

USING WATERSHED RESEARCH AS AN INTERDISCIPLINARY TEACHING TOOL

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One of the greatest challenges facing undergraduate teaching is developing truly interdisciplinary experiences for students. In the environmental field, interdisciplinary thinking is mandatory for successful solutions to difficult problems. The study of watersheds provides an excellent vehicle for showing the important interactions between biological, chemical, and geological parameters. It also is an excellent way of showing that teasing apart human impact from natural change can be difficult and requires the analysis of several variables.

At Furman University, we have embarked on a focused interdisciplinary study of the water quality of the 1900 km² Enoree River basin in South Carolina. A closely knit faculty team of two geologists, two chemists, and three biologists, have generated funds from the university, the NSF, and the EPA to study the watershed using inorganic and organic chemistry, total and fecal coliform bacterial counts, fish diversity, and aquatic insect diversity. Students are divided into interdisciplinary teams to study selected tributary watersheds focusing on the relationship between land use and water quality. Each student is expected to cycle through all phases of fieldwork and analysis, although each student does focus on research techniques related to his or her major.

During the ten-week summer research experience, the students learn a variety of techniques from bottle washing to data reduction and analysis. In the field, students learn to properly collect and preserve samples and use pH, conductivity, and dissolved oxygen meters. They are also responsible for calibrating and maintaining equipment. In the laboratory, students use a variety of analytical instrumentation including autoclaves, a Varian ICP-AES, a GC-MS, a Dionex 120 ion chromatograph, and a Dohrman 80 organic carbon analyzer. Students also learn how to identify fish and aquatic insects to the species level, and perform fecal coliform bacteria counts. The most important aspect, however, is the interdisciplinary nature of the work, which results in students and faculty gaining an appreciation of research challenges in the other disciplines.