2017

WATER SAMPLING

RESULTS

FOR SELECTED

MS4 SITES

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ELKHART COUNTY HEALTH DEPARTMENT

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IN-STREAM SAMPLING PROTOCOLS FOR MS4 SITES

Beginning the first week of May and ending the last week of September, the Storm Water Section of the Environmental Health Division conducted surface water testing on a weekly basis throughout the county on ditches, creeks, lakes, and the Elkhart 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 includes 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 2017 season:

New Miller Stutsman Ditch; CR 28
Shaffer Ditch; CR 28
Fulmer Ditch; CR 28
Hoke Ditch; CR 9
Yellow Creek; CR 138
Weaver Ditch; CR 44
Pine Creek; CR 23 and Roske Drive at Wyland Drive
Cobus Creek; CR 10
Christiana Creek; CR 4
Rock Run Creek; CR 21, CR 34 and CR 35 at CR 30
Solomon Creek; CR 52 and CR 33
Elkhart River; CR 43 and Indiana Avenue
Heaton Lake; Ideal Beach and 22892 Lake Shore
Simonton Lake; 51093 Beach Drive and 51330 SR 19

The sampling form includes whether the sample was considered wet or dry and whether it was raining at the time of sample collection. 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.

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. 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 are collected every Tuesday at the newer sampling sites: New Miller Stutsman on CR 28; Shaffer Ditch on CR 28; Hoke Ditch on CR 9 and Cobus Creek on CR 10 for analysis by the Elkhart Public Works and Utilities Laboratory. Every other Thursday, total suspended solids are collected at Rock Run Creek on CR 35 at CR 30, Solomon Creek on CR 52 and CR 33 for analysis by the City of Goshen Waste Water Treatment Plant Laboratory. For all E. coli samples and the Tuesday total suspended solids samples, a 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 Thursday total suspended solids, the samples are collected 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 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 PHOTOS, RESULTS AND CHARTS

The photos are in appendix 1 for New Miller Stutsman Ditch, Hoke Ditch, and Weaver Ditch where the water levels became too low to collect samples.

Appendix 2 contains the sampling results.

Appendix 3 contains the charts for E. coli.

SUMMARY AND CONCLUSIONS

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 2017 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.

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 and will require further investigation to determine the source.

ACKNOWLEDGEMENTS

I would like to thank the following vector technicians who assisted with the sampling: Jessica Daub and Isaac Godshalk. Also, recognition goes to fellow colleagues Marc Stewart, Clay Reagan, Lindsey Depriest and Bradley Bishop who provided assistance with sample collections prior to the technicians arriving and after their departure.

Special recognition goes to the laboratory staff at the Elkhart Public Works and Utilities and Goshen Waste Water Treatment Plant. Their cooperation and expertise was instrumental to this effort and is very much appreciated.

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APPENDIX 1:

PHOTOS

LOW WATER LEVEL AT NEW MILLER STUTSMAN CR 28

LOW WATER LEVEL AT HOKE DITCH CR 9

LOW WATER LEVEL AT WEAVER DITCH CR 44 (LOOKING UPSTREAM)

LOW WATER LEVEL AT WEAVER DITCH CR 44 (LOOKING DOWNSTREAM)

APPENDIX 2:

SURFACE

WATER DATA

New Miller Stutsman - CR 28

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/2/2017	9:25	9.3	13.40	470.1	8.06	3.90	0.195	85.36	2	31	N	Y
5/9/2017	9:30	9.1	6.51	434.9	7.86	3.17	0.321	133.05			N	N
5/16/2017	9:45	14.6	2.85	505.0	7.64	2.01	0.269	75.35	9	116	N	N
5/25/2017	8:25	14.1	5.61	426.3	7.79	5.01	0.857	42.89			N	Y
6/1/2017	8:30	13.2	3.66	484.6	7.74	2.41	0.298	52.21	5	124	N	N
6/6/2017	8:30	16.8	1.73	501.0	7.65	2.64	1.820	173.86	111	252	N	N
6/13/2017			Not enough water to sample									
6/20/2017			Not enough water to sample									
6/27/2017			Not enough water to sample									
7/11/2017			Not enough water to sample									
7/18/2017			Not enough water to sample									
7/25/2017			Not enough water to sample									
8/1/2017			Not enough water to sample									
8/8/2017			Not enough water to sample									
8/15/2017			Not enough water to sample									
8/22/2017			Not enough water to sample									
8/29/2017			Not enough water to sample									
9/5/2017			Not enough water to sample									
9/12/2017			Not enough water to sample									
9/19/2017			Not enough water to sample									
9/26/2017			Not enough water to sample									

Shaffer Ditch - CR 28

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/2/2017	9:35	9.9	6.03	465.8	7.75	1.78	0.264	62.91	3	500	N	Y
5/9/2017	9:40	9.6	2.13	483.3	7.45	1.89	0.225	137.11			N	N
5/9/2017	9:50	15.3	3.67	522.0	7.22	1.47	0.254	350.05	11	136	N	N
5/25/2017	8:35	14.6	0.067	705.0	7.24	2.53	0.446	192.74			N	Y
6/1/2017	8:40	13.5	1.20	731.0	6.98	1.74	0.212	516.00	109	4400	N	N
6/6/2017	8:35	15.2	2.67	709.0	7.07	0.664	1.550	805.79	38	380	N	N
6/13/2017	8:20	20.3	0.42	747.0	6.99	2.45	6.150	715.47		680	N	N
6/20/2017	8:25	15.4	3.50	542.0	7.79	2.65	5.270	147.69	242	1060	N	N
6/27/2017	8:25	13.3	5.07	427.9	7.57	2.56	5.290	103.79	280	1440	N	N
7/11/2017	8:30	19.1	4.84	573.0		3.15	6.510		34	900	N	Y
7/18/2017	8:25	17.6	4.04	444.6		1.48	1.560		47	1260	N	N
7/25/2017			No sample - tall vegetation									
8/1/2017			No sample - tall vegetation									
8/8/2017			No sample - tall vegetation									
8/15/2017			No sample - tall vegetation									
8/22/2017			Not enough water to sample									
8/29/2017			Not enough water to sample									
9/5/2017			Not enough water to sample									
9/12/2017			Not enough water to sample									
9/19/2017			Not enough water to sample									
9/26/2017			Not enough water to sample									

Fulmer Ditch - CR 28

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/2/2017	9:45	9.3	2.60	444.9	7.49	4.82	0.325	65.31	12	750	N	Y
5/9/2017	9:50	9.5	6.63	446.3	7.47	4.63	1.47	158.94			N	N
5/16/2017	10:00	16.1	5.65	512.0	7.45	2.38	0.312	107.90	156	108	N	N
5/25/2017			No sample - tall vegetation									
6/1/2017			No sample - tall vegetation									
6/6/2017			No sample - tall vegetation									
6/13/2017	8:30	21.7	0.43	399.3	7.62	0.482	1.62	184.68	62	980	N	N
6/20/2017	8:35	15.7	2.72	512.0	7.69	1.92	6.14	222.79	16	600	N	N
6/27/2017	8:35	14.8	3.71	346.7	7.71	1.87	6.01	135.51	18	450	N	N
7/11/2017	8:40	20.9	2.32	583.0		1.82	1.98		17	675	N	Y
7/18/2017	8:35	18.6	0.29	668.0		2.25	0.719		520	4200	N	N
7/25/2017	9:20	16.5	1.40	824.0	7.65	0.985	2.34	718.76	105	1840	N	N
8/1/2017			No sample - tall vegetation									
8/8/2017			No sample - tall vegetation									
8/15/2017			Not enough water to sample									
8/22/2017			Not enough water to sample									
8/29/2017			Not enough water to sample									
9/5/2017			Not enough water to sample									
9/12/2017			Not enough water to sample									
9/12/2017			Not enough water to sample									
9/26/2017			Not enough water to sample									

Hoke Ditch - CR 9

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/2/2017	9:55	9.1	7.74	484.2	7.82	7.68	0.699	150.88	10	1300	N	Y
5/9/2017	10:00	9.4	8.23	446.8	7.77	8.94	0.350	189.67			N	N
5/16/2017	10:10	14.7	7.53	601.0	7.78	5.12	0.498	188.45	5	204	N	N
5/25/2017	8:45	13.9	6.38	469.9	7.58	11.30	1.230	185.03			N	Y
6/1/2017	8:55	13.3	6.90	550.0	7.87	6.42	0.401	252.12	7	760	N	N
6/6/2017	8:45	16.5	5.60	706.0	7.96	6.10	3.200	275.37	9	820	N	N
6/13/2017	8:40	21.7	4.14	777.0	7.93	2.70	5.330	276.43	64	920	N	N
6/20/2017	8:45	16.6	4.33	527.0	7.87	8.03	9.420	335.61	13	63200	N	N
6/27/2017	8:45	15.0	5.48	795.0	8.11	7.01	8.420	322.09	36	514	N	N
7/11/2017	8:50	19.8	5.43	650.0		2.98	6.220		24	4600	N	Y
7/18/2017	8:40		Not enough water to sample									
7/25/2017			Not enough water to sample									
8/1/2017			Not enough water to sample									
8/8/2017			Not enough water to sample									
8/15/2017			Not enough water to sample									
8/22/2017			Not enough water to sample									
8/29/2017			Not enough water to sample									
9/5/2017			Not enough water to sample									
9/12/2017			Not enough water to sample									
9/19/2017			Not enough water to sample									
9/26/2017			Not enough water to sample									

Yellow Creek - CR 138

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/2/2017	10:10	9.9	10.25	587.0	7.89	12.00	0.834	258.27		3200	N	Y
5/9/2017	10:15	9.8	3.12	662.0	7.85	16.00	0.696	357.63			N	N
5/16/2017	10:25	15.5	7.18	686.0	7.84	8.67	0.698	270.21		1100	N	N
5/25/2017	9:00	15.1	5.72	415.3	7.57	11.90	0.744	139.60			N	Y
6/1/2017	9:10	14.4	6.11	673.0	7.95	13.00	0.712	61.36		1800	N	N
6/6/2017	9:00	15.8	7.35	697.0	7.94	8.92	1.060	275.42		2000	N	N
6/13/2017	9:05	20.1	4.53	837.0	7.89	9.50	1.300	338.92		1440	N	N
6/20/2017	8:55	16.6	5.27	509.0	7.98	12.60	5.02	231.54		540	N	N
6/27/2017	9:00	14.6	6.21	769.0	8.08	11.30	4.02	377.32		540	N	N
7/11/2017	9:00	19.7	5.25	777.0		8.78	1.39			63200	N	Y
7/18/2017	8:50	19.0	5.09	893.0		6.61	2.01			1520	N	N
7/25/2017	9:35	17.8	4.86	974.0	7.97	11.40	1.320	508.21		1840	N	N
8/1/2017			Not enough water to sample									
8/8/2017			Not enough water to sample									
8/15/2017			Not enough water to sample									
8/22/2017	9:20	20.4	4.41	510.0	8.04	3.86	2.45	212.60			Y	N
8/29/2017	9:40	17.0	5.16	893.0	7.99	6.60	1.51	521.35		695	N	N
9/5/2017	9:45	16.6	4.14	744.0	8.27	5.47	2.260	247.60		250	N	N
9/12/2017	10:10	13.4	4.92	655.0	8.06	7.03	1.660	378.12		202	N	N
9/19/2017	9:40	14.2	3.95	406.0	8.01	5.48	4.130	248.70		63200	N	Y
9/26/2017			Road closed no sample									

Weaver Ditch - CR 44

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/2/2017	10:25	10.6	3.80	798.2	7.62	6.88	5.560	429.03		63200	N	Y
5/9/2017	10:30	10.0	5.54	808.0	7.46	10.80	1.450	690.62			N	N
5/16/2017	10:40	13.5	5.02	713.0	7.50	4.98	3.120	486.70		63200	N	N
5/25/2017			No sample - tall vegetation									
6/1/2017	9:25	13.3	4.51	778.0	7.30	10.20	2.450	300.03		629	N	N
6/6/2017	9:15	13.2	4.40	791.0	7.42	7.32	2.230	333.41		940	N	N
6/13/2017	9:20	17.1	3.71	888.0	7.61	7.45	2.580	312.71		1600	N	N
6/20/2017	9:05	14.9	5.31	1043.0	7.86	12.00	4.800	523.08		63200	N	N
6/27/2017	9:10	13.0	4.67	801.0	7.93	11.70	4.180	449.50		1450	N	N
7/11/2017	9:15	18.5	3.42	2039.0		8.54	2.85			63200	N	Y
7/18/2017			Not enough water to sample									
7/25/2017			Not enough water to sample									
8/1/2017			Not enough water to sample									
8/8/2017			Not enough water to sample									
8/15/2017			Not enough water to sample									
8/22/2017			Not enough water to sample									
8/29/2017			Not enough water to sample									
9/5/2017			Not enough water to sample									
9/12/2017			Not enough water to sample									
9/19/2017			Not enough water to sample									
9/26/2017			Not enough water to sample									

Pine Creek - CR 23

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/2/2017	10:50	9.2	11.18	483.2	8.03	4.14	0.302	92.05		1400	N	Y
5/9/2017	10:55	10.1	9.70	574.0	8.06	4.64	0.258	193.63			N	N
5/16/2017	11:10	15.6	9.23	601.0	8.08	2.12	0.189	197.28		390	N	N
5/25/2017	9:45	14.5	7.42	159.5	7.86	3.46	0.694	65.26			N	Y
6/1/2017	9:50	12.9	8.64	578.0	8.08	4.12	0.198	235.95		440	N	N
6/6/2017	9:40	14.2	7.83	551.0	8.10	4.01	0.240	247.82		330	N	N
6/13/2017	9:45	15.6	6.75	621.0	8.02	4.31	0.808	205.40		1800	N	N
6/20/2017	9:35	15.1	6.98	537.0	8.04	4.49	4.270	229.66		5100	N	N
6/27/2017	9:35	13.5	7.62	556.0	8.04	4.12	4.100	227.05		955	N	N
7/11/2017	9:40	18.2	6.37	541.0		4.28	0.912			2900	N	Y
7/18/2017	9:25	17.2	7.65	528.0		3.98	2.100			1155	N	N
7/25/2017	10:10	16.5	8.47	519.0	8.13	4.19	0.301	110.59		1020	N	N
8/1/2017	9:25	16.9	7.95	543.0	8.16	4.57	0.844	205.87		1160	N	N
8/8/2017	9:30	14.8	6.58	566.0	8.16	4.12	0.878	263.35		1200	N	N
8/15/2017	9:15	16.7	5.83	576.0		4.23	3.000			880	N	N
8/22/2017	9:50	19.4	5.68	487.0	8.14	4.22	0.388	202.10			Y	N
8/29/2017	10:05	15.7	7.14	563.2	8.25	4.68	0.534	211.59		850	N	N
9/5/2017	10:20	15.9	5.22	488.8	8.19	5.04	0.543	252.80		1060	N	N
9/12/2017	10:35	13.3	5.13	494.6	8.24	4.79	3.370	79.42		500	N	N
9/19/2017	10:15	18.5	4.72	332.0	8.37	3.65	3.210	198.76		5500	N	Y
9/26/2017	10:25	17.4	4.56	485.0	8.16	4.25	0.427	106.46		1240	N	N

Pine Creek - CR 23

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/2/2017	10:50	9.2	11.18	483.2	8.03	4.14	0.302	92.05		1400	N	Y
5/9/2017	10:55	10.1	9.70	574.0	8.06	4.64	0.258	193.63			N	N
5/16/2017	11:10	15.6	9.23	601.0	8.08	2.12	0.189	197.28		390	N	N
5/25/2017	9:45	14.5	7.42	159.5	7.86	3.46	0.694	65.26			N	Y
6/1/2017	9:50	12.9	8.64	578.0	8.08	4.12	0.198	235.95		440	N	N
6/6/2017	9:40	14.2	7.83	551.0	8.10	4.01	0.240	247.82		330	N	N
6/13/2017	9:45	15.6	6.75	621.0	8.02	4.31	0.808	205.40		1800	N	N
6/20/2017	9:35	15.1	6.98	537.0	8.04	4.49	4.270	229.66		5100	N	N
6/27/2017	9:35	13.5	7.62	556.0	8.04	4.12	4.100	227.05		955	N	N
7/11/2017	9:40	18.2	6.37	541.0		4.28	0.912			2900	N	Y
7/18/2017	9:25	17.2	7.65	528.0		3.98	2.100			1155	N	N
7/25/2017	10:10	16.5	8.47	519.0	8.13	4.19	0.301	110.59		1020	N	N
8/1/2017	9:25	16.9	7.95	543.0	8.16	4.57	0.844	205.87		1160	N	N
8/8/2017	9:30	14.8	6.58	566.0	8.16	4.12	0.878	263.35		1200	N	N
8/15/2017	9:15	16.7	5.83	576.0		4.23	3.000			880	N	N
8/22/2017	9:50	19.4	5.68	487.0	8.14	4.22	0.388	202.10			Y	N
8/29/2017	10:05	15.7	7.14	563.2	8.25	4.68	0.534	211.59		850	N	N
9/5/2017	10:20	15.9	5.22	488.8	8.19	5.04	0.543	252.80		1060	N	N
9/12/2017	10:35	13.3	5.13	494.6	8.24	4.79	3.370	79.42		500	N	N
9/19/2017	10:15	18.5	4.72	332.0	8.37	3.65	3.210	198.76		5500	N	Y
9/26/2017	10:25	17.4	4.56	485.0	8.16	4.25	0.427	106.46		1240	N	N

Pine Creek - Wyland and Roske

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/2/2017	11:05						Sample collected on Pine Creek - CR 17					
5/9/2017	11:10	10.7	9.38	521.0	8.15	3.29	0.190	227.93			N	N
5/16/2017	11:25	16.2	8.65	591.0	8.19	2.16	0.138	186.96		269	N	N
5/25/2017	10:00	14.6	7.52	337.5	8.00	3.16	0.456	39.17			N	Y
6/1/2017	10:05	13.7	8.78	537.0	8.17	3.01	0.142	252.79		380	N	N
6/6/2017	9:55	15.0	8.43	548.0	8.21	3.65	0.147	342.55		540	N	N
6/13/2017	10:00	18.3	8.26	603.0	8.16	3.51	0.170	260.05		700	N	N
6/20/2017	9:50	15.1	9.79	504.0	8.15	3.34	0.937	252.11		1240	N	N
6/27/2017	9:50	13.6	9.09	849.0	8.18	3.30	1.010	249.44		940	N	N
7/11/2017	9:50	18.3	7.70	503.0		4.51	0.199			63200	N	Y
7/18/2017	9:40	16.8	7.69	533.0	8.28	3.37	1.870	227.81		770	N	N
7/25/2017	10:25	16.0	7.84	656.0	8.26	3.29	0.231	187.89		1560	N	N
8/1/2017	9:40	16.1	8.25	596.0	8.26	3.35	1.770	215.07		695	N	N
8/8/2017	10:25	15.1	9.11	643.0	8.29	3.08	1.680	260.72		625	N	N
8/15/2017	9:30	16.1	7.54	547.0		3.40	1.190			595	N	N
8/22/2017	10:10	18.5	6.18	511.0	8.22	3.26	0.243	247.88			Y	N
8/29/2017	11:20	15.5	6.67	385.0	8.31	3.58	1.420	256.18		585	N	N
9/5/2017	11:35	16.2	5.79	551.0	8.22	3.67	0.230	179.48		340	N	N
9/12/2017	10:50	13.4	6.37	461.7	8.29	3.54	0.177	164.17		360	N	N
9/19/2017	10:30	17.0	6.43	312.0	8.20	2.90	2.640	164.22		1240	N	Y
9/26/2017	10:40	16.9	5.77	502.0	8.28	3.25	0.210	188.72		490	N	N

Christiana Creek - CR 4

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/2/2017	11:30	12.1	10.86	251.2	8.21	1.24	0.064	16.18		140	N	Y
5/9/2017	11:30	12.7	9.90	350.4	8.27	1.28	0.000	42.62			N	N
5/16/2017	11:50	19.0	9.15	416.8	8.30	0.124	0.012	54.16		75	N	N
5/25/2017	10:25	17.2	8.39	393.4	8.23	1.28	0.064	24.73			N	Y
6/1/2017	10:25	17.8	7.38	401.2	8.29	0.97	0.010	59.26		164	N	N
6/6/2017	10:15	19.8	8.01	432.4	8.24	1.36	0.055	87.98		98	N	N
6/13/2017	10:20	22.7	7.43	458.4	8.21	1.40	0.888	68.55		162	N	N
6/20/2017	10:15	20.2	7.11	429.0	8.26	1.28	1.590	48.01		300	N	N
6/27/2017	10:10	18.0	7.61	430.8	8.26	1.08	1.110	86.67		238	N	N
7/11/2017	10:15	22.5	6.87	397.5	8.20	1.01	0.287	36.41		228	N	Y
7/18/2017	10:00	23.0	6.99	421.0		0.841	0.715			156	N	N
7/25/2017	10:45	22.6	7.61	355.8		0.875	0.062			80	N	N
8/1/2017	10:00	22.2	6.81	426.5	8.35	0.981	0.137	77.16		236	N	N
8/8/2017	10:45	20.5	7.31	395.7	8.42	0.961	0.117	49.42		159	N	N
8/15/2017	9:50	21.7	6.58	386.2	7.84	0.941	0.775	20.19		167	N	N
8/22/2017	10:30	22.6	6.02	413.2	8.51	1.10	0.176	80.08			Y	N
8/29/2017	11:40	19.6	6.92	403.0	8.40	0.222	2.240	61.19		200	N	N
9/5/2017	11:55	19.0	6.51	406.3	8.36	1.04	1.140	16.28		780	N	N
9/12/2017	11:25	17.2	7.74	282.3	8.20	1.20	0.169	22.95		169	N	N
9/19/2017	10:50	20.6	6.19	321.5	8.19	0.906	0.181	24.41		830	N	Y
9/26/2017	11:00	22.0	5.53	426.9	8.49	1.04	0.048	51.54		136	N	N

Cobus Creek - CR 10

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E.COLI	RAINING	WET
5/2/2017	11:45	10.7	8.60	239.4	7.98	0.582	0.068	15.52	2	308	N	Y
5/9/2019	11:50	YSI NOT OPERATIONAL				0.068	0.075				N	N
5/16/2016	12:00	18.5	7.58	336.7	8.11	0.870	0.093	67.33	5	510	N	N
5/25/2017	10:35	15.7	7.14	297.6	7.98	0.548	0.077	25.48			N	Y
6/1/2017	10:40	15.7	8.17	313.2	8.11	0.860	0.072	39.55	10	232	N	N
6/6/2017	10:30	16.7	7.22	330.0	8.15	0.414	0.105	57.73		278	N	N
6/13/2017	10:35	19.7	7.23	342.0	8.09	0.381	0.147	44.58	11	260	N	N
6/20/2017	10:30	17.0	8.18	322.5	8.10	0.498	0.795	72.20	7	289	N	N
6/27/2017	10:30	14.6	8.77	310.8	8.10	1.12	0.998	100.94	6	313	N	N
7/11/2017	10:30	21.1	7.40	364.0	7.93	1.12	0.312	35.44	8	420	N	Y
7/18/2017	10:15	19.9	7.25	320.6		0.312	1.030		10	400	N	N
7/25/2017	11:00	19.3	7.52	312.7	8.18	0.329	0.151	23.08	9	225	N	N
8/1/2017	10:15	19.1	8.52	332.3	8.18	0.432	1.57	212.10	16	294	N	N
8/8/2017	10:55	17.7	8.20	312.4	8.10	0.782	1.42	25.81	7	259	N	N
8/15/2017	10:00	18.9	9.34	332.9	7.67	0.313	1.23	7.23	13	305	N	N
8/22/2017	10:45	21.0	7.11	236.5	8.25	0.373	0.652	63.84			Y	N
8/29/2017	11:55	17.6	7.80	318.4	8.51	1.12	0.064	54.67	1	304	N	N
9/5/2017	12:10	16.6	8.01	319.8	8.52	0.259	0.423	15.99	1	600	N	N
9/12/2017	11:40	14.1	8.18	311.9	8.50	0.251	0.964	41..78	1	460	N	N
9/19/2017	11:05	19.0	6.69	304.6	8.17	0.245	0.396	21.39	5	1360	N	Y
9/26/2017	11:25	19.5	6.58	332.1	8.09	0.246	0.055	48.67	7	530	N	N

Rock Run Creek CR 21

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/4/2017	9:40	10.4	10.30	458.8	8.00	4.10	5.380	138.98			N	Y
5/11/2017	8:35	10.1	8.30	183.6	7.62	4.45	0.237	44.29		63200	N	Y
5/18/2017	8:55	16.7	8.04	585.0	8.11	3.78	0.212	177.38			N	N
5/23/2017	8:20	14.5	8.10	510.0	7.97	4.29	0.262	48.75		1770	N	N
5/30/2017	8:45	14.1	8.48	541.0	8.07	5.29	1.890	161.65			N	N
6/8/2017	8:20	15.0	8.45	553.0	8.21	3.74	0.318	315.05		263	N	N
6/15/2017	8:35	18.9	7.70	654.0	7.89	2.45	0.178			780	N	N
6/22/2017	8:25	18.1	7.88	733.0	8.18	3.85	0.287	325.15		555	N	N
6/29/2017	8:35	17.1	7.98	537.0	8.23	3.54	0.143	341.72		385	N	N
7/6/2017	8:30	18.7	7.41	1033.0	8.23	2.99	1.460	334.95		490	N	N
7/13/2017	8:35	19.6	7.11	467.4	7.95	3.12	0.412	75.87		6100	N	Y
7/20/2017	8:35	20.4	7.32	775.0		2.91	0.208			150	N	N
7/27/2017	8:30	19.6	7.67	660.0	8.25	2.54	0.175	188.7		350	N	N
8/3/2017	8:25	18.7	7.63	657.0	7.72	3.14	0.316	55.25			N	N
8/10/2017	8:30	16.9	5.71	520.0	8.23	2.60	1.400	189.12		318	N	N
8/17/2017	8:20	20.1	4.46	733.0	8.17	3.41	0.216	226.28		510	N	N
8/24/2017	9:20	15.8	5.14	525.0	8.38	2.60	1.400	337.84			N	N
8/31/2017	9:30	16.3	4.82	580.0	8.30	2.85	0.237	363.80		196	N	N
9/7/2017	9:50	13.9	4.80	741.1	8.30	2.83	0.239	119.95		1390	N	Y
9/14/2017			Equipment issue - no sample									
9/21//2017	9:40	19.6	4.07	528.0	8.20	4.25	0.301	136.27			N	N
9/28/2017	8:45	15.2	4.41	602.0	8.41	3.10	0.518	320.27		366	N	N

Rock Run - CR 34

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E.C OLI	RAINING	WET
5/4/2017	9:55	9.5	8.44	498.4	7.83	4.26	3.110	117.17			N	Y
5/11/2017	8:50	10.1	10.23	207.6	7.48	6.02	0.370	36.91		63200	N	Y
5/18/2017	9:10	16.4	6.97	630.0	7.85	4.12	0.301	183.0			N	N
5/23/2017	8:40	14.0	7.55	587.0	7.72	5.14	0.312	86.78		2200	N	N
5/30/2017	9:00	13.4	8.58	527.0	7.84	6.04	1.670	212.37			N	N
6/8/2017	8:40	13.6	7.11	591	7.93	5.99	0.319	269.4		740	N	N
6/15/2017	8:50		YSI not operational			5.12	0.148			1643	N	N
6/22/2017	8:40	17.2	6.59	646.0	7.90	6.13	0.273	213.69		1310	N	N
6/29/2017	8:45	16.4	7.12	550.0	7.90	6.26	0.182	223.22		2225	N	N
7/6/2017	8:50	17.3	6.47	652.0	8.02	5.81	3.44	215.72		1070	N	N
7/13/2017	8:50	18.5	6.62	518.0	6.85	5.41	0.987	10.09		63200	N	Y
7/20/2017	8:50	18.9	6.33	574.0		5.96	0.304			1000	N	N
7/27/2017	8:45	18.1	7.82	748.0	8.10	6.53	0.150	167.67		1100	N	N
8/3/2017	8:40	17.0	7.37	617.0	8.14	6.41	0.882	178.46			N	N
8/10/2017	8:45	15.0	6.25	582.0	8.08	1.33	1.540	152.02		945	N	N
8/17/2017	8:40	19.5	6.32	647.0	8.13	5.96	0.728	200.42		3400	N	N
8/24/2017	9:40	14.1	7.36	567.0	8.17	1.33	1.540	234.28			N	N
8/31/2017	9:50	15.3	6.83	489.8	8.25	6.32	0.427	215.62		520	N	N
9/7/2017	10:10	13.1	6.96	740.4	8.26	7.29	0.185	173.92		700	N	Y
9/14/2017	9:10	15.2	5.18	613.0	8.13	7.01	0.435	120.17		780	N	N
9/21/2017	9:55	18.2	4.25	689.0	8.21	6.01	0.298	133.32			N	N
9/28/2017	9:05	13.5	5.77	655.0	8.23	3.26	0.396	186.22		1380	N	N

Rock Run - CR 35 & CR 30

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E.COLI	RAINING	WET
5/4/2017	10:05	9.3	8.76	450.6	7.9	4.3	3.600	73.11	15.5		N	Y
5/11/2017	9:05	10	8.76	193.7	7.53	12.1	0.311	25.21		63200	N	Y
5/18/2017	9:25	16.1	8.42	639.0	8.16	5.12	0.254	277.12	4.5		N	N
5/23/2017	8:50	14.1	8.85	492.3	7.92	6.98	0.298	112.08		1750	N	N
5/30/2017	9:10	13.8	8.35	516.0	8.02	8.24	9.850	101.53			N	N
6/8/2017	8:50	12.5	6.04	593.0	8.16	12.0	0.469	314.86	4.5	1370	N	N
6/15/2017	9:05		YSI not opertional			1.48	0.250			7200	N	N
6/22/2017	8:50	15.8	7.08	639.0	8.13	11.1	0.510	277.81	8	1580	N	N
6/29/2017	8:55	16.1	8.40	622.0		12.2	0.233			2350	N	N
7/6/2017	9:00	16.0	8.21	603.0	8.15	11.9	8.17	344.6	2.1	3700	N	N
7/13/2017	9:00	18.2	6.73	647.0	6.52	9.2	1.42			23500	N	Y
7/20/2017	9:00	17.7	6.46	726.0	8.06	11.4	0.269	173.18	6.3	4750	N	N
7/27/2017	8:55	17.2	7.21	671.0	8.25	1.38	0.255	233.22		1400	N	N
8/3/2017	8:50	16.3	7.85	587.0	8.24	10.2	1.05	270.43	2.9		N	N
8/10/2017	9:05	15.1	8.04	778.0	8.12	11.5	2.53	170.57		935	N	N
8/17/2017			Not enough water to sample									
8/24/2017	9:50	14.4	5.20	617.0	8.31	11.5	0.536	320.95			N	N
8/31/2017	10:00	15.7	7.27	807.0	8.33	10.4	0.601	334.44	4.38	780	N	N
9/7/2017	10:20	14.0	7.19	739.3	8.42	11.2	0.217	276.93		1355	N	Y
9/14/2017			Equipment issue - no sample									
9/21/2017	10:05	18.1	5.56	692.0	8.26	11.1	0.301	150.87			N	N
9/28/2017	9:20	13.9	6.48	614.0	8.43	8.20	0.540	329.46	4	1120	N	N

CR 43 Elkhart River

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/4/2017	10:30	11.5	9.48	439.5	7.98	1.74	0.147	114.73			N	Y
5/11/2017	9:30	13.1	8.04	314.5	7.92	1.18	0.249	78.09		400	N	Y
5/18/2017	9:45	20.1	5.57	497.3	7.88	1.42	0.216	129.92			N	N
5/23/2017	9:10	16.7	6.75	438.8	7.81	1.62	0.257	100.33		390	N	N
5/30/2017	9:35	18.4	5.74	442.6	7.84	1.66	9.480	126.75			N	N
6/8/2017	9:05	19.4	5.49	467.1	7.88	0.87	0.194	167.51		80	N	N
6/15/2017	9:25		YSI not operational			1.01	0.698			120	N	N
6/22/2017	9:20	20.9	5.80	502.0	7.87	1.03	0.416	161.13		190	N	N
6/29/2017	9:20	18.9	6.33	515.0	7.95	1.14	0.267	144.83		206	N	N
7/6/2017	9:20	21.9	5.78	498.6	8.04	0.94	1.020	202.69		136	N	N
7/13/2017	9:20	22.2	6.68	515.0		1.87	0.321			1662	N	Y
7/20/2017	9:20	23.6	5.83	498.0		0.922	0.398			169	N	N
7/27/2017	9:15	22.4	5.25	382.6	7.99	0.981	0.699	184.72		106	N	N
8/3/2017	9:10	21.9	6.53	557.0	8.09	1.32	0.327	209.57			N	N
8/10/2017	9:20	19.7	7.36	491.2	7.72	1.01	2.640	49.69		112	N	N
8/17/2017	9:10	23.1	5.38	561.0	8.45	8.12	0.301	172.40		124	N	N
8/24/2017	10:10	19.2	6.18	489.6	8.28	1.01	2.64	195.67			N	N
8/31/2017	10:20	19.2	6.12	481.9	8.29	1.23	0.205	236.70		84	N	N
9/7/2017	10:45	16.0	6.88	739.4	8.04	1.05	0.207			184	N	N
9/14/2017	9:35	17.0	4.96	638.0	8.16	1.06	0.305	246.17		369	N	N
9/21/2017	10:25	20.9	5.37	503.0	8.09	1.08	0.245	104.59			N	N
9/28/2017	9:45	18.4	5.56	437.9	8.28	1.64	0.316	213.56		180	N	N

Elkhart River - Indiana Ave.

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/4/2017	11:20	11.6	10.01	470.1	8.06	2.21	0.154	126.51			N	Y
5/11/2017	10:25	13.6	10.01	474.7	8.07	1.86	0.159	84.97		196	N	Y
5/18/2017	10:35	20.1	8.12	543.0	8.07	0.181	0.128	166.55			N	N
5/23/2017	10:00	16.6	7.06	439.4	7.76	0.179	0.14	99.19		490	N	N
5/30/2017			No sample - bridge work									
6/8/2017	10:05	19.2	7.51	524.0	7.99	1.75	0.267	188.08		25	N	N
6/15/2017	10:15		YSI not operational			1.26	0.161			96	N	N
6/22/2017	10:05	20.7	7.80	555.0	8.02	1.66	0.342	205.37		76	N	N
6/29/2017	10:05	18.7	8.35	636.0	8.11	1.55	0.249	226.65		90	N	N
7/6/2017	10:10	22.4	7.02	590.0	8.01	1.40	0.352	202.9		25	N	N
7/13/2017	10:10	21.9	6.69	613.0		2.12	0.312			192	N	Y
7/20/2017			Storms - no sample									
7/27/2017	10:05	22.6	7.19	571.0	8.21	1.24	0.168	169.75		50	N	N
8/3/2017	10:00	22.5	7.80	526.0	8.28	2.22	0.218	209.75			N	N
8/10/2017	10:10	20.3	8.07	387.1		6.58	0.244			28	N	N
8/17/2017	10:15	22.3	6.01	514.0	8.36	2.78	0.201	241.13		61	N	N
8/24/2017	11:20	20.2	6.42	466.1	8.22	6.58	0.244	267.67			N	N
8/31/2017	11:15	19.4	6.21	481.0	8.22	1.58	0.171	282.77		35	N	N
9/7/2017	11:45	17.0	6.23	741.5	5.58	1.31	0.176			58	N	Y
9/14/2017			Equipment issue - no sample									
9/21/2017	11:10	21.1	6.32	585.0	8.14	1.84	0.186	128.5			N	N
9/28/2017	10:35	19.5	6.32	578.0	8.28	2.01	0.178	287.2		34	N	N

Solomon Creek - CR 52

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/4/2017	10:45	10.4	7.28	545	7.68	3.31	0.205	131.07	7.5		N	Y
5/11/2017	9:45	11.8	6.9	477.5	7.64	2.38	0.066	77.62		230	N	Y
5/18/2017	9:55	16.7	7.34	889	7.33	2.98	0.042	143.44	4.67		N	N
5/23/2017	9:25	15.1	5.94	565	7.64	3.64	0.067	157.96		150	N	N
5/30/2017	9:45	14.1	6.34	559	7.71	3.89	0.668	162.94			N	N
6/8/2017	9:20	13.9	6.90	481	7.83	1.82	0.071	230.74	8.17	102	N	N
6/15/2017	9:35		YSI not operational			1.12	0.078			316	N	N
6/22/2017	9:30	16.9	6.05	527.0	7.81	1.92	0.055	167.84	4.38	500	N	N
6/29/2017	9:35	15.9	8.19	614.0	7.88	1.73	0.087	193.48		420	N	N
7/6/2017	9:30	17.5	6.68	689.0	7.90	1.60	3.680	272.93	3.4	470	N	N
7/13/2017	9:35	18.6	5.68	551.0		4.14	0.198			2200	N	Y
7/20/2017	9:30	18.2	5.35	500.0	6.67	1.42	0.050		3.2	79	N	N
7/27/2017	9:30	18.4	6.07	702.0	7.96	1.13	0.083	108.46		340	N	N
8/3/2017	9:25	18.0	6.71	651.0	8.01	4.04	0.093	176.39	5.5		N	N
8/10/2017	9:35	15.9	6.92	1130.0	7.10	1.10	5.300	117.10		292	N	N
8/17/2017	9:20	20.0	5.79	590.0	8.00	1.12	0.087	175.76	5.4	850	N	N
8/24/2017	10:20	15.1	7.33	610.0	8.05	1.10	5.300	159.88			N	N
8/31/2017	10:35	16.5	6.67	676.0	8.08	1.51	0.047	219.24	3.25	228	N	N
9/7/2017	11:05	13.7	7.04	739.7	5.82	1.09	0.076			274	N	Y
9/14/2017	9:50	15.3	6.11	628.0	8.05	1.21	0.123	340.14	2.38	225	N	N
9/21/2017	10:35	18.7	5.04	706.0	8.03	2.03	0.096	97.98			N	N
9/28/2017	9:55	13.9	7.72	648.0	8.11	3.01	0.091	140.24	2.75	232	N	N

Solomon Creek - CR 33

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/4/2017	10:55	10.4	7.80	533.0	7.81	3.91	0.149	137.23	10		N	Y
5/11/2017	9:55	11.9	7.66	520.0	7.78	2.90	0.092	104.9		210	N	Y
5/18/2017	10:10	16.6	6.92	586.0	7.94	4.01	0.061	132.86	13.2		N	N
5/23/2017	9:35	14.9	6.55	573.0	7.79	4.02	0.091	179.05		580	N	N
5/30/2017	9:55	14.1	7.15	626.0	7.87	4.51	0.272	139.68			N	N
6/8/2017	9:35	14.3	7.50	559.0	8.01	2.08	0.076	253.15	7.83	138	N	N
6/15/2017	9:50		YSI not operational			1.17	0.074			245	N	N
6/22/2017	9:40	17.4	6.92	607.0	8.01	2.40	0.093	185.23	11.4	238	N	N
6/29/2017	9:45	16.2	7.57	629.0	8.09	1.96	0.162	220.96		277	N	N
7/6/2017	9:45	18.6	7.15	615.0	8.14	1.65	0.272	226.33	7.5	236	N	N
7/13/2017	9:45	19.0	6.24	632.0		3.12	0.177			9400	N	Y
7/20/2017			Storms - no sample									
7/27/2017	9:40	19.4	6.71	646.0	8.16	1.18	0.084	160.96		106	N	N
8/3/2017	9:35	19.2	7.08	680.0	8.22	3.11	0.176	203.16	4.9		N	N
8/10/2017	9:45	17.2	7.67	679.0	8.31	1.07	0.207	279.81		96	N	N
8/17/2017	9:45	21.3	7.01	868.0	8.30	3.98	0.162	229.51	4.5	196	N	N
8/24/2017	10:35	16.3	7.30	685.0	8.29	1.07	0.207	223.18			N	N
8/31/2017	10:45	17.4	6.68	691.0	8.34	1.73	0.084	257.26	2.63	150	N	N
9/7/2017	11:15	14.2	7.38	740.0	6.09	1.17	0.058			278	N	Y
9/14/2017	10:00	15.9	6.57	560.0	8.15	1.05	0.334	282.14	2	228	N	N
9/21/2017	10:45	19.4	6.77	713.0	8.18	2.68	0.085	127.34			N	N
9/28/2017	10:05	14.8	7.37	688.0	8.45	2.98	0.079	185.36	1.75	148	N	N

Heaton Lake - Ideal Beach

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/4/2017	11:50	12.4	10.38	307.2	8.21	3.360	0.039	23.03			N	Y
5/11/2017	10:55	13.7	10.29	306.1	8.49	0.322	0.042	14.55		87	N	Y
5/18/2017	11:20	23.5	9.65	369.0	8.65	0.172	0.038	28.4			N	N
5/23/2017	10:30	19.3	8.49	357.4	8.48	0.178	0.041	59.38		53		
5/30/2017	10:40	25.7	8.30	350.0	8.60	0.183	0.822	75.24			N	N
6/8/2017	10:40	23.6	10.51	359.7	8.82	1.850	0.047	63.11		22	N	N
6/15/2017	10:40		YSI not operational			0.140	0.054			63	N	N
6/22/2017	10:40	24.7	5.89	337.3	8.21	0.177	0.082	52.54		400	N	N
6/29/2017	10:35	22.3	6.82	348.1	8.29	0.181	0.049	41.87		78	N	N
7/6/2017	10:40		YSI not operational			0.193	0.729			21	N	N
7/13/2017	10:40	25.5	4.31	366.8		0.178	0.098			7300	N	Y
7/20/2017			Storms - no sample									
7/27/2017	10:35	27.0	7.67	290.6	8.81	0.143	0.055	67.18		42	N	N
8/3/2017	10:35	27.3	8.07	240.5		0.147	0.071				N	N
8/10/2017	10:40	24.0	6.23	279.6	7.28	0.094	0.374	47.56		13	N	N
8/17/2017	11:00	26.3	5.96	252.1	9.35	0.167	0.062	49.31		3300	N	N
8/24/2017	11:40	22.2	6.81	250.3	8.14	0.094	0.374	52.66			N	N
8/31/2017	11:45	21.6	6.27	243.6	8.10	0.117	0.040	41.9		172	N	N
9/7/2017	11:45	17.0	6.23	741.5	5.58	1.310	0.176			92	N	Y
9/14/2017	11:05	19.7	6.04	220.3	8.07	1.270	0.614	78.64		84	N	N
9/21/2017	11:35	25.1	6.71	242.3	8.43	0.301	0.038	42.85			N	N
9/28/2017	11:10	20.9	8.24	218.0	8.25	0.302	0.059	45.14		147	N	N

Heaton Lake - 22892 Lake Shore

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/4/2017	12:00	12.8	8.98	321.1	8.15	0.392	0.048	28.73			N	Y
5/11/2017	11:05	14.4	9.68	316.8	8.31	0.287	0.064	41.98		152	N	Y
5/18/2017	11:30	22.5	7.24	391.1	8.31	0.141	0.050	70.68			N	N
5/23/2017	10:40	19.1	10.01	357.2	8.57	0.142	0.054	70.65		12	N	N
5/30/2017	10:50	20.30	8.92	355.0	8.54	0.171	0.377	67.47			N	N
6/8/2017	10:50	23.20	8.23	350.7	7.92	0.261	0.068	58.17		0	N	N
6/15/2017	10:50		YSI not operational			0.101	0.041			7	N	N
6/22/2017	10:55	24.7	4.62	351.8	8.20	0.157	0.115	20.50		53	N	N
6/29/2017	10:45	22.2	6.97	341.8	8.33	0.192	0.045	66.22		3000	N	N
7/6/2017	10:50		YSI not operational			0.121	0.509			0	N	N
7/13/2017	10:50	25.1	6.46	335.9		0.187	0.111			19	N	Y
7/20/2017			Storms - no sample									
7/27/2017	10:45	27.1	7.71	325.7	8.54	0.100	0.043	52.68		3	N	N
8/3/2017	10:40	26.2	7.40	293.6		0.162	0.028				N	N
8/10/2017			Road closed - no sample									
8/17/2017	11:10	25.9	6.28	162.8	8.01	0.141	0.037	36.38		520	N	N
8/24/2017	11:55	21.7	7.28	248.2	8.16	0.074	0.104	38.47			N	N
8/31/2017	11:55	21.7	6.38	249.8	8.04	0.145	0.079	46.80		14	N	N
9/7/2017	12:20	19.1	6.75	741.9	6.41	0.081	0.084			39	N	Y
9/14/2017	11:15	19.6	5.78	246.8	8.12	0.165	0.702	47.62		10	N	N
9/21/2017	11:45	24.5	6.74	267.2	8.15	0.207	0.046	36.07			N	N
9/28/2017			Pier removed, muck at shoreline - no sample									

Simonton Lake - 51903 Beach Drive

DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/4/2017	12:15	11.6	10.01	470.1	8.06	0.645	0.051	126.51			N	Y
5/11/2017	11:20	14.7	8.88	347.6	8.25	0.761	0.049	49.02		88	N	Y
5/18/2017	11:45	22.1	7.83	378.2	8.43	0.201	0.041	97.56			N	N
5/23/2017	10:50	18.8	9.42	401.6	8.54	0.275	0.045	51.65		0	N	N
5/30/2017	11:00	20.7	7.84	361.2	8.42	0.375	0.490	78.06			N	N
6/8/2017	11:00	23.3	7.56	411.6	8.31	0.118	0.059	108.79		116	N	N
6/15/2017	11:05		YSI not operational			0.101	0.032			232	N	N
6/22/2017	11:05	24.0	7.11	405.1	8.44	0.162	0.113	81.15		43	N	N
6/29/2017	10:55	21.8	8.74	345.7	8.84	0.083	0.060	39.93		17	N	N
7/6/2017	11:00		YSI not operational			0.134	3.790			63200	N	N
7/13/2017	11:00	25	6.65	327.6		0.132	0.121			311	N	Y
7/20/2017			Storms - no sample									
7/27/2017	10:55	26.9	7.03	382.6	8.94	0.053	0.030	111.33		115	N	N
8/3/2017	10:50	26.8	7.42	404.9		0.079	0.050				N	N
8/10/2017	10:55	24.4	6.92	370.3	8.97	0.048	0.111	92.20		7	N	N
8/17/2017	11:20	26.3	6.65	380.4	9.02	0.082	0.040	126.59		976	N	N
8/24/2017	12:05	21.9	6.73	304.6	8.61	0.048	0.111	58.30			N	N
8/31/2017	12:05	22.1	5.78	354.2	8.57	0.140	0.081	64.18		26	N	N
9/7/2017	12:45	17.9	6.88	741.7	6.01	0.077	0.040			224	N	Y
9/14/2017			Road closed - no sample									
9/21/2017	12:00	25.4	6.07	301.2	8.42	0.487	0.059	67.58			N	N
9/28/2017	11:40	21.4	8.14	202.0	8.25	0.546	0.054	41.42		504	N	N

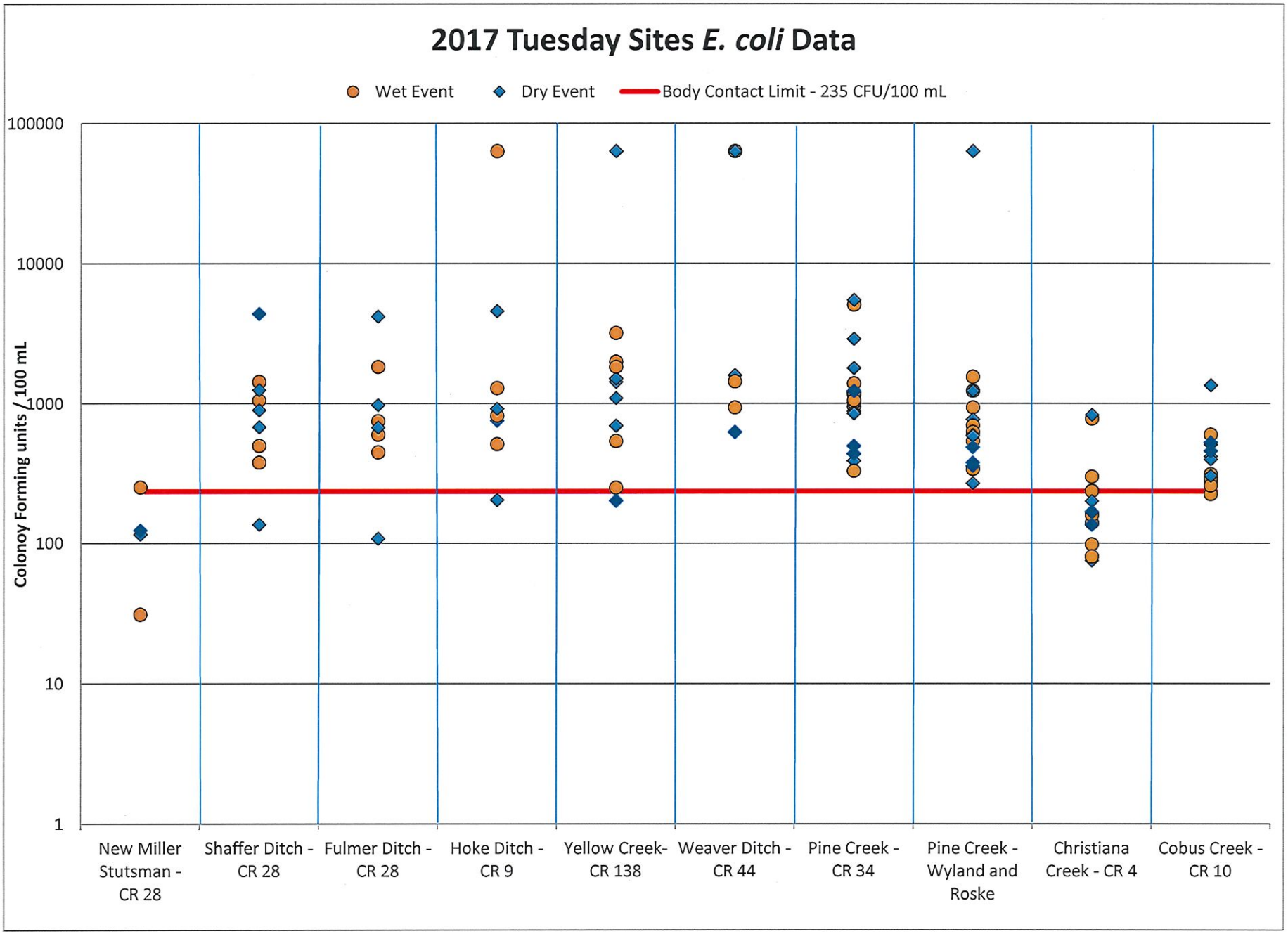
Simonton Lake - 51330 SR 19

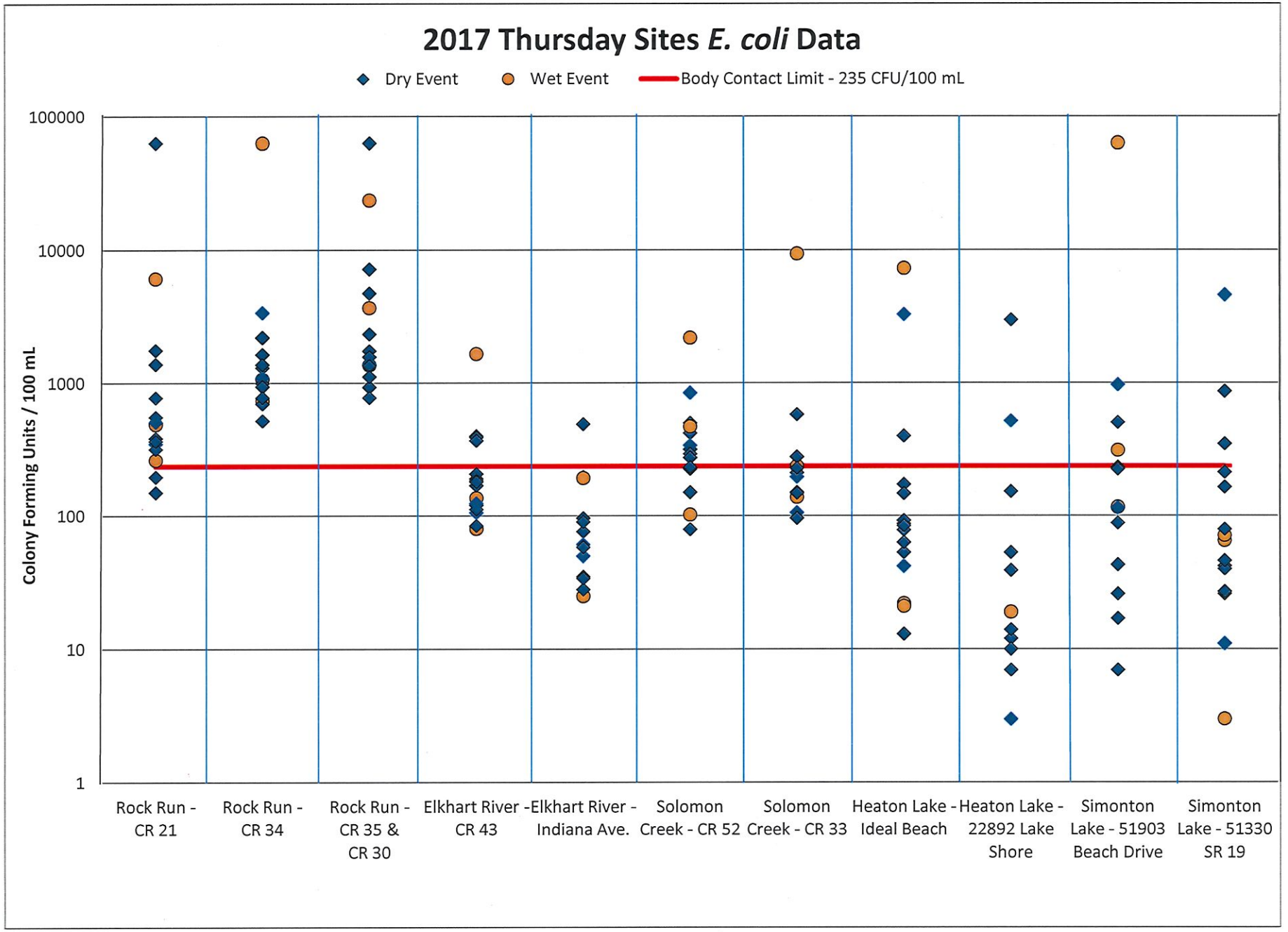
DATE	TIME	TEMP	DO	SPC	PH	NITRATES	PHOSPHORUS	CHLORIDES	TSS	E. COLI	RAINING	WET
5/4/2017	12:25	12.3	9.44	324.1	8.31	0.71	0.034	116.64			N	Y
5/11/2017	11:35	14.6	9.24	300.3	8.32	0.73	0.029	83.01		42	N	Y
5/18/2017	11:55	22.3	7.67	380.2	8.57	0.307	0.043	101.36			N	N
5/23/2017	11:05	18.4	7.82	490.4	8.41	0.371	0.054	107.81		26	N	N
5/30/2017	11:10	20.2	7.48	388.4	8.39	0.578	0.510	131.35			N	N
6/8/2017	11:15	22.7	7.31	415.7	8.43	0.308	0.046	102.99		65	N	N
6/15/2017	11:15		YSI not operational			0.121	0.018			164	N	N
6/22/2017	11:20	24.6	6.11	395.1	8.17	0.366	0.053	108.60		40	N	N
6/29/2017	11:05	22.3	8.31	402.9	8.45	0.292	0.061	102.95		46	N	N
7/6/2017	11:15		YSI not operational			0.211	4.050			3	N	N
7/13/2017	11:10	25.3	7.42	312.6		0.141	0.142			71	N	Y
7/20/2017			Storms - no sample									
7/27/2017	11:10	26.4	6.42	392.1	6.72	0.042	0.014	96.90		11	N	N
8/3/2017	11:00	25.8	8.07	375.9	8.31	0.161	0.040	108.47			N	N
8/10/2017	11:15	24.5	8.40	285.9	8.86	0.027	0.870	135.64		212	N	N
8/17/2017	11:30	26.1	7.82	389.5	8.41	0.168	0.050	150.41		4600	N	N
8/24/2017	12:15	22.4	6.27	306.4	8.58	0.027	0.870	83.40			N	N
8/31/2017	12:20	21.7	6.20	352.6	8.78	0.080	0.001	112.31		79	N	N
9/7/2017	1:00	18.8	6.31	741.9	8.88	0.090	0.052	100.86		869	N	Y
9/14/2017	11:30	19.5	6.06	203.7	8.78	0.052	0.252	87.62		27	N	N
9/21/2017	12:10	25.3	6.56	366.2	8.31	0.596	0.071	45.41			N	N
9/28/2017	11:55	21.3	7.55	229.7	8.36	0.610	0.098	91.21		348	N	N

APPENDIX 3:

CHARTS

FOR E. COLI


2017 Tuesday Sites E. coli Data
Wet Event
Dry Event
Body Contact Limit - 235 CFU/100 mL
Colonoy Forming units / 100 mL
100000
10000
1000
100
10
1
New Miller Stutsman - CR 28
Shaffer Ditch - CR 28
Fulmer Ditch - CR 28
Hoke Ditch - CR 9
Yellow Creek- CR 138
Weaver Ditch - CR 44
Pine Creek - CR 34
Pine Creek - Wyland and Roske
Christiana Creek - CR 4
Cobus Creek - CR 10


2017 Thursday Sites E. coli Data
Dry Event
Wet Event
Body Contact Limit - 235 CFU/100 mL
Colony Forming Units / 100 mL
100000
10000
1000
100
10
1
Rock Run - CR 21
Rock Run - CR 34
Rock Run - CR 35 & CR 30
Elkhart River - CR 43
Elkhart River - Indiana Ave.
Solomon Creek - CR 52
Solomon Creek - CR 33
Heaton Lake - Ideal Beach
Heaton Lake - 22892 Lake Shore
Simonton Lake - 51903 Beach Drive
Simonton Lake - 51330 SR 19