SUBCOMMITTEE on SEDIMENTATION
USGS, Office of Surface Water Quality
Reston, Virginia
April 5, 2012
9 AM, EST

The meeting was called to order at 9:00 A.M. by Marie Garsjo, Chair. Present were:

- Marie Marshall Garsjo, Chair, and retired geologist, Natural Resources Conservation Service (NRCS), National Design, Construction, and Soil Mechanics Center, Ft. Worth, TX
- Jen Bracewell , USGS, RESSED FilemakerPro Team Member, Reston, VA
- Alan Ellsworth, Water Resources Division Liaison for National Park Service (NPS), Washington D.C.
- Doug Glysson, Hydrologist, Office of Water Quality, U.S. Geological Survey (USGS), Reston, VA
- John R. Gray, National Sediment Specialist, Office of Surface Water, USGS, Reston, VA
- Meg Jonas, Assistant Levee Safety Program Manager, U.S. Army Corps of Engineers (USCOE), Washington D.C.
- Lee Koss, Bureau of Land Management (BLM), Washington D.C.
- Kevin Laurent, USGS, RESSED FilemakerPro Team Member, Reston, VA
- Paul Makowski, Federal Energy Regulatory Commission (FERC), Washington D.C.
- Robert Mason, Acting Chief, USGS Office of Surface Water, Reston, VA
- Matt Römkens, Director National Sedimentation Lab, and Researcher in erosional processes, Agricultural Research Center (ARS), Oxford, MS
- David Wegner, Guest, Senior Democratic Staff, Subcommittee on Water Resources and Environment, Committee on Transportation and Infrastructure

Via WebEx:

- Jon Fripp, Stream Mechanics Engineering, NRCS Alternate, Fort Worth, TX
- Tim Randle, Manager of the Sedimentation and River Hydraulics Group, BOR, Lakewood, CO
- Amanda Cox, Research Scientist, Colorado Water Resources Research Institute, Colorado State University (CWRRI)
- Jeff Bradley, ASCE Representative, WEST Consultants (Water Environmental Sedimentation Technology), Salem, OR
- Deborah Cooper, U.S. Army Corps of Engineers, RESSED FilemakerPro Team Member
- Mark Landers, Chief, Federal Interagency Sedimentation Project, and staff member, Office of Surface Water, USGS, Atlanta, GA
- Joe Schubauer-Berigan, Environmental Protection Agency (EPA), Cincinnati, OH

Meg Jonas graciously agreed to keep the meeting notes.

OLD BUSINESS

Agenda was reviewed and adjusted **Garsjo**

Accept minutes of January 2012 meeting **Garsjo**

Acceptance moved by John Gray, seconded by Matt Collins

National Stream Morphology Database (NSMD) John R. Gray/Matt Collins/Marie Peppler

The National Institute for Water Resources (NIWR) is considering a proposal by Marion Muste and others to develop design specifications for the National Stream Morphology Database. Marie Garsjo and John Gray wrote a letter of support for the proposal February 21 on behalf of both the ACWI Subcommittee on Sedimentation and the USGS. Accomplishing this critical step should render the actual development of a National Stream Morphology Database to be a relatively straight-forward programming project. The Subcommittee on Sedimentation and the USGS look forward to the proposal receiving a full and fair evaluation in light of the strong need for a database of this nature and are confident that the proposal itself will be a good contribution to structuring the plan for the SOS NSMD workgroup.

Matt Collins reported that Marie Peppler (USGS) has been leading a sub-workgroup charged with identifying the next steps for developing a NSMD and the means to achieve it. On May 15, the sub-workgroup published in AGU-EOS a "Forum" article entitled, "Developing a National Stream Morphology Data Exchange: Needs, Challenges, and Opportunities"; see: http://acwi.gov/sos/2012EO-forum.pdf].

Marie Peppler stated that the sub-workgroup came up with two action items: a) a proposal for a pilot project through the NIWR; and b) an ArcGIS Online portal to collect data and/or metadata for the pilot project.

Matt Römkens indicated that Andrew Simon had been expected to join the subgroup, but has retired. A second potential subgroup member, Doug Shields, is retiring in May. Due to funding limitations, ARS is losing the two people who are the most experienced people in fluvial geomorphology, and will not replace them.

A question was raised regarding where the metadata will be housed. Marie Peppler stated that it would be free and housed by ESRI, a company specializing in GIS mapping software (www.esri.com). Meg Jonas commented that: a) the database would be valuable for channel and sediment management in watersheds; b) that there will probably be a lot of controversy about processes; and c) she would like to see a strong Corps presence from the river engineering staff, but was not sure how to implement it.

John Gray stated that we would not have a single data standard metric for a given parameter, but multiple metrics that have been published which can be selected by those collecting the data. For instance, on bridge scour, there are a variety of methods in the literature that could be listed and the user would select one most appropriate to their project. Matt Römkens suggested beginning with a large, inclusive selection, which would gradually be narrowed down. Matt Collins stated that their focus is less on particular methods and more on common reporting standards and metadata, and that they are not being prescriptive of data protocols or methodologies.

Doug Glysson suggested that the subgroup might consider proposing the development of a new standard to the ASTM subcommittee D19.07, on "Sedimentation, Geomorphology, and Open-channel Flow". There, it would be exposed to a wider audience in the approval process, and would have consensus approval. There is weight associated with ASTM standards; they have never been successfully challenged in a court decision. ASTM has a new system that allows a proposed standard to be submitted and then reviewed on line. Any non-member can join ASTM at $75 annually and then vote on any standard. Possible input could be coordinated through the Office of Water Data, which has funded retirees to write guidance on groundwater and other issues.

Ron Ferrari is the chair of this ASTM committee. Mark Landers, Chief of the Federal Interagency Sedimentation Project (FISP) is going to take Doug Glysson's place on the committee. Most of the committee members actively work on turbidity issues. The group addresses methods like TSS vs. SSC analyses and operating a gaging station. Doug Glysson agreed to post Marie Peppler's 14-page document and the list of ASTM standards pertaining to sediment on our website.

Sediment Hydroacoustics Workshop Summary **John R. Gray**

John Gray provided a summary of the sediment hydroacoustics workshop held March 20-22, 2012, sponsored by the SOS. The USGS has produced a protocol on turbidity (http://pubs.usgs.gov/tm/tm3c4/) and is working on a protocol for the use of suspended sediment hydroacoustics. Sediment hydroacoustics measure selected characteristics of suspended sediment, bedload, and bed material. John Gray stated that they can measure several orders of magnitude more streamflow with the turbidity hydroacoustics, which measure "at-a-point", providing much better information on the variability of sediment concentration in the flow. Mark stated that the backscatter is indicative of the quantity and size of suspended material, and noted that backscatter is affected by many other factors which may complicate its use for this purpose.

Mark Landers stated that the workshop brought people together from academia, federal agencies, and industry, all of whom were in agreement that hydroacoustic technology has the potential of being widely used. A workshop summary was published in AGU-EOS Vol. 93, Number 26, page 244, June 26, 2012.

The meeting began with a series of plenary talks by Alex Hey, Marian Muste, Thad Pratt, David Abraham, John Gray, Jim Chambers, and others. They focused on suspended sediment, but also discussed bedload

and determination of bed-material gradation and the complementary data on flow hydrodynamics provided by some hydroacoustics instruments (e.g., ADCPs). Their key research issues are determining how to promote and improve the use of acoustics so that its use is equivalent or better than that of turbidity instrumentation, and to refine the use of acoustics to determine fluxes and gradations of sediment.

The USGS and FISP are forming a sediment-acoustic workgroup that includes people from other agencies including the Corps and USBR. Industry people were included in the workshop.

Matt Römkens suggested including this topic in the SEDHYD conference and also asked about international representation. Doug Glysson indicated that it will be added, and Mark Landers stated that they will include bedload and other topics as well.

FISP still lacks equipment or procedures that can replace physical samples, and they are working on hydroacoustics and other surrogate methods. Tim Randle asked Mark if he is aware of their activities on the Elwha River. Mark responded that FISP funded an investigation using bedload sensors to measure bedload, a hydroacoustic sensor and a laser diffraction device. They obtained quite a bit of other information, and found that the quantitative results on bedload were very exciting.

REServoir SEDimentation Database (RESSED) **John R. Gray**

David Wegner, Senior Democratic Staff, House of Representatives Subcommittee on Water Resources and Environment Committee on Transportation and Infrastructure, started the discussion. David had worked with the USBR while they were working on the Glen Canyon Environmental Studies. Meg Jonas gave a presentation on the RESSED program, which she is frequently requested to do. There are four relevant areas that face us in Congress:

- Reservoir Management: There are ~ 85,000 dams (reservoirs) in the COE National Inventory of Dams and we need to know how to manage the data necessary to evaluate the storage capacity of reservoirs that are losing storage capacity due to sedimentation. This includes the NRCS watershed management program. How should we manage those reservoirs?
- Dam Removal: Examples include the dams on the Klamath River, and the Elwha and Glines Canyon Dams. Many dams will be evaluated to determine the quantity and quality of sediments that will evacuate the system once a dam is removed. How do you lessen the impact on people and biota downstream as a dam is removed?
- Fish Passage and Sediment: USFWS is working with FEMA to replace bridges and culverts. How should the sediment behind those structures be managed?
- Climate Change: How to manage data associated with climate change to better understand its impacts on sedimentation? What are the impacts? What are the sediment impacts of more-frequent, higher flows? What is the impact on infrastructure?

The USEPA has published a list of the top ten impairments to the Nation's surface waters. If sediment is removed as an impairment, nine out of ten of the top ten impairments would likely drop off of the list. Reservoir sediment data are also being collected by State agencies and should be added to the national database. The problems with sediment data for arid states are even worse.

There are six to nine million impoundments in the US, most of which are stockwater ponds. The cumulative amount of sediment stored behind those structures is huge. Tim Randle stated that the cost of a large reservoir survey is about $100K, and that the costs go way down if you are just looking at sediment, rather than getting detailed information on shoreline changes. Joe-Schubauer-Berigan asked if we are doing any modeling in watersheds with which the RESSED data can be confirmed. Meg Jonas responded that the RESSED data complements sediment gage data and that all analyses are used to asses watershed sediment yield.

John Gray hopes that the WaterSMART program will provide a permanent home for RESSED. Robert Mason commented that water census looks at different parts of water budget. John Gray indicated that COE's Jerry Webb wants RESSED support to be a line item in the USGS budget. Matt Römkens indicated that is why we got the ACWI RESSED support resolution passed in July, 2011.

Jen Bracewell discussed and showed the RESSED interface screens, which consists of a series of different tabs. There are ~27 factors that can be recorded for each reservoir. If sediment studies are run on a regular basis, some data will be collected that is the same for each reservoir, for example the height of dam. There is a tab on the screen that will show the user which points are missing.

Kevin Laurent thanked John Gray, Meg Jonas, and Tim Randle for their involvement in this project. The COE's Omaha District had provided six to seven pages of comments on RESSED. He stated that the database is flexible and can be adapted to meet not only our needs now and those of the future. Output formats must be flexible, and Kevin discussed their use of the "query" style. A user can extract information and export it to Excel, XML (of which html is a version), JavaScript, or other formats. These formats also include Corpsmap and other web-based applications.

Meg Jonas discussed background and requirements for data import. There is a need for Corps to collate their own data. Matt inquired about NRCS and other agencies, as this is a national database – if USGS is to continue to lead the RESSED effort – base funding in the USGS budget is needed. Notes on sediment activities started in 1940's and were compiled by regions. Doug Glysson stated that the SOS used to send a call out to their agencies to get data. The USGS, USBR, SCS/NRCS, and the Corps were the major agencies that would provide data; although the last data submitted by the SCS/NRCS was in 1985. After each compilation was finished, all SOS representatives were given copies of all the Form 34's that had been collected since the last compilation and were expected to keep an "official file" for their agency.

Tim Randle stated that we need a national sedimentation database that is available to the public. Doug Glysson asked how much trouble is it to put data into the spreadsheets and whether it will be automated. Tim Randle replied that it has to be manually entered and it is summary data. Jen Bracewell

stated that there are a lot of ways to enter the old data into the new RESSED database, modifying only what had changed. Tim Randle stated that Kevin Laurent and Jen Bracewell have done a great job of organizing the database and making the data entry more user friendly. Matt R. Römkens asked if we will have enough surveys to determine the impact of sediment on dam failures and potentially develop early warning systems. Dave Wegner asked John Gray if there was an estimate of funding requirements, so Dave can shop this around on the Hill. John provided the following cost estimates in 2012 dollars to Dave on April 9 via email, representing annual needs for a full "RESSED-21" program:

Estimated Costs for a "RESSED-21" Project (4/9/2012, John R. Gray)

Year I:	**$376 K**
Year II:	**$388 K**
Year III:	**$399 K**
Year IV:	**$305 K**
Year V:	**$192 K**

Meg Jonas indicated that the Corps does not want RESSED support coming out of other COE budget items like dam and levee safety. Since it is a national-scale project, then the Corps would like to see a USGS line item in the budget for it. Robert Mason stated that the Streamstats database provides a service for a fee. John Gray stated that if the USGS has to pay for it without the line item, they will lose gaging stations and he's been loath to press the issue within the USGS. OMB 92.01 authorizes the USGS to collect and store the nation's water information. Doug Glysson asked if someone wanted to find information on reservoirs with water quality or environmental studies, could they search and find them. Jen Bracewell stated there are places for putting general notes and that they could add a module for this information, or other data collected. Joe Schubauer-Berigan suggested that users be tasked with supplying this information.

Federal Interagency Sedimentation Project (FISP) Mark Landers

Mark discussed the progress of the FISP and FISP-sponsored research efforts. In 1939, the entities that would become the FISP and SOS started to support standardized, accurate, comparable sediment data collection efforts by multiple federal agencies. A lot of research has gone into designing an isokinetic sampler, where the water coming in represents the overall flow velocity, sediment concentration, and grain-size distribution in the stream.

The P-61 point integrating sampler, which has a mechanical valve, could be used for sediment but not for water quality since the metal valve parts can contaminate the sample. The DH-2 and the D-96 were developed to take larger and cleaner samples at greater depths. The D-96 can be used up to 112 feet, and the P-61 can sample to 180 feet. The P6, which was approved for use in 2010, replaced the P-61 (1961 point sampler), which had many moving parts. One researcher on the Colorado River (Grand Canyon) questioned the D-96 sampler because it did not seem to be isokinetic in shallow turbulent flow there. FISP is still looking into this potential issue with the D-96. It works well in nearly all the tested

environments; so we want to alert users to potential problems and get additional tests in environments other than the Colorado River.

A second mission of the FISP is to supply samplers and documentation of methods to the federal community. They now contract out the construction of the samplers, but still supply and perform the QA/QC and repair, in partnership with the USGS Hydrologic Instrumentation Center. A third mission is to fund research to advance sediment-monitoring technology and methods. Typical research grants are on the order of approximately $25K. They are funding work in sediment hydroacoustics and laser diffraction (IL and WA Water Science Centers). They are also funding research with a digital imaging particle size analyzer, which involves passing the sediment mixture through a flow-through cell, using a high-speed camera and a 2-D digitizer to obtain both the size and shape of each particle. This technique has a lot of promise. Another of FISP's ongoing projects is a pilot study for evaluating the characteristics of bedload transport. Past projects include: a depth-integrating sampler for small channels (application in urban areas); silt and clay measurements; and a method of sampling bedload by sequential mapping of bedform movements (David Abraham).

The FISP is directed by a technical committee formed by members of multiple federal agencies (USGS, USBR, BLM, ARS, COE, and the USFS). The USACE historically has had a major role in the FISP; more recently Jim Selegean from the Detroit District has served as a non-voting representative. The EPA historically has also been a voting member; more recently Joe Schubauer-Berigan has served as a non-voting representative. The research and instrument supply efforts of the FISP are funded by contributions (annual $15K minimum) from participating federal agencies, giving them the right to vote; the USGS and Corps have traditionally contributed staff time as well.

Sediment surrogates, such as turbidity, estimate sediment characteristics with greater accuracy, temporal resolution, and potential lower costs, after they have been calibrated to physically sampled sediment (see discussion of hydroacoustics seminar for CUAHSI).

A question was asked regarding the continuing need for the FISP, since they have physical samplers and methods ready. Mark Landers answered that they are still finding problems with existing samplers, and developing surrogate methods that have great potential. With the widespread and accelerating use of sediment surrogate methods we once again (as in the 1940s with physical samplers and methods) have diverse methods producing non-comparable sediment data with unknown accuracy. Tim Randle stated that yes, the FISP is doing a valuable job and that the surrogate methods are very important. The need for the FISP is as important today as it was in the 1930's.

Mark wrapped up discussing the challenges going forward. FISP is an interagency effort. They would like input from the SOS, and encourage interagency coordination. They would like to re-engage agencies like USACE, EPA, TVA, and others. Many of the ASTM standards grew out of the FISP effort. Matt Römkens indicated that he knew they were working on better sampling protocols and asked if they are also working on the underlying physics. Mark responded that they have more sedimentologists and

hydrologists than physicists and they do need more physicists. Marie Garsjo ended the discussion stating that FISP will be added to the agenda for 15 minutes at each quarterly meeting.

Reservoir Sustainability Workshop **Tim Randle**

See Attachments 1 and 2, Reservoir Sustainability Workshop Flyer and Agenda

Tim Randle discussed the Reservoir Sustainability Workshop to be held July 10-12, 2012. The SOS is a sponsor, along with the U.S Society on Dams (USSD) and the American Society of Civil Engineers (ASCE). Greg Morris will deliver the keynote lecture. Ron Ferrrai, USBR; Rollin Hotchkiss, professor, BYU; Kyle Juracek, USGS; and others will give talks. John Gray will talk on RESSED.

The workshop is open to the SOS and people with some expertise to contribute. A white paper will be developed from the workshop. Participants will discuss in what situations different methods would be required, including watershed modeling, bypassing, etc. Matt Römkens stated that he would like to have University of Mississippi representatives there for the modeling discussions. Tim Randle stated that the discussion would probably be more on management instead of modeling. Alan Ellsworth (NPS) asked about dam decommissioning. Tim Randle responded that there is a different group on this and they already have had two workshops. For example, the San Clemente Dam has no identified project benefits, and the price tag for its retirement is between $40-80M. Doug Glysson asked if there will be a registration fee. Tim Randle responded that they will not because the SOS contributed funding, and they will keep their budget at that level.

Joint Federal Interagency Sedimentation and Hydrology (SEDHYD) conference Doug Glysson

Doug Glysson discussed SEDHYD 2014. Doug Glysson and Jerry Bernard will be going to Las Vegas and Reno the week of June 18 to look at a total of eight hotels. With all the problems associated with government travel, they will be talking to hotels about other aspects. Jeff Bradley told him the ASCE EWRI conference will be held early in June, so they will work around that date. They evaluated the costs of air fare to the various locations, using 300 participants for an estimate. They did not receive any hotel proposals from Tucson. The estimate from the Sheraton in New Orleans was twice the cost of the others. The others are coming in at approximately the same costs: $1,300-1,400 per person. Because of new government regulations, Doug Glysson will write up what they did to select the city and hotel. For a June meeting, we would be on schedule. If the meeting is to be between March and May, we are behind schedule. We need to get an announcement out in December if not before.

A 1.5-day organizing meeting will be held. Sometimes this meeting is coordinated with an SOS meeting, but the other committees need to be present as well. Marie Garsjo stated that we need to find mentees to follow us around and be able to take over for the next conference. Tim Randle sent a write-up for the Grand Canyon field trip. Meg Jonas suggested getting mentees from leadership development programs in each agency. Jerry Webb was going to check on an AV person from HEC so that we don't have to hire a person as we did last time.

Prospectus 2007 – 2012 Update **Marie Garsjo**

Marie Garsjo discussed the prospectus from 2007. It needs to be updated, as its sunset date of 2013 is approaching. Paul Makowski sent Marie some great ideas. She volunteered to write up the "sediment issues confronting the federal sector" but would like others to volunteer for the other parts. Marie also asked about the bylaws for the FISC, which are currently in the prospectus, and would like to see them put with the other FISC documentation. Doug Glysson indicated that our new sediment concept would have each agency do one page with a proscribed format. John Gray suggested we get three or four people and do it. Joe Schubauer-Berigan stated it would take five years; though he thinks it is worthwhile. Also, there has been difficulty in finding this information. Doug Glysson stated that the USGS does not have money. John Gray asked if it should be annual and if some information can be automated. Marie Garsjo will head up the review, and she and Meg Jonas will discuss the sedimentation activities. Meg Jonas will review the input.

Summer SOS Meeting **Marie Garsjo**

The next meeting will be a WebEx meeting held on Thursday, June 28th at 11 AM EST. The Fall meeting will be held on Monday, August 20th, at Port Angeles, WA. A field trip will be held on the next day, August 21st. It was discussed that the SOS might contribute to costs required for the field trip, but no decision was made.

The meeting was adjourned at 3:30 PM.