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## Chemical and Geological Control on Surface Water within the Shade River Watershed in Southeastern Ohio

PDF (Size: 1175KB) PP. 1-11 DOI: 10.4236/jep.2013.41001

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### ABSTRACT

The under-sampled middle and western branches of Shade River Watershed (SRW) in SE Ohio were investigated as part of the Ohio University—U.S. Environmental Protection Agency (EPA) STAR grant. This project was for monitoring the quality of watersheds in Ohio and classifying them according to their physical, chemical, and biological conditions. Water samples, as well as field parameters, were taken at twenty-two sites for chemical analyses. The ions analyzed included Ca, Mg, Na, Fe, Mn, Al, NO<sub>3</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, and total PO<sub>4</sub>, while the field parameters measured included pH, dissolved oxygen (DO), total dissolved solids (TDS), electrical conductivity (EC), and alkalinity. To assess the water quality within the SRW, the analyzed ions and field parameters were compared to the USEPA criteria for the survival of aquatic life. Analytical results showed that the watershed is dominated by Ca-HCO<sub>3</sub> waters with DO, Fe, Mn, and PO<sub>4</sub> being the main causes of impairment within the streams. The relatively elevated concentrations of manganese and less extent iron may be associated with the local geology and the acidic nature of the soils. The high alkalinity and calcium concentrations are due to the limestone geology. The elevated phosphate concentration may be due to anthropogenic sources, fertilizers, or contributions from phosphorus-rich bedrock that differs geochemically from other areas.

### KEYWORDS

Shade River Watershed; STAR Grant; Stream Water; USEPA Criteria; Mineral Stability; Total Phosphate

### Cite this paper

P. Gbolo and D. López, "Chemical and Geological Control on Surface Water within the Shade River Watershed in Southeastern Ohio," *Journal of Environmental Protection*, Vol. 4 No. 1, 2013, pp. 1-11. doi: 10.4236/jep.2013.41001.

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