Confluence

NWS Hydrology Program News

Integrated Water Resources Science and Services

New multi-agency initiative is underway to address the Nation's water resources challenges...

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Headwaters

Gary Carter, Director, Office of Hydrologic Development

Welcome to the second issue of *Confluence*, the new bi-monthly newsletter of the NWS Hydrology Program! In this issue we spotlight Integrated Water Resources Science and Services (IWRSS). We say goodbye to John Feldt, the well-known Hydrologist-in-Charge at Southeast River Forecast Center, and say hello to Kate Abshire, a new hydrologist who has just joined OHD. In addition to updates on CHPS, AWPS II, and the construction of the National Water Center, we introduce you to Jim Rawls, our new Information Technology Manager, who will be a regular contributor to *Confluence* with "IT Corner". And, with this column, you're reading my last contribution to *Confluence*, since I will be retiring at the end of September.

It has been my honor and privilege to join forces with you as the Hydrology Program's servant-leader since 2000. Together, we have developed and delivered valued science, software and information for river and stream forecasts; implemented almost 80% of the Advanced Hydrologic Prediction Service; and introduced the new Community Hydrologic Prediction System.

Although much has been accomplished, even more daunting challenges lie ahead. The recent study entitled "Weather Services for the Nation: Becoming Second to None" (http://www.nap.edu/catalog.php?record_id=13429), con-

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In This Issue

Water is the driving force in nature.
Leonardo da Vinci

Project Spotlight

Integrated Water Resources Science and Services (IWRSS)

IWRSS is off to a good start as we initiate new interagency teams, prepare for the first regional demonstration project, continue laying the groundwork for a new state-of-the-art National Water Modeling System to deliver the summit-to-sea water resources information so critical to our stakeholders, and construct the National Water Center.

After the leaders of NOAA, the U.S. Army Corps of Engineers, and the U.S. Geological Survey formalized the IWRSS partnership on the bank of the Potomac River last year, the three agencies began working behind the scenes to align programs and set up the management mechanisms needed to begin IWRSS implementation. Improving the interoperability of our data and systems has resonated in all three agencies as a high priority, as has focusing and aligning our collective efforts to develop and deliver flood inundation mapping. The first two interagency teams are focused on these topics (see sidebar, right).

A major impetus for starting IWRSS was the well-recognized importance of leveraging the rich array of modeling capabilities that exist within the three agencies to enable comprehensive, summit-to-sea water resources information services. Over the past year, high-level dialogue between the IWRSS partners, the National Science Foundation and the academic community has resulted in a conceptual "National Water Modeling System" (NWMS). The NWMS concept, still very formative, would be an Earth-system based modeling and data services framework to combine our modeling assets to enable more complete simulation of hydrologic processes and the water budget - at very high resolution over continental scales. The concept links

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First Interagency IWRSS Project Teams Launched

Charters for two interagency IWRSS teams were recently signed, and the teams will begin working together in October.

These teams will be focused on defining requirements for flood inundation mapping (FIM) and system interoperability and data synchronization.

The FIM Team will define requirements and technical specifications for static and dynamic inundation mapping services, while the System Interoperability Team will define requirements for the standardized, seamless, secure, real-time communication of critical water information.

IWRSS Stakeholder Engagement and Northeast Regional Demonstration Project

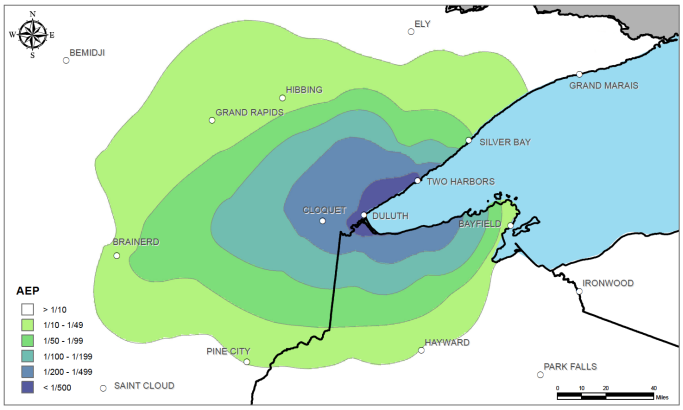
A key component of the IWRSS Roadmap, Regional Demonstration Projects are intended to enhance our engagement with stakeholders and demonstrate new IWRSS capabilities. Plans are underway to conduct the first IWRSS Demonstration Project in the Northeast U.S. involving four major stakeholders: 1) the Interstate Commission on the Potomac River Basin, 2) the Delaware River Basin Commission, 3) the Susquehanna River Basin Commission, and the 4) Hudson River Watershed Alliance. The first phase of this effort will be to meet with these groups beginning in early FY13 to validate existing and identify new gaps in water resource services. Importantly, this effort will also aim to quantify the socioeconomic benefit of addressing these gaps. The Hydrology Program has partnered with NOAA's Coastal Services Center and the Eastern Research Group to develop and implement the social science components for this effort. The result of this first phase will be a demonstration project plan to guide IWRSS partners as we work to provide new information and services to meet stakeholder needs.

OHD's Hydrometeorological Design Study Center

Historical precipitation extreme analyses guide the Nation's engineering decisions

The next time you walk down any city street, take a minute to consider the systems all around you that are designed to handle a seemingly simple thing - the rain. Water lands on a roof, is channeled to a downspout, runs down the gutter, and into a storm drain. All engineered. Most of our society depends on sound engineering design, and the design process has to account for the fact that things get wet. Roads, culverts, bridges, small dams, airport runways, erosion and pollution control systems, flood insurance studies, ecosystem management plans - at some point during the design of each of these, the question gets asked: How wet might it get?

With origins dating back to the late 1940s, OHD's Hydrometeorological Design Studies Center (HDSC) exists to provide hydrologic design information for the U.S. on behalf of the federal government. Historically it has provided probable maximum precipitation (PMP) estimates used in the design of large dams, wind climatology used in airport design, evaporation atlases, and special studies of hydrometeorological climatologies for the U.S. military overseas. Today, it focuses exclusively on precipitation frequency estimates delivered via the Precipitation Frequency Data Server (PFDS) at http://www.nws.noaa.gov/oh/hdsc/.



Example of a product occasionally produced by HDSC for extreme events, showing the severity of a rain event in terms of annual exceedance probability (AEP), the chance of rainfall equaling or exceeding a particular value. In this case, extreme rainfall in and around Duluth last May showed 24 hour rainfall with AEP more rare than 1 in 500.

Led by Dr. Sanja Perica, HDSC analyzes the nation's precipitation data and translates it into information useful for engineering design. Her team of seven analyzes vast precipitation data bases to determine the statistical characterstics of rainfall throughout a region. They produce a suite of products that describe how frequently rainfall of specific intensities are expected to occur. Rainfall intensity, or the amount of rain in a specific amount of time, is critically important for many engineering design considerations. For example, a system might be designed to withstand enormous quantities of rain as long as it occurs over a long time period, but might fail if the same amount of rain occurs quickly. The HDSC products describe how likely different scenarios are, enabling engineers, planners and decision makers across the country to understand risks and develop effective designs and plans.

Funded through the contributions of interested external agencies, HDSC information makes its way into the regulations and design manuals of many Federal, state and local agencies, and ultimately affects the design of billions of dollars of civil infrastructure built to cope with rainfall and runoff each year.

HDSC's work is conducted regionally, gradually completing a national atlas. *NOAA Atlas 14, Precipitation Frequency Atlas of the United States, Volume 1*, covering the semi-arid southwest was first published in 1993, and successive volumes have been added as funding allowed. Volumes 8 and 9 for eleven midwest and six southeast states are expected to be published by March 2013, followed by Volume 10 for eight northeast states in the summer of 2016. That will leave only Texas and the five northwest states remaining to be completed.

Information Technology Corner

What is Data Center Consolidation?

We rely on information technology (IT) every second of every day to perform our mission, and the world of IT is changing fast. I've joined OHD to help the Hydrology Program navigate this changing landscape and ensure that we have a robust and viable IT future. You're probably already aware of many of the "in-the-news" changes in the IT world - ubiquitous mobile devices, ever-faster computers, the ups and downs of social media, and so on. But you might not be aware of one of the biggest changes going on right now that very likely will affect you: Data Center Consolidation.

Driven by a 2010 Office of Managment and Budget (OMB) mandate, the Federal Data Center Consolidation Initiative (FDCCI) is underway across the federal government (see http://www.cio.gov/documents/State-of-the-Federal-Datacenter-Consolidation-Initiative-Report.pdf and http://www.whitehouse.gov/blog/2011/12/20/expanding-our-efforts-data-centers). The FDCCI is aimed at reducing the federal IT energy footprint, reducing IT costs, improving IT security, and shifting to more efficient IT technologies. For purposes of this initiative, any room or facility that "consumes, manufactures, and transits" data is considered a data center, regardless of size. Tied to the Federal Information Processing (FIPS) definition of a government IT system, if you ingest data, process or re-process data, generate data, or provide data to external data partners/customers, you are in fact a data center.

OHD has multiple data centers. Moreover, it's clear that every WFO, RFC, and Regional HQ is a data center. So where do we go from here?

OHD has been very proactive on FDCCI, and has developed plans to consolidate its five data centers down to two by FY14, with a real cost savings expected. Using IT Service Management (ITSM), central processing centers will provide the access for smaller, distributed facilities be to able to tailor and run their own products. Bandwidth is a critical issue for this approach. As we begin consolidation over the coming months, we will be working diligently to ensure integrity and availability for a large number of datasets.

So what if we could provide centralized processing and storage for you in the field? I'd like to hear what you think of that, particularly suggestions on how it might be a success! Email me at james.rawls@noaa.gov.

Next time: a little bit on FISMA and IT security!

Meet Jim Rawls

Jim Rawls joined OHD as IT Manager in October 2011. Previously he was the NWS IT Security Officer and IT Specialist for the NWS Office of Climate, Water and Weather Services. Prior to NWS, Jim worked as a Systems Engineer and IT Security Manager for the U.S. Air Force, following his first career for the U.S. Navy, where he retired as an Aerographer's Mate Senior Chief, working in meteorology and oceanography for 21 years. Jim is a graduate of Eastern Illinois University, and holds both IT management and technical certifications.

Welcome Jim to "Team Hydro"!

Decision Support Pioneer John Feldt Retires


Met Intern John Feldt, St. Louis, circa 1979

After 35 years of dedicated service to the nation, John Feldt, most recently the Hydrologist-in-Charge (HIC) of the Southeast River Forecast Center (SERFC) has moved on to the next phase of his personal and professional life. Communicating weather, water, and climate information will continue to be his passion.

With a Meteorology degree from St. Louis University, John began his career with the NWS in 1977 as a Communicator (STEP) at WSFO Anchorage. This position provided great Alaskan adventures, such as surveying on a NOAA plane and serving on a NOAA ship on the Arctic Sea, and shaped his long career with a reputation as a communicator. He spent the 1980s gaining experience across the Midwest at Missouri Basin RFC and at Weather Forecast Offices from Kansas City to St. Louis, Milwaukee, and Louisville. His leadership career started in the early 1990s as Deputy Meteorologist-in-Charge (DMIC) and Acting Area Manager in Topeka. From 1992 until 1997, he served as Area Manager/MIC at WFO Des Moines, Iowa. In 1997, he moved to Peachtree City, Georgia, to become the HIC at the SERFC.

John excelled during the plentiful weather disasters of his career. It was his innovation to broadcast live over NOAA Weather Radio during the 1991 Andover, Kansas tornado, directing people out of harm's way. In Des Moines he provided leadership through the Great Midwest Flood of 1993. John was instrumental in the 1997 Advanced Hydrologic Prediction Service (AHPS) pilot project in the Des Moines River basin, leading the way to the over 3000 AHPS locations of today. Weather disasters followed him to the SERFC: the El Nino floods of 1998, the Hurricane Floyd floods of 1999, and the 2007-2008 drought in the southeast US. Again, he rose to the occasion by demonstrating new ways to communicate information to save lives and protect communities. He led the SERFC staff in producing GIS graphics which were easy to understand and told the story quickly. The Director of the Georgia Emergency Management Agency, Charley English (presenting a proclamation to John at left from Georgia Governor Nathan Deal earlier this year for his service to the State) said "What I appreciated most [about John] was that when he spoke to me it was in terms of impacts and things that I could expect in the coming hours and days. He truly helped me do my job in that he took care of all of the science, formulas and computer models and provided me with a useful interpretation that I could act upon to make a difference to the people and property that were in jeopardy."

John has pioneered what we've now come to know as Integrated Decision Support Services, driven throughout his career to try new and innovative techniques to better tell the story of weather and water events and their impacts on peoples' lives. His enthusiasm for his job and the NWS Hydrology Program mission will truly be missed.

Hydro People in the News

• OHD welcomed Kate Abshire as a full-time employee after she completed her Master's degree in Civil and Environmental Engineering from Duke University. As a student in NOAA's Graduate Sciences Program (GSP), Kate worked in OHD the past few summers. She will be coordinating activities related to the Integrated Water Resources Science and Services initiative.

• Congratulations to Tabitha Clarke, Senior Service Hydrologist at the Little Rock (LZK) Weather Forecast Office (WFO), for being selected as the recipient of the 2012 Gregg B. Rishel Award for her outstanding relationship building and decision support services provided before, during and after the protracted April-May 2011 flood event. This award recognizes an individual for hydrologic science and/or service contributions which support the fulfillment of the hydrologic services mission of the National Weather Service (NWS).

• Congratulations to Kris Lander, Central Region Headquarters Scientific Services Division, and the Kansas Silver Jackets Team, for being awarded the USACE Silver Jacket "Best Project of the Year" for their development of a flood risk management tool for Manhattan, Kansas. During the 2012 USACE Flood Risk Management and Silver Jackets workshop, USACE Major General Michael J. Walsh, Deputy Commanding General, Civil and Emergency Operations, HQUSACE provided plaques to Brian Rast (USACE), Tom Morey (Kansas Department of Agriculture), and Kris Lander (NWS) to recognize their contributions in this project. NWS worked with USACE and other members of the Kansas Silver Jacket team to scope, manage, and develop the flood inundation libraries for display on our AHPS website.

CHPS Bits

News and Updates on the Community Hydrologic Prediction System

The term "team depth" is applicable not only in sports, but also in an RFC. The NWSTC CHPS training modules are part of building team depth in the configuration focal point and system manager ranks. Currently available modules include:

• CHPS Basic Configuration, the first course, explains functional concepts and process workflow with supporting job sheets providing specifics on completing configuration tasks.

• CHPS Simulation Configuration, building on the Basic Configuration course, guides the focal point through the configuration steps in developing simulation-based training.

• CHPS System Manager, provides examples of using the applications within CHPS to perform system management tasks and troubleshooting. Job sheets provide a guide for the steps in those processes.

Advanced Configuration will be available by the end of December 2012, followed by User Training and End-to-End Simulation Training.

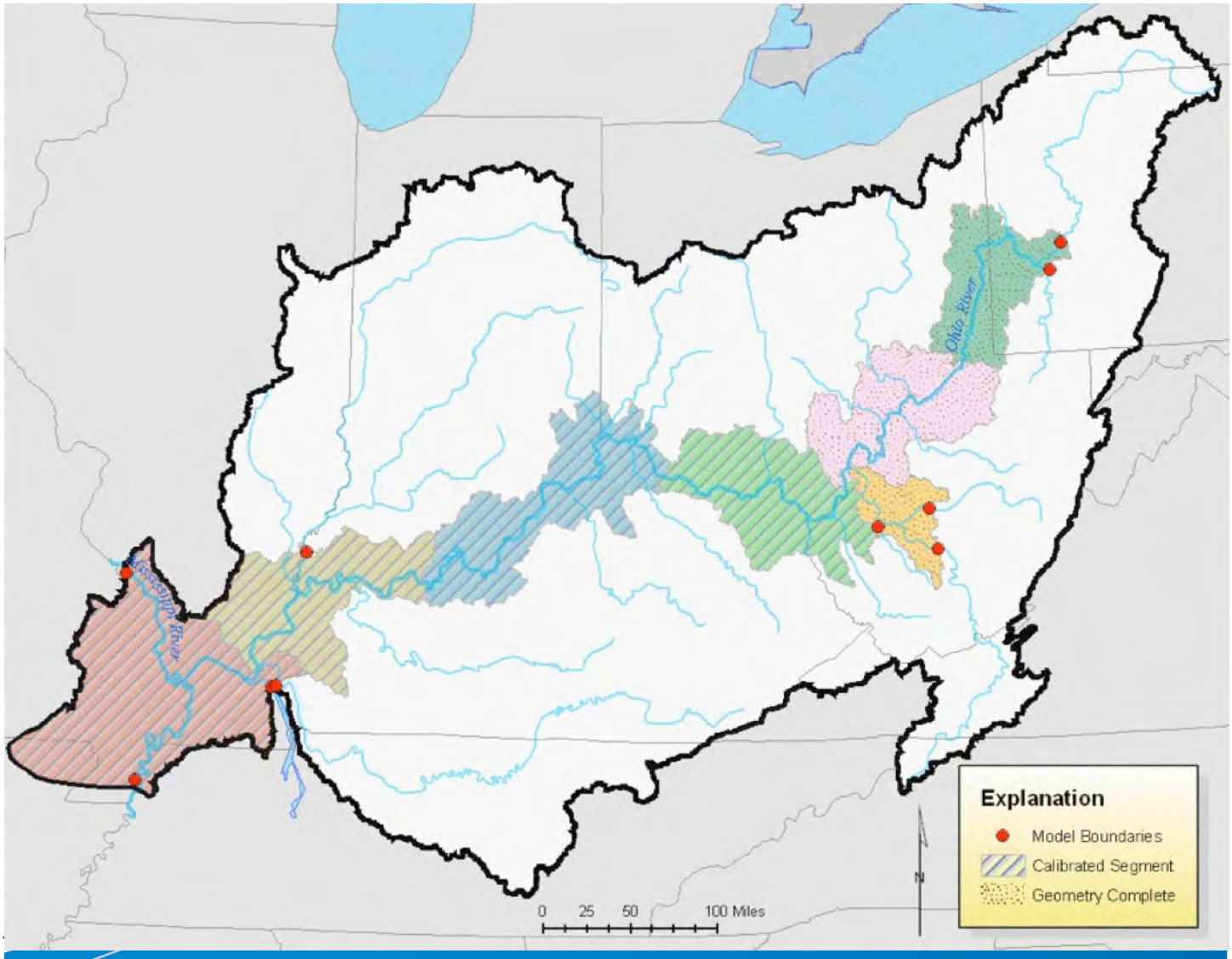
Bookmark the NWSTC page – it has links to all of the available courses and to other helpful sites.

http://www.nwstc.noaa.gov/CHPS/

Field Spotlight

Ohio River Community HEC-RAS Model

Beginning in 2006, the OHRFC and the USACE began a collaborative development effort on a community unsteady flow model for the mainstream of the Ohio River, using the USACE's HEC-RAS model. While both agencies can use the model independently for their own operational needs, development was a shared effort between the two. The model scope encompasses 1300 miles of modeled reach, including 20 locks and dams (see figure below). The model became operational during the fall of 2010, and was put to the test the next spring during the historic flooding along the Ohio and Lower Mississippi Rivers. High water concerns at Cairo, IL prompted real-time collaboration beween the NWS and USACE, and the model was instrumental for making critical reservoir operating decisions and enhancing river forecasts. By executing the model, OHRFC was able to provide information to the USACE, which was in-turn used to manage the floods on the middle and lower Mississippi River. OHRFC's use of the model during this event, and the decision support services provided to the USACE, produced positive results for the protection of life and property.



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ducted by the National Academy of Sciences, highlights the gaps between state-of-the-science and NWS hydrologic operations:

"Presently, there is an enormous amount of active research in both the land-atmosphere-vegetation modeling communities and the catchment hydrology modeling communities. The level of sophistication and representativeness of real world processes, as well as characterizations of uncertainties, in those non-NWS research and operational communities outpace those used in NWS-hydrology operations. NWS hydrological prediction models are simplified, often lack real physical meaning, and are limited in terms of ensemble and data assimilation capabilities." The NWS must close this gap to address the enormous water challenges faced by our nation today and in the future.

Fortunately, we have started a process to engage the academic community and our Federal water partners to design and develop a more robust water modeling system that can be implemented at the National Water Center to address this challenge and enable the NWS River Forecast Centers to keep up-to-date with the advancing state of the science. I am confident you will continue to work together to make this happen and deliver a new generation of water resources information and services to save lives, protect property and enhance America's economy!

IWRSS, from p. 2

surface and groundwater, erosion and sedimentation, and contaminant transport within one analysis and prediction framework. The dialogue has recognized the parallel needs for sustaining and improving the legacy modeling systems which serve a variety of purposes within each agency, while at the same time developing a more unified and comprehensive system that can more effectively address some of our largest water resources challenges. This dialogue will continue over the coming months to further refine the concept and prepare for launching a third interagency team.

The National Water Center will no doubt play a large role in NWMS, and construction is underway. The design-build contractor for the project, Triune-Beck, has begun foundation work and are finalizing utility relocation and general site preparation. Concurrently, the NOAA Project Team is working with Triune-Beck to finalize the remaining design elements of the NWC. It is anticipated foundation work will be completed by fall of this year. The shell of the facility should become visible in the following months as the tentative completion date of the NWC is July 2013.

Program Update

Advanced Weather Interactive Processing System II (AWIPS-2)

The technological evolution of both Weather Forecast Office (WFO) and River Forecast Center (RFC) operations continues with deployments of AWIPS-2 software, which uses an extensible service-oriented architecture quite different from AWIPS-1. The deployment focus is on formal field Operational Test and Evaluation (OTE) offices. Five WFOs and one RFC (Middle Atlantic) are using AWIPS-2 for operations, with a second RFC (Arkansas-Red Basin) recently beginning their OTE. The crucial feedback these offices provide is used to correct deficiencies for monthly update releases. Office preparation for AWIPS includes a two-week residence training course on AWIPS System Administration, along with installation of the prototype AWIPS Data and Application Migration (ADAM) platform and subsequent adaptation of local processes.

Hydrologic operations will use a new Environmental Data Exchange (EDEX) data ingest function, which incorporates a new SHEF and METAR data decoder but still uses the existing relational Integrated Hydrologic Forecast System (IHFS) hydrologic database. The new Common AWIPS Visualization Environment (CAVE) display interface replaces D2D and also captures the Graphical Forecast Editor (GFE), HydroView, and Multisensor Precipitation Estimator (MPE) interface. Existing hydrologic processing and the RFC CHPS forecast system will continue to execute, alongside AWIPS-2. All offices are scheduled to receive AWIPS-2 by February 2013.