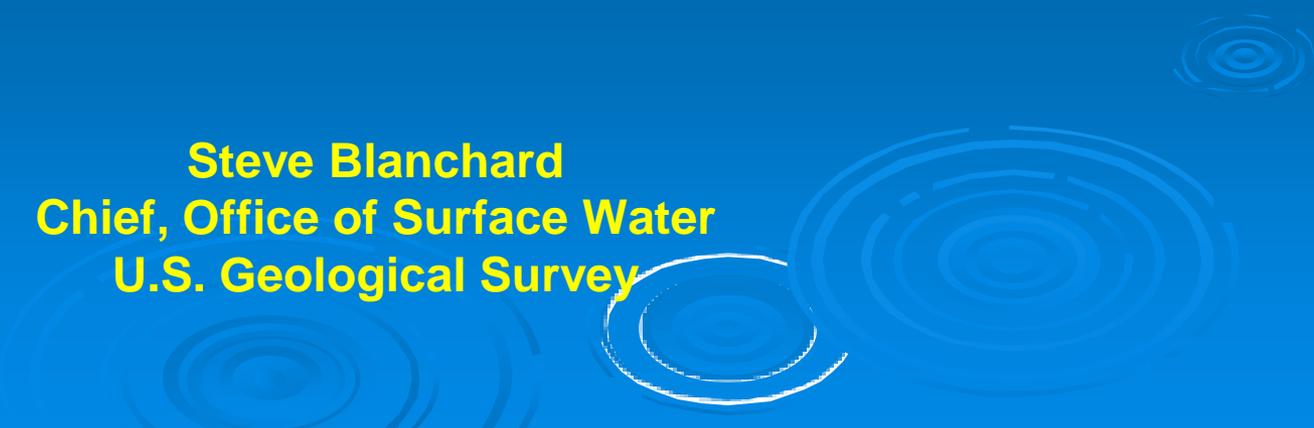


# ACWI Subcommittee on Hydrology (SOH)

## FY 2009-10 Report

- Introduction and Background
- Overview of the general Work Groups Activities in FY 2009-10

Steve Blanchard  
Chief, Office of Surface Water  
U.S. Geological Survey



# Subcommittee on Hydrology

- The purpose ... is to analyze relevant issues and facts and to draft proposed position papers or recommendations for improving the availability and reliability of surface-water quantity information.
- Carry out purpose by:
  - (a) sharing valuable water related information through the meetings and activities, and
  - (b) organizing working groups to accomplish tasks as needed.

# Subcommittee on Hydrology

- Very active committee
- **20 Federal and Non-federal agency members**
- Met 4 times in FY 2009, 3 times in FY2010  
January, April, July, October
- Non-Federal Participants for about a decade
- Federal participation since the early 1970's
- Roots extend back to the Federal Inter-Agency River Basin Committee (1945)

# Subcommittee on Hydrology - Membership

- Agricultural Research Service
- American Forests
- Association of State Floodplain Managers
- Bureau of Land Management
- Bureau of Reclamation
- Defenders of Property Rights
- Federal Emergency Management Agency
- Federal Energy Regulatory Commission
- Federal Highway Administration
- NASA/Goddard Space Flight Center
- National Hydrologic Warning Council
- Natural Resources Conservation Service
- National Science Foundation
- National Weather Service
- Nuclear Regulatory Commission
- Office of Surface Mining
- US Army Corps of Engineers
- US Environmental Protection Agency
- US Forest Service
- US Geological Survey

# SOH - Activities

Published  
newsletter

“The SOH  
Connections”

Excellent  
Reviews  
& Information  
Distribution

**WICP** Water Information Coordination Program  
**ACWI** Advisory Committee on Water Information

The SOH  
**CONNECTIONS**

Volume 2 Issue 1 December 2007

**Newsletter of the Subcommittee on Hydrology**  
available on-line at: <http://acwi.gov/hydrology/index.html>

In this Issue:	Welcome from the Chair
Welcome from the Chair.....1	
About the Subcommittee On Hydrology.....2	<i>Incoming Chair, Steve Blanchard (left), USGS, and Outgoing Chair, Sam Lin (right), FERC.</i>
Highlights from the October 2007 meeting.....3	As I begin my term as Chair of the Subcommittee, I want to first state that I count it a real privilege to be able to serve in this capacity. I look forward to working with Mary Greene, the Vice-Chair, and all the members of the Subcommittee and its Workgroups to accomplish our purpose, which is to “improve the availability and reliability of surface-water quantity information needed for hazard mitigation, water
Workgroup Reports.....4	of Workgroups under the Subcommittee, development and distribution of the Subcommittee newsletter, and generally raising the energy level of the Subcommittee and its sphere of influence. On behalf of the whole Subcommittee, I want to express a big “Thank You” to Sam for all of his hard work and the excellent leadership he provided to the Subcommittee.
Latest News from Member Organizations.....6	
Upcoming Conferences and Calls for Papers.....7	
Accomplishments for 2007.....8	
Editor's Corner.....10	
Upcoming Meetings.....10	

# Subcommittee on Hydrology

## 5 Work Groups & 1 Initiative

- **Hydrologic Modeling**  
(Don Frevert – retired, BOR)
- **Satellite Telemetry Interagency**  
(Charles Allen – USBR)
- **Hydrologic Frequency Analysis**  
(Will Thomas – ASFPM)
- **Hydrologic and Hydraulic GIS Applications**  
(Bill Merkel – NRCS)
- **Extreme Storms**  
(Tom Nicholson – NRC)
- **Hydrologic Information System - Data Exchange Initiative (proposed Work Group)**  
(David Goodrich – ARS)

# SOH – Hydrologic Modeling Work Group

Chair-elect – Jerry Webb  
(Corps of Engineers)

E-mail contact – [Jerry.W.Webb@usace.army.mil](mailto:Jerry.W.Webb@usace.army.mil)

Phone contact – 202-761-0673

Vice Chair-elect - Joseph Giacinto (NRC)

Volunteer Technical Chair for 2014 conference -  
Claudia Hoefl (NRCS)

# SOH – Hydrologic Modeling Work Group

- **Goal:** To promote sharing of information on modeling tools and modeling systems in hydrology and water resources.
  - **Primarily responsibility:** Planning, organizing and running the Federal Interagency Hydrologic Modeling Conferences
  - **Federal Interagency Hydrologic Modeling Conferences:** 1998, 2002, 2006 and 2010 (2006 and 2010 held with Sediment Conference)
  - **2010 Joint Conference** June 27-July 1, 2010 in Las Vegas; had about 480 attendees.
- 

# SOH – Satellite Telemetry Interagency Work Group (STIWG)

**2010 Chair** –Richard Engstrom  
United States Corps of Engineers

[cmallen@usbr.gov](mailto:cmallen@usbr.gov)

208-378-5189

Kay Metcalf

NOAA GOES DCS Program Manager

[Kay.metcalf@noaa.gov](mailto:Kay.metcalf@noaa.gov)

301-817-4558

# SOH – Satellite Telemetry Interagency Work Group (STIWG)

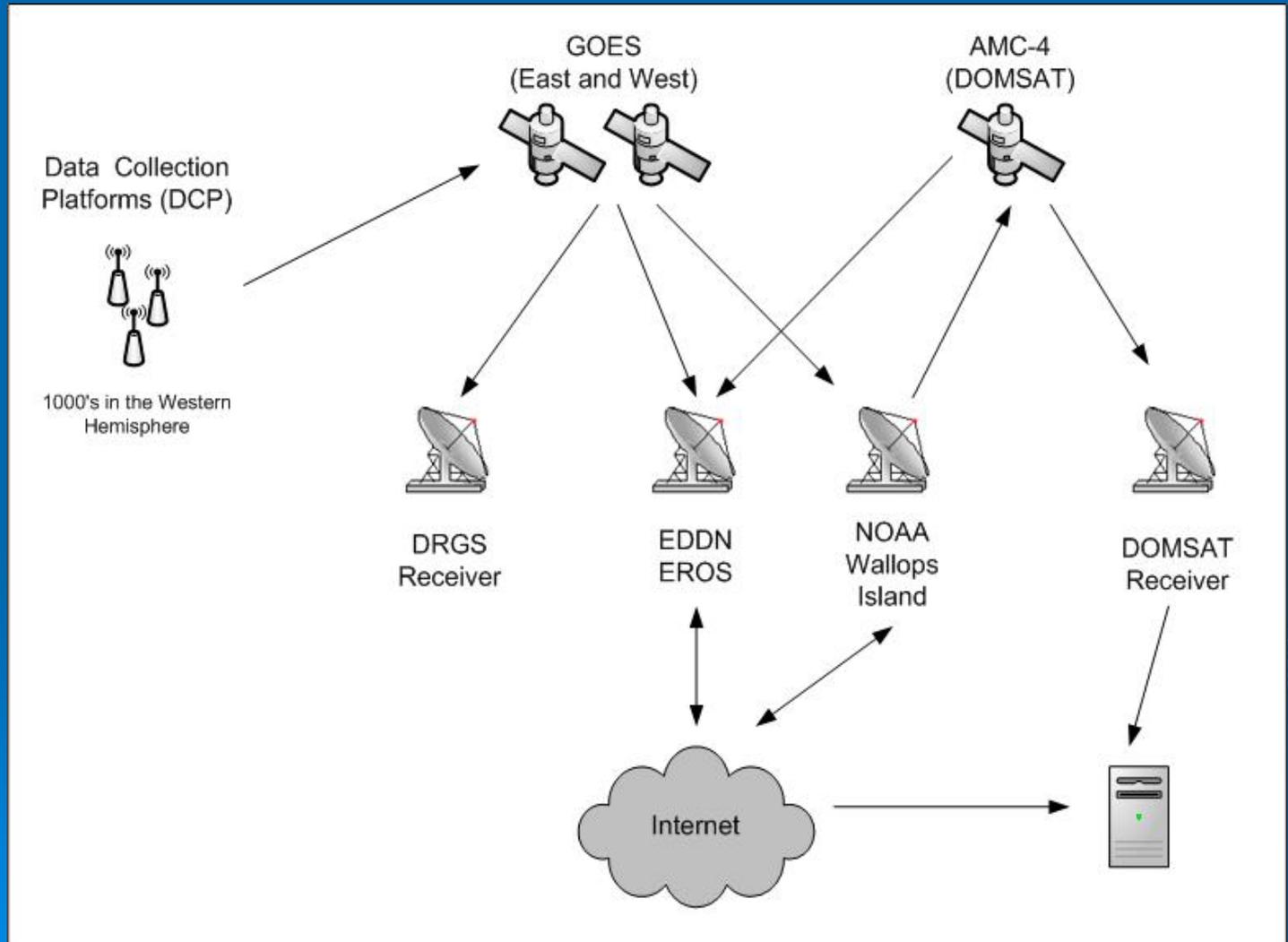
## Geostationary Operational Satellites (GOES)

- **Primary mission:** To continuously observe changing weather phenomena from satellite-based sensors situated approximately 25,000 miles from Earth.
- **Data Collection System (DCS) -The DCS uses the GOES spacecraft for the relay of data** from remotely located insitu sites at or near the Earth's surface

# SOH – Satellite Telemetry Interagency Work Group (STIWG)

GOES

DCS



# Technical Improvements to the GOES DCS System

- **Investigating a 2-way communications capability for GOES DCS.**
  - *Prototypes expected by end of 2010.*
- **New Ground System processing system (DADDS) operation**
  - *Replaces 20 year old DAPS system; includes back-up at Suitland, MD*
- **Investigating development of a binary protocol for use on the GOES DCS.**
  - **ON-GOING Project**
- **Investigating development of a standard format for expressing metadata about remote sites for information sharing.**
  - **ON-GOING Project**

# SOH - Hydrologic Frequency Analysis Work Group (HFAWG)

**Chair – Will Thomas**

Michael Baker, Jr.

Representing

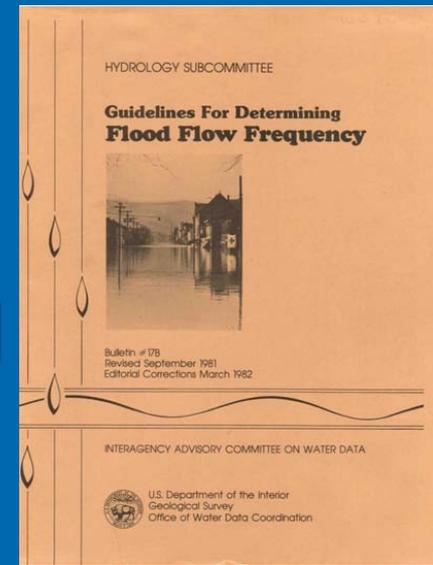
The Association of State Floodplain Managers

[WTHOMAS@mbakercorp.com](mailto:WTHOMAS@mbakercorp.com)



# SOH - Hydrologic Frequency Analysis Work Group (HFAWG)

➤ The HFAWG is evaluating potential improvements to Bulletin 17B



- see HFAWG web site for details

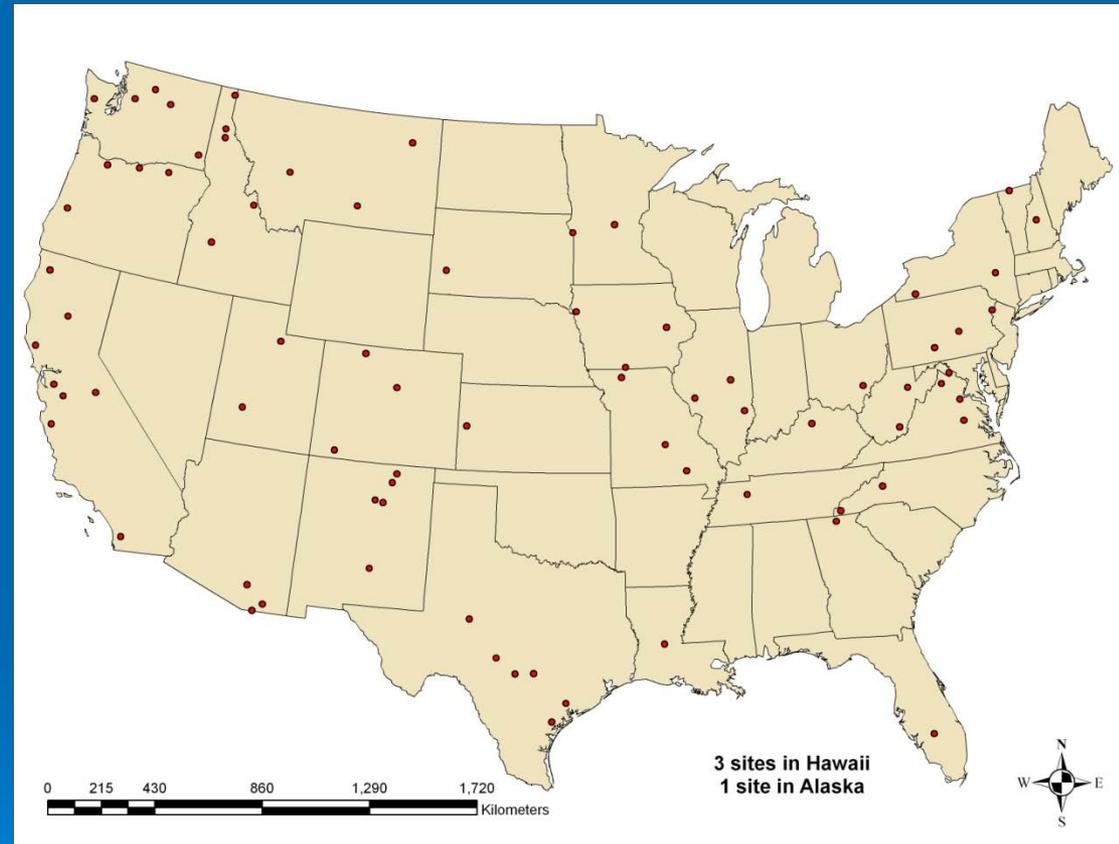
**<http://acwi.gov/hydrology/Frequency>**

# SOH - Hydrologic Frequency Analysis Work Group (HFAWG)

- **Expected Moments Algorithm (EMA)** = new statistical technique for fitting the Pearson Type III distribution
- **Evaluate and compare EMA and Bulletin 17B** for analyzing data sets with historic and paleoflood data, low outliers and zero flows

# SOH - Hydrologic Frequency Analysis Work Group (HFAWG)

- Testing EMA for:
- 82 gaging stations with an average record length of 80 years
- Monte Carlo simulations for assumed frequency distributions



# SOH - Hydrologic Frequency Analysis Work Group (HFAWG)

## ➤ Status of work:

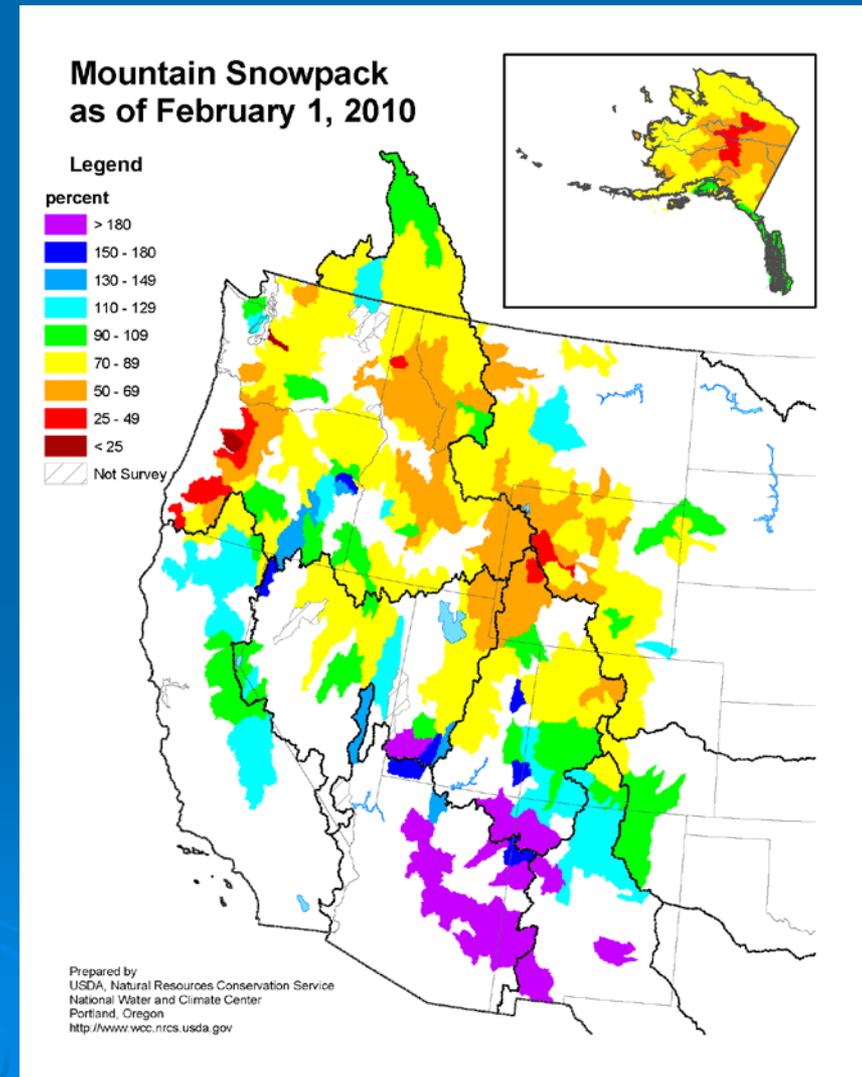
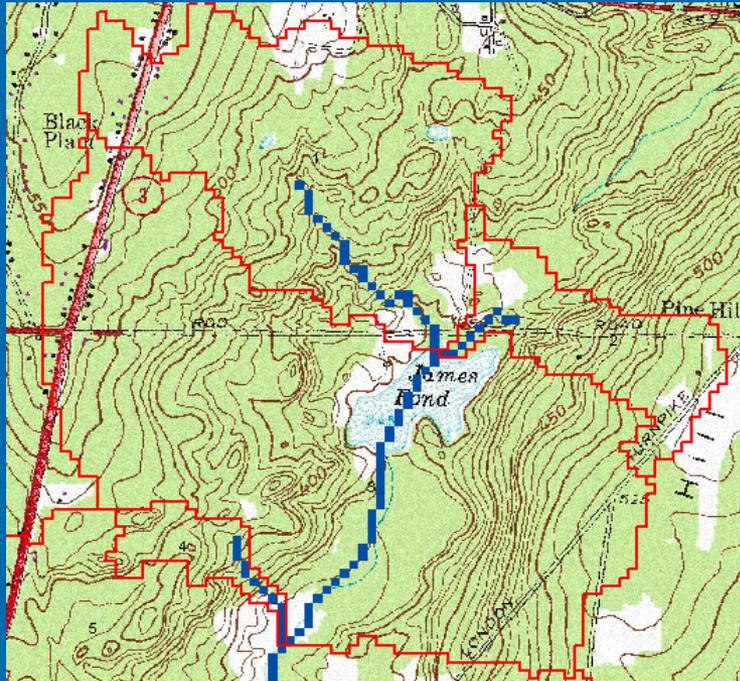
- EMA and Bulletin 17B applied and compared at 82 long-term gaging stations
- Split sampling analyses for observed data and Monte Carlo simulations are underway
- Draft report prepared describing the testing procedures and results to date
- Draft report was discussed and reviewed at a November 19, 2009 meeting of the HFAWG

# SOH - Hydrologic Frequency Analysis Work Group (HFAWG)

## ➤ **Additional improvements to Bulletin 17B:**

- Describe improved procedures for estimating generalized/regional skew
- Implement improved procedures for defining confidence limits
- Implement improved plotting position formula when historic data are available
- Develop an electronic version of a new Bulletin 17C

# Hydrologic and Hydraulic GIS Applications Work Group



**Chair: William Merkel**

USDA-NRCS

[william.merkel@wdc.usda.gov](mailto:william.merkel@wdc.usda.gov)

(301) 504-3956

# Hydrologic and Hydraulic GIS Applications Work Group

## ➤ Purposes of Work Group

- Provide a forum for information exchange
- Provide learning opportunities
- Develop a list of web links to GIS applications
- Provide a forum to express needs for GIS applications
- Promote collaboration on the development and use of H&H GIS applications.

# Hydrologic and Hydraulic GIS Applications Work Group



**Hydrologic Modeling Inventory Website**



Welcome to the Hydrologic Modeling Inventory Website. This is a collaborative effort between [Texas A&M University](#) and the [Bureau of Reclamation](#) to provide basic information on a variety of hydrologic models to practitioners in the academic, governmental and private sectors.

The effort was started in 1999 as a collaborative effort between Louisiana State University and the Bureau of Reclamation. Developers of well known models were contacted by Dr. Vijay P. Singh, Dr. Donald K. Frevert and several other Bureau of Reclamation staff members. Each developer was asked to fill out a questionnaire providing basic information including the capabilities of their model, input requirements, output information, assumptions, hardware requirements and contact information. The questionnaires were originally posted on a Bureau of Reclamation website, but in 2007 the website was moved to the Texas A&M domain to facilitate support and maintenance. Developers have been contacted in subsequent years to update the information on their respective models and new models continue to be added as appropriate.

Visitors to the website will click on the link at the bottom of this page and will be directed to a page with a listing of model links which, in turn, will direct the visitor to the summary sheet for each model. More detailed information on specific models can be obtained by contacting the developers and the e-mail, phone or mailing addresses indicated.

<http://hydrologicmodels.tamu.edu/>

# Hydrologic and Hydraulic GIS Applications Work Group

## Geographic Information System (GIS)-based models

- [Automated Geospatial Watershed Assessment Tool](#)
- [eCoastal Program](#)
- [BASINS version 4.0](#)
- [GIS Weasel](#)
- [HAZUS-MH](#)
- [HEC-GeoRAS](#)
- [MapWindow](#)
- [NHDPlus Append Tool](#)
- [NRCS Geo-Hydro ArcGIS](#)
- [NRCS Geo-Hydro ArcView](#)
- [StreamStats](#)
- [Soil and Water Assessment Tool \(SWAT\)](#)

# SOH - Extreme Storm Work Group Needs, Activities and Recommendations

Chair – Thomas Nicholson  
U. S. Nuclear Regulatory  
Commission (NRC)

301-415-6268

[Thomas.Nicholson@nrc.gov](mailto:Thomas.Nicholson@nrc.gov)



# ***SOH - Extreme Storm Work Group***

## **Technical Needs for Extreme Storm Estimates**

### **1994 NAS report: *Estimating Bounds on Extreme Precipitation Events* recommended:**

- Increased research efforts for numerical modeling of extreme storms in mountainous regions.
- Improved PMP Estimates are most critical for small-area basins
- Storm-based analysis and utilize NEXRAD system.

### **2002 FEMA report on *The National Dam Safety Program Research Needs Workshop: Hydrologic Issues for Dams* recommended:**

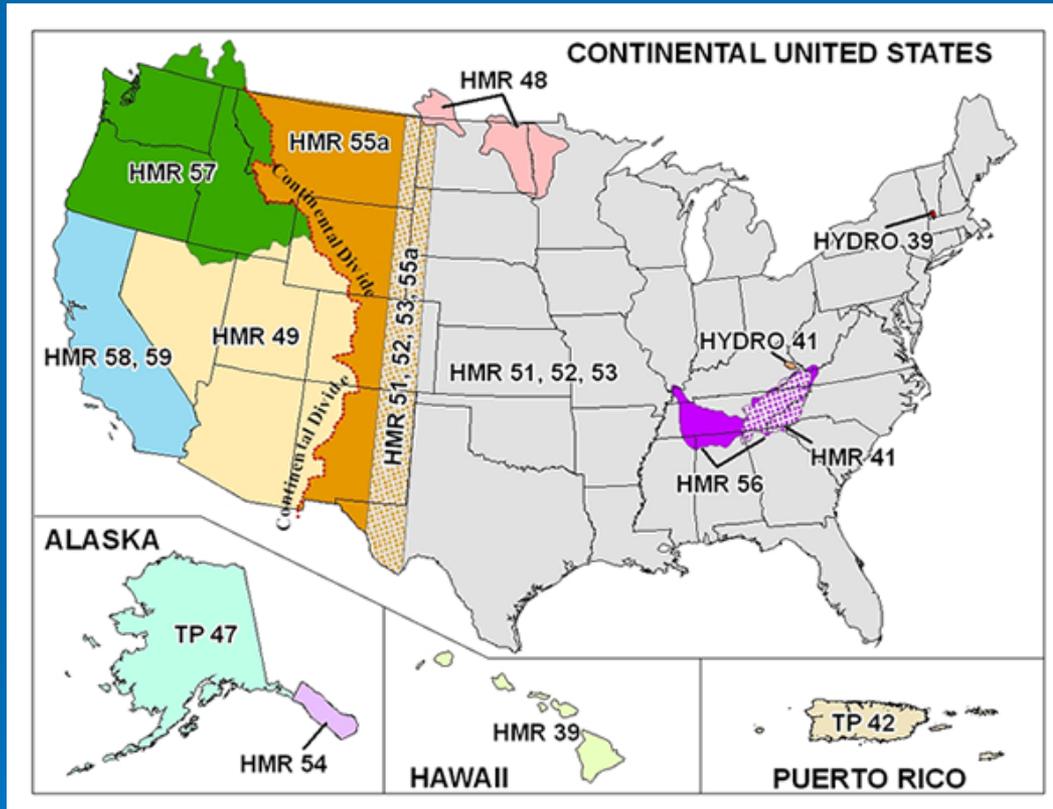
- Need to generate an organized database of information on both floods and extreme storms to be shared among all agencies
- Rainfall frequency analysis for return periods greater than 0.001 event
- Methods to extrapolate rainfall and flow-frequency curves

# SOH - Extreme Storm Work Group

## Current Generalized PMP HMR Reports

PMP = probable maximum precipitation

HMR = Hydrometeorological report



HMR	Last Storm Date
49	1970
51	1972
55A	1978
57	1980
59	1986

over 20 to 40 YEARS more data since generalized HMR reports!

# ***SOH - Extreme Storm Work Group***

## **Federal Agency Needs for Extreme Storm Estimates**

- **U.S. Nuclear Regulatory Commission (USNRC):**
  - Technical basis to develop guidance for license applicants on acceptable methods and data sources for estimating and **using PMP to calculate Probable Maximum Floods**
- **Bureau of Reclamation (USBR):**
  - Extreme storm rainfall frequency estimates, including point rainfall frequency, basin-average rainfall depth frequencies and extreme storm models, up to and **including PMP**
- **Federal Energy Regulatory Commission FERC:**
  - Coordinated effort to review extreme storm data and update HMR's for use in extreme storm development.

# ***SOH - Extreme Storm Work Group***

## **Federal Agency Needs for Extreme Storm Estimates (continued)**

- **USACE :**

- Use the most accurate and up-to-date HMR studies to properly evaluate their existing portfolio of over 600 dams or to properly design any new dams

- **National Hydrologic Warning Council:**

- Use of PMP and corresponding PMF estimates in the design of reservoirs. Impacts of any proposed changes to design and safety standards for dams

- **USGS :**

- Accurate regional and temporal characterization of extreme precipitation

# ***SOH - Extreme Storm Work Group***

## **Federal Agency Needs for Extreme Storm Estimates**

- **FEMA:**

- Reviewing proposed methodologies and data collection techniques used to develop design precipitation estimates of large storm events up to and including the Probable Maximum Precipitation

- **Natural Resources Conservation Service (NRCS):**

- Dam design criteria specifies use of PMP estimates obtained from the NWS's HMRs, or ratios of the PMP storm events, to hydrologically size dams and other hydraulic control structures in order to convey large storm events.

# ***SOH - Extreme Storm Work Group***

## **Initial Work Group Activities**

- Commence **Pilot Extreme Storm Study in Southeast U.S.** for application to flood assessments of nuclear facilities
  - Discuss ways to **update generalized HMRs and PMP estimates**
  - **Compare recent storm data** and PMP estimates to published PMP estimates in HMR 51
  - **Review and analyze Depth-Area-Duration (DAD) data sets** used to develop generalized PMP estimates
  - **Upper Missouri Pilot storm data** by USACE for use in future storm transposition studies and HMR updates
- 

# SOH - Extreme Storm Work Group

## Recommendations

- Update HMRs for the entire U.S. to include storm events since their last update or development.
- Utilize, support (such as CoCoRaHs), and where necessary **develop data-collection surveys in combination with radar** (especially for mountainous and desert regions) for extreme **storm events**. (CoCoRaHS is an acronym for the Community Collaborative Rain, Hail, and Snow Network.)
- **Examine new extreme storm methods** (e.g. mesoscale models; individual storms; transposition; and moisture maximization) to test PMP assumptions and to improve temporal-spatial PMP estimates.

# SOH - Extreme Storm Work Group

## Recommendations (continued)

- Investigate potential effects of climate variability and change on DAD relationships and PMP specific procedures (transposition, maximization, and envelopment).
- Develop a national database of extreme storm events related to flooding.
- Assist the States in development of regional and local PMP estimates for use in Dam Safety and Flood Analysis studies

# *SOH - Extreme Storm Work Group*

## Recommendations to ACWI

- Support of the recommendations proposed
- Designation of a Lead Agency to accomplish this work
- Identification / Designation of funding to support these activities of **environmental and national security relevance & urgency**

# **SOH – Proposed Work Group on Hydrologic Information Systems (HIS)**

**SOH Lead – David Goodrich**

USDA, Agricultural Research Service (ARS)

The background of the slide is a solid blue color. In the lower right quadrant, there are several decorative elements consisting of concentric white circles, resembling ripples on water. These ripples are of varying sizes and are arranged in a way that suggests a point of impact or a spreading effect.

# SOH – Proposed Work Group on Hydrologic Information Systems (HIS)

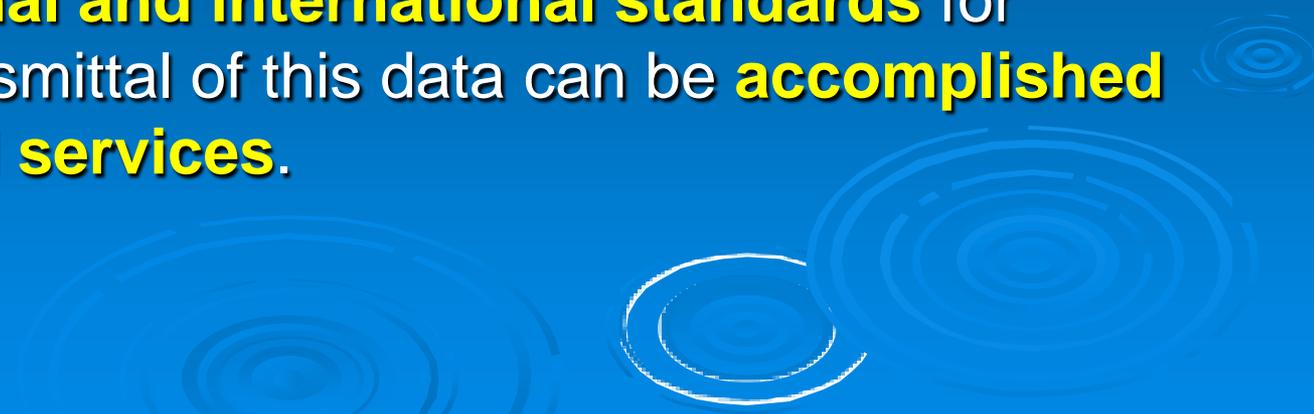
## Purpose:

To effectively promote the sharing of hydrologic information and promote open standards to effectively share and disseminate hydrologic information via the **internet** with an extensible structure to support as-yet unknown functions and capabilities.

# SOH – Proposed Work Group on Hydrologic Information Systems (HIS)

## Scope:

**Coordinate the input of Federal agencies collecting and storing hydrologic information** on the types of data they collect and how to best describe and represent this data and information so that **comprehensive and inclusive national and international standards** for sharing and transmittal of this data can be **accomplished with web-based services.**

The background of the slide features several concentric white circles of varying sizes, resembling ripples on water, scattered across the blue background.

# SOH – Proposed Work Group on Hydrologic Information Systems (HIS)

## Applicability:

The group will **cooperate with:**

- A work group from the FGDC/ACWI **Spatial Water Data Subcommittee**
- **Other SOH subcommittees** focused on water related web-based information services
  - **NWQMC – Water Quality**
  - **Groundwater**
  - **Sedimentation**

# SOH – Proposed Work Group on Hydrologic Information Systems (HIS)

## Genesis:

Working closely with the **NSF sponsored CUAHSI - HIS**

Consortium of Universities for the Advancement of Hydrologic Sciences, Inc.) - Hydrologic Information Systems group

(Prof. David Maidment, U. Texas, PI).

# SOH – Proposed Work Group on Hydrologic Information Systems (HIS)

## Issues for ACWI:

- *How might this (Proposed) SOH Work Group interact or work with other ACWI subgroups?*
- ACWI contains **4 Subcommittees** that deal with **point observations**:
  - NWQMC for Water Quality,
  - Groundwater
  - Hydrology
  - Sedimentation

# SOH – Proposed Work Group on Hydrologic Information Systems (HIS)

## Issues for ACWI (continued):

The **ACWI Subcommittee on Spatial Water Data** could ensure **geographic descriptions of the observations sites are consistent** among all the forms of water observations i.e.

- Water Quality
- Hydrology
- Groundwater
- Sedimentation

**In this sense, geography “Brings things together”.**

# SOH – Proposed Work Group on Hydrologic Information Systems (HIS)

## Decisions for ACWI:

- How might this SOH Work Group interact or work with other SOH and ACWI subgroups?
- Should a broader ACWI work group tackle this issue?

# Subcommittee on Hydrology

## SUMMARY

### SOH Recommendations to ACWI

- **Extreme Storms Funding and Designated Lead** - funding to support updating PMP Nationwide and designation of a lead agency to coordinate this activity / research / products
- **Hydrologic Information System Data Exchange Decision**- SOH requests a decision from ACWI on HIS Data Exchange
  - SOH and other Subcommittees continue working on this independently
  - ACWI forum (multiple Subcommittees) to address aspects of this activity

# Subcommittee on Hydrology (SOH)

**Additional information and contacts:**

**<http://acwi.gov/hydrology/index.html>**

## Questions?

