Monday 8:00 am - 12:00 pm	Monday 1:00 pm - 5:00 pm	Monday 8:00 am - 5:00 pm	Friday 1:00 pm - 5:00 pm
Sediment Data Collection and Records Computation Techniques	An Overview of Selected Sediment Surrogate Techniques	Reservoir Sedimentation and Sustainability	Sediment Transport Modeling in Streams with SRH-2D
Sediment Sourcing Workshop	New Features of HEC-RAS 5.1	Adaptive Hydraulics Two-Dimensional Shallow Water Module (AdH-SW2D) with SEDLIB	Interpreting fish response to past/future infrastructure or management: the Eulerian-Lagrangian-agent Method (ELAM) model
Part A: Introduction to Successful Sediment Transport Modeling	Part B: Sediment Transport Modeling in 1D Using HEC-RAS	Stage 0 Restoration: Planning, Design, Implementation, and Appraisal	Application of Shallow Acoustic Reflection (Seismic) Data into Regional Sediment Management Challenges: Using Chirp Data to Improve Sediment Management Strategies.
Application of Numerical Models to Simulate Hydrology, Reservoir Operations, River Hydraulics and Flood Impacts	Use of Bulletin 17C for Flow Frequency Analysis	Overview and Application of the Automated Geospatial Watershed Assessment (AGWA) Tool	Proper Uses of HEC-RAS and Other Tips for Bridge Scour 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 8:00 am to 12:00 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.

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

TITLE:
Reservoir Sedimentation and Sustainability

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

DESCRIPTION:
The nation's 90,000 dams and reservoirs constitute a critical component of the country's infrastructure ensuring the stability of water and energy supplies and flood risk management. However, the reservoir storage capacity, essential to meeting these purposes, has been filling with sediment (clay, silt, sand, gravel, and cobble). Reservoir water storage capacity will become even more important over time with population increases, declining groundwater levels, and climate change. In addition, the trapping of sediment in reservoirs often leads to erosion of downstream channels and degradation of habitat for fish and wildlife.

Short course provides participants will learn why reservoir sedimentation is a big deal and why we should care about it. Next participants will learn about sustainable sediment management alternatives, economics of sediment management, permitting sustainable projects, and sedimentation monitoring. Participants will learn these concepts through a combination of lectures, discussions, and in-class exercises. Students should bring laptop computers to fully participate in the exercises.

INSTRUCTORS:
Subcommittee on Sedimentation, National Reservoir Sedimentation and Sustainability Team Members

TITLE:
Adaptive Hydraulics Two-Dimensional Shallow Water Module (AdH-SW2D) with SEDLIB

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

DESCRIPTION:
This course will begin with an introduction into AdH-SW2D and walk through running an AdH model. This will include building input files, running the example AdH model, and finally processing and viewing the outputs. There will also be a discussion and demonstration of available features within AdH. These include adaption, the friction library, wetting/drying, eddy viscosity options, tolerances, structures, debugging, and hot-starting the model. The second half of the course will start with an introduction into SEDLIB and walk through an example detailing how to incorporate SEDLIB into an AdH-SW2D model run. This will include modifying the input files to initiate the sediment transport model, running the sediment transport model with AdH, and explaining/processing/viewing the sediment transport output.

INSTRUCTORS:
Jared McKnight, Research General Engineer, River and Estuarine Engineering Branch, Coastal and Hydraulics Laboratory, U.S. Army Engineering and Research Development Center
Gary Brown, Research Hydraulic Engineer, River and Estuarine Engineering Branch, Coastal and Hydraulics Laboratory, U.S. Army Engineer Research and Development Center
Gaurav Savant, Senior Water Resources Engineer, Dynamic Solutions LLc., Contractor River and Estuarine Engineering Branch, Coastal and Hydraulics Laboratory, U.S. Army Engineer Research and Development Center

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:
Overview and Application of the Automated Geospatial Watershed Assessment (AGWA) Tool

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

DESCRIPTION:
This full-day training course provides an introduction to the AGWA tool through a combination of lectures and hands-on exercises. AGWA automates the parameterization and execution of a suite of hydrologic and erosion models (RHEM, KINEROS2, and SWAT). It has been designed to support watershed assessment and analysis across a range of spatial and temporal scales, automate the model parameterization process, and graphically visualize modeling results. Through a stepwise interface in ArcMap, and requiring relatively little hydrologic expertise from the user, AGWA identifies areas that are more susceptible to land use impacts and evaluates different management scenarios and/or alternative futures. AGWA parallels other efforts (ArcSWAT, BASINS, MWSWAT, HEC-GeoHMS, ArcAPEX) that use Geographic Information Systems (GIS) to support the application of hydrologic models, but distinguishes itself by offering models that allow it to be used on a continuum of spatial and temporal scales, ranging from hillslopes (~hectares) to large watersheds (>1000 km2) and from individual storm events (minute time steps) to continuous simulation (daily time steps over multiple years), all in a single tool. Several tutorial tracks will be available that highlight AGWA tools and functionality, including, but not limited to: 1) post-fire watershed assessments, 2) alternative futures and BMPs, 3) green infrastructure 4) stock pond/erosion control dams and 5) better representation of land use and watershed characteristics with KINEROS2. One-on-one assistance with your own data and projects may be available if time allows. AGWA and the AGWA versions of RHEM, KINEROS2, and SWAT are in the public domain and can be downloaded at no charge from: www.tucson.ars.ag.gov/agwa. A laptop computer with ArcGIS 10.x for Desktop (ArcMap) with a Spatial Analyst license is required.

INSTRUCTORS:
Phil Guertin (University of Arizona)
Dave Goodrich (USDA-ARS)
Shea Burns (University. of Arizona)

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

TITLE:
Interpreting fish response to past/future infrastructure or management: the Eulerian-Lagrangian-agent Method (ELAM) model

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

DESCRIPTION:
This is a half-day short course that will introduce the basic capabilities and limitations of the Eulerian-Lagrangian-agent Method (ELAM) model developed by Dr. Goodwin over the past 20 years for analyzing and forecasting the movement trajectories and distributions of fish near waterways infrastructure. 2-D or 3-D hydraulic model (any hydraulic model!) output is used as ELAM model input. On completion of the course, participants will have a basic understanding of the theory upon which the ELAM model is developed, its unique capabilities as well as limitations, the types of projects/data where the ELAM model is worthwhile (not all types of projects), and what it requires of the user to make good use of the model. The course is not intended to fully train participants in all the scientific fields that are part of prudent ELAM modeling, but participants will leave the course with enough understanding of the technology to begin the process of applying the ELAM model to their own work.

Participants will need to bring a laptop computer with the following installed:

Tecplot 360: www.tecplot.com/products/tecplot-360/
3-day free trial (full version) available via Tecplot website

Programming experience is desired, but not required.

INSTRUCTOR:
R. Andrew Goodwin, U.S. Army Engineer Research and Development Center

TITLE:
Application of Shallow Acoustic Reflection (Seismic) Data into Regional Sediment Management Challenges: Using Chirp Data to Improve Sediment Management Strategies

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

DESCRIPTION:
The use of shallow acoustic reflection (chirp) data to gain insight on stratigraphy, sediment budgets, and subsurface hazards has greatly increased in the Federal government in the past 10 years. Despite this rising interest, few guidelines exist that guide education or training requirements for the collection and processing of these data by government agencies, academia, or the private sector. The U.S. Army Corps of Engineers has recently begun to incorporate chirp data in multiple applied Regional Sediment Management challenges, and we hope to gauge the interest of State and Federal agencies in the further application of these data in coastal, estuarine, riverine, and lacustrine environments. Chirp systems utilize a range of low-frequency acoustic pulses to map the elevation and spatial extent of underlying stratigraphy in a wide range of aqueous environments. These data can be collected simultaneously with bathymetric and/or sidescan sonar data, and generate significantly more accurate three-dimensional maps of underlying stratigraphy than borehole collection alone. Recent and potential future applications that utilize chirp data include but are not limited to: (a) mapping the thickness and heterogeneity of potential borrow regions; (b) quantifying sediment volumes for dredging or reservoir maintenance applications; (3) identifying potential disposal sites; and (4) identifying shallow, buried navigation hazards.

The primary goals of the workshop will be to: 1) Educate the participants about the current uses of chirp data, and the benefits it can provide for project analysis and management, (2) Identify expertise and capabilities within Federal and State agencies, as well as in the academic and/or private sector; (3) Identify and develop mechanisms for collaboration and contracting efforts across State and Federal agencies, as well as in the academic and/or private sector, to execute investigations; and (4) Identify current and potential applications of this technology for applied sediment management challenges. Participants will be exposed to chirp data collection and processing, as well as example datasets. Participants should include those who currently collect chirp data for applied projects and those with an interest in seeing how these data might improve their current management strategies.

INSTRUCTORS:
Jesse E. McNinch, U.S. Army Corps of Engineers Engineering and Research Development Center, Coastal and Hydraulics Laboratory’s Field Research Facility
Heidi M. Wadman, U.S. Army Corps of Engineers Engineering and Research Development Center, Coastal and Hydraulics Laboratory’s Field Research Facility

TITLE:
Proper Uses of HEC-RAS and Other Tips for Bridge Scour Analysis

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

DESCRIPTION:
The U.S. Army Corps of Engineers Hydrologic Engineering Center's HEC-RAS software (HEC-RAS) is the primary tool used in the water resources industry for hydraulic analysis. From its popularity for regular hydraulic analysis, it has also been popular for performing bridge scour analyses. The ease of using HEC-RAS for scour analyses is seducing in that an engineer can perform a "successful" analysis but does not have a full understanding of what the program is doing when performing the scour calculations. In addition, the bridge scour algorithms in HEC-RAS are based upon Hydraulic Engineering Circular No. 18 (HEC-18, 2001) but several updates have been issued with the latest being on April 2012. Since the HEC-RAS Version 3.0.1 was issue in 2001, HEC has not updated Version 5.0.3 based upon the HEC-18 document released in 2012.

This workshop/short course will point out subtle errors that can occur and explain the updates that were not input to HEC-RAS. Depending on time constraints, 10 examples or more will be presented to illustrate the potential errors and a list presented of the HEC-18 updates with discussions on their ramification on the HEC-RAS results. In addition, general comments on bridge scour will be presented that should be considered in any bridge scour analysis, regardless of what model is used.

Topics to be discussed are, but not limited to:

1. Application of scour depths to anticipated lateral movement of the main channel
2. Analysis of Pier groups
3. Modeling pier debris buildup and its effect on pier scour
4. Understanding basis of pier and abutment built in safety factors and their application
5. Potentially double counting pier skew
6. Proper selection of approach and exit cross sections for abutment scour
7. Analysis of complex piers systems (pier, pier cap, piles, foundations, etc.)
8. Determining the worst case scour scenario (may not be the highest discharge)
9. Analysis of elongated piers
10. Analysis of sacrificial abutment slopes for abutment scour.

INSTRUCTOR:
David T. Williams, DTW and Associates