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Developing a Numerical Water Quality Model for Brewster Lake

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The purpose of this research study was to develop an advanced two-dimensional "process-oriented" numerical water quality model for Brewster Lake that incorporates the physical, chemical, and biological interactions that occur within the lake. The study included measuring and obtaining the basic physical, chemical, and biological characteristics of the lake to develop the model and appropriate initial and boundary conditions. Two rounds of measurements, one in the beginning of June and one at the end of July 2013, of the physical and chemical variables were conducted and were used to develop and calibrate the model. A hydrodynamic analysis of the lake's watershed was completed using a mass balance approach over water. A set of "process-oriented" water quality mathematical equations that incorporates the water chemical and biological interactions was developed. The finite element solution will result in predicted values for the lake's water quality parameters as a function of time and varying environmental conditions. It is anticipated that the results of this computer modeling will aid the Pierce Cedar Creek Institute staff in decision-making related to the management and planning of Brewster Lake and its watershed.

Information about the Authors:
Kasey Marley has always had an interest in environmental engineering since she job shadowed with the company Greeley and Hansen during her junior year of high school. She is a civil engineering major. In the future, she plans on obtaining a design and consulting position within the environmental engineering discipline. Sarah Brunsvold is currently a senior civil engineering major. She worked on a different research project last school year, and was excited to do more research over the summer having to do with environmental engineering. She will be attending graduate school next fall to specialize in environmental engineering and hopefully participate in more research dealing with sustainable engineering practices.

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