



Influence of Local Hydrodynamic Properties on Macroinvertebrate Distributions

Products	The product of this research will be a technical note and a technical report describing correlations between flow parameters, substrate types, and insect distributions.
Benefits	To improve the predictions of habitat in natural streams, flow parameter data are essential. Turbulent flow characteristics (e.g., velocity gradient, turbulent intensity, turbulent energy) could provide valuable information on quality of habitats. Data from this project will provide correlations between flow parameters, substrate types and in-stream population of macroinvertebrates at the McCarran Ranch reach of the lower Truckee River. This research will provide important guidance for hydraulic engineers to assess the impacts on macroinvertebrates during flood events.
Issue	Restoration of aquatic habitat requires an understanding of the relationships between physical and ecological processes and tools able to predict the impacts of alternative management and restoration scenarios. Recent studies on the Truckee River have revealed predictive relationships between the physical environment and recruitment of riparian plant species (i.e., willows and cottonwoods). However, relationships between hydrodynamic parameters and distributions of aquatic organisms are not well understood. Researchers have collected a large number of macroinvertebrate samples in the Truckee River over the past several years. These data have revealed correlations between basic physical habitat descriptions (flow depth, water velocity, substrate type) and community composition of macroinvertebrates. However, local descriptions of flow characteristics (near bed velocity and turbulence) are needed in order to better understand the physical mechanisms driving these interactions.
Description	The relationships between local flow field variables and macroinvertebrate populations were investigated by collecting paired hydrodynamic and biological measurements at 12 stations in the Truckee River McCarran Restoration Project. Macroinvertebrate samples were collected from the bed using a kick net and standard sampling protocols. The samples were transferred to the Desert Research Institute (DRI) and analyzed to describe community composition at each station. Immediately following insect collection, high resolution velocity measurements were collected using an acoustic Doppler velocimeter (ADV).



Data collection on Truckee River, McCarran ranch restoration site

ADV measurements were collected near the streambed and at 2 to 3 points higher in the water column at a frequency of 50 Hz. The high sampling rate and small sampling volume of the ADV allowed for near bed measurements and descriptions of turbulence parameters. The next stage of this research will be to complete a statistical analysis of the biological and hydrodynamic data in order to evaluate correlations.

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Points of Contact Mark Stone, Desert Research Institute

Email: mark.stone@dri.edu

Phone: 702-862-5457

Kumud Acharya, Desert Research Institute

Email: kumud.acharya@dri.edu

Phone: 702-862-5371

Donald Sada, Desert Research Institute

Email: don.sada@dri.edu

Phone: 775- 673-7359

Lisa Hubbard, Program Manager, ERDC, Coastal and Hydraulics Laboratory

Email: Lisa.C.Hubbard@usace.army.mil

Phone: 601-634-4150