

# Flood Risk Management Newsletter

December 2008 vol 2 no 2



## Focusing on Water Allocation/Water Supply

### Table of Contents

National Planning Center of Expertise for Water Management & Reallocation Studies	1	What HEC can do for Corps Districts in water supply, reallocation, and reservoir operations	6
Flood Risk Management Planning Center of Expertise	2	Infrastructure Conference Call for Abstracts	7
Water Supply Tools R&D Initiative	3	8th NHWC Training Conference & Exposition	8
Reservoir Sedimentation	3	Link of Interest	8
CIRP 10th Annual Technology Transfer Workshop	4	PROSPECT Courses	8
Errata	5	Conferences	9
Western States Watershed Study	5	Subscribe – Unsubscribe – Feedback	12
		Upcoming Newsletter Themes	12

Editor's note: The Corps' National Planning Centers (PCXs) are part of an initiative to improve the quality and effectiveness of the Corps planning process for water resources projects called the Planning Excellence Program (PEP). Highlighted in this issue are two PCXs geared toward our focus of water allocation, water supply and flood risk management. Other PCXs support the accomplishment of planning studies for Deep Draft Navigation, Inland Navigation, Ecosystem Restoration, Hurricane and Storm Damage Reduction, and Hydropower. The PEP includes training and work force capability improvement, enhanced quality assurance and control efforts, process improvement and regional and national planning centers.

The March 2009 issue of the FRM Newsletter will focus on Emergency Management. Note the upcoming themes on the last page and start planning your articles now. We look forward to your contributions.

Thanks, Harry Kitch

## National Planning Center of Expertise for Water Management & Reallocation Studies

The National Planning Center of Expertise (PCX) for Water Management & Reallocation Studies (WMRS), based in the Southwest Division, seeks to support and promote Corps planning technical excellence for watershed-oriented water management, particularly in developing water supply and storage reallocation plans and studies, and water storage contract documents.



US Army Corps  
of Engineers

**Flood Risk Management** Page 1 of 12  
**Newsletter**

**Dec 2008**  
**vol 2 No 2**

The PCX also has potential involvement in related areas such as lake-oriented recreation, reservoir operations, and watershed management. Water supply and storage reallocation interact in a watershed context with other project purposes (e.g., hydropower, recreation, and ecosystem restoration) and project operations (e.g., sedimentation surveys, and updates of water control manuals). The WMRS PCX therefore coordinates as needed between the Planning Community of Practice, and the Engineering and Operations CoPs.

The WMRS PCX provides technical analysis; consultation and advice on technical and policy issues; model certification; training; and management of Agency Technical Review and Independent External Peer Review as requested or required. It strives to build strategic relationships with stakeholders in water management planning at every level. It also assists Headquarters in water management related policy studies and development of guidance, as well as assessing research and development needs.

Peter Shaw is the Technical Director of the CX. For more information check the website: <http://www.swd.usace.army.mil/pcx/index.asp>; or contact [WMRSPCX@usace.army.mil](mailto:WMRSPCX@usace.army.mil).

## **Flood Risk Management Planning Center of Expertise**

The Flood Risk Management Planning Center of Expertise (FRM-PCX) was established at the South Pacific Division in August 2003. The FRM-PCX supports Project Delivery Teams in the accomplishment of planning studies that are nationally significant, complex, large in scope, and/or are controversial by developing, maintaining and applying the best and most appropriate engineering, economic, and environmental expertise and considerations in response to the Nation's flooding problems.

The FRM-PCX is a virtual center with resources located across the country. It includes members of the South Pacific Division, as the lead Major Subordinate Command, and members of the Northwestern, Great Lakes and Ohio River, and Mississippi Valley Divisions as partnering regional business centers. It also includes members from the Institute of Water Resources, the Hydrologic Engineering Center, the Engineer Research and Development Center, and the National Non-Structural/Flood Proofing Committee.

The mission of the FRM-PCX is twofold: to develop, maintain, and apply the best and most appropriate nationally available expertise, science, and engineering technology for planning of flood risk management projects; and to support national goals of enhancing professional and technical development, creating and sharing knowledge, and promoting communication with a specific focus on flood risk management. To achieve this mission, the FRM-PCX works closely with allied communities of practice such as Engineering, Real Estate, Construction, Operations, and Regulatory.

The roles and capabilities of the FRM-PCX are: to provide independent policy and technical review or external peer review support; to certify, validate, and peer review planning, economic, and flood risk models; to champion flood risk management planning expertise and concepts through promoting effective flood risk management communication, developing flood risk management training and programs of lessons learned, and providing input into new guidance development; to provide advice to HQUSACE, the laboratories and other stakeholders on significant flood risk management planning issues and policy compliance review; to identify research and development priorities for flood risk management; to develop and strengthen partnerships within and outside the Corps in the field of flood risk management; and to provide



technical support for key analytical components of very costly, highly complex and controversial studies. To learn more about the FRM-PCX, or to engage its services, please contact: Eric Thaut, Program Manager, FRM-PCX at 415-503-6852 or [eric.w.thaut@usace.army.mil](mailto:eric.w.thaut@usace.army.mil), or visit the website at [www.spd.usace.army.mil/frm-pcx](http://www.spd.usace.army.mil/frm-pcx).

## **Water Supply Tools R&D Initiative**

**Steve Ashby, ERDC-EL**

USACE identified the need for a consistent, corporate process of performing water supply analyses. Through the System-Wide Water Resources Program (SWWRP) ERDC and HEC have begun the process to develop a set of corporately endorsed tools that includes all hydrologic processes and that are useful for studies with multiple levels of fidelity over multiple levels of temporal and spatial scales. Other USACE water supply experts and users will be engaged.

The tools will address surface water and groundwater interactions within watersheds, rivers, reservoirs, and estuaries, and will be used to determine the effects of climate and man-induced changes over regional time and space scales. The water supply tools will be used in multi-purpose project studies (e.g. for navigation, flood control, and ecosystem restoration), so they must include the processes and levels of fidelity required in each discipline area involved.

Research helping develop this toolset includes: 1) identifying water supply analysis methods currently used in the Corps; 2) developing surface water and groundwater water supply tools that improve on current capabilities, e.g., HEC-ResSim and Adaptive Hydraulics (ADH) for groundwater; 3) providing verification and validation procedures and associated data sets to support the tools; and 4) developing standardized approaches, applicable throughout the Corps, for performing water supply analyses.

Products will include: state of the practice document for Corps water supply studies (FY09); new and updated simulation tools and guidance for performing water supply studies (FY09-10); verification and validation procedures and supporting data sets for water supply models (FY09-10); and standardized approaches for designing and performing water supply studies (FY09-10).

Additional efforts will expand the capabilities of water supply tools for environmental considerations, e.g., HEC-ResSim coupled with CE-QUAL-W2 for water quality assessments in a system-wide assessment. SWWRP and the Flood & Coastal Storm Damage Reduction (FCSDR) Research Program are developing watershed, reservoir, riverine, and estuarine modeling tools and associated GUIs and data management tools that will form the enterprise toolset for water supply analyses. The tools will allow local and regional scale analyses at different levels of modeling fidelity and will produce the necessary data to support environmental assessments of water supply operations.

POCs: Steve Ashby, SWWRP Program Manager, [Steven.L.Ashby@usace.army.mil](mailto:Steven.L.Ashby@usace.army.mil); Bill Curtis, F&CSDR Program Manager, [William.R.Curtis@usace.army.mil](mailto:William.R.Curtis@usace.army.mil).

## **Reservoir Sedimentation**

**Fred Pinkard & Meg Jonas, ERDC-CHL**

The impacts of reservoir sedimentation can extend considerable distances upstream and downstream, influencing channel morphology, stability, and ecological health, as well as



reservoir operations for flood control, water supply, recreation and other purposes. The potential impacts of climate change, along with the certain increase in water demand, make sustainable reservoir capacity an urgent issue. The number of reservoirs the Corps of Engineers operates and maintains (383 reservoirs within the United States) underscores the need to develop ways to effectively manage sediments from a systems perspective while also seeking to extend the effective and economic lives of reservoir projects.

In 2007 questions arose concerning the magnitude of sediment deposition in Corps' reservoirs, the impacts of sediment deposition on authorized project purposes, and what is being done to address this sediment deposition in the long term. In response, the Corps' Committee on Channel Stabilization (CCS) was engaged to serve as the basis for a reservoir sedimentation Project Delivery Team (PDT). A 'kickoff' Reservoir Sedimentation Workshop was held in September 2007 at the Coastal and Hydraulics Laboratory. The assembled sedimentation specialists were asked to use a watershed perspective to address the current status of the Corps of Engineers' reservoir sedimentation program, and then to determine the future direction and scope of a program to address reservoir sedimentation needs and problems. Various issues associated with reservoir sedimentation were documented at the workshop. The PDT evaluated these issues and identified the three most critical: 1) data needs and requirements to support project decision making; 2) the need to complete and update guidance; and 3) the need to quantify the affects of reservoir sedimentation on project missions, goals, and authorized purposes and to develop management strategies to address those impacts.

During a follow-up meeting held in April 2008 at ERDC, the PDT developed a comprehensive data call for all Corps reservoirs and the framework for a scope of work to address reservoir sedimentation issues. The data call was issued in July 2008. It included questions concerning basin hydrology, primary sediment contributing land use, loss of volume due to sediment deposition, influence of sediment filling on authorized project purposes, incorporated sediment management practices, obstacles to sediment management practices, and time sequenced history of sediment surveys. The survey information is substantially complete.

The PDT is currently refining the scope of work which is to include identifying the technical approach needed to address the identified reservoir sedimentation issues. Once completed, the reservoir sedimentation effort will provide a comprehensive data base of all Corps reservoir pertinent information, updated guidance for the monitoring and maintenance of the sediment in reservoirs based on state-of-the-art techniques, and reliable strategies for the management of reservoir sediment. The information, guidance, and strategies will inform more effective management of reservoir sediments and the effective operation of Corps reservoirs well beyond their previously projected effective and economic lives. POC: Fred Pinkard, [Fred.Pinkard@usace.army.mil](mailto:Fred.Pinkard@usace.army.mil).

## **CIRP 10th Annual Technology Transfer Workshop Announcement**

The 10th annual CIRP workshop, "Advanced Integrated Coastal Inlet Simulation with Applications," will be held 16-18 February 2009 at the Tradewinds Island Resort, St. Petersburg, FL, prior to the 22nd Annual National Conference on Beach Preservation Technology convened by the Florida Shore & Beach Preservation Association (FSBPA).

This workshop will focus on recent advancements in and hands-on applications of the Coastal Modeling System (CMS), with an emphasis on coastal inlets, navigation channels, and



adjacent beaches. Two cost-free optional evening sessions will also be held. On Monday evening, February 16, there will be a Corps-only session open to all Corps staff including those not attending the workshop. This session will introduce the Coastal Structures Management, Analysis, and Ranking Tool (CSMART) and the Channels Prioritization Tool (CPT) developed under the CIRP. The Tuesday evening session, February 17, will cover the new release version of the Regional Morphology Analysis Package (RMAP) that operates in a stand-alone GIS environment, developed under the System-Wide Water Resources Program.

The Coastal Inlets Research Program (CIRP) is a USACE Headquarters funded navigation research and development program. Please check the CIRP web site <http://cirp.wes.army.mil/cirp/> and FSBPA web sites <http://www.fsbpa.com/> for registration information as it becomes available.

## Errata

We inadvertently omitted the author of the article, “Coastal Working Group Meeting” in the September 2008 issue. Our apologies. Thanks to Phil Ross, Detroit District, for providing the overview of the meeting.

## Western States Watershed Study

**Gene Lilly, Tulsa District**

Regional alliances of state governors provide strategic priorities for water resources management and policy development. An important role of federal agencies is to provide appropriate collaborative support for this approach to water resources planning and project implementation.

The Western States Watershed Study<sup>1</sup> (Study) involved multiple organizations and addressed the following priority topics identified by the Western States Water Council (WSWC) and the active 17 western state members: water data collection, drought, climate change, watershed tools/ collaborative planning, federal resources/collaboration, asset management and policy/ programs. Selected information from the Study was used to develop several recommendations contained in the report: Water Needs and Strategies for a Sustainable Future: Next Steps which was released by the Western Governors’ Association (WGA) in June 2008, available at <http://www.westgov.org/wswc/water%20needs%20&%20strategies-6'08%20final.pdf>.



Topics addressed in the Study are important considerations in developing state water plans that typically include the following interacting components: 1) demand projections, 2) supply and gap analysis, 3) identification and evaluation of supply alternatives, and 4) state water policy. The Study demonstrated that Federal programs could provide a significant framework of

<sup>1</sup> The Western States Watershed Study is one of five national studies conducted under the FY06 Energy and Water Development Appropriations Act (PL 109-103) which directs the Assistant Secretary of the Army for Civil Works to conduct at full federal expense, comprehensive analyses to examine multi-jurisdictional use and management of water resources on a watershed or regional scale.

support and a considerable amount of information and expertise to help states strategically plan for short- and long-term water resource challenges. Collaboration between multiple organizations, along with the leveraging of “planning assistance to states” type programs, provides more benefits to the nation than the scenario where each organization works independently on similar water resource issues. Therefore, in June 2008 the WSWC recommended the formalization of both a Federal Liaison Officer position and a Western States Federal Agency Support Team (WestFAST).

In August 2008 Ms. Jonne Hower, Bureau of Reclamation, was selected to serve as the Federal Liaison Officer. Efforts are underway to execute a WestFAST Declaration of Cooperation. Mr. Mike Fallon, Director of Southwestern Division Programs, is the Chairman of the WestFAST. Other USACE senior leader proponents of WestFAST initiatives are Steve Stockton, Deputy Director of Civil Works; Robert Pietrowsky, Director of the Institute for Water Resources (IWR); and Beth Fleming, Director of the Environmental Laboratory at the Engineering Research and Development Center (ERDC).

Federal agencies that provided experts to the Project Delivery Teams (PDTs) during the study are the Bureau of Reclamation, U.S. Geological Survey, National Oceanic and Atmospheric Administration, Natural Resources Conservation Service, the Environmental Protection Agency and the Corps of Engineers. The Corps provided experts from Headquarters (HQ); Northwestern, South Pacific, and Southwestern Division Offices; Omaha, Seattle, Albuquerque, Los Angeles, Sacramento, Fort Worth and Tulsa District Offices; IWR; and ERDC. The results of the collaborative Study do not represent the positions of any federal agency, but rather provide information for the consideration of decision makers. The recommended next steps, if accepted, are intended to be prioritized by decision makers for both short- and long-term implementation.

For further information contact Gene Lilly, [Douglas.E.Lilly@usace.army.mil](mailto:Douglas.E.Lilly@usace.army.mil).

## **What HEC can do for Corps Districts in water supply, reallocation, and reservoir operations**

**Beth A. Faber, Thomas A. Evans, HEC-IWR**

The Hydrologic Engineering Center (HEC) supports Corps of Engineers reservoir operations by providing software tools for reservoir simulation and optimization as well as providing expert services both to support the use of those programs and to perform analysis in support of Corp studies and operations.

HEC-ResSim, the Center’s reservoir system simulation tool, supports analyses of operating rules for all reservoir purposes, including flood protection, hydropower generation, recreation, and to an increasing extent, water supply. It can be used either in support of real-time operating decisions or for off-line event or period-of-record analysis. HEC-ResPRM (Prescriptive Reservoir Model) the center's reservoir optimization tool, allows evaluation of trade-offs between reservoir purposes. Across the period-of record, it determines operations that maximize the goals of each reservoir system function (as described by a series of penalty curves), or balances all functions simultaneously. "Optimal" operations can then be distilled into operating rules and simulated in ResSim.

While water supply is not one of the Corps major mission areas, many Corps reservoirs provide water supply to local water users, who contract with the Corps to allocate a portion of



the reservoir's storage space for their use. When a potential water supply customer approaches the Corps, a "firm" yield analysis must be performed to determine how much storage volume that user requires to supply them through the driest period expected (critical period). Presently, the Corps does not have consistent, nation-wide guidance or standard methods for analyzing water supply yield. HEC is helping meet the need for a consistent approach by providing modeling tools to perform these analyses. ResSim and ResPRM development is expanding the capabilities of these tools in yield analysis.

HEC-ResSim can currently be used to determine firm yield provided by a single reservoir, or a system of reservoirs, across the period of hydrologic record. In contrast to traditional yield analysis which tracks inflow and water demand in isolation, ResSim's yield computation reflects the relative priority of water supply among the other purposes of the reservoir, for example demonstrating the impact of meeting a water demand on the system hydropower production. To accurately determine yield, ResSim's computation also captures the physical aspects and limitations of water diversion from reservoirs, such as the elevation of an outlet compared to actual pool level.

HEC-ResSim's yield analysis currently requires manual iteration to maximize water use, but that procedure will soon be automated. Other upcoming extensions include the ability to evaluate yield of an individual user's storage pool within the Conservation Pool, and inclusion and crediting of return flows to the reservoir, ultimately leading to a comprehensive water accounting ability. As ResSim's water quality abilities are advanced, quality-aspects of water supply yield, such as required dilution of return flows, will also be included.

HEC-ResPRM can directly maximize individual monthly water supply diversions, but not yet a sustained (constant) yield across the period of record. Ongoing development will allow maximization of sustained yield, first at a monthly time-step and eventually at daily.

In addition to software development, HEC has provided expertise to Corps Division and District offices in developing models and analyzing results to support reservoir manual updates, re-operation plans, FERC re-licensing, storage/yield analysis and negotiations over disputed water resources. HEC continues to expand the expertise of its staff through involvement in projects such as these, and makes the knowledge gained through this work available to all parts of the Corps. POC: Beth Faber, [Beth.Faber@usace.army.mil](mailto:Beth.Faber@usace.army.mil).

## **USACE Infrastructure Conference to be July in Cleveland, OH**

23 January 2009 is the deadline for abstract submittal for the Corp's Infrastructure Conference (ISC). Abstracts must be 200 words or less, contain an estimated presentation delivery time, and be submitted through the website, <http://www.usaceiscconf.org/2009>.

The ISC will be held at the Cleveland Convention Center, Cleveland, OH, from 20-24 July 2009. The theme for this national conference is 'Building National Technical Competency.' The Conference is co-sponsored by the Society of American Military Engineers (SAME) and is open to all interested parties including federal agencies, the private sector and academia. There will be a plenary session and technical breakout sessions on construction, dam and levee safety, electrical engineering, geospatial, geotechnical engineering, hydrology and hydraulics, survey and mapping, materials engineering, mechanical engineering and structural engineering. There will also be workshops and sessions for individual Community of Practice (CoP) meetings. All sessions offer Professional Development Hours (PDHs).



The ISC is vital to maintaining the continuing professional technical competency of the Corps and presents attendees with an excellent opportunity to exchange ideas, knowledge, and experiences within the Engineering and Construction (E&D) Community. The Conference web site, <http://www.USACEISCCConf.org/2009>, provides schedule, agenda, abstract submittals, on-line Conference registration, hotel information, etc. Check it out!

**8th NHWC Training Conference & Exposition**

The Eighth National Hydrologic Warning Council (NHWC) Training Conference and Exposition – “Exploring New Hydrologic Warning Frontiers” - will be held 18-21 May 2009 in Vail, CO. The conference is the largest in the United States devoted specifically to real-time hydrologic warning systems and how these technologies assist local officials with storm readiness, emergency response, and disaster recovery. Steve Stockton, Director of Civil Works, U.S. Army Corps of Engineers (USACE), Headquarters, will serve as the Keynote Speaker.

The USACE, in collaboration with the U.S. Department of Homeland Security (DHS), will be hosting a 4-hour workshop on "Flood Risk Management." These Federal agencies have partnered with State and non-Federal agencies in a series of collaborative efforts focused on improving public safety and flood damage reduction. The Workshop is intended to familiarize participants with ongoing programs and will serve as a forum to facilitate potential involvement of additional entities in this area. More details are available at the NHWC Conference website following link:

[http://www.hydrologicwarning.org/content.aspx?page\\_id=22&club\\_id=617218&module\\_id=48494](http://www.hydrologicwarning.org/content.aspx?page_id=22&club_id=617218&module_id=48494)

**Link of Interest**

An article in the September issue of “Planning Ahead” provided information on and a link to the presentations and final reports for five watershed planning pilot studies – Middle Mississippi River Corridor Study, Great Lakes Habitat Initiative, Virgin River Watershed Study, Western States Watershed Study, and the Delaware River Basin Study. They can be found on the Planning CoP website at [http://www.usace.army.mil/cw/cecw-cp/news/watershed\\_06.html](http://www.usace.army.mil/cw/cecw-cp/news/watershed_06.html). The September issue of the Newsletter is available at [http://www.usace.army.mil/cw/cecw-cp/news/pa\\_newsletter/v11i9.pdf](http://www.usace.army.mil/cw/cecw-cp/news/pa_newsletter/v11i9.pdf).

**PROSPECT Courses FY 2009**

No.	Title	Dates	Location
160	OMBIL Applications for Managers	13 -15 Jan 2009	Huntsville, AL
276	Wetlands Development and Restoration	23 – 26 Feb 2009	Apalachicola, FL
173	Interior Flooding Hydrology	3 – 9 Mar 2009	Davis, CA
270	Economic Analysis	23 - 27 Mar 2009	Springfield, VA



No.	Title	Dates	Location
345	Nonstructural Measures for Flood Risk	30 Mar – 3 Apr 2009	Davis, CA
11	Coastal Project Planning	20 – 24 Apr 2009	Duck, NC
349	Risk Analysis WRP& M	1 - 5 Jun 2009	Davis, CA
409	Hydrologic and Hydraulic Considerations	15 – 18 Jun 2009	Buffalo, NY
209	Risk Analysis – Flood Damage Reduction Project	15 -19 Jun 2009	Davis, CA
160	OMBIL Applications for Managers	16 - 20 Jun 2009	Huntsville, AL
58	Statistical Methods In Hydrology	13 – 17 Jul 2009	Davis, CA
245	Operations Management	27 – 31 Jul 2009	Washington, DC
406	Plan Formulation	28 – 31 Jul 2009	Park City, UT
276	Wetlands Development and Restoration	3 – 6 Aug 2009	Olympia, WA

**Additional Information:** <http://pdsc.usace.army.mil/downloads/PurpleBook2009.pdf>

## Conferences

This listing is for information only and is not a complete list of FRM-related meetings. These meetings are not endorsed by the Corps of Engineers unless specifically stated.

25 – 27 Jan 2009. American Water Works Association Water Resources Symposium: Managing in Times of Change and Uncertainty. Portland, OR. [www.awwa.org](http://www.awwa.org)

28 – 30 Jan 2009. 6th EverythingAboutWater Expo2009. New Delhi, India. <http://www.eawater.com/expo2009>

29 – 30 Jan 2009. Water Efficiency in Urban Areas. Würzburg, Germany. <http://www.otti.de>

10 – 13 Feb 2009. Water Resources Management, In Arid and Semi-Arid Regions. L'Aquila, Italy. [www.desline.com](http://www.desline.com)

18 – 20 Feb 2009. 22<sup>nd</sup> Annual Conference on Beach Preservation Technology. St. Petersburg, FL. <http://www.fsbpa.com>

23 – 24 Feb 2009. 5th Conference on Hydrogeology, Ecology, Monitoring, and Management of Ground Water in Karst Terrains. Safety Harbor, FL. [www.ngwa.org](http://www.ngwa.org)

23 – 25 Feb 2009. Water Investment World North America 2009. New York, NY. <http://www.terrapinn.com/2009/waterworld/>



23 – 26 Feb 2009. International Conference on Implementing Environmental Water Allocations. Port Elizabeth, South Africa. <http://www.wrc.org.za>

24 – 26 Feb 2009. 4<sup>th</sup> IASME/WSEAS International Conference: Water Resources, Hydraulics and Hydrology (WHH '09). Cambridge, UK.  
<http://www.wseas.org/conferences/2009/cambridge/whh/>

2 – 4 Mar 2009. Principles of Ground Water: Flow, Transport, and Remediation. Dublin, OH.  
[www.ngwa.org](http://www.ngwa.org)

2 – 5 Mar 2009. Coastal GeoTools: Building the Digital Coast. Myrtle Beach, SC.  
[www.csc.noaa.gov/geotools/index.html](http://www.csc.noaa.gov/geotools/index.html)

16 – 22 Mar 2009. 5th World Water Forum: Bridging Divides for Water. Istanbul, Turkey.  
<http://www.worldwaterforum5.org>

4 – 8 Apr 2009. 2009 Florida Water Resources Conference. Palm Beach, FL.  
<http://www.fwrc.org/index.asp>

6 – 10 Apr 2009. National Hurricane Conference. Austin, TX.  
<http://www.hurricanemeeting.com/>

19 – 22 Apr 2009. Collection Systems 2009, Working Together to Address Wet Weather Challenges. Louisville, KY. <http://www.wef.org/Collectionsystems>

29 – 30 Apr 2009. CIWEM's Annual Conference 2009: Water & The Global Environment. London, UK. [http://www.ciwem.org/events/annual\\_conference](http://www.ciwem.org/events/annual_conference)

4 – 6 May 2009. American Water Resources Association, 2009 Spring Specialty Conference: Managing Water Resources and Development in a Changing Climate. Anchorage, AK.  
<http://www.awra.org/meetings/Anchorage2009/index.html>

11 – 13 May 2009. International Seminar on Water Resources and Coastal Management in Developing Countries. Manado, North Sulawesi, Indonesia. <http://www.hathi-manado.org>

17 – 21 May 2009. World Environmental & Water Resources Congress. Kansas City, MO.  
<http://content.asce.org/conferences/ewri2009/submission.html>

18 – 21 May 2009. National Hydrologic Warning Council (NHWC): Exploring New Hydrologic Warning Frontiers. Vail, CO.  
[http://www.hydrologicwarning.org/content.aspx?page\\_id=22&club\\_id=617218&module\\_id=48494](http://www.hydrologicwarning.org/content.aspx?page_id=22&club_id=617218&module_id=48494)

20 – 24 May 2009. International Marine Conservation Congress. Washington, DC.  
<http://www2.cedarcrest.edu/imcc/index.html>



26 – 28 May 2009. 4th Tsunami Society Symposium, East-West Center, University of Hawaii, Honolulu, HI. <http://www.sthjournal.org/2009.pdf>

1 – 3 Jun 2009. International Forum on Integrated Water Management. Sherbrooke, Quebec, Canada. <http://www.cogesaf.qc.ca/rv-eau>

7 – 12 June 2009. Association of State Flood Plain Managers (ASFPM) 33rd Annual Conference, Orlando, FL. <http://www.floods.org/Conferences,%20Calendar/calendar.asp>

8 – 10 June 2009. Groundwater for the Americas. Panama City, Panama. [www.ngwa.org](http://www.ngwa.org)

22 – 26 June 2009. Society of Wetlands Scientists Annual Meeting. Madison, WI. [www.sws.org/2009\\_meeting/index.mgi](http://www.sws.org/2009_meeting/index.mgi)

29 June – 1 July 2009. Adaptive Management of Water Resources II. Snowbird, UT. <http://www.awra.org/meetings/SnowBird2009/>

8 – 10 July 2009. ECOSUD 2009 – Seventh International Conference on Ecosystems and Sustainable Development. Chiancino Terme, Italy. <http://www2.wessex.ac.uk/09-conferences/ecosud-2009.html>

19 – 23 July 2009. Coastal Zone 09. Boston, MA. <http://www.csc.noaa.gov/cz>

20-24 July 2009. USACE 2009 Infrastructure Conference. Cleveland, OH. <http://www.usaceisconf.org/2009/> .

20 – 24 Jul 2009. 3<sup>rd</sup> National Conference on Ecosystem Restoration (NCER). Los Angeles, CA. <http://www.conference.ifas.ufl.edu/NCER2009>

7 – 9 Sep 2009. River Basin Management 2009: Fifth International Conference on River Basin Management including all aspects of Hydrology, Ecology, Environmental Management, Flood Plains and Wetlands. Malta. <http://www2.wessex.ac.uk/09-conferences/river-basin-management-2009.html>

14 – 15 Sep 2009. Smart Rivers 2009 Conference: Contribution of Inland Water Navigation to Climate Protection. Vienna, Austria. [otto.schwetz@tinavienna.at](mailto:otto.schwetz@tinavienna.at)

16 – 18 Sep 2009. Coasts, Marine Structure and Breakwaters 2009. Edinburgh, Scotland. <http://ice-breakwaters.com>

10 – 13 Dec 2009. 2009 NGWA Ground Water Expo and Annual Meeting. New Orleans, LA. [www.ngwa.org](http://www.ngwa.org)

25 – 28 Apr 2010. Ports 2010. Jacksonville, FL. <http://www.content.asce.org/conferences/ports2010>



## Subscribe – Unsubscribe – Feedback

To Subscribe/unsubscribe: <http://operations.usace.army.mil/flood.cfm>.

We would love your input – recommended article length is ½ to 1 page. Articles should be submitted to Doyle L. Jones, Canvassing Editor, [Doyle.L.Jones@usace.army.mil](mailto:Doyle.L.Jones@usace.army.mil). Also, we would appreciate your feedback. Contact Dinah McComas, Managing Editor, [Dinah.N.McComas@usace.army.mil](mailto:Dinah.N.McComas@usace.army.mil) or Doyle Jones.

## Upcoming Newsletter Themes

So you can begin to formulate articles for future issues, here is the current plan for newsletter themes:

**March 2009** – Emergency Management

**June 2009** – Flood Risk Management on the International Scene

