2020 WATER SAMPLING REPORT FOR SELECTED MS4 SITES

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IN-STREAM SAMPLING PROTOCOLS FOR MS4 SITES

Beginning the second week of May and ending mid-September, the Environmental Health Division conducted surface water testing on a weekly basis throughout the county on ditches, creeks, lakes, and the Elkhart River and the St. Joseph River. The sampling provides data to help prioritize sites with a high illicit discharge potential, characterizes water quality problems, helps determine critical areas for improvement, and documents the long term success of the illicit discharge and elimination program.

The sites are selected by storm water representatives from the MS4 Partnership which include the cities of Elkhart and Goshen, the town of Bristol, and Elkhart County agencies which meet annually to determine if changes need to be made to the locations. The standard procedure is to obtain a minimum of three years of data per site in order to identify any trends. The following is a list of the sites from the 2020 season:

Rock Run Creek: CR 34
Yellow Creek: Concord High School and CR 138
Weaver Ditch: CR 13
Berlin Court Ditch: CR 15
Turkey Creek: CR 50
Dausman Ditch: CR 19
Swoveland Ditch: CR 19
Pine Creek: CR 18 and Wyland & Roske
Christiana Creek: CR 4
Elkhart River: Bainertown and Indiana Avenue
St. Joseph River: Bristol Boat Launch
Heaton Lake: Ideal Beach and 22880 Lake Shore
Simonton Lake: 51093 Beach Drive and 51330 SR 19

The sampling form includes whether the sample was considered wet or dry. A wet weather event is defined as a rain event with precipitation greater than .1 inches of rain within a twenty-four hour period prior to collection. A dry weather event is defined as a sampling event with no precipitation twenty-four hours prior to collection. Monitoring during both types of events provides representative samples and helps identify how differences in land use impact water quality.

Data gathered for chlorides, dissolved oxygen, pH, temperature, and conductivity are obtained in the field by using a YSI Professional Plus Instrument Probe. Calibration of the instrument probe is done in accordance with the owner's manual. The instrument probe is lowered into the approximate center part of the waterway and placed below the surface of the water to obtain actual real time data. At the sites with piers (Heaton Lake and Simonton Lake) the instrument probe is lowered into the water at the end of the piers. For the sites at Bainertown and the Bristol Boat Launch, sample collection is made from the edge of the rivers. According to the technical experts at YSI, this information is to be used for trending purposes only.

Tests for nitrates, phosphorus, total suspended solids, and E. coli are grab samples in which a single volume of water is obtained at a given point in time, placed in a prepared sample bottle, and then analyzed. Water samples were collected using one of two methods. For low flow sampling and sites with piers, a dipper was used. The dipper is rinsed three times at each site prior to collection to prevent cross contamination between samples sites. For high flow streams, a Van Dorn sampler is used. The

device is lowered into the approximate center of the waterway and placed below the water surface for a minimum of twenty seconds with the ends open to allow rinsing of the unit between sampling sites. A weight is then dropped on a line striking a triggering mechanism which tightly closes each end of the tube at the same time. This captures the free flowing water to be sampled. All samples are placed in pre-labeled and prepared sample bottles.

Nitrates and phosphorus samples are collected for analysis in the Elkhart County Health Department Laboratory using a Hach portable spectrophotometer. Chain of custody procedures are required and implemented. These include labeling the bottles with the sample site number and all other information as recorded on the water sampling form. Items on the water sampling form include the sampling site identification, sampling date and time, sampling number, dry or wet event, raining at the time of collection, and "ECHD" as the agency that collected the sample.

Total suspended solids collected on Tuesday are analyzed at the City of Goshen Waste Water Treatment Plant Laboratory. On Thursday, total suspended solids are collected and submitted for analysis at the Elkhart Public Works and Utilities Laboratory. Total suspended solids are not collected at the lake sites. All E. coli samples are submitted to the Elkhart Public Works and Utilities Laboratory which provides the bottles and a pre-printed label. This label is filled out with the site number, location, collection date, who collected the sample, who transported and relinquished the sample. These documents are attached to the sample container. Upon arrival at the Elkhart Public Works and Utilities Laboratory, time is also added to the label. The label includes a space to acknowledge who received the sample. The Elkhart County Health Department's water sampling form is also signed by an Elkhart laboratory representative with the time of sample delivery and a copy is made and kept in their laboratory records. This procedure is implemented to verify chain of custody. For the total suspended solids, the samples are collected and placed in pre-labeled containers with the site number, location, date, and who collected the sample. The time is added to the sampling form when the samples are delivered to the City of Goshen Waste Water Treatment Plant Laboratory. Upon delivery, an Elkhart County Health Department representative places the total suspended solids samples into a refrigerated unit to ensure proper temperature requirements before analysis.

All samples collected are immediately placed in a cooler with chill packs as soon as they are obtained in the field in order to maintain proper temperature requirements during transportation per standard methods protocol.

PARAMETER DEFINITIONS AND THEIR IMPORTANCE

CHLORIDES are found in groundwater, streams, and lakes and may be of natural mineral origin or from human or animal sewage, industrial process wastewaters, agricultural fields and roadway deicing salts. It is recommended if very high levels (500 mg/l or more) are found, further investigation should take place to locate the source.

CONDUCTIVITY (SpC) is a measure of how easily electricity flows through water. It is strongly correlated with total dissolved solids. It is useful as a general measure of water quality. Each water body has a fairly constant range of conductivity that can be used for baseline readings. Significant changes in conductivity may be an indicator that a discharge or some other source of pollution has entered the water way. If this occurs, it is recommended that further investigation should take place to locate the source.

DISSOLVED OXYGEN (DO) is considered to be one of the most important parameters of water quality in streams, rivers, and lakes. All aquatic organisms need dissolved oxygen in the water to survive. Stream systems produce and consume oxygen. If more oxygen is consumed than produced, dissolved oxygen levels decline and some organisms move away, weaken, or die. Higher concentrations of dissolved oxygen equate to better water quality. Aquatic life is stressed at levels below 5.0 mg/l and levels below 2 mg/l will not support fish. Dissolved oxygen is very sensitive to temperature. The solubility of oxygen in water decreases as temperature increases. A waste discharge can have a dramatic effect on the oxygen balance of a water body by raising water temperature or introducing pollutants which remove the dissolved oxygen. According to 327 IAC 2-1-6 and the US EPA, the recommended target value is > 6 mg/l and not > 9 mg/l.

E. COLI is a species of fecal coliform bacteria that is specific to fecal matter from humans and other warm-blooded animals. E. coli indicates the possible presence of pathogenic bacteria, viruses, and protozoa that also live in the digestive systems of humans and animals. Their presence in a water body indicate pathogens might be present and that swimming/full body contact recreation can be a health risk. As required by the United States Environmental Protection Agency, total maximum daily load (TMDL) calculations have been established by the Indiana Pollution Control Board (327 IAC 2-1-6 Section 6(d)) for E. coli using membrane filter count and are the following numeric standards:

> "Concentrations shall not exceed 125 cfu/100 ml as a geoemetric mean based on not less than five samples equally spaced over a 30-day period nor exceed 235 cfu/100 ml in any one sample in a 30-day period."

NITRATES (N03) are one of the four forms of nitrogen in the nitrogen cycle. They are essential plant nutrients but in excess amounts they can cause significant water quality problems. Together with phosphorus they can cause increase in plant growth and changes in the types of plants and animals that live in surface water. In turn this affects dissolved oxygen and temperature. Excess nutrients can cause hypoxia which is a condition characterized by low levels of dissolved oxygen when the plants decay. The natural level of nitrates in surface water is typically low, less than 1 mg/l. Sources of nitrates include failing onsite septic systems, runoff from animal manure storage areas, fertilizer runoff from lawns and cropland, wastewater treatment plants and industrial discharges that contain corrosion inhibitors. The US EPA reference level is < 1.5 mg/l.

pH The pH scale measures the logarithmic concentration of hydrogen and hydroxide ions which make up water. Pure water, equal ion concentrations, is neutral with a pH of 7.0. Below 7.0 the water is acidic and above 7.0 the water is alkaline. pH affects many chemical and biological processes in water. The majority of the aquatic organisms survive and thrive at a range of 6.5-8.0. pH outside of this range reduces the diversity of the water way because it stresses the physiological systems of most organisms and can reduce reproduction. Low pH also allows toxic elements and compounds to become soluble and available for uptake by aquatic plants and animals. Some industrial discharges contain very high 12-14 pH or very low 1-3 pH. pH is a good monitoring parameter and significant fluctuations need to be investigated. According to 327 IAC 2-1-6, the target value is > 6 or < 9.

PHOSPHORUS Like nitrogen, phosphorus is an essential nutrient for plants and animals that make up the aquatic food chain. Phosphorus in waterways accelerates plant growth and algae blooms and with their decomposition result in low dissolved oxygen and death of some fish, invertebrates and other aquatic species. There are many natural and human sources of phosphorus. These include soil and rocks, wastewater treatment plants, runoff from fertilized lawns and cropland, failing onsite septic systems, runoff from animal manure storage areas, disturbed land areas and commercial cleaning preparations. Phosphorus is the limiting nutrient in many aquatic environments and very small inputs greatly affect photosynthetic productivity and can initiate a massive bloom of plants and algae in slow moving streams and ponds. These blooms are not desired and have a deleterious effect on the aquatic environments where phosphorus has been enriched. The IDEM 303(d) listing criteria is < 0.3 mg/l.

TEMPERATURE is a very important water quality parameter and influences all biological and chemical reactions. Temperature influences the dissolved oxygen content of the water, the metabolism of all aquatic organisms, the rate of photosynthesis, and the sensitivity of organisms to pollutants such as toxic wastes and parasites. All aquatic organisms have optimal temperatures for their survival. Many factors affect temperature including stream flow, sunlight, shade, water depth, turbidity, bottom color and composition, soil erosion, storm water runoff, and seasonal changes. Temperature is measured in degrees Celsius.

TOTAL SUSPENDED SOLIDS (TSS) are particulates in water and can include many organic and inorganic sources such as silt, decaying plant and animal matter, sewage and industrial wastes. They cause the water to be milky or muddy looking due to the light scattering from very small particles in the water. This is called turbidity. Suspended solids can destroy fish habitat because they can settle to the bottom and smother the eggs of fish and aquatic insects and suffocate newly hatched insect larvae. High levels of suspended solids can clog the gills of fish and reduce their growth rates and reduce dissolved oxygen. Also, pollutants and contaminants adhere to the suspended solids. Total suspended solids are measured in mg/l. There are no numeric standards for total suspended solids however they must meet narrative standards which state in part: "all waters at all times and places, including the mixing zone, shall meet the minimum conditions of being free from substances, materials, floating debris, oil, or scum attributable to municipal, industrial, agricultural, and other land use practices, or other discharges which are in amounts sufficient to injure, be acutely toxic to, or otherwise produce serious adverse physiological responses in humans, animals, aquatic life or plants."

NOTE: The above information was obtained from the United States Environmental Protection Agency (US EPA), the Indiana Department of Environmental Management (IDEM), The Center for Watershed Protection, and Purdue University Department of Agricultural and Biological Engineering.

SAMPLING RESULTS, CHARTS, AND MISCELLANEOUS INFORMATION

The sampling data results are in Appendix 1.

Appendix 2 contains the charts for E. coli and Total Suspended Solids.

Appendix 3 contains the water quality targets.

Appendix 4 contains the Indiana Department of Environmental Management's Policy for Reporting "Too Numerous to Count (TNTC) Data for E. coli Testing.

SUMMARY AND CONCLUSIONS

With the impacts of the COVID-19 virus, the Elkhart Public Works and Utilities Laboratory staff was reduced and not available for weekly analysis on a consistent basis.

According to the United States Environmental Protection Agency, "a water body is considered impaired when a water quality standard is violated, whether through exceedance of a numeric or narrative criterion, impairment of a designated use or violation of anti-degradation policy." The results of the 2020 sampling season continue to indicate E. coli levels in excess of the total maximum daily load of 235 cfu/100 ml at many of the sample sites except Christiana Creek which is the control site.

Additionally, sediment transport continues in many waterways depositing sediment and contributing to flow restrictions especially after wet weather events. Visible impairments to the structure of the waterways, the stability of the banks and the clarity of the water were also observed.

All water bodies are capable of assimilating a certain amount of pollution without adverse effects because of the dilution and self-purification capabilities of natural processes. The ability of a water body to mitigate for an organic pollutant, such as E. coli is dependent on many factors such as stream flow, depth, dissolved oxygen, temperature, available sunlight, and time. However, the high levels of E. coli indicate these pathogens are being infused at a rate greater than can be mitigated through natural processes resulting in these higher than acceptable numbers. Results such as these are indicators of illicit discharges entering the water bodies requiring investigation to determine their source and enforce compliance with environmental regulations prohibiting these discharges.

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APPENDIX 1: SAMPLING DATA

ROCK RUN CREEK CR 34

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/12/2020	9:05	6.2	13	490.2	6.45	51.22	6.37	0.225	3.78		N
5/19/2020	8:40	12.9	8.06	327.7	8.9	43.22	5.43	1.480	23		Y
5/26/2020	8:50	15.9	8.3	555	8.05	165.55	6.02	0.339	6		N
6/2/2020	8:25	14.8	8.24	592	8.54	174.16	6.23	0.254	8.5		N
6/9/2020	8:30	10.3	10.41	632	7.61	142.49	6.08	0.319	11.5	1060	N
6/16/2020	8:20	14.9	7.84	400.4	6.71	87.66	6.55	0.266	9.8	940	N
6/23/2020	8:30	18.0	7.07	500	8.13	151.01	5.53	1.380	145	63200	Y
6/30/2020	9:00	18.7	6.89	691	9.21	159.63	6.48	0.359	8.13	1060	N
7/7/2020	8:35	18.9	6.49	709	7.78	147.58	6.56	0.314		860	N
7/14/2020	8:30	16.3	7.8	633	7.28	72.01	3.60	0.321	6	700	N
7/21/2020	8:30	17.7	8.6	596	8.72	264.84	5.94	0.335	7.29	580	N
7/28/2020	8:45	16.8	8.39	641	7.68	149.09	6.44	0.280	8.38		N
8/4/2020	8:25	17.0	7.2	638	7.51	162.00	6.52	0.615		1860	N
8/11/2020	8:45	18.5	6.43	625	7.91	206.63	5.94	0.431	9.38	5200	Y
8/18/2020	8:35	16.2	8.4	646	7.64	152.87	7.09	0.208	6.45	1950	N
8/25/2020	8:30	19.3	7.01	506	7.73	128.80	7.34	0.303	92.5	1900	N
9/1/2020	8:45	17.4	8.5	670		152.00	7.28	0.312	3.63	940	N
9/8/2020	8:50	16.6	7.98	570		135.82	7.37	0.433	35		Y
9/15/2020	8:40	13.3	9.17	655		109.03	6.98	0.462	12	1050	N
9/22/2020	8:30	11.1	10.43	560	8.66	84.71	6.90	0.950	2.77		N

ST JOE RIVER BRISTOL BOAT LAUNCH

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/12/2020	9:30	8.5	11.68	462.5	8.85	45.4	2.69	0.138	5.11		N
5/19/2020	9:10	14.6	7.02	317.8	7.38	25.9	3.12	0.732	28.7		Y
5/26/2020	9:20	20.3	7.26	548	7.94	132.98	2.47	0.237	9.13		N
6/2/2020	8:50	18.1	9.63	518	9.61	152.12	2.68	0.188	9		N
6/9/2020	8:50	19.8	6.18	530	7.87	151.29	2.58	0.419	48	220	N
6/16/2020	8:45	17.4	5.73	544	9.39	60.07	2.67	0.242	12.7	100	N
6/23/2020	9:00	19.4	5.73	568	6.71	86.88	2.53	0.351	24.7	2300	Y
6/30/2020	9:30	22.3	6.31	785	9.28	151.61	2.16	0.235	15.6	124	N
7/7/2020	9:30	23.2	6.00	530	8.09	107.64	2.10	0.217	3.25	88	N
7/14/2020	9:00	20.8	6.05	571	9.57	113.03	1.17	0.249	8.1	136	N
7/21/2020	9:00	21.3	6.30	594	8.03	108.9	2.38	0.239	5.62	160	N
7/28/2020	9:10	21.3	5.77	480	6.20	52.6	2.43	0.208	4.38		N
8/4/2020	9:00	19.3	7.06	566	7.56	195.83	2.52	0.291		520	N
8/11/2020	9:15	20.9	5.98	737	7.80	133.78	2.43	0.218	2.25	156	N
8/18/2020	9:10	21.1	1.43	446	8.07	74.83	1.86	0.153	1.625	72	N
8/25/2020	9:00	22	3.74	703	7.47	294.38	2.20	0.143	2.25	86	N
9/1/2020	9:10	18.2	3.50	977		556.35	2.49	0.312	25.8	220	N
9/8/2020	9:15	17.7	6.45	525		210.35	2.36	0.223	10.2		Y
9/15/2020	9:20	15.6	8.94	506		88.36	2.87	0.312	4.88	172	N
9/22/2020	8:55	13.2	11.21	557	8.61	96.84	2.68	0.204	8.13		N

PINE CREEK CR 18

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/12/2020	9:50	7.3	12.25	493.9	8.86	71.35	4.22	0.279	10		N
5/19/2020	9:30	13.7	8.33	435.7	7.23	47.05	3.53	0.45	46		Y
5/26/2020	9:40	16.9	8.74	600	8.09	214.56	3.80	0.296	16.8		N
6/2/2020	9:05	13.8	9.48	531	9.9	187.11	3.89	0.222	16		N
6/9/2020	9:10	16	9.11	458.2	7.56	63.65	4.12	0.26	3.17	3300	N
6/16/2020	9:00	14.7	8.81	609	8.54	190.66	4.40	0.179	8.7	880	N
6/23/2020	9:15	18.2	6.75	491	7.85	82.87	7.25	0.681	66.5	12700	Y
6/30/2020	9:50	18.5	8.06	647	8.90	244.97	4.16	0.253	15.7	1460	N
7/7/2020	9:45	18.2	8.20	653	7.85	161.19	4.16	0.252	12	1560	N
7/14/2020	9:20	16.5	8.35	575	9.90	47.38	1.84	0.329	21	2200	N
7/21/2020	9:15	17.8	9.21	597	7.49	133.21	4.15	0.350	23	1360	N
7/28/2020	9:30	16.9	9.47	602	7.55	132.51	4.26	0.329	22		N
8/4/2020	9:15	16.9	8.60	570	7.27	172.48	3.91	0.323		1550	N
8/11/2020	9:40	18.3	7.83	563	7.82	218.77	3.76	0.249	24.2	1900	N
8/18/2020	9:30	16.5	8.78	564	7.48	159.25	3.94	0.204	15.167	1350	N
8/25/2020	9:15	18.5	8.17	564	7.45	266.86	3.69	0.337	18.75	1550	N
9/1/2020	9:30	17.2	8.50	535		222.00	4.00	0.276	14.6	1050	N
9/8/2020	9:40	16.5	7.75	360.6		84.51	2.56	0.408	382		Y
9/15/2020	9:35	14.1	12.62	594		131.67	3.12	0.422	13.17	780	N
9/22/2020	9:20	11.7	11.02	553	8.54	93.14	4.37	0.312	13.3		N

PINE CREEK WYLAND & ROSKE

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/12/2020	10:00	7.8	11.82	47.4	8.72	68.98	3.63	0.215	10.6		N
5/19/2020	9:45	13.8	8.24	470.3	7.81	80.44	3.49	0.336	52.7		Y
5/26/2020	9:50	18.5	9.97	600	8.10	240.83	3.31	0.298	17.3		N
6/2/2020	9:20	17	8.88	521	8.64	192.81	3.52	0.246	23.5		N
6/9/2020	9:25	16	8.24	581	7.54	176.44	3.58	0.21	17.8	1290	N
6/16/2020	9:10	14.6	8.35	507	8.42	122.02	3.82	0.137	17.6	560	N
6/23/2020	9:30	18.2	6.9	456.3	6.33	70.61	5.79	1.05	117	5600	Y
6/30/2020	10:05	18.2	8.3	575	8.52	243.41	3.72	0.269	12.3	1180	N
7/7/2020	10:10	17.9	8.04	533	7.90	133.92	3.4	0.193	10.1	760	N
7/14/2020	9:30	16.3	8.53	581	9.25	30.92	2.06	0.299	16.7	840	N
7/21/2020	9:30	17.4	8.33	605	8.62	92.33	3.5	0.315	20	680	N
7/28/2020	9:40	16.8	8.42	574	8.10	128.72	3.59	0.314	30.8		N
8/4/2020	9:30	16.6	8.16	552	7.11	173.23	3.27	0.364		1050	N
8/11/2020	9:50	17.8	7.48	570	7.85	246.89	3.04	0.203	18.2	1550	N
8/18/2020	9:45	16	7.33	586	7.80	176.8	3.4	0.138	14.2	1000	N
8/25/2020	9:35	18.2	7.79	605	7.12	239.53	3.15	0.182	16.2	780	N
9/1/2020	9:50	17.1	8.37	581		230.15	3.32	0.225	9.5	840	N
9/8/2020	9:50	16	8.1	491		129.07	2.79	0.248	54.4		Y
9/15/2020	9:55	13.8	9.25	573		158.5	3.34	0.298	8.38	560	N
9/22/2020	9:35	11.8	11.29	552	8.78	84.53	3.56	0.206	12.2		N

HEATON LAKE IDEAL BEACH

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/12/2020	10:20	13.5	11.08	238.8	8.64	23.76	0.278	0.135			N
5/19/2020	10:05	16	8.9	339.6	8.95	21.47	0.373	0.116			Y
5/26/2020	10:10	24.5	9.3	377.1	7.94	36.97	0.306	0.087			N
6/2/2020	9:40	19.5	6.93	364.6	7.82	35.49	0.241	0.074			N
6/9/2020	9:40	24.7	9.29	343.4	8.00	50.95	0.254	0.116		52	N
6/16/2020	9:30	23.3	8.01	320.1	7.89	37.3	0.347	0.137		53	N
6/23/2020	9:50	24.2	8.76	207.9	7.00	71.12	0.271	0.128		778	Y
6/30/2020	10:20	27.9	7.35	285.3	8.66	76.64	0.284	0.119		390	N
7/7/2020	10:25	31	7.71	272.1	7.87	52.44	0.224	0.123		3200	N
7/14/2020	9:50	22.4	5.83	297.7	8.33	32.7	0.228	0.112		1	N
7/21/2020	9:45	27	5.04	303.1	9.73	30.66	0.234	0.133		246	N
7/28/2020	10:00	28.3	7.13	336.3	7.62	27.49	0.212	0.123			N
8/4/2020	9:45	23	7.9	311.3	7.06	37.24	0.197	0.105		7500	N
8/11/2020	10:10	25.2	7.83	327.8	7.76	43.62	0.422	0.096		16400	N
8/18/2020	10:05	24.9	8.34	283.3	7.87	53.57	0.225	0.091		112	N
8/25/2020	9:50	26.1	4.98	308.5	7.88	46.02	0.22	0.185		4400	N
9/1/2020	10:15	26	5.5	359		58	0.3	0.156		480	N
9/8/2020	10:15	21.6	5.06	306.9		49.03	0.273	0.16			Y
9/15/2020	10:15	20.1	8.02	304.8		54.92	0.254	0.189		84	N
9/22/2020	9:55	17.9	9.21	290	8.06	59.1	0.272	0.297			N

HEATON LAKE 22880 LAKE SHORE DRIVE

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/12/2020											
5/19/2020											
5/26/2020											
6/2/2020											
6/9/2020											
6/16/2020											
6/23/2020											
6/30/2020											
7/7/2020	10:45	29	6.81	293.8	7.31	32.46	0.217	0.124		2	N
7/14/2020	10:30	26.5	4.1	311.2	7.27	14.9	0.216	0.131		1	N
7/21/2020	9:55	26.4	4.76	320.7	7.21	20.41	0.228	0.142		2	N
7/28/2020	10:05	26.4	5.28	332.8	6.1	20.58	0.243	0.118			N
8/4/2020	10:00	24.2	5.63	329.6	7.04	42.25	0.196	0.111		10	N
8/11/2020	10:20	24.7	7.52	305.3	7.78	48.51	0.248	0.115		48	N
8/18/2020	10:25	24.7	6.6	288.2	8.13	46.29	0.22	0.127		5	N
8/25/2020	10:00	26.2	4.27	320.9	7.85	34.84	0.029	0.139		3	N
9/1/2020	10:30	25.1	3.65	389		60.24	0.289	0.165		3	N
9/8/2020	10:25	21.5	4.01	343.5		54.75	0.264	0.165			Y
9/15/2020	10:25	19.7	6.77	329.5		60.25	0.212	0.145		24	N
9/22/2020	10:05	18.2	8.02	353	8.77	61.13	0.259	0.158			N

SIMONTON LAKE 51093 BEACH DRIVE

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/12/2020	10:35	10.5	11.42	238.4	8.08	35.61	0.917	0.11			N
5/19/2020	10:25	16.7	9.16	370.2	8.33	34.32	1.08	0.079			Y
5/26/2020	10:25	24.8	8.47	450	8.00	60.36	0.794	0.081			N
6/2/2020	9:55	20	9.2	366.2	8.79	32.92	0.641	0.077			N
6/9/2020	10:00	24.6	9.4	393.5	7.29	82.32	0.473	0.072		39	N
6/16/2020	9:45	22	8.5	350.8	9.75	56.62	0.323	0.105		6	N
6/23/2020	10:05	24	6.87	370	8.40	61.48	0.418	0.221		226	Y
6/30/2020	10:35	27	6.69	368.1	8.99	67.7	0.339	0.089		9	N
7/7/2020	11:00	30	6.41	391.4	7.25	42.62	0.216	0.121		7	N
7/14/2020	10:05	26.4	6.42	37.2	7.75	53.9	0.138	0.111		8	N
7/21/2020	10:05	25.7	7.08	382	7.75	40.79	0.186	0.1		54	N
7/28/2020	10:20	26.6	6.26	385.5	6.03	29.02	0.216	0.111			N
8/4/2020	10:10	23.9	6.94	364.8	6.98	47.27	0.25	0.137		100	N
8/11/2020	10:30	25	5.14	374.8	7.67	55.77	0.294	0.104		128	N
8/18/2020	10:35	24.6	6.23	380.4	7.82	60.35	0.18	0.089		46	N
8/25/2020	10:15	26.2	6.01	402.4	7.73	59.24	0.174	0.128		74	N
9/1/2020	10:35	25	6	342		60.3	0.637	0.116		35	N
9/8/2020	10:35	21.1	6.71	353.8		126.29	0.215	0.145			Y
9/15/2020	10:45	19.3	8.23	301.8		63.14	0.287	0.132		152	N
9/22/2020	10:20	17.3	8.56	352	8.41	73.7	0.225	124			N

SIMONTON LAKE 51330 SR 19

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/12/2020	10:45	11.8	10.62	326.3	8.12	35.68	1.16	0.103			N
5/19/2020	10:40	16.5	8.54	359.9	7.68	34.04	1.26	0.108			Y
5/26/2020	10:35	23.2	7.96	431	8.02	61.2	1.11	0.062			N
6/2/2020	10:10	20	8.53	333.7	8.88	53.24	0.953	0.06			N
6/9/2020	10:15	23	7.51	419.8	8.37	51.63	0.925	0.04		16	N
6/16/2020	10:00	23	7.93	181	8.78	110.7	0.83	0.088		22	N
6/23/2020	10:15	24	5.49	398	7.85	58.33	0.729	0.092		192	Y
6/30/2020	10:50	26.4	6.69	415.9	8.11	35.19	0.704	0.1		18	N
7/7/2020	11:15	29.3	6.4	430.1	7.74	39.39	0.487	0.069		1	N
7/14/2020	10:15	26.3	7.57	401.2	8.16	155.6	0.267	0.066		1	N
7/21/2020	10:20	25.5	7.6	393	8.07	33.11	0.425	0.09		56	N
7/28/2020	10:30	26.5	7.39	392.9	8.03	31.91	0.395	0.064			N
8/4/2020	10:25	23.2	6.7	370.8	7.04	53.44	0.303	0.082		72	N
8/11/2020	10:45	24.6	5.05	392.9	7.71	60.43	0.416	0.123		44	N
8/18/2020	10:50	24.6	2.68	406.6	7.38	51.77	0.148	0.084		156	N
8/25/2020	10:30	25.5	4.82	402.7	7.24	47.75	0.255	0.099		66	N
9/1/2020	10:51	25.1	6.5	353		76.46	0.383	0.088		7	N
9/8/2020	10:40	20.9	4.9	293		135.26	0.303	0.141			Y
9/15/2020	11:00	19.9	8.82	350.1		93.37	0.308	0.124		69	N
9/22/2020	10:30	18.1	8.68	343	8.38	105.64	0.278	0.065			N

CHRISTIANA CREEK CR 4

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/12/2020	11:00	10.9	11.67	351.3	8.08	22.46	1.67	0.11	2.38		N
5/19/2020	10:50	16.6	9.52	379.3	8.13	19.42	1.39	0.159	2.88		Y
5/26/2020	10:45	22	8.32	437.4	8	40.9	1.28	0.123	1.63		N
6/2/2020	10:30	19.4	8.62	421.2	7.78	47.37	1.45	0.083	4.125		N
6/9/2020	10:25	21.8	7.74	469.9	7.89	50.39	1.44	0.093	3.67	144	N
6/16/2020	10:05	20.2	7.55	443.5	8.75	84.29	1.64	0.102	19.3	248	N
6/23/2020	10:25	22.7	6.55	461.8	8	52.07	1.28	0.122	5	450	Y
6/30/2020	BRIDGE CLOSED										
7/7/2020	11:30	27	7.76	486.8	6.77	27.96	1.42	0.114	3.63	116	N
7/14/2020	10:45	23.9	7.54	452.5	7.87	14.24	0.686	0.126	4.5	124	N
7/21/2020	10:25	23.9	7.65	432.5	9.79	11.58	1.22	0.097	4.38	180	N
7/28/2020	10:40	23.6	7.15	441.6	6.27	18.46	1.35	0.126	3.88		N
8/4/2020	10:35	22	7.87	411.7	7.12	28.19	1.19	0.097		144	N
8/11/2020	10:55	23.1	7.8	433.5	7.75	37.43	1.22	0.102	5.67	200	N
8/18/2020	11:00	22.2	7.74	415.5	7.72	40.86	1.25	0.112	2.33	300	N
8/25/2020	10:40	23.5	7.03	435.8	8.2	40.01	1.43	0.103	3.75	0.23	N
9/1/2020	11:00	22.7	7.7	422		40.2	1.26	0.126	1.5	152	N
9/8/2020	10:55	19.2	7.33	365.8		32.3	1.24	0.133	3.88		Y
9/15/2020	11:10	18.5	8.52	398		41.7	1.02	0.109	3.5	148	N
9/22/2020	10:40	16	10.31	387	8.12	35.38	1.51	0.127	2.25		N

YELLOW CREEK CONCORD HIGH SCHOOL

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/14/2020	8:30	12.4	8.08	573	9.38	179.65	3.39	0.538			Y
5/21/2020	8:25	12.5	9.38	501	6.15	131.02	7.71	1.14			N
5/28/2020	8:15	17.5	7.63	657	10.03	263.02	5.57	0.583			Y
6/4/2020	8:20	16.9	7.27	701	10.51	200.56	3.77	0.455	18	1000	N
6/11/2020	8:20	16.3	7.75	683	12.26	241.06	3.7	0.511	10	3500	N
6/18/2020	8:30	16.4	7.17	655	8.16	184.85	2.47	0.381	8	1350	N
6/25/2020	8:40	16.2	8.15	630	7.63	204.25	2.93	0.482			N
7/2/2020	8:35	18.9	6.27	672	8.24	181.52	2.63	0.418	14	1300	N
7/9/2020	8:25	20	6.26	684	9.44	118.39	1.68	0.368		1950	N
7/16/2020	8:15	19.1	7.30	549	5.7	340.97	2.89	0.499			Y
7/23/2020	8:15	19.4	6.48	112.4	6.63	513.2	2.24	0.564	12	2800	Y
7/30/2020	8:15	19.7	6.42	775	9.29	116.61	2.46	0.612	5	900	N
8/6/2020	8:15	16.5	7.59	650	7.72	175.26	1.7	0.514			N
8/13/2020	8:30	17.5	6.67	670	7.46	253.46	1.39	0.293	4	700	N
8/20/2020	8:25	16	6.80	663	7.55	657	1.23	0.328			N
8/27/2020	8:30	20.3	4.85	680		223.56	1.57	0.487	44	880	N
9/3/2020	8:20	17.7	6.14	665		237.27			12	3700	N
9/10/2020	8:30	17	6.12	637		185.35	2.31	0.753	10	7800	N
9/17/2020	8:30	16	7.16	690		172.49	1.97	0.812			N

YELLOW CREEK CR 138

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/14/2020	11:10	11.5	10.47	737	8.42	352.84	12.5	0.261			Y
5/21/2020	8:45	12.5	8.46	571	6.11	253.35	16.1	0.808			N
5/28/2020	8:35	16.1	7.76	830	9.41	341.83	17.7	0.689			Y
6/4/2020	8:40	17.1	7.42	866	10.67	343.73	15.1	0.663	7	2325	N
6/11/2020	8:35	17.1	5.88	679	12.27	264.04	10.5	0.739	16	3600	N
6/18/2020	9:00	18.8	7.19	890	7.87	327.45	14	1.14	33	2300	N
6/25/2020	9:00	16.7	6.32	888	8.33	313.35	12.9	1.02			N
7/2/2020	9:00	19.4	4.47	1029	9.08	319.7	13	1.05	44	2650	N
7/9/2020	9:00	20.5	5.27	1096	7.81	295.29	13.7	1.26		1350	N
7/16/2020	8:35	20.8	5.17	559	6.54	94.21	12.9	1.87			Y
7/23/2020	8:40	20.9	4.00	998	6.95	338.8	9.63	2.46	18	6000	Y
7/30/2020	8:40	20.8	5.22	1142	9.23	425.92	8.97	3.12	44	2200	N
8/6/2020	8:40	16	4.82	1005	7.63	488.64	10.2	4.86			N
8/13/2020	8:50	17.6	4.30	1067	7.39	701.15	7.18	2.12	331	6900	N
8/20/2020	8:50	16.4	6.37	607	7.71	265	2.05	1.96			N
8/27/2020	8:50	21.7	3.79	1011		488.3	8.78	2.01	13	1700	N
9/3/2020	8:50	18.7	4.37	1015		520.61			191	3700	N
9/10/2020	9:00	17.8	4.61	862		269.11	4.81	2.54	100	9800	N
9/17/2020	8:50	16.5	8.44	730		218.23	7.99	3.12			N

WEAVER DITCH CR 13

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/14/2020	10:25	10.8	3.11	1306	9.04	623.98	2.68	14.2			Y
5/21/2020	9:00	11.6	9.02	947	6.12	363.5	3.51	4.01			N
5/28/2020	8:50	14	5.03	1342	8.62	TNTC	TNTC	TNTC			Y
6/4/2020	9:00	16.1	9.66	551	11.3	262.9	TNTC	TNTC	####	240000	N
6/11/2020	8:50	15.7	0.23	338	10.9	423.21	11.37	8.49	125	466000	N
6/18/2020	9:15	15.3	0.4	1458	6.98	635.87	TNTC	TNTC	3030	890000	N
6/25/2020	9:20	16.1	0.18	1103	8.03	429.09	14.1	9.82			N
7/2/2020	9:15	18.2	0.06	916	9.58	1217.92	1.5	7.13	9630	470000	N
7/9/2020	9:20	17.6	0.51	1988	8.55	1326.65	TNTC	7.25		1880000	N
7/16/2020	8:45	20.7	3.47	685	6.62	149.43	TNTC	TNTC			Y
7/23/2020	8:50	18.5	0.37	1570	6.48	1042.73	TNTC	TNTC	427	145000	Y
7/30/2020	8:50	18.6	0.67	2088	9.31	TNTC	TNTC	TNTC	1070	1080000	N
8/6/2020	8:55	17.8	0.12	2474	7.83	TNTC	TNTC	TNTC			N
8/13/2020	9:10	18.3	0.11	170	7.45	TNTC	TNTC	TNTC	420	700000	N
8/20/2020	9:00	17.8	0.7	2040	7.89	TNTC	TNTC	TNTC			N
8/27/2020	9:15	19.2	0.008	1689		TNTC	TNTC	TNTC	####	370000	N
9/3/2020	9:10	19.1	0.8	2122		TNTC			8732	590000	N
9/10/2020	9:15		NOT ENOUGH WATER								
9/17/2020	9:10	18.2	0.4	2522		TNTC	TNTC	TNTC			N

BERLIN COURT DITCH CR 15

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/14/2020	9:15	12.2	6.54	582	9.65	248.2	10.9	0.214			Y
5/21/2020	9:25	12.6	7.40	487.7	6.05	117.01	9.24	0.535			N
5/28/2020	9:15	18.5	5.32	669	8.2	223.07	9.14	0.62			Y
6/4/2020	9:30	18.7	6.75	740	11.07	310.09	10.4	0.345	3	300	N
6/11/2020	9:15	17.7	6.40	706	13.35	391.2	0.034	0.564	1	510	N
6/18/2020	9:25	19.2	5.18	668	6.55	378.02	11	0.352	17	89	N
7/2/2020	9:35	18.3	6.16	603	6.91	152.48	10.92	0.487			N
7/9/2020	10:15	22.3	5.23	706	8.93	211.97	7.63	0.444	2	120	N
7/16/2020	10:00	23.0	3.48	873	8.05	328.12	12.1	0.576		112	N
7/23/2020	9:05	22.1	6.22	263.5	6.82	41.56	11.8	0.612			Y
7/30/2020	9:15	22.6	3.59	750	6.61	385.85	5.76	0.689	5	308	Y
8/6/2020	9:20	21.7	1.87	915	9.01	480.66	8.12	0.718	4	2300	N
8/13/2020	9:20	17.2	2.21	730	7.67	478	2.1	0.845			N
8/20/2020	9:30	19.2	1.76	646	7.33	502.71	5.61	0.585	2	104	N
8/27/2020	9:50	22.6	2.08	1196		1072.6	12.2	0.383	4	528	N
9/3/2020	9:35	18.9	4.37	812		631.7			68	4400	N
9/10/2020	9:30	19.4	4.82	511		219.04	3.86	0.706	9	330	N
9/17/2020	9:35	17.2	3.46	869		729.65	4.99	0.812			N

TURKEY CREEK CR 50

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/14/2020	9:30	13.1	7.66	549	9.5	140.92	11	0.134			Y
5/21/2020	9:40	13.6	8.03	468.1	6.07	39.49	5.15	0.27			N
5/28/2020	9:30	20.8	6.39	501	7.81	107.46	2.1	0.275			Y
6/4/2020	9:45	19.3	6.34	504	11.01	106.01	2.13	0.163	13	168	N
6/11/2020	9:30	17.8	6.19	616	12.49	187.8	2.79	0.168	7	176	N
6/18/2020	9:50	19.1	6.03	568	5.71	120.41	2.35	0.149	6	236	N
6/25/2020	9:50	18.2	6.03	590	7.07	198.71	2.67	0.159			N
7/2/2020	10:35	21.7	5.33	651	7.92	115.44	2.72	0.196	9	152	N
7/9/2020	10:25	22.2	5.43	696	8.15	150.41	2.31	0.191		184	N
7/16/2020	9:20	21.4	6.41	324	6.81	24.83	2.01	0.189			Y
7/23/2020	9:30	21.3	6.86	720	6.36	157.67	2.07	0.19	7	310	Y
7/30/2020	9:30	22.3	5.30	665	8.97	134.84	2.12	0.198	18	260	N
8/6/2020	9:35	17.9	6.99	631	7.51	105.86	8.17	0.201			N
8/13/2020	9:50	20.2	6.34	736	7.33	226.59	1.97	0.214	2	240	N
8/20/2020	9:40	18	6.04	634	5.28	217	2.31	0.187			N
8/27/2020	10:15	21.8	5.39	737		281.78	2.48	0.193	7	370	N
9/3/2020	9:50	19.8	5.70	709		269.97			3	270	N
9/10/2020	9:45	19.5	5.17	626		181.95	2.46	0.257	4	268	N
9/17/2020	9:50	17.4	8.00	712		210.11	3.12	0.344			N

DAUSMAN DITCH CR 19

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/14/2020	9:40	12	7.79	588	8.45	224.85	3	0.575			Y
5/21/2020	9:50	12.3	9.35	546	6.66	160.39	15.9	0.808			N
5/28/2020	9:40	17.2	6.45	697	9.81	219.47	12.8	1.16			Y
6/4/2020	9:54	17.7	6.12	707	11.11	190.13	9.54	0.851	57	1600	N
6/11/2020	9:40	16.6	7.34	675	12.4	213.48	8.52	0.951	11	11800	N
6/18/2020	9:55	16.5	8.56	655	5.74	203.72	5.92	0.612	34	440	N
6/25/2020	10:00	17.7	7.57	695	7.07	242.91	7.42	0.777			N
7/2/2020	10:45	20.3	6.43	812	9.75	156.98	9.2	0.611	120	1080	N
7/9/2020	10:40	19	7.10	721	8.82	158.88	4.17	0.432		440	N
7/16/2020	9:25	21.1	5.38	365.5	6.32	20.62	5.89	0.698			Y
7/23/2020	9:40	18.9	4.09	653	7.06	198.58	3.49	1.4	10	520	Y
7/30/2020	9:40	16.5	6.47	649	9.24	167.46	4.87	1.2	4	460	N
8/6/2020	9:50	14.1	6.73	719	7.55	179.37	4.16	1.87			N
8/13/2020	10:05	15.2	7.62	615	7.3	198.11	3.9	0.528		840	N
8/20/2020	9:50	14	5.31	624	7.33	209	3.81	1.79			N
8/27/2020	10:30	17.7	5.96	588		127.06	2.99	1.54	4	410	N
9/3/2020	10:00	16	5.34	641		208.46			7	1530	N
9/10/2020	10:00	16.8	2.06	998		242.8	2.68	3.47	10	5700	N
9/17/2020	10:05	14.9	5.35	586		118.85	3.89	3.12			N

SWOVELAND DITCH CR 19

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/14/2020	9:50	11.6	7.88	569	8.75	174.67	8.72	0.419			Y
5/21/2020	10:00	12.4	10.28	541	6.28	180.93	14.6	0.739			N
5/28/2020	9:50	17.6	8.45	680	7.72	243.18	12	0.831			Y
6/4/2020	10:05	18.4	7.32	625	8.12	181.22	12.4	0.613	12	12000	N
6/11/2020	10:00	17.3	7.13	671	7.13	203.7	12.4	0.885	11	171	N
6/18/2020	10:05	17.8	4.16	707	4.86	174.28	11.2	0.396	6	388	N
6/25/2020	10:05	17.9	8.21	6.27	7.27	242.82	11.9	0.687			N
7/2/2020	11:00	21.1	6.37	755	9.16	153.93	13.6	0.779	8	750	N
7/9/2020	11:00	20.7	2.07	612	8.71	153	7.11	0.496		790	N
7/16/2020	9:50	20.9	6.24	474.6	6.47	25.36	9.99	0.712			Y
7/23/2020	9:50	21.5	3.59	1015	6.45	284.95	12.1	4.89	27	7000	Y
7/30/2020	9:50	20.5	1.75	706	8.98	145.53	10.1	5.12	7	1030	N
8/6/2020	10:00	16.3	4.55	805	7.27	327.36	11.8	6.01			N
8/13/2020	10:20	18.2	3.25	2090	7.41	453.12	11.4	1.47	215	44400	N
8/20/2020	10:00	16.5	4.41	727	7.47	327	2.12	0.249			N
8/27/2020	10:45	22.7	3.9	821		292.13	5.99	0.487	8	213	N
9/3/2020	10:20	19.1	1.18	1132		474.05			25	3500	N
9/10/2020	10:15	17.5	2.21	9.11		285.89	5.92	4.62	18	5700	N
9/17/2020	10:15	16.9	4.27	760		268.72	6.89	5.12			N

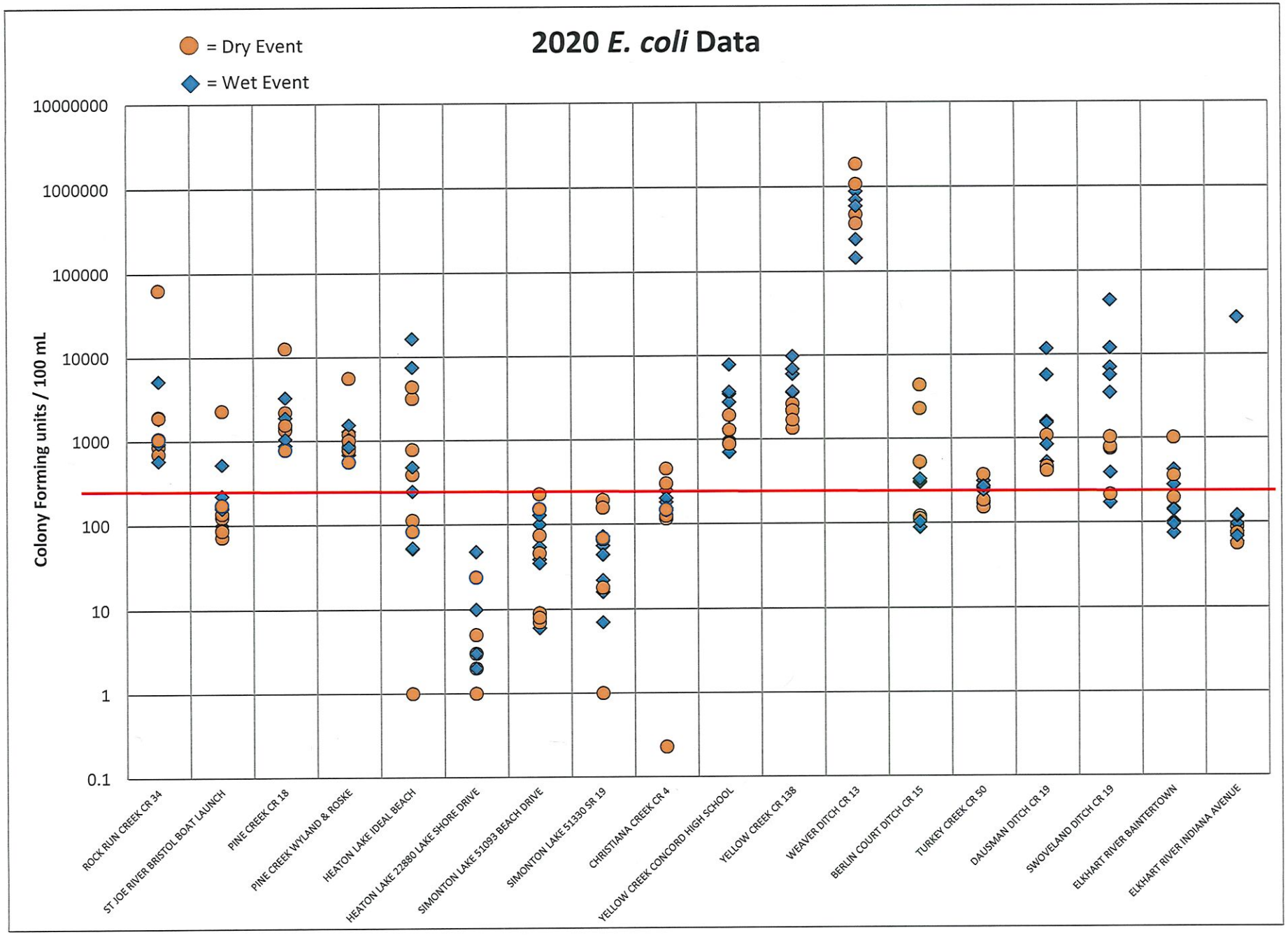
ELKHART RIVER BAINTERTOWN

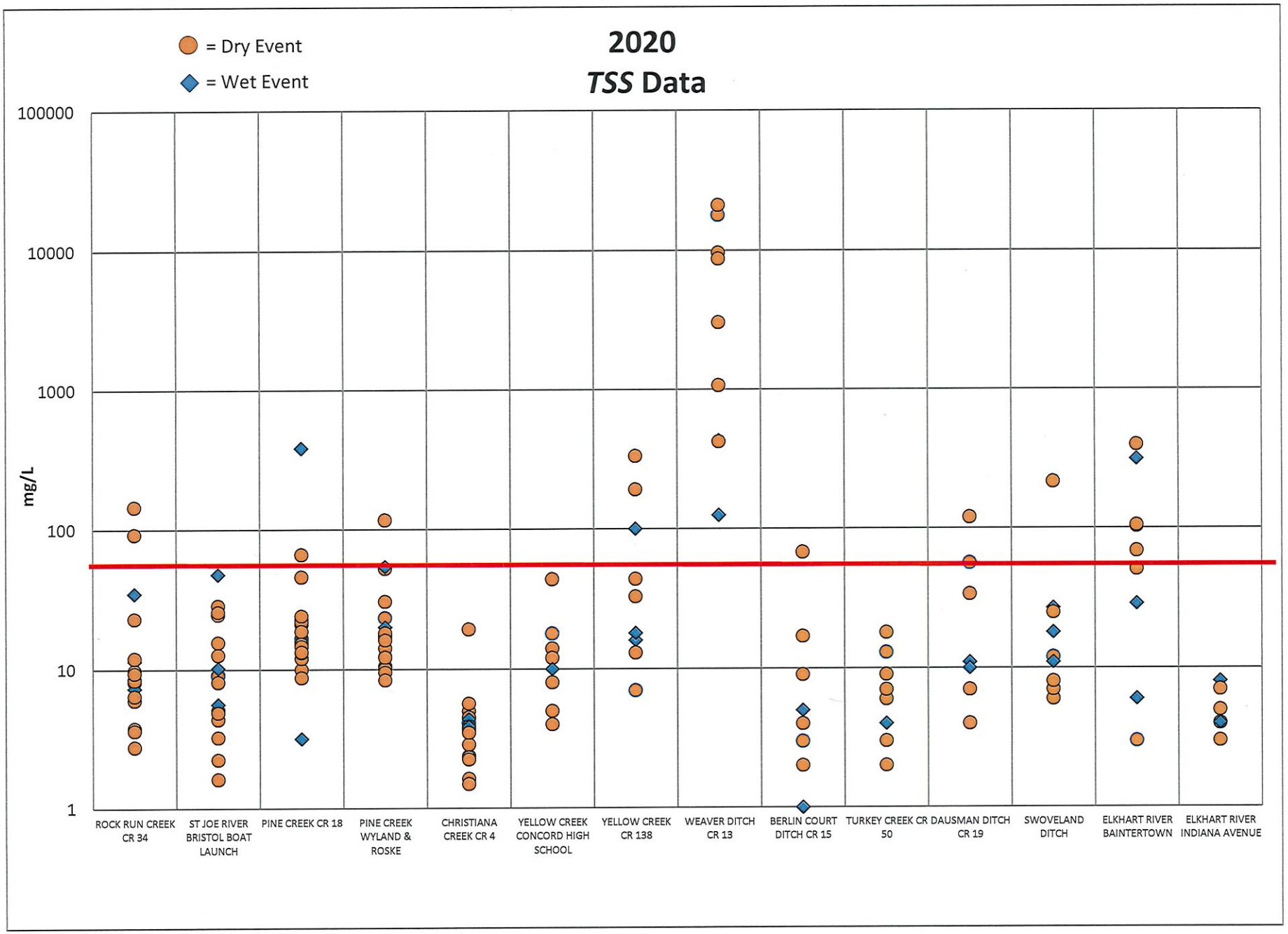
DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/14/2020	10:05	13.4	8.04	494.5	9.05	41.48	10.3	0.15			Y
5/21/2020	10:15	14.4	6.92	418.6	6.19	30.97	2.67	0.312			N
5/28/2020	10:05	22	4.62	413.5	7.07	111.46	0.958	0.336			Y
6/4/2020	10:25	21.1	4.1	473	8.44	36.60	1.22	0.298	3	75	N
6/11/2020	10:10	21.1	3.46	389.3	7.69	119.8	1.33	0.318	6	102	N
6/18/2020	10:20	21.2	3.54	468.7	7.66	61.17	2.19	0.37	69	144	N
6/25/2020	10:20	20.5	3.51	620	7.77	121.59	3.1	0.343			N
7/2/2020	NO SAMPLE TIME CONSTRAINT										
7/9/2020	11:15	25.5	1.65	765	8.26	51	1.44	0.455		194	N
7/16/2020	10:00	23.1	4.61	509	6.41	66.3	1.01	0.789			Y
7/23/2020	10:10	23	2.44	596	6.51	111.31	1.94	0.899	313	276	Y
7/30/2020	10:10	23.7	1.65	476.5	9.01	64.97	1.87	0.912	396	1010	N
8/6/2020	10:15	18.8	3.31	484	8.18	60.76	2.12	0.847			N
8/13/2020	10:40	21.7	1.84	571	7.32	82.26	0.322	1.28	103	420	N
8/20/2020	10:20	20	1.67	1516	7.11	68	TNTC	TNTC			N
8/27/2020	11:00	24	0.32	581		163.1	TNTC	TNTC	105	356	N
9/3/2020	10:35	21.5	2.72	596		194.88			51	140	N
9/10/2020	10:30	19.9	1.81	565		147.94	1.16	0.568	29	96	N
9/17/2020	10:35	18.4	4.33	387.9		98.93	0.991	0.612			N

ELKHART RIVER INDIANA AVENUE

DATE	TIME	TEMP	DO	SPC	PH	CHLORIDES	NITRATES	PHOSPHORUS	TSS	E. COLI	WET
5/14/2020	11:30	13.5	10.21	492.6	7.17	145.86	1.52	0.137			Y
5/21/2020	10:40	14.5	9.6	445.6	8.00	77.09	4.25	0.4			N
5/28/2020	10:30	21.9	7.2	522	7.40	129.32	1.64	0.467			Y
6/4/2020	10:40	21.1	7.73	525	8.51	114.65	1.48	0.254	7	78	N
6/11/2020	10:30	21.3	7.54	533	7.81	166.37	1.73	0.322	8	27400	N
6/18/2020	10:40	21.6	7.92	700	7.04	162.65	1.85	0.236	7	59	N
6/25/2020	10:35	20.6	7.41	523	8.00	174.5	1.57	0.254			N
7/2/2020	NO SAMPLE TIME CONSTRAINT										
7/9/2020	11:55	25.7	7.65	710	8.20	119.77	1.49	0.315		88	N
7/16/2020	10:25	23	7.2	767	6.35	79.68	1.48	0.445			Y
7/23/2020	10:30	22.8	7.11	628	7.86	121.85	1.91	2.76	5	96	Y
7/30/2020	10:35	23.5	6.81	646	8.27	131.99	1.86	0.587	4	56	N
8/6/2020	10:40	19.3	7.81	606	7.94	149.07	2.01	0.412			N
8/13/2020	11:00	22	6.62	656	7.24	197.76	1.71	0.214	3	116	N
8/20/2020	10:40	20.6	7	566	7.34	200	1.38	0.859			N
8/27/2020	11:25	23.9	6.08	649		183.43	2.14	0.987	3	74	N
9/3/2020	11:05	21.3	7.04	623		191.16			5	68	N
9/10/2020	10:50	19.4	7.3	597		186.32	1.49	0.229	4	120	N
9/17/2020	11:00	18.2	8.25	615		185.5	1.12	0.208			N

APPENDIX 2: CHARTS FOR E.COLI & TSS


2020 E. coli Data
= Dry Event
= Wet Event
Colony Forming units / 100 mL
10000000
1000000
100000
10000
1000
100
10
1
0.1
ROCK RUN CREEK CR 34
ST JOE RIVER BRISTOL BOAT LAUNCH
PINE CREEK CR 18
PINE CREEK WYLAND & ROSKE
HEATON LAKE IDEAL BEACH
HEATON LAKE 22880 LAKE SHORE DRIVE
SIMONTON LAKE 51093 BEACH DRIVE
SIMONTON LAKE 51330 SR 19
CHRISTIANA CREEK CR 4
YELLOW CREEK CONCORD HIGH SCHOOL
YELLOW CREEK CR 138
WEAVER DITCH CR 13
BERLIN COURT DITCH CR 15
TURKEY CREEK CR 50
DAUSMAN DITCH CR 19
SWOVELAND DITCH CR 19
ELKHART RIVER BAINTERTOWN
ELKHART RIVER INDIANA AVENUE


= Dry Event
= Wet Event
2020
TSS Data
100000
10000
1000
100
10
1
mg/L
ROCK RUN CREEK CR 34
ST JOE RIVER BRISTOL BOAT LAUNCH
PINE CREEK CR 18
PINE CREEK WYLAND & ROSKE
CHRISTIANA CREEK CR 4
YELLOW CREEK CONCORD HIGH SCHOOL
YELLOW CREEK CR 138
WEAVER DITCH CR 13
BERLIN COURT DITCH CR 15
TURKEY CREEK CR 50
DAUSMAN DITCH CR 19
SWOVELAND DITCH
ELKHART RIVER BAINTERTOWN
ELKHART RIVER INDIANA AVENUE

APPENDIX 3: WATER QUALITY TARGETS

Water Quality Targets

Parameter	Target	Source
Dissolved Oxygen	> 6 mg/L and not > 9 mg/L	327 IAC 2-1-6/US EPA recommendation
Temperature	40-85 degrees F (4.4 – 29.4 C)	MI – R.323.1075
Escherichia coli	< 235 CFU/100 ml per single sample and < 125 CFU/100 ml per the geometric mean of 5 equally spaced samples over a 30 day period	327 IAC 2-1.5-8
Turbidity	< 10.4 NTU	US EPA recommendation (2000)
Total Dissolved Solids	< 750 mg/L	MI – R.323.1051 / 327 IAC 2-1-6
Total Suspended Solids	< 25 mg/L	US EPA recommendation
Total Phosphorus	< 0.3 mg/L	IDEM 303d listing criteria
Nitrate	< 1.5 mg/L	US EPA reference level (2000)
Nitrate-Nitrite	< 1.5 mg/L	Dodds et al. (1998)
TKN	<0.076 mg/L	Dodds et al. (1998)
Biological Oxygen Demand	< 50%	Hoosier Riverwatch Protocol
pH	> 6 or < 9	327 IAC 2-1-6
macroinvertebrate Index of Biotic Integrity (mIBI)	>23 points / >36 points	Hoosier Riverwatch Protocol / IDEM (2008)
Qualitative Habitat Evaluation Index (QHEI)	> 51 pts	IDEM (2008)
Index of Biotic Integrity (IBI) (fish)	≥ 36 points	IDEM (2006)

APPENDIX 4: TNTC REPORTING POLICY

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

Mitchell E. Daniels, Jr.
Governor

Thomas W. Easterly
Commissioner

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Indianapolis, Indiana 46204
(317) 232-8603
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www.IN.gov/idem

MEMORANDUM

To: **All NPDES Permittees Who Must Perform *E.coli* Testing**

From: **Martha Clark Mettler, Acting Assistant Commissioner, Office of Water Quality**

Subject: **Policy for Reporting "Too Numerous to Count" (TNTC) Data for *E. coli* Testing**

Date: **July 1, 2005**

Utilization of this TNTC policy should not become necessary in any but the rarest of situations. Any questions regarding this policy should be directed to Barbara McDowell at 317-233-6464 or bmcdowel@idem.IN.gov

For Testing Methods Utilizing a Membrane Filter:

NPDES permits require that the monthly average of *E. coli* be less than 125 colonies per 100 milliliters (mL) of filtered sample. *Standard Methods for the Examination of Water and Wastewater* 20th Edition – pages 9-59, indicate that the allowable maximum number of colonies per plate (filter) is 200. The optimum count is in the range of 20 to 80 colonies, with an ideal sample yielding about 50 colonies. (If no filter has a count falling in the optimum range, meaning in the range of 20 to 80 colonies, total the colonies on all filters and report as number per 100 mL) (See 20th Edition – pages 9-61 for detailed examples.)

Even though filtration of 100 milliliters (or lesser volumes) normally produces an acceptable colony count for disinfected effluent, occasionally the count for these normally acceptable dilutions may exceed 200 colonies per plate.

To prevent such an occurrence we are strongly recommending that laboratory personnel *routinely* run a 1.0 milliliter dilution *along with* the normally acceptable dilutions for each test.

If all dilutions for that test, including the 1.0 mL dilution, result in plates (filters) that are deemed TNTC, the number reported for the 1.0 mL test should be 63,200. This number should be reported on the Monthly Report of Operations (MRO) as the *E.coli* result for that day and should be included in the monthly average calculation.

Justification: If the 1.0 mL plate is deemed TNTC, then the actual count is likely to be somewhere between 20,000 (maximum count for a 1.0 mL dilution) and 200,000 (maximum count for a 0.1 mL dilution). **The TNTC number of 63,200 is the geometric mean of those two numbers.**