

# Confluence

## NWS Hydrology Program News

### National Water Census

In synergy with IWRSS, USGS to provide comprehensive information on current and historical water budgets...

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## Headwaters

Don Cline, Chief, NWS Hydrology Laboratory



In this issue we introduce you to Eric Evenson with the USGS. Eric is the Coordinator for the National Water Census, a major USGS initiative to assess water budgets across the country. The USGS planned the Water Census concurrently as we worked together to plan IWRSS, and Eric has been involved with both since the beginning. Consequently our plans are well-aimed at providing a seamless suite of water information from the past through the present via the Water Census, and into predictions via IWRSS. With this edition of Con-

fluence, I'd pleased to introduce a new column called "*Wavefronts: New Developments in Hydrology*". In *Wavefronts*, Tim Schneider will highlight what is new, innovative and exciting in the hydrologic sciences and related fields. The premiere article is on coupled water cycle modeling, a very timely topic as we work towards providing predictive water budget information. With the snow season in full swing and spring snowmelt just around the corner, we spotlight the National Snow Analyses produced by the National Operational Hydrologic Remote Sensing Center. In this month's *IT Corner* Jim Rawls introduces the concept of IT Service Management (basically why Jim is here), and he'll be discussing that more deeply in future issues. We have three Distinguished Career awards to tell you about, as well as the retirement of Ben Weiger. Special efforts are underway to support navigation concerns on the Mississippi, and of course we have updates on the National Water Center.

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Enjoy!

Eventually all things merge into one, and a river runs through it.

Norman Maclean

## USGS Spotlight

# National Water Census

*Eric Evenson, USGS*

Water is a key ingredient for healthy communities, economies, and natural environments. The Nation faces an increasingly large set of water-resource challenges as water shortages and water-use conflicts become more commonplace. As competition for water grows—for irrigation of crops, for use by cities and communities, for use in energy production, and for the environment—the need for information and tools to aid water-resource managers also grows. No comprehensive assessment or census of information summarizing the availability of the Nation's freshwater has been presented since 1978. The Omnibus Public Land Management Act of 2009 (Public Law 111-11), passed on March 30, 2009, contained Subtitle F, also known as the SECURE Water Act, which calls for the establishment of a “national water availability and use assessment program” within the U.S. Geological Survey (USGS). The USGS will achieve this assessment through the National Water Census (Water Census).

The Water Census is designed to synthesize and report water availability information at the regional and national scales, with an emphasis on presenting the information in a way that is useful to states and others responsible for water management and natural-resource issues. Key components of the Water Census are designed around the water budget concept. The objective in the Water Census is to provide information about precipitation, evapotranspiration, streamflows, groundwater, water in snowpack and ice, reservoir storage, human water use, and ecological water needs at spatial and temporal scales relevant to water managers' needs. Our operational spatial scale is the 12 digit hydrologic unit code (HUC-12) watershed, which averages about 37 square miles across the Nation. Our temporal scale varies by water budget component, but will allow for an estimated monthly water budget at each HUC-12 watershed. Water Census information will be presented through an online national data portal.



*Eric is the Coordinator for the National Water Census. He's located in West Trenton, New Jersey.*

Planning for the Water Census started approximately the same time as the planning for the Integrated Water Resources Science and Services (IWRSS) initiative. There was an immediate recognition of the synergy that could be gained between IWRSS and the Water Census. The Water Census needs information that can be uniquely provided through IWRSS partners' expertise and resources (examples include precipitation and reference evapotranspiration provided by the National Weather Service and reservoir information provided by the Army Corps of Engineers). In addition, the Water Census can provide a solid baseline of information for forecasting of future hydrologic conditions, which can be accomplished through IWRSS. The Water Census is designed to provide current and historical hydrologic information on water availability. Stakeholders seeking forecast information could logically obtain them through the IWRSS initiative. Through the partnership of IWRSS and the Water Census, the Nation can be well served with up to date information to inform water availability decisions.

## Wavefronts

# Coupled Models of the Hydrologic Cycle (PARFLOW)

Water does not care about lines on a map, and it often pays little heed to physical boundaries as well: it changes form and phase as it flows through the atmosphere and across and below the Earth's surface, sculpting it as it does so. Yet our models, our primary tools to understand and predict water, most often treat these interconnected and inseparable processes as isolated and independent. But there are a growing number of scientists and engineers who are beginning to explore and develop ways to integrate these processes by coupling models together. One such center of activity is in the research group of Reed Maxwell at the Colorado School of Mines (CSM).

Maxwell and his team have developed a suite of fully coupled models of the hydrologic cycle. This involves coupling land surface models with process-based vadose and groundwater models. These efforts are built upon a collaborative project known as ParFlow: "an open-source, object-oriented, parallelized watershed flow model, which includes fully-integrated overland flow, the ability to simulate complex topography, geology and heterogeneity, and coupled land-surface processes including the land-energy budget, biogeochemistry and snow." Furthermore, Maxwell's team has coupled ParFlow with atmospheric models, such as the Weather Research and Forecasting

model (known to all as WRF), to more accurately simulate fluxes of water and feedbacks from 'bedrock-to-boundary layer.'

The CSM group has applied these tools to study a range of problems, including studies of the interplay between groundwater and land-surface energy processes, which they have shown exert a significant influence on the lower atmosphere; simulations of watershed transport and residence times to explore watershed scaling issues; diagnoses of watershed response and feedbacks to a changing climate; and characterizing the feedbacks due to groundwater pumping and/or irrigation on land-energy processes. In the extreme, this kind of modeling requires some big iron: using petaflop-scale computers with more than 16K processors, they have modeled hill-slope scale processes at 1m horizontal resolution (and 2.5 cm in the vertical, resulting in 8B model cells), and scaling up, they have run these coupled models at near-CONUS scales with a resolution of 1km.

You can learn more about this work at: <http://inside.mines.edu/~rmaxwell/index.shtml>

## AWIPS-II Updates

The AWIPS-2 project recently reached a milestone when the Operational Test and Evaluation (OTE) for RFCs concluded, with recommendations from the two OTE RFCs and others to proceed to full deployment. The nine RFCs not operating AWIPS-2 will begin using AWIPS-2 for operations no later than September 2013. Issues identified with the software should be

reported to the NCF and as necessary, coordinated with your regional AWIPS Focal Point. Joe Ostrowski will continue to provide support for the AWIPS-2 migration. Other AWIPS changes include the upgrade of the storage to a new NAS, and upgrade of the Redhat OS, Postgres database, and other system software.

## Information Technology Corner

### *What is Risk-Based IT Service Management?*

Jim Rawls, OHD IT Manager



IT Service Management (ITSM) can be simply defined as a set of processes, involving people and other technology resources that are in place to meet the business goals of the enterprise. So let's take out the management piece of it and IT Service can be

defined as a "Collection of IT components (including hardware, software, facilities, people, processes and procedures) that meet a standard, well-known business need of IT customers". The service is what the customer experiences, whereas a solution is a set of resources that work together to produce the service. So the management of these process and resources required to produce the service becomes crucial with respect to what's referred to as the "Four Cs – Change, Compliance, Complexity and Cost". Any variance in the Four Cs make producing the IT service more complex and in most cases increase costs.

ITSM is incorporated into the business governance functions to ensure adequate technology based resources are available to meet those goals defined by executive level management. It's easy to see how this works for the private sector as technology is seen as an "enabler" rather a commodity service. Technology is fed and nourished by the private sector in order to support "profit", and is a measurable set of processes. In the government it's not that easy and technology is generally viewed as only supporting the organization level goals by providing unique services that in the end state, "provide a capability" to the end user.

ITSM correctly implemented with a set of successful and repeatable processes, can serve to decrease risks (costs included) to the business as it meets the customer's expectations.

Next issue let's breakdown ITSM and look at the different core services included"

## Distinguished Career Awards

Congratulations to the three winners of the NOAA's 2012 Distinguished Career Awards – all of them represent important aspects of the NWS Hydrology Program. The awards will be presented at a ceremony on May 7, 2013.

Robin Radlein is the Hydrologist-in-Charge at the Alaska-Pacific River Forecast Center. Joe Ostrowski, until his recent retirement, was the Development and Operations Hydrologist at the Middle Atlantic River Forecast Center, and Mike Callahan is the Service Hydrologist at the Louisville, KY Weather Forecast Office.

Their citations are:

### **Robin Radlein**

For a distinguished career dedicated to the continued infusion of new technology and evolving science in support of weather and water operations and the NWS mission.

### **Joseph Ostrowski**

For outstanding technological contributions to the National Weather Service's hydrologic forecasting program.

### **Mike Callahan**

For outstanding technical leadership and support to NOAA/NWS offices and remarkable service to the citizens of central Kentucky and southern Indiana.



## Ben Weiger Retires

Ben Weiger, Southern Region Hydrologic Services Branch Chief, retired in January after over 33 years in the NWS.

Ben started his federal service in January, 1979 at the United States Geological Service (USGS) in Columbus, Ohio then joined the NWS Ohio River Forecast Center (OHRFC) in May, 1979. In 1987, he took on a new challenge, moving to NWS Headquarters in Silver Spring, MD to work in the Hydrologic Services Division (HSD) of the Office of Hydrology. In 1998, Ben was promoted to Hydrologic Services Branch Chief at Southern Region Headquarters (SRH) in Fort Worth, TX, a position he held until his retirement in January.

Ben's work and leadership throughout his career left a positive mark on the NWS in many areas. At OHRFC, he led efforts to recognize the 50-year anniversary of the



Flood of 1937 along the Ohio River at Cincinnati. At HSD, he conducted research and analyses of the various ground-based data networks to identify available precipitation gages under each WSR-88D and collaborated within NWS Headquarters and the academic and climate communities to identify issues with ASOS heated tipping bucket rain gages.

He continued his contributions to the hydrology program at SRH, where he guided efforts to improve collaboration with partners and communication with the public by first setting up a pilot project to issue bi-weekly drought information statements. This led to operational implementation for all SR WFOs and ultimate expansion nationwide. He also brought a new level of cooperation between our hydrologic partners by leading efforts to orchestrate the first ever water resource interagency meeting with the Corps of Engineers, USGS, and Bureau of Reclamation covering Oklahoma, Texas, and Arkansas and has been an active member of the Mississippi River Fusion Team. Ben was also an advocate improving the communication of hydrologic information on the web – especially precipitation information. We all appreciate Ben's contributions to the hydrology program and wish him a relaxing and fulfilling retirement.

## Mississippi River Navigation Support

While recent rainfall has provided some relief to drought in the Midwest, the stretch of the Mississippi River between St. Louis, MO and Cairo, IL continues to be an area of concern for navigation. The U.S. Army Corps of Engineers (USACE) is working to complete rock removal near Thebes, IL, to ensure the continuation of commercial barge operations. In support of this work, the North Central River Forecast Center (NCRFC), Missouri Basin River Forecast Center (MBRFC), Ohio River Forecast Center (OHRFC) and Lower Mississippi River Forecast Center (LMRFC) have been providing the USACE with a 28-day river forecast contingency product. These river forecasts—for areas along the Ohio, Mississippi, and Missouri Rivers--incorporate

16-day QPF model output. This product provides an upward boundary condition for USACE officials to use for rock removal operations. USACE leadership has stated these contingency forecasts, in conjunction with the official 28-day forecast, have been crucial for their operations and briefings in support of navigation.

Some recent articles on the USACE's work can be found here:

[http://www.cnbc.com/id/100417160/Rock\\_clearing\\_on\\_droughtthit\\_Mississippi\\_River\\_nears\\_completion](http://www.cnbc.com/id/100417160/Rock_clearing_on_droughtthit_Mississippi_River_nears_completion)

<http://gcaptain.com/rock-blasting-and-rainfall-improve-mississippi-river-conditions-says-kirby/>

## Hydro People in the News

On February 4, CAPT. Barry Choy became the new Acting Director of the NWS Office of Hydrologic Development. Barry, a NOAA Corps officer, has been involved in many different parts of NOAA in his 27-year NOAA career. His aviation assignments included work as a pilot for the Airborne Snow Survey Program at the National Operational Hydrological Remote Sensing Program (NOHRSC) in Minnesota and for the P-3 aircraft flying into numerous storms and hurricanes. He comes to OHD from the National Centers for Environmental Prediction where he served as the Chief Science Officer since 2010. He was part of the management team overseeing emerging technologies, modeling developments, high-performance computing resources, cooperative agreements, and legislative affairs.

On January 31, Richard (Joel) Lanier retired after nearly 42 years of government service. Joel had been the Senior Service Hydrologist at the Tallahassee WFO since 1998 and had also worked there as a student intern back in 1969 (when it was called the Weather Bureau). In between, he had served 21 years as a Navy meteorologist before joining the NWS in 1993 as the Senior Hydrometeorological Analysis and Support person at Northwest River Forecast Center.

## CHPS Bits

### *News and Updates on the*

### *Community Hydrologic Prediction System*

The winter semi-annual release of CHPS, CHPS-3.0.1, is expected to be released to the RFCs in early March. Interesting new items will be: the first FEWS upgrade in a year (from 2011.02 to 2012.02), which will include some features requested by the NWS for Calibration; and OHD-CORE-CHPS which will incorporate the Graphics Generator into the CHPS baseline for the first time.

On January 8, 2013 the CHPS Department of Commerce Gold Medal winners received their medals in a ceremony in the Ronald Reagan Building and International Trade Center in Washington, D.C.



The CHPS training module suite has recently expanded with the release of the Advanced Configuration module. CHPS training modules are available at <http://www.nwstc.noaa.gov/CHPS/>, and include: Introduction to CHPS, Basic Configuration, Display Configuration, Simulation Configuration, Advanced Configuration, and System Management. The Forecaster/User training module is scheduled next.

## Operations Spotlight

# National Snow Analyses

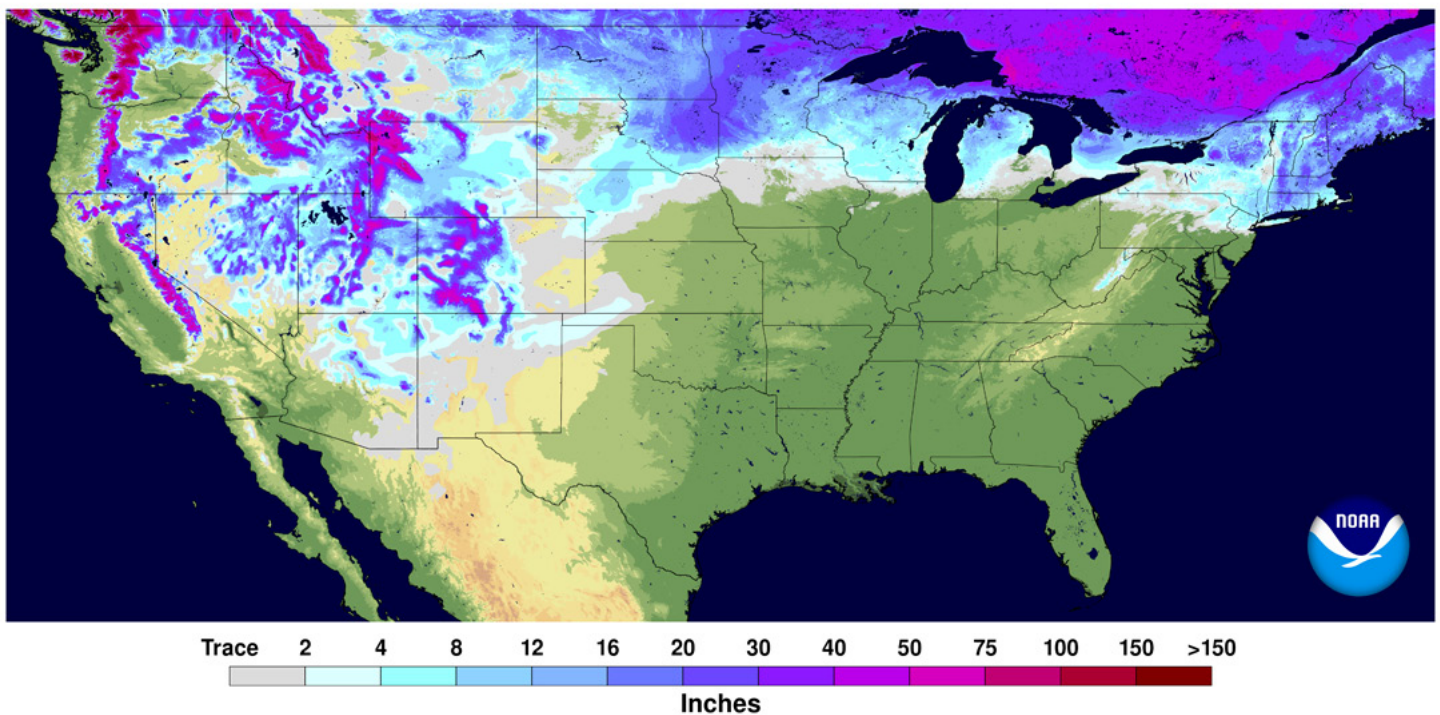
Snow plays a major role in cold regions hydrology. In the western U.S., where approximately 85% of the freshwater runoff originates as snowmelt, the economic value of snow information is estimated at \$3B/year. In the eastern U.S., nine of the twenty most significant floods in the 20th Century were directly related to snowmelt. Accurate and consistent measurement and monitoring of the Nation's snowpack and forecasting when, where and how much will melt is an important role of the National Weather Service. The National Operational Hydrologic Remote Sensing Center (NOHRSC) in Chanhassen, MN is the NWS center of expertise in geospatial data analysis of snowpack conditions across the coterminous US, Alaska and the Yukon, and southern Canada.

The NOHRSC's National Snow Analyses (NSA) starts with gathering all available ground, airborne and spaceborne snow observations, then uses a high-resolution data assimilation and modeling system and numerical weather prediction data to generate comprehensive hourly snowpack information. Products include 1-km gridded estimates of water content, depth, density, temperature, and melt. The NSA includes 72-hour forecast products and services, the National Snow Observation Database, Airborne Snow Surveys, Satellite Snow Cover Mapping, interactive visualization and analysis tools, and a comprehensive suite of gridded datasets and forecast text summaries for hydrologic basins available through AWIPS.

The NOHRSC hosts weekly snow coordination meetings with each of the NWS regions' RFCs, WFOs, and their Federal partners and stakeholders. Visit the NOHRSC at [www.nohrsc.noaa.gov](http://www.nohrsc.noaa.gov).

## Modeled Snow Depth

2013-02-12 12 GMT





## National Water Center Construction Update

Construction of the approximately 65,000 square ft. National Water Center (NWC) facility in Tuscaloosa, Alabama, continues. The design-build contractor for the project, Triune-Beck, has completed first floor structural steel installation while decking and preparation for the first floor elevated slab (i.e. over the partial basement footprint) is underway. First floor slab-on-grade will be poured once piles and structural work are complete outside of the basement footprint in the coming weeks.

The University of Alabama continues installation of duct work and has begun coring work for installation of hydronic piping. The NOAA Project Team (Office of the Chief Administrative Officer/Project Planning and Management Division in Kansas City and the Office of Hydrological Development) is working with Triune-Beck to finalize the few pending design elements of the NWC. The tentative completion date of the NWC facility is July 2013, with occupation expected two months later.



*Main Entrance - South Side*



*West End*



*North Entrance*