

1035-B1-1706      **Gregory H. Graves\*** ([greg.graves@usma.edu](mailto:greg.graves@usma.edu)), U.S. Military Academy, MADN-MATH, 646 Swift Road, West Point, NY 10996, and **Lance Edling**. *Helping Calculus Students Predict the Health of a Natural Water System.*

The presence of dissolved oxygen (oxygen molecules that are dissolved in water) is necessary for healthy lakes and rivers. The absence of dissolved oxygen in water is a sign of possible pollution. Bacteria which consume waste also utilize oxygen which may result in an oxygen deficit in the water. When dissolved oxygen falls below a certain level, clean-water organisms such as fish die off and pollution tolerant organisms take over in the ecosystem. Dissolved oxygen is returned to natural water systems through the process of reaeration.

This presentation discusses an interdisciplinary project which introduces first-year calculus students to the concept of dissolved oxygen in natural water systems and the impact that pollution has on the wildlife population. Developed by faculty in mathematics and environmental engineering, the project provides an explanation of the behavior of dissolved oxygen levels after pollutants are added to a natural water system. A mathematical model for the oxygen deficit is introduced, and students must apply calculus concepts to determine if and how the change in the oxygen level impacts a specific species of fish native to the water system. (Received September 20, 2007)