

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

**January 29, 2004  
National Weather Service Office  
Room 14316, 1325 East West Highway, Silver Spring, MD**

**AGENDA**

1. Welcome and Introductions
2. Review and Approval of Agenda
3. Approval of Minutes from October 2nd Meeting of 2003
4. Action Items from October 2nd Meeting of 2003
5. Update on Committee Membership
6. Approval of Proposed Changes to Terms of Reference
7. Hydrologic Frequency Analysis Work Group Update
8. Discussion of Potential for a Universal Definition of a Flood (proposed by Martin Becker)
9. Plans for Joint Federal Interagency Hydrologic Modeling and Sedimentation Conference in 2006
10. Hydrologic Modeling Work Group Update
11. NWS efforts in Updating Precipitation Frequency Estimates
12. Announcements and Business Reports from Attendees
13. Other Business
14. Next Meeting
15. Adjournment

Immediately following the meeting, Advanced Hydrologic Prediction Service (AHPS) Update Presentation on Community Hydrology Prediction System

**SUMMARY OF MEETING**

**PARTICIPATING**

Don Woodward, American Forests  
Will Thomas, Association of State Floodplain Managers  
Jery Stedinger, Cornell University (by phone hookup) (jrs5@cornell.edu)  
Martin Becker, Defenders of Property Rights  
Kevin C. Long, FEMA (kevin.long@dhs.gov)  
Sam Lin, Federal Energy Regulatory Commission (FERC)  
David Dajc, FHWA (david.dajc@fhwa.dot.gov)

Eugene Stallings, National Hydrologic Warning Council  
Douglas James, National Science Foundation (NSF)  
Tom Donaldson, National Weather Service  
Geoff Bonnin, National Weather Service  
George Smith, National Weather Service (george.smith@noaa.gov)  
Rocky Durrans, University of Alabama  
Jeff Harris, US Army Corps of Engineers (david.j.harris@usace.army.mil)  
David Wingerd, US Army Corps of Engineers  
Don Frevert, US Bureau of Reclamation  
Paula Makar (by phone hookup) (pmakar@do.usbr.gov)  
Chris Knopp, USDA Forest Service  
Eric Janes, USDI BLM (by phone hookup)  
Jim Carleton, US Environmental Protection Agency  
Steve Blanchard, US Geological Survey (USGS)  
John Costa, US Geological Survey (USGS) (by phone hookup) (jecosta@usgs.gov)

*(Note: A total of 22 participated - eighteen in person and four by conference call; email addresses listed above are only for those first time attendees or new addresses for previous attendees)*

## **MEETING HIGHLIGHTS**

Don Frevert called the meeting to order at 9:30 a.m.

### **1. Welcome and Introductions**

There were 22 participants representing 15 member organizations, the University of Alabama and Cornell University.

### **2. Review and Approval of Agenda**

The order of original meeting agenda was adjusted and approved as listed above.

### **3. Approval of Minutes from October 2<sup>nd</sup>, 2003 Meeting of 2003**

The minutes of the October 2<sup>nd</sup>, 2003 subcommittee meeting have been updated and posted on the subcommittee's website below as the "October 2, 2003 Meeting:"

[http://water.usgs.gov/wicp/acwi/hydrology/minutes/Minutes\\_100203.html](http://water.usgs.gov/wicp/acwi/hydrology/minutes/Minutes_100203.html)

### **4. Action Items from October 2<sup>nd</sup> Meeting of 2003**

Action: Don Frevert forwarded a question, raised by Bob Hirsch of USGS, the alternate chair of ACWI during September 2003's ACWI meeting, about the vulnerability of natural hazards such as hurricanes and vandalism to the ground receivers of satellite signals to the Satellite Telemetry Interagency Work Group's chair, Jim Doty (BOR).

Action: Don Frevert contacted FHWA representatives by e-mail to confirm that FHWA will remain as a member organization of the subcommittee by attending the future meetings. Frevert further contacted the ARS' representative lab director to confirm its desire to remain on the subcommittee. FHWA responded positively and will attend future meetings. ARS did not respond.

Action: Don Frevert organized a conference call of the Hydrologic Modeling Task Group before the holidays. As part of that conference call, the task group filled key positions for their 2006 conference.

Action: George Leavesley was to send out two complimentary copies of the proceedings from the 2002 conference to each member organization.

**Action:** Jon Werner will provide the subcommittee with additional information on the Subcommittee on Water Availability and Quality which reports to the President's Office of Science, Technology and Policy.

## **5. Update on Committee Membership**

The acting alternate of FHWA, David Dajc attended this meeting.

Kevin Long reported that the primary FEMA representative will be designated after its reorganization is done.

**Action:** Frevert will continue his effort to invite ARS to rejoin the SOH by attending the future meetings.

Sam Lin circulated the latest version of SOH roster for attendees to update and will send out a revised copy with this meeting minutes to members.

## **6. Approval of Proposed Changes to Terms of Reference**

Changes to Terms of Reference by Don Woodward as proposed in the October 2, 2003 meeting minutes were approved by SOH.

## 7. Hydrologic Frequency Analysis Work Group Update

Rocky Durrans reported that the Hydrologic Frequency Analysis Work Group (HFAWG) met on January 28, 2004 at the office of Michael Baker, Jr. in Alexandria, VA. The meeting was conducted by him, the HFAWG Chair. Ten people attended in person and three people by conference call. Following is a brief summary of issues discussed and action items.

- 1) Rocky Durrans reported there was no significant progress on the regulated flood frequency guidelines. He suggested the task group on regulated flood frequency should meet in the near future to continue work on these guidelines.
- 2) Will Thomas and Zhida Song-James provided a summary of about 25 generalized (regional) skew studies completed by USGS and USACE since the publication of Bulletin 17B. The generalized skews developed in these studies were shown to be more accurate than the Bulletin 17B skew map providing some motivation for a nationwide study. A small task group will develop guidance or standards on performing generalized skew studies and address the benefits of such a study and the impacts on flood frequency analysis, and will submit this document to the SOH for their consideration and action.
- 3) Bill Kirby provided an update on the USGS PEAKFQ program that implements Bulletin 17B guidelines. USGS is developing a windows version of this program and adding the Expected Moments Algorithm (EMA) as a computational option. This will enable USGS and others to more easily evaluate the EMA technique using observed peak flow data and to determine if this technique is superior to existing procedures in Bulletin 17B. If so, the EMA technique would be included in Bulletin 17B. Jeff Harris reported that USACE is also developing a windows version of HEC-FFA that implements Bulletin 17B guidelines and planned to add the EMA technique to their program. Ken Bullard reported the Bureau of Reclamation is using the EMA technique in a computer program developed by John England.
- 4) Martin Becker provided a few examples of Code of Ethics relative to data analysis and asked the work group to identify a few key points that could form the basis for "Guidelines for Practice". Based on work group input, Martin will draft some guidelines for data analysis that could become a supplement to Bulletin 17B or a standalone document that would be put on the HFAWG web site.
- 5) Will Thomas and Zhida Song-James provided a brief summary of the 42 references given in Appendix 1 of Bulletin 17B, identified those that were outdated and new reports that may be more applicable. The work group agreed that all references in Bulletin 17B should be located and archived in a library such as the USGS or USDA libraries. A brief summary of each reference will be prepared that describes the applicability of the reference and also identifies other more current publications on the same topic. Jerry Stedinger (Cornell University) suggested that one of his graduate students could prepare this summary that would be put on the HFAWG web site.
- 6) Will Thomas will assume the Chair of the HFAWG at the July 2004 meeting and Ken Bullard will become Vice Chair.
- 7) Next meeting of the HFAWG will be in July 2004 just prior to the SOH meeting.

## **8. Discussion of Potential for a Universal Definition of a Flood** (proposed by Martin Becker)

Martin Becker opened this discussion by referencing to his e-mail to the subcommittee of January 20, 2004 (see *Appendix A.1*) and also his earlier e-mail of November 13, 2003 (see *Appendix A.3*).

The e-mail of January 20<sup>th</sup> had as an attachment a paper that was jointly prepared by Martin and Will Thomas (see *Appendix A.2*). It outlined areas of their agreement and disagreement on debris flows and how they should be classified in the USGS database. Their primary difference was Martin's reliance on FEMA's regulatory definition of a flood (44CFR 59.1) that includes debris flows as floods and Will's reliance on a report by the National Research Council in 1982<sup>1</sup> that does so for purposes of the National Flood Insurance Program (NFIP). At the meeting, Martin provided an excerpt from a 1985 memorandum from the Federal Insurance Administration (FIA) stating that the regulatory definition was the most appropriate definition of the two. Will acknowledged the opinion of the 1985 position paper (see *Appendix A.4*).

Martin expressed the opinion that FEMA has established a definition of a flood that is universal because it reflects the position of Congress and a formal rule making process by FEMA. Although that definition includes debris flows as floods, it is not being used in USGS' databases as such. He reiterated that the issue is a conflict between real life, and a science fair approach at the USGS where debris flows are not classified as floods. He drew the analogy of the USGS' failure to classify debris floods as floods in its database to the accounting errors at World Com that cost the public approximately five billion dollars. It was his opinion that if the science fair version of debris flows rather than the regulatory version of debris flows continues to be used by the USGS in its database, future damages to life and property could occur at levels similar to the amount of the World Com damages. The reason is because without flow of record data, the proper hazard protection will not be adopted.

After comments by some SOH members defending the USGS procedure, Martin asked the group whether they would be willing to have their families live in a house in a debris flow prone area not properly mapped because the USGS had not recorded a debris flow as a flood. Martin was concerned about the true risk of flooding and feared that data collection and analysis procedures that in some instances threw out the flood flow estimates associated with the largest floods of records because they were debris flows would result in a significant misrepresentation of the risk of flooding. He indicated that the recent Waterman Canyon flood with its associated loss of life illustrated the real life problems experienced in San Bernardino County, California. Further, if the USGS had such problems determining what the correct flood flow value was in those instances where the USGS has removed peak flow data from the online databank for the public, how could they decide that the value they had withdrawn from the database was wrong?

After the discussion by various members of the SOH, Martin Becker voiced his position that the classification of debris flows in accord with the regulatory definition and the concurrent recording by the USGS in its database was a life or death issue. For that reason, he moved that he, along with Steve Blanchard of USGS and Geoff Bonnin of NWS prepare a fact sheet reflecting the comments from the meeting on the subject of the proper classification debris flows that would be presented to

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<sup>1</sup> Federal Insurance Administration (FIA) Review of the Mudslide, I. E., Mudflow Coverage of the National Flood Insurance Program

the Office of Information and Regulatory Affairs of OMB with an invitation for it to attend the next SOH meeting to discuss the issue. This motion died for lack of a second.

In the discussion individuals made their comments below.

**Will Thomas:**

The FEMA definition of "Flood" includes mudslides (mud flows) because of the desire to provide flood insurance coverage to those who suffer damages from these hazards. The 1982 NRC report and USGS Open-File Report 85-276 indicate that mudslides (mud flows) are a type of landslide, not a flood. However, both reports indicate that mud floods (debris flows) are a type of flood. FEMA's definition of "Flood" should be used for the National Flood Insurance Program (NFIP) but should not be the controlling definition of flood within the Federal government because this definition includes mudslides, a type of landslide, and is not consistent with other government or organizational publications. There is no need for a universal definition of "Flood".

USGS should provide a footnote in their peak flow file (web site) that identifies peak flows affected by significant debris and have a link to another file that describes all data (indirect measurement, pictures, cross sectional data, profiles, etc.) related to the debris-affected peak flow. Users of the data can utilize the debris-affected flood as they consider appropriate. Consistent with statements by Robert Mason, USGS, in the Subcommittee on Hydrology August 2003 minutes, USGS should continue research related to estimation and use of debris-affected peak flows.

**Steve Blanchard:**

I appreciate Martin raising this question on the definition of a flood. Hazards are an important issue. Martin raising the issue related to the definition of floods and debris flows will result in constructive dialogue that will hopefully resolve some confusion and misconceptions about the issue.

The role of the USGS is to correctly characterize hazard events. That is, to use the best technical and scientific methods we have available to accurately describe these events and what happened.

In relation to Martin's request to the SOH that a universal definition for a "flood" be adopted by Federal agencies, and that the definition should be the definition specified in the US Code (USC) of Federal Regulations for the National Flood Insurance Program, the USGS disagrees with Martin's proposal. The definition for a flood for the NFIP is primarily for determining who receives payments for damages from those events defined as "floods" in the USC. The USC doesn't state which equations should be used to describe the event or what data base should be a repository for the data describing the event.

The USGS believes it is wrong to use an equation such as Manning's equation, which is for Newtonian fluids (water), to estimate a discharge for a debris flow, which is a non-Newtonian flow event. What the USGS has done for debris flows, is to include the date and stage (flow height) of the event in our peak flow file, but we have not included a discharge. We are exploring options for making the debris flow information available through another database. A description of and the data for debris flows events continues to be available from the USGS office which worked the event.

In regards to Martin's motion to have a small group work on a white paper on this issue and to include OMB, the USGS declined the motion because of the vagueness of the motion, especially related to the white paper - it was unclear what the purpose of the white paper was, what issues would be addressed by the white paper, etc. The USGS declined the motion but did agree to work with Martin and others to try and accurately document the content of the SOH meeting discussion on this subject.

**Don Woodward:**

Raised the question of whether debris flows could be flagged or annotated in a flood flow data base.

**John Costa:**

I support Will's position that the FEMA definition of floods is far more inclusive and broad than that of any other agency or organization, including ASCE, AGI (American Geological Institute), TRB (Transportation Research Board), and USGS, among others. None of these recognize mud or debris flows as floods.

USGS policy is never to destroy or remove data on flow events. In fact, recent efforts have increased the amount of information available on debris flows at gaging stations. You just can't get a discharge value from the web page, but there is at least one other indication that a large event occurred - the stage record. If anyone wants additional information, they have to ask the local office, who will be glad to provide information, even inappropriate indirect measurements that may have been done.

USGS can't control who uses our data, or for what purpose. The evidence is present in our databases for large flow events that may not be floods at gaging stations. It is the responsibility of the user to be sufficiently familiar with the hydrology of an area to know how to recognize those indications. It is not difficult to do. Our primary statutory responsibility is to provide the most scientifically correct information possible to the public.

**Doug James:**

Observed that there is a need to treat both flood and landslide/debris flow data – even though mixing the two may not be technically correct.

**Don Frevert:**

Inquired as to whether anyone monitors landslides and debris flows on a national or local basis. (The prompt response was that USGS has a national landslide mapping program)

**David Wingerd:**

- Not all peak flow should be used in hydrologic runoff studies. An example of a peak flow on the Snake River in Idaho. This flow was the result of the failure of Teton Dam.
- How various agencies' definition of a flood is influenced by how they use the data. For example NRC defines a mudslide as occurring only in a river. Commonly mudslides can

occur anyplace, but NRC is only concerned with mudslides in a river. The Corps' Geotech folks took a look of the agency definitions and found that none were universal. They have different definitions for Mudflow, Mudslides, and Debris flows.

**Kevin Long:**

Noted that FEMA's definition of a flood was driven by insurance considerations.

**Gene Stallings:**

At the most recent meeting, the debate on debris flows or debris floods was lively with some strong differences of opinion of what is a flood. The National Hydrologic Warning Council members have much interest in the subject. Just prior to our meeting, I received an e-mail from one of our members in California, raising some of the same issues as Martin Becker. (Since I attended the Meeting and prepared my Executive Summary for the NHWC members, I have received additional comments—this is an aside).

My comments were that ice jams and dam breaks are also floods. This is my first comment. A flood is a flood. The damage can be the same. Second, I heard several comments during the one hour discussion period, there were new to me. I made the recommendation that this valuable information should not be lost by requesting to document their comments. Whether we need a Work Group on the subject is not known. But if we do form a group, Terms of Reference should be defined and understood by all.

Based on the interest of the NHWC in this subject, we may be able to take an active role.

**Jery Stedinger:**

The public is exposed to a real risk from floods with a range of characteristics and there are two issues. One is the collection of accurate data. The USGS is appropriately concerned if records of floods that included significant debris are accurately described. It appears that USGS may not want to include estimated flows for such events in their records because they cannot accurately compute a flow from the stage records. The other issue is how to compute risk of flooding for residents and occupants of the floodplain. For the second task it is imperative for the analysis to recognize the risk of floods whatever their characteristics.

My concern is that the risk of flooding may not be accurately evaluated because the needed data is not collected or reported, perhaps because such an effort was not viewed as being part of the mission of the USGS or some other agency. I believe the hydrology subgroup should not believe the public safety is served by just including stage information in USGS records with a footnote describing data problems, along with the assumption that the public and consultants will then do the appropriate risk computation. This subgroup, representing the expertise from the relevant federal agencies, should take responsibility to ensure that appropriate methods and analysis procedures are available and employed for computing the actual risks of flooding.

## **Christopher M. Knopp:**

I questioned the validity of establishing flood plain maps given that the debris flows discussed resulted from the consequences of high intensity rain on burned over slopes. Without the fire, there was negligible risk. While the frequency of fire can be determined, fire frequency is not a statistic figure that lends itself to a meaningful return interval determination. I would add to my earlier discussion by saying that debris flows of this type should have their own delineation, separate from flood plain mapping. Lumping this sort of information with flood mapping would dilute the importance of both.

### **9. Plans for the Joint Federal Interagency Hydrologic Modeling and Sedimentation Conference in 2006**

Paula Makar, the joint operations chair for the 2006 conference, called in to report on plans for the conference. The conference is scheduled for April 2-6, 2006 at the Silver Legacy Hotel in Reno, NV. The organizing committee met in Denver on January 14 and several members joined the meeting by phone. The conference theme will be "Interdisciplinary Solutions for (to) Watershed Sustainability". The conference is expected to include six concurrent tracks - with four papers per session and eleven sets of concurrent sessions covering three and a half days. Under this format, a total of 264 technical papers can be accommodated. There will also be posters and exhibits. Field trips and short courses will be available before and after the conference. Most of the organizational positions have been filled. Doug Glysson will serve as the overall Joint Chair for the combined conference. Don Frevert will be chair of the Hydrologic Modeling Conference and Jerry Bernard will be chair of the Sedimentation Conference. Decisions still need to be made regarding the conference proceedings - whether there will be a single CD or separate CDs - and also whether any hard copy proceedings will be distributed.

### **10. Hydrologic Modeling Work Group Update**

The main focus of the Hydrologic Modeling Work Group is on the 2006 Hydrologic Modeling and Sedimentation Conference. The Hydrologic Modeling group met by conference call on December 18, 2003. The work group elected Don Frevert as chair to replace Arlen Feldman who has retired from the Corps of Engineers. Other key assignments for the Hydrologic Modeling Conference include Steve Markstrom and George Leavesley as technical co-chairs, Tom Donaldson as demonstration session chair, Jeff Rieker as registration chair and Roland Viger as AV coordinator.

### **11. NWS efforts in Updating Precipitation Frequency Estimates**

Geoff Bonnin presented the status of responses to the Subcommittee's resolution at its last meeting whereby the Subcommittee endorsed a full national update of precipitation frequency estimates with funding of approximately \$1M/yr for 4 years to be shared among 5-6 agencies. Agency reps were to respond to Mr. Bonnin by November 15, 2003 indicating the ability of their agency to participate. The number of responses was lower than expected and a critical mass of funding has not been

reached. Positive responses were received from USACE and NRCS. Negative responses were received from USBR and FERC. DOT continues to seek funds. The Subcommittee recommended that Mr. Woodward and Mr. Bonnin prepare a recommendation from SOH to ACWI that ACWI endorse the proposal and recommend funding by appropriate Federal Agencies.

## **12. Announcements and Business Reports from Attendees**

### FERC:

Sam Lin reported as follows:

*Introduction:* FERC began in 2003 applying the risk-driven Potential Failure Mode Analysis (PFMA) initiative to some of its independent consultant dam safety inspections. This approach provides a systematic procedure to identify and classify potential failure modes of dam systems so that dam inspections can be more effectively focused on safety shortcomings. In fact, dam safety inspection and PFMA are made for each other to achieve the goal of public safety. The PFMA approach is recognized as a new tool to help enhance dam safety evaluation, performance monitoring, and risk reduction/remediation.

*Potential Failure Modes (PFMs):* Each possible failure mode (FM) that could threaten a dam's structural integrity and ultimately cause loss of a reservoir should be developed and listed with adverse and positive factors. Those factors could affect the potential for each FM to happen as the triggering mechanism of a dam failure. Weighing associated adverse and positive factors, each PFM can be classified in the following categories:

- Highlighted PFM
- Not highlighted PFM
- More information needed PFM
- Ruled out PFM (physically impossible or remote)

For example, we consider the following general PFMs of a concrete dam's flood-induced failure:

- Overtopping flows causing dam failure due to inadequate spillway capacity (e.g., resulting from insufficient available capacity and operational and/or procedures difficulties such as inoperable or malfunctioned gate system because of losing power, mechanical trouble or floating debris strict; improper reservoir operation, etc.)
- High flows thru the outlet works (e.g., spillway structure) causing erosion and damage to those structures
- High flow channel erosion causing headcutting the outlet works
- High flow adverse hydraulic conditions which negatively impact the abutment/foundation support that the dam relies upon
- High foundation and abutment water pressures triggering a foundation-related failure

*Merits of PFMA Process:* Conventional dam inspections apply standards-based criteria to identify a dam's "traditional" PFMs (i.e., deficiencies). However, PFMA is a site specific approach to integrate those criteria with risk-based judgment in order to identify and classify "traditional" and

“non-traditional” PFMs. Thus PFMA provides enhanced understanding and insight of the risks associated with a dam. The PFMA-oriented dam inspection has the following advantages:

- It collects all available background information (e.g., design reports, construction records, inspection and analysis reports, photographs, drawings, etc.) as comprehensive as possible for review.
- It gathers all needed role players with expertise as a collaborative group (usually called the “core team” or “working group”) comprised of the facilitator, FERC staff, licensee and consultant and adds with the project site’s related personnel (e.g., project operators, field personnel, etc.) to brainstorm PFMs in a thorough and independent manner.
- It focuses dam inspections on critical PFMs based on objective risk qualifications instead of subjective risk quantifications
- It prioritizes (a) risk reduction remedial measures to mitigate PFMs, and (b) visual surveillance and instrumentation monitoring programs to provide early warning of PFMs

As described above, PFMA is systematically conducted for a very focused and directed dam inspection process. As a result of practice, PFMA has been acknowledged as an efficient and effective tool functioning as a decision-support system for dam safety management.

*PFMA Guidelines Website:* The PFMA guidance is posted on FERC’s website, titled “Chapter 14 Dam Safety Performance Monitoring Program (DSPMP) - Potential Failure Modes Analysis.” The website is listed below:

<http://www.ferc.gov/industries/hydropower/safety/dspmp.asp>

#### NSF:

Doug James had no new developments to report.

#### USDA Forest Service:

Chris Knopp reported that the Forest Service will hold an internal conference on Watershed Management Issues in October, 2005.

#### NWS:

Tom Donaldson reported that the NWS Advanced Hydrologic Prediction Service (AHPS) was fully funded, \$6 million, for FY 2004. However, one major program for which NWS has signed agreements was not funded so that the funding for AHPS had to make up the difference. That difference was \$1.3 million. The impact that this had on the AHPS program this year was to reduce the number of forecast locations planned for conversion to AHPS. The number now stands at 419 additional locations. The good news is that AHPS was fully funded, the bad news is that the program took a hit from internal.

## CORPS OF ENGINEERS – HEC CENTER:

Jeff Harris reported that Version 1.0 of HEC-ResSim has been released. HEC-ResSim will replace HEC-5, our DOS based reservoir routing software. Efforts are ongoing to add water quality and sediment transport capabilities to HEC-RAS. The HEC-HMS software is undergoing a major rewrite using the JAVA language. Several enhancements are being added including detailed continuous soil moisture accounting, rain-on-snow runoff capabilities, detailed areal rainfall reduction techniques and an improved graphical interface. We are also undertaking an effort to upgrade our statistical frequency analysis software in one Windows based package. Currently, we have 4 pieces of software which are DOS based. The most visible of these is the HEC-FFA software which performs frequency analysis based on Bulletin 17B criteria. ResSim 2.0, RAS 3.1.1 and HMS 2.2.2 are available from the HEC website.

## USGS:

Steve Blanchard reported as follows:

1. Status of USGS Streamgaging Program - the USGS budget for streamgaging in FY04 is very slightly reduced. As a result the USGS will be solely funding a few less gages in FY04. In addition, most of the cooperating partners for the streamgaging program are also experiencing flat or declining budgets. This includes state and local agencies and other Federal agency partners. The end result is that 100's of gages are at risk of being discontinued and the streamgaging network will likely shrink in FY04.
2. USGS Publications Warehouse - the USGS has just implemented a new on-line publications warehouse. You can access the pubs warehouse at the URL: <http://pubs.usgs.gov> The USGS is in the process of scanning and putting on-line an electronic version of all our reports. By the end of FY04 another 20,000+ reports should be on-line.
3. The USGS is sponsoring a Hydroacoustics Workshop in San Diego, CA the week of March 22-26. The workshop will focus on the use of hydroacoustics to measure water, sediment, and bathymetry. Any member of the SOH that has interest in attending should contact Steve Blanchard for the meeting and registration information.
4. Steve Blanchard distributed hard copies of two recently released USGS reports. The first report is "Large Floods in the United States: where they happen and why" by Jim O'Conner and John Costa, USGS Circular-1245. This report is available on-line electronically at URL: <http://water.usgs.gov/pubs/circ/2003/circ1245/>  
  
The second is a Fact Sheet "Effects of Urban Development on Floods" by Christopher Konard, USGS Fact Sheet FS-076-03. This Fact Sheet is available on-line electronically at URL: <http://water.usgs.gov/pubs/fs/fs07603/>
5. There is a National Academies of Science Disasters Roundtable Workshop on "Reducing Future Flood Losses: The Role of Human Actions" on March 2, 2004 in Washington DC. The meeting

information and agenda are available at URL: <http://dels.nas.edu/dr/f10.html>. The Workshop is open to the public. You can register for the Workshop at their web site.

#### FEMA:

Kevin Long reported that FEMA had received funding for their map modification efforts.

#### Association of State Floodplain Managers (ASFPM):

Will Thomas reported that the Stormwater Management Committee of the ASFPM provided comments to the USGS on December 16, 2003 on their proposal entitled "Improving Information Needed for Flood Mapping in the United States". The Stormwater Management Committee of ASFPM is supportive of the proposal and recommended that the proposal be expanded to include the unit hydrograph approach and research on lag time determinations. The Committee recommended that no funds be transferred from the USGS National Streamflow Program to fund the proposed flood frequency research because the National Streamflow Program is the keystone for all flood frequency analyses and must be maintained. Furthermore, the Committee recommended that FEMA's Map Mod Program continue in a timely manner and not wait for products from the USGS proposal. The Committee urged Congress and the Administration to fully fund the USGS proposal.

Will Thomas also reported that the ASFPM annual floodplain conference will be held in Biloxi, MS during the week of May 16-21, 2004. There will be about 15 workshops given either before or after the conference. Will and selected colleagues from Michael Baker will present a 4-hour workshop on Hydrology and Hydraulics for Floodplain Managers.

#### NATIONAL HYDROLOGIC WARNING COUNCIL

Eugene Stallings reported that he has been active on the Hydrology Subcommittee (or Committee depending on the time) off and on since the early 1970's. Historically, he can not remember such a large turnout at the meetings on a consistent basis. Apparently, the Subcommittee is working on topics of considerable interest to the hydrology community. The future looks very bright for the Subcommittee. Keep up the good work.

#### AMERICAN FORESTS:

Don Woodward had no new developments to report.

#### FHWA:

David Dajc had no new developments to report.

## CORPS OF ENGINEERS:

Dave Wingerd reported the inconsistent river flow data issue as follows:

The Corps, USGS, NWS and others received the stage data electronically via telemetry often from the same gage. A rating curve at the receiving office translates stage data into flow data. When the river changes the rating curves need to be revised. The USGS monitors the gaging stations and, when necessary modifies the curves.

If the new rating curve is not rapidly deployed to NWS or the Corps, the computed flow values on the three agencies' web page could be different. If there is a significant change, the change in the rating curve could effect how the Corps regulates it projects. Also this is becoming a serious PR problem when automated data is displayed on the Internet. Theoretically three different agencies could report three different flows for the same point. It has been a difficult, unsolved issue that local field offices in different agencies were trying to solve in different ways.

Actions toward the solution are underway. The USGS assigned a focal point and USGS, the Corp and NWS each put together a team of end users from various field offices that understand and use the rating curves.

Also being addressed is the issue of extending the rating curves at its upper and lower ends surfaced.

## BUREAU OF RECLAMATION:

Don Frevert reported that the Bureau of Reclamation held its River Systems Management Workshop November 4-6, 2003 in Fort Collins Colorado. The workshop was attended by about 100 managers and technical specialists from Reclamation, other federal and state agencies, universities and private industry. The next workshop is scheduled for March, 2006.

Although Reclamation's overall budget and its funding for research have remained relatively flat over the past two years, Reclamation's funding for the interagency Watershed and River Systems Management Program has been cut severely and progress on the Reclamation portion of the program has been seriously impeded.

Several SOH member agencies are involved in the ASCE/EWRI Watershed Management Conference which will be held in Williamsburg, VA July 19-22, 2005. This conference is held every five years. A call for papers was distributed at the meeting and is also being distributed in electronic form. Proposals for sessions as well as abstracts for individual papers are being solicited.

## BLM:

Eric Janes reported that Ms. Heidi Hadley has reported as the BLM Salinity Control Coordinator to the Upper Colorado Region Office of the U.S. Bureau of Reclamation at Salt Lake City. Heidi will provide the lead coordination for the BLM's role in management of saline sediment and salt uptake/transport on public lands for the seven Basin States. Heidi will report to Ed Shepard, Assistant Director for Renewable Resources and Planning, BLM Headquarters. Eric also mentioned that the

BLM is actively participating with other federal departments (e.g. USDA-Forest Service) in a fast track Web-Based Field Implementation Guide for the President's Healthy Forests Initiative and the Healthy Forests Restoration Act of 2003. The principal area of interest to the Subcommittee in this endeavor will be the watershed-based risk assessment for municipal water supply watersheds in areas with dangerous levels of wildland fuel accumulation that need hazardous fuels treatment. Much more information will be available on this effort for the April, 2004 meeting.

There will be a change in the primary representation to the Subcommittee very soon. Eric Janes will be retiring on Feb. 29, 2004 after three decades of service with the BLM, the last 6 of which Eric served on the SOH as a Headquarters representative. For the next several months, Jim Fogg, BLM Alternate Member of the BLM's National Science and Technology Center will provide the continuity for our representation to the SOH. By late spring or summer, the BLM hopefully will communicate with ACWI on who the Primary Member will be.

### **13. Other Business**

None.

### **14. Next Meeting**

The next meeting will be held on Thursday morning, April 22nd, 2004 at 9:30 am at Room 14316 in NWS, 1325 East West Highway, Silver Spring, MD.

**Action:** Don Frevert will provide details including the draft agenda in advance of the meeting. Any member who would like to suggest an afternoon presentation or tour should contact Don as soon as possible.

### **15. Adjournment**

The meeting was adjourned at 1:00 p.m. A brief presentation from NWS followed the meeting.

### **“A COMMUNITY HYDROLOGIC PREDICTION SYSTEM” Presentation Summary**

George Smith presented a summary of NWS' efforts in developing a Community Hydrologic Prediction System (CHPS) using the PowerPoint slides of *Appendix B* as a hand-out material .

The CHPS is intended to provide just what the name implies: a system to allow the hydrologic community to make water predictions. Our hope in the NWS is that we can help facilitate this community activity. CHPS will not be "ours" anymore than the highway system belongs to a specific town or an individual. CHPS is intended to be a vehicle to bring the research and operational portions of the hydrologic community together.

The focus of the CHPS architecture is on structural openness since it builds on a) standard software packages and protocols and b) open data modeling standards. As such, the architecture will enable a new level of collaboration and sharing of data and algorithms. This kind of collaboration is based on several important elements:

- 1) Common data modeling language for the hydro community: without some form of standardized hydrologic modeling language (HML), collaboration will be difficult, even if the technology supports its concept. If the community does want to collaborate, its members must invest in this effort of creating a common "language" for structuring objects, events, etc. While OHD is in no way attempting to impose such a common language (those attempts don't work so well and end up with a too-specific object set), we are making a unified call for such an effort, and are willing to lead the effort by creating the venue for this collaboration. Common object sets like HML should be developed in concert between government, academia and commercial interests, to ensure representation and broad future adoption. This is a strategic effort with potentially profound impact on the community for years to come.
- 2) Standardized interfaces through which all participants in the community can exchange data automatically. Currently, data is exchanged "by hand" or by file transfer protocol (ftp). The community will benefit enormously from the ability to exchange appropriately chunked data sets at the appropriate time and programmatically, resulting in network-based applications that use the most suitable data from whomever can provide it. This effort, if undertaken, will transform the weather service (and any other group which produces information) into a large-scale data provider in a new sense of providing raw scientific data in an unprecedented way.
- 3) Shared algorithms that are open to rapid prototyping, modification and testing. Currently, exchanging scientific/algorithmic capabilities appears to be cumbersome or impossible. The hydro field as a whole will be able to advance its skills much more rapidly and flexibly if it could share not just data, but algorithmic capabilities as well. No matter how the implementation goes, this ability will enable a new community process and collaborative development on a new scale, which also will have a significant impact on the services the weather service and others in the community will provide in the future.

## **Appendix A References for the Meeting Agenda Item 8: "Discussion of Potential for a Universal Definition of a Flood"**

### **Appendix A.1 Martin Becker's email of January 20, 2004**

SOH,

After the recent fires in Southern California, I requested that the issue of the "federal" definition for flood be placed on the agenda for the January 29, 2004 meeting of the Subcommittee on Hydrology (SOH). This issue is an extension of the presentation to the SOH in August 2003 by the USGS. In my opinion, the regulatory definition (44CFR 59.1) of floods includes mudslides and mud flows (commonly referred to as debris flows); and should prevail in defining floods throughout the federal government. This is an issue because in spite of the fact that the regulatory definition is the result of the actions of Congress and FEMA, the USGS is taking the position that "debris flows" are

not floods for data purposes. Therefore, peak flow data relating to debris events is not being included and/or is being removed from the peak flow data bank without a more correct peak flow as a replacement. As a result, in my opinion, it is probable that floodplains below debris basins such as the Waterman Canyon in San Bernardino County, California will be underestimated with that far-reaching harm will occur (Waterman Canyon is the site of the fatal mudslide several weeks ago).

In an effort to present more than one viewpoint, I invited Will Thomas to participate in the preparation of a paper for the SOH. Of note is the fact that Will disagrees with me regarding the reach of FEMA's definition of a flood throughout the Federal Government. Presented below are several definitions of "flood" that have been gathered by Will and me. Please note that 44CFR 59.1 is the only definition of "flood" that is the result of a formal rule-making process. Another point of disagreement between Will and me is that it is Will's opinion that the peak flow data relating to debris-effected events should be shown in a secondary database and available to the public, but not is the main database. It is my opinion that the peak flow data should be shown in both databases.

If anyone has any comments prior to the meeting, please provide them to me by the end of the day on 1/17/04.

Thanks,

Martin Becker

## **Appendix A.2**

**A discussion of floods, debris flows, mudslides and landslides prepared for the January 29, 2004 meeting of the Subcommittee on Hydrology** (Prepared by Will Thomas and Martin Becker, January 20, 2004)

### **(A) FEMA National Flood Insurance Program (NFIP) Regulations**

FEMA Regulations (44 CFR 59.1) defines "Flood or Flooding" as follows:

(a) A general and temporary condition of partial or complete inundation of normally dry land areas from:

- (1) The overflow of inland or tidal waters.
- (2) The unusual and rapid accumulation or runoff of surface waters from any source.
- (3) Mudslides (i.e., mudflows) which are proximately caused by flooding as defined in paragraph (a)(2) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.

FEMA further defines Mudslide (i.e., mudflow) as:

"Mudslide (i.e., mudflow) describes a condition where there is a river, flow or inundation of liquid mud down a hillside usually as a result of a dual condition of loss of brush cover, and the subsequent accumulation of water on the ground preceded by a period of unusually heavy or sustained rain. A mudslide (i.e., mudflow) may occur as a distinct phenomenon while a landslide is on progress, and

will be recognized as such by the Administrator only if the mudflow, and not the landslide, is the proximate cause of damage that occurs.”

National Research Council (NRC) 1982 report on “Selecting a Methodology for Delineating Mudslide Hazard Areas for the National Flood Insurance Program

FEMA asked the NRC Committee on Methodologies for Predicting Mudflow Areas for a “review of the Congressional intent undergirding the mudflow coverage and for a comparison of the flood insurance definitions of mudflow with the many-varied scientific classifications that which mix mudflow as a peril with the separate peril of landslide.” A major intent of the NRC report was to clarify how mudslides were different from other landslides for identification purposes and insurance claims within the NFIP.

The NRC Committee distinguished between mud floods (debris flows) and mud flows (mudslides), the latter of which is considered a type of landslide.

NRC defined “mud flood” as a flood in which the water carries heavy loads of sediment (as much as 50 percent by volume), including coarse debris.

NRC defined “mud flow” as a specific subset of landslides whose dominant transporting mechanism is that of a flow having sufficient viscosity to support large boulders within a matrix of smaller-sized particles.

NRC referenced the congressional record but did not consider it in their classification system.

The following classification system was provided by NRC:

Class of Phenomenon	Event	Location		Covered by NFIP	Status of Hazard Mapping
FLOODS	Clear Water Floods	Floodplains	Drainage Channels and Alluvial Fans	Yes	Now Mapped
	Mud Floods				Not Now Mapped
LANDSLIDES	Mud Flows	Hillslopes		No	
	Other Landslides				

Figure 1 from the 1982 NRC report.

As shown in Figure 1, floods were identified as occurring in floodplains, drainage channels and alluvial fans. Landslides were identified as occurring on hillslopes with the exception that mud flows (mudslides) occasionally occur in drainage channels and on alluvial fans. As shown in Figure 1, damages from clear water floods, mud floods (debris flows), and mud flows (mudslides) are covered by flood insurance within the NFIP.

The NRC report provided some recommendations of which the first was “A clear decision by FEMA as to which phenomena are to be included under the mudslide provisions of the NFIP and which are to be excluded, with reference to a standard classification scheme for earth movements.”

**(B) U.S. Geological Survey Fact Sheet 176-97, “Debris-Flow Hazards in the United States”, dated 1997**

USGS Fact Sheet 176-97 defines debris flows as fast-moving landslides. USGS further states that “Debris flows, sometimes referred to as mudslides, mudflows, lahars, or debris avalanches, are common types of fast-moving landslides”. Pictures of debris flows in Fact Sheet 176-97 indicate that debris flows can occur solely on hillslopes.

USGS Fact Sheet 176-97 is available on the USGS (Geologic Division) web site: [http://landslides.usgs.gov/html\\_files/fire-flows.html](http://landslides.usgs.gov/html_files/fire-flows.html) .

**(C) USGS Open-File Report 85-276 A-D, Feasibility of Nationwide Program for the Identification and Delineation of Hazards from Mud Flows and Other Landslides, dated 1985, edited by Russell Campbell**

Russell Campbell, the editor of USGS Open-File Report 85-276 A-D, was a member of the NRC Committee on Methodologies for Predicting Mudflow Areas that wrote the 1982 NRC report.

USGS Open-File Report 85-276A indicates “The assertion in the regulatory definition that heavy rainfall and absence of brush cover are usual conditions for the occurrence of “mudslides (i.e., mudflows)” is inaccurate. Neither rainfall nor absence of brush cover are requisite conditions for the formation of mud flows, which begin on well-vegetated slopes at least as commonly as on slopes that have lost brush cover, and mud flows occur in association with snowmelt as well as rainfall; nor is either of those conditions required for the initiation of a mud slide.”

USGS Open-File Report 85-276A provides a more detailed description of the various types of landslides and indicates that “wet non-cohesive flows”, not “wet cohesive flows” are intended for coverage under the NFIP. This report is consistent with the NRC 1982 report in defining Mud Floods (debris flows) as a type of flood. As is the case the 1982 NRC report, mudflows are shown as being covered by the NFIP.

In USGS Open-File Report 97-438 (<http://geohazards.cr.usgs.gov/pubs/ofr/97-438/97-438.html>) that was co-authored by Russell Campell, there is the following quote:

“For existing (or future) structures in hazardous areas, obtaining flood insurance through the National Flood Insurance Program (NFIP) is another non-structural means of limiting losses due to debris flows. An amendment to the NFIP extended the coverage to mudslides, even though the range of phenomenon covered by the term “mudslides” has not been consistently interpreted in all parts of the country. As worded the standard flood insurance policy includes “mudslide” (i.e., mudflow) and excludes “landslides”. Coverage under NFIP has usually been interpreted to include the damaging effects of debris flows in California, but conflicting interpretations have been applied in some other areas.”

## **(D) Other Issues**

In addition to the issues discussed in this paper, there are other issues relating to the debris flow topic. The issues that we have discussed and should discuss include:

- 1) What is the definition of a flood and should all agencies use the same definition? Should the FEMA regulatory definition be the controlling definition of “flood” in the Federal Government?
- 2) Should debris-affected peak flow events be removed from the data bank without having a more correct peak flow as a replacement?
- 3) How to estimate debris-affected peak flows (volume and peak discharge) and how is it being done in practice?
- 4) Where to store the debris flow data? In the USGS flood data file or a separate file? USGS peak flow file or a separate file?

### **Appendix A.3 Martin Becker’s email of November 13, 2003**

At the August, 2003, meeting of our committee, I expressed the following concern as indicated in the minutes of the meeting:

“ ... Becker feels that the censoring of peak flow data of record is going to increase the likelihood of devastation to people living in areas like Southern California that should be characterized as flood plains but are not because USGS has eliminated the data to make the proper determination.

Martin expressed concern that the USGS approach is "too much like a science fair project" and not oriented enough towards the national flood insurance program which defines debris flows as floods. ...”

I am enclosing, below, a newspaper article from the LA Times dated 11/4/03. It discusses potential aftermaths that may result from the recent fires in Southern California. Certainly, debris floods are one of the possibilities. To the extent that the USGS continues to say a debris flood is not a flood even though FEMA defines it as a flood in accordance with the National Flood Insurance Act, potential devastation to property and the potential loss of life in Southern California is almost certain. The reason is that the USGS which we all know is the water data depository for Federal Government will have censored the debris flows from its data bank of annual peak flows.

When you read the article, below, you will note a discussion regarding Deer Creek. One of the reasons that the area below the the Deer Creek debris basin has become populated is because the USGS expunged the flow of record from its data

bank because it was a debris flow. Therefore, the event of record was not be fully considered in the analysis of potential flooding.

The issue of major flooding events in Southern California being expunged from the record because a federal agency does not use FEMA's definition of flood is a major issue. For that reason, I request that the issue of a universal definition of flood in the federal community (if we do not already have one) be an agenda item for our January meeting. Time is of the essence since we appear to have a potential disaster at hand. This is real life!

Thanks,

Martin Becker

#### **Appendix A.4 FIA MEMORANDUM**



**Appendix B - "A Community Hydrologic Prediction System" Presentation Handout**  
(Double click picture below to view PowerPoint presentation)



