

RECLAMATION

Managing Water in the West

Federal Interagency Sedimentation Project

Research and Development Office
Science and Technology Program
(Interim Report) ST-2015-2559-2



U.S. Department of the Interior
Bureau of Reclamation
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Mission Statements

The U.S. Department of the Interior protects America's natural resources and heritage, honors our cultures and tribal communities, and supplies the energy to power our future.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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NUMBER(S) ST-2015-2559-2****12. DISTRIBUTION / AVAILABILITY STATEMENT**Final report can be downloaded from Reclamation's website: <https://www.usbr.gov/research/>**13. SUPPLEMENTARY NOTES****14. ABSTRACT** The Federal Interagency Sedimentation Project (FISP) is the national leader in the identification, evaluation, and development of standardized, calibrated equipment and methods for consistent, accurate quantification and analysis of sediment characteristics and transport in surface waters, which support the proper characterization and management of natural resources. The FISP committee is made up of representatives from several Federal agencies. The FISP advances part of its mission through contracted research, primarily surrogate sediment measurement methods and instrumentation. The remainder of the FISP mission is met through approving new and overseeing existing sediment measurement methods, equipment, and procedures. The ultimate goal of the FISP is to achieve consistent and accurate measurement of fluvial sediment across all Federal agencies and other entities.

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Peer Reviewer: I have reviewed the assigned items/sections(s) noted for the above document and believe them to be in accordance with the project requirements, standards of the profession, and Reclamation policy.

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FISP Background

The Federal Interagency Sedimentation Project (FISP) is the national leader in the identification, evaluation, and development of standardized, calibrated equipment and methods for consistent, accurate quantification and analysis of sediment characteristics and transport in surface waters, which support the proper characterization and management of natural resources. The FISP was created in 1939 by the following agencies: the U.S. Department of Agriculture, the Bureau of Reclamation, the Office of Indian Affairs, the U.S. Geological Survey (USGS), U.S. Army Corps of Engineers (USACE), and the Tennessee Valley Authority (TVA). The FISP was created to unify the research and development activities of Federal agencies involved in fluvial-sediment studies.

Currently, the FISP is headed by the US Geological Survey and the chief is Dr. Mark Landers. Other partner agencies include the Bureau of Reclamation, U.S. Forest Service, Agricultural Research Service, U.S. Army Corps of Engineers, USEPA, and Bureau of Land Management. The committee interacts with other organizations including federal agencies, academia, and private industry for research and development of standardized, calibrated equipment, and methods to allow consistent and accurate quantification of sediment characteristics and transport in surface waters. FISP activities focus on the measurement and analysis of suspended sediment, bed load sediment, bed material, bed topography, adsorbed constituents, and sediment characteristics using physical samplers and surrogate technologies.

The FISP meets twice each year, once in the fall and again in the spring. The location of these meetings is typically co-located with a current or past FISP-funded project or other location relevant to sediment measurement. The fall meeting is when research proposals are reviewed, judged, and awarded. During the spring meeting presentations are provided by each funded researcher as a progress update. Regular FISP business is conducted at both meetings. The FISP is funded by partner agency contributions and from the sale of sediment sampling equipment developed by the FISP. The Hydrologic Instrumentation Facility

(HIF), located at Stennis Space Center in Mississippi, handles the sales and oversight (QA/QC, etc.) of FISP sediment measurement equipment.

FISP activity can be tracked on the [FISP website](#).

Project Update

Fall Meeting 2015

In FY2016 the FISP held two committee meetings. The fall meeting was held in Reston, VA, December 2 – 3, 2015. Details of this meeting include:

- Attended a field trip to Rock Creek, hosted by the USGS. Viewed emerging technology to remotely operate, control, view, and download continuously collected surrogate sediment data.
- Molly Wood was announced as the new sediment specialist for the USGS, replacing John Gray (retired).
- Reviewed HIF sales update as it pertains to FISP equipment sales. These were the lowest sales since 2008.
 - Johnny Wheat reviewed the QA database for FISP samplers
 - Reviewed sampler inventory
- Hosted research updates on FISP funded projects
 - Justin Boldt (USGS) – CFD analysis of sampler nozzles
 - Dr. Xiaofeng Liu (Penn State) – verification of FISP sampler using CFD
 - Jeb Brown (USGS) analysis of side-looking Doppler acoustics an upper limit to these devices
- Discussed FISP's role in supporting the USGS sediment labs, not financially but regarding lab methods & techniques, QA/QC, etc.
- Discussed upcoming research on hydraulic efficiency of bed load samplers. Drs. Bunte and Thornton (CSU) will be performing this research for the FISP.
- Discussed procedures for near-bed suspended sediment sampling;

- 0.9 * Depth vs. 2-ft off the bed, when and where is each one appropriate? Will release FISP memo when supporting data are available
- Discussed and voted on research proposals submitted for funding. Selected the following priority for funding. The FISP budget allowed the top three to be funded.
 - 1. Drs. Bunte and Thornton – testing the hydraulic efficiency of pressure difference bed load samplers
 - 2. John Gray (USGS retired) – complete reporting of flume tests on trap efficiency of pressure differential bed load samplers in the flume at St. Anthony Falls Lab.
 - 3. J.R. Rigby (ARS) Sound propagation and flow induced noise in gravel bed streams for sediment generated noise measurement of bed load
 - 4. Tim Calappi (USGS) Visualizing the measurement of bed load; camera options, feasibility, and stability
 - 5. Kate Norton (USGS) Quantification of the performance of a custom built laboratory vane splitter for separating fine suspended sediment into equal-mass, equal-volume subsamples
- Discussed FISP memo regarding bag samplers and the recommendation for performing an efficiency test for each nozzle used. We now have enough information from field users to retract this recommendation.
- Committee discussed sediment acoustics methods for the Techniques and Methods (T&M) report, Surrogate Analysis and Index Developer (SAID) tool, and training.
- Committee discussed the FISP chief's priorities for in-house research
- Discussed FISP membership by agencies who used to be members but no longer are
- Set meeting date and time for next meeting, Boise Idaho (USGS host) the week of April 25
- Meeting adjourned

Spring Meeting 2016

The spring FISP meeting was held in Boise, ID April 26-27, 2016. Details of this meeting include:

- HIF update
 - Covered sales for first half of FY
 - Discussed efficiency testing of bag samplers, lab and field tests
 - Discussed testing of the LISST ABS, an acoustic backscatter device that works similar to an Optical Backscatter Sensor (small sample volume). Sampler has some problems with accuracy across a 15° C temperature variation
- USGS T&M report on single-frequency sediment acoustics expected to be approved within days of the meeting. This T&M report is guidance for the use of side looking Doppler devices for suspended sediment measurement. Guidance for dual-frequency devices will be included when available,
- Updates (via teleconference) on FISP funded research
 - Dr. Xiaofeng Liu (Penn State Univ.) – Accuracy evaluation and verification of FISP sediment samplers through CFD. Final report expected around May 1 2016
 - Jeb Brown (USGS) – Analysis of lower limits of densimetric suspended sediment concentration measurements
 - John Gray (USGS retired) – Calibration of four bed load samplers
 - Dr. Daniel Wren (ARS, for JR Rigby) – Investigation of sound propagation and flow-induced noise in gravel-bed streams for SGN measurements

- Drs. Thornton and Bunte (Colo. St. Univ) – Flume testing for hydraulic efficiency of pressure difference bed load samplers
- Update on FISP budget from FISP Chief. Discussed funding difficulties with some agencies no longer supporting the FISP
- Discussed a follow-up workshop on surrogate sediment measurement, to be held in 2017 or 2018? Likely the latter. Will discuss with the chief of the Office of Surface Water (Robert Mason). This workshop will be done in conjunction with the Consortium of Universities for the Advancement of Hydroscisnce and Engineering
- Discussed the application of down-looking ADCPs for suspended sediment concentration measurements. A key assumption used for side-looking ADCPs is not valid for down-looking ADCPs. How do we get around this?
- The committee discussed future funding possibilities and the likelihood that a 1-year funding hiatus might be necessary to square up funded research.
- Toured Univ. of Idaho lab and flume. Listened to presentations from Drs. Elowyn Yager and Daniele Tomina, highlighting current research at UI.
- Determined next meeting to be held in Traverse City, MI (USACE sponsor)
 - Dates to be determined later
- Meeting adjourned

Data Sets that support the final report

There are no data sets associated with this project.