SEDHYD 2019 Workshops

Monday **24 June 2019** **8:00 am - 12:00 pm**	**Monday** **24 June 2019** **1:00 pm - 5:00 pm**	**Monday** **24 June 2019** **8:00 am - 5:00 pm**	**Friday** **28 June 2019** **1:00 pm - 5:00 pm**
Sediment Data Collection and Records Computation Techniques	An Overview of Selected Sediment Surrogate Techniques	Stage 0 Restoration: Planning, Design, Implementation, and Appraisal	Sediment Transport Modeling in Streams with SRH-2D
Sediment Sourcing Workshop	New Features of HEC-RAS 5.1		
Part A: Introduction to Successful Sediment Transport Modeling	Part B: Sediment Transport Modeling in 1D Using HEC-RAS		
Application of Numerical Models to Simulate Hydrology, Reservoir Operations, River Hydraulics and Flood Impacts	Use of Bulletin 17C for Flow Frequency Analysis		

TITLE:
Sediment Data Collection and Records Computation Techniques

TIME:
Monday, June 24, 2019 from 8:00 am to 12:00 pm

DESCRIPTION:
This training course is intended to provide an overview of the following topics:

- Basic fluvial-sediment concepts and physical properties of fluvial sediment
- Design and function of suspended-sediment and water-quality samplers
- Sampling techniques for suspended sediment, bedload, and bed material
- Computation techniques and software for generating sediment load records

INSTRUCTORS:
Gary Johnson, USGS
Greg Koltun, USGS
John R. Gray, Principal, GraySedimentology, LLC (tentative)

TITLE:
Sediment Sourcing Workshop

TIME:
Monday, June 24, 2019 from 8:00 am to 12:00 pm

DESCRIPTION:
Sediment, whether in suspension in the water column, or as deposition on a stream or lake bed, is one of the most common causes of loss of stream-biologic integrity. Sediment also reduces the capacity of our nation's water-supply reservoirs. An important strategy in managing sediment is to determine the dominant sources and transport pathways in any given watershed. This half-day workshop will outline approaches and methods for determining sediment sources by using a sediment budget framework. We will discuss how a sediment budget is accomplished by using available tools and resources, including recent advances in multi-temporal remote sensing (lidar, structure-from-motion (SfM)). In order to conduct a sediment budget study, the sources of sediment should be clearly defined. The sediment fingerprinting approach, which identifies specific sediment sources by establishing a minimal set of physical and (or) chemical properties that uniquely characterize each source in the watershed, will be highlighted, and the steps necessary to conduct a sediment fingerprinting study will be outlined. The workshop will also instruct and demonstrate the use of the USGS Sediment Source Assessment Tool (Sed_SAT). Sed_SAT is a program written in the statistical language R (R Core Team, 2016) and utilizes a Microsoft Access® interface that allows the user to step through all the necessary analytical steps to apportion sediment. Participants are encouraged to download the program at https://my.usgs.gov/bitbucket/projects/SED/repos/sed_sat/browse, and bring their laptops to the workshop.
**Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.*

INSTRUCTORS:
Allen C. Gellis, U.S. Geological Survey, MD-DE-DC WSC, Baltimore, MD
Lillian Gorman Sanisaca, U.S. Geological Survey, MD-DE-DC WSC, Baltimore, MD

TITLE:
Introduction to Successful Sediment Transport Modeling

TIME:
Monday, June 24, 2019 from 8:00 am to 12:00 pm

DESCRIPTION:
This short course will introduce the basic principles of designing a successful sediment transport modeling analysis. Participants will be exposed to a wide range of applications of sediment transport modeling issues. The course will discuss the selection of the appropriate sediment transport model and steps necessary in the selection process: identification of the question you want to answer, identification of the process you want to simulate, understanding the limitations of various model types, and then the review of current models. The abilities and limitations of various sediment transport model types, such as sediment budgets, one-dimensional, and two-dimensional sediment transport models will be discussed. The importance of understanding model limitations will be emphasized as that is the key to properly designing and interpreting the analysis. This course is intended to be a pre-cursor to the course "Sediment Transport Modeling in 1D using HEC-RAS" and "Sediment Transport Modeling with SRH-2D".

INSTRUCTORS:
Blair Greimann, USBR
Stanford Gibson, USACE

TITLE:
Application of Numerical Models to Simulate Hydrology, Reservoir Operations, River Hydraulics, and Flood Impacts

TIME:
Monday, June 24, 2019 from 8:00 am to 12:00 pm

DESCRIPTION:
The Hydrologic Engineering Center's Real-Time Simulation (HEC-RTS) program package is a comprehensive data management as well as hydrologic and hydraulic modeling system for short-term water management decision support. Through HEC-DSS (Data Storage System), HEC-RTS facilitates the real-time use of observed and forecasted precipitation, observed flows and stages, and other meteorological and hydrologic data. HEC-RTS also facilitates the integration of HEC-HMS (Hydrologic Modeling System) for forecasting flows throughout a watershed, HEC-ResSim (Reservoir System Simulation) for simulating reservoir operations and release decisions, HEC-RAS (River Analysis System) for forecasting river stages and producing flood inundation maps, and HEC-FIA (Flood Impact Analysis) for estimating potential flood impacts on life safety and agricultural and urban infrastructure. This short course will provide an overview of HEC-RTS and its data and modeling components. The course will also include HEC-RTS live demonstrations of real-time data acquisition, the use of gridded precipitation preprocessor, flow forecasting, reservoir releases determination, and flood inundation map generation for decision support.

INSTRUCTORS:
Fauwaz Hanbali, Senior Hydraulic Engineer, US Army Corps of Engineers Hydrologic Engineering Center (HEC)
Matt McPherson, Senior Hydraulic Engineer, US Army Corps of Engineers Hydrologic Engineering Center (HEC)

TITLE:
An Overview of Selected Sediment Surrogate Techniques

TIME:
Monday, June 24, 2019 from 1:00 pm to 5:00 pm

DESCRIPTION:
This short course would cover highlights of selected sediment surrogate techniques being used or funded for evaluation by the Federal Interagency Sedimentation Project Technical Committee (FISP TC). FISP TC members will present the operational status, use cases, and procedural highlights of each technique. The short course agenda may change but is expected to include:

1. Introduction (0.25 hour):
2. Surrogates for suspended sediment (1.5 hours):
    - Acoustic method using sidelooking and downlooking meters
    - Point methods (turbidity and acoustic backscatter)
    - Pressure difference
3. Break (0.25 hour)
4. Surrogates for bedload sediment (1.5 hours):
    - Sediment-generated noise/hydrophones
    - Impact plates
    - Gravel tracers
5. Open panel discussion on future research needs in sediment surrogates (0.5 hour)

INSTRUCTORS:
Molly Wood (USGS)
Tim Straub (USGS)
Roger Kuhnle (USDA ARS)
Rob Hilldale (USBR)
James Selegean (USACE)

TITLE:
New Features of HEC-RAS 5.1

TIME:
Monday, June 24, 2019 from 1:00 pm to 5:00 pm

DESCRIPTION:
In this short course we will cover many of the new features that are being added to HEC-RAS 5.1. Students will learn about the new features being developed and how to use them to solve river hydraulics problems. Example applications of these new features will be shown. Some of the new features that will be discussed in the workshop are:

1. Spatial precipitation
2. Spatial Infiltration
3. Wind Forces
4. Pump stations inside 2D Flow Areas
5. Bridge Hydraulics inside 2D Flow Areas
6. Physically Based Dam and Levee Breaching
7. 3D Visualization tool
8. New Features within HEC-RAS Mapper

INSTRUCTORS:
Gary W. Brunner, Hydrologic Engineering Center, U.S. Army Corps of Engineers.
Cameron T. Ackerman, Hydrologic Engineering Center, U.S. Army Corps of Engineers.

TITLE:
Sediment Transport Modeling in 1D using HEC-RAS

TIME:
Monday, June 24, 2019 from 1:00 pm to 5:00 pm

DESCRIPTION:
This short course is a continuation of “Introduction to Successful Sediment Transport Modeling” course. This course will focus on the application of one-dimension sediment transport models. We will describe the data requirements and data collection activities necessary for the model. Various methods to calibrate model parameters using historical data will be given and, in the absence of historical data, selection of model parameters and sediment transport formulae will be discussed. Methods to address model uncertainty will be suggested. Participants will be guided through the development of an actual sediment transport simulation using HEC-RAS.

INSTRUCTORS:
Stanford Gibson, USACE
Blair Greimann, USBR

TITLE:
Use of Bulletin 17C for Flow Frequency Analysis

TIME:
Monday, June 24, 2019 from 1:00 pm to 5:00 pm

DESCRIPTION:
Flood-frequency analysis of peak streamflow records provides the essential statistical interpretation of hydrologic data for estimating flood risk and for floodplain mapping. This workshop provides an overview and refresher on flood-frequency analysis of peak streamflow data, as well as introducing methods adopted in the new federal guidelines, Bulletin 17C at https://doi.org/10.3133/tm4B5. These new methods include a generalized method-of-moments estimator, the Expected Moments Algorithm (EMA), for dealing with zeros, low outliers and historical data. It also employs a generalized version of the Grubbs-Beck test (MGB) for the identification of potentially influential low floods (PILFs). Participants will learn about methods implemented in Bulletin 17C, how to properly characterize flood peaks for inclusion in a Bulletin 17C analysis, and how to interpret Bulletin 17C flood frequency analyses. Software with actual examples from Bulletin 17C will be used.

INSTRUCTORS:
Michael Bartles, Hydraulic Engineer, Hydrologic Engineering Center, U.S. Army Corps of Engineers

TITLE:
Stage 0 Restoration: Planning, Design, Implementation, and Appraisal

TIME:
Monday, June 24, 2019 from 8:00 am to 5:00 pm

DESCRIPTION:
Stage 0 has been recognized as an ecologically superior restoration goal for alluvial valleys with incised channels. This course will cover the most up-to-date theory and practice of Stage 0 restoration throughout the life cycle of a project, including the supporting science, planning where and under what conditions Stage 0 is a relevant goal that supports species recovery, methods of design and construction including examples ranging from nudging deposition processes to wholesale resetting of valleys. Examples will be from diverse ecoregions, will put Stage 0 in risk vs. performance context to established restoration practice, will address permitting concerns, and emerging post construction appraisal and monitoring methods. One method, resetting alluvial valleys to Stage 0 conditions, will be included as a class design exercise. However other less invasive methods for addressing incised channels will be presented.

INSTRUCTORS:
Brian Cluer
Colin Thorne
Sue Niezgoda
Paul Powers

TITLE:
Sediment Transport Modeling in Streams with SRH-2D

TIME:
Friday, June 28, 2019 from 1:00 pm to 5:00 pm

DESCRIPTION:
SRH-2D is a two-dimensional (2D) depth-integrated flow and sediment transport model developed at the Bureau of Reclamation. It has been used for a wide range of engineering projects over a decade. The key feature of SRH-2D is that robust and stable numerical schemes have been adopted so that reliable solutions may be obtained with only a few calibration parameters. SRH-2D model, along with the manual and selected publications, are free to download and the latest version will be distributed at the class. Highlights include: (a) a new Reclamation developed 2D mesh generator, SRH-Mesh; (b) new improvements and additions; (c) a case study used to teach various aspects of sediment modeling; and (d) hands-on learning of running SRH-2D. The outline of the topics covered in the class is as follows:

- SRH-Mesh Introduction
- SRH-Mesh Demonstration
- SRH-2D New Capabilities
- Description of a Sediment Case
    - Study questions
    - Domain setup and mesh development
- Hands-on Learning of Running SRH-2D
    - Parameter selection guideline
    - Calibration and sensitivity essentials
    - Modeling tips
- Results Interpretation

Attendees will learn the following: (1) A new and free 2D mesh generator SRH-Mesh; (2) How to approach sediment related study questions; (3) What key data are needed for sediment modeling; (4) Relative importance of input data; and (5) how to run SRH-2D for sediment modeling.

INSTRUCTORS:
Yong Lai, Technical Service Center, U.S. Bureau of Reclamation
Victor Huang, Technical Service Center, U.S. Bureau of Reclamation