



## USDA-CSREES 2005 National Water Quality Conference

### Nutrient Limitation of Algae at Lake Eucha, Oklahoma

**Abstract:** Lake Eucha has come into sharp legal, political, and environmental focus because of a settlement agreement between the municipal drinking water supply (plaintiffs) and several poultry integrators and one municipal wastewater treatment plant (defendants).

**Objectives:** We determined the limiting nutrient (nitrogen or phosphorus) of phytoplankton and periphyton in Lake Eucha, Oklahoma.

**Methods:** We used floating enclosures to assess phytoplankton nutrient limitation and passive diffusion periphytometers to assess periphyton nutrient limitation.

**Partnerships:** This project involves the USDA - ARS and the Biological Engineering Department at the University of Arkansas.

**Resources:** This project was funded through the USDA CSREES Nutrient Science for Improved Watershed Management Program RFP.

**Integration of Research, Teaching, and Extension:** this research will be integrated into the larger scale project to develop a nutrient management decision support system for this basin. The decision support systems will involve stakeholder deliberation and feedback mechanisms where this information will be effectively communicated to targeted policy and stakeholder groups.

**Results:** Initial results from this study showed that nitrogen was limiting phytoplankton and periphyton production in July and September 2003. After fall turnover (November 2003), it appeared that phosphorus was the limiting nutrient of phytoplankton whereas neither nitrogen nor phosphorus stimulated significant periphyton growth. Nutrient additions in February 2004 did not increase algal growth. However, in May and July 2004 phytoplankton and periphyton growth appeared to be phosphorus limited, contrasting the previous summer. Several summer storm events likely contributed to increased advective nutrient supply and shifted summer nutrient limitation to phosphorus as supposed to nitrogen.

**Author:** Brian E. Haggard