ONE-DIMENSIONAL SEDIMENT MODELING OF LEVEE SETBACK AND FLOODPLAIN GRAVEL PIT CAPTURE ON THE YAKIMA RIVER, WA

Peter C. Brooks, P.E., Senior Engineer, Northwest Hydraulic Consultants, 13600 Christensen Road, Suite 350, Seattle, WA 98188, pbrooks@nhcweb.com; Dave McLean, Ph.D., P.E., Principal, Northwest Hydraulic Consultants, 405 - 495 Dunsmuir Street, Nanaimo, BC V9R 6B9 Canada, dmclean@nhcweb.com; Andrew Nelson, Geomorphologist, Northwest Hydraulic Consultants, 13600 Christensen Road, Suite 350, Seattle, WA 98188, anelson@nhcweb.com; Karen Hodges, Natural Resource Specialist\Project Manager, Water Resources Division, Yakima County Public Services, 128 N. 2nd St., Yakima, WA 98901, karen.hodges@co.yakima.wa.us

EXTENDED ABSTRACT

The Yakima River in eastern Washington State has been confined due to the construction of numerous levees over the past century. Although providing valuable flood protection, levee confinement has interrupted natural morphologic processes resulting in reduced channel complexity and habitat. As part of a plan to reactivate the Yakima River floodplain to reduce flood elevations and velocities as well as increase access to back channel habitat, the Yakima County Flood Control District has undertaken a Section 1135 Environmental Restoration Feasibility Study with the Seattle District U.S. Army Corps of Engineers for a levee setback project on the Yakima River, within the City of Yakima, WA.

However, the area is the site of former gravel mining and three large gravel pits are currently located landward of the existing levee. These pits would be vulnerable to capture through channel avulsion were the levee to be setback. Gravel pit capture poses threats to channel stability by disruption of sediment transport continuity and upstream headcut migration. An existing SRH1D model was used to evaluate possible effects of gravel pit capture on upstream and downstream channel adjustment. Computational analyses were complemented by a geomorphic assessment and review of case studies of previous gravel pit capture episodes on the Yakima River and elsewhere. Findings were used to assess risks to morphologic stability, channel habitat, and surrounding infrastructure, including several Federal flood protection levees still located on the reach.