A Comparison and Characterization of Sediment Loads on Turkey Creek, Carroll Creek, and North River Tributaries to Lake Tuscaloosa, Tuscaloosa, Alabama

Lake Tuscaloosa is the major public water supply for the cities of Tuscaloosa and Northport, and other portions of Tuscaloosa County. It is also a recreation destination for much of west central Alabama. The City of Tuscaloosa is very interested in quantifying the sediment load flowing into Lake Tuscaloosa and how this process is affected by conditions such as climate events, geologic types, and land use. A comparison of historical and current aerial photography shows that Lake Tuscaloosa is losing storage volume due to sedimentation. Portions of the lake near major tributaries that were once open water are now unnavigable or hazardous to a large degree. An accurate estimate of how much sediment has been deposited into Lake Tuscaloosa since impoundment is unavailable and the rate at which sedimentation is occurring is also unknown. Sedimentation not only causes a decrease in storage volume but it can also create water quality problems and affects lakefront property located in the upper parts of tributaries. The U.S. Geological Survey (USGS) is working with the City of Tuscaloosa to provide data and scientific interpretation that will help to answer many of these questions. The project is currently in the first year of the four year investigation.

This past year the USGS has been collecting suspended-sediment samples on three tributaries to Lake Tuscaloosa: Turkey Creek, Carroll Creek, and North River. Samples have been collected during both storm flows and normal flows using ISCO 6712 automatic samplers and handheld samplers (depth-integrated, equal width samples using DH-48 or DH-74 samplers). The handheld sampling method produces a concentration that is representative of the total stream cross-section and is assumed to be the mean value of the sediment concentration at that particular cross-section. The handheld measurements are used to calibrate the samples collected by the single-point ISCO samplers.

Turkey Creek, Carroll Creek, and North River drain from the Coker and Pottsville Formations and contain a wide variety of land uses from heavily wooded to light industrial and mining. While all the tributaries contain residential land uses, the Carroll Creek watershed contains more high-density residential land use than Turkey Creek or the upper North River. The drainage areas at the sampling stations are 6.2, 20.9, and 223 square miles for Turkey Creek, Carroll Creek, and North River, respectively. Historical sediment samples collected by the USGS are available on these streams to varying degrees for the period from 1981-1984; however, these samples were more of a synoptic variety and are not representative of the detailed information that is being collected now at a much greater sampling frequency.

This presentation will present information concerning the sediment concentrations and resulting sediment loads collected over the past year. The sediment results during storm events and normal flows will be compared based on watershed area, stream characteristics, land use, and geology.

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