



## **EPP 234 – HEC-RAS – Steady Open Channel Flow Modeling Emphasizing Stream Restoration Applications**

**Course Summary:** This short-course will provide a thorough introduction to the one-dimensional capabilities of the well-known U.S. Army Corps of Engineers Hydrologic Engineering Center - River Analysis System (HEC-RAS). This entry-level to intermediate-level course is intended for river restoration practitioners with backgrounds in geoscience, the life sciences or engineering with an interest in learning to use HEC-RAS in the context of restoring rivers or needs to make reliable interpretations of the outputs of HEC-RAS models built and run by colleagues and other river restoration stakeholders. Participants should have a basic understanding of the physics of open channel flow and experience using Windows on a PC.

The course will provide an overview of the HEC-RAS model with hands-on experience in using the software for modeling a variety of situations commonly encountered when restoring rivers. It will include in-depth instruction on: fundamentals of open channel flow; using HEC-RAS to model stream flows and drainage networks; and modeling river crossings (bridges and culverts) to ensure they meet relevant fluvial performance standards and are passable by aquatic organisms. It will also deal with hydraulic modeling of natural streams and streams with added habitat features (e.g. large wood, boulders), and it will touch on floodplain permitting applications (“no-rise” analysis, CLOMRs and LOMRs). A brief introduction to two-dimensional modeling will also be provided.

**Duration:** 4 days

**Topics include:**

- Understanding the basic theory & assumptions inherent in one-dimensional open-channel flow modeling using HEC-RAS.
- Using the HEC-RAS software to set up the analysis file (flow & geometry) to solve a variety of applications including basic stream networks, bridges and culverts, & other natural and introduced stream features and structures.
- Troubleshooting commonly occurring modeling errors and understanding & reliably interpreting model outputs.
- Introduction to two-dimensional modeling and some of the benefits for stream restoration applications and modeling more complex systems.