



9353 Hill Road • Swartz Creek, MI 48473
(810) 635-4400 • Fax (810) 635-4404

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Testing Date: June 10, 2014

Eight Point Lake

Clare County, Michigan

Water Quality Test Results:

East Shore:

		<u>Target Range</u>
Temperature:	70.4 °F	
Transparency:	10.2 Feet	More than 6.5 Feet
pH:	8.14	7.0 – 9.0
TDS:	91 ppm	0-1,000 ppm
Conductivity:	173 µS	0 – 1,500 µS
Dissolved Oxygen:	8.5 mg/L	4.0 – 12.0 mg/L
Alkalinity:	83 ppm	0 – 250 ppm
Hardness:	98 ppm	100 – 300 ppm
Salinity:	80 ppm	0 – 500 ppm
Total Phosphorus:	30 ppb	0 – 100 ppb
Nitrates:	176 ppb	0 – 1,000 ppb

Deep Hole:

		<u>Target Range</u>
Temperature:	69.2 °F	
Transparency:	11.1 Feet	More than 6.5 Feet
pH:	7.97	7.0 – 9.0
TDS:	88 ppm	0-1,000 ppm
Conductivity:	167 µS	0 – 1,500 µS
Dissolved Oxygen:	8.0 mg/L	4.0 – 12.0 mg/L
Alkalinity:	79 ppm	0 – 250 ppm
Hardness:	97 ppm	100 – 300 ppm
Salinity:	70 ppm	0 – 500 ppm
Total Phosphorus:	20 ppb	0 – 100 ppb
Nitrates:	88 ppb	0 – 1,000 ppb

North Shore:

		<u>Target Range</u>
Temperature:	69.4 °F	
Transparency:	10.9 Feet	More than 6.5 Feet
pH:	8.21	7.0 – 9.0
TDS:	93 ppm	0-1,000 ppm
Conductivity:	176 µS	0 – 1,500 µS
Dissolved Oxygen:	8.3 mg/L	4.0 – 12.0 mg/L
Alkalinity:	81 ppm	0 – 250 ppm
Hardness:	98 ppm	100 – 300 ppm
Salinity:	70 ppm	0 – 500 ppm
Total Phosphorus:	40 ppb	0 – 100 ppb
Nitrates:	176 ppb	0 – 1,000 ppb

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West Shore:

		<u>Target Range</u>
Temperature:	69.4°F	
Transparency:	10.9 Feet	More than 6.5 Feet
pH:	8.11	7.0 – 9.0
TDS:	92 ppm	0-1,000 ppm
Conductivity:	174 µS	0 – 1,500 µS
Dissolved Oxygen:	7.9 mg/L	4.0 – 12.0 mg/L
Alkalinity:	79 ppm	0 – 250 ppm
Hardness:	97 ppm	100 – 300 ppm
Salinity:	80 ppm	0 – 500 ppm
Total Phosphorus:	30 ppb	0 – 100 ppb
Nitrates:	220 ppb	0 – 1,000 ppb

South Shore:

		<u>Target Range</u>
Temperature:	69.8 °F	
Transparency:	10.4 Feet	More than 6.5 Feet
pH:	8.28	7.0 – 9.0
TDS:	91 ppm	0-1,000 ppm
Conductivity:	173 µS	0 – 1,500 µS
Dissolved Oxygen:	8.2 mg/L	4.0 – 12.0 mg/L
Alkalinity:	82 ppm	0 – 250 ppm
Hardness:	97 ppm	100 – 300 ppm
Salinity:	80 ppm	0 – 500 ppm
Total Phosphorus:	40 ppb	0 – 100 ppb
Nitrates:	264 ppb	0 – 1,000 ppb

Discussion:

The results of the 2014 testing indicate the water of Eight Point Lake remains very healthy and shows no signs of worsening. The data shows that the aquatic environment is very suitable to support natural wildlife. Also, the lake is safe for recreational uses, such as swimming, boating, fishing, etc., as there are no signs of pollution.

2014 is the seventh consecutive year that LakePro tested the lake water. The accumulation of data allows us to better identify the parameters that vary each year and the parameters that are trending in a certain direction. Each successive year of testing will continue to make the analysis more accurate.

The **Temperature** was slightly higher than this time last year, but overall is lower than in the past because the sampling date was earlier than in previous years. Furthermore, the 2013-14 winter was unusually strong, freezing the lake more than most years. As expected with water temperatures near 70°F, there were many plants already growing at the time of testing, including various pondweeds and Eurasian Milfoil.

Transparency decreased slightly since last year, but is still trending upward since testing began in 2008. Water clarity is important to maintain the “visual” water quality of the lake. However, increased clarity allows more sunlight penetration, which warms the water and promotes plant growth. The transparency is very good for a heavily developed inland lake and is typical of a mesotrophic lake.

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pH increased since last year but is still decreasing over the course of our testing. Rain water is slightly acidic and decreases the pH as it enters into the lake in spring and early summer. Increases of dissolved oxygen and carbonate ions will drive the pH upward. The carbonate ions in the lake, **Alkalinity**, will buffer against changes in pH, but can be used up as low pH water enters the lake. However, as some rain water infiltrates the ground and enters the water table, it will pick up more carbonates and deliver them to the lake, replenishing the alkalinity. For this reason, the alkalinity varied across testing sites depending on the influence of runoff and springs delivering water to the lake.

Hardness measures the amount of minerals in the water, including calcium and magnesium. The carbonates that influence alkalinity are usually delivered in the form of Calcium Carbonate, so hardness and alkalinity usually move in the same direction.

The **Total Dissolved Solids** and **Conductivity** increased since last year, but have remained relatively steady since testing began. The snow melt and spring rains may have brought new substances into the lake, driving these parameters slightly upward.

The **Dissolved Oxygen** concentration remained at a very healthy level to support a healthy fish population. It is important that the lake has sufficient oxygen in the spring to support the fishery through the warm summer months.

The total **Salinity** increased slightly from last year, but is still much lower than when we began testing this parameter. During this harsh winter, it is likely that more road salt was put down, which eventually entered the lake. But the snow melt and spring rains can help flush salts out of the lake before they have a chance to settle in the deep holes of the lake.

The **Total Phosphorus** spiked in 2010 and has decreased since then. The general decrease in phosphorus around the lake is a positive sign for the lake and shows good stewardship by the homeowners around the lake.

Nitrate decreased since last year. All of the concentrations are still within the target range. However, it is important to ensure all residents around the lake are practicing lake-safe practices regarding lawn fertilizers, yard waste, tree leaves, pet droppings, septic systems, and any other possible source of nutrients that might reach the lake.

Water samples were taken on 6/10/2014 at 11:00 AM. Water tests were completed on 6/11/2014 at 7:00 AM. This report describes conditions at the time the samples were taken. The quality of the water was tested only to the parameters listed above.

Completed and Certified by:

Peter Filpansick, B.S.

Date: August 4th, 2014

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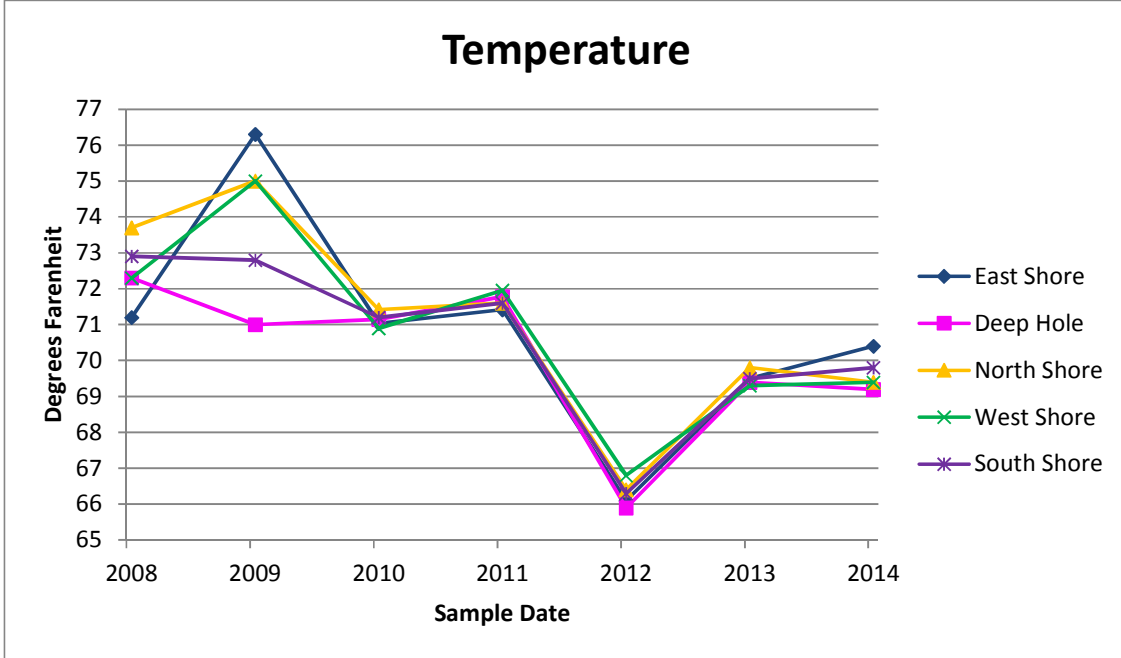




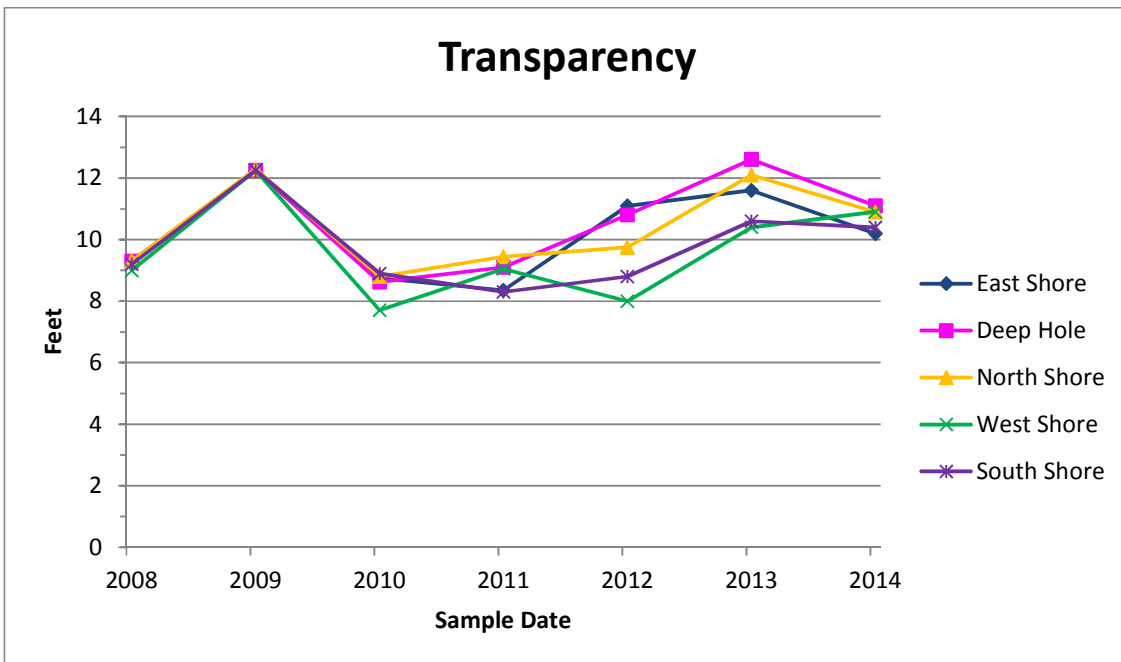
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Temperature



Transparency



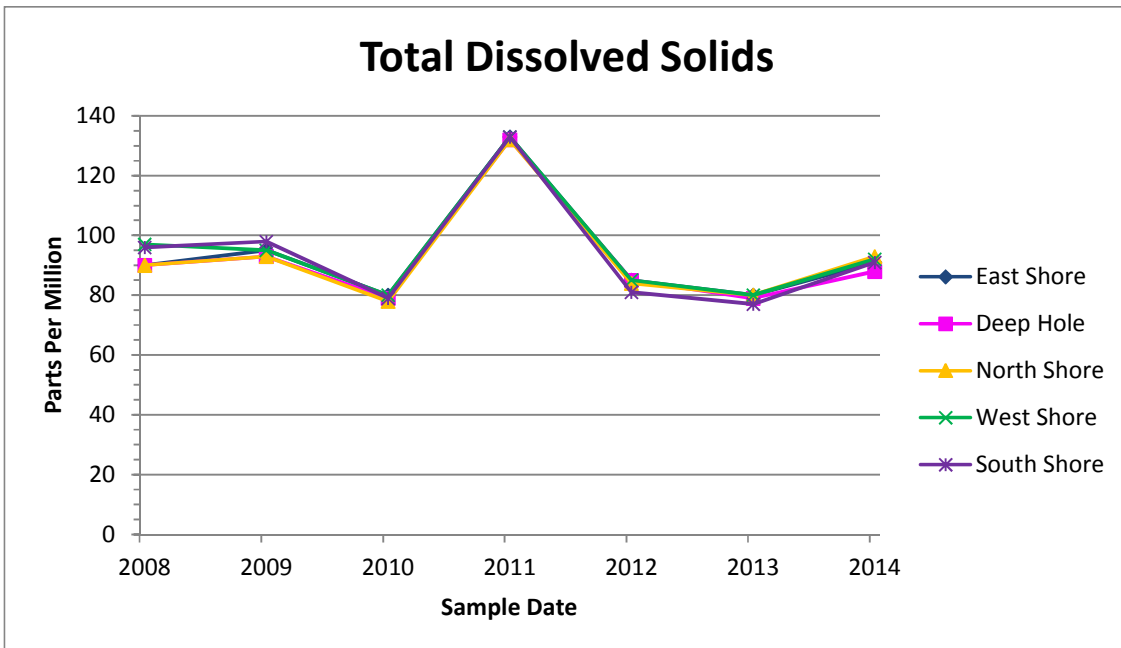
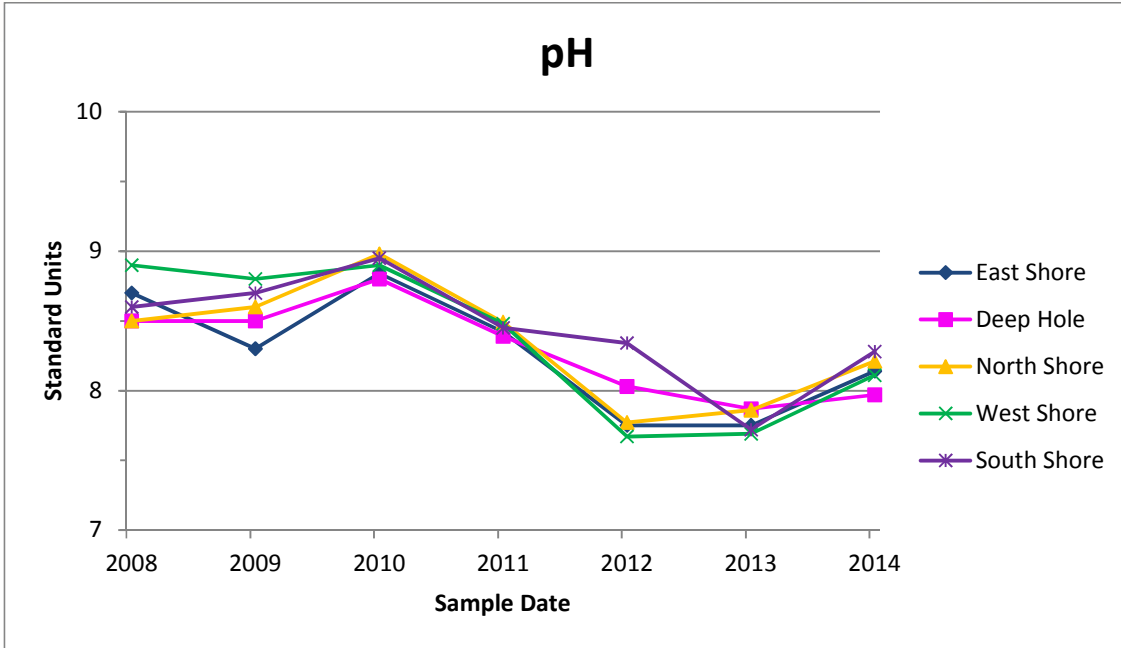
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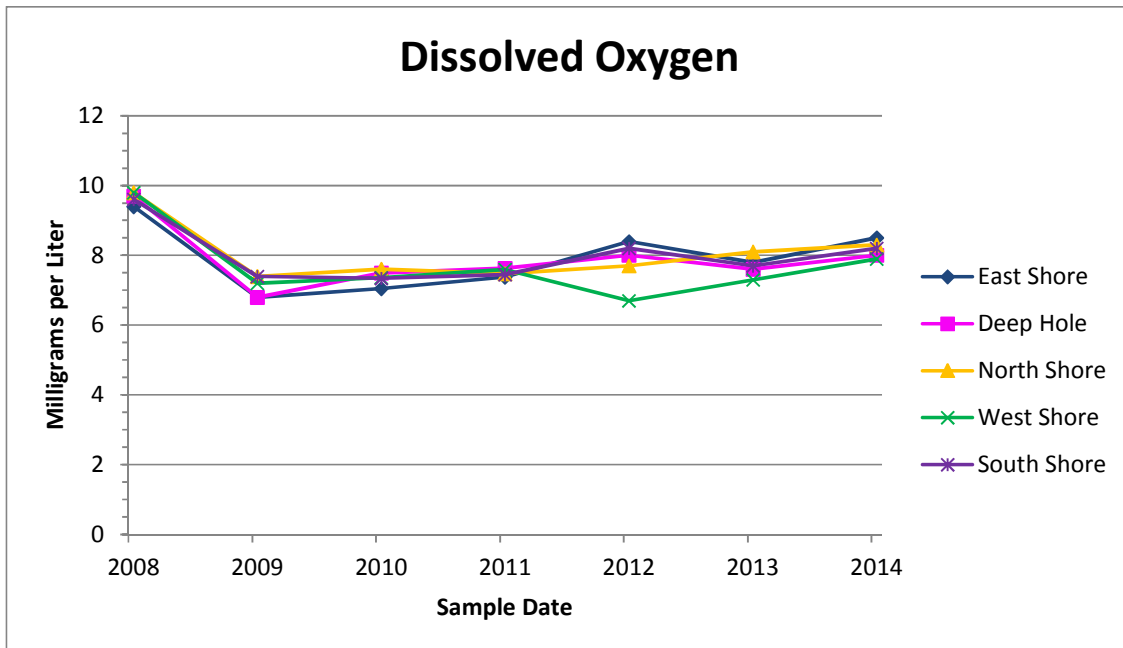
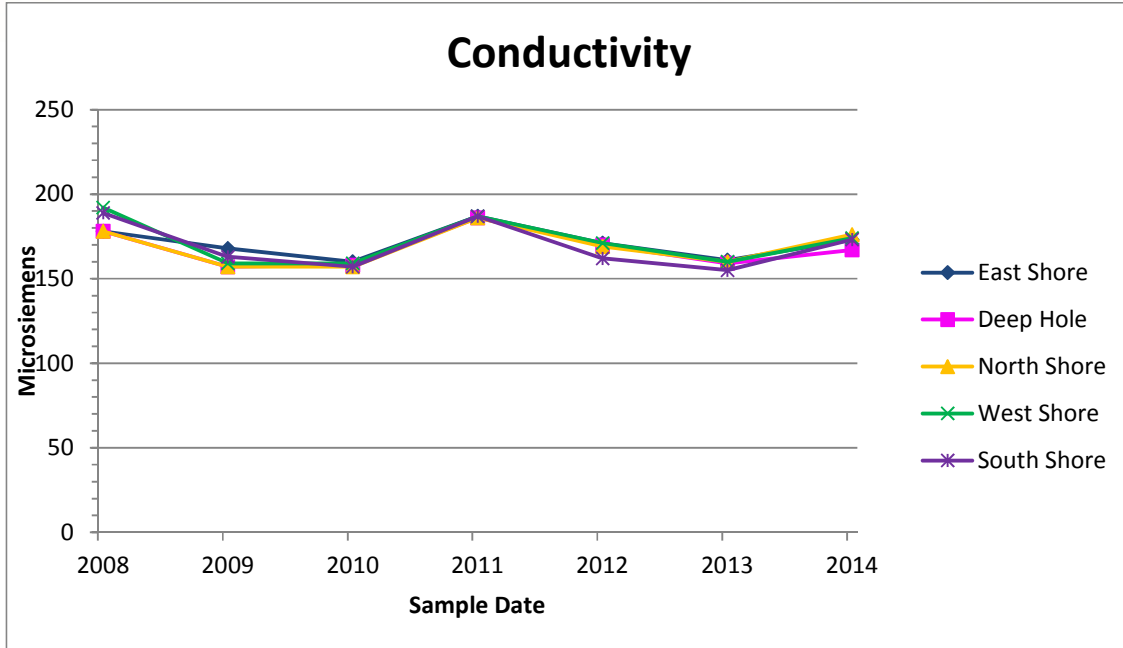
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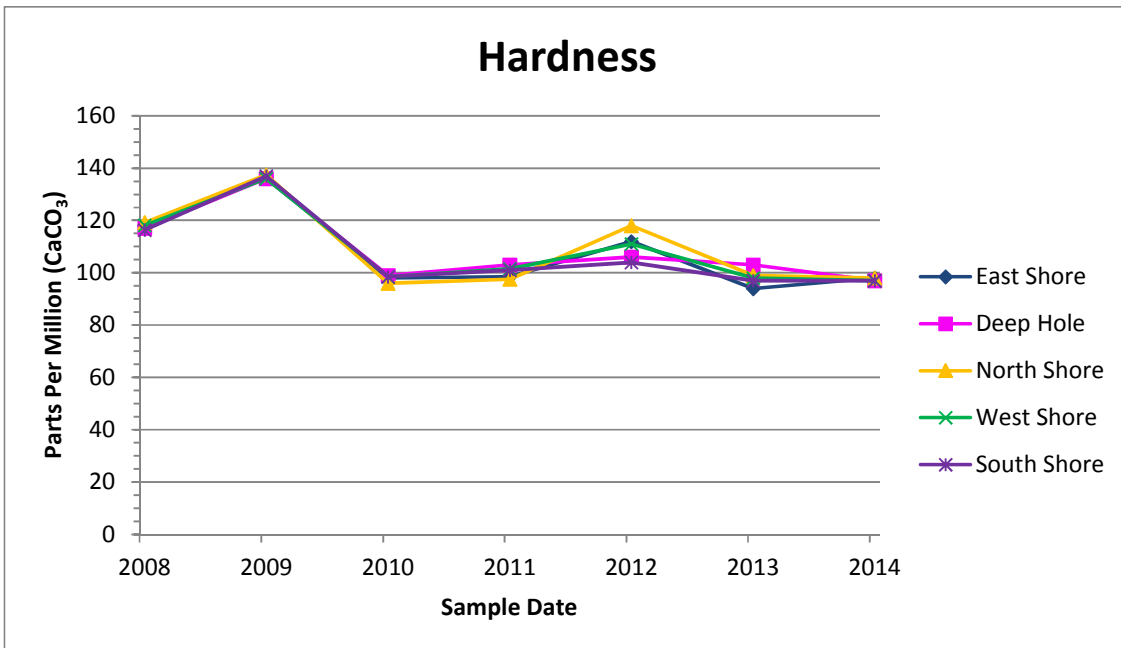
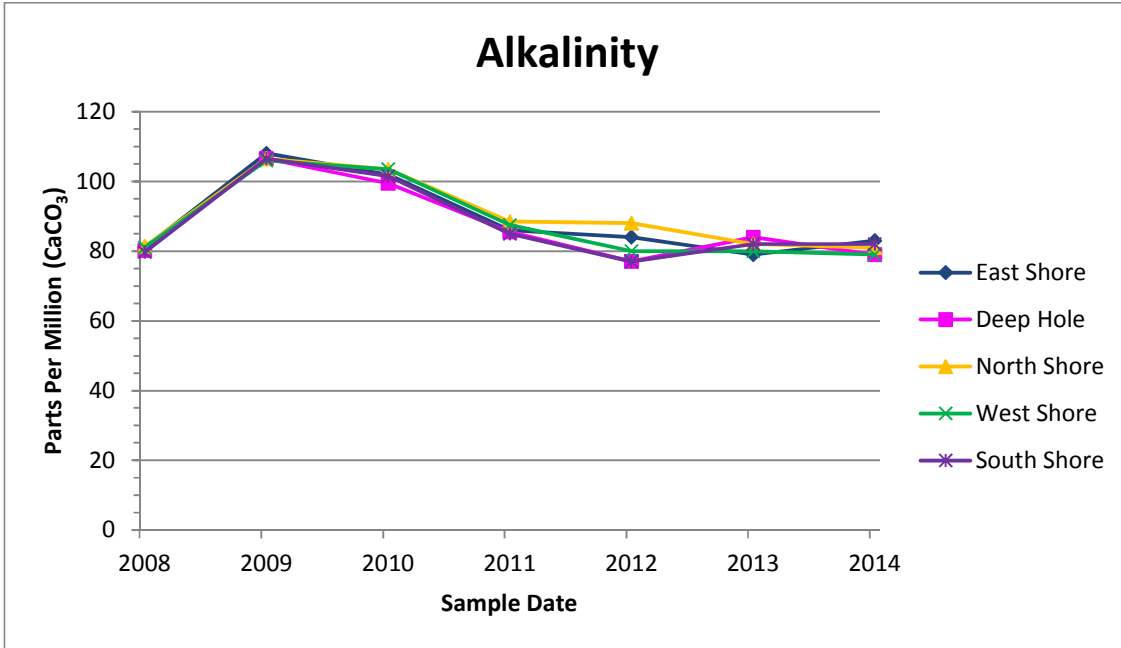
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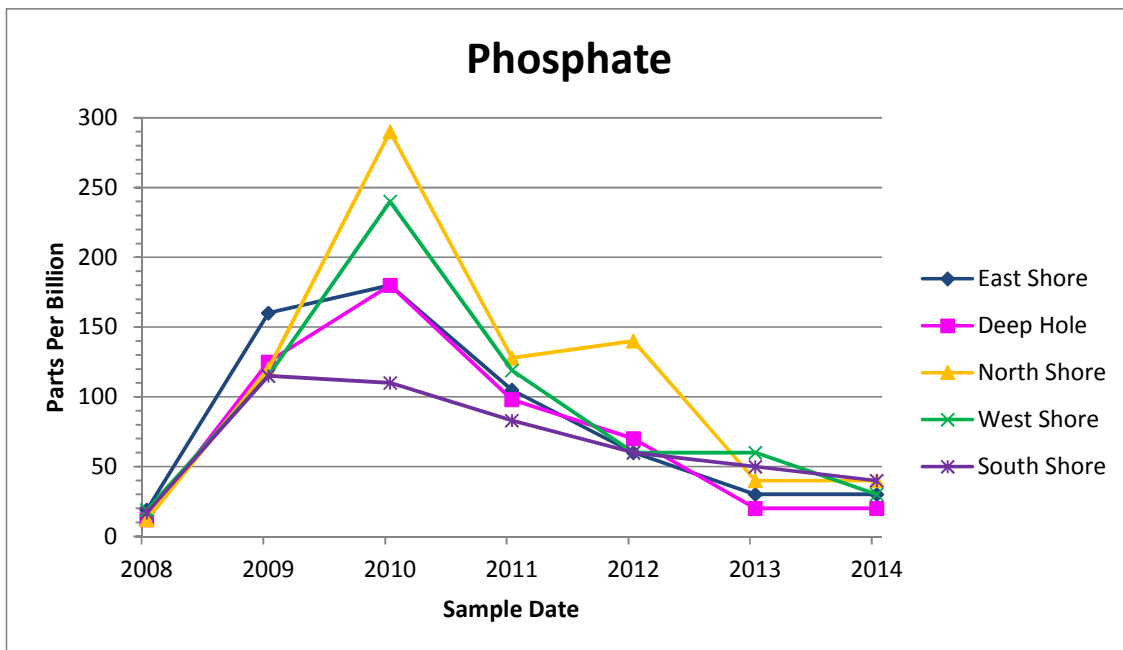
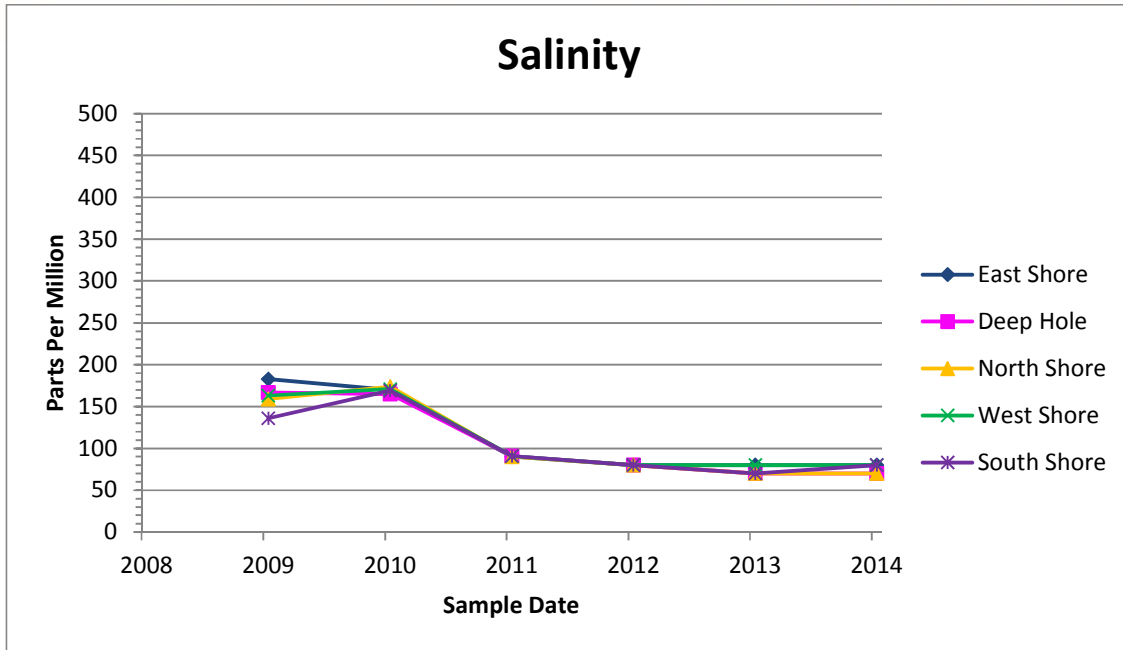
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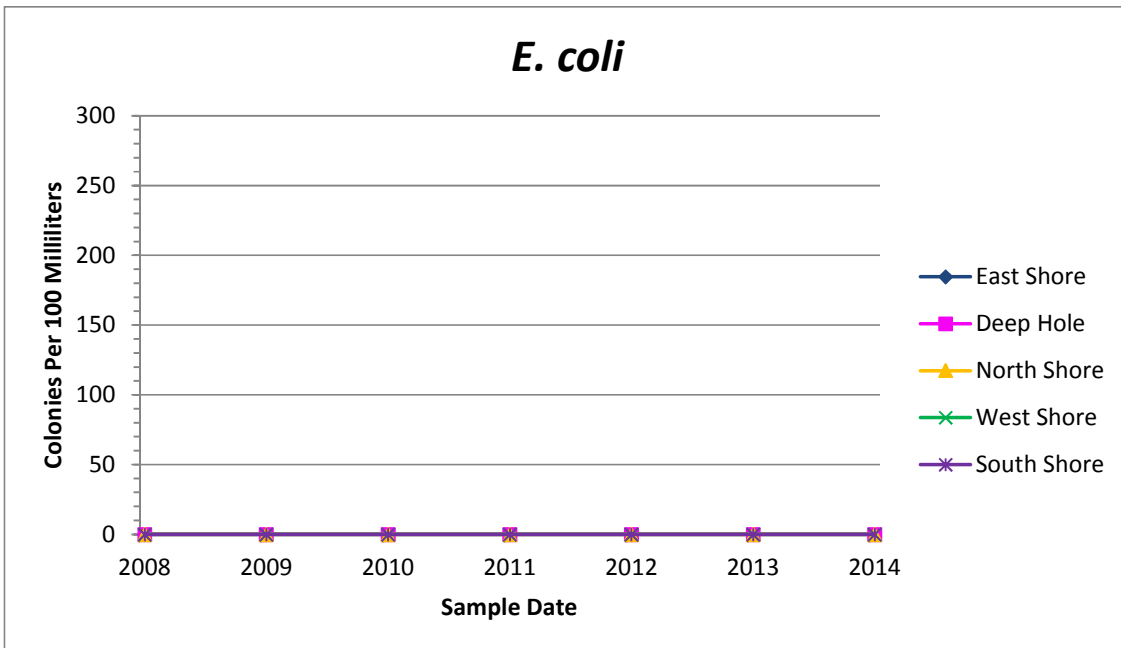
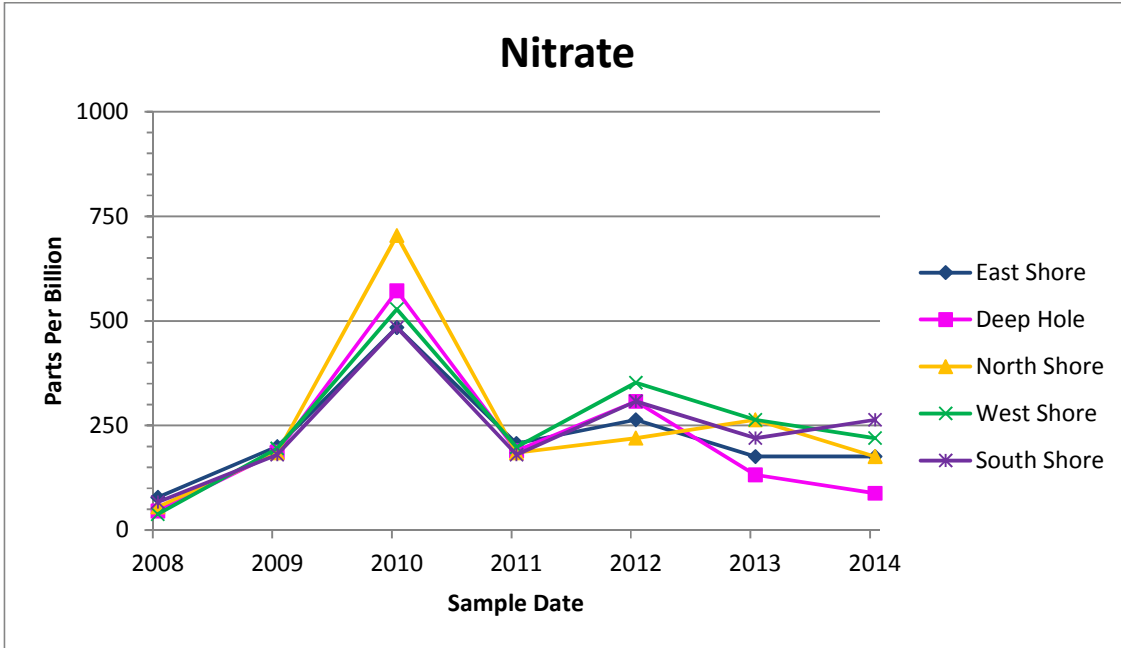
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Analysis Information

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.
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 CaCO ₃ ". 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 CaCO ₃ .
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.
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.
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.
Phosphates:	Phosphate is the form of phosphorous that is most readily available to plants and algae.
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.

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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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