

**MEETING OF
ADVISORY COMMITTEE ON WATER INFORMATION'S (ACWI'S)
SUBCOMMITTEE ON HYDROLOGY (SOH)**

**12:30 AM – 3:00 PM (EDT)
9:30 AM – 12:00 Noon (Las Vegas Time)
July 7, 2009
Riviera Hotel, Las Vegas
Meeting Room - Skybox 210**

The meeting room is in the conference facility of the Riviera Hotel (the far section from the hotel and casino and on the second floor).

MINUTES

AGENDA

- | | |
|---|-----------------|
| 1. Welcome and Introductions | Steve Blanchard |
| 2. Review and Approval of Agenda | Steve Blanchard |
| 3. Approval of Minutes from April 30, 2009 Meeting | Steve Blanchard |
| 4. Status of Action Items from April 30, 2009 Meeting | Steve Blanchard |
| 5. Update on Hydrologic Modeling Work Group | Don Frevert |
| 6. Update on Hydrologic Frequency Analysis Work Group (<i>by phone</i>) | Will Thomas |
| 7. Update on Hydrologic and Hydraulic GIS Applications Work Group (<i>by phone</i>) | William Merkel |
| 8. Update on Extreme Storms Work Group (<i>by phone</i>) | Tom Nicholson |
| 9. National Hydrologic Information System (HIS) development and SOH effort | David Goodrich |
| 10. Current Events within Hydrologic Communities | All |
| • NWS Partners Meeting on June 25, 2009 – Gene Stallings | |
| 11. Announcements and Q&A on Business Reports from Member Organizations | All |
| • “ <i>The SOH CONNECTIONS</i> ” Newsletter Editor’s Report | |
| ○ Need for new co-editor – Richard Raione (NRC) has volunteered | |
| 12. Future SOH Chair and Vice-chair | Steve Blanchard |
| • Steve Blanchard’s and Mary Greene’s terms expire at the end of the October 2009 meeting | |
| 13. Plans for Next Meeting – October 2009 | Steve Blanchard |

Adjourn

SUMMARY OF THE MEETING

(Prepared by Mary Greene, USDA - NRCS – National Water and Climate Center)

PARTICIPANTS

Martin Becker	Defenders of Property Rights (DPR) <i>(by phone)</i>
Steve Blanchard	Geological Survey (USGS)
Mike Eff	Tennessee Valley Authority (TVA) <i>(by phone)</i>
Ted Engman	National Aeronautics and Space Administration (NASA) <i>(by phone)</i>
Don Frevert	Unaffiliated (USBR - Retired)
Doug Glysson	Geological Survey (USGS)
David Goodrich	USDA – Agricultural Research Service (ARS)
Mary Greene	USDA – NRCS – National Water and Climate Center (NWCC)
Greg Hanson	USDA – Agricultural Research Service (ARS)
Jeff Harris	Army Corps of Engineers (USACE)
Claudia Hoeft	Natural Resources Conservation Service (NRCS) <i>(by phone)</i>
Sam Lin	Federal Energy Regulatory Commission <i>(by phone)</i>
Paula Makar	Bureau of Reclamation (USBR)
William Merkel	USDA Natural Resources Conservation Service
Tom Nicholson	Nuclear Regulatory Commission (NRC) <i>(by phone)</i>
Dave Raff	Bureau of Reclamation (USBR)
Matt Römkens	USDA – Agricultural Research Service (ARS)
Tim Randle	Bureau of Reclamation (USBR)
Gene Stallings	National Hydrologic Warning Council (NHWC) <i>(by phone)</i>
Nancy Steinberger	Federal Emergency Management Agency (FEMA) <i>(by phone)</i>
Will Thomas	Association of State Floodplain Managers (ASFPM) <i>(by phone)</i>
Jerry Webb	Army Corps of Engineers (USACE)
David Wells	Environmental Protection Agency (USEPA) <i>(by phone)</i>
Don Woodward	American Forests
Max Yuan	Federal Emergency Management Agency (FEMA) <i>(by phone)</i>

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AGENDA

1. Welcome and Introductions Steve Blanchard
Steve Blanchard called the meeting to order at 9:05 AM (EST) and welcomed everyone. Each person introduced themselves and their organizational affiliation. There were 25 participants including 11 attending via phone.
2. Review and Approval of Agenda Steve Blanchard
Approved with no changes.
3. Approval of Minutes from April 30, 2009 Meeting Steve Blanchard
Accepted with minor modifications.
Action Item: Modifications to be sent to Mary Greene by Friday July 24, 2009
4. Status of Action Items from April 30, 2009 Meeting Steve Blanchard
All action items were completed.
5. Update on Hydrologic Modeling Work Group Don Frevert

**Report from Hydrologic Modeling Work Group
July 7th, 2009**

Don Frevert reported that the work group would meet on Wednesday morning July 8th to discuss plans and the program for the Fourth Federal Interagency Hydrologic Modeling Conference to be held June 27th through July 1st, 2010.

The conference will again be held in conjunction with the Federal Interagency Sedimentation Conference and a total of six tracks of oral presentations will be presented. Additionally short courses, poster sessions, exhibits and field trips will be included in the program.

A total of about 80 abstracts had been received to date for the Federal Interagency Hydrologic Modeling Conference.

The next meeting of the work group will be Wednesday, August 26th at 1:00 pm Eastern Time.

6. Update on Hydrologic Frequency Analysis Work Group (*by phone*) Will Thomas
Will Thomas reported that the June 2009 meeting of the HFAWG was postponed because the EMA – Bulletin 17B testing has not been completed. The next meeting of the HFAWG will occur when the testing team (John England, Tim Cohn and Nancy Steinberger) has completed sufficient test results to make a meeting worthwhile.

Will also reported that the Association of State Floodplain Managers (ASFPM) sent letters to the USGS and the House Appropriations Subcommittee on Interior, Environment and Related Agencies recommending the creation of a dedicated budget to ensure that the update of Bulletin 17B is completed in a timely fashion. ASFPM believes that the update to Bulletin 17B will help ensure that new maps created by FEMA delineating our nation's floodplains properly reflect the true risk of flooding. Specifically, letters were sent to Dr. Suzette Kimball, Acting Director of USGS, Matthew Larsen, Associate Director of Water for USGS, and to the Honorable Norm Dicks, Chairman, and the Honorable Mike Simpson, Ranking Minority Member, the House Appropriations Subcommittee.

7. Update on Hydrologic and Hydraulic GIS Applications Work Group (*by phone*) William Merkel

Report to SOH (July 7 meeting in Las Vegas) from GIS Applications in H&H Work Group
July 14, 2009

Teleconferences for Work Group members are held regularly. The last one was July 13, 2009 and the next one is scheduled for September, 2009. The teleconference minutes are posted at <http://acwi.gov/hydrology/h2gisa/>.

The overall purposes of the Work Group are to transfer technology among agencies and those outside of government and to promote communication among agencies with respect to use of GIS in water resources issues.

The current focus of the Work Group is to gather information (specific items listed in a questionnaire) for GIS applications in hydrology and hydraulics. Once this information is gathered, the plan is to post it on the internet for those individuals interested in learning about and downloading the various applications. There are currently 12 questionnaires received.

Dr. Vijay Singh maintains a list of hydrologic model contacts at Texas A&M University (TAMU). The web site for this is <http://hydrologicmodels.tamu.edu/> for anyone who wants to see what models are listed and their contacts. A proposal from the Bureau of Reclamation for a CESU agreement with Texas A&M has been approved for \$20,000. The GIS applications in hydrology and hydraulics will be included in the web site. There is a detailed plan of work for the graduate student at Texas A&M to conduct the project. This will include searching for additional GIS applications in hydrology and hydraulics. Coordination between the student and the Work Group will be ongoing over the next year. Placing the questionnaires on the web site will be the highest priority and this step should be completed in the fall of 2009.

Involvement with the upcoming 4th Federal Interagency Hydrologic Modeling Conference (June 2010) includes a submittal for an oral presentation. The presentation will cover the activities and progress of the work group.

8. Update on Extreme Storms Work Group (*by phone*) Tom Nicholson

9. National Hydrologic Information System (HIS) development and SOH effort David Goodrich
Below is the written report that David Goodrich reported on orally at the meeting. It was provided courtesy of Ilya Zaslavsky, a colleague of David Maidment on the CUAHSI- HIS team.

On behalf of the CUAHSI Hydrologic Information System project, and project PI David Maidment, we are pleased to submit the following report describing the main accomplishments of the project during April-June 2009. The main themes of the project continued to be: providing robust and easy to use data infrastructure for publishers and users of hydrologic observations data; supporting different communities in their use of HIS; developing new system modules (the Desktop HIS, in particular), joint work with federal and other data providers, and with international standards organizations, on refining water data services, and theoretical

developments at the intersection of hydrology and information management. Specific activities included:

- 1) **HIS Desktop Development.** HIS Desktop is a new component of HIS, designed as a desktop application for managing locally stored hydrologic data, integrating local data with data retrieved from remote water data services via WaterML, as well as combining hydrologic time series with GIS and model data. In the future, the HIS Desktop will host digital watershed and hydrologic workflow applications, synthesizing and transforming hydrologic data from multiple sources to support advanced analysis and modeling. The HIS Desktop is being developed over the MapWindow open source GIS platform. In the last three months, HIS Desktop database schema and functional specification have been finalized, and development of user interface tools continued. The HIS Desktop communicates with the HISCentral application over recently developed HISCentral services (item 2). It has been demonstrated at several recent workshops (item 3).
- 2) **HISCentral web services.** HIS Central is an online application that supports both hydrologic data publishers and data users. To support publishing hydrologic data, it provides tools for registering, indexing, and semantic tagging of submitted water data services. To support data discovery, it maintains a registry of water data services and an integrated metadata catalog that contains metadata for all published observation networks (40+ networks, from government and academic sources, and community projects), accessed via a spatial and semantic discovery client, Hydroseek. Over the last three months, an additional interface to the service registry and the metadata catalog has been specified and implemented: they are now accessible via web services, enabling data discovery from other applications. HIS Desktop is already taking advantage of the new web service interface.
- 3) **HIS training courses and presentations.** Disseminating HIS and recruiting new hydrologic data publishers and users is an integral part of the project. Several HIS training workshops were conducted by Tim Whiteaker: at UT-Austin (May 27) and University of Vermont (June 3-4); additional courses are planned. The previous workshop at Kansas state University (March 24-25) generated strong interest in HIS from respective state and local agencies. In addition, extensive HIS presentations were given at the US Army Corps of Engineers and at UC Davis (at Hydrology round table attended by many participants from California state agencies). An international HIS training workshop is being planned in Malaysia in July '09 (under separate funding). A CUAHSI cyberseminar conducted by D. Maidment and D. Tarboton on May 15 (<http://www.cuahsi.org/sem-current.html>), was attended by nearly 100 participants (estimated the largest turnout this year). Another day-long session focused on hydrologic information system is being planned as GIS Hydro 2009 (a pre-conference seminar at the ESRI annual meeting 2009). Multiple talks on the HIS project have been presented, including at the Australian Bureau of Meteorology (who have adopted several components of HIS as their interim solution for managing hydrologic data), at the European Geophysical Union meeting, at World Meteorological Organization, and at OGC technical meetings.
- 4) **OGC Hydrology Domain Working Group.** The domain working group (DWG) is organized within the Open Geospatial Consortium, the leading international spatial data standards organization. The focus of this working group is development of international standards for hydrologic data exchange, and promoting best practices in standards-based

hydrologic data management. The standards efforts within this group will leverage WaterML, the CUAHSI HIS-developed specification for exchanging hydrologic time series, which has been widely deployed and adopted by USGS and NCDC. The Hydrology DWG is a joint activity with the World Meteorological Organization's Commission for Hydrology. At the recent OGC Technical Committee meeting in Boston, Ilya Zaslavsky from the CUAHSI HIS project was elected as co-chair of the DWG. The DWG maintains a mailing list

(<https://lists.opengeospatial.org/mailman/listinfo/hydro.dwg>) and a web site with DWG materials

(http://external.opengis.org/twiki_public/bin/view/HydrologyDWG/WebHome) – both are publicly accessible.

- 5) **Hydrologic ontology development.** In the last months, significant effort was devoted to upgrading HIS data discovery system, in particular enhancing the representation of hydrologic variables by incorporating parameter lists developed by our agency partners. Several visualizations are available:

<http://test.hydroseek.net/ontology/USGSPParamOntology.html>, (mappings of 8300 USGS parameter codes to the EPA Substance Registry System);

<http://test.hydroseek.net/ontology/CUAHSIOntologyMay2009.html> (SRS and the parameter codes incorporated in the CUAHSI ontology),

http://test.hydroseek.net/ontology/CUAHSIOntologyMay2009_sourceOriented.html (same, with identification of ontology sources). Work continued with federal agency partners (USGS and NCDC, in particular), on water data service development and on technical details of service implementation.

- **CUAHSI HIS All Hands Meeting.** The AHM took place in April 2009 at SDSC, and was a chance for the team to discuss face-to-face the most important issues in HIS development, including enhancements to HIS architecture and interfaces between the main HIS components (HIS Central, HIS Desktop, HIS Server), maintaining operational water data services, HIS desktop development, and underlying data structures.

10. Current Events within Hydrologic Communities

All

- NWS Partners Meeting on June 25, 2009 – Gene Stallings

There were 75 participants who attended the National Weather Service (NWS) Partners Meeting on June 25, 2009. NWS Director Dr. Jack Hayes stated that the goals of the Partners Meeting are to continue to have dialogue with those partners who use NWS products and services. Dr. Hayes described the NWS Strategic Plan for 2010 to 2025 and stated that it is mandatory that Partners and Decision-Makers should be aware of future plans of the NWS. He also remarked that integrated water resources is a must and emerging science and technology should be addressed in NWS future planning efforts.

Dr. Edward Johnson, NWS Office of Planning and Policy, reported that staffing for NOAA's Science Advisory Board (SAB)'s Environmental information Services Work Group is now complete.

Gene Stallings, National Hydrologic Warning Council

11. Announcements and Q&A on Business Reports from Member Organizations

All

- "The SOH CONNECTIONS" Newsletter Editor's Report
 - Need for new co-editor – Richard Raione (NRC) has volunteered

- Confirmed unanimously by the subcommittee members
- **Action Item:** Submissions should be sent to Claudia, Mary, and Richard by Friday September 18, 2009
- Mary will serve as editor through the next newsletter publication. Claudia will then assume the editors position.

12. Future SOH Chair and Vice-chair Steve Blanchard

- Steve Blanchard's and Mary Greene's terms expire at the end of the October 2009 meeting
 - **Action Item:** Nominations should be sent to Steve Blanchard by Friday July 24, 2009
 - Steve will Chair the October meeting and Mary will assume the position of Chair at the end of the meeting.

13. Plans for Next Meeting – October 2009 Steve Blanchard

October 8, 2009 at Main Interior in Washington DC

Adjourn

Action Items from July 9, 2009 SOH Meeting

1. E-mail final modifications of the April 30, 2009 SOH meeting to Mary Greene by COB Friday July 24, 2009.
2. E-mail **Work Group Reports** to Mary Greene by COB Friday July 24, 2009.
3. E-mail **Member Business Group Reports** to Mary Greene by COB Friday July 24, 2009.
4. E-mail **Vice-Chair nominations** to Steve Blanchard by COB Friday July 24, 2009.
5. E-mail **Newsletter entries** to Claudia, Mary, and Richard Raione by COB Friday September 18, 2009.
6. Steve Blanchard will inform ACWI that NWS is no longer performing PMP analysis for the Federal community. Steve will report back to the SOH at the October meeting regarding the outcome of this discussion and any potential funding opportunities.
7. **Next Meeting:** October 8, 2009 at Main Interior in Washington DC

SOH Member Business Reports for SOH Meeting July 7, 2009

Current: July 27, 2009

FERC – Sam Lin

1. FERC in May held on an internal all hands video training session to explain the proposed changes to the FERC Security program, Revision 2, and the improvements to the Dam Assessment Matrix for Security and Vulnerability Risk (DAMSVR). DAMSVR is the methodology developed by FERC to assess the security measures at FERC dams.
2. FERC participated in an Association of State Dam Safety Officials (ASDSO) Subcommittee meeting in June focusing on needed improvements and updating of the ASDSO Program of Study (POS) for dam safety professionals. The ASDSO POS is an established curriculum that provides for necessary training opportunities for dam safety engineers at all stages of their career, entry, mid-level and expert level.

National Hydrologic Warning Council – Gene Stallings

With over 300 participants, five concurrent speaker tracks, and the largest exhibition hall of vendors ever, the 2009 Vail Conference and Exposition was a huge success. The value of the Conference and the strength of the agenda and speakers, along with the fun social networking events enabled the NHWC to hold its largest conference ever – even during the worst economic times in a generation. It was the biggest and the best! San Diego, California will be the location of the NHWC 2011 Conference and Exposition.

NOAA NWS – Victor Hom

1. Community Hydrologic Prediction Service (CHPS)

NWS is making strong progress on the development of the Community Hydrologic Prediction Service (CHPS). CHPS is the new modern software infrastructure being built to replace the NWS River Forecast System (NWSRFS). It is based on standard software packages and protocols, and open data modeling standards, the basis from which new and existing hydraulic and hydrologic models and data can be shared within a broader hydrologic community. Using a "service oriented architecture", an emerging standard for large-scale systems, CHPS is being designed to enable scientists and programmers to work together and rapidly transition new innovative analyses and forecast techniques from the drawing board to operational deployment.

One of the deliverables for CHPS will include a hydrologic ensemble forecast system, capable of using de-biased precipitation and temperature ensembles from NCEP models as input to generate short and long range forecast needs. This will allow NWS the capability to produce de-biased ensemble hydrologic forecasts for understanding the range of model error, to provide ensemble and probabilistic forecasts to the public for better understanding of the quality of the forecasts, and to support decision-makers for better understanding of short-term potentials and/or long term planning of water resource needs. More information about this and other capabilities of CHPS can be found at [\(http://www.nws.noaa.gov/oh/hrl/chps/\)](http://www.nws.noaa.gov/oh/hrl/chps/).

2. Integrated Water Resources Science and Services (IWRSS) Consortium

A primary focus of the IWRSS Consortium is to align multiple agencies with water-related missions to better integrate services and service delivery, improve river and flood forecasts, and provide new summit-to-sea water resources forecasts. IWRSS is designed to enhance collaboration, leverage existing and new partnerships, and adapt to exploit new models, data, systems, and water science to better address growing demand for relevant and reliable water information. NWS led efforts to establish a Multi-Agency IWRSS Road Map. Details about the Strategic Road Map, is available at http://www.nohrsc.noaa.gov/~cline/IWRSS/IWRSS_ROADMAP_v1.0.pdf. IWRSS is currently a collaborative effort among NOAA, the U.S. Geological Survey (USGS), and the U.S. Army Corps of Engineers (USACE) to meet the rapidly growing demand for enhanced water resources information.

3. National Annual Flood Loss Summary for 2008

NWS reported that the national annual losses for 2008 were about \$7.5 billion due to Tropical Storms/Hurricanes, \$5.5 billion due to floods, and 80+ fatalities due to flash and riverine flooding

(<http://www.nws.noaa.gov/om/hazstats/sum08.pdf>). The numbers are consistent with annual averages over the past 20 years. Information was provided to the U.S. Army Corps of Engineers (USACE) to satisfy their Congressional reporting requirements. Other statistics on weather related hazards can also be found at (<http://www.nws.noaa.gov/om/hazstats.shtml>).

USGS – Steve Blanchard

New USGS Chief Scientist for Hydrology - Dr. Jerad Bales has been selected as the USGS Chief Scientist for Hydrology. In his more than 23 years with the USGS, he has served as a research hydrologist, supervisory hydrologist and, most recently, Director of the USGS North Carolina Water Science Center. Dr. Bales' leadership in fostering a diverse pool of talent and promoting scientific collaborations and partnerships has contributed to the North Carolina Water Science Center becoming one of the most efficient and productive in the USGS. Dr. Bales has held positions in the private sector and academia and has experience in the use of a wide variety of hydrologic, hydraulic, and surface-water quality models. He has been a strong champion of innovation in the measurement of streamflow and water quality, advancing the North Carolina Science Center in the use of acoustic velocity meters to measure stream discharge in tidal waters and in the use of continuous water-quality monitoring. Dr. Bales served as Chair of the American Society of Civil Engineers' Committee on Hydraulic Instrumentation and has collaborated with many Federal agencies, including NASA, NOAA, USAID, U.S. Army Corps of Engineers, EPA, and the Department of Defense. He represented the USGS on a design team for the National Water Quality Monitoring Network where he led development of the national design for the rivers component. Dr. Bales received the Department of the Interior's Superior Service Award for his efforts to build an estuarine research program for the USGS in North Carolina. He has authored numerous scientific articles and technical reports. He holds a bachelor's degree and master's degree in civil engineering from the University of Tennessee and a Ph.D. in civil engineering from the University of Texas.

New USGS Fact Sheet Report -- Acoustic Doppler Current Profiler Applications Used in Rivers and Estuaries by the U.S. Geological Survey - Anthony J. Gotvald and Kevin A. Oberg U.S. Geological Survey Fact Sheet 2008–3096, 4 p.

The U.S. Geological Survey (USGS) has collected streamflow information for the Nation's streams since 1889. Streamflow information is used to predict floods, manage and allocate water resources, design engineering structures, compute water-quality loads, and operate water-control structures. The current (2007) size of the USGS streamgaging network is over 7,400 streamgages nationwide. The USGS has progressively improved the streamgaging program by incorporating new technologies and techniques that streamline data collection while increasing the quality of the streamflow data that are collected.

The single greatest change in streamflow measurement technology during the last 100 years has been the development and application of high frequency acoustic instruments for measuring streamflow. One such instrument, the acoustic Doppler current profiler (ADCP), is rapidly replacing traditional mechanical current meters for streamflow measurement (Muste and others, 2007). For more information on how an ADCP works see Simpson (2001) or visit <http://hydroacoustics.usgs.gov/>.

The USGS has used ADCPs attached to manned or tethered boats since the mid-1990s to measure streamflow in a wide variety of conditions (fig. 1). Recent analyses have shown that ADCP streamflow measurements can be made with similar or greater accuracy, efficiency, and resolution than measurements made using conventional current-meter methods (Oberg and Mueller, 2007). ADCPs also have the ability to measure streamflow in streams where traditional current-meter measurements previously were very difficult or costly to obtain, such as streams affected by backwater or tides.

In addition to streamflow measurements, the USGS also uses ADCPs for other hydrologic measurements and applications, such as computing continuous records of streamflow for tidally or backwater affected streams, measuring velocity fields with high spatial and temporal resolution, and estimating suspended-sediment concentrations. An overview of these applications is provided in the fact sheet.

New USGS Report – Guidelines and Procedures for Computing Time-Series Suspended-Sediment Concentrations and Loads from In-Stream Turbidity-Sensor and Streamflow Data

Chapter 4 of Book 3, Applications of Hydraulics - Section C, Sediment and Erosion Techniques

By Patrick P. Rasmussen, John R. Gray, G. Douglas Glysson, and Andrew C. Ziegler

In-stream continuous turbidity and streamflow data, calibrated with measured suspended-sediment concentration data, can be used to compute a time series of suspended-sediment concentration and load at a stream site. Development of a simple linear (ordinary least squares) regression model for computing suspended-sediment concentrations from instantaneous turbidity data is the first step in the computation process. If the model standard percentage error (MSPE) of the simple linear regression model meets a minimum criterion, this model should be used to compute a time series of suspended-sediment concentrations. Otherwise, a multiple linear regression model using paired instantaneous turbidity and streamflow data is developed and compared to the simple regression model. If the inclusion of the streamflow variable proves to be statistically significant and the uncertainty associated with the multiple regression model results in an improvement over that for the simple linear model, the turbidity-streamflow multiple linear regression model should be used to compute a suspended-sediment concentration time series. The computed concentration time series is subsequently used with its paired streamflow time series to compute suspended-sediment loads by standard U.S. Geological Survey techniques. Once an acceptable regression model is developed, it can be used to compute suspended-sediment concentration beyond the period of record used in model development with proper ongoing collection and analysis of calibration samples. Regression models to compute suspended-sediment concentrations are generally site specific and should never be considered static, but they represent a set period in a continually dynamic system in which additional data will help verify any change in sediment load, type, and source.