LABORATOIRE DE CONSTRUCTIONS HYDRAULIQUES

Cycle de conférences LCH

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Annonce de conférence

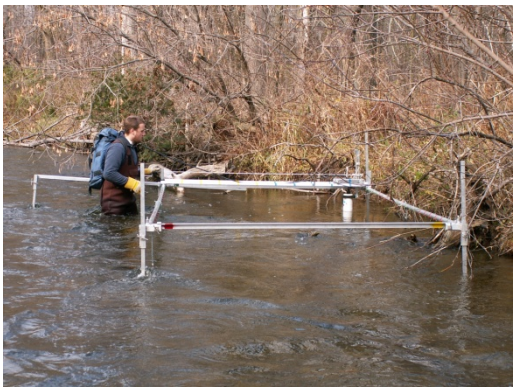
Jeudi 21.06.2012 à 12:00, Salle CM 1368 (Salle à l'accueil EPFL)

William (Bill) K Annable

Associate Professor, PhD, PhD, PEng, PGeo

Department of Civil and Environmental Engineering, University of Waterloo, Canada

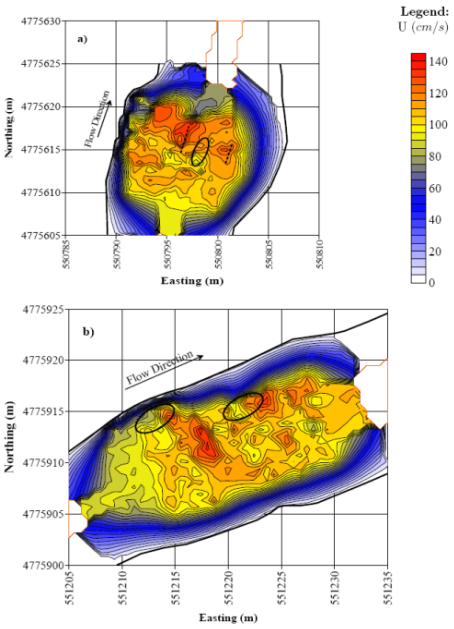
Hydrodynamic conditions surrounding Brown trout (Salmo trutta) and Rainbow trout (Salmo gairdneri) redds



High-resolution velocity profile measurements were taken over a series of riffles on a gravel-bed stream using a Pulse Coherent Acoustic Doppler Profiler (PCADP) to quantify the fluid structure of riffles and nests (redds) where brown trout *(Salmo trutta)* and rainbow trout *(Oncorhynchus mykiss)* spawned. Velocity profiles were obtained on a highly discretized planometric scale ranging between 20 cm – 40 cm grid spacings, with vertical observation occurring every 1.6 cm. From the velocity profiles, between 15,000 – 38,000 velocity measurements were obtained over each riffle on any given day of measurement.

Velocity profiles were converted to streamwise velocity magnitude, flow depth, Reynolds number, Froude number, shear stress, vertical velocity components and turbulent kinetic energy per unit area to evaluate the spatial structure of the riffles and the spatial structure of redds (pits and tailspills) relative to the surrounding riffle structure. Semi-variograms were employed to evaluate the persistence of the fluid structure based upon the metrics evaluated.

Results showed that discrete velocity observations poorly described the spatial structure of the flow system and poorly correlated with redd locations. Reynolds number analysis identified a relatively consistent fluid property for distances typically 2 – 3 times the longitudinal length of redds. Turbulent kinetic energy per unit area consistently identified common regions on all riffles studied that corresponded with the location selections for redds where flow was identified as essentially uni-directional. Froude number was found to be insensitive in predicting the fluid spatial structure in wadeable flow depths and relating it to the fluid structure of redds. Results indicated that a series of metrics at varying spatial scales of turbulence may be necessary to understand the spatial complexity of redd selection.



La conférence sera donnée en anglais. Durée env. 45 minutes, suivie d'une discussion.

Prof. Dr Anton SCHLEISS