

## Student Scientists Examine Nitrate Levels in the Great Lakes



**Above:** Dhareus Franks braving 20mph wind gusts and frigid temperatures to collect water samples from Lake Ontario at Fort Niagara

The Great Lakes- Huron, Erie, Michigan, Superior, and Ontario- represent 21% of the world's surface fresh water. People, plants and animals depend on access to this water for their daily survival. The Great Lakes are part of a large ecosystem that stretches from the Atlantic Ocean to the Saint Lawrence River to the Mississippi River Basin. Protecting it from human pollution and invasive species is critical.

Ecotek student scientists Dhareus Franks, a junior at Communications and Media Arts High School (CMA) and Damon Rogers, a junior at Detroit Edison Early College of Excellence, are studying the variability of nitrate levels found in the upper and lower Great Lakes. Nitrogen is a gas and in order for it to be accessible to plants and other organisms it must be converted into water soluble forms such as nitrates, nitrites and ammonium during the nitrogen cycle.

Nitrate levels in water are impacted by industrial wastewater, detergents, septic systems, and fertilizer runoff. Elevated nitrate levels can cause an increase in plant growth which can decrease oxygen levels resulting in the decline in the populations of oxygen dependent organisms. While conducting their research Damon and Dhareus have been able to better understand how human activity can impact nitrate levels. The data gathered over the past few months indicates that Lake Erie (a lower lake), which is bordered by cities such as Cleveland, Ohio and Toledo, Ohio has a higher nitrate concentration than those found in Lake Superior (an upper lake).

To validate their work, on November 23, 2013 Damon and Dhareus traveled to the University of Buffalo. While there they met with Dr Joe Atkinson, Professor of Civil, Structural and Environmental Engineering to discuss best practices for evaluating the health of the Great Lakes. They also learned about how the Earth's rotation and gravity can affect the circulation of water and transport of chemical species in the Great Lakes



Damon Rogers collecting sandstone and granite rock samples at the Ecotek Lab survey site near Pictured Rock National Lake Shore- Lake Superior



Dr. Joe Atkinson at the University of Buffalo explaining the fluid mechanics of the Niagara River and Lake Ontario to Dhareus Franks, Damon Rogers and Chandler Harris



Dhareus Franks in Ecotek Lab conducting nitrate concentration test on water samples taken from Lake Superior and Lake Erie

### About the Ecotek Science Program

Ecotek is a science research lab program for young inventors and researchers in grades 5 thru 12. Student scientists work on projects aligned with the issues being addressed by world leaders at the United Nations. To learn more about Ecotek Lab go to <http://www.ecotek-us.com>