

Salt Creek / Busse Woods Field Trip Data and Results Interpretation

Sampling Site 1 -- Salt Creek at Golf Road Overpass

Date: 10 Sept 2011

Recorder: B. Shulman

Site Characteristics: Channelized urban stream that receives stormwater run-off from surrounding communities (Schaumburg, Rolling Meadows, etc.). Vegetated shoreline but no floating or submerged macro-vegetation. Silty bottom sediment gives water a brown appearance. Mostly sunny conditions and seasonably warm (75F). This site is the northern boundary of the vast 3,700-acre New Brown Forest Preserve in Cook County, just east of Schaumburg. Salt Creek flows through the preserve's wetlands and feeds Busse Lake, a man-made reservoir. Storm water run-off from the eastern half of Schaumburg eventually flows into Salt Creek and Busse Lake in this preserve.

Test	Expected Range	Test Value	Sampling Comments and Results Interpretation
Bacteria (total coliform)	50-100,000 colonies/100ml (for Chicago River)	LaMotte: positive	Note that this is a measure of total coliform bacteria, and does not quantify it but merely registers a positive or negative result. A positive reading does not mean there's definitely a problem, but warrants more specific testing for fecal coliform, <i>E. coli</i> , etc. No direct sewage discharge into creek that we know of, so unlikely to be much bacteria present. Yet this result is positive. What might be possible sources of bacteria? And is this a potential health hazard?
Chlorine (Free and Total)	0.2-5ppm in tap water	Hach (free): 0ppm LaMotte (total): 1ppm	Total chlorine is always = or > free chlorine. Not surprising values are low here, since creek is fed by run-off.
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"> • Concentration: 10ppm • % Saturation: 125% LaMotte: <ul style="list-style-type: none"> • Concentration: 4ppm • % Saturation: 55% 	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.)
Hardness	up to 100+ppm	LaMotte: 320+ppm	Quit measuring after adding several reagent tabs; actual value might be higher. This is

			a pretty mineral-rich (calcium and magnesium) stream, apparently.
Iron	<0.2ppm in tap water	LaMotte: 5ppm	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: 0ppm LaMotte: 0ppm (2 trials)	An indicator of good quality. Why so low? Consider the stream characteristics and the surrounding suburban landscape.
pH	6-8.5 (Chicago River)	LaMotte: 8ppm	Slightly basic (alkaline), but well within the optimal range for living organisms.
Phosphate	0.1-2.5ppm (Chicago River)	Hach: 0.5ppm LaMotte: 1ppm	Good congruence here between tests; Hach is more precise. Well under the limit of 1ppm for wastewater effluent, but still 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: 78F Reading 2: 76F Reading 3: 26C	Fairly consistent readings. Why so warm here?
Turbidity	2-140cm	Sample 1: 47cm Sample 2: 40cm Sample 3: 37cm Average: 41cm (= 15 NTU)	NTU = Nephelometric Turbidity Units, a standard unit used in water quality analysis (WR p26). Not bad consistency in measurement. What are possible sources of error in this procedure?

Sampling Site 2 -- Busse Lake's South Pool

Date: 10 Sept 2011

Recorder: K. Nawls

Site Characteristics: One of the extensive pool networks of Busse Reservoir, an artificial lake created by damming Salt Creek at the south end of the Busse Woods Forest Preserve. South Pool is fed by Salt Creek and, more directly, by the West Branch of Salt Creek. It is a receptacle, therefore, of the wastewater effluent from the John Egan Treatment Plant just west of the Preserve, as well as stormwater run-off from the eastern half of Schaumburg. Vegetated shoreline but no floating or submerged macro-vegetation where we were. Silty bottom sediment gives water a brown appearance. Mostly sunny conditions and seasonably warm (75F).

Test	Expected Range	Test Value	Sampling Comments and Results Interpretation
Bacteria (total coliform)	50-100,000 colonies/100ml	LaMotte: Positive	Note that this is a measure of total coliform bacteria, and does not quantify it but merely registers a positive or negative result. A positive reading does not mean there's definitely a problem, but warrants more specific testing for fecal coliform, <i>E. coli</i> , etc. What are possible inputs of coliform bacteria here?
Chlorine (Free and Total)	0.2-5ppm in tap water	Hach (free): 0.2ppm LaMotte (total): 0.2ppm	Good congruence here. Can we tell if this is substantially different from Salt Creek?
Copper	<0.03ppm in tap water	LaMotte: 0ppm	Always good to see a negative result.
Dissolved Oxygen	1-12ppm	<u>Hach:</u> <ul style="list-style-type: none"> • Concentration: 5ppm • % Saturation: 55 LaMotte: <ul style="list-style-type: none"> • Concentration: 8+ppm • % Saturation: 95 	Possible reasons for big disparity in values? Note that the EPA uses 5ppm as the lower limit benchmark for adequate oxygen for maintaining healthy biota. Busse Lake is stocked with fish and has a diverse fish population. What does this tell us about the probably DO levels in the lake?
Hardness	up to 100+ppm	LaMotte: 160ppm	Lots of minerals, though more dilute than Salt Creek. Does this make sense intuitively?
Iron	<0.2ppm in tap water	LaMotte: 1ppm	Still high compared to tap water, but significantly lower than Salt Creek.

Nitrate	0.2-8ppm	Hach: 2ppm LaMotte: N/A	There's a fair amount of nitrate here, enough to stimulate algal blooms; but not nearly enough to impact fish populations or humans negatively.
pH	6-8.5	LaMotte: 8	Slightly basic, as with Creek.
Phosphate	0.1-2.5ppm	Hach: 0ppm (3 trials) LaMotte: 0.5ppm	1ppm is upper limit, ideally, for wastewater treatment effluent. How does the South Pool measure up?
Temperature		Reading 1: 26.5C Reading 2: 24C Average: 25C	In general, lower temps are better for stream life than higher temps; and the temp reading is crucial for determining the degree of saturation of oxygen in the water: the higher the temp, the less oxygen it can hold. Relation of temp to our sampling site? to the lake's fish population?
Turbidity	2-140cm	Sample 1: 47 Sample 2: 38 Sample 3: 31 Sample 4: 27 Sample 5: 42 Sample 3: 32 Average: 36 (= 19 NTU)	NTU = Nephelometric Turbidity Units, a standard unit used in water quality analysis (WR p26). A rather big range in results here -- 27 to 47. What are possible sources of error in this procedure? How good a result is this in terms of water quality?