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QUANTIFYING FLOODPLAIN STREAM BANK EROSION AND DEPOSITION RATES IN A CENTRAL U.S. URBAN WATERSHED

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ABSTRACT: Streambank dynamics are under increasing scrutiny in part because streambank erosion can contribute as much as 80% of suspended sediment to streams, particularly in urbanizing watersheds. Objectives of the following study were to a) Quantify the rates of streambank erosion and deposition in an urban floodplain stream in Central Missouri, b) Identify seasonal effects to streambank erosion and deposition rates, and c) Further investigate the relative contribution of streambank erosion to in-stream suspended sediment load. Study sites were located in a lower floodplain reach of the Hinkson Creek Watershed located in Boone County, Missouri. Bank erosion and deposition rates were quantified using the erosion pin method comparing a remnant bottomland hardwood forest (BHF) to an adjacent agricultural site. Ten erosion pin plots (n = 342 pins) representing various bank geometry and vegetation cover were selected to represent the continuum of streambank heterogeneity. Soil characteristics (i.e. bulk density, porosity, water content) were identified using the soil core method. Preliminary results indicate that 1,962 and 16,518 kg of soil erosion occurred in the five pin plots of BHF and agricultural site respectively from June 2010 through May 2011. Erosion/deposition rates varied spatially and temporally (SDspatial=57 kg/m, SDtemporal=43kg/m). Both the BHF and agricultural site underwent greater average bank erosion than deposition, with erosion rates of 5.48 and 60.07 kg/m respectively from June 2010 to May 2011. Season one (December 2010-March 2011) had the largest erosion rate (66.59 kg/m), followed by season three (August 2010-November 2010) with the erosion rate of 33.97kg/m. Season two (April 2011-July 2010) experienced greater deposition than erosion with the deposition rate of 13.92kg/m. These results hold important implications for land use management practices in urban areas of the central U.S. Continued research and data analysis will supply information to land managers wishing to improve land use practices, water quality and natural resource sustainability in dynamic urbanizing flood prone lands.

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