

# **FISP Technical Committee Spring 2017 Meeting**

**May 2-3, 2017**

**USGS California Water Science Center, Sacramento State University Campus  
Sacramento, California**

**Attendees:** Rob Hildale (BOR), Roger Kuhnle (USDA ARS), Mark Landers (USGS FISP), Jim Selegean (USACE), Molly Wood (USGS; arrived at 10:00), Joe Schubauer-Berigan (EPA; by phone)

## **Tuesday, May 2, 2017**

**08:00** – Welcome message by Scott Wright, USGS California Water Science Center

**08:10** - Meeting called to order

- The Technical Committee (TC) reviewed the planned agenda for the spring 2017 meeting. The agenda was revised to add a presentation by Kate Norton at 14:30-15:00 on an error analysis she conducted on low suspended sediment concentration analyses.
- The amended agenda was accepted by the TC.
- The TC reviewed the minutes of the fall 2016 FISP TC meeting. Rob motioned to approve the minutes; the TC approved.

**08:30** - Discussion with HIF on sampler sales and testing

- A report from Johnny Wheat was presented by Mark.
- FY17 sales for 1<sup>st</sup> half of year (Oct-Mar) were \$61,800. Total FY sales projection is unknown.
- The top seller was the D-96. A report of sales is attached to the minutes.
- P6-200 efficiency testing in the flume: 98.7% at 3.7, 6, and 10 ft/sec.
- Estimation of uncertainty in sediment predictions was discussed.

**09:00** - FISP 2017 Interim Budget Review

- See attached report.
- Agency contributions to date: BOR for \$24,000. No other agencies have transferred funding because of the FY17 budget continuing resolution. USACE and USDA-ARS will initiate fund transfers after a FY17 budget is passed.
- J.R. Rigby and J. Gray will be sent funds as part of their contract research funding.

**09:30** - LISST-ABS Discussion

- Mark has been testing a LISST-ABS (8MHz) in the field (Missouri River). Others testing them are David Topping (Colorado River), Jeb Brown (Rio Grande), and Scott Wright (Bay Delta). There is a strong size dependency in the LISST-ABS. Must use in an environment where sand size is not substantially changing. If sand size changes during sampling, an independent measure of sand size is needed.

**10:00** - Updates on Existing FISP Projects

**10:01** – John Gray - bedload report

- Discussed John's progress on bedload data report. He has generated a number of figures and is looking for feedback on format and content.
- Report should include all raw data in a machine readable format.
- Comments by FISP TC members on John's figures requested by May 16.
- John's goal is to get a draft in the hands of the report co-authors by May 23.
- John probably should get his report into editorial review by end of FY (for funds to be obligated in current FY, there needs to be an IPPA signed for the report).

**10:30** - J.R. Rigby and Daniel Wren – Sediment Generated Noise (SGN)/Hydrophone project

- J.R. submitted a paper to HMEM on the flow noise/SGN work. Finished a few runs in the flume at flow rates comparable to previous work at Half Moon Creek. Ran some simulations with no bedload. Fairly consistent spectral signals from water surface (bubble noise). Will present more work at HMEM. They decided they won't need to do tests at Stillwater Creek per original proposal.
- Would instead like to investigate whether they can detect grain size based on different signals in a flume environment. Frequency response changes based on particle diameter; but unknown is what effect shape of the particle has on this. Want to look at sensitivity of signal change to small changes in grain size.
- Univ of Miss is putting together a hydrophone array. This will help to test localized distribution - a mobile array that would allow you to map 2-D SGN/bedload. They would like to modify the proposal to incorporate this testing. Working on a cost estimate now to see whether there would be any change in cost.
- Money has not yet been sent to them from FISP. Mark states that we need the FY17 budget approved before we can send. J.R. will send a revised proposal (see previous bullet) by end of next week. Rob suggested stating in the proposal the timeline is based on number of months after receipt of funds.
- Molly asked whether J.R. is familiar with Matt Marineau's work? Yes, somewhat.
- Molly will ask Matt about sending J.R. Matt's Sauk River proposal when finalized just as an FYI.
- Flow noise relevant up to 4-5 kHz. Potentially spurious signals if your bedload signal is in this range, too.
- Originally wanted to go to Stillwater Creek because of natural banks. Now - can you take noise source and triangulate to determine where it is? Transient clicks, not a continuous wave source - in this case, boundaries don't make as much of a difference (boundaries would strongly reflect continuous wave sources).

**11:00** - Kristin Bunte (CSU) – Bedload sampler mesh configuration testing project

- Presentation attached.
- Project entails hydraulic efficiency (HE) testing of pressure difference samplers while varying mesh size, length, shape, and % open area/clogging.
- Tested: BL-84, Elwha, TR2: tested 4 different mesh sizes (2 for BL-84, 3 for Elwha, 4 for TR2), 3 flow velocities, 8-10 sampler/bag/net configurations in a 6'x40' flume.
- Results:
  - Use of a liner to simulate clogging had a greater effect (reduced HE and velocities) than using gravel to simulate clogging; possibly because flow adjusts by passing smoothly over a gravel wedge instead of turbulence induced by blocked end.
  - HE often >100% especially for TR2 and Elwha
  - Sampler width strongly influenced HE

- Overall %Ao final had a negligible effect in most cases compared to other factors like sampler size and target velocity.
- TR2: net clogging reduced HE in fast flow
- Elwha: equal effects of mesh density and clogging on HE
- BL-84: clogging stronger effect than mesh density
- Longer and more flexible nets have more even HE for different fill levels
- Recommendations for optimizing HE:
  - Create a sampler with a reduced expansion ration for large pressure diff samplers
  - Downscale Elwha to 3"x6"
  - Flume and field experiments new ideas
- TC members indicated a logical next step would be to study the effects on the actual material sampled. The biggest effects are still likely scooping and sucking/vortices.
- Kristin would like to publish a paper but would need additional funding – would take about 4-6 weeks to write?
- TC members will talk with Dan Cenderelli about a possible arrangement to allow Kristin time to write paper.

**12:00 – 13:15** – Break for lunch

**13:15** - FISP bag sampler memo

- Mark led discussion on some of the highlights.
- TC members had a couple of comments but will provide more comments once have a chance to review in more detail.
- Some discussion on how often methods like Edwards and Glysson would be updated to incorporate new policies.
- Jim asked - how do people find out about the latest methods if they are not familiar with OSW or FISP?

**14:00** - Recently published WRR paper on sediment samplers/sampling (Gitto et al)

- Mark led discussion; wanted to know whether we should issue some kind of statement or review
- Key issues with paper:
  - Authors disregarded many of Mark's review comments
  - Authors didn't address the uncertainty in a 1 vs 9 vs 12 minute samples
  - Authors didn't consider what kind of sampler would be needed to collect the volume that would result from a 9 or 12 minute sample
  - Authors used a LISST for velocity measurements
- Mark stressed the need for a paper describing all the sources of uncertainty in collecting sediment data.
- All TC members should read the paper and provide input on whether we think we need to write a response. Would it be worth the time? What would be the goal?

**14:15** - Some discussion on a SSC sample replicate (A and B set) policy

- USGS planning to develop a policy to clarify for the field
- Perhaps policy should be to look for sand and collect a B set if there is substantial sand? Following Edwards and Glysson policy.
- Perhaps require people to code the other set as a replicate if flow is steady; might require some re-coding of SedLogin.

- Right now FISP “recommendation” is to get both every time, but many offices not following this.

#### 14:30 - Kate Norton (USGS CVO) - Analytical Uncertainty on Sediment Lab Results presentation

- The goal of Kate’s work is to quantify bias and uncertainty of sediment laboratory results
- Evaluating two methods for uncertainty determination: propagation and method performance
- Relative uncertainty increases as mass decreases
- Lower mass detection threshold determines detection limit
- Propagation method - shows that larger sampling volumes reduce uncertainty
- Method performance (SLQA program and in-house knowns) - found consistent 2-4% low bias in concentration and -1 to -6% in % finer in in house knowns and most of the SLQA samples because you always lose a little (mainly fines) during sample handling. "Nominal" pore size of filters - could be some variability. 15-20 mg is kind of a breakpoint to get a lower bias and lower variability
- Challenges with how to translate these biases to an environmental sample.
- Kate indicates that detection limits are about 2 mg divided by your sample volume
- USGS sed labs report that 8.2% of sample are asking for net sediment below RL 0.0020 g and 36% want sand break net sediment below 0.0150 g.

#### 15:30 - Discussion of ADCP SSC Test Datasets

- Molly presented the latest update on work
- Molly will send out an email with planned dates of dataset collection to FISP members - invite them to come along.
- Jim S mentioned that the plan is set for collecting a dataset on the St. Joe River; waiting for a storm event.
- Went over field plan for the following day on the Sacramento River.

#### 16:20 - Discussion of emerging surrogate technologies

- Rob discussed upcoming work on Cherry Creek on May 24. The plan is to survey sediment movement before and after sediment release out of reservoir. USGS will be collecting sediment data downstream of the dam using a DH95. Rob wanted to rent a LISST 100X but not possible; Mark is going to loan an ABS; Rob will check on borrowing a LISST 200X.
- TC members briefly discussed new instruments (combined optical and acoustic) being developed by Sequoia
- Rob gave a brief update on Dave Varyu’s supergage work on Arroyo de los Pinos (ephemeral tributary). Jonathan Laronne involved. Some delays in site setup/contracting so missed monsoon season this year. Not sure when it will be constructed.
- Jim asked whether there was any other surrogate work going on? Observation that a lot of sediment surrogate work has been initiated in government sector, not so much academia, which is unusual.
- Mark mentioned Nutrient Sensor Challenge; vendors are the ones winning these.
- Molly mentioned an idea of contributing funds to USGS Innovation Fund to try to direct funding for sediment surrogate technology development.
- Jim - idea of a scholarship to PhD students or MS students to help fund sediment surrogate research?
- Some talk of other hot topics - remote sensing, sediment fingerprinting, structure from motion.

**17:30** - Talked briefly about upcoming conferences

- Molly mentioned HMEM in July 2017, USGS Data Conference in August 2017, RiverFlow in France Sept 2018.
- Mark mentioned continuous QW monitors workshop in Atlanta in June - around 80 people.
- Tim Randle heading up 2019 SEDHYD conference planning - Mark on planning committee.
- Budget cuts and conference scrutiny impacting all.

**17:40** - New membership

- Dan Cenderelli working on getting USFS to join.
- Matt Collins (NOAA) may be a possibility
- Molly will talk to Tim Mayer (FWS)

**17:45** - Possibility of a CUAHSI workshop

- We had talked about doing a suspended sediment surrogate workshop
- Another idea is to do something on remote sensing of sediment
- A lot of uncertainty in budgets and ability to plan and participate in conferences in the next few years
- Table further discussion until later

**17:50** - Agency Updates

- Rob Hilldale - BOR - Mentioned Research Challenge Grant, reservoir sedimentation work. Also canal safety - concern about sediment in canals; could be a good use of sediment surrogates to measure sediment in canals; sometimes it's coarse sediment that is of interest for abrasion; other times it's finer sediment; impacts on water diversion conveyance.
- Molly Wood - USGS - Mentioned dual frequency updates to SAID tool; multidisciplinary USGS Sediment Round Table to brainstorm USGS sediment research directions and data needs; opportunities for sediment monitoring and modeling as part of Gulf Restoration work post-Deepwater Horizon.
- Roger Kuhnle - USDA ARS - Research on impact plate work; would like to do some varying frequency response work with impact plates; piggy backed on gravel transport and hydrophone work already being done in flumes. High resolution laser measurements to try to relate transport to grain size - come up with a better way of scaling surface for transport and develop a prediction tool. More hydrophone work planned - 2 hydrophones mounted close together provide a lot of information, connecting 2 channels.
- Jim Selegan - USACE - Focused on Detroit work - Source to sink lagtime study - BMPs implemented on farmland - do we see any reduced need to dredge - no. Why? Jim is looking at what is the lagtime of sediment fluxes. Using geochemistry; radioisotopes. Doing a sediment workshop this year - bringing someone in to teach field methods on RFID tag tracking for gravel. Might experiment with using drones to do the detections of the tags. No cost for the workshop. Jim looking for an RFID expert (Roger suggested Mary Nichols with ARS). Just completed a dam capacity study around the Great Lakes. USACE has communities of practice similar to USGS Sediment Round Table concept. Some discussion on ISDOT - multibeam - is this considered remote sensing?

**18:20** - Next FISP TC Meeting

- Jim will set the agenda; Molly will take notes.

- Possibility: Sapelo Island, Georgia; University mini-campus
- Tentatively October 24-25, 2017

**18:30** – Adjourned meeting

**Wednesday, May 3, 2017**

Field data collection on the Sacramento River at Freeport (USGS 11447650) to test the use of downlooking ADCPs for estimating suspended-sediment concentration.

Personnel were divided up on two boats.

Field work involved:

- collecting point sediment samples with a P-6 sampler at 25 locations (5 verticals, 5 depths within each vertical);
- collecting stationary profiles of ADCP data at each vertical (3 ADCPs: 1200kHz TRDI Rio Grande, 600kHz TRDI Rio Grande, multifrequency SonTek M9)
- collecting turbidity and LISST-ABS profiles at each vertical
- collecting bed sediment samples at each vertical
- organizing and labeling all samples
- maintaining field notes