

Variation in Instream Water Quality and Magnetic Susceptibility across the Coulee Baton Microwatershed in Southwestern Louisiana

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ABSTRACT

This study was designed to study the variation in sediment composition and instream surface water quality in an agricultural watershed in Louisiana. We identified seven channel sites for sediment collection, water quality sampling, and channel characterization. We monitored pH, temperature, turbidity, conductivity, and dissolved oxygen in the field using a portable water monitor. In the lab, total suspended solids (TSS), total combustible solids (TCS), biological oxygen demand after five days (BOD₅), and fecal coliform were measured. Sediment was collected from each site (left bank, center of stream, and right bank) and analyzed using a magnetic susceptibility meter and an inductively coupled plasma (ICP) spectrometer. Magnetic susceptibility was high at sites 1, 2, 5, 6, and 7 during the spring, but by summer magnetic susceptibility decreased for sites 1–4 and increased for sites 5–7. There is no evidence of stream erosion taking place at any of the monitoring locations, so, apparently, heavy metals and pollutants are slowed down by clay-rich sediment, and it takes longer for these materials to reach the main outlet. It appears that the channel is having a positive impact on the water quality by keeping inorganic pollutants trapped. However, the suspended sediment load at the main outlet (site 1) is high (109.86 ± 20.72 mg/L) where discharge averaged 1.830 ft³/s. This indicates that suspended sediment is having a negative impact on instream water quality. Fecal coliform is high at locations near residential areas. However, those sites that had their septic system changed had readings that were much lower.