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2018 Eight Point Lake Water Quality Report

Clare County, Michigan

Introduction

The goal of this testing protocol was to monitor various water quality parameters of the lake, compare results to historical data, and identify any potential risks to the health of Eight Point Lake. Water samples were taken at five different locations and tested for 12 different parameters. Tests were conducted with a Hanna Multiparameter Water Quality Meter or LaMotte SMART2 Colorimeter. Test results were compared to the “2017 Eight Point Lake Water Quality Report” by LakePro, Inc.

Testing Dates

Field tests and water samples were taken on June 15th, 2018. Laboratory tests were completed on June 15th, 2018. This report describes conditions at the times the samples were taken. Historical testing dates at the end of this report.

Analyses

Water samples were tested for Temperature, Dissolved Oxygen, Total Phosphorus, Nitrates, Transparency, pH, Total Dissolved Solids, Conductivity, Alkalinity, Hardness, Salinity, and E. coli.

Water Quality Sampling Sites

The following map shows the five water quality sampling locations.



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Water Quality Results

2018 Lakewide

Parameter	Average	Target Range
Temperature	72.8 °F	Less Than 75 °F
Dissolved Oxygen	7.8 mg/L	4.0 – 12.0 mg/L
Total Phosphorus	40 ppb	0 – 100 ppb
Nitrate	194 ppb	0 – 1,000 ppb
Transparency	12.9 feet	More than 6.5 feet
pH	7.5	7.0 – 9.0 S.U.
Total Dissolved Solids	88 ppm	0 – 1,000 ppm
Conductivity	176 µS	0 – 1,500 ppm
Alkalinity	86 ppm	0 – 250 ppm
Hardness	98 ppm	100 – 300 ppm
Total Salinity	80 ppm	0 – 500 ppm
<i>E. coli</i>	0 CFU	0 – 300 CFU
Trophic State Index – Total Phosphorus	57	Oligotrophic: 0 - 40 Mesotrophic: 40 – 50
Trophic State Index – Transparency	46	Eutrophic: 50 – 70 Hypereutrophic: 70+

Discussion:

The results of the 2018 testing showed the water of Eight Point Lake remained healthy with few concerns. The data shows that the aquatic environment was suitable to support natural wildlife. There were no signs of pollution, so the lake was safe for recreational uses, such as swimming, boating, and fishing.

2018 is the eleventh consecutive year that LakePro tested the lake water. The accumulation of data allowed us to identify the parameters that varied and those that moved in a certain direction. Each additional year of testing will continue to make the analysis more accurate.

The **Temperature** was slightly lower than last year, with no significant impact. As expected with warm water, there were plants growing at the time of sampling. Warmer water holds less oxygen, so lower water temperatures are best for the lake.

The **Dissolved Oxygen** concentrations were at healthy levels. There was enough oxygen in the water to support a healthy fish population. It is important that the lake has enough oxygen in June to support the fishery in the warmer summer months.

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The **Total Phosphorus** spiked in 2010 and has remained low since then. The decrease of phosphorus in the lake was a positive change and showed good stewardship by the riparians. This year, the phosphorus remained in the lower half of the target range and showed a slight improvement since last year.

Nitrate followed the same pattern. So, all the nutrient concentrations were within the target ranges. It is still important all residents practice lake-safe methods for lawn fertilizers, yard waste, tree leaves, pet droppings, septic systems, and any other source of nutrients.

Transparency improved since last year, measuring the clearest since testing began. Water clarity is important to maintain the visual water quality of the lake. But, better clarity allows more sunlight penetration to warm the water and fuel plant growth. The transparency was terrific for a developed inland lake and classified Eight Point Lake as *mesotrophic*.

pH varied from last year and remained within the target range. pH is a broad indicator of lake health that can show changes based on rainfall, dissolved oxygen, groundwater inputs, and pollution. It is important this parameter stay within the target range.

The **Total Dissolved Solids** and **Conductivity** were very near to last year's data, showing no significant changes in the lake chemistry.

The **Alkalinity** and **Hardness** were at good concentrations in your lake. Calcium carbonate is the main constituent of these parameters. Calcium carbonate enters the lake with groundwater that coursed through limestone. The carbonate ions buffer against shifts in the pH from other influences, so having sufficient alkalinity is beneficial to the lake.

Both of these parameters increased slightly from last year. This shows that the groundwater inputs of the lake (higher pH and carbonate) exceeded the runoff inputs.

The **Salinity** was at normal levels in the water and remained unchanged from last year.

Finally, there were no **E. coli** present in any of the water samples collected.

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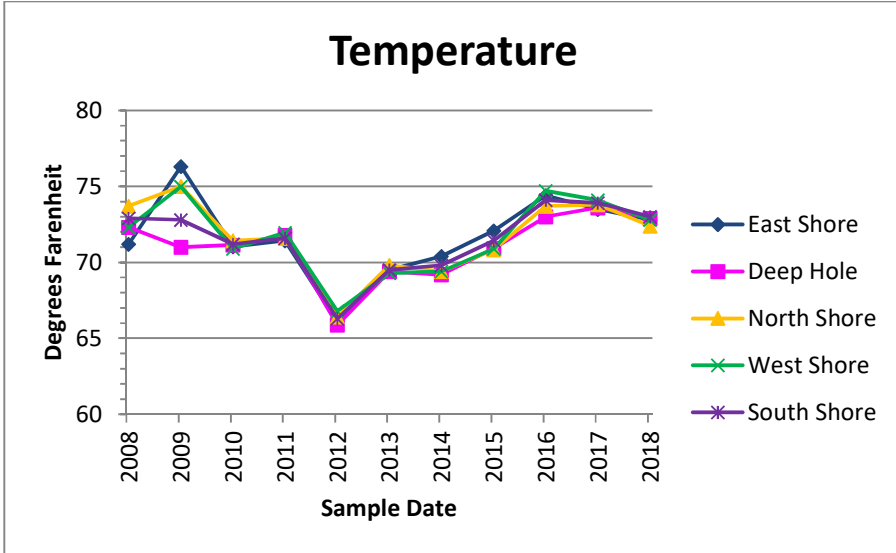




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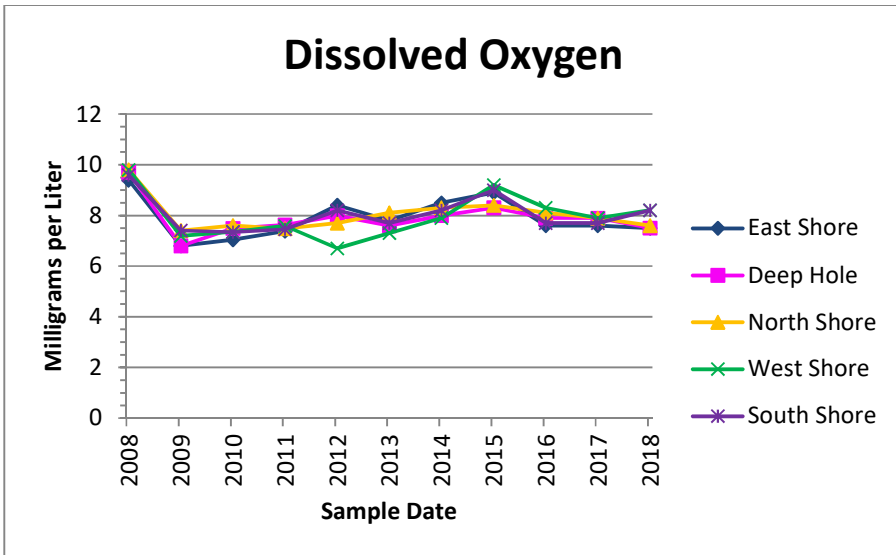
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Parameter & Sampling Site Details



2018 Results	
East Shore	72.8 °F
Deep Hole	72.9 °F
North Shore	72.4 °F
West Shore	72.8 °F
South Shore	73.0 °F
Lakewide Average	72.8 °F

Target Range: < 75°F



2018 Results	
East Shore	7.5 mg/L
Deep Hole	7.5 mg/L
North Shore	7.6 mg/L
West Shore	8.2 mg/L
South Shore	8.2 mg/L
Lakewide Average	7.8 mg/L

Target Range: 4.0 – 12.0 mg/L

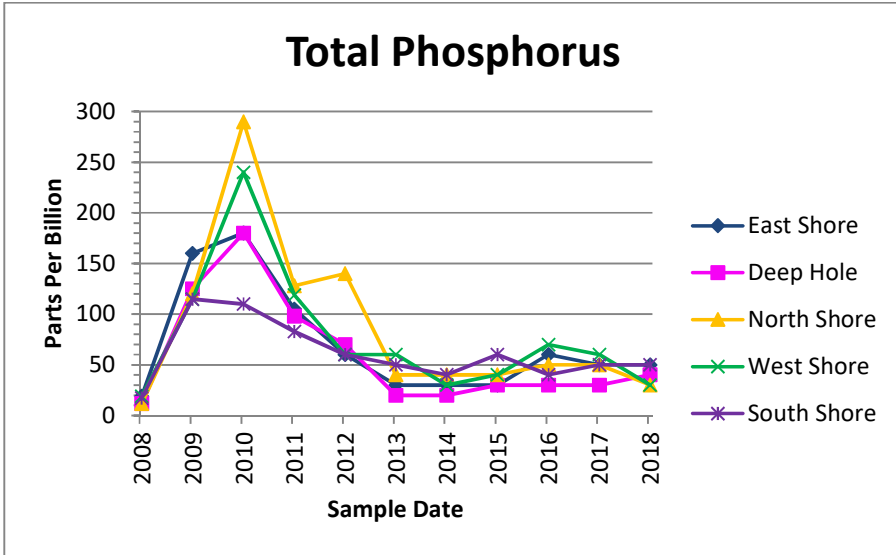
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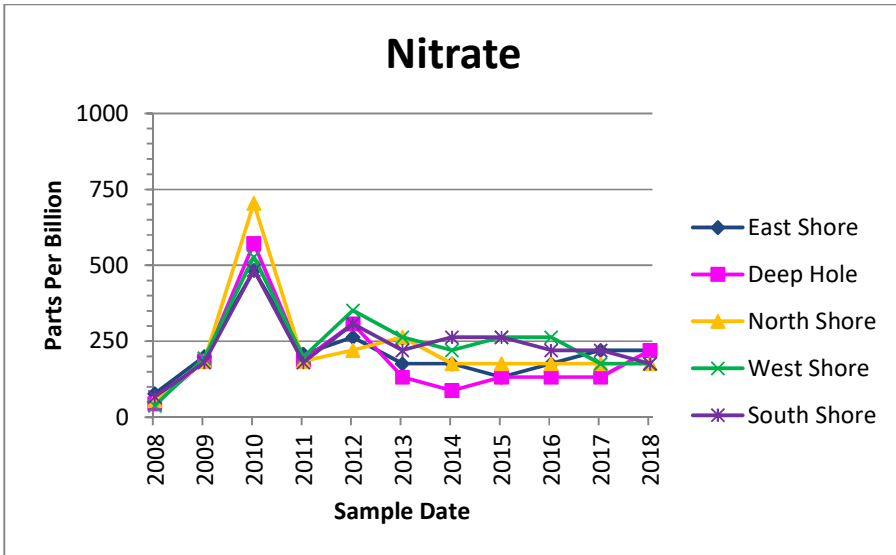
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2018 Results	
East Shore	50 ppb
Deep Hole	40 ppb
North Shore	30 ppb
West Shore	30 ppb
South Shore	50 ppb
Lakewide Average	40 ppb

Target Range: 0 – 100 ppb



2018 Results	
East Shore	220 ppb
Deep Hole	220 ppb
North Shore	176 ppb
West Shore	176 ppb
South Shore	176 ppb
Lakewide Average	194 ppb

Target Range: 0 – 1,000 ppb

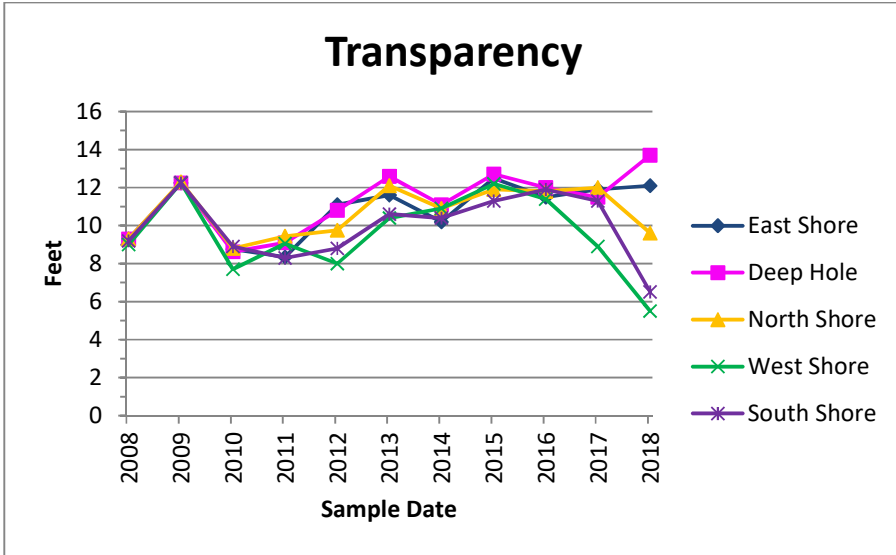
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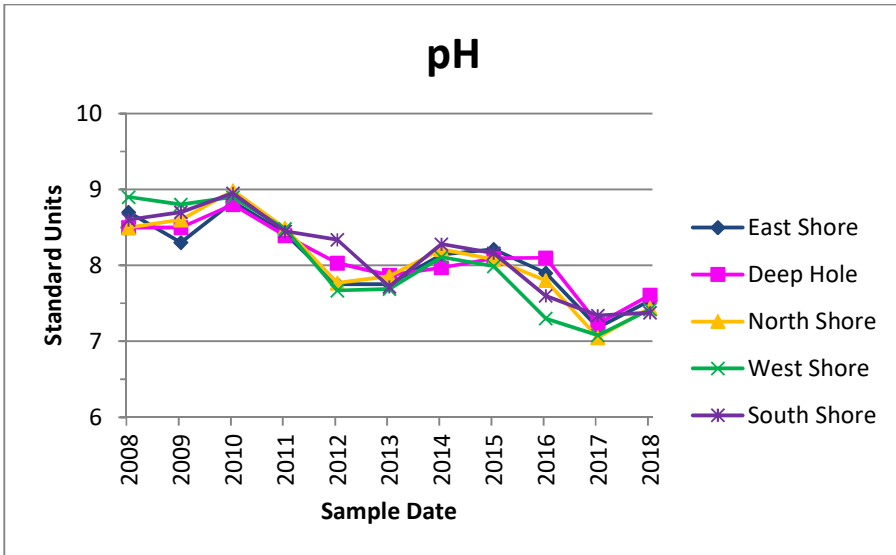
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2018 Results	
East Shore	12.1 feet
Deep Hole	13.7 feet
North Shore	9.6 feet
West Shore	5.5 feet
South Shore	6.5 feet
Lakewide Average	12.9 feet

Target Range: More than 6.5 feet



2018 Results	
East Shore	7.5
Deep Hole	7.6
North Shore	7.4
West Shore	7.4
South Shore	7.4
Lakewide Average	7.5

Target Range: 7.0 – 9.0

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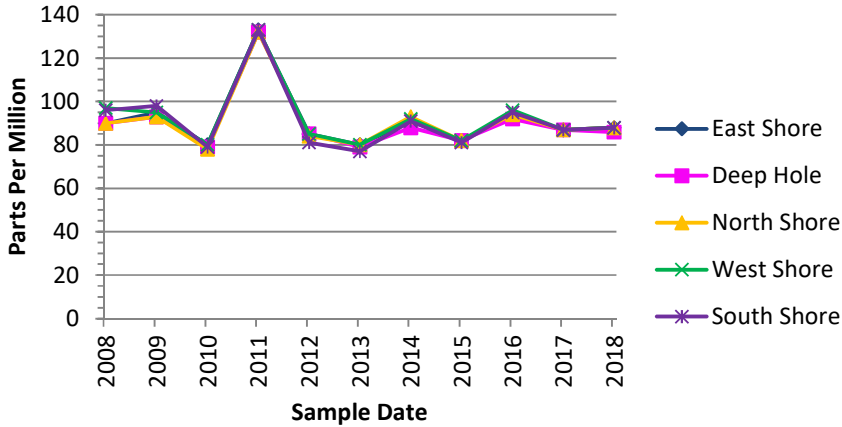




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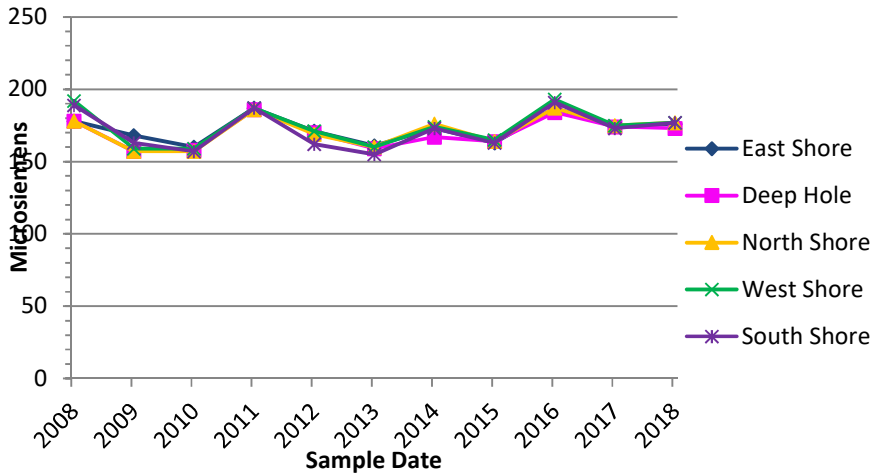
Total Dissolved Solids



2018 Results	
East Shore	88 ppm
Deep Hole	86 ppm
North Shore	88 ppm
West Shore	88 ppm
South Shore	88 ppm
Lakewide Average	88 ppm

Target Range: 0 – 1,000 ppm

Conductivity



2018 Results	
East Shore	176 µS
Deep Hole	173 µS
North Shore	177 µS
West Shore	177 µS
South Shore	177 µS
Lakewide Average	176 µS

Target Range: 0 – 1,500 µS

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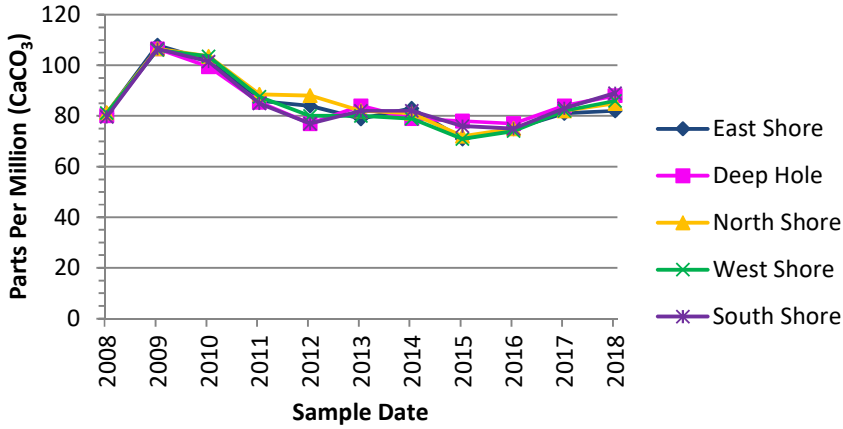




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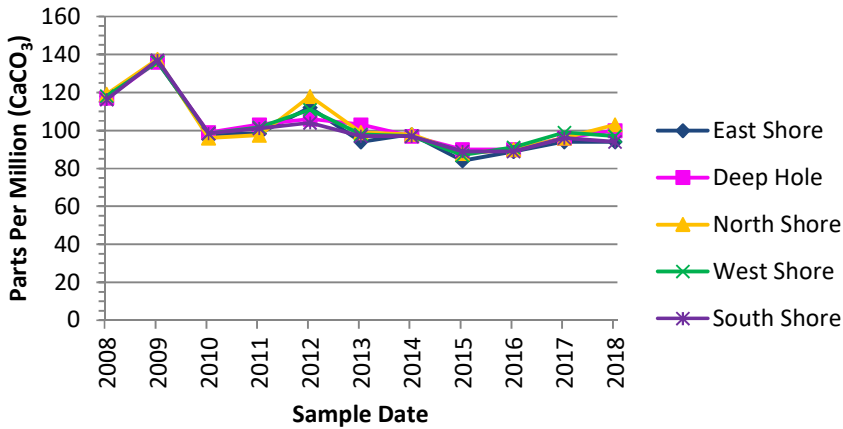
Alkalinity



2018 Results	
East Shore	82 ppm
Deep Hole	88 ppm
North Shore	85 ppm
West Shore	86 ppm
South Shore	89 ppm
Lakewide Average	86 ppm

Target Range: 0 – 250 ppm

Hardness



2018 Results	
East Shore	94 ppm
Deep Hole	100 ppm
North Shore	103 ppm
West Shore	97 ppm
South Shore	94 ppm
Lakewide Average	98 ppm

Target Range: 100 – 300 ppm

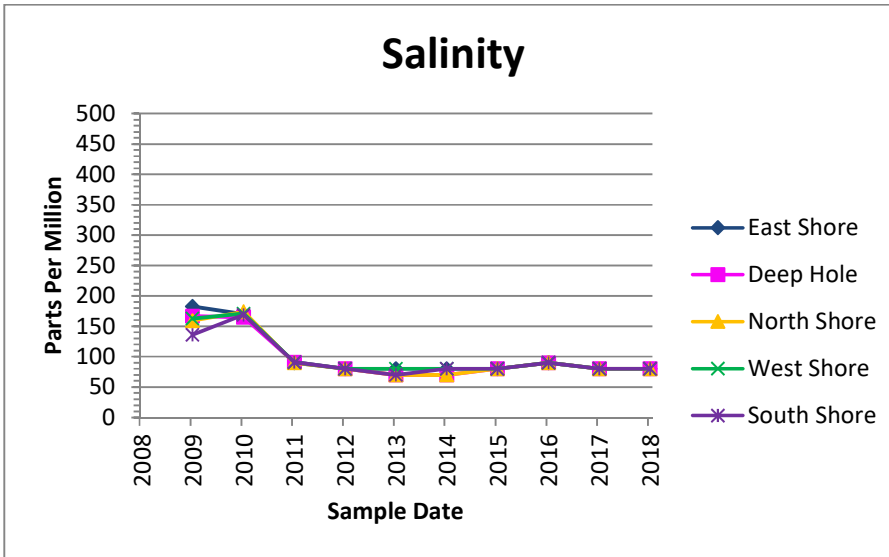
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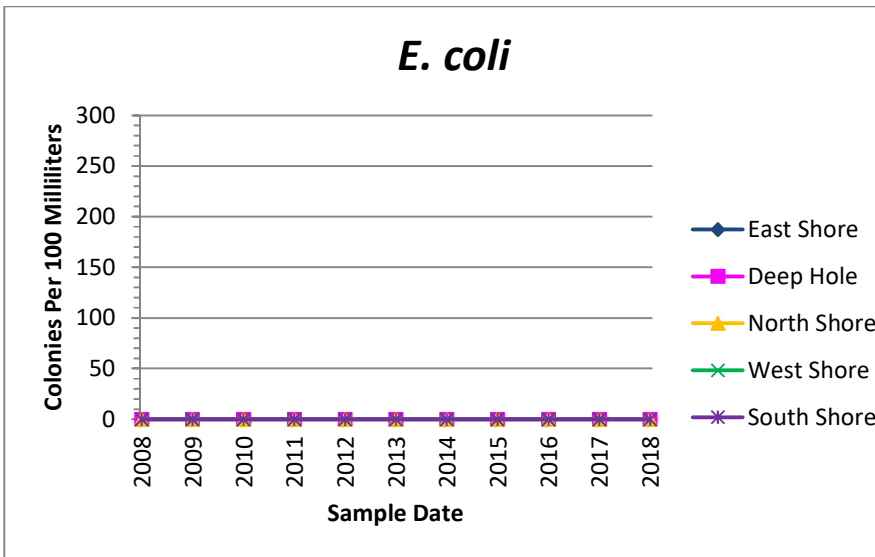
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2018 Results	
East Shore	80 ppm
Deep Hole	80 ppm
North Shore	80 ppm
West Shore	80 ppm
South Shore	80 ppm
Lakewide Average	80 ppm

Target Range: 0 – 500 ppm



2018 Results	
East Shore	0 CFU
Deep Hole	0 CFU
North Shore	0 CFU
West Shore	0 CFU
South Shore	0 CFU
Lakewide Average	0 CFU

Target Range: 0 – 300 CFU

Completed and Certified by: _____

Peter Filpansick, B.S.

Date: July 25th, 2018

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Historical Test Results

Date	Sample Station	Temperature °F	Dissolved Oxygen mg/L	Total Phosphorus ppb	Nitrate ppb	Transparency feet	pH	TDS ppm	Conductivity µS	Alkalinity ppm	Hardness ppm	Salinity ppm	E. coli CFU
6/30/2008	ES	71.2	9.4	19	78	9.3	8.7	90	178	81	118	-	0
	DH	72.3	9.7	12	46	9.3	8.5	90	178	80	117	-	0
	NS	73.7	9.8	12	56	9.3	8.5	90	178	81	119	-	0
	WS	72.3	9.8	19	38	9.0	8.9	97	192	81	118	-	0
	SS	72.9	9.6	17	68	9.2	8.6	96	189	80	116	-	0
6/22/2009	ES	76.3	6.8	160	200	12.3	8.3	95	168	108	137	183	0
	DH	71.0	6.8	125	186	12.3	8.5	93	157	107	136	167	0
	NS	75.0	7.4	120	185	12.3	8.6	93	157	107	138	159	0
	WS	75.0	7.2	115	195	12.3	8.8	95	159	106	136	163	0
	SS	72.8	7.4	115	180	12.3	8.7	98	163	107	137	136	0
6/16/2010	ES	71.0	7.1	180	484	8.8	8.8	80	160	102	98	170	0
	DH	71.2	7.5	180	572	8.6	8.8	79	158	100	99	165	0
	NS	71.4	7.6	290	704	8.8	9.0	78	157	104	96	174	0
	WS	70.9	7.4	240	528	7.7	8.9	80	159	104	99	171	0
	SS	71.2	7.3	110	484	8.9	9.0	79	157	102	99	169	0
6/21/2011	ES	71.4	7.4	105	207	8.4	8.4	133	187	86	99	90	0
	DH	71.8	7.6	98	189	9.1	8.4	132	186	86	103	91	0
	NS	71.6	7.5	128	185	9.5	8.5	132	186	89	98	90	0
	WS	72.0	7.6	119	198	9.1	8.5	133	187	88	102	91	0
	SS	71.6	7.5	83	180	8.3	8.5	133	187	85	101	91	0
6/4/2012	ES	66.1	8.4	60	264	11.1	7.8	85	171	84	112	80	0
	DH	65.9	8.0	70	308	10.8	8.0	85	170	77	106	80	0
	NS	66.4	7.7	140	220	9.8	7.8	84	169	88	118	80	0
	WS	66.8	6.7	60	352	8.0	7.7	85	171	80	111	80	0
	SS	66.3	8.2	60	308	8.8	8.3	81	162	77	104	80	0
6/4/2013	ES	69.5	7.8	30	176	11.6	7.8	80	161	79	94	80	0
	DH	69.4	7.6	20	132	12.6	7.9	79	159	84	103	70	0
	NS	69.8	8.1	40	264	12.1	7.9	80	160	82	99	70	0
	WS	69.3	7.3	60	264	10.4	7.7	80	160	80	98	80	0
	SS	69.5	7.7	50	220	10.6	7.7	77	155	82	97	70	0
6/10/2014	ES	70.4	8.5	30	176	10.2	8.1	91	173	83	98	80	0
	DH	69.2	8.0	20	88	11.1	8.0	88	167	79	97	70	0
	NS	69.4	8.3	40	176	10.9	8.2	93	176	81	98	70	0
	WS	69.4	7.9	30	220	10.9	8.1	92	174	79	97	80	0
	SS	69.8	8.2	40	264	10.4	8.3	91	173	82	97	80	0
6/9/2015	ES	72.1	8.9	30	132	12.5	8.2	82	163	71	84	80	0
	DH	70.9	8.3	30	132	12.7	8.1	82	164	78	90	80	0
	NS	70.8	8.4	40	176	11.9	8.1	82	164	72	88	80	0
	WS	70.9	9.2	40	264	12.2	8.0	82	165	71	87	80	0
	SS	71.4	9.0	60	264	11.3	8.2	81	163	76	89	80	0
6/17/2016	ES	74.4	7.6	60	176	11.5	7.9	94	187	75	89	90	0
	DH	73.0	7.9	30	132	12.0	8.1	92	184	77	90	90	0
	NS	73.7	8.1	50	176	11.8	7.8	94	187	75	90	90	0
	WS	74.7	8.3	70	264	11.4	7.3	96	193	74	91	90	0
	SS	74.1	7.7	40	220	11.9	7.6	95	191	75	89	90	0
6/20/2017	ES	73.5	7.6	50	220	11.9	7.2	87	174	81	94	80	0
	DH	73.6	7.9	30	132	11.5	7.2	87	174	84	96	80	0
	NS	73.8	7.9	50	176	12.0	7.1	87	175	82	96	80	0
	WS	74.1	7.9	60	176	8.9	7.1	87	175	82	99	80	0
	SS	73.9	7.7	50	220	11.3	7.3	87	173	83	96	80	0
6/15/2018	ES	72.8	7.5	50	220	12.1	7.5	88	176	82	94	80	0
	DH	72.9	7.5	40	220	13.7	7.6	86	173	88	100	80	0
	NS	72.4	7.6	30	176	9.6	7.4	88	177	85	103	80	0
	WS	72.8	8.2	30	176	5.5	7.4	88	177	86	97	80	0
	SS	73.0	8.2	50	176	6.5	7.4	88	177	89	94	80	0

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Analysis Information

- Temperature:** The water temperature directly affects the amount of oxygen that is able to dissolve into the water. The temperature of surface waters is not indicative of the entire water column.
- Dissolved Oxygen:** D.O. is a measure of the amount of oxygen dissolved in the water. This oxygen is available to fish and other animals for respiration. Vegetation generally increases DO, particularly during the day and early evening. Animals and other respiring organisms consume the oxygen, mostly during the day. Oxygen is also added to the lake through wave action, rain, fountains and aerators.
- Total Phosphorus:** Phosphorus is an essential nutrient for plant growth. However, concentrations exceeding 100 ppb can impair the water and results in nuisance vegetation growth.
- Nitrate:** Nitrogen is also essential for plant growth. Nitrate is the predominant form of nitrogen in water. Excessive nitrate concentrations may also result in pollution and increased vegetation.
- Transparency:** The ability of light to penetrate the water column is determined by the amount of dissolved and suspended particles in the water. Although aesthetically desirable, transparent water allows increased light to reach the lake bed and may result in vegetation growth.
- pH:** pH is a measure of acidity or alkalinity. pH is a general measure of lake health and can roughly indicate the range of other measurements such as alkalinity and hardness.
- TDS:** Total Dissolved Solids is the amount of all organic and inorganic substances in the water in a molecular or ionized state. Higher values generally indicate richer and more productive water. Lower values usually indicate cleaner and less productive water.
- Conductivity:** Conductivity is a measure of the ability of water to conduct electricity. Dissolved ions in the water increase conductivity, thus TDS and Conductivity are closely related.
- Alkalinity:** Alkalinity refers to the ability of the water to neutralize acids, mainly through the hydrogenation of carbonate ions. This is why the alkalinity is expressed as “ppm as CaCO₃”. However, other basic molecules in the water can also contribute to alkalinity.
- Hardness:** Hardness is very closely related to alkalinity. It is a measure of the dissolved salts and metals in the water, including but not limited to CaCO₃.

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- Salinity:** Salinity is the measure of the dissolved salt content of water. Salinity influences the types of organisms that are able to survive in the water. Salinity also affects the chemistry of the water, and including conductivity and potability.
- Fecal Coliforms:** Non-fecal coliforms are naturally found as soil organisms. Fecal Coliforms, such as *E. coli*, are coliforms found in the intestines of warm-blooded animals and humans. The presence of fecal coliforms indicates contamination from either animals or humans.
- Trophic States**
- Oligotrophic:** Water is very clear. Nutrient levels are generally low. Plant and algae productivity is also low. Sufficient dissolved oxygen in the bottom, cooler waters allows cold-water fish to survive, such as salmon and trout.
- Mesotrophic:** Water is moderately clear. Nutrient levels are slightly elevated. Plant and algae productivity is present, but generally not a nuisance. Oxygen and temperature in the lower portion of the lake allow walleye and perch to survive.
- Eutrophic:** Water is not clear due to high nutrients levels, increased turbidity, and excessive algal growth. There is no oxygen in the bottom, cooler waters, restricting the lake to warm water species, such as bass and bluegill.
- Hypereutrophic:** Nutrient levels are extremely high, promoting very high algae productivity. Blue-green algae blooms are likely. High turbidity and algae growth make the water opaque. Little plant growth is restricted to invasive plants. The only fish that can survive this environment are rough fish, such as carp, catfish, and mudminnows.

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