

# Agricultural Chemicals in Surface Waters and Sediments from the Upper Conasauga River

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**Abstract.** Surface waters and sediments were collected from the upper Conasauga River in Georgia and Tennessee and analyzed for agricultural chemicals (nutrients, glyphosate, hormones, metals) that may be responsible for fish and mussel declines over the past decade. Surface-water samples were collected from the mainstem, major tributaries, and farm tributaries after major rain events. Depositional sediments were collected above and below major tributaries in 2010, 2012, and 2013 and from the major tributaries in 2012. In assessments of chronic toxicity using *Ceriodaphnia dubia*, *Hyalella azteca* and *Lampsilis siliquoidea*, few water or sediment samples were determined to be harmful. Concentrations of nitrate in surface waters often exceeded a level protective of sensitive invertebrates (2 mg NO<sub>3</sub>-N/L) while phosphorus concentrations in many samples were above levels that may alter the distribution of aquatic plants (0.1 mg P/L). Glyphosate was rarely observed in surface water, but its primary degradation product, aminomethyl phosphonic acid (AMPA), was detected in 77% of the samples. Water and sediment concentrations of glyphosate/AMPA ( $\leq 0.15$  mg/L and  $\leq 2.4$  mg/Kg) were high compared to samples from other agricultural regions, but bioassays with *Ceriodaphnia dubia* and *Cyprinella trichroistia* exposed to a glyphosate-based herbicide indicated little toxicity at measured levels. Sediment-hormone concentrations ranged from 1 - 200  $\mu$ g/Kg, which may be sufficient to disrupt endocrine functions in aquatic biota. Metal concentrations in water and sediment samples were low. Nutrients and hormones are potential causes of observed species declines. Probable sources include inorganic and organic fertilizer, livestock production, and domestic septic systems.