

Spectral Analyses of Lake Eutrophication through a Multi-Institutional Partnership

Spectro-photometric analyses of the seston reflectance of water samples from multiple locations on Lake Martin was initiated coincident with an ongoing lake water quality study. The Auburn University Fisheries Department is conducting a water quality study of the lake and its embayments for Alabama Power Company (APCo) in partnership with the Alabama Water Watch citizen volunteer monitor group, Lake Watch of Lake Martin (LWLM). The goal of this study is to characterize the water quality status of several mainstem and embayment sites during the 2009 growing season (April-October) for submission to FERC for consideration in the process of relicensing of Martin Dam. Scientists working on the AU Water Resource Center-funded Tallapoosa Watershed Project communicated with APCo and LWLM to investigate the possibility of conducting coincident remote sensing measurements alongside the ongoing water quality study.

Benefits of the partnership include significantly lower water quality sampling cost, strong stakeholder buy-in because of active participation in planning and conducting research, and leveraging data collection to complement multiple research projects. Preliminary results show strong correlations between lake trophic state indicators (chlorophyll a, total phosphorus, and Secchi disk visibility) and measurements of the planktonic algal component of lake seston using low-cost spectrophotometers, Landsat satellite reflectance values, and digital camera color metrics. . Researchers plan to refine predictive regression models between hyperspectral readings and lake chlorophyll a that were developed in an earlier USDA-funded project (see <https://fp.auburn.edu/twpOld/Documents/TWP-Report-2006-07.pdf>). Through correlations between in-situ water quality measurements and same-day Landsat satellite imagery, researchers plan to map water quality conditions throughout the entire lake. Lastly, through correlations between in-situ water quality measurements and color coordinates extracted from digital photographs of lake waters, researchers will explore the development of a low-tech tool to aid citizen monitors in determining lake trophic state.

Presenter:

Luke Marzen

marzelj@auburn.edu

Auburn University Department of Geology and Geography

Co-authors:

Luke Marzen¹, John Glasier², Bill Deutsch³, Wendy Seesock³, Eric Reutebuch³, and Dick Bronson²

¹Auburn University Department of Geology and Geography

²Lake Watch of Lake Martin, Alexander City

³Department of Fisheries and Allied Aquacultures, Auburn University