

**SUMMARY OF THE MEETING OF THE
ADVISORY COMMITTEE ON WATER INFORMATION'S (ACWI)
SUBCOMMITTEE ON HYDROLOGY (SOH)
12:30 p.m. – 3:45 pm, Eastern Standard Time
October 20, 2016**

1. Welcome

Chair Robert Mason called the meeting to order at 12:36 pm and welcomed the participants.

2. Roll-Call

A roll call was performed for in-person attendees and those on the phone. The list of attendees is included as Attachment 1.

3. Review and approval of agenda

Robert asked for a motion to adopt the meeting agenda. Tom Nicholson made a motion to adopt the agenda, Chandra Pathak seconded the motion. There were no objections and the agenda was adopted. The agenda is included as Attachment 2.

4. Words from our Host

Wade Crow welcomed everyone to the Beltsville Agricultural Research Center. There are 18 laboratories, including his own laboratory, which is the Hydrology and Remote Sensing Lab.

5. Background on SOH

Siamak Esfandiary provided an introduction to the SOH, as there are often guests who attend in person or by phone. The SOH is part of the ACWI, which advises the federal government on matters relating to water information. The purpose of the SOH is to improve the availability and reliability of surface-water quantity information needed for hazard mitigation, water supply and demand management and environmental protection. The SOH is comprised of 20 member organizations. It has four active workgroups, and two proposed workgroups: the streamflow information collaborative and the data gaps proposal.

Doug Yeskis noted that the streamflow information collaborative is active in terms of having had several meetings, but Robert noted that it does not yet have an approved charter which is required to make it an active workgroup.

6. Feature Presentation

Robert introduced Steve Lev, of the Institute for Defense Analyses, Science and Technology Policy Institute. The Science and Technology Policy Institute is a federally-funded research and development center chartered to work with the President's science advisor. It has been supporting the Office of Science and Technology Policy (OSTP) and the U.S. Group on Earth Observations (USGEO).

Steve presented the results of the earth observations assessment so far, as not all of it is available yet. The results will show the current U.S. capabilities for earth observations.

This process started in 2010 with the NASA authorization act, which included routine national planning of civil Earth observation activities. USGEO has four subgroups: assessment, data management, international activities, and satellite needs. The USGEO subcommittee has thirteen member agencies.

The assessment working group oversees and executes a triennial assessment of Earth observation systems, documents lessons from each assessment and synthesizes recommendations of expert teams to make general recommendations for the executive branch for a ten year period.

The National Earth Observation Assessment (EOA) is a snapshot of the portfolio of the systems on which the federal government currently relies. The benefits are based on societal objectives that rely on earth observing systems. The final product is an input into the National Plan.

There are thirteen societal benefit areas (SBAs): agriculture and forestry, biodiversity, climate, disasters, ecosystems, energy and mineral resources, human health, oceans, space weather, transportation, water resources, weather, and reference measurements. There was coordination such that overlapping areas did not double-count benefits. There were 200 objectives in these SBAs.

The EOA value tree framework divided each SBA into sub-areas and drafted a description, which included key objectives for delivering the benefit, and whether we rely on earth observations to deliver it. Key products, services and outcomes (KPSOs) were identified. Data sources are the data, information and earth-observing systems needed to produce the KPSOs. Data sources could be all kinds of earth observations including everything from old soils maps to Landsat data.

Data was collected from agencies by asking how well the information works for the product being produced. The answers are scored, and scores are rolled up to the top of the value tree. This provides the impact of a particular input to the SBA.

To illustrate this, an example is the water resources SBA, water extremes sub-area. One key objective is to improve flood resilience. One KPSO group is estimates of flood inundation. One KPSO is the Dartmouth Flood Observatory current and historical flood maps. Each KPSO can include many data sources.

For each KPSO, subject matter experts (SMEs) are asked to identify a list of input data sources that contribute to the delivery of the KPSO, including observations and datasets.

Improvements for the 2016 assessment include increase numbers of inputs; the new assessment as 217 key outcomes (KOs), 1753 unique KPSOs, and 1323 earth-observing inputs, which is three times the number of earth-observing inputs from the last assessment. The assessment has consistent consideration of research objectives, consistent and reproducible weighting methodology, and 3000 SMEs.

Currently, the group is in the process of finalizing the results. This is an interagency process, and the final report is going through a review process. There will be an internal as well as a public version of the report.

One example of the use of the assessment is the determination of the importance of the USGS stream gage network in the 2012 assessment. The USGS stream gage network was determined to be an important contributor to ten out of thirteen SBAs. The assessment identified agencies and products using the stream gages.

The presentation was followed by a question and answer period.

Tom asked who had been briefed on the report, specifically if congressional oversight committees and Office of Management and Budget (OMB) had been briefed. Steve responded that right now the report is internal, and OMB has been briefed as part of the executive branch. Robert added that this information is available to agencies to make their case for funding.

Terry Davies asked if CUAHSI data was used. Steve responded that there may be academic persons and subject matter experts who work with the agencies included in representative groups. There are 1300 data sources, so he cannot answer without looking it up, but it would be easy to determine.

Chandra Pathak asked if there is information in the report to help him make the case for the value of his programs. Something like a cost-benefit ratio would be helpful. Steve answered that the results of this provide an additional piece of information for agencies to take into the discussion. It can help define the benefits more broadly.

Victor Hom noted that the challenge is to connect the dots between the dollars spent and societal benefits.

Tom noted that if Steve's presentation is put on the website, Zhuoting Wu (Zi) and others could add a discussion as to how to use it as well. **Robert said that he would take an action item to provide some context. The Office of Surface Water will put together some summaries.**

Terry noted that NSF funded a workshop in August about the data gap between federal agencies and academia. The report is coming out in a few weeks and Terry will send to the group. **Robert suggested that NSF write a business report.**

Steve noted that there is going to be a public version of the report, the subcommittee is deciding what it will look like.

Zi said that the number one type of data that USGS relies on internally is field work, followed by the stream gage network.

Terry noted that there is a briefing next week on water on the Hill.

A 10 minute break occurred, after which the meeting was reconvened.

7. Review of previous meeting summaries

Vic moved to approve last meeting's minutes with Tom's corrections. Tom seconded the motion. There were no objections and the motion passed.

8. Review of action items from prior meetings

The action items on the agenda were largely simple items and not discussed. Robert noted that Sujay Kumar's white paper may involve more discussion, so it is also the next item on the agenda under "Old Business."

9. Old Business

Ted Engman discussed the outline of the white paper. This is at the stage of being a proposal for a working group, and he is looking for feedback.

He is proposing to study and report on the current status of dealing with missing or nonexistent spatial and/or temporal hydrologic data. The paper would identify and describe new technologies.

The product would be a white paper with a comprehensive description of the problem and literature review. It would include descriptions of procedures currently used by agencies and their consultants for when data do not exist; this would be two pages maximum per agency/group. There will be two pages of discussion on potential new technologies that have been identified, as well as a list of selected references, a summary and recommendations.

The project would need representatives from each agency or group. There would be no budget needed as the work would take place by teleconference and email, with monthly scheduled meetings. The group would present a quarterly report to the SOH. The final product would be a white paper for the ACWI and a journal article. The duration would likely be 18-24 months.

Claudia Hoefft asked if the need is known, and if we have an expected outcome. Ted answered that there are new technologies/approaches that have been published in academic journals, such as assimilation methods to deal with data gaps.

Siamak wanted to know if this is a big problem. For example in hydrology, if there are data gaps there are known techniques to deal with those gaps. Ted answered that one example would be data assimilation methods to provide streamflow or precipitation data from other sources where there is none. He does not know how important or needed this is, the white paper or subsequent meetings would answer this question and determine whether to move forward.

Tom noted that until we get into examples it is going to be difficult for people to understand. Perhaps Sujay could include a two-three page write up with example.

Dongsoo Kim noted that the focus may be too wide. He is working on precipitation data. Many processed data is not properly processed (i.e., zeros instead of missing values). Ted responded that the white paper would refer to the techniques available. The current procedures being used may be dated and newer technologies should be used.

Robert inquired about the parameters of interest. Ted answered that streamflow and precipitation are of interest, but soil moisture could be included as well. He said there do not appear to be techniques for groundwater. Robert says that is fine, we can engage the groundwater committee if necessary. Ted said we would focus on streamflow, precipitation, soil moisture, snow.

Chandra asked if it would be appropriate to change the title to "observational needs" and "identifying" data gaps instead of filling them, to get a better handle on the scope. Some examples would be helpful. Ted said that the first part of the study, the comprehensive description of the problem, would include this. We need to have a short white paper.

Ted asked if the group if it would be better to define the scope before getting the go-ahead from the subcommittee, or to form the group and then define the scope.

Vic said we need to define the gaps: quality, spatial and temporal.

Claudia said from a subcommittee standpoint, the SOH could support the group going forward to better define the scope.

Ted noted that there are more techniques out there in the literature but he is not sure if they are being used yet. He would like to keep it as simple as possible so that it can be done in 18 months.

Tom noted that the ESEWG was created as a task force. The task force defined the problem and created a charter. Once the problem is defined, we can go forward with a working group. For only 18 months, a task force would be better than a working group.

Vic made a motion for Ted to create a small task force to identify, scope out the needs for this task, provide an example of how this task is beneficial, and make a proposal for a working group. Claudia seconded.

Steven Yochum at the forest service noted that the group could identify lack of techniques as well.

Ted would like to solicit for volunteers now. Claudia will volunteer NRCS (but not herself) and Robert said the USGS would participate. The NRC is interested but needs to check with management. The NWS will provide observational requirements. ARS, BLM, and FERC would like to participate. Dongsoo will provide an overview what he has dealt with in this area. Chandra said the USACE will respond after he is able to speak with colleagues.

Ted will draft a task force outline, send it to Robert, then run it by the full subcommittee to get volunteers from agencies. Sujay will chair the group, Ted will do a lot of the work.

10. New Business

Jerry Webb provided the updates on the SEDHYD conference. The conference will be held in 2018. The RFP has been prepared and sent out, but there are no responses yet. Many people would like to have it held elsewhere besides Las Vegas/Reno. In terms of organizing, the conference has lost its historic continuity with Doug Glysson and Jerry Bernard. Jerry (Webb) is semi-retired himself.

Jerry noted that conferences have bank accounts with carryover funds to start next conference. Additional names need to be put on the bank accounts for continuity. The SOH needs to support having someone from HMWG on the accounts. Claudia's agency ethics department has advised her not to be on the accounts. Who from the hydrology side should be named on the accounts?

Robert noted that the BOR has done it for years, the bank accounts are located in Denver. Jerry did not know what approvals were given by the agencies and that some of the current signers have been on accounts for years.

Robert suggested an action item that he, Claudia, and Jerry will confer about the appropriate representatives from the SOH for the finance side of the conference. Any names should be people involved with the conference.

Jerry is willing to be on the account. At this point he is serving as the conference chair. He thinks he will be fully retired at that point, and with his current status being named on the account should not be a problem. Claudia is fine with this, and will continue to be involved, but she cannot handle the money.

The decision was that just Jerry will be added to the account for now, and then the operations coordinator can be added to the account. This will be the interim solution. There were no objections from the committee.

Vic commented that there was some discussion about supporting SedHyd through the IWRSS Tech Exchange team. This would be a good way to promote tech exchange.

11. Announcements - Agency business reports

Robert asked if anyone would like to make any agency business reports, with the reminder that reports will be in the minutes and on the web. Reports are a brief summary only. Full reports are provided as attachments 3-7.

NRC - Meredith Carr announced the flood hazard assessment workshop, from Jan 23-25. It will provide an overview of probabilistic flood hazard assessment research. The meeting is open to the public, but all will need to register so that enough seating can be provided. Official announcement provided as an attachment. Additionally, NRC will participate in a round table discussion on November 2, a link will be provided.

NWS – Vic will provide a full report for the minutes. It includes information on the national water model, which is now forecasting river reaches on a national scale. Also, the NOAA COOPs program has a new GIS data portal.

FEMA –Siamak announced that Congress has asked that FEMA look into urban flooding, outside of SHFA areas. National Academy of Sciences is engaged to do the study.

NRCS – Claudia said that the agency released a technical note in September for hydrologic analysis in post-wildfire conditions. The public can access the document through the NRCS website.

FERC – Sam discussed FERC’s remedial actions on spillway capacity.

Forest Service – Steven Yochum is the new agency lead from the Forest Service (he is formerly of NRCS).

USGS – Robert noted that the USGS has published a paper on flood trends. The paper shows no indication of systematic increases in flood flows. Any increases are national and the trends are not very strong. The paper is not disputing climate change, but it is saying empirically that we are not seeing significant or consistent flood trends.

12. News from the SOH workgroups

HMWG – This was covered under new business.

STIWG – LySanias Broyles provided the report.

The workgroup waiting for what the FCC will decide on the auction of the portion of the spectrum. STIWG responded on the impacts of the radio intrusion. There is a lot of support for the recommendation that the 1675-1695 frequency be inherently governmental.

The group is also in process of modifying the charter. They are adding a vice chair to work with the chair and moving to two year terms. There are two subcommittees that have been formed: a DCS preservation group, and an open DCS standardization group. The standardization group is in the process

of source selection, there is a need to separate government owned side of the code from commercial software.

ESEWG – Tom provided the report.

George Huffman will join ESEWG. Recently, Sujay did a seminar, and there were 40 people on the phone. The USACE has approved funding for Marion Baker to continue as vice chair.

Vic is working on the paper; more is needed on the probabilistic flood hazard approach. Dongsoo Kim is one of the reviewers. The report is pretty much final except for the missing portion. Robert noted that ACWI is meeting in January and having the report to present to them would be good.

HFAWG – Will Thomas provided the report.

Will sent a report to SOH members. The latest Bulletin 17C draft is dated Aug 26, 2016. It includes the results on the comments received from the public. On September 6, Robert sent out the responses to public comments to the SOH for review, and all those who voted approved the responses.

At the end of September, Robert sent the report out for peer review, and comments should be received by November 15. As soon as comments on the draft are received, the workgroup will prepare responses and ask for the approval of the subcommittee.

Robert demonstrated that the public comments and responses are posted on the website.

Martin asked about the status of ASCE questions and answers.

Robert will take the action item from the previous minutes as an action item for the next meeting. (He will compile a participant list from the ASCE and ASFPM short courses on Bulletin 17C and put together a survey. He will send to Martin to review.) The survey will be sent to the participants.

Streamflow information collaborative – Doug provided the report. The group will have its next call in November; Doug is working on the notes from the last call.

Full reports from the workgroups are provided as attachments 8-11.

13. Review Actions and Plans for next SOH meetings

The next meeting will be at the USACE. The date is to be determined given that the third Thursday of the quarter is the day before the presidential inauguration. USACE will also present their new software, HEC-MetVue, at the meeting.

Review of action items from this meeting:

- 1. Steve to provide the feature presentation to Robert for posting on the web**
- 2. Robert/OSW to provide some summaries/context on using the USGEO assessment to be posted on the web with Steve's presentation**
- 3. NSF to provide a business report**
- 4. For the NASA white paper, Ted will draft a task force outline, send it to Robert, then run it by the full subcommittee to get volunteers from agencies. Sujay will chair the group, Ted will do a lot of the work.**
- 5. Robert will draft a letter for Jerry Webb for the conference bank account.**

- 6. Robert will take the action item from the previous minutes as an action item for the next meeting. (He will compile a participant list from the ASCE and ASFPM short courses on Bulletin 17C and put together a survey. He will send to Martin to review.) The survey will be sent to the participants.**

14. Meeting adjourned

Ted moved to adjourn the meeting. Tom seconded the motion. There were no objections and the meeting adjourned at 3:45 pm.

Attachment 1 - Roll call

In person

Robert Mason, USGS*
Victor Hom, NOAA/NWS*
Ted Engman, NASA*
Wade Crow, USDA/ARS
Siamak Esfandiary, FEMA*
Tom Nicholson, NRC*
Meredith Carr, NRC
Chandra Pathak, USACE*
Steve Lev, IDA
George Huffman, NASA
Zhuoting Wu, USGS
Laura Chap, STARR II

On phone

Bob Boyd, BLM*
Claudia Hoeft, USDA/NRCS*
Dongsoo Kim, NOAA
Ed Tomlinson, Atmospheric Science Associates
Jack Felbinger, Office of Surface Mining Reclamation and Enforcement*
Libby Gress
Steven Yochum, USDA/USFS*
Teresa Davies, NSF*
Jerry Coffey, public (former OMB)
Dave Goodrich, USDA/ARS*
Li-Chuan Chen, NOAA/NWS
Martin Becker, BECKER*
Ben Pratt, National Hydrologic Warning Council*
Brian Beucler, FHWA*
Doug Yeskis, USGS
Sam Lin, FERC*
LySanias Broyles, USACE
Jerry Webb, USACE
Will Thomas, ASFPM*

*Denotes SOH member

**MEETING OF THE
ADVISORY COMMITTEE ON WATER INFORMATION'S (ACWI)
SUBCOMMITTEE ON HYDROLOGY (SOH)
12:30 p.m. – 3:45 pm, Eastern Standard Time
Thursday October 20, 2016**

Special presentation: NASA Hydrological Sciences Lab

Location: Beltsville Agricultural Research Center, Bldg. 005, BARC-West, 10300
Baltimore Avenue, Beltsville, MD, 20705

For map see: <http://www.ba.ars.usda.gov/std/all/map-barc.html> (click on "BARC-West" text on left-side of map to zoom into Bldg. 005).

Attendees: Please register in advance via the survey monkey (see URL below) as we will be providing this list to security for expedited check-in. Please bring government-issued ID or badge. Allow 25 minutes for logistics, please. Problems? Wade Crow, 301-504-6847 (office), 301-219-6818 (cell).

Remote Instructions:

1. In the interest of time, we will be using the survey monkey to do our roll-call. Please register before COB on October 7, 2016 via <https://www.surveymonkey.com/r/MYSZZDQ>.
2. Join us via the web <https://usgs.webex.com/usgs/j.php?MTID=mb4ea57baca42c179bf48e9a6b9a0ff41>
3. Dial the conference call: 855-547-8255 (1-703-648-4848) Passcode: 20387#

Draft Agenda (subject to SOH Approval)

- | | |
|--|------------------------|
| 1. Welcome and Opening Remarks (2 mins) | Robert Mason |
| <ul style="list-style-type: none">• <i>Logistics: Internet Access</i> | |
| 2. Roll-Call (Remote Participants/In-Person Attendees) (3-5 mins) | SOH Members and Guests |
| <ul style="list-style-type: none">• <i>Roll-call will follow the registration survey.</i> | |
| 3. Review and Approval of Agenda (5 mins) | Robert Mason |
| 4. Words from our Host (3 mins) | Wade Crow |
| <ul style="list-style-type: none">• <i>Introduction of Special Guests</i>• <i>Logistics: Emergency Procedures, Facilities Orientation</i> | |

5. **Background on SOH** (5 mins) Siamak Esfandiary
6. **Feature Presentation** (~60 mins) (12:45 – 2:00 PM)
- **Speaker Introduction** *Robert Mason*
 - **Water Resources Earth Observing Systems Assessment** Steve Lev
 - **Questions/Answers/Discussion** *All*

BREAK (2:00 – 2:15 PM)

7. **Review of Previous Meeting Summaries** (5 mins)
 July 28, 2016 (See email from [Laura Chap \(laura.chap@atkinsglobal.com\)](mailto:laura.chap@atkinsglobal.com) Laura Chap)
8. **Review of Action Items from Prior Meetings** (5 mins) Robert Mason
- Post NASA presentations on SOH webpage
Done.
 - Laura Chap and Robert to draft and circulate 7-28-16 meeting summary.
Meeting summary circulated 9/2/16.
 - Robert will identify a meeting location and host
Done.
 - Robert will invite representatives of the OST EOA workgroup to present to the SOH.
Done.
 - Sujay Kumar (NASA) will prepare a white paper of data observation gaps.
Done. See old business below.
9. **Old Business** (10 mins)
- SOH white paper on hydrological observation gaps Sujay Kuma
10. **New Business** (20 mins)
11. **Announcements** (10 mins)
- *Agency Business Reports*
 - (FERC, NRCS, USGS, NWS, FEMA, etc.) *All*
 - *Upcoming Meetings, Conferences*
12. **News from the SOH Workgroups** (50 mins) All
- [HMWG](#) *Plans for SedHyd conference?*
 - [STIWG](#)
 - [ESEWG](#) *Results from meeting with NASA; status of proposal.*
 - [HFAWG](#) *Path Forward for B17C.*
 - *Streamgaging collaborative*
13. **Review Actions and Plans for next SOH meetings** (15 mins) Robert Mason
14. **Meeting To Adjourn** (Around 3:45 pm)

Attachment 3 – NRC

Please note that the announced PFHA Workshop will be open to the public, but seating will be limited and registration is required.

We are planning to have the PFHA workshop available via GoToWebinar for those wishing to attend remotely. However, you still need to register for remote attendance.

Please contact Meredith Carr for further information and registration.

The U.S Nuclear Regulatory Commission Office of Research is hosting the 2nd Annual Probabilistic Flood Hazard Assessment (PFHA) Research Workshop at U.S. NRC HQ in Rockville, MD from Jan 24-25, 2017. This workshop will provide an overview of PFHA research being performed by U.S. NRC Staff and contractors, as well as, research being conducted on behalf of industry by the Electric Power Research Institute. Over 20 technical presentations focusing on flood process modeling, flood hazard estimation, and flood protection reliability are scheduled. The meeting is open to the public, though seating is limited and registration is required: contact Meredith Carr at 301-415-6322 or Meredith.Carr@nrc.gov for registration or webinar information.

Attachment 4 – NRCS

NRCS released Engineering Technical Note 210–4: [Hydrology Technical Note No. 4: Hydrologic Analyses of Post-Wildfire Conditions](#), dated August 2016 posted to NRCS e-Directives on September 15, 2016. The tech note focuses on the adaptation and use of NRCS hydrologic analyses procedures for assessment of conditions following wildfire. It also includes 5 case studies documenting the modeling of wildfire-burned watersheds. It is available for public download through the NRCS eDirectives web-site, using the hyperlink: <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=39877.wba>.

FERC Report to October 2016 SOH Meeting

- In October, FERC conducted a special inspection of the Columbia Canal Project, located on the Broad River in South Carolina, to observe drilling of the canal embankment. The subsurface investigation is needed to evaluate repair options for the embankment, which breached in October 2015 during a High Flow Event.
- In September, FERC met with California Division of Safety of Dams personnel to discuss the technical aspects of evaluating seepage through rockfill dams in an attempt to discuss the different methods of evaluating the seepage through the structures. . The purpose of meeting is to ensure the dual-regulated Licensees are receiving consistent design requirements from both regulatory agencies.
- In September, FERC conducted a construction inspection of the Island Lake Dam development of the St. Louis Project in Minnesota. The design consists of the construction of a reinforced concrete labyrinth spillway in the North Dike which will enable the project to safely pass its inflow design flood.
- In August, FERC participated in a review board meeting for a statewide Probable Maximum Precipitation (PMP) study for the States of Colorado and New Mexico. The review board included representatives from the USACE, BOR, and NOAA, and discussed the technical methods used in the study. Results of the study may be used in the future for spillway designs at FERC regulated hydropower dams.
- In August, FERC participated in a conference call with the licensee for an update on plans to remediate the Buzzards Roost Project structure in South Carolina to safely accommodate the Site Specific Probable Maximum Flood (SSPMF).
- In August, FERC participated in the 2nd Board of Consultants Meeting with regards to the Site Specific Probable Maximum Precipitation and Incremental Design Flood (SSPMP/IDF) associated with the Gross Dam Project in Colorado.
- In July, FERC participated in the first meeting of the Board of Consultants (BOC) to discussing the site specific Probable Maximum Precipitation (SSPMP) and SSPMF for the Piney Project in Pennsylvania.

The USGS SOH Buiness Report

October 20, 2016

Submitted by Robert Mason

USGS Hurricane Matthew Flood-Data Collection Effort Nearing Completion

As Hurricane Matthew approached the US Atlantic Coast, USGS scrambled crews to deploy new storm-tide monitoring sensors (STS) and rapid deployment gages (RDGs) to collect and water-level data need by emergency management officials to better monitor and respond to the flood impacts of the storm. At the request of the Federal Emergency management Agency (FEMA) USGS crews from Florida north into Virginia completed the deployment of the 393 storm-tide sensors at 290 locations. Data from these sensors will be used to by USGS to quantify storm-tide dynamics (wave heights, forces, speeds, and extent) for various storm conditions, topographies, ecologies, built environments, and land uses. This information will lead to improved and more targeted FEMA response and recovery operations over the short-term and better storm-tide models, more accurate flood forecasts, more effective flood-protection infrastructure, and wiser land use policies in the long run.

The USGS [Food Event Viewer for Hurricane Matthew](#) provides key information to the water levels at different sites along the coast. Users can select a data point on the map and learn if the gauge recorded a peak record, when, and at what stage. Some rapid deployment gauges (green triangles) also provide graphs of the water levels from deployment to collection of the sensors. Also at the request of FEMA, USGS had flagged and surveyed 642 costal highwater marks and 131 riverine highwater marks.

USGS completes new Study of Flood Trends

The USGS has published the results of an analysis of flood trends. The study by scientists from the U.S. Geological Survey and the Vienna University of Technology in Austria examined the recent history of floods in the United States for the time period 1940-2013. The scientists found some regional trends, but no widespread national pattern of flood change.

Using a novel approach based on data from a carefully selected set of 345 U.S. streamgages, the investigation set out to resolve the apparent contradiction between findings by climate scientists of increases in the frequency and magnitude of heavy precipitation in most parts of the country and other studies that have failed to identify statistically significant increases in floods. The science team considered the years 1940-1969 to be a base period for comparison with flood properties in more recent years.

“An important prerequisite for effective flood risk management is to have an accurate assessment of how flooding is changing over time,” said Stacey Archfield, USGS scientist and lead investigator of the team. “Of course, changes in climate as well as land- and water-use

management are each potential sources of change in flooding frequency or magnitude. But the relative influence of these factors across broad areas has been difficult to discern.”

To reduce the direct influence of human factors on the data, the USGS streamgages selected for the study were geographically representative but were located in watersheds that are relatively free of the blurring effects of water storage reservoirs, high concentrations of urban land, storm surges, or other coastal flooding.

The team’s conclusion was that most of the assessed regions have not experienced significant change in key flood characteristics over the 1940-2013 period with some notable exceptions.

The northern Great Plains and Upper Mississippi Valley show statistically significant, but small, decreases in the frequency of floods, but large increases in the peak magnitude, volume, and duration of floods. For example, some portions of that area experienced more than a doubling of the average volume and average duration of flood events relative to the base period.

Large parts of New England exhibit the opposite behavior, showing large, significant increases in the frequency of flood events and significant (but small) decreases in the average peak magnitude, average volume, and average duration of flood events. In some parts of New England, the average frequency of floods increased from 2 floods per year to an average of 4 or 5 events per year relative to the base period.

Moving beyond simply testing for the significance of trends in each region, the research team also evaluated the likelihood that the number of regions with significant trends could have occurred by chance. In considering the frequency, average volume, and average duration of flood events, the number of regions with significant trends in either direction was found to be greater than the number of significant trends that would have been occurred by chance. This finding confirms that the number of regions with observed significant trends in these flood properties was, in fact, substantive.

In addition, the number of regions with increasing trends in the peak magnitude was significantly greater than the number with negative trends. The authors note, however, that there were far more regions with no significant trend in any of the flood characteristics than the number of regions with either positive or negative trends.

The analyses show that generalizations about the nature of flood trends are not possible at this time. The analyses further suggest that a nuanced approach is required to address flood change for the purposes of management of flood hazard, rather than uniform approaches applied to a regional or national domain.

The authors of the study stressed the importance of continued streamflow monitoring and continued re-analysis of flood records, using a wide range of possible measures of changing flood behavior as only one part of an overall strategy needed to increase the ability to forecast the trajectory of flood conditions. This ability to forecast flood behavior is needed to guide natural resource and natural hazard planning and management over the coming decades.

The study, “[Fragmented patterns of flood change across the United States](#)”, was recently published in the journal *Geophysical Research Letters*.

SOH Member Business Reports (Oct 2016)
NOAA

NWS Office of Water Prediction (OWP)

The Office of Water Prediction now has social media presence on both Facebook and Twitter. You can follow OWP on Twitter at <https://twitter.com/NWSOWP> or on Facebook at <https://www.facebook.com/NWSOWP>. If you already have Facebook or Twitter, just search for NWSOWP. OWP hopes to be sharing their work on programs and initiatives such as the Airborne Snow and Soil Moisture Program and the new National Water Model.

The National Water Model (NWM)

On Tuesday, August 16, 2016, the Office of Water Prediction (OWP) National Water Center (NWC) began hosting water information from the National Water Model (NWM) - an hourly, uncoupled hydrologic analysis and forecast system that provides streamflow for 2.7 million river reaches and other hydrologic information on 1 km and 250 m grids, on NOAA's Experimental Water Information Interface Webpage (<http://water.noaa.gov/map>). This interface allows users to display a range of water information, such as snow depth and snow water equivalent, and experimental output from the NWM, including streamflow, streamflow anomaly, soil saturation images, and forecast hydrographs for 2.7 million river reaches for short-, medium-, and long-forecast ranges. A topographic map with NWM flowlines appears when the webpage is first displayed. For more info, see [link](#) for a description.

NWS Hazard Simplification Project

For decades, the NWS has used the Watch, Warning, and Advisory (WWA) system to alert users of forecast hazards. Although the WWA system has been highly effective in protecting life and property, NWS have received feedback that some users find the WWA terms confusing. In particular, users are sometimes confused about how to interpret and distinguish the large number of individual WWA "products" (e.g., Wind Advisory, Flood Watch, Winter Storm Warning). Based on this initial feedback, NWS is exploring alternatives for more effectively communicating the hazard messages with the support from NOAA social and behavioral scientists. At this time, the NWS is not making any changes to the operational system but is carefully considering a number of options, such as: 1) Keeping the current WWA system as is; 2) Making small to moderate changes; or 3) Making a transformational change to the WWA system. Given that the WWA system has been in place for a very long time, NWS is carefully weighing any and all new ideas carefully. NWS will be collecting public comments on these possible options, so please see the following [link](#) for opportunities to comment in upcoming surveys.

Turn Around Don't Drown

The Centers for Disease Control and Prevention report that over half of all flood-related drownings occur when a vehicle is driven into hazardous flood water. Many of these deaths occur in automobiles as they are swept downstream. Of these drownings, many are preventable, but too many people continue to drive around the barriers that warn you the road is flooded. A mere **6 inches** of fast-moving flood water can knock over an adult. It takes just **12 inches** of rushing water to carry away a small car, while **2 feet** of rushing water can carry away most vehicles. To alert drivers of a potential threat, the "When Flooded, [Turn Around Don't Drown®](#)" [warning sign](#) could be deployed at locations where the incidence of flooding is high, the onset of flooding is rapid, and/or it is not practical to deploy incident signs in a timely manner. For more info about the TADD program, please see [link](#).

Map Services from NOAA's CO-OPS GIS Data Portal

On September 7th, the NOAA's Center for Operational Oceanographic Products and Services (CO-OPS) launched a new GIS Data Portal to provide public access to CO-OPS stations and derived data products in the form of GIS services, including as public ArcGIS Server REST Services. The services include OGC compliant Web Feature Services (WFS), providing full access to oceanographic and meteorological data. For more info, please see [link](#).

Attachment 8 – STIWG

1) Charter Modification

- a) Upgrade secretary to Vice-Chair and delineate roles and responsibilities
- b) Moving to 2-year terms to promote more continuity

2) DCS Preservation Subcommittee

- a) Monitoring the status of the FCC deliberation on the 1675-1680 frequency sharing proposal from Ligado (formerly LightSquared)
 - i) DCS: 1679.9 MHz
 - ii) GRB: 1686.6 MHz
 - iii) HRIT: 1694.1 MHz
- b) STIWG responded collectively with a whitepaper and individually during Federal comment period
- c) Non-Federal users and stakeholders are now submitting comments
- d) Agencies are deploying interference detection systems to monitor radio activity around ground stations
- e) Interference with the GOES downlink has dire consequences regarding the nation's hydro-met data collection network

3) OpenDCS Standardization Subcommittee

- a) Working with Cove LLC and Sutron Corporation in a joint effort to consolidate the OpenDCS software variants
 - i) OpenDCS is used by STIWG agencies and others to collect, process and disseminate GOES DCS data
 - ii) Consolidation leverages resources and enhancements from all agencies in a single software package versus separate diverging development paths
 - b) Have submitted source selection criteria to both developers in order to determine the code base upon which to build the consolidated software

5) GOES-R spacecraft scheduled to launch 16-Nov-2016

- i) Improved spectral and spacial capabilities
- ii) Real-time lightning mapping
- iii) Improved geomagnetic storm, thunderstorm, tornado and hurricane tracking
- iv) Improved space weather sensors and imagery capabilities

4) Next meeting scheduled for June 2017

Hydrologic Frequency Analysis Work Group (HFAWG) Report for the Subcommittee on Hydrology Meeting on October 20, 2016

The Hydrologic Frequency Analysis Work Group (HFAWG) Bulletin 17C writing team (co-authors) revised the December 29, 2015 draft of Bulletin 17C on the basis of review comments received during the public comment period (February 22 to April 22, 2016). The revised draft of Bulletin 17C is dated August 26, 2016. John England, USACE, coordinated this effort.

The co-authors of Bulletin 17C drafted responses to the 50 public review comments and Robert Mason, Chair of the Subcommittee on Hydrology (SOH), provided the review responses to SOH members in an email on September 6, 2016 (information available on a google site established by John England). A copy of the August 26, 2016 version of Bulletin 17C and responses to the public comments are now posted on the Bulletin 17C web site at <http://acwi.gov/hydrology/Frequency/b17c/index.html>. In his September 6 email, Robert requested the SOH members to vote (via a “survey monkey”) “yes or no” if the responses to the public review comments were acceptable. The results of that vote are included below:

Subcommittee on Hydrology votes on whether or not the responses to the public comments on Bulletin 17C are acceptable

Tom Nicholson	U.S. Nuclear Regulatory Commission	Yes
Sam Lin	FERC	Yes
Ben Pratt	NHWC	Yes
Michael Eberle	USDA-FS	Yes
David Goodrich	USDA-ARS	Yes
Jack Felbinger	OSMRE	Yes
Claudia Hoeft	USDA-NRCS	Yes
Ian Ferguson	Bureau of Reclamation	Yes
Robert Mason	USGS	Yes
Don Woodward	GEC	Yes
Ted Engman	NASA	Yes
Victor Hom	NOAA-NWS	Yes
Martin Becker	Becker	Yes
Teresa Davies	NSF	Yes
Siamak Esfandiary	FEMA	Yes
Curt Jawdy	TVA	Yes
Will Thomas	ASFPM	Yes
Chandra Pathak	USACE	Yes
Brian Beucler	Federal Highway Administration	Yes
Mathini Sreetharan*	Dewberry	Yes
David Raff*	Bureau of Reclamation	Yes
Li-Chuan Chen*	NOAA-CICS-MD	Yes

*Alternate member also voted

As shown in the table above, the vote was unanimous that the responses to the public review were adequate and this allowed the Chair of the SOH to proceed with the USGS peer review. At the end of September, Robert Mason forwarded the August 26, 2016 draft of Bulletin 17C to the five peer reviewers and requested they provide their review comments by November 15, 2016.

The peer reviewers include:

- Chuck Kroll, Professor, SUNY University,
- Henry Hu, Consultant, WEST Consultants,
- Ben Pope, Consultant, AECOM,
- Gabriele Villarini, Professor, University of Iowa, and
- Rich Vogel, Professor, Tufts University

As soon as the peer review comments are received, the co-authors of Bulletin 17C will respond to the peer review comments and revise the draft of Bulletin 17C as needed. The peer review comments and the responses will be provided to the SOH members for approval. After the peer review comments are addressed and Bulletin 17C is revised, USGS will proceed with publication.

Will Thomas

Michael Baker International

Chair of the HFAWG

October 18, 2016 – revised October 21, 2016

Attachment 10 – Streamflow information collaborative

The Streamflow Information Collaborative is a working group under the Advisory Committee on Water Information (ACWI) Subcommittee on Hydrology (SOH). The Collaborative is charged with helping to coordinate national streamflow information network goals and priorities with related activities of other government agencies, non-governmental organizations, and the general public.

The list of invited members is everyone on the SOH, but so far representatives from ICWP, WSWC several Federal agencies (NRCS, USEPA, BOR, USACE, BLM, NRC, USDA, FERC, NASA, etc.), and private consultants have attended the calls. Additional members are being solicited from other organizations to participate.

Approximately monthly conference calls have been held in May, June, July and September. A draft charter has been developed, and the conference calls have been focused on the goals of the collaborative and possible revisions to the charter.

Report of the Extreme Storm Events Work Group to the SOH at the October 20, 2016 Meeting

by Tom Nicholson, Interim Chair and Marian Baker, Vice-Chair

We are pleased to announce our newest work group member, Dr. George J. Huffman, Deputy Project Scientist on the Global Precipitation Measurement Mission, Goddard Space Flight Center, NASA. His contact information is: E-mail: george.j.huffman@nasa.gov, telephone +1 301-614-6308 and mail address: NASA/GSFC Code 612, Greenbelt, MD 20771.

Dr. Huffman will make a presentation to the ESEWG in mid-January on NASA's missions involving precipitation.

The Proposal Writing Team (PWT) of the Extreme Storm Events Work Group (ESEWG) continues to work on the national proposal f "Extreme Rainfall Product Needs."

Marian Baker, ESEWG Vice-Chair and Proposal Team Lead, uploaded the latest draft of the ESEWG product needs report to her server and forwarded it to Tom Nicholson and Victor Hom.

The update includes:

1. A placeholder in the introduction chapter for a link to the server copy of the 2014 products needs draft that needs to be hosted somewhere on the SOH website.
2. All of John Onderdonk's, FERC, write-up are included in the request for HMRs/new methods of computing PMP values. There are pieces in his write up that appear to be proprietary and may have to be rewritten in more general terms. It appears that MetStat is involved in this portion of the John's write-up. Marian will review it and edit it where needed in consultation with John.
3. Placed Victor Hom's, NOAA/NWS, section 2.4 into the proposal, but not section 2.5 which needs further work. Marian thinks that having a portion of the report that addresses probabilistic approach could be written to include risk-based issues.
4. The end sections of the proposal still need to be completed. Marian wonders if we need all of outlined sections since they may be nice to have – but are they all really necessary?
5. The appendix on acronyms is complete.

Marian will contact Sanja Perica, NOAA/NWS for an update on the NOAA Atlas 14 chapter in the proposal.

Marian's section on the USACE storm database will likely be completely rewritten in the next year, but for now, everything is the same.

Marian has been funded by USACE to continue her ESEWG work in FY17.

We anticipate the next steps to be:

- Send the updated draft of ESEWG Proposal to PWT on December 1, 2016
- Forward final draft of the ESEWG Proposal to SOH by January 3, 2017
- SOH provides comments on draft ESEWG Proposal at January SOH meeting
- January 2017 SOH Meeting - Motion to Approve the Recommendations
- Cost Estimates to PWT by SOH agencies by December 1, 2016
- ESEWG Proposal with agreed-upon cost estimates to SOH by January 10, 2017
- Discussion on Cost Estimates and Motion to Assemble Final Report at January 2017 SOH Meeting.