SUMMARY OF THE MEETING OF THE
ADVISORY COMMITTEE ON WATER INFORMATION'S (ACWI)
SUBCOMMITTEE ON HYDROLOGY (SOH)
12:30 pm – 3:30 pm, Eastern Standard Time
January 18, 2018

U.S. Geological Survey Headquarters, Reston, VA

1. Welcome

Siamak Esfandiary, new SOH Chair, called the meeting to order at 12:33 pm.

2. Roll call

The list of attendees is included as Attachment 1.

3. Review and approval of the agenda

There were no comments on the draft agenda, and it was agreed to skip the background on the SOH. The draft agenda is included as Attachment 2.

4. Featured presentation

The featured presentation was given by Siamak, titled "Probabilistic Mapping for the NFIP." At this stage, the concept in the presentation is simply an issue that FEMA is studying. Siamak would like to show the group a few things to start a discussion.

First, he started with a discussion about what FEMA does. Siamak explained that FEMA performs the hydrology and hydraulics studies to delineate the 100- and 500-yr floodplains and create flood insurance maps. They also delineate floodways as a management tool. The regulatory Base Flood Elevation (BFE) is the 100-year flood. The 100-yr flood is determined from frequency analysis to yield the 1% chance discharge; the floodplain from this discharge is mapped as the 100-year flood.

The 100-year flood was not supposed to be a safety standard. It is not a good risk communication tool. It was intended as a tool for the NFIP actuaries to determine appropriate insurance rates for structures. It was not intended to imply that if a structure is located outside of the 100-yr floodplain, then that structure is safe. Additionally, the 100-yr is not stationary; it changes with development, construction of dams, et cetera.

Using the 100-year flood as a standard is causing problems with communities. In particular, there are situations where a structure is elevated one foot above the BFE and then the BFE changes. There is mandatory purchase of flood insurance if a house is in the 100-year floodplain, so it is important whether the structure is in or out of the floodplain.

This study considers the idea of trying to go from a hazard-centric map to a risk-centric map.

Right now, FEMA has a lot of 1D models in its library. Everything between the cross sections is interpolated. All products are designed for a 1D world. It is difficult to translate 2D information onto maps.

Burnt Mill Creek in Wilmington, North Carolina, was selected as a 2D model study area. Much like performing frequency analyses at gage, if a 2D model is run with many discharges using a Monte Carlo-type process a frequency analysis can be done for each cell. This can provide a structure-level risk assessment. This analysis yields a probability exceedance curve for each cell. The 1%-annual-chance event may be different at each cell.

So instead of determining the 1%-annual-chance event at the gage, and running the hydraulic model, this method involves running the hydraulic model 10,000 times and performing a frequency analysis on the results.

For the Burnt Mill Creek study, a heat map was created. The model was run 1000 times, with storm events sampled from the 2 year to the 2500 year event. The number of times the flood depth in each cell was greater than 1 foot was counted. From the heat map, it can be determined those cells that were flooded more than 50% of the time to a depth of 1 foot or more. In any given year, this map would represent fluvial flood risk.

Claudia Hoeft asked about uncertainty; Siamak responded that uncertainty is taken that into account. Flows are from 17C and the study uses error bands to account for the uncertainty.

Siamak wanted to emphasize that FEMA is not using this or planning on using this, at this time they are just studying it.

Martin Becker asked if there is a comparison of the 100-year flood in the 1D versus 2D model. However, in the heat maps, there is no 100-yr flood included. Siamak said this analysis could not be used on a FIRM right now.

Siamak noted that TMAC, NAS and Congress also think that something needs to change in how FEMA evaluates risk.

Beyond the fluvial floodplain, the risk is controlled by pluvial flooding. There is a need for a combined pluvial/fluvial floodplain. There has been some work on this in the UK and Vietnam. There are no best practices or guidelines for this type of analysis, although some documents have been produced by the USACE and NRCS. The SOH role may be in how to think about best practices and guidelines for pluvial flooding.

Tom Nicholson agreed that there should be a meeting to talk about this. NRC staff is very interested in this topic. In particular, how do we avoid creating artificial uncertainties. NRC is primarily interested in flooding at a site, not the whole river length like FEMA is.

Martin asked, using this map what is the point at which flood insurance would be required? Siamak said that is a question that needs to be answered by actuaries. That would be risk rating 2.0; is there a way to come up with better rates?

Martin noted that this was a better idea than the current concept of a line (where a property is either in or out). It helps people think about what it means to be in the floodplain. What happens below the BFE?

Robert Mason added that the TMAC recommendation was to compute an annualized loss amount for each structure. In that way, a homeowner can weigh annualized loss versus coverage.

Tom noted that some of this is risk versus hazard. He thinks SOH should continue looking at this issue; the SOH should not be concerned with insurance estimates, but it should be concerned about risk assessment.

Siamak noted that the flood damage is computed using depth damage curves from HAZUS. There are uncertainties; for example, the first floor elevation confidence depends on whether survey, LiDAR, or Google Maps was used. Theoretically the NFIP could consider uncertainties in first floor elevation. It could provide other tools such as how to recoup costs in elevating a structure by adjusting the average annualized loss for each structure.

Martin noted it could help with the process of a structure being built.

Claudia said that it brings with it the possibility of a revision to the damage curve. This is a powerful tool for a property owner. But in the end, it is the lenders who require the flood insurance. What is the lender viewpoint?

Martin asked if everyone currently in the floodplain has flood insurance policies. Siamak answered that FEMA has 5 million policies, but not all of them are in Special Flood Hazard Areas (SFHAs). Robert believes that that the percentage of homes in the SFHA with policies is relatively low.

Siamak noted that a large percentage of losses are outside of the SFHA.

Tom said that maybe the next step is to organize a task force to discuss risk assessments. "Risk significant" is an important concept. Perhaps in a future meeting, the U.S. Army Corps of Engineers could present their hydrologic studies focusing on risk assessment. Under new business, we could discuss a task force on risk.

This group needs to talk about two things: urban flooding and pluvial flooding.

Martin said that there are urban areas within the designated floodplain; neighborhoods predate the flood insurance program.

Terry Davies announced that there is an NSF report about sustainability in cities. The link is https://www.nsf.gov/news/news_summ.jsp?cntn_id=244179&org=NSF&from=news

5. Review and approval of meeting summaries

Laura Chap emailed the edits to the October 2017 meeting summary, as well as an additional edit to the previously approved September 2017 meeting summary to the SOH prior to the meeting. Robert moved to approve the meeting summaries for both the October and September meetings. Tom Nicholson seconded the motion. There were no objections and the motion passed.

6. Action Items from the October 19 meeting

The SOH governance call is scheduled for January 25, 2018.

The Low-Flow White Paper is assumed to be on track; this may be an action item for the next meeting.

7. New business

Robert, in following up to Siamak's presentation, noted the importance of topic. Would the SOH like to form a discussion group to think through and perhaps charter a work group? The discussion group could formulate a scope and objective.

Martin suggested that we address it on a broad enough basis, not just a risk map but to incorporate actuarial issues, and other issues that can help with the funding of the flood insurance programs, also those in the designation floodplains but not buying insurance currently. Siamak feels this should not revolve around insurance, but FEMA will still benefit from the outcome. The conversation should be around flood simulation. Martin agreed to start there.

Tom suggested to begin the discussion on risk-informed methodology and not focus on FEMA. Martin agreed, and Siamak agreed this is needed.

Siamak said that for pluvial flooding, there is no good information.

Robert made a motion that the members and guests of the SOH provide to the chair names of persons who would be interested in this group.

Martin would like to wait for the governance meeting.

Tom said we should determine Whether this issue should be an objective for SOH.

Martin made a motion that we pursue the discussion on risk-based issues with FEMA floodplains and take whatever discussions forward.

Tom made a motion that risk-informed methodologies be one of our objectives of SOH for future presentations and discussions. Martin seconded.

It was proposed at the next meeting the group consider Robert's motion.

8. SOH Workgroups

HFAWG

Robert provided the report. 17C was presented at ACWI. There was positive feedback. The USGS will publish the report within the next couple of months.

ESEWG

Tom provided the Extreme Storm Event Work Group (ESEWG) report. The report which is the draft ESEWG meeting minutes of January 11, 2018 is included as Attachment 3. The Proposal Writing Team of the ESEWG is reviewing the draft of the "Extreme Rainfall Product Needs" proposal. The proposal status is that Section 2.1 was recently updated; Section 2.2 appears fine; Section 2.3 is being updated; and Section 2.4 appears fine. The next meeting of the ESEWG is scheduled for February 28 at 2:00 pm EST when the draft "Extreme Rainfall Product Needs" will be discussed.

STIWG

LySanias Broyles provided the report. The group is waiting for the GOES satellite in March. The DCS preservation subcommittee is still working on FCC awareness of the issues. The next meeting will be in March.

Streamflow information collaborative

Doug Yeskis provided the report. Ryan Mueller will become co-chair, Mike will be the new chair. The group is looking at future directions for streamflow information. There will likely be conflicts down the road in terms of integrating data from all the networks. One possible framework is to tie into NHD Plus.

Data gaps

Ted Engman provided the report. No action was taken on the charter since people had not read it since the last meeting. Ted suggests a simplified process to streamline this. Mike Woodside said that the groundwater committee uses a template.

Robert noted that SOH was consumed by 17C and HFAWG for the past several years, and there should be more breathing room for other work now.

HMWG

Claudia was not present at this point in the call. Ted said that at ACWI yesterday that they announced the location of the conference, the Peppermill Resort, and the date, June 24-28, 2019. The SOH is responsible for overall program chair. Tom said that the conference will need organized sessions and timely topics, otherwise it will be difficult for attendees to get approval to go.

Terry works with AGU/AGI, and there will be a briefing series on Capitol Hill. They are planning on one on water in February or March. The topic is how geoscience contributes to water. There will be a panel of three speakers and a moderator. The event will bring in staff and members from the hill.

9. **Announcements/business reports (not announced at meeting, incorporated in minutes only)**

Terry provided a link to the following report. A new study finds that the increase in precipitation variability will outstrip the increase in average precipitation, which means that water managers may be miscalculating the magnitude of future swings from wet to dry or vice versa. https://www2.ucar.edu/atmosnews/just-published/130921/drier-and-wetter-future-precipitation-variability

10. **Actions and plans for next meeting**

For the April meeting, the low flow white paper should be available. The group will plan to read it in advance, and have a presentation and discussion.

The governance conference call will occur on January 25. The results of that discussion will be reported to the subcommittee.

The next meeting will be April 19 at 12:30 pm. Dewberry will host.

Tom suggested one possible future topic for presentation would be the national water model. Based on calendar schedules of potential speakers on this topic, Vic did not think that would work for the next meeting.

Terry suggested David Maidment, who has students in Tuscaloosa for research every summer. NCAR could be another avenue. Another suggestion was Gene Longnecker, who has created maps as a result of Harvey. Robert will contact Gene first, Terry will try Tuscaloosa as backup.

Martin motioned to adjourn the meeting. Vic seconded the motion. There were no objections and the meeting adjourned at 3:02 pm.

Attachment 1 – Roll Call

Name	Agency/Group	In person/On phone
Martin Becker*	BECKER	On phone
Claudia Hoeft*	NRCS	On phone
Karen Metchis*	USEPA	On phone
Brian Beucler*	FHWA	On phone
Steve Yochum*	USFS	On phone
Siamak Esfandiary*	FEMA	In person
Tom Nicholson	NRC	In person
Kendra Russel	USGS	In person
Mike Woodside	USGS	In person
Julie Kiang	USGS	In person
LySanias Broyles	USACE	In person
Robert Mason*	USGS	In person
Doug Yeskis	USGS	In person
Laura Chap	Atkins/STARR II	In person
Terry Davies*	NSF	In person
Ted Engman*	NASA	In person
Mathini Sreetharan	Dewberry	In person

*SOH member

Attachment 2 – Draft Agenda

MEETING OF THE
ADVISORY COMMITTEE ON WATER INFORMATION'S (ACWI)
SUBCOMMITTEE ON HYDROLOGY (SOH)
12:30 p.m. – 3:30 pm, Eastern Time
Thursday, January 18, 2018

Location: **In-person meeting at USGS, National Center, 12201 Sunrise Valley Drive, Reston, VA (Meeting Room 5A-137 – 5th floor)**

Problems? Laura Chap, Office: (301) 210 6800; Robert Mason, cell: (703) 405-5823

Meeting Instructions and Resources:

1. In the interest of time, we will be using the doodle poll to do our roll-call. Please register before COB on January 19th via https://doodle.com/poll/55ye7y4miek4khz5

2. Webx link:
   https://gstalk.usgs.gov/

   When prompted please enter in the meeting number "20387," your name and hit "join meeting"

3. Conference call Number(s): 1- 855-547-8255 (703-648-4848) ACCESS CODE: 20387

   Note: PC weblink for meeting will be open around 5-10 minutes prior to the meeting. Please allow amble time to setup your computer.

I. Tentative Agenda

1. **Welcome** (5 mins) — **Siamak Esfandiary**
2. **Roll-Call** (5 mins) — **SOH Members and Guests**
3. **Review and Approval of Agenda** (2 mins) — **Siamak Esfandiary**
4. **Background on SOH** (5 mins) — **Siamak Esfandiary**
5. **Featured presentation – Probabilistic Mapping for the NFIP** (45 mins)
6. **Approval of the October 19, 2017 Meeting Summary** (3 mins) — **Laura Chap**
7. **Status of Action Items from October 19, 2017 Meeting** (5 mins) — **Siamak Esfandiary**

   - Martin, Siamak, Victor and Claudia will discuss governance – call scheduled for 1/25

- Review of the low flow white paper – this will likely not be available by the January meeting but might be an action item for the April meeting

8. **New Business/Announcements** (10 mins)

9. **SOH Workgroups** ***(****50 mins****)*** **Siamak Esfandiary**
   - *HFAWG* *Will Thomas*
   - ESEWG *Tom Nicholson*
   - *STIWG* *LySanias Broyles*
   - *Streamflow Info Consortium* *Doug Yeskis*
   - *Data Gaps* *Ted Engman*
   - *HMWG* *Claudia Hoeft*

11. **Review Actions and Plans for next SOH meeting** (*10 mins)* **Siamak Esfandiary**

12. **Next Meeting:** All

    - *Thursday, April 19, 2018 from 12:30PM to 3:30PM EDT (Tentative)*
    - *Location: TBA*
    - *Guest Speaker Topics? Suggestions??*

13. **Meeting Adjourn** (*Around 3:30 pm*)

Attachment 3 – ESEWG Report

01/11/2018

Draft Minutes of the January 10, 2018 Meeting of the ESEWG

A meeting of the Extreme Storm Events Workgroup (ESEWG) was held at 2:00 p.m. EST on Wednesday, January 10, 2018 via teleconferencing.

The meeting objectives were to: (1) discuss the ESEWG input to the SOH for their annual briefing to the ACWI at the ACWI Public Meeting on January 18, 2018 at the USGS headquarters in Reston, VA; (2) review recommendations from the Proposal Writing Committee on their draft "Extreme Rainfall Product Needs" for the ESEWG input; and (3) schedule the next ESEWG meeting to review the draft Proposal with the full ESEWG membership.

Tom Nicholson, ESEWG Interim Chair, opened the teleconference with introductions and review of the agenda (please see attached agenda).

The meeting attendees were:

Thomas Nicholson, ESEWG Interim Chair, Senior Technical Advisor, NRC

Sanja Perica, Chief, Hydrometeorological Design Studies Center, NWS/NOAA;

Mark Perry, State of Colorado;

Marian Baker, NWS/NOAA;

Kenneth Fearon, FERC;

John Onderdonk, FERC;

Wendy Norton, USGS/ACWI;

Tom Nicholson and Wendy Norton, USGS – ACWI secretary discussed the posting of the "***Proceeding of the 2014 Workshop to Define Extreme Precipitation Product Needs"*** (please see https://acwi.gov/hydrology/extreme-storm/) as a "Product" of the ESEWG. The posting provides citable information sources on the Workshop Synthesis Report with Appendices and presentations. The

detailed information is on the SOH Website at: (https://acwi.gov/hydrology/extreme-storm/minutes/index.html).

Sanja Perica, NOAA discussed her recent revisions to the Extreme Rainfall Product Needs Proposal. She emphasized the need for designated annual funding for NOAA Atlas 14 to complete it and maintain it. She also commented on the need for a national atlas based on watersheds and not State political boundaries which introduce discontinuities to the estimates.

Mark Perry, Ken Fearon and John Onderdonk discussed their review and revisions to section 2.3 ***"Site-Specific PMP Studies – Updating the NWS Guidance in the Hydrometeorological Reports***" of the Proposal. They agreed to meet separately to reviews their input and forward a unified draft to William Otero, Proposal Writing Team Leader by early February 2018.

Sanja Perica discussed the NOAA analyses of select extreme storm events during 2017. She provided a link to the analyzes of hurricane and extratropical cyclone data related to severe flooding (e.g., Hurricanes Harvey and Maria; Missouri 2017 storm)
http://www.nws.noaa.gov/oh/hdsc/aep_storm_analysis/index.html

The recommendations in the ESEWG input to the SOH briefing presentation (slide #14) was discussed. Specifically, the recommendations based upon the 2014 Workshop Synthesis Report and drafting of the Proposal were:

1. Review and update NOAA Hydrometeorological Reports using recent extreme storm data - particularly HMRs 49, 51, 52; withdrawal those HMRs not being updated
2. Complete and update NOAA Atlas 14 with a dedicated annual budget
3. Configure NOAA Atlas 14 to watershed boundaries and not State boundaries for both short and long durations (e.g., 96 hours)
4. Develop Guidance to Review Regional and Site-Specific PMP Estimates
5. Support U.S. Extreme Precipitation Database for Flood Assessments
6. Analyze Hurricane and extratropical cyclone data related to severe flooding (e.g., Hurricanes Harvey and Maria; Missouri 2017 storm)
   http://www.nws.noaa.gov/oh/hdsc/aep_storm_analysis/index.html

Concerning the first bullet, Mark Perry and Marian Baker suggested adding HMRs 55A, 57 and 59 to the list of HMRs needing immediate attention. Marian Baker and John Onderdonk suggested changes to the first bullet to consider and evaluate withdrawal of HMRs since withdrawal of HMRs could severely impact established dam ssafety guidance. Everyone agreed that dedicated annual funding is needed for updating the HMRs.

Concerning the third bullet, Sanja Perica wanted to remove the parenthetical reference to 96 hours since some analyze may no longer. She also stressed the need for dedicated staffing to complete NOAA Atlas 14.

The discussion went onto slide #15 dealing with item #1 Coordinate Studies and Database." Marina Baker suggested that for the second item in #1, it should read "Develop a national repository for precipitation data" rather than a "central."

Marian Baker agreed to send edits concerning the wording in slides 14 and 15 by Friday, January 12, 2018 to Tom Nicholson for his consideration in drafting the final set of slides.

Everyone agreed to schedule the next ESEWG meeting for Wednesday, February 28, 2018 at 2:00 p.m. EST via teleconferencing. A copy of the draft Proposal should be send to each member of the ESEWG (see attached Directory of ESEWG Members).