DEVELOPMENT OF AN INTEGRATED WATERSHED AND LAKE MODEL SYSTEM TO EVALUATE NUTRIENT LOADS IN THE UPPER COOSA RIVER BASIN

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Abstract. In 2006, Tetra Tech was contracted by the Georgia Environmental Protection Division (GAEPD) to develop watershed and lake models to evaluate nutrient loadings for Total Maximum Daily Loads (TMDLs) for chlorophyll a impairments in Carters and Allatoona Lake. These models were later incorporated into the Georgia Comprehensive State-Wide Water Management Plan (GSWP). In 2008, the Environmental Protection Agency (EPA) released a draft TMDL for chlorophyll a impairments in Weiss Lake, and the State of Georgia developed state-line criteria for total phosphorus in the Coosa and Chattooga Rivers to meet the TMDL. The GAEPD utilized the Coosa model Tetra Tech developed for the GSWP to evaluate nutrient loads in the basin.

To develop the Upper Coosa River Basin models for the TMDLs and GSWP, Tetra Tech created an integrated modeling system that consisted of three watershed models and two lake models. The watershed models utilized Loading Simulation Program C++ (LSPC), which simulates the watershed flows and nutrient loadings. In the Carters and Allatoona Lake watershed models, these flows and loadings were linked to the downstream lake models. The lake models utilized the Environmental Fluid Dynamics Code (EFDC) to simulate the lake hydrodynamics and water quality. The Carters and Allatoona EFDC lake models were then linked to the Upper Coosa watershed model. These linked models allowed the GAEPD to evaluate and quantify nutrient loadings in the Upper Coosa River Basin watersheds for variety of scenarios.