NUMERICAL SIMULATION OF CHANNEL ADJUSTMENT OF THE KALAMAZOO RIVER FOLLOWING THE REMOVAL OF TWO LOW-HEAD DAMS BETWEEN OTSEGO AND PLAINWELL, MICHIGAN

Eddy J. Langendoen, Research Hydraulic Engineer, USDA-ARS-NSL, Oxford, MS, elangendoen@msa-oxford.ars.usda.gov; Robert R. Wells, Research Hydrologist, USDA-ARS-NSL, Oxford, MS, rrwells@msa-oxford.ars.usda.gov

Abstract: The state of Michigan is interested in removing two low-head dams in an 8.8 km reach of the Kalamazoo River between Plainwell and Otsego, Michigan while minimizing impacts to the study reach and downstream reaches. The study was designed to evaluate the erosion, transport, and deposition of sediments over a 38-year period using the channel evolution model CONCEPTS for three simulation scenarios: Dams In, Dams Out, and Design. The total mass of sediment emanating from the channel boundary for the Dams In case shows net deposition of 8,760 T/y for the study reach, with net transport (suspended and bed load) of 10,500 T/y passing the downstream boundary. For the Dams Out case, there is net erosion of 9,180 T/y with net transport of 30,100 T/y passing the downstream boundary. For the Design case, net deposition was 9,070 T/y with transport of 14,200 T/y passing the downstream boundary. The most significant finding is that removal of the low-head dams will cause significant erosion of PCB-contaminated bed and bank material upstream of the dams.