

## Chicago River North Branch -- Field Trip Data and Results Interpretation

Sampling Site -- North Avenue Turning Basin Shoreline

Date: 8 Oct 2011

Recorder: B. Bermea

Site Characteristics: Channelized urban river on Chicago's near-North Side that receives stormwater run-off from surrounding neighborhoods, wastewater effluent, and some Lake Michigan flow via the North Shore Channel upstream. Recognized as a heavily polluted stretch of the Chicago River, compared to farther up the North Branch, but therefore typical of the CAWS southward. Shoreline alternates between steel or concrete retaining walls and minimal vegetation that displays considerable erosion. No floating or submerged macro-vegetation. Silty bottom sediment gives water a brown appearance. Sunny conditions and unseasonably warm (80°F).

Test	Expected Range	Test Value	Sampling Comments and Results Interpretation
Bacteria	50-100,000 colonies/100ml (for Chicago River)	LaMotte: positive	Not much precision here, since test is a positive/negative determination. T'would be shocking to get a negative result, so this is in line with expectations given the number of Combined Sewage Outfalls along the river.
Chlorine (Free and Total)	0.2-5ppm in tap water	Hach (free): 0ppm LaMotte (total): NA	Total chlorine is always = or > free chlorine. Not surprising values are low here, since there is no final disinfection of wastewater effluent.
Copper	< 0.03ppm in tap water	LaMotte: 0ppm	A heartening result but not surprising, since copper is found in small amounts in natural bodies of water.
Dissolved Oxygen	1-12ppm	<u>Hach</u> : <ul style="list-style-type: none"> <li>Concentration: 5ppm</li> <li>% Saturation: 60%</li> </ul> LaMotte: <ul style="list-style-type: none"> <li>Concentration: 8ppm</li> <li>% Saturation: 90%</li> </ul>	Note disparities in values here. What might account for this? (Consider the sampling conditions as well as different level of precision in measurement techniques in the Hach Surface Waters kit and the LaMotte Urban Waters kit. The latter allows estimates of 0, 4, or 8ppm, so is much less precise.)
Hardness	up to 100+ppm	LaMotte: 200ppm (5 tabs)	Indicator of calcium and magnesium, minerals that dissolve in groundwater as it flows through rock. Chicago area is rich in limestone.
Iron	<0.2ppm in tap water	LaMotte: NA	Iron is naturally present in many water sources, and is an important nutrient for plants as well as animals.

Nitrate	0.2-8ppm (Chicago River)	Hach: 5ppm  LaMotte: 20ppm	Hach value is within the expected range, though the LaMotte value is 4x higher. Any ideas about the disparity in values? Does this matter for fish living in the river? What does this say about the potential for algal blooms?
pH	6-8.5 (Chicago River)	LaMotte: 7 Mini: 7	Neutral solution, within the optimal range for living organisms.
Phosphate	0.1-2.5ppm (Chicago River)	Hach: 2.9ppm  LaMotte: 2ppm	Good congruence here between tests; Hach is more precise. Well over the desired upper limit of 1ppm for wastewater effluent, and more than high enough to stimulate plant growth such as algae blooms, which in turn can deplete dissolved oxygen levels in the water.
Temperature	Varies with season, weather, depth of sample	Reading 1: 21F Reading 2: 20F Reading 3: 20C  Hach: 21C	Fairly consistent readings.
Turbidity	2-140cm	Sample 1: 41cm Sample 2: 30cm Sample 3: 38cm  Average: 36cm (18 NTU)	A little inconsistency in measurement, but two values agree. What are possible sources of error in using the turbidity tube?  Relatively clear lakes may have a turbidity reading of up of 25 NTU, so this value here is pretty good for a notoriously polluted river.

Data collected by members of SUST 220 Water and PLS 391 Seminar in Natural Science