

## **The Potential Impact of Water Reallocation on Retention and Algal Biomass in Weiss Lake, Alabama**

Water demand has increased in North Georgia and prompted officials in 2001 to propose a water reallocation plan that would permit two Georgia reservoirs upstream from Weiss Lake, Alabama to increase water withdrawals nearly three fold. A severe drought in 2006-2007 once again prompted considerations of water reallocation. From the plan proposed in 2001, hydrologic modeling predicted lower flows in the Coosa River, the primary tributary of Weiss Lake, during average to below average flows (exceedences from 50 to 90%). Consequently, I predicted retention (reservoir volume/discharge) would increase in Weiss Lake under reallocation. Using data from 1989 to 2000 as a baseline, I estimated the effect of longer retention on algal biomass as measured by chlorophyll a concentrations (CHLA). CHLA measured during the growing season (April to October) was positively correlated ( $P < 0.01$ ) to retention in both upstream and downstream reservoir regions of Weiss Lake and retention accounted for 24 to 28% of the variation in CHLA. Under the reallocation scheme, increased retention would cause an increase in CHLA of 8 to 15% compared to historic conditions. If average retention should increase 10 days or more with water reallocation, I estimated CHLA could increase about 20 to 30% under a “worst-case scenario”. If longer retention does occur in Weiss Lake with water reallocation, a greater frequency of hypereutrophic conditions is expected. Water withdrawals from the upper Coosa River basin during the late fall and winter would have little effect on algal concentrations in Weiss Lake, but demand for water in Georgia is lower during this time. Construction of smaller water storage reservoirs in Georgia that can capture discharge during late fall and winter is an alternative to water withdrawals from the Coosa River basin during the summer months when Weiss Lake is more prone to algal blooms.

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