POSTER #17

Simulating Reach-Scale Sediment Reduction from Stream Stabilization in the Fort Cobb Reservoir Watershed Using CONCEPTS

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Excess sediment from unstable streambanks and beds continues to impair surface waters. Many techniques are used to stabilize unstable bed and banks to reduce sediment erosion, including in-stream structures, grade control, vegetative plantings, and streambank armoring. These techniques can be cost prohibitive and therefore stabilization often focus on one site within an unstable stream system. While stabilizing a single site may reduce sediment leaving that site, it may be insignificant at a reach scale. Therefore, the objective of this research is to determine the effectiveness of various streambank and bed stabilization practices on reducing total sediment yield from an entire stream reach. Bank erosion, channel aggradation/degradation, and sediment transport processes can be simulated on the reach-scale scale using the CONservational Channel Evolution and Pollutant Transport System (CONCEPTS). CONCEPTS simulates unsteady, one-dimensional flow to predict the response of stream corridors to flow and sediment transport using soil erodibility and shear strength parameters, channel geometry, and flow hydrographs as input. A CONCEPTS model has been developed and calibrated for two tributaries to the Fort Cobb Reservoir which is located in southwest Oklahoma. The reservoir fails to meet water quality standards based on sediment, with unstable and incised channels being the primary source of sediment. Using CONCEPTS, total reduction in sediment from the entire stream system for various stabilization practices, including bed and bank armoring, toe protection, sloped banks, and vegetative plantings will be simulated and compared. Also, the length of stream that needs to be stabilized to provide a significant reduction in total sediment yield on the reach scale will be determined.