US Army Corps of Engineers®

2-D Flow Hydrodynamics and Sediment Transport Modeling in Rio Salado

Products

1) A database of sediment particle size distributions from the river bed

2) An input data set and computational mesh for the CCHE2D model

3) A technical report that describes the approach, data, analysis, and results from the study in detail

4) A conference paper and a journal paper regarding the mining effects in the study reach

Benefits

1) The study will improve estimates of floodplain coverage under large flow events

2) Results will assist local managers in assessing morphological change due to floods

3) This research will improve understanding of the effects of in-channel mining on channel stability

Issue

The Rio Salado Reach has experienced severe bed degradation and bank erosion. Among the major modifications to the river channel and hydrology, sand and gravel mining operations has been a great concern to U.S. Army Corps of Engineers (USACE) officials. To estimate the mining effects on the channel, there is a great need for a two-dimensional model of the hydrodynamics and sediment transport in the Rio Salado through Phoenix, AZ. The existing Hydrologic Engineering Center-River Analysis System (HEC-RAS) and HEC-6T models are one-dimensional, and therefore channel responses at the banks cannot be analyzed.

Description

The primary objectives of this project are to: 1) model the hydrodynamics and sediment transport in the study reach under 5-year, 10-year, 20-year, 50-year, 100-year, and 500-year flood events (FY 05); and to 2) estimate the effects of gravel pit mining on the channel (FY 06). The first phase of the project has been finished. A technical report describing sediment sampling in the field, laboratory work, and data analysis, preparing input data and computational mesh for CCHE2D model, and the calculated results has been prepared. a conference paper was submitted to the American Society of Civil Engineers Environmental Water Resources Institute (ASCE EWRI) 2007 conference. The calculation of mining effects is an ongoing task. We are currently simulating sediment transport by assuming varied scenarios from mild to severe gravel mining. This project is progressing well and we expect timely completion of the

Rio Salado, Phoenix, AZ

project. A final technical report including mining effect will be submitted by the agreed upon date.

Sponsor

Urban Flood Damage Reduction and Channel Restoration Development and Demonstration Program for Arid and Semi-Arid Regions (UFDP).

Points of Contact

Lead-PI: Kumud Acharya, Desert Research Institute
Email: kumud.acharya@dri.edu
Phone: 702-862-5371

Co-PI: Mark Stone, Desert Research Institute
Email: mark.stone@dri.edu
Phone: 702-862-5427

Co-PI: Dong Chen, Desert Research Institute
Email: dong.chen@dri.edu
Phone: 702-862-5541

Lisa Hubbard, Program Manager, ERDC, Coastal and Hydraulics Laboratory
Email: Lisa.C.Hubbard@usace.army.mil
Phone: 601-634-4150

Partners

Scott Estergard, USACE, Los Angeles District, Phoenix Field Office
Email: Scott.K.Estergard@usace.army.mil
Phone: 602-640-2003

Steve Scott, ERDC, Coastal and Hydraulics Laboratory
Email: Steve.H.Scott@usace.army.mil
Phone: 601-634-2371