

Watershed Characteristics and Water-Quality Trends and Loads in 12 Watersheds of Gwinnett County, GA

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Abstract. The U.S. Geological Survey, in cooperation with Gwinnett County Department of Water Resources, established a comprehensive Long-Term Trend Monitoring (LTTM) program in 1996 to monitor, analyze, and quantify the magnitudes of instream pollutants and the effects of urbanization on six watersheds. In 2001, six additional watersheds were added to the LTTM program. These 12 watersheds were continuously monitored for water level, streamflow, precipitation, and water-quality properties (water temperature, specific conductance, and turbidity). Discrete water-quality samples were collected during storm and base-flow conditions and analyzed for nutrients, trace metals, total dissolved solids, and total suspended sediment (total suspended solids and suspended sediment). This sampling schedule was designed to identify variations in water quality both hydrologically and seasonally. The 12 watersheds were characterized for basin slope, population density, land use, and impervious area. Seasonal patterns and long-term trends in flow-adjusted water-quality concentrations were identified for five constituents—total nitrogen, total phosphorus, total zinc, total dissolved solids, and total suspended solids. Seasonal patterns of all five constituents were fairly similar, with higher concentrations in the summer and lower concentrations in the winter. Surface water loads were computed for 10 water-quality constituents. These loads represent the cumulative effects of watershed characteristics, hydrologic processes, climatic variability, and human influences on watershed water quality. Variations in constituent yields, in load per unit area, between watersheds appeared to be related to basin slope and impervious area. Yields then were used to compare contaminant loads from watersheds of different sizes and constituent trends from 1997-2009.