Federal Interagency Sedimentation Project (FISP)
Technical Committee (TC)
Tuesday, November 8-10, 2011
USGS Flagstaff Science Center, Arizona
Minutes

The Technical Committee (TC) meeting was held at the USGS Flagstaff Science Center, Flagstaff, Arizona on from 1 p.m. Nov. 8 to 11 a.m. Nov. 10. Chair John R. Gray lead the meeting, and turned the FY2012 gavel over to Vice Chair Roger Kuhnle upon adjournment of the meeting. A TC field trip was based from the Albright Training Center, South Rim of Grand Canyon National Park on November 7. Snow and fog limited the sites that could be visited to the area around the Albright Training Center.

Present:
John R. Gray, USGS representative
Rob Hilldale, USBR representative
Roger Kuhnle, USDA-ARS representative
James Selegean, USACE visitor
Joseph Schubauer-Berigan, US EPA, visitor
Mark Landers, FISP Chief

On webX:
Johnny Wheat, HIF, affiliate
Dan Cinderelli, USFS representative.

Visitors: David Topping, Flagstaff, USGS, Jack Schmidt, Flagstaff Science Center Director, USGS, Tom Sabol, Flagstaff USGS + others

Tuesday, November 8, 2011

Introductions: Call to order by Gray at 13:00

A welcome to the USGS Flagstaff Science Center, Grand Canyon Science Center was provided by Jack Schmidt, Director of the facility.

Arrange for note-taker: Roger Kuhnle, with assistance from other TC members, in future vice-chair will take notes. Kuhnle will be the TC Chair upon adjournment of this meeting for the through the fall 2012 meeting. Rob Hilldale as the vice-chair who will take over as chair after the fall 2012 meeting.

Review/Vote on minutes from Spring TC meeting, discussion: none, motion to pass by: Kuhnle, seconded: Hilldale, passed by voice vote.

Agency research interests in sediment sampling technology were reviewed by representatives presents:

- FS Cinderelli: interested in suspended sediment measurement methods as well as bed load for use in developing TMDLs.
- BR Hilldale: more interested in bed load than suspended load techniques. BR also has an interest in reservoir sedimentation.
- COE Selegean: interested in both improved suspended load and bed load techniques. Perhaps bed load interests are more important.
- ARS Kuhnle: interested in technologies to measure wash, suspended, and bed load, bed material. ARS is strongly interested in automated technologies as to make the collection of sediment data more affordable.
- EPA (Joe) is interested in a wide variety of techniques. Sedimentation and capping of contaminated sediments, resuspension. Interested in stream restoration, water quality as it relates to sediments (suspended). Interested in urban systems and streams that flow through them. EPA does not have money to hire people to collect data – thus emphasizing the need for automatic systems. Tiered monitoring (1st level order of magnitude and maybe more-specific data.
- USGS Gray: USGS is charged by OMB Circular 92-01 to collect, archive, and disseminate the Nation's water data. This includes sediment and water-quality data. The preponderance of USGS monitoring and research has been on suspended-sediment load, often with the goal of quantifying water-quality issues. However, the USGS remains keenly interested in data on, and new means for, measuring and monitoring bedload, bed material, and bed form.

Gray presented a review of the long (since 1939) history of the TC and Subcommittee on Sedimentation, the role they historically have played and the future direction of the committee. He stated that the TC has been studying sediment surrogates for over 20 years as a means for providing sediment data of greater quality, at a cheaper cost and with greater temporal and spatial resolution. These advanced methods in quantifying the size and flux of sediment in fluvial systems are a critical piece of the future of hydraulic engineering and is one of the main focuses of the TC. (Selegean opinion – for a hydraulic engineer to remain relevant into the 21st century they must be skilled in the use of numerical models to solve a wide range of river engineering problems, and moreover, must be skilled at interpreting, and in some cases collecting, high resolution data sets for model calibration and validation that are only obtainable through the use of sediment-surrogate techniques, i.e., hydroacoustics, laser diffraction, optics, pressure differential, and other technologies.). It was emphasized that the use of surrogates in combination with conventional measurements or the use of multiple surrogate techniques at a site is not redundant but rather synergistic and can offer much greater insight into sediment dynamics.

FISP Research: LISST Technical summary of method, data, findings, recommendations

Tim Straub (Urbana, Illinois, USGS, via web X): LISST-SL with concurrent physical samples from a boat and a bridge, flow measurements also. He described13 data sets from 11 sites with

concentrations ranging from18-2,200 mg/l. Flow velocities ranged from 1.1 – 7.6 ft/s, and depths from 2-30 ft. In testing 170 samples, 17 density determinations (Pycnometer Testing) indicated a values of 2.56 – 2.72, with a mean value of 2.64 (cost $50 each for density measurement). The range in particle sizes measured by the LISST-SL might be problematic in some of the Illinois rivers in wich the device was tested, in that it appears a substantial percentage of the sediment in transport was clay-size material smaller than the 1.5-micron minimum value measured by the –SL. . LISST results for concentration were about 2.5 times larger than lab results; a technically supportable explanation was not available at the time of the meeting An adjustment was used to compare lab determined results to LISST because of unmeasured sizes. Some problems were noted regarding the –SL tail catching debris and the pitot tube for inferring pressure plus dynamic head plugging up. Aside from concentration accuracy issues, which are obviously critical to the ultimate usefulness of the -SL, the device performed well. David Topping noted that he has seen similar software glitches on LISST instruments. David also noted that he has had problems with the LISST-100 in measuring very fine sediment sizes

Reagan Huffman subbed for colleague Chris Curran (via web X, Tacoma, Washington, USGS): They received their comparative data but 2 weeks ago and hence have not had time to do a sufficient analysis. They are still having deployment issues – weight of sampler is not sufficient for the flows in which they have been using the LISST-SL. –SL-measured velocities have been biased low compared to other measurements.

Mark Landers (Atlanta, Georgia, USGS): LISST-Streamside Results from Yellow River near Atlanta. This system operates by pumping water from the stream past the bank-mounted LISST-Streamside. This should remove the problem of sensor fouling common to in-stream optical instruments. The Streamside was acquired in 2009. It originally had temperature-compensation problems. Requires a clean water supply for collection of a background reading. Comparisons were made between lab-determined sizes and concentrations and LISST-Streamside values. The LISST-
Streamside performed well but problems were encountered when comparing mass-based size distributions from samples and volume-based size distributions from the Streamside. Apparently there were problemswith unmeasured fraction. The data follow the trends of the data well but the volumetric to mass conc comparison is nearly 1 to 1 rather than the expected ratio of 2.65 based on the assumed density of predominant minerals in nature, quartz and feldspar. It is not clear what is happening. David Topping remarked that transmission as well as rings are used to calculate size by LISST. Therefore there may be some "bleeding" from grains that are too fine for the LISST to measure. Topping and associates have seen similar biases in concentrations measured by the LISST-100 and have calibrated the instruments in the lab. Empirically derived density coefficients were determined to deviate significantly from 2.65. They also found that there was a different relation for coarser than finer sizes i. e. they developed and used two different calibration equations.

LISST discussions and decisions. The LISST instruments use laser technology to measure volumentric size distributions and infer concentrations from those measurements, but comparative mass-based data from physical samples are not providing the expected close match in results from both methods. The instruments cannot "see" particles with a diameter less than

about 2 microns. The instruments apparently track the data (Landers) but require calibration to get actual concentration by size data. Right now they make "a great research grade instrument, but they (LISST) need to be extensively calibrated before they will be ready to be used for data collection and are not ready to approved by the Technical Committee for use by the wider sediment group of users" (Landers).

FISP Research and Discussion: Acoustic Surrogates of SSC

Acoustic Method for estimating fine sediments using a purpose built sensor (Chambers)
James Chambers was inadvertently not invited to present at the meeting.

High-resolution monitoring of suspended-sediment concentrations and grain-size distributions using multi-frequency hydroacoustics.
(Topping)

David Topping gave a detailed account of the use of acoustic attenuation and backscattering to calculate concentrations of suspended sediment and to infer size classes as sand or finer material in the Colorado River in the Grand Canyon. They have observed that concentration and size of sediment changes with rising and falling stages (hysteresis) in data from the Colorado River in the Grand Canyon. Therefore one needs to monitor sediment transport throughout the hydrograph. Acoustic instruments do not require frequent servicing (~every 2 weeks or less) required by LISST instruments deployed in a stream. Acoustics can measure suspended sediment concentrations much higher than LISST-type instruments. Also, the measurement field for acoustics in the Colorado River, Grand Canyon, is orders of magnitude larger than that associated with point-measuring devices such as a pumping sampler, LISST, or turbidimeter. Frequency is important in the measurement of sand sizes (backscatter) but matters very little for silts and clays (attenuation).

His conclusion was that at least two frequencies of acoustics are needed to measure sediment concentration and size classes but conventional samples are needed to calibrate the acoustics and then to verify the technique. The acoustics allows the collection data to include much more temporal and spatial coverage than conventional samples likely would because of personnel requirements and cost.

Meeting adjourned at 17:45.

Wednesday, November 9

FISP Research and Discussion: Acoustic Surrogates of SSC (continued)

Methods and Results for estimating SSC and Sediment Loads from ADCPs (Landers)
Mark present data from using SSC surrogates from an urban river in which the population in the watershed is 500,000. An ISCO sampler, US D-95, LISST-streamside, ADCP 1.2 MHz , 1.5MHz, 3 MHz side lookers mounted on bridge pier were all deployed at the USGS gage Yellow River at Gees Mill, GA. Mark was unable to determine sediment size using acoustic

attenuation from theoretical curve. Results from the LISST-Streamside, and three frequency acoustics were successful after calibration with conventional samplers.

Discussion for future research directions and recommendations to FISP on Acoustics Surrogates

The big selling point for hydroacoustics is that one can obtain a near-continuous record of the sediment concentration at several locations across a cross-section, rather than just a few vertical samples from manually collected samples at a more-or-less single discrete time. The errors for acoustics are larger than for manual samples but as long as the biases of the method can be removed the greater record is very valuable. Topping recommends that two frequencies are the best compromise to get size and concentration data from ADCPs. This winter, a professional paper from Wright, Topping and others will be available on how they calculate SSC from acoustic information. Scott Wright says that some general guidelines could be written, but that in some cases it may not work as well as other surrogates. There is still some uncertainty in the technique. Scott Wright thinks that instruments should have data from the manufacturer for standard backscatter references.

Letter from FISP chair to acoustic manufacturers about the need for standard backscatter data for commercially available ADCPs!!??

Performance of FISP samplers during 2011 Mississippi River Basin Flood

Heather Welch, (Web-X) USGS, USGS Mississippi Water Science Center, Pearl, MS gave a summary of some of the problems they encountered with samplers and other equipment during Mississippi River floods last spring. The Mississippi basin received more than 5 times the average precipitation this past spring. Sampling at the Mississippi River at Vicksburg was accomplished using a US D-96 sampler from a 21-ft boat. The workers encountered a problem with pinhole leaks of some of the sample bags used with the D-96 sampler.

Action Item: How to handle the bag with bag samplers needs to be spelled out in guidance in the future.

The decision to deploy suspended-sediment samplers to 0.9 depths (90 percent of total depth, leaving the bottom 10 percent of depth unsampled) should be looked into by the FISP. This approach to collecting samples in the Mississippi River is used by the the MS and LA Water Science Centers of the USGS. Scott Wright suggests that a calibrated ADCP may be a good method to use in large wide channels. We need to get some input from sampler users on how to sample in rivers with different characteristics. **John Gray would like people to email him info on this topic.**

Jason Alexander, Dave Rus, (Web-X) USGS Nebraska Water Science Center, related experiences of sampling the 2011 flood on the Missouri River. The goal was to estimate transport of both bed load and suspended load in the Missouri River. A FISP US BL-84 was

used to collect bed load samples. They encountered many problems with high flows, bed forms, and sampling from a high bridge using the US BL-84.

USGS Professional Paper 1774: "Field Evaluation of Error Arising from Inadequate Time Averaging in the Standard Use of Depth-Integrating Suspended-Sediment samplers", by By Topping, Rubin, Wright, and Melis.

There was a short presentation of the results of Professional Paper 1774 by David Topping. Basically, David recommended that the TC read the report and draw our own conclusions on their conclusions, which can be summarized more or less as, "Get the maximum number of verticals and transits as practical."

FISP TC Disccussion of EDI/EWI methods Does the info in this report indicate to TC that additional research or guidance from FISP is needed?

Action item: Technical committee should read PP1774 and discuss for next meeting.

Results of Flagstaff Science Center Bag Sampler (D-96) Testing on Colorado River Sabol/Topping

Based on an extensive sampling project at sites on the Colorado River in Grand Canyon, the US D-96 sampler was determined to generally collect samples at below isokinetic rates. This was attributed by the the principal investigators to be caused by inefficient venting of water from the cavity of the sampler to the stream (i.e., backflooded water outside of the bag, not sample water). They found that the intake rate of water of the US D-96 decreases with time, particularly after about 60 seconds of immersion. They noticed that some US D-96 samplers had a shorter tray inside to support the bag and that the shorter tray seemed to improve the isokinetic performance of the US D-96. Although the US D-96 is was found to sample at sub-isokinetic rates from a large amount of data, it appears to not oversample sand (as sedimentological theory would suggest) when compared to paired data collected with a bottle sampler in the Colorado River.

Idea from Scott Wright: LISST-SL could be modified to sample at different velocities with a manual control of the pump. With the control of the pump, sampling velocity could be controlled and the effect on sediment concentration and size as measured by the SL could be compared.

Idea from Mark: instrument a US D-96 with pressure transducers on the inside and outside to see if the pressure increases with time as the bag fills.

Action item: Send a memo to all users to check the isokinetic functioning of the US D-96, US D-99, and US DH-02 routinely with their use and to send this data to the FISP.

Bedload by Bathymetry, Abraham and McElroy

It is their thesis that bed load and suspended load may be calculated using bathymetry of bed forms. The hypothesis is that the mean deformation of bed forms (dunes) as they migrate is related to the suspended part of bed material load.
Mean flux=translative flux+deformation flux. Multi-beam data and other data were collected from the lower Mississippi River. This technique yielded data that came within a factor of 2/3 to independent measures of bed load and suspended load. The question several of asked ourselves was: Does deformation flux really equal suspended load?

Progress and Plans (see document) of FISP

Query other presenters to see if their presentations may be placed on line (Mark).

Draft FISP Research Plan for 2012 (document)

Priority List

Evaluation and verification of accuracy of FISP physical samplers such as bag samplers.

Memo to ask for isokinetic data with all bag samplers.

Gather data that have been collected on hydroacoustics

Budget proposed by Mark accepted by TC. Gray moved, Kuhnle seconded, approved unanimously by TC

Sales report by HIF (Johnny Wheat attached in appendix)

Total sales(attached report)

New Agreement :IAG It was decided to change the IAG to an MOU with no mention of dollars. Each agency will work out its own method to transfer dollars to the FISP. John Gray will work with the USGS Office of Policy and Analysis to achieve this goal.

FISP discussion, The TC agrees to give Landers the task of developing a Memo

Thursday, November 10, 2011

Vice-chair FISP TC for 2012 will be Rob Hilldale, USBR

Proposal discussion.
Fifteen proposals were submitted. It was decided that each agency representative would make a list of their top 5 proposals. The top one was given 5 points down to 1 point for the fifth proposal. Those projects with the greatest total points would be prioritized for funding. . The

top five projects are listed below. The top three proposals will be funded if funding projections do not change.

Ranking of proposals:

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Pro #	Name of proposal	Points
11	ADCP/LISST-SL/SSC data analysis and surrogate testing, Part I only. J. Czuba, Straub, Curran, USGS, IL, WA	20
10	Digital Imaging for Particle Analysis and Characterization Gooding, USGS, CVO, WA	17
3	Pilot Study for Evaluation of Multi-Frequency Acoustics as a Surrogate for Bedload Transport Wood, USGS, ID	14+
1	Advanced Computational Fluid Dynamic (CFD) Modeling of a FISP Sampler Stroesser, Georgia Tech	14-
6	Deploying Passive Hydrophones to Identify Temporal Distribution of Bedload Sediment Fosness, USGS, ID	12.5

Summary of Action Items for FISP Chief from Nov 2011 Technical Committee Meeting:

- Announce winners for FISP proposal Process
- Contact Czuba/Straub/Curran about modifications to their proposal for funding
- Follow up with HIF and USGS Sed Labs regarding (a) pinholes in bags, and (b) method(s) for sending bag samples to lab
- Prepare FISP memo regarding bag samplers that (a) reminds and emphasizes need for hyd. eff. (H.E.) tests when using bag samplers; (b) requests existing and new H.E. test results be forwarded to HIF, along with any ancillary data and experiences
- Build data base of bag sampler H.E. and ancillary data results
- Contact HIF mechanical engineering group about instrumenting a D-96 with internal to external pressure differential sensors (for starters)
- Work with selected field crews to obtain side-by-side D-96 and P-61, or D-fixed bottle sample results
- Work w/ Sequoia to consider effects of variable speed intake to non-isokinetic conditions on measured volumetric concentration results
- Prepare a FISP fact sheet for use in developing FISP amongst Federal Agencies
- Work with TC Chair to further develop Federal Agency participation
- Query other presenters to see if their presentations may be placed on line (Mark).
- Letter from FISP chair to acoustic manufacturers about the need for standard backscatter data for commercially available ADCPs!!??

Summary of Action Items for Other TC Members from Nov 2011 Technical Committee Meeting:

- Action item: Technical committee should read PP1774 and discuss for next meeting. **(All TC members)**

- New Agreement :IAG It was decided to change the IAG to an MOU with no mention of dollars. Each agency will work out its own method to transfer dollars to the FISP. **(John Gray will lead)**
- Action Item: Draft and distribute a memorandum asking users of bag samplers to adhere requirement articulated in the 1990's to time duration of bag sampler deployment and determine the mass of the water-sediment mixture obtained to compare to velocity measurements in verticals (Landers and Gray lead)
- Action Item: How to handle the bag with bag samplers needs to be spelled out in guidance in the future **(??)**

Tentative: Next meeting of the FISP-Technical Committee
Around March 19 before Hydroacoustics Workshop, Shepardstown, WVa.
Or April in Fort Collins, CO

Adjourned 11:20

Appendixes
I. Agenda
II. HIF Report on Sampler Sales
III.

Fall, 2011 FISP-TC Meeting Agenda

Tuesday November 8th

Welcome from the Chief, Flagstaff Science Center (0:10, Schmidt, Melis or Topping)

- Introductions, Review and approval of Agenda (0:10, Gray)
- TC Chair, Vice-Chair, FY2012; arrange for note-taker for minutes of this meeting (0:10, Gray)
- Review of/Vote on Minutes from Spring TC meeting (0:10, Gray)
- Brief Review of Approved Research Plan for FY2012 and Call for Proposals (0:15, Landers)
- Discussion of Procedure for Proposal Selections: Historical method; Any Suggestions for Changes; Decision on Procedure for FY2012 (0:25, Landers/TC)
- Review/discussion on history and present TC membership (0:15, Gray)

Hand Out Hard Copies and Summary Spreadsheet of All Proposals (Landers)

FISP Research & Discussion: Laser Diffraction

FISP Research: LISST -- Technical Summary of Method, Data, Findings, Recommendations (~20 minutes each, and they stay on for discussion)

- Dr Tim Straub (Illinois)
- Chris Curran (Washington)
- Mark Landers (Georgia)

LISST: **Discussion and Decisions** on criteria for FISP surrogate-technology approval –

a.) Would FISP approve individual LISST instruments or a suite of instruments with this technology?

b.) Does FISP want to approve a technology or device for volumetric concentration within instrument-specified size range – and discuss its many benefits and limitations and how this is used to determine SSC? What would TC want the Technical Memo to say?

BREAK

FISP Research & Discussion: Acoustic Surrogates of SSC

Acoustic Methods for estimating fine sediments using s purpose-built sensor: Chambers
Acoustic Methods for estimating SSC and Sediment Loads from ADCPs: Topping

Wednesday November 9th

FISP Research & Discussion: Acoustic Surrogates of SSC (continued)

Methods and Results for estimating SSC and Sediment Loads from ADCPs (30 min) Landers
Discussion for future research directions and recommendations by FISP on Acoustics Surrogates

Performance of FISP samplers During 2011 Mississippi River Basin Flooding

- Heather Welch, USGS, Mississippi Water Science Center (:20)
- Jason Alexander/Dave Rus, USGS, Nebraska Water Science Center (:20)

Discussion (:20)

FISP Research & Discussion: Physical Samplers

USGS Professional Paper 1774, "Field Evaluation of the Error Arising from Inadequate Time Averaging in the Standard Use of Depth-Integrating Suspended-Sediment Samplers" by Topping, Rubin, Wright, Melis. (Evaluation of EDI/EWI sampling procedures)

BREAK

Results of Flagstaff Science Center Bag Sampler Testing on CO River Tom Sabol/David Topping
FISP TC Discussion of Bag Samplers – Does Research Plan for FY2012 reflect our best experimental plan in response to bag-sampler findings?
LUNCH
FISP TC Discussion of EDI/EWI Methods – Does the information in this report indicate to TC that
additional research or guidance from FISP is needed? Of what sort and scope and timing?

FISP Research & Discussion: Bedload

FISP Research: Bedload by Bathymetry: Abraham and McElroy (30 min)

FISP Progress, Plans, and Budget

FISP Progress, FY2011 – (:20) Landers
FISP transitions, Web Site, Contract Management, FISP Chief Research,
FISP Research Plan and Focus for Call for Proposals, FISP IAG

FISP Plans for FY2012 – review and discuss research plan and goals (:30) Landers

BREAK

FISP Budget: review of 2011, Proposed for 2012 – (:30) Landers

FISP-HIF: instrument purchases, stock, testing, QA, sales, & repairs (:30) Wheat
P-6 Testing Results, Issues, and Status
Discussion of FISP IAG (was MOU) (:30) TC
FISP Discussion and Decision: FISP Memo approving T&M Turbidity for use? (Landers)

Thursday November 10th

FISP Proposal Selection for 2012

Discussion, Ranking, and Selection for 2012 Proposals (1+ hr)
BREAK
Closure, Ranking, and Selection for 2012 Proposals (1+ hr)

TC Membership and Support in FY2012 and Thereafter
Next TC Meeting: Date, Location
Adjourn

Current Status of FISP Samplers at the HIF

P-6 Sampler

Performed initial inspection of sampler head to determine why the sampler leaked water through the nozzle with no power applied to the solenoid. When the sampler was dropped in Tacoma the nozzle was jammed at the far end of its threads where it connects with the head and makes contact with the flap of the solenoid. Basically the nozzle was not screwing in far enough into the head to make a water tight seal with the flap unless a wrench was used to tighten the nozzle to its proper position. The threads on both nozzles and the head were re-tapped to allow the nozzles to be inserted against the flap properly using no wrenches (**finger tight**). I received a total of 4 stainless steel springs from Mr. O'Neal to replace the steel springs in the solenoid assembly. The old springs were changed out and the sampler was taken to the Hydraulics Lab for functional testing. Several runs were done at 3.7 feet per second in the flume with no power applied to the solenoid at time durations of 30, 60, 90 and 120 seconds and no leakage through the nozzle was detected. Functional Sampling tests were performed at 3.7 feet per second and the sampler complied with efficiency criteria for stated velocity.
The P-6 Sampler is repaired and tested and awaits deployment for more field testing.

DH-95 Samplers

The initial inspection of 4 samplers revealed a flaw in the machining of the 0-ring groove in the head. The groove on these 4 samplers was machined to the proper depth in house and the vendor (Rickly Hydrological) was instructed on the proper dimension to correct this flaw. 10 more samplers were received and complied with drawing specifications with the exception of the sample bottle container would not insert properly inside the head. With previous samplers done by the HIF this cavity required no machining for the sample bottle to be inserted properly, it appears that the process in which the vendor's foundry poured these sampler heads differed and produced a smaller cavity than our previous samplers. The 14 samplers were stripped of paint, machined to the proper dimension to accept the sample bottle and repainted and reassembled in house. 5 DH-95 Samplers were taken for flume testing at the Hydraulics Lab and complied with functional testing. The remaining 11 samplers recently arrived and are in the process of being inspected. The finished dimension for the head cavity has been added to the DH-95 drawing package.
14 DH-95 Samplers are completed and are ready for stock; the remaining 11 are being evaluated.

D-96 Samplers

The initial inspection of 5 samplers was inspected for compliance with dimensional drawings, and other than some minor flaws (nozzle holder fit too tight mating to head insert; trays too loose or too tight) the samplers complied with dimensional drawing criteria. The 5 samplers were taken to the Hydraulics Lab for functional testing. The initial balance test revealed that all 5 samplers swam in the water with the nose down indicating that the sampler was either too heavy on the nose end or that the pivot point where the hanger bar attaches was not correct. This measurement was rechecked and the hanger bar distance complied with our drawing dimensions. The 5 samplers were taken back to the warehouse and weighed and compared to the weight of an existing D-96 Sampler in stock with the following results: Three samplers weighed 7 pounds lighter and 2 weighed 11 pounds lighter. This weight difference would change the location of the pivot point where the hanger bar attaches. The cause of this discrepancy is still being looked at, the alloy used for both the upper half (**bronze**) and the lower half (**aluminum**) comply with drawing specifications. The samplers were taken back to the Hydraulics Lab and tested for balance using the original welded tailfin which is smaller in diameter than both the bolted tailfin produced by Carnet Technology and Rickly Hydrological. The test resulted in no change of each samplers balance in moving water (3.7 fps) regardless of tailfin rear diameter size. The 5 samplers were then tested for sampling efficiency in the flume at 3.7 feet per second in the nose down position, all 5 samplers complied with efficiency specifications for the 3/16, 1/4, and 5/16 nozzle.
The 5 samplers were then balanced in the flume adding counter weights to the lower tail fin and tested for efficiency of all three nozzles at the same velocity. The test results from this run mirrored the initial test; all 5 samplers complied with the sampling efficiency specification.
5 D-96 Samplers are completed and are ready for stock, the remaining 20 will be individually balanced and efficiency tested in the flume.

BL-84 Sampler

A procurement to fabricate 4 samplers was recently sent to several vendors for fabrication quotes, one response received back from Carnet Technology was that the BL-84 sampler should have weight applied to the front tubing to prevent the sampler from tipping over during sampling at higher velocities and deeper depths. Research was done of all the HIF's archived and existing files on this matter and there was no documentation or drawings to verify this issue. After further conversation with Mr. Oneal (former FISP Chief) it was revealed that this revision to the sampler was never documented or relayed to personnel at the HIF, and that the FISP was in the process of revising the documentation to illustrate this change during the transfer of samplers and related documentation to the HIF. The BL-84 samplers that the HIF currently sell is fabricated by one FISP approved vendor (**Rickly Hydrological**) and is considered an off the shelf item meaning that only the intake nozzle is checked for dimensional compliance with HIF drawings. In the process of revising the entire drawing package our drafting section found several dimensional oddities in the tubing that should be better dimensioned and explained with drawing notes to have this sampler fabricated by other vendors in compliance with our drawings.
The BL-84 drawings are being revised to allow added weight to the front tubing and compliance with HIF drawings once fabricated by any vendor.

D-99 Sampler

The HIF has been tasked by the Office of Surface Water to build 3 D-99 Samplers and have them tested and ready for rental or loan to Water Science Centers by spring 2012. The FISP drawings have been updated and revised with dimensions and notes from our initial fabrication of 1 sampler 2 years ago. Once the casting are poured the units will be machined, then assembled and tested in house.
A procurement to have 3 D-99 samplers poured into castings has been initiated.