

SUBCOMMITTEE on SEDIMENTATION, ACWI

Meeting Minutes

Friday, September 8, 2017

Meeting Host

U.S. Bureau of Reclamation
 Denver Federal Center, Building 67, Room 579/581
 Lakewood, CO 20228

Roll Call

Subcommittee on Sedimentation (SOS) Chair, Tim Randle, called the meeting to order and began with a roll call of member organizations.

Organization	Representatives	Mailing Address
American Society of Civil Engineers	Absent	American Society of Civil Engineers; West Consultants, Inc., 2601 25th St. SE Suite 450, Salem, OR 97302
Colorado Water Resources Research Institute	Peter Nelson	Colorado Water Resources Research Institute, Colorado State University; 1372 Campus Delivery, Fort Collins, Colorado 80523-1372
Consortium of Universities for the Advancement of Hydrologic Sciences, Inc.	Absent	The Consortium of Universities for the Advancement of Hydrologic Science, Inc., Executive Director, CUAHSI Cambridge, MA
Cooperative Institute for Research in Environmental Sciences	Toby Minear	Cooperative Institute for Research in Environmental Sciences, 216 UCB University of Colorado Boulder, CO 80309
DOI - Bureau of Land Management	Doug Curtis	Water Resources Specialist Bureau of Land Management Environmental Quality and Protection 20 M St., SE, Room 5282 Washington, DC 20003
	Bob Boyd	Bureau of Land Management Denver Federal Center, Building 50 Denver CO 80225-0047
	Scott Davis	
	Hannah Englbrecht	
DOI - Bureau of Reclamation	Tim Randle	Bureau of Reclamation Denver Federal Center, Building 67 PO Box 25007, 86-68240 Denver CO 80225
	Caroline Ubung	
	Jennifer Bountry	
	Joel Sholtes	

Organization	Representatives	Mailing Address
DOI - National Park Service	Absent	National Park Service, 1201 Oakridge Drive Suite 250, Fort Collins CO 80526
DOI - U.S. Geological Survey	Tim Straub	U.S. Geological Survey, 405 N. Goodwin Avenue Urbana IL 61801
DOT - Federal Highway Administration	Absent	Federal Highway Administration, Central Federal Lands Division, 12300 West Dakota Ave., Suite 340, Lakewood, CO 80228
Federal Energy Regulatory Commission	Absent	Federal Energy Regulatory Commission, Division of Hydropower Licensing, 888 First St. NE, Washington, D.C., 20426
Missouri Water Resources Research Center	Amanda Cox	Missouri Water Resources Research Center, Saint Louis University, 3450 Lindell Blvd, Saint Louis, Missouri 83103
NOAA - National Marine Fisheries Service	Matt Collins	NOAA Fisheries, 55 Great Republic Drive Gloucester, MA 01930-2276
Tennessee Valley Authority	Absent	Tennessee Valley Authority, Dam Safety Governance & Oversight, WT 10C-K, 400 W. Summit Hill Dr., Knoxville, TN 37902
U.S. Army Corps of Engineers	John I. Remus, II	Chief of the Missouri River Basin Water Management Division U.S. Army Corps of Engineers - Omaha District, 1616 Capitol Avenue, Suite 9000, Omaha, Nebraska 68102
U.S. Environmental Protection Agency	Joseph Schubauer-Berigan	Chief, Environmental Stressors Management Branch, U.S. Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, 26 W. Martin Luther King Drive, Cincinnati, OH 45268
USDA - Agricultural Research Service	Eddy Langendoen	Agricultural Research Service; United States Department of Agriculture; Watershed Physical Processes Research Unit; 598 MC ELROY DRIVE Oxford, MS 38655
USDA - Forest Service	Dan Cenderelli	U.S. Forest Service, Fluvial Geomorphologist/Hydrologist, National Stream and Aquatic Ecology Center
USDA - Natural Resource Conservation Service	Absent	National Resources Conservation Service, NDCSMC, 501 W. Felix St., Fort Worth, TX 76115

The people attending in person included Peter Nelson, Toby Minear, Bob Boyd, Scott Davis, Hannah Englbrecht, Tim Randle, Jennifer Bountry, Joel Sholtes, Amanda Cox, and Eddy Langendoen. Everyone else participated remotely by phone and internet.

Subcommittee on Sedimentation Member Reports

A SOS representative from each organization was asked to describe their recent sediment-related activities and agency needs.

DOI - Bureau of Land Management (Bob Boyd)

- Understanding where sediment is coming from (overland transport)
- Colorado River sediment transport model for salinity control program in partnership with ARS
- Wind sediment transport research including monitoring network
- Lots of site specific sediment work (riparian habitat restoration)
- Landscape approach concept at regional and national scale. Natural resource inventory recently funded and working with NRCS

USDA - Agricultural Research Service (Eddy Langendoen)

- Range land and crop land research
- Just started 5-year research on where sediment sources are from

Colorado Water Resources Research Institute (Peter Nelson)

- Research to understand mechanics of sediment transport
- Understand post fire sediment response
- Response of pools and riffles to increased sediment supply
- Bar morphology and grain size response to channel migration
- Field studies, flume experiments, and numerical modeling
- Gravel bed river evolution over time, including improved bed sorting

Missouri Water Resources Research Center (Amanda Cox)

- Remote sensing to detect sediment concentration using surface reflectance
- Synoptic data collection technique
- Developing sediment budget along the middle Mississippi River
- Bed load transport in 3D flow environment using PIV techniques coupled with CFD models focusing on incipient motion

NOAA - National Marine Fisheries Service (Matt Collins)

- Dam removal sediment release monitoring. Project starting this week in Baltimore, MD. Largest sediment volume release in eastern U.S. (300,000 m³) 2/3 sand and 1/3 silt
- Dam removal schedule to for summer 2018

DOI - U.S. Geological Survey (Tim Straub)

- Training class for sediment measurement using acoustic methods (Minnesota August 2017)
- Dual frequency method for sediment measurement
- Use of ADCP for suspended sediment concentration

- DOI team to look at sediment impacts on Mekong River from proposed hydroelectric dams
- Sediment delivery: use of geospatial tools
- Dam removal research, including Klamath Dam removals
- Hurricane impacts

U.S. Army Corps of Engineers (John I. Remus, II)

- Reservoir sediment management for small reservoirs (sediment flushing)
- On August 15 - 17, 2018, the USACE Regional Sediment Management Program facilitated a training workshop on reservoir sediment management, with a specific focus on topics of interest to regulators, planners, and managers. Thirty-six people attended, with robust participation by fourteen USACE districts and research labs. Other participants included Bureau of Reclamation, Denver Water, the Kansas Water Office, EPRI (a hydropower industry group), Brigham Young University, and reservoir sedimentation experts Dr. George Annandale and Dr. Rollin Hotchkiss. The training workshop was highly successful in educating the group about reservoir sediment management. The workshop included presentations, case studies, hands-on demonstrations, and laboratory and field site visits. Another workshop is planned for June 2017 with a focus on engineers.

USDA - Forest Service (Dan Cenderelli)

- Manage roads to reduce sediment delivery to streams.
- Modeling and mitigation to reduce sediment yield from wildfire.
- Working with CSU (Bunte) to develop bed load database and developing various tools for stream restoration
- Updating sediment transport model (BAGS) and applying to case studies

DOI - Bureau of Reclamation (Tim Randle)

What is new sediment-related activities are happening Reclamation?

- Completing report on Elwha River Restoration Sediment Management
- Rio Grande studies (NM) including channel realignment of upstream from Elephant Butte Reservoir
- San Joaquin River restoration, CA
- Trinity River restoration
- Various Pacific Northwest channel restoration projects
- Reservoir surveys
- Paonia Reservoir sediment management investigations
- Pipeline scour estimates (Navajo-Gallup and Pojoaque Water Supply projects)
- Flood hazard guidelines for Colorado
- Research
 - Numerical Modeling and Prediction
 - Reservoir sediment pressure flushing
 - Reservoir sedimentation prediction
 - Coupling to SRH-2D to a MODFLOW

- Integrating SRH-2D into iRIC (International River Interface Cooperative) river simulation framework
 - Complex sediment processes using experimental data
 - Simulate observed patterns of gravel dispersion
 - Simulation of Large Wood Structures in SRH-2D
 - 3D Modeling Tools for Rivers with Complex In-Stream Structures
 - Improvement in the accuracy and speed of riparian vegetation simulation
 - Mercury transport and transformation processes at reservoirs
 - 2D mesh generation
 - Model uncertainty
- Remote Sensing of Vegetation Roughness
- Sediment Measurement
 - Development of ADCP software tools for processing of bathymetry and discharge data
 - Acoustic Doppler for monitoring suspended sediment
 - Measuring bed load with hydrophones
 - Elwha Bedload Impact Plate System - accelerometers
 - Ephemeral Tributary Sediment Transport Measurement
 - Using beryllium-10 derived erosion rates as a proxy for reservoir sedimentation
- Reservoir Sediment Management
 - Pilot Studies of Reservoir Sustainability Options - Flushing and Sluicing
 - RSI (Reservoir Sedimentation Information) Database
 - Time-Based Estimation of Reservoir Sedimentation Impacts
- Design
 - Design of Low-Flow Ecosystem Features for Urban Flood Control Structures

What are Reclamation sediment needs?

- Reservoir sediment surveys and methods to estimate reservoir sedimentation
- Robust 3D sediment transport model

Cooperative Institute for Research in Environmental Sciences (Toby Minear)

- CIRES scientists, including Minear, were participants in NASA's Arctic Boreal Vulnerability Experiment (ABOVE) project this summer, measuring the elevation and inundation extent of rivers and lakes. The primary instrument of interest was AirSWOT, the airborne prototype for the upcoming NASA SWOT Mission, used to estimate river discharge and lake volume change remotely. Overall, good experience this summer and leaves high hopes for SWOT after launch in 2021.
- Looking into adapting satellite-derived products for 3D mapping, developed for SWOT, to be used to measure above-water sediment volumes in reservoirs. Developing the proposal now (any agencies interested?) for submittal this fall.
- CU and CIRES scientists published a paper on sediment yield from Front Range catchments, co-authored with Ben Livneh and Toby Minear, using an ensemble method of six different sediment

yield algorithms with multi-objective parameterization. Being published this year in the journal, JAMES (Journal for Advances in Modeling Earth Systems). The developed ensemble method is robust and useful for scaling up or applying elsewhere.

- CIRES hydrophone project continues on the White and Gunnison Rivers with Bureau of Reclamation and US Fish and Wildlife Service. Good results from spring 2017 with a single mobile hydrophone, boat-mounted with linked ADCP and GNSS. Toby Minear is working on a new multi-hydrophone array system with geophysicists in CIRES, to be able to locate sound sources and estimate approximate grain size distribution. Testing started this summer, will continue for the next two years.
- CU and CIRES researchers received funding and started prototype work using multiple cameras for simultaneously and remotely measuring surface water velocities and distances. Collaborative project between CU Engineering school (Autonomous Robotics Group), CU Geology and CIRES. Initial tests from spring 2017 show improvements over traditional LSPIV, more similar to LSPTV but with better object detection and ID using machine learning.

SEDHYD 2019 Planning

Tim Randle explained that the next SEDHYD conference is scheduled for June 24-28, 2019 at the Peppermill Hotel in Reno, NV. This conference facility was selected by the SEDHYD Planning Committee on May 10, 2017 because it was the least cost and also best conference facility among the proposals submitted.

The Planning committee conducted a nation-wide search for a conference venue. Requests for proposals were sent during December 2016 to 118 venues in 20 different cities from California to Florida. Proposals were received from 37 venues in 17 different cities between December 2016 and February 2017. On February 24, 2017, the SEDHYD Planning Committee decided to conduct additional analysis on a short list of 13 venues in 7 different cities: Albuquerque, Phoenix, Tucson, Reno, Las Vegas, St. Louis, and Orlando. On March 24, 2017, the SEDHYD Planning committee narrowed the search to four venues: two in Saint Louis, MO and two in Reno, NV. A site evaluation team was sent to visit these four venues in person.

Volunteers are still needed to help plan and convene the SEDHYD-2019 conference. The table below lists the volunteer positions that have been identified or still needed for SEDHYD-2019 along with the people who volunteered for SEDHYD-2015 (<http://www.sedhyd.org/2015/>).

Volunteer Positions	SEDHYD-2019	SEDHYD-2015
Conference Chair	Jerry Webb	Doug Glysson
Conference Operations Chair	Jennifer Bountry	Paula Makar
Conference Technical Program Chair		Jerry Bernard
Sedimentation Chair	Tim Randle	Tim Randle
Sediment Technical Program Chair	Eddy Langendoen	Marie Marshall Garsjo
Hydrologic Modeling Chair		Jerry Webb
Hydrologic Technical Program Chair		Claudia Hoeft
Registration Coordinator		Darren Nezamfar & Penni Baker

Volunteer Positions	SEDHYD-2019	SEDHYD-2015
Web site Coordinator		Darren Nezamfar & Penni Baker
Proceedings Coordinator	Bob Boyd	Mark Strudley
Audio-Visual Equipment & Student Assistants Coordinator		Jeff Harris
Exhibits Coordinator		Mark Landers
Short Course Coordinator		Jeffrey B. Bradley
Field Trip Coordinator		Victor Hom
Poster and Model demonstration Coordinator		Jennifer Bountry
Student Program Coordinator	Amanda Cox	Amanda Cox
Young Professionals Program Coordinator		Rebecca Kallio & Allison Danner

U.S. Geological Survey and the U.S. Army Corps of Engineers will likely have volunteers to help with the conference planning, but there is plenty of room for additional volunteers to serve in a wide variety of capacities.

The following ideas were suggested for SEDHYD-2019 field trips:

- Truckee River restoration with possible raft trip
- Lake Tahoe
- Marble Bluff Diversion Dam sediment management and fish passage issues

Work Group on Reservoir Sedimentation and Sustainability

Tim Randle reported on the activities of the work group and the National Reservoir Sedimentation and Sustainability Team:

- Frequently Asked Questions about Reservoir Sedimentation and Sustainability have been posted on the SOS web site at https://acwi.gov/sos/faqs_2017-05-30.pdf
- The policy statement on reservoir sediment management and permitting has been revised after comments were received from the Advisory Committee on Water Information on February 23, 2017. The revised version has been reviewed by solicitors from the U.S. Army Corps of Engineers.
- A short video and three webinars are being planned. The webinars would be broadcast live and then posted on the SOS web site along with the video:
 - What is reservoir sedimentation, why it is important, and what are the potential management solutions? (10 minutes) Video Production <https://www.usbr.gov/research/challenges/waterstorage.html>
 - Ground-water versus surface water, climate change, the need for reservoir sediment management, economic evaluation by George Annandale (45 minutes)
 - Data Needs for Sedimentation Management (Gregory L. Morris Engineering) (45 minutes)

- Federal perspective (Reclamation and USACOE) (45 minutes). Explain what is needed
- A white paper is being developed on reservoir sedimentation and sustainability. A conference paper has been written as an executive summary of the white paper:
 - Randle, T.J.; S. Kimbrel; and K.L. Collins, 2017. “Reservoir Sedimentation and Sustainability”, in proceedings of the U.S. Society on Dams, 37th Annual USSD Conference, Anaheim, California, April 3-7, 2017.
https://ussdams.wildapricot.org/resources/Pictures/USSD_2017_Conference_Proceedings.pdf
- The U.S. Army Corps of Engineers, in collaboration with the Bureau of Reclamation, is developing the Reservoir Sedimentation Information (RSI) database. This database is linked to the National Inventory on Dams. The Corps has already entered and checked nearly all of their reservoir sediment survey data. The data from Reclamation reservoir surveys have been entered and is presently being checked. Other agencies will be encouraged to enter data from their reservoir sediment surveys. Eventually, other dam owners may be able to enter data from their reservoir sediment surveys.

Work Group on Climate and Sediment

Matt Collins provided a summary of work group activities:

- Provided reviews for infrastructure and environment paper
- Provided reviews on Dam Removal Sediment Analysis Guidelines
- The work group is working on an extreme events paper

Work Group on National Stream Morphology Data Exchange

Eddy Langendoen provided a summary of work group activities:

- A research proposal was developed (large scale modeling)
- Work continues on the database proposal
- Consider providing a metadata template for others to use, which could be posted on the SOS web site
- Coordinate with DOI open source data initiative
- National map database with USGS
- NOAA interagency elevation inventory <https://coast.noaa.gov/inventory/>

Doug Curtis mentioned the “A reservoir morphology database for the conterminous United States, Data Series 1062” by Kirk D. Rodgers, Prepared in cooperation with the Reservoir Fisheries Habitat Partnership, <https://pubs.er.usgs.gov/publication/ds1062>.

Federal Interagency Sedimentation Project Activities

In the absence of Mark Landers, Tim Randle provided a very brief synopsis on FISP activities:

- Surrogate technologies to measure sediment concentration and bedload
 - More focus on acoustics surrogate technologies rather than optical
 - less problems with fouling,
 - higher range of concentrations can be measured
 - less cost
- Validating bedload samplers (TR-2 and Elwha)

Technical Presentation (Sediment Measurement)

David Varyu (Reclamation, Denver) presented “Measuring the Transport of Sediment in an Ephemeral Stream.” This presentation described plans to construct a sediment monitoring station on the Arroyo de los Pinos in New Mexico. Monitoring would include bed load traps, suspended sediment concentration measurements and less costly surrogate technologies. The long-term objective is to develop a relationship between the signals from surrogate measurement with actual measurement. This collaborative effort includes many Federal agencies and universities.

Work Group on Sediment and Dam Removal

Tim Randle and Jennifer Bountry stated that the Dam Removal Analysis Guidelines for Sediment - Version 4 are nearing completion. About 100 reviewers from around the nation were offered a chance to review the document. Review Comments were received from 19 individuals or organizations:

- Tom Augspurger (USFWS)
- Joe Rathbun (Michigan, DEQ)
- Chauncey Anderson (USGS)
- Amy East (USGS)
- Jeff Duda (USGS)
- Molly Wood (USGS)
- Jon Major (USGS)
- American Rivers
- Blair Greimann (Reclamation)
- Alex Hackman (Massachusetts DFG)
- Jim MacBroom (Milone & MacBroom)
- Joanna Curran (Northwest Hydraulic Consultants)
- Marcin Whitman (California DFG)
- Toby Minear (CIRES)
- Jon Fripp (USDA - Natural Resource Conservation Service)
- Chris Bromley (Scottish Environment Protection Agency)
- Eric Hutchens
- Ken Finkelstein
- Matt Collins (NOAA - National Marine Fisheries Service)

The comments from these reviewers were very constructive and a large majority have been incorporated. The document is expected to be ready for SOS approval in early October 2017. The final document will be sent to the Subcommittee by email. Member organizations will be asked to respond within two weeks after receipt of the email with either a vote for approval, disapproval, or a request for more time to review the document. The absence of any response by a member organization will be treated as a vote for approval.

Subcommittee on Sedimentation Chair & Vice Chair Elections

Tim Randle's two-year term as Subcommittee Chair expires at the end of the fiscal year (September 30, 2017). Meg Jonas was the Subcommittee Vice Chair, but retired from the U.S. Army Corps of Engineers at the end of May 2017 and will not continue on as the Subcommittee Chair.

Toby Minear nominated Eddy Langendoen (USDA - Agricultural Research Service) to be the new SOS Chair for Fiscal years 2018 and 2019 (October 1, 2017 through September 30, 2019). This nomination was accepted and seconded by Amanda Cox and passed unanimously.

John Remus, II offered that the U.S. Army Corps of Engineers would find someone from their agency to serve as the SOS Vice Chair. Prior to the meeting, John Fripp (NRCS) had nominated Jo Johnson (NRCS) to serve as the SOS Vice Chair. SOS representatives decided that the U.S. Army Corps of Engineers representative would serve as the Vice Chair and that Jo Johnson would serve as the alternate Vice Chair. The alternate Vice Chair would assist the Vice Chair and serve as Vice Chair whenever the Vice Chair was not present at SOS meetings.

Work Group on Environment and Infrastructure

Joel Sholtes and Caroline Ubing briefed SOS members on the status of the white paper "Managing Infrastructure in the Stream Environment." This paper has been peer reviewed, is in the final stages of editing, and is expected to be completed in October 2017.

Jennifer Bountry and other SOS members commented about a statement in the paper:

Faced with these uncertainties, managers may: 1. Apply safety factors or use methods that result in more conservative design alternatives

Perhaps this statement should be clarified so that designers don't think of using larger rip rap or deeper sheet pile. Incorporation of redundancy and resiliency may be good ways to deal with uncertainty.

Some ideas were discussed on publicizing the white paper after its completion and a couple of organizations were identified:

WESTFAST Western Federal Agency Support Team

<http://www.westernstateswater.org/westfast/>

Association of State Floodplain Managers

Technical Presentation

As a follow-up to the previous day's SOS field trip, Joel Sholtes presented research finding from the paper "Stream power framework for predicting geomorphic change: The 2013 Colorado Front Range flood" (Yochum, Sholtes, Scott, and Bledsoe, 2017). A summary of the field trip is attached.

Subcommittee on Sedimentation Website Review

The SOS web site (<https://acwi.gov/sos/>) briefly reviewed and found to be a bit out dated. Everyone seemed to like the organization of the web site for National Water Quality Council (<https://acwi.gov/monitoring/index.html>). A work group was formed to more carefully review the website and recommend changes: Toby Minear, Scott Davis, and Amanda Cox). Tim Straub said he would talk with Mark Landers about having someone serve from USGS.

Subcommittee on Sedimentation Prospectus Development

The SOS Terms of Reference is dated September 10, 2003 (https://acwi.gov/sos_TORS_9_23_2003.pdf). The most recent SOS prospectus is for the years 2007 to 2012 (https://acwi.gov/sos/Prospectus2007_2012_online_12_18_2007.pdf). A work group was formed to review these documents and recommend updates: Eddy Langendoen, Tim Randle, Scott Davis.

Next Meeting

The next SOS quarterly conference call meeting (1 to 2 hours) is planned for January 2018. The next face-to-face meeting is planned for March or April in Washington D.C. Tim Randle will send out a poll to determine the specific dates that will work best for everyone.

Adjourn

The meeting adjourned at 4:15 PM.

Attachment – Subcommittee on Sedimentation Field Trip

Colorado Front Range between xxx and Lyons, Colorado, September 7, 2017

The SOS field trip was organized by Toby Minear and Joel Sholtes to visit the flood damage and reconstruction from the September 2013 floods along Upper James Creed near Jamestown, Colorado and the South St. Vrain Creek near Lyons Colorado. The following people attended the field trip:

Peter Nelson	Colorado Water Resources Research Institute
Toby Minear	Cooperative Institute for Research in Environmental Sciences
Han Sang Kim	DOI - Bureau of Reclamation
Melissa Foster	DOI - Bureau of Reclamation
Joel Sholtes	DOI - Bureau of Reclamation
Nate Bradley	DOI - Bureau of Reclamation
Tim Randle	DOI - Bureau of Reclamation
Victor Huang	DOI - Bureau of Reclamation
Amanda Cox	Missouri Water Resources Research Center
Eddy Langendoen	USDA - Agricultural Research Service

The following people from Lyons, CO provided briefings of flood damage and reconstruction along the South St. Vrain Creek:

- Jim Blankenship (JLB Engineering)
- Victoria Simonsen (Administrator, Town of Lyons, Colorado)
- Scott Shipley (S2o Design and Engineering)



Figure 1. SOS field trip participants on Upper James Creek near Jamestown, CO (Eddy Langendoen, Joes Sholes, Nate Bradley, Amanda Cox, Melissa Foster, Han Sang Kim, Toby Minear, and Tim Randle) [Photo taken by Victor Huang].



Figure 2. Looking upstream along Upper James Creek, near Jamestown, CO [photograph taken by Tim Randle].



Figure 3. Looking downstream along St. Vrain Creek near Lyons, CO [photograph taken by Tim Randle].