RIVERS TO RESERVOIRS: HYDROLOGICAL DRIVERS CONTROL RESERVOIR FUNCTION BY AFFECTING SUBMERGED AQUATIC VEGETATION COVERAGE

Alan Covich[1], Stephen D. Shivers[1,2], Stephen W. Golladay[2], Matthew N. Waters[4], and Susan B. Wilde[3]

AFFILIATION: [1]UGA Odum School of Ecology, [2]Joseph W. Jones Ecological Research Center, [3]UGA Warnell School of Forestry & Natural Resources, [4]Auburn University, Dept. of Crop, Soil, and Environmental Sciences
REFERENCE: *Proceedings of the 2017 Georgia Water Resources Conference*, held April 19-20, 2007, at the University of Georgia

Freshwater ecosystems, including lakes and reservoirs, are important sites for biogeochemical cycling on a regional scale. Reservoirs affect nutrient storage and transformation as water moves through a watershed from the land to the sea. Reservoirs can also facilitate the spread of invasive species because of heavy anthropogenic use. Invasive species, particularly submerged aquatic vegetation (SAV) such as Hydrilla verticillata, affect nutrient transformation and storage within a reservoir, which can affect downstream water quality. The goal of this study was to investigate how hydrology affected SAV coverage and how changes in coverage affected in-reservoir nutrient processing. To assess these effects, annual vegetation surveys were completed during the peak of the SAV growing season, and a comprehensive water quality monitoring program quantified nutrient concentrations in the inflows and outflows. Greater areal precipitation in the spring of 2013 and 2014 caused increased river flow (208 m^3/s and 192 m^3/s in 2013 and 2014, respectively compared to 74 m^3/s in 2012), which created turbid conditions within the lake. Consequently, SAV decreased from 35.5 km^2 in 2012 to 18.3 km^2 in 2014. Increased NO_3-N concentrations were also observed as SAV coverage declined. These results indicate that hydrological variation was driving changes in SAV coverage, and that changes in coverage altered nutrient processing at the reservoir scale. Water resource and invasive species management plans should consider effects of SAV on in-reservoir processing to ensure downstream water quality is maintained.

Program reference: 6.1.4