# DISTRIBUTION OF TRACE ELEMENTS AND CS-137 IN SEDIMENTS OF A COASTAL PLAIN STREAM IMPACTED BY INDUSTRIAL ACTIVITIES

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A 2014 study of contaminants in stream sediments revealed average concentrations of eight elements to be elevated above their Ecological Screen Values (ESV) in a beaver pond on a coastal plain stream located on the U.S. Department of Energy's Savannah River Site (SRS), South Carolina. Previous studies also illustrated the importance of slow water depositional zones in accumulation of contaminants. The current study compares this beaver pond to those in other systems and investigates the distribution and potential source areas of contaminants upstream of the originally studied pond. We collected composite sediment samples from the previously studied beaver pond and depositional areas in McQueen Branch tributaries between the beaver pond and upstream industrial areas. Samples were also collected from Meyers Branch, another SRS stream potentially affected by periodic industrial runoff, as well as a reference beaver pond unaffected by industry. A total of 44 sediment samples were processed and analyzed to determine the concentrations of 16 trace elements and Cs-137. While detected levels of Cs-137 were low, our analyses found concentrations of over 7 elements to exceed their ESV in sediments in or near sedimentation basins at the heads of two tributaries and in the previously studied beaver pond. Concentrations tended to attenuate downstream of these headwater basins. Levels were also lower in reaches of stream that were severely scoured by excessive stormwater runoff. Concentrations of many elements were positively correlated to both organic matter and clay content, although organic matter appeared less influential in ponds and basins where an exceptional abundance of organic matter occurred. It appears that sedimentation basins and beaver ponds play an integral role in the storage and subsequent redistribution of contaminants in the study streams. Future studies should further evaluate the source, fate, and effects of contaminants entering this and similar stream systems.

*Brooke in the field.*