Focusing on: Emergency Management

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Preparedness

Ed Hecker, Director, Directorate of Contingency Operations (Provisional)

In October 2008 the Chief of Engineers approved the establishment of a Directorate of Contingency Operations (Provisional) that serves to integrate the Civil Disaster and Military Contingency planning and response organizations and functions at HQ. There remains a Homeland Security Office in Civil Works that includes the Flood Control and Coastal Emergencies, National Emergency Preparedness Program and Flood Risk Management Programs. Mr. Hecker serves as the overall SES for these two offices, which are matrixed together as a unified National Program to address both Critical Infrastructure Resilience (Campaign Plan Goal 3b) and overall USACE Contingency Readiness and operations (CP Goal 1). This provides an effective framework for system risk management. This is the concept now referred to as “Readiness XXI.” Thus, the Directorate of Contingency Operations (Provisional) is responsible for worldwide USACE missions to respond to disasters or military contingencies. How does this relate to flood risk management? Flood risk management seeks to integrate and synchronize our ongoing, diverse flood risk management projects, programs and

authorities internally and externally. Similarly, *Readiness XXI builds off the core belief that risk management includes actions occurring both in the short and long term and throughout the Corps' various functional areas.* The cycle (preparation + actions taken during and after an event or flood = modified behavior) is a way for improved business practices to evolve across the entire risk management spectrum. This engages the concept of reducing risk through a comprehensive strategy linking pre-event mitigation, such as the levee safety program, with contingency planning and operations.

Floods in the Midwest and Pacific Northwest this past year resulted in increased collaboration with local, state and federal entities to establish more effective flood risk management policies. For example, following the June 2008 Midwest floods, an Interagency Levee Task Force (ILTF) was established to develop a collaborative regional approach to the short and long-term restoration of damaged flood management systems. The Corps, working with the Federal Emergency Management Agency (FEMA) and other federal, state and local agencies, assembled the ILTF to provide a uniform approach across the five-state region. It's a model the Corps expects to duplicate and make a regular part of our post-disaster response.

So far the results have been extremely favorable. Meeting since August 2008, the ILTF has enhanced communication and coordination among the agencies; employed collaborative problem-solving where issues overlap various agency authorities; and worked to fashion best business practices. The group is also preparing to recommend several policy changes for some of the agencies, including ours, to ensure future task forces can work together even more effectively.

We and FEMA also continue to nationally leverage the flood risk management approach with our nonfederal partners through quarterly discussions with two key stakeholder organizations: Association of State Floodplain Managers, and National Association of Flood & Stormwater Management Agencies. We want to reduce flood risk in the context of a comprehensive watershed approach by improving communication and collaboration between Federal agencies and with non-Federal partners. These efforts are being shared with elected officials who can impact flood risk at the state and federal levels. (POC: *Edward.J.Hecker@usace.army.mil*)

Brief Results of CERP Study of Impoundment Embankment

Jeff Melby, CHL

As part of the Comprehensive Everglades Restoration Project (CERP), the Jacksonville District of the U.S. Army Corps of Engineers is designing an impoundment embankment cross-section. The structure is intended to comprise the perimeter of a water supply basin. The conceptual cross-sections feature interior step and berm embankment faces to armor the containment levee, to reduce wave overtopping to acceptable levels, and to control reflected wave energy (Figure 1).

The goal of the study was to develop engineering guidance for optimizing the structure cross-section to provide the minimum structure that met both wave overtopping and wave pressure design criteria. A small-scale physical model study of waves impacting and overtopping the embankment was conducted at the Coastal and Hydraulics Laboratory (CHL) in Vicksburg, MS. A parallel effort was also completed at CHL using the COBRAS numerical model based on the

Reynolds-averaged Navier Stokes (RANS) equations. The COBRAS model was shown to predict both wave overtopping and hydraulic pressures on the embankment well. An empirical equation was developed to predict wave overtopping as a function of structure, wave and water level conditions. The study concluded that the stepped structure with no berm was optimal at reducing overtopping. The maximum pressures were shown to vary un-predictably with increasing berm width and depth. The maximum pressure was generally higher for the stepped structure without a berm than for the sections with berms. However, the highest pressure occurred for the widest berm. The highest pressures on the embankment appeared to be more a function of the details of the breaking wave interacting with the structure face than the structure geometry.

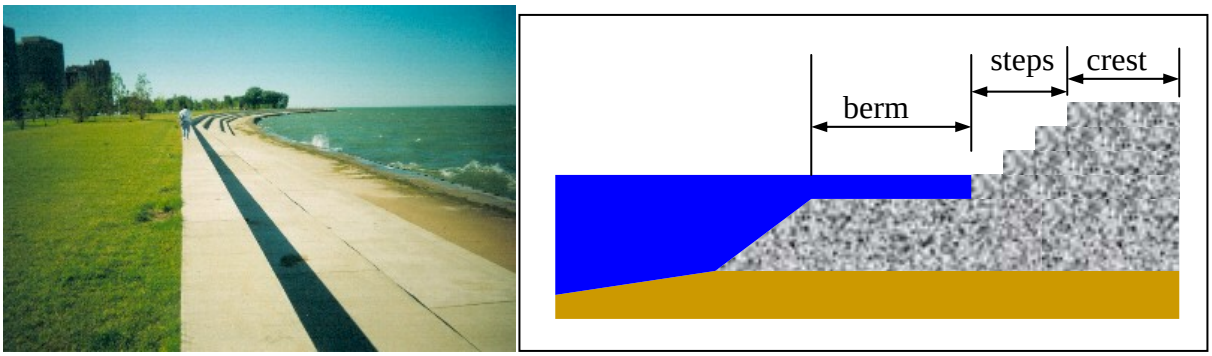


Figure 1. Photograph (left) of step-berm shoreline structure at Hyde Park, Chicago and cross-sectional illustration (right)

The study was successful at defining the optimal step-berm embankment cross section. In addition, the empirical overtopping equation is generalized and can be used to optimize embankments and levees that utilize either steps or berms or combinations of the two. Finally, although the study scope was limited to the step-berm structure, the COBRAS numerical model appears to be useful for modeling complex breaking wave-structure interaction and determining breaking wave forces on structures. This model has the potential to reduce project costs and increase design efficiency for complex two-dimensional breaking wave problems. (POC: *Jeffrey.A.Melby@usace.army.mil*)

Emergency Management Technologies for Monitoring and Mitigation of Flooding Events

David C Finnegan, CRREL

Monitoring physical conditions is essential to emergency management. The USACE Flood and Coastal Storm Damage Reduction Program (FCSDR) Emergency Management Technologies focus area is developing a holistic approach to monitoring flood activities in emergency management situations by integrating field-deployable monitoring systems, efficient and reliable communications and robust database infrastructures for data dissemination. These efforts, combined with existing enterprise architecture and new field-based monitoring technologies, provide critical information during emergency response situations. The systems are

useful for monitoring other critical infrastructure situations as well, such as piping and seepage and the effectiveness of mitigation activities.

By leveraging existing database infrastructure, we are able to economically and efficiently develop field-based automated monitoring systems capable of transmitting real-time data from the field. We are "building strong" on the Corps Water Management System (CWMS), which is the USACE time-series Oracle database designed for the management, modeling and dissemination of hydrologic data. CWMS is designed to operate as a distributed set of databases nationwide supporting the USACE water management mission for monitoring and managing hydrologic data.

Figure 1. Rapidly deployable flood monitoring system designed to be portable, easily transported/shipped and deployed with minimal effort. Redundant satellite communication systems and a direct link to CWMS allow near real-time web-based access to critical flood information in emergency situations.

By utilizing CWMS as the primary data collection system we are able to streamline communications from the field. Examples include: in-situ sensors for long-term monitoring of environmental conditions, real-time in-situ geophysical measurements of levees and rapidly deployable flood monitoring systems for urban and rural flood environments. This allows us to leverage ground personnel and automated systems using satellite communication systems such as Iridium Short Burst Data and IP based protocols for real-time 2-way communications. Building on CWMS further facilitates near-real-time database interactions with field and office-based personnel using web-based portals which provide text, graphical, and spatial information related to the real-time data collected during emergency operations. (POC: *David.Finnegan@usace.army.mil*)

Stream and Watershed Workshop

Meg Jonas, CHL

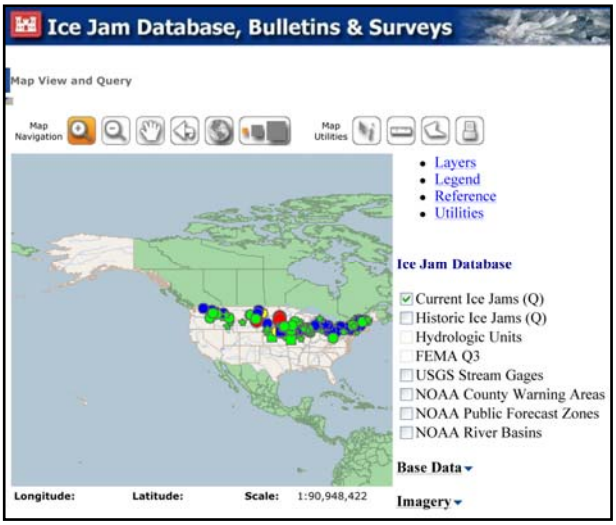
Researchers from the U.S. Army Engineer Research and Development Center (ERDC) Coastal and Hydraulics Laboratory (CHL) and the Institute for Water Resources (IWR) recently taught a workshop in northern Virginia on stream stabilization and watershed sediment processes. Instruction was provided by Dave Derrick and Meg Jonas, CHL, and Dr. Mark Sudol, IWR. The 60 people attending the workshop represented multiple federal, state and county agencies, along with private firms and non-profit groups. Attendees visited two streambank protection projects on nearby Accotink

Creek: a successful project constructed in 1987, and a project currently under construction. These projects use stone toe and bendway weir techniques currently under study by the Flood & Coastal Storm Damage Reduction program. Workshop topics ranged from the selection and design of bank stabilization measures for these particular sites, to the watershed-scale evaluation of hydrology, hydraulics and sediment using Sediment Impact Analysis Methods and other analysis techniques. Many positive comments were received from workshop attendees, and the instructors are planning to continue collaborative efforts between ERDC and IWR. This type of course can be customized for any interested groups. (POC: Meg Jonas, *Margaret.M.Jonas@usace.army.mil*)

Corps Provides Knowledge on Ice Jams

The U.S. Army Engineer Research and Development Center's Cold Regions Research and Engineering Laboratory (ERDC-CRREL) is the lead provider of technical support for Corps ice jam emergency response activities. CRREL supports the Ice Jam Database, the Ice Engineering Manual, and ice jam research.

In 1990, the CRREL Ice Jam Database, *https://rsgis.crrel.usace.army.mil/icejam/* was created as a result of the requirement for rapid, effective emergency response to ice jam problems. The database was designed to serve as an accessible repository of ice records both for ice jam emergency response and for design for the Corps, other Federal agencies, state and local agencies, and the private sector. It currently has more than 16,000 ice events on more than 2,200 rivers in just over 5,000 locations in the United States, with the earliest occurring in 1780. This database is a reliable resource used to research previous ice jams and to assess specific situations that may cause ice jam formation. Each entry includes river name, location, U.S. Geological Survey (USGS) hydrologic unit code, USGS gage number (if available), jam type and date (if known), local and ERDC-CRREL contacts, a summary of the event, and a list of publications on the jam. The database also can serve as a source of documented responses from engineers and officials who helped relieve the emergency situations. This in turn led to the Ice Jam Clearinghouse, also at *https://rsgis.crrel.usace.army.mil/icejam/*, an information portal for ice jam mitigation and control. The Ice Jam Database is also important to CRREL efforts to develop methods of predicting ice jam occurrence and severity.



Continuing developments in the field of ice engineering are reflected in the Ice Engineering Manual, last updated by CRREL in 2006. EM 1110-2-1612 is available at *http://140.194.76.129/ publications/eng-manuals/*. The IE Manual covers a broad range of topics in the field of ice engineering on rivers and lakes. It is divided into three parts: ice properties, processes, and problem solutions; ice jams and mitigation measures; and winter navigation on inland waterways.

Supporting ice jam research is CRREL's Ice Engineering Research Facility, the largest cold-room facility in North America dedicated to ice engineering and its attendant studies. The Facility has a test basin, a refrigerated towing tank for large-scale studies of ice forces on structures such as dams, piers, ships, and off-shore platforms. Additionally, it has a refrigerated flume capable of generating supercooled water for the study of frazil ice, sediment transport under a wide range of controlled temperatures and ice conditions, and driver processes. A general purpose research area provides space for conducting large-scale physical models, including the study of ice passage at locks and dams and the design and testing of ice control structures.

Engineers at ERDC-CRREL are also developing and optimizing low-cost structural and nonstructural techniques to prevent or alleviate damages caused by ice jams, such as early warning systems, ice dusting, ice breaking, ice weakening, and ice jam removal techniques. (POC: Steve Daly, *Steven.F.Daly@usace.army.mil*, or Andrew Tuthill, *Andrew.M.Tuthill@usace.army.mil*)

Task Force Hope and Risk Management

Reuben Mabry, MVN

On 29 August 2005, Hurricane Katrina struck the Gulf Coast causing one of America's largest natural disasters. The damage to the New Orleans, Louisiana, area was catastrophic. The U.S. Army Corps of Engineers responded immediately to begin repairs. Over time, the lessons learned as a result of Katrina guided the Corps' transition to becoming a risk-based organization.

The Corps of Engineers established Task Force Unwatering to unwater the city, and Task Force Guardian to repair or replace 220 miles of levees and floodwalls, build three interim gated structures for the three outfall canals, and perform four closure structure repairs. This work brought the system repairs and heights to roughly pre-Katrina levels by June 2006.

The Interagency Performance Evaluation Task Force (IPET), over 150 national and international experts, was formed in 2005 to provide scientific and engineering answers to questions about performance of the system during Hurricane Katrina.

To further reduce risk, Congress appropriated over $14 billion to provide the area with a Hurricane and Storm Damage Risk Reduction System (HSDRRS) to provide a 100-year level of protection in 2011.

Task Force Hope was formed to oversee the completion of the HSDRRS, one of the largest Civil Works missions ever undertaken by the Corps. The HSDRRS consists of more than 350 projects forming a comprehensive system of levees, floodwalls, gates, internal drainage and pumping stations and other structures, integrated into a single system designed to reduce the risk of hurricane and storm damage to the Greater New Orleans area. IPET findings using risk-based analysis helped the Corps restore and improve the system for defense against hurricane threats.

Environmental compliance, a unique challenge for the ambitious program schedule, is being handled using Alternative Arrangements, an expedited process that fully meets the requirements of the National Environmental Policy Act.

A risk-based approach provided the Corps with an understanding of the levels and sources of vulnerability and the nature of the consequences, giving a framework for examining alternative approaches to reducing risk. Concepts of redundancy, resilience, and other important lessons learned helped shape a strategy for HSDRRS development and guide the transformation of the Corps of Engineers into a risk-based organization. (POC: Reuben Mabry, *Reuben.C.Mabry@usace.army.mil*)

Coastal Engineering Manual, EM 1110-2-1100, Change 2 – Posted

Change 2 to the Coastal Engineering Manual (CEM), dated 1 August 2008, was recently posted to the USACE publications page, *http://140.194.76.129/publications/eng-manuals/*. The file listed as "Change 2" on the main page for each part of this manual explains the changes. Not all chapters are involved in this Change, so chapters have varying dates. Part VI of the CEM is close to finalization. (POC: Dinah McComas, *Dinah.N.McComas@usace.army.mil*)

Announcing a Spatial Hydrologic Modeling 4-Day Workshop Using WMS and GSSHA

Sponsored by the System Wide Water Resources Program (SWWRP)

The System Wide Water Resources Program (SWWRP) is sponsoring a course on spatial hydrologic modeling within the U.S. Army Corps of Engineers (USACE). In this course, you will learn the basics of the USACE GSSHA model, developed at the Engineer Research and Development Center (ERDC). The course will feature instruction in the use and application of the spatial surface and subsurface hydrologic model GSSHA and the Watershed Modeling System (WMS) for many types of changing hydrologic conditions. Instruction will be given by principle GSSHA model and WMS software development team members. The course is intended for those with basic hydrology and hydrologic modeling experience who want to learn about advanced hydrologic modeling tools. Some prior knowledge of WMS and GSSHA is helpful, but not mandatory. Familiarity with GIS and digital spatial datasets is also be helpful, but is not required.

Computers will be provided for the course but participants are welcome to bring their own laptop if they so desire. Three days of course instructions are planned with the fourth day being an optional day with access to the course instructors for site-specific help on current or planned projects.

The only cost for the course is the nominal $50 expense of lunch and breaks. This $50 fee will be collected at the beginning of the course.

To sign up for the course or for further information, contact Barbara Parsons, *Barbara.A.Parsons@usace.army.mil*.

HURRY! Space is limited to 40 participants on a first-come, first-served basis, with preference given to USACE employees.

USACE Establishes Dam Safety Risk Management Center at IWR

Recruitment For New Center's Director Position

USACE has established a new national organization — the Dam Safety Risk Management Center (RMC) — as a component of the Institute for Water Resources (IWR) and has begun recruitment for the new Center's Director position. The position is open to all government and private sector employees meeting the qualifications. The Center and the Director's position are a collaborative effort between Headquarters Dam and Levee Safety Programs and the IWR.

The RMC will be the foundation of the Corps approach to centrally lead and manage, but decentrally execute its safety programs, with responsibilities for developing, deploying, training, overseeing, and managing all aspects of risk assessments and activities related to assurance of reliable, safe infrastructure. The RMC will seek to establish a strong relationship with academia, and will reflect a similar business model that emphasizes service to USACE field offices in support of mission success. Although the RMC will initially focus on dams, it is expected that levees and other infrastructure will become central to its mission.

The announced duty station is at IWR (Fort Belvoir) in Alexandria, VA; however, it is anticipated that the RMC will ultimately be located remote from the Washington, DC, National Capital Region, in an academically and logistically favorable locale. The salary of the position will be initially set with the local market supplement for the Washington metro area but would change to correspond with the local market supplement for the actual duty station.

The announcements opened on 13 March 2009 and will close 27 April 2009. Complete job announcements are posted on CPOL (*http://acpol.army.mil/*) and USAJOBS (*www.usajobs.opm.gov*). Federal employees should use NCFL09229562 to apply; persons other than current federal employees should apply under NCFL09299562D. Please carefully follow the directions in the vacancy announcements to apply for the positions. For additional information, please contact Merry Henley, at *Merry.G.Henley@usace.army.mil*. For more information on the nature of the position and the scope of responsibilities, please contact either Robert A. Pietrowsky, IWR Director, at *Robert.A.Pietrowsky@usace.army.mil*, or Eric Halpin, CECW-CE, Special Assistant for Dam and Levee Safety, at *Eric.C.Halpin@usace.army.mil*.

PROSPECT Courses FY 2009

No.	Title	Dates	Location
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.

4–8 April 2009 — 2009 Florida Water Resources Conference. Palm Beach, FL. *http://www.fwrc.org/index.asp*

6–10 April 2009 — National Hurricane Conference. Austin, TX. *http://www.hurricanemeeting.com/*

6–10 April 2009 — International Symposium on Snow and Avalanches (ISSA 2009): Processes & Effects of Global Climate Change. *http://issa2009.in/*

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

29–30 April 2009 — CIWEM'S Annual Conference 2009: Water & the Global Environment. London, UK. *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*

11–15 May 2009 — World Ocean Conference 2009. Manado, North Sulawesi, Indonesia. *http://www.woc2009.org*

11–14 May 2009 — Oceans ‘09 IEEE. Bremen, Germany. *http://wwwoceans09ieeebremen.org*

12–14 May 2009 — Interspill 2009. Marseille, France. *http://www.interspill.com*

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

19–24 May 2009 — International Marine Conservation Congress. Washington, DC. *http://www2.cedarcrest.edu/imcc/index.html*

25 May 2009 — 23rd International Commission on Large Dams Congress and 77th Annual Meeting 2009. *http://icoldbrasilia2009.org/ingles/general%20information.htm*

26–28 May 2009 — 4th Tsunami Society Symposium. Honolulu, HI. *http://www.sthjournal.org/2009.pdf*

1–3 June 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*

9–11 June 2009 — 16th Annual Conference of International Emergency Management Society (TIEMS 2009). *http://www.tiems2009.org/*

22–26 June 2009 — Society of Wetlands Scientists Annual Meeting. Madison, WI. *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/*

1–3 July 2009 — 3rd International Conference on Safety and Security Engineering (SAFE 2009). *http://www.wessex.ac.uk/09-conferences/safe-2009.html*

8–10 July 2009 — ECOSUD 2009. Seventh International Conference on Ecoystems 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*

19–29 July 2009 — IAMAS IAPSO and IACS Joint Assembly 2009 – Our Warming Planet. *http://iamas-iapso-iacs-2009-montreal.ca/index.asp*

20–24 July 2009 — USACE Infrastructure Systems Conference: Building National Technical Competency. Cleveland, OH. *http://www.usaceiscconf.org/2009/*

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

10–14 August 2009 — Conference on High Resolution Climate Modeling 2009 – Impact of SST Changes and the MJO on Tropical Cyclones. Trieste, Italy, *http://cdsagenda5.ictp.trieste.it/full_display.php?ida=a08174*

7–9 September 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 September 2009 — Smart Rivers 2009 Conference. "Contribution of Inland Water Navigation to Climate Protection." Vienna, Austria. POC: *otto.schwetz@tinavienna.at*

14–16 September 2009 — 3rd International Conference on Estuaries & Coasts (ICEC 2009). Sendai, Japan. *http://donko.civil.tohoku.ac.jp/icec2009/index.html*

16–18 September 2009 — Coasts, Marine Structure and Breakwaters 2009. Edinburgh, Scotland. *http://ice-breakwaters.com*

23–25 September 2009 — 6th International Conference on Climate Change and Global Warming (CCGW 2009). Amsterdam, Netherlands. *http://www.waset.org/wcset09/amsterdam/ccgw/*

23–25 September 2009 — 1st International Conference on Disaster Management and Human Health Risk (Disaster Management 2009). New Forest, United Kingdom. *http://www2.wessex.ac.uk/09-conferences/disaster-management-2009.html*

10–12 November 2009 — 4th International Conference and Exhibition on Consequences of Climate Change and Flood Protection (acqua alta 2009). *http://www.hamburg-messe.de/acquaalta/acquaalta_en/start.php*

10–13 December 2009 — 2009 NGWA Ground Water Expo and Annual Meeting. New Orleans, LA. *www.ngwa.org*

25–28 April 2010 — Ports 2010. Jacksonville, FL. *http://www.content.asce.org/conferences/ports2010*

27 June – 1 July 2010 — Joint 9th Federal Interagency Sedimentation Conference, 4th Federal Interagency Hydrologic Modeling Conference. Las Vegas, NV. *http://www.jfic2010.org*

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*.

Also, we would appreciate your feedback. Contact Dinah McComas, Managing Editor, *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:

June 2009 – Flood Risk Management on the International Scene