

INTEGRATED MONITORING OF STREAM QUALITY IN AN URBANIZING KANSAS COUNTY

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ABSTRACT

Johnson County is one of the most rapidly urbanizing counties in Kansas. In 2002, the U.S. Geological Survey, in cooperation with the Johnson County Stormwater Management Program, began an investigation to characterize the quality of county streams. An integrated monitoring approach that included chemical, biological, and physical aspects of stream quality was used to provide a comprehensive assessment of current and changing conditions in complex urbanizing watersheds. The investigation has included water and streambed-sediment sampling to identify contaminant sources, macroinvertebrate and habitat surveys to describe biological conditions, and continuous in-stream water-quality monitoring and regression-model development to estimate real-time chemical concentrations and loads.

The integrated monitoring approach provided valuable stream-quality information. Point and nonpoint contaminant sources were identified and relations to land use determined. Stream sites with biological communities that were most and least affected by human disturbance were identified. The effects of wastewater discharges were quantified, including relative contributions of indicator bacteria, nutrients, and wastewater compounds. Large concentrations and loads of sediment and bacteria associated with stormwater runoff were documented. Continuous water-quality monitors recorded seasonal differences in water quality and rapidly changing conditions during storm runoff.

The Johnson County Stormwater Management Program and the cities in Johnson County are using these data to better understand current stream quality, to assist in developing best management practices to protect and improve stream quality by minimizing the effects of point source discharges and nonpoint source urban runoff, and ultimately, to determine the effectiveness of implemented best management practices. This information is critical as the county and cities strive to comply with National Pollutant Discharge Elimination System Phase II Stormwater requirements.

KEYWORDS

Water quality, urban streams, continuous monitoring, biological monitoring