



Testing Date: 6/21/2011

Eight Point Lake

Clare County, Michigan

Water Quality Test Results:

East Shore:

	<u>2011</u>	<u>Target Range</u>
Temperature:	21.9 °C / 71.4 °F	
Transparency:	8.35 Feet	More than 6.5 Feet
pH:	8.42	7.0 – 9.0
TDS:	133 ppm	0-1,000 ppm
Conductivity:	187 µS	0 – 1,500 µS
Dissolved Oxygen:	7.38 mg/L	4.0 – 12.0 mg/L
Alkalinity:	86.0 ppm	0 – 250 ppm
Hardness:	98.5 ppm	100 – 300 ppm
Salinity:	90 ppm	0 – 500 ppm
Total Phosphorus:	105 ppb	0 – 100 ppb
Nitrates:	207 ppb	0 – 1,000 ppb

Deep Hole:

	<u>2011</u>	<u>Target Range</u>
Temperature:	22.1 °C / 71.8 °F	
Transparency:	9.10 Feet	More than 6.5 Feet
pH:	8.39	7.0 – 9.0
TDS:	132 ppm	0-1,000 ppm
Conductivity:	186 µS	0 – 1,500 µS
Dissolved Oxygen:	7.63 mg/L	4.0 – 12.0 mg/L
Alkalinity:	85.5 ppm	0 – 250 ppm
Hardness:	103.0 ppm	100 – 300 ppm
Salinity:	91 ppm	0 – 500 ppm
Total Phosphorus:	98 ppb	0 – 100 ppb
Nitrates:	189 ppb	0 – 1,000 ppb

North Shore:

	<u>2011</u>	<u>Target Range</u>
Temperature:	22.0 °C / 71.6 °F	
Transparency:	9.45 Feet	More than 6.5 Feet
pH:	8.49	7.0 – 9.0
TDS:	132 ppm	0-1,000 ppm
Conductivity:	186 µS	0 – 1,500 µS
Dissolved Oxygen:	7.48 mg/L	4.0 – 12.0 mg/L
Alkalinity:	88.5 ppm	0 – 250 ppm
Hardness:	97.5 ppm	100 – 300 ppm
Salinity:	90 ppm	0 – 500 ppm
Total Phosphorus:	128 ppb	0 – 100 ppb
Nitrates:	185 ppb	0 – 1,000 ppb



**West Shore:**

	<u>2011</u>	<u>Target Range</u>
Temperature:	22.2 °C / 72.0 °F	
Transparency:	9.05 Feet	More than 6.5 Feet
pH:	8.48	7.0 – 9.0
TDS:	133 ppm	0-1,000 ppm
Conductivity:	187 µS	0 – 1,500 µS
Dissolved Oxygen:	7.59 mg/L	4.0 – 12.0 mg/L
Alkalinity:	87.5 ppm	0 – 250 ppm
Hardness:	101.5 ppm	100 – 300 ppm
Salinity:	91 ppm	0 – 500 ppm
Total Phosphorus:	119 ppb	0 – 100 ppb
Nitrates:	198 ppb	0 – 1,000 ppb

South Shore:

	<u>2011</u>	<u>Target Range</u>
Temperature:	22.0 °C / 71.6 °F	
Transparency:	8.30 Feet	More than 6.5 Feet
pH:	8.45	7.0 – 9.0
TDS:	133 ppm	0-1,000 ppm
Conductivity:	187 µS	0 – 1,500 µS
Dissolved Oxygen:	7.45 mg/L	4.0 – 12.0 mg/L
Alkalinity:	85.0 ppm	0 – 250 ppm
Hardness:	101.0 ppm	100 – 300 ppm
Salinity:	91 ppm	0 – 500 ppm
Total Phosphorus:	83 ppb	0 – 100 ppb
Nitrates:	180 ppb	0 – 1,000 ppb

Discussion:

The results of this year's testing indicate that the water within Eight Point Lake remains very healthy. The results show 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.

2011 is the fourth 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** showed no significant changes since 2008. In 2010 and 2011, the surface temperature was more consistent across the five sampling sites, showing the lake turned over and mixed more evenly throughout its entirety.

Transparency decreased in 2010 and 2011, most likely due to the inclement weather (heavy winds and rain) during the sampling events. Despite the decreased clarity, transparency was still very good for a heavily developed inland lake and was typical of a *mesotrophic lake*.

pH changed very little over the past four years and showed very little variation between sampling sites. The pH was at a normal level for an inland lake.





The **Total Dissolved Solids** and **Conductivity** were relatively steady in previous years but showed a slight increase in 2011. This was most likely due to the large amount of rainfall during the spring and early summer. As runoff converges and enters the lake it brings many molecules that can affect these two parameters.

The **Dissolved Oxygen** concentration remained at a very healthy level to support a healthy fish population. It is important that the water is well-oxygenated in the early summer so there is sufficient oxygen to last through the summer when the surface temperature rises and the lake cannot hold as much oxygen. The historical data shows that the dissolved oxygen spiked in 2008 and the concentration has steadied in the past three years.

The **Alkalinity** and **Hardness** both increased slightly in 2009 and continued to decrease since then to near the 2008 levels. The increase in 2009 of both parameters was most likely due to an influx of calcium carbonate (limestone). The decrease can be due to dilution, outflow, neutralization, or consumption. Calcium carbonate is the main component of shelled aquatic organisms such as snails and zebra mussels.

The **Salinity** also decreased in 2011, which could be due to the same reasons mentioned above. Along with sodium and chloride, calcium and carbonates also contribute to the total salinity. Therefore, the decrease in salinity is linked to the decrease in alkalinity and hardness. The decrease in these parameters in spite of increased ionic molecules (TDS, conductivity) indicates that runoff was not carrying a significant concentration of sodium, calcium, chloride, or carbonates. It also indicates that the 2009 source of calcium carbonate is no longer a significant source for the lake.

The **Total Phosphorus** spiked in 2010, but decreased in 2011 to an acceptable level. The spike in 2010 was most likely due to a reduced amount of algae and plant growth, which left more nutrients dissolved in the water column. The decrease in 2011 may be a result of increased plant growth, dilution, or outflow.

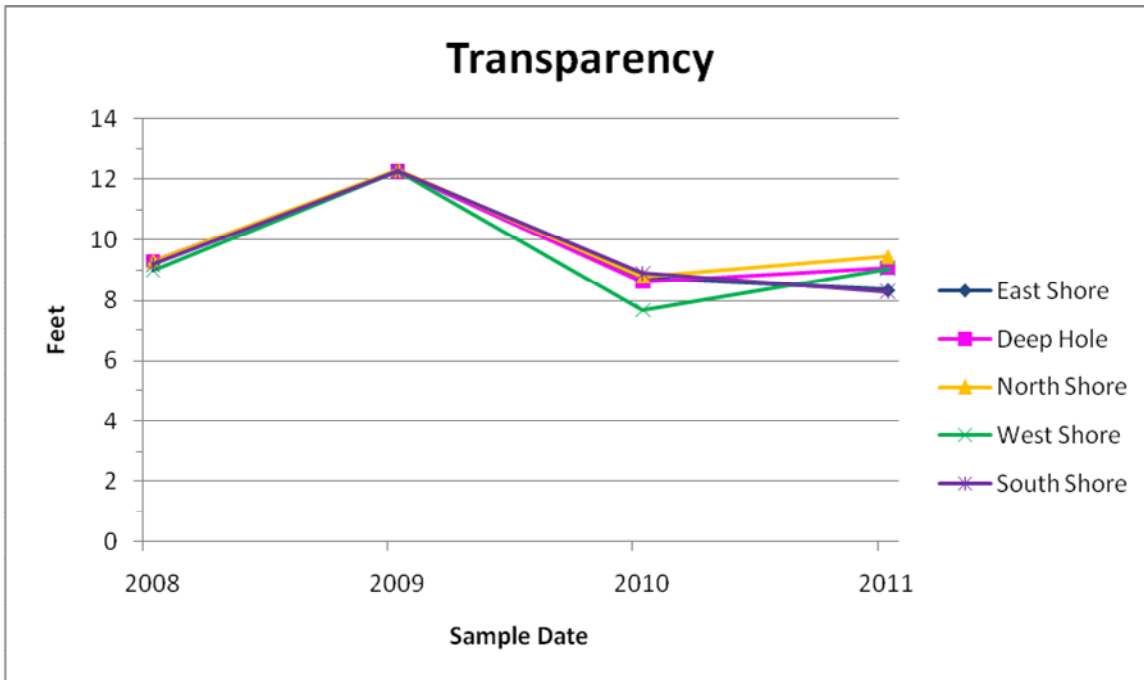
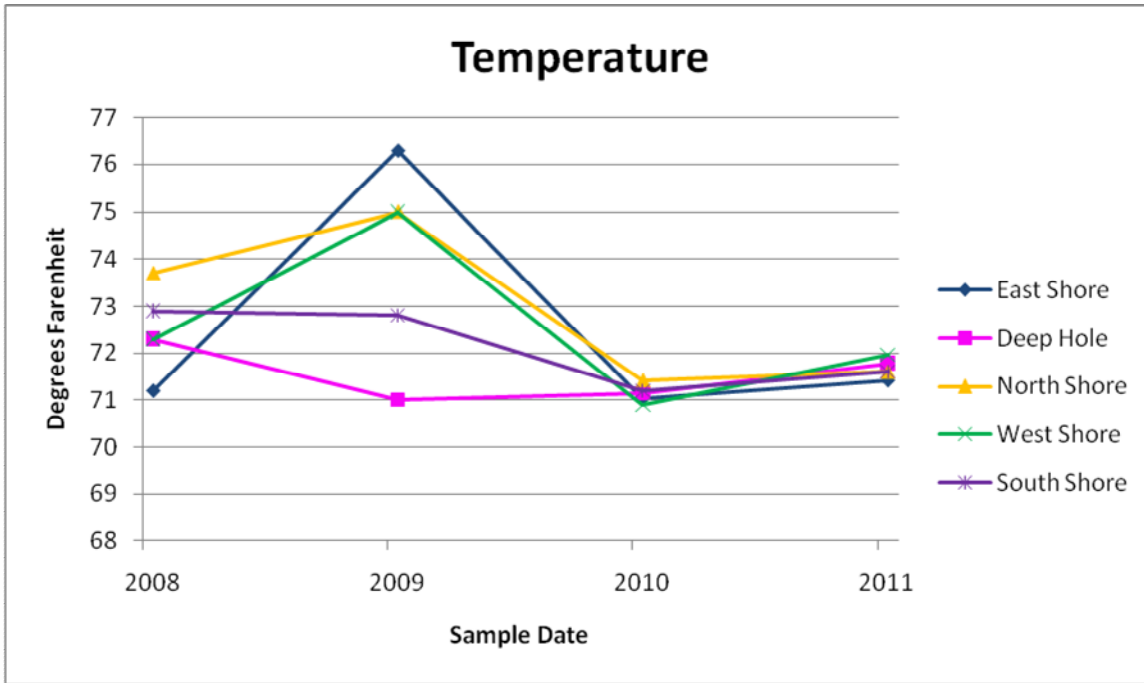
Nitrate showed a similar pattern to phosphorus, but in 2010 the concentrations did not exceed the acceptable level. In 2011 the nitrates returned to the expected level. Both nutrients were still not as low as in 2008, which may be the result of a small upward trend.

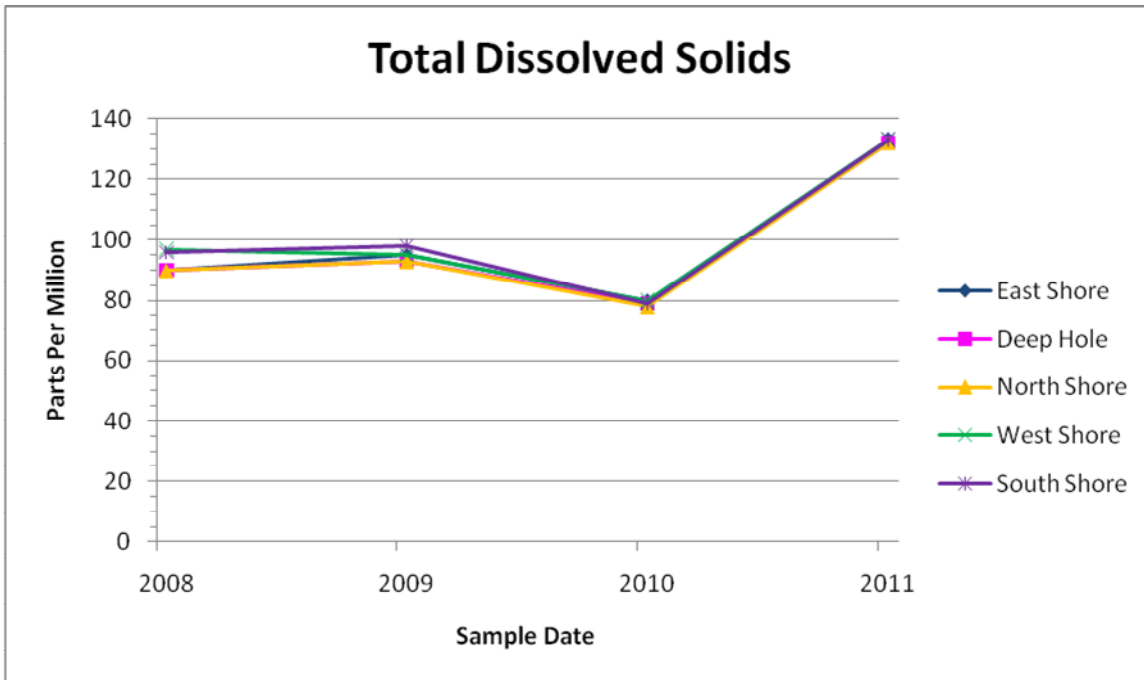
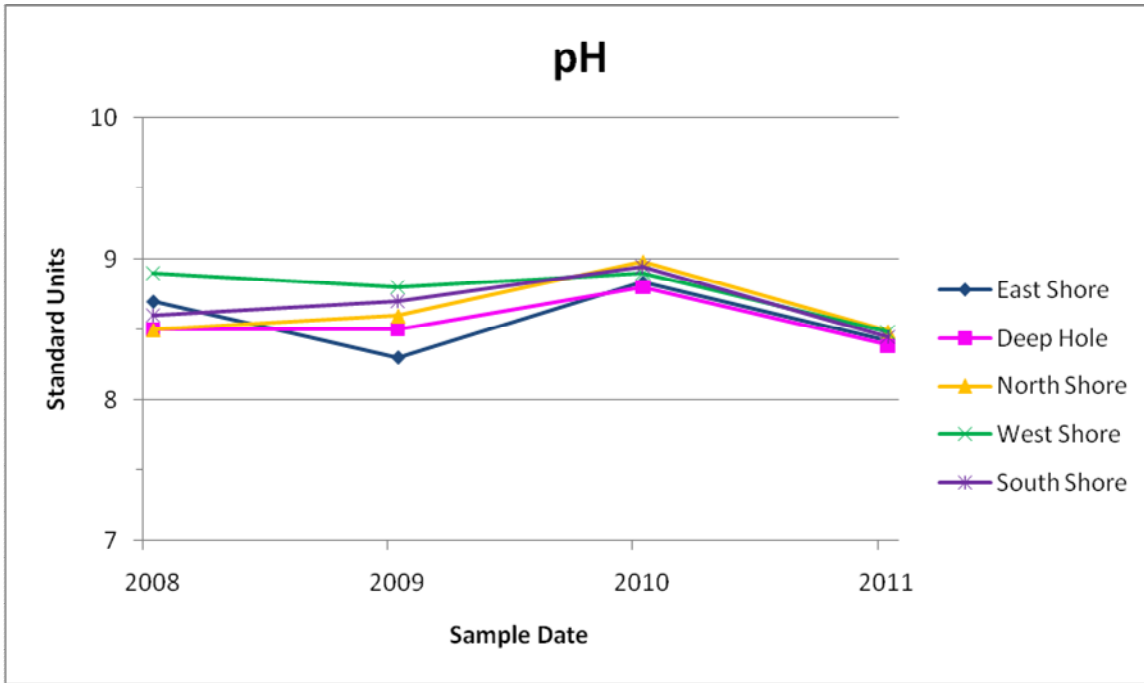
Water samples were taken on 6/21/2011 at 11:30 AM. Water tests were completed on 6/22/2011 at 7:00 AM. This report describes conditions at the time the samples were taken. The quality of the water was tested only to the parameters listed above.

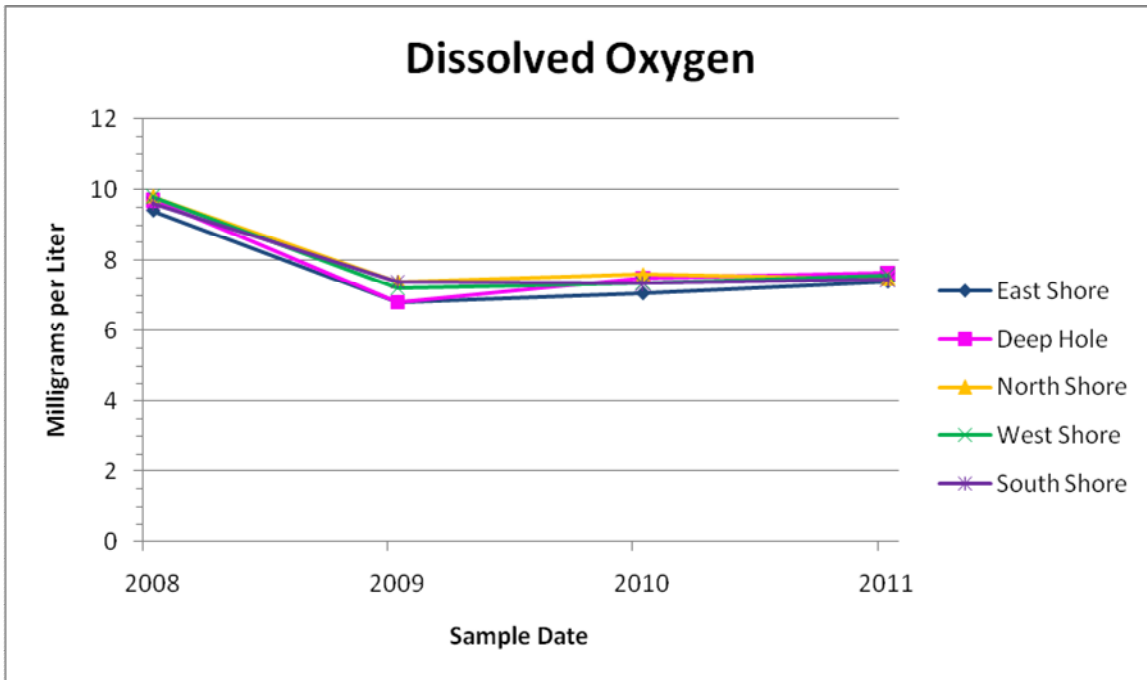
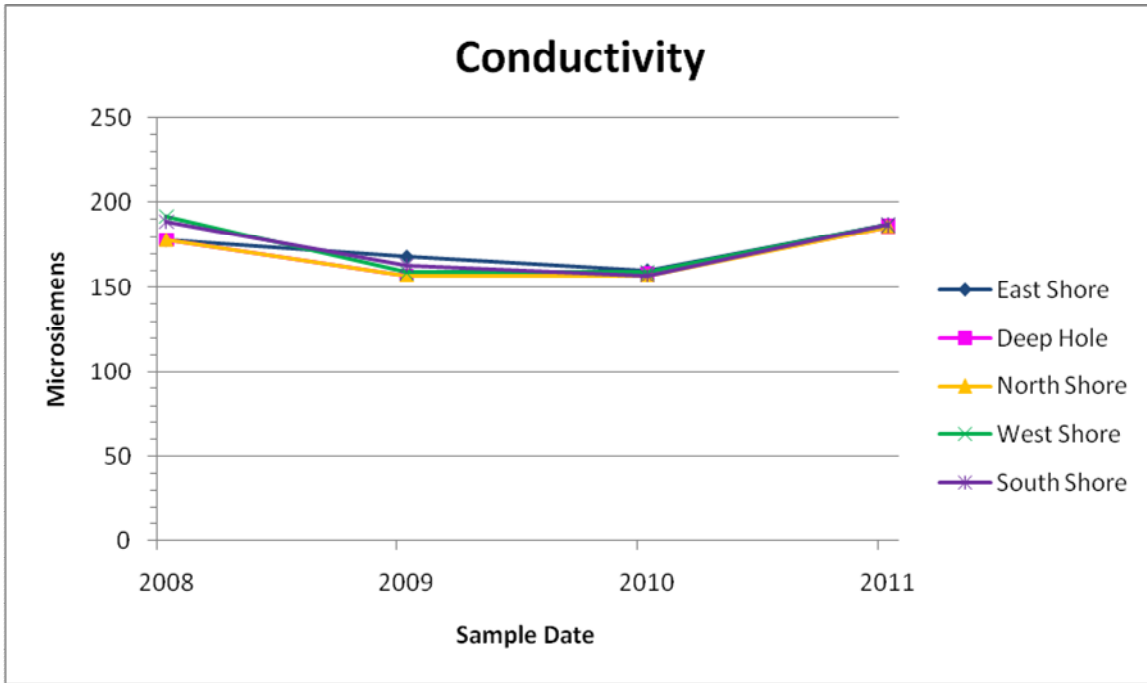
Completed and Certified by: _____ Date: July 7th, 2011
Peter Filpansick, B.S.

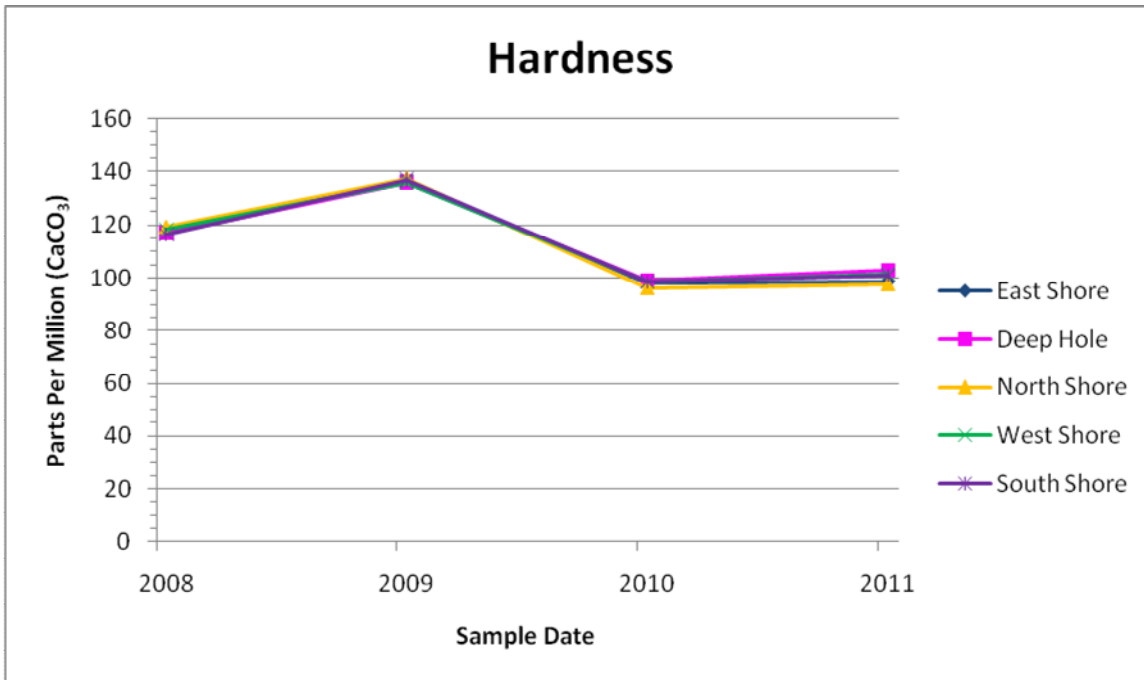
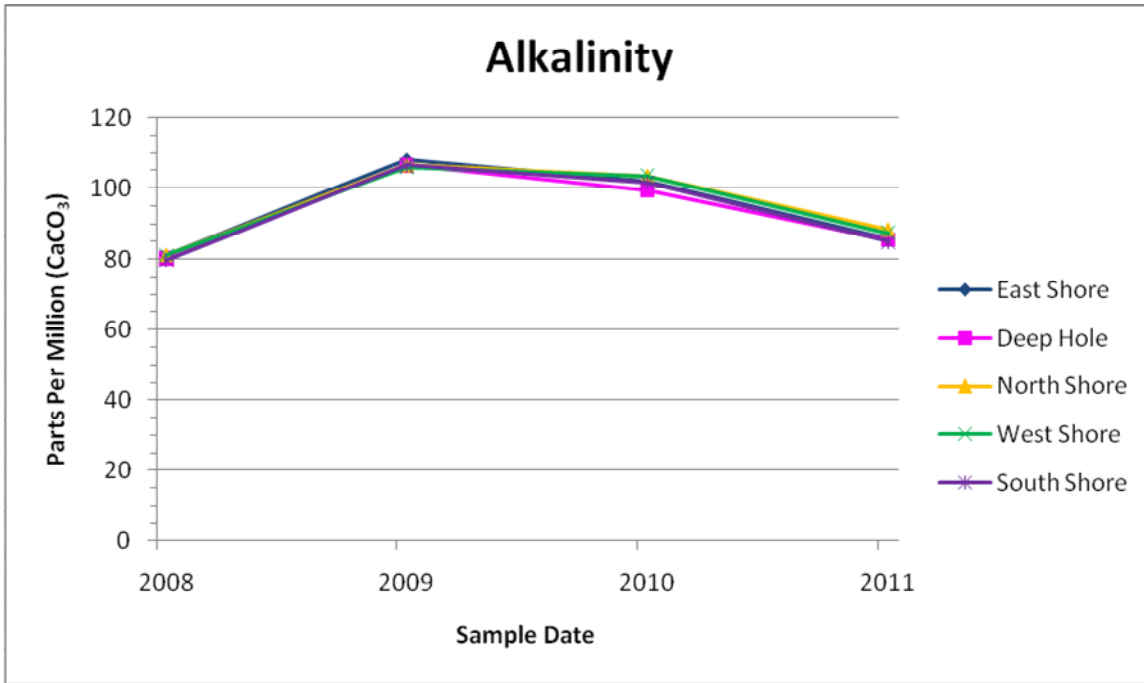
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Paul Dominick, B.A.

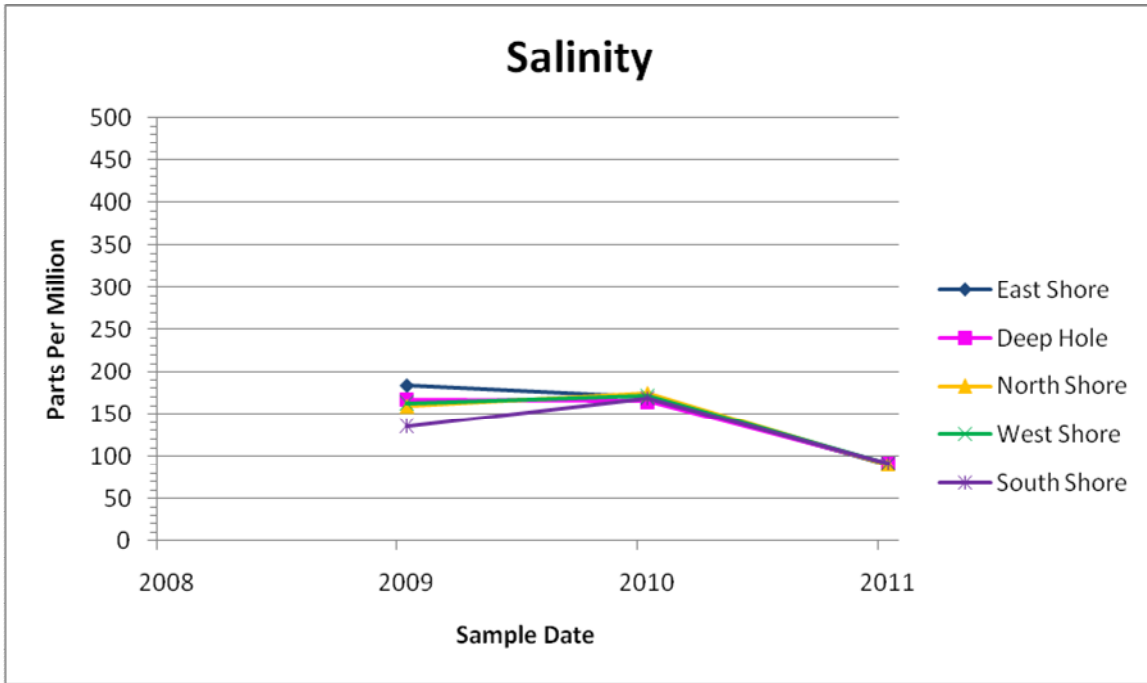


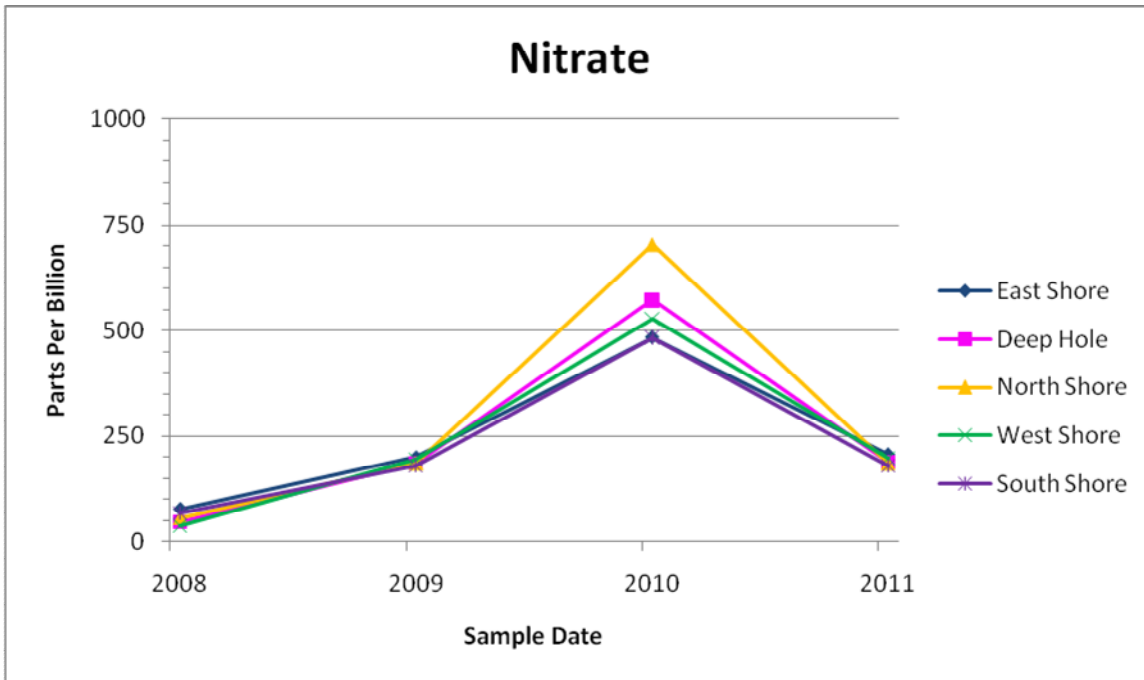
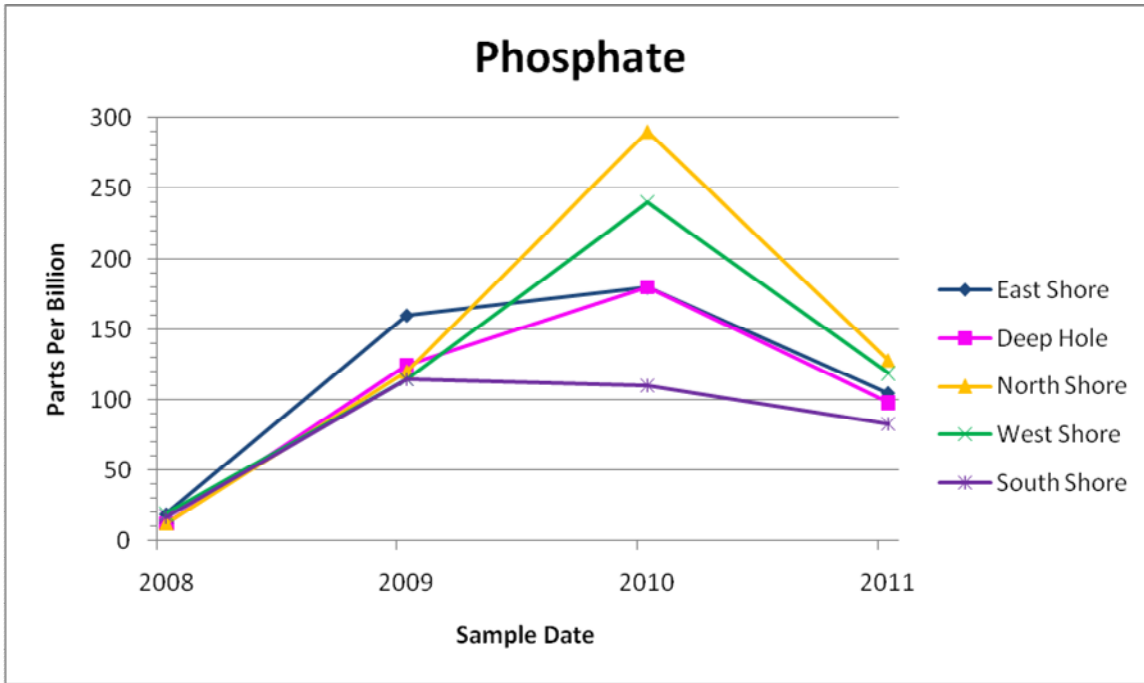


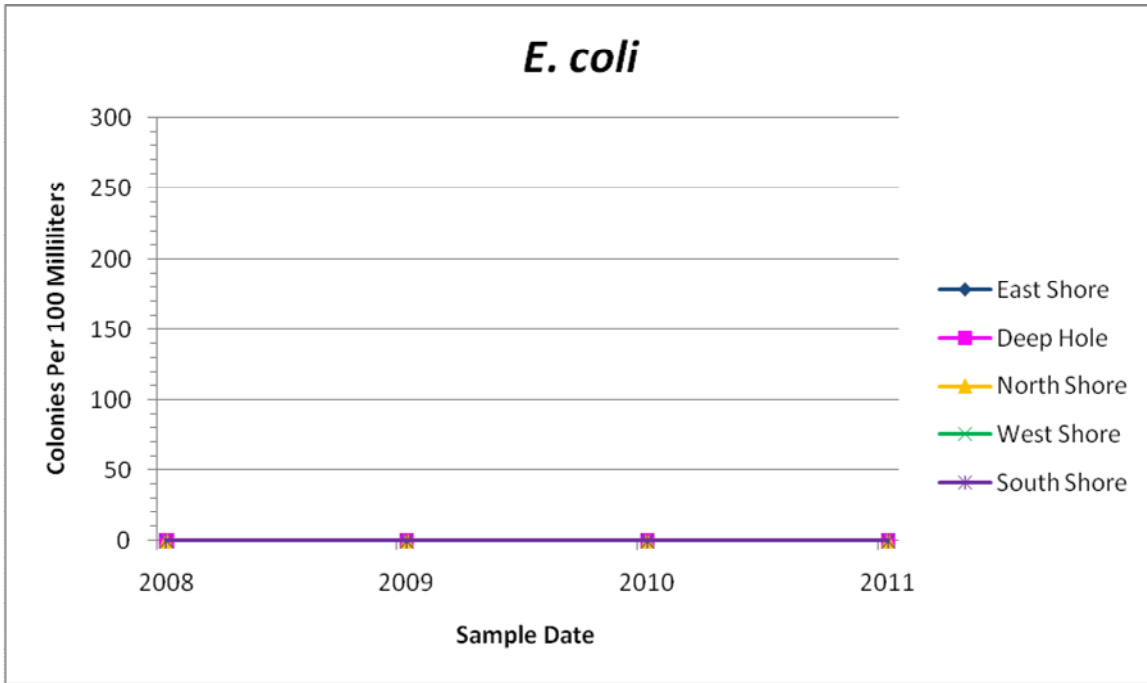








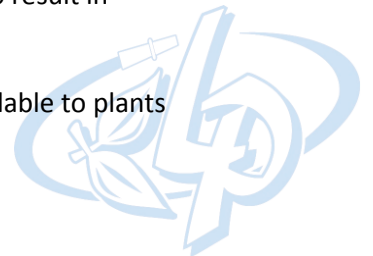






Analysis Information

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.

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.

