Estimates of Nutrient Concentrations in the Eucha-Spavinaw Basin using Real-Time Continuous Water-Quality Monitoring

The Eucha-Spavinaw Basin is the source of water for Lake Eucha and Spavinaw Lake, which are part of the water supply for the City of Tulsa (COT). COT has received complaints of taste and odor in the finished drinking water because of deteriorating water quality largely due to algal growth from the input of nutrients from the Eucha-Spavinaw Basin. The U.S. Geological Survey, in cooperation with COT, implemented a continuous, real-time water-quality monitoring program in the Eucha-Spavinaw Basin to better understand the source of nutrient loading. Continuous in-stream water-quality monitors that measure physical water properties were installed at two existing continuous streamflow-gaging stations – Spavinaw Creek near Colcord and Beaty Creek near Jay, Oklahoma.

Manually collected nutrient samples and in-stream monitors were used to develop linear regression equations relating in-stream physical water properties (specific conductance and turbidity) to total nitrogen and total phosphorus concentrations. These equations may be used to estimate instantaneous nutrient concentrations, which can be used to compute loads and yields in real-time. The methods used in this study show promise for monitoring future effectiveness of implemented best management practices, development of total maximum daily loads, early detection of taste-and-odor occurrences, and to anticipate treatment needs for water suppliers.