tube, then stir the tube to equally distribute turbid particles. Keep adding Standard Turbidity Reagent in .5ml intervals and stirring until the “clear water” tube is as cloudy as the river water. Record the amount of Standard Turbidity Reagent added.
5. Each .5ml addition equals 5 Jackson Turbidity Units in the 50mL size sample. If a 25mL sample is used, each .5L addition of Reagent equals 10 JTUs.

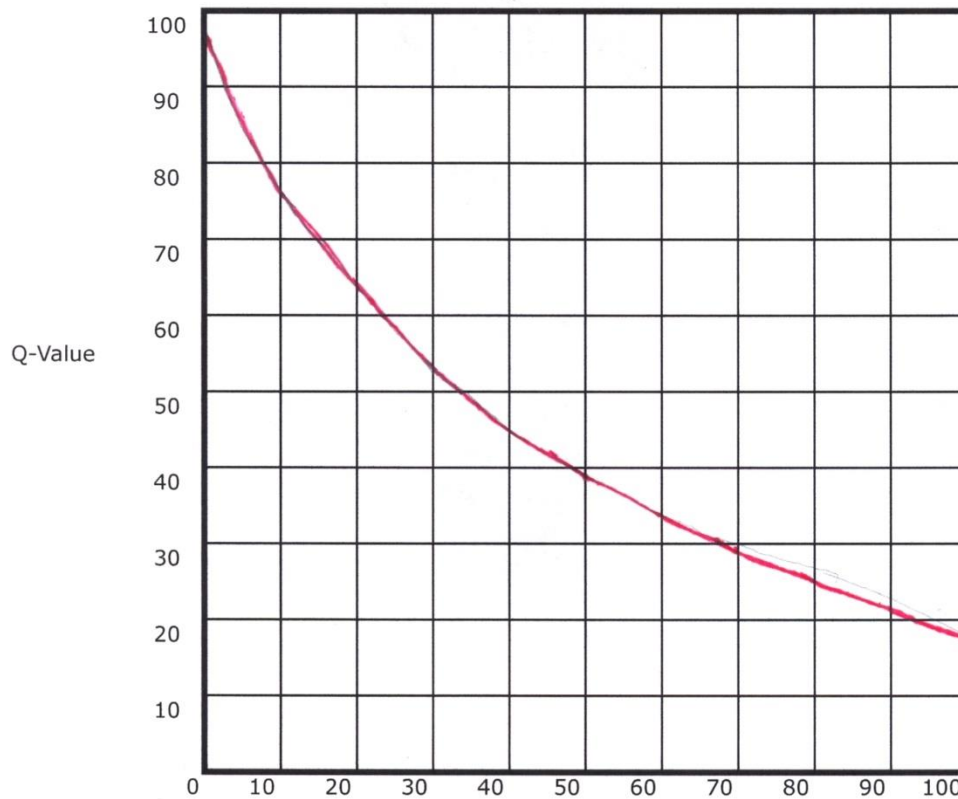
#### **TURBITITY TEST RESULTS**

Number of Measured Additions	Amount in mL	50 mL Graduation	25 mL Graduation
1	0.5	5 JTU	10 JTU
2	1.0	10 JTU	20 JTU
3	1.5	15 JTU	30 JTU
4	2.0	20 JTU	40 JTU
5	2.5	25 JTU	50 JTU
6	3.0	30 JTU	60 JTU
7	3.5	35 JTU	70 JTU
8	4.0	40 JTU	80 JTU
9	4.5	45 JTU	90 JTU
10	5.0	50 JTU	100 JTU
15	7.5	75 JTU	150 JTU
20	10.0	100 JTU	200 JTU

**IV. Determining the Q-Value**

Calculating The Results

**Chart 8: Turbidity Test Results**



Turbidity: NTU / JTU (JTU & NTU are interchangeable.)

Note: If turbidity is > 100.0, Q-Value = 5.0

### **V. What to Watch Out For: Common Mistakes**

-One of the most common mistakes in this test is adding the Standard Turbidity Reagent to the river water instead of to the “clear water”

-Do not forget to shake up the Standard Turbidity Reagent vigorously before you add it to the “clear water”. Failure to do so will lead to an incorrect result.

-Do not forget to stir the “clear water” after each .5mL addition of Standard Turbidity Reagent.

-Make sure you are checking for the clarity of the water, not the color of the water when you are doing the test. Sometimes it is easy to confuse the two.

-Attempt to get your water sample from a part of the stream that others have not been walking around in yet. If necessary, go upstream from the rest of the students to take your sample.

### **VI. Consistency When Doing Multiple Tests**

If you are conducting multiple tests, use the average (arithmetical mean) of all the results. If you have a wide variety in your test results, talk to your mentor or FRWC staff about those results.

### **VII. How to Analyze Why The Results is Good or Bad**

Turbidity can vary widely based on what part of the watershed you are in. Proximity to a rain or runoff event can also greatly affect turbidity. If you have a turbidity reading of over 25 JTUs, try to explain why this is the case. If there has been a recent rain event, that may be “normal”. If there has not been a recent runoff event, you may want to see what is causing the turbidity.