

Flood Risk Management Newsletter

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Social-Cognitive Aspects of Risk and Performance Management in Flood Response

Matthew D Wood, Todd Bridges, and Igor Linkov – all EL

Response to floods and related natural hazards, like those seen during Hurricane Sandy, requires coordination across multiple domains, integration of technical information, and the judgment of federal decision makers and stakeholders, including the general public. The Engineer Research and Development Center (ERDC) is developing a tool designed to formally represent human cognition in an emergency setting. This tool is to be a system of models that will support decision making in emergency situations, like flood risk management. Drs. Bridges and Linkov of ERDC's Environmental Laboratory (EL) lead the project with Matthew Wood, a Science, Mathematics and Research for Transformation (SMART) Scholar sponsored by ERDC's Environmental Lab who later this year will complete his Ph.D. in Cognitive Psychology from Carnegie Mellon University.

People interpret many aspects of the world around them using simplified internal cognitive representations of the environments, people, and problems with which they interact. These cognitive representations are known as mental models, and can be used to better understand, describe, and predict behavior. Though the theoretical construct refers to the cognitive representations within the head of a single individual with respect to a topic of interest, tools can be used to construct a representation of an aggregate mental model that stands in for the beliefs and values of a class of individuals (*e.g.*, hydrologists), a particular type of work team (*e.g.*, conceptual design team), or even an entire organization (*e.g.*, the Environmental Laboratory). Influence diagrams provide one way to represent mental models, and have been applied in the recent past to identify areas of improvement for the current USACE flood risk management

process. This representation technique uses transcripts from structured interviews and workshops to develop a relational diagram with “nodes” representing key variables or concepts for an area of interest (like flood risk management), and arrows indicating the direction of influence between variables. While successfully applied to flood risk management, this method can be used to sample the network of individual stakeholders’ beliefs related to any organizational process, and may also facilitate the development of decision models for planning new risk mitigation projects.

Latent semantic analysis (LSA) is another tool for mental model representation and can help researchers and practitioners understand when a group of stakeholders is developing consensus on key elements of an action plan. LSA is a machine learning technique which can be applied to any set of archival (*e.g.*, emails) or elicited (*e.g.*, surveys) textual data from stakeholders, and has been used to develop metrics of consensus with engineering and policy design teams. These metrics might also be applied to risk management or other work teams as a project management tool, or be used to represent consensus across stakeholder groups in the early phases of planning for new infrastructure or dredging projects.

If you are interested in learning more about mental models or different representation techniques that have been used to elicit and describe mental models, please consult one of the articles below.

- Wood, M. D., Bostrom, A., Bridges, T., & Linkov, I. (2012). Cognitive Mapping Tools: Review and Risk Management Needs. *Risk Analysis*, 32(8), 1333-1348.
- Wood, M. D., Chen, P., Fu, K., Cagan, J., & Kotovsky, K. (2012 June). *The role of design team structure on individual and shared mental models*. Paper presented at the Fifth International Conference on Design Computing and Cognition.
- Wood, M. D., Kotovsky, K., & Cagan, J. (in-review). The role of team interaction structure on team mental models. *Cognitive Science*.
- Wood, M., Kovacs, D., Bostrom, A., Bridges, T., & Linkov, I. (2012). Flood Risk Management: US Army Corps of Engineers and Layperson Perceptions. *Risk Analysis*, 32(8), 1349-1368.
- Wood, M. D., Linkov, I., Bridges, T., Kovacs, D., Thorne, S., Butte, G. (2011). Flood risk management: Insights from an Expert Modeling process. US Army Corps of Engineers Technical Note, Vicksburg, MS.

POCs: Todd Bridges, Todd.S.Bridges@usace.army.mil ; Matthew Wood, mwood1@andrew.cmu.edu; Igor Linkov, Igor.Linkov@usace.army.mil.

89th CERB Meeting

The 89th meeting of the Coastal Engineering Research Board (CERB), held 18-20 September 2012 in Jacksonville, FL, was hosted by the USACE South Atlantic Division and the Jacksonville District. Over 90 participants from Headquarters, ERDC, the Institute for Water Resources (IWR), six Corps Divisions, and the research community attended. The theme of the meeting was Regional Sediment Management – Uniting Navigation, Beaches, and the Ecosystem. The concept was to review the coastal engineering challenges within the southeast Atlantic coastal system, focusing on how regional sediment management can help

to bridge multi-purpose and multi-agency missions, and to identify the research and technology needed to help districts and the Nation meet these challenges. Attendees heard presentations related to challenges to ports and navigation, challenges to beaches and coastal risk, and challenges to the ecosystem made by 26 presenters from states, private sector, and Corps perspectives. A boat field trip was taken to the Jacksonville Port Authority Container Terminal, Mile Point Training Wall Relocation and Beneficial Use Marsh Creation, the Mayport US Navy Channel, St. Johns River Jetties and Entrance Channel, Nearshore Placement Area, and a bus trip was taken to the Jacksonville Beach Renourishment site.



L-R: COL Kevin J. Wilson, Executive Secretary and Commander of the USA Engineer and Development Center; COL Kent D. Savre, Member and Commander of the North Atlantic Division; Mr. William H. Hanson, Member, Great Lakes Dredge and Dock Company; BG Michael C. Wehr, Member and Commander of the South Pacific Division; MG Michael J. Walsh, President and Deputy Commanding General for Civil and Emergency Operations, Headquarters, USACE; Mr. John R. Headland, Member, Moffatt & Nichol Engineers; COL Donald E. Jackson, Member and Commander of the South Atlantic Division; and Dr. David L. Kriebel, Member, US Naval Academy.

Full-Scale Wave Overtopping Resiliency Testing of Earthen Levees

Steven Hughes, CHL retired

Full-scale tests are being conducted in the Colorado State University Wave Overtopping Test Facility in Ft. Collins, CO, to evaluate the wave overtopping resiliency of grass-only slopes and grass slopes strengthened with turf reinforcement mats (TRMs). These tests support engineering

decisions being formulated by the U.S. Army Corps of Engineers' New Orleans and Jacksonville Districts.

Two distinct soils types were used in the overtopping testing. For New Orleans District the soil underlying the grass was the same stiff clay being used to construct the Hurricane Storm Damage Risk Reduction System. Wave overtopping testing indicated that high-quality Bermuda sod nurtured on stiff clay is very resilient to large wave overtopping rates. However, un-reinforced dormant sod was significantly damaged at lower overtopping discharges because of reduced grass root density. Dormant Bermuda sod reinforced with a high-strength TRM suffered no damage at the highest wave overtopping rate. The dormant-sod test results are a key factor in levee armoring decisions being proposed by Task Force Hope of the New Orleans District.

The Jacksonville District and the State of Florida construct levees using a native soil with a high percentage of sandy material. Bahiagrass sod placed over four types of sandy soil obtained from Florida was tested in the Wave Overtopping Test Facility. Grass failure occurred at lower overtopping rates than determined for the New Orleans dormant Bermuda sod on clay soil. Bahiagrass sod overlying TRMs endured hydraulic loading between 3 and 4 times that of un-reinforced sod on the same sandy soil, demonstrating the increased resiliency provided by high-performance turf reinforcement mats.

Prior to the wave overtopping tests conducted for the Corps of Engineers Districts, there was no knowledge about (1) the magnitude and duration of wave overtopping that could be tolerated by the grass-covered earthen levees, and (2) the increased overtopping resiliency provided by TRMs. (POC: Dr. Steven Hughes, Senior Research Scientist, Colorado State University, shughes2@engr.colostate.edu)



Colorado State University's Wave Overtopping Test Facility

NFRMP's Program Management Plan Approved

Stephanie Bray

The USACE National Flood Risk Management Program (NFRMP) was established in 2006. In November 2012 Ms. Karen Durham-Aguilera, USACE Director of Contingency Operations and Homeland Security, approved the Program Management Plan (PgMP) developed for the NFRMP. Prior to final approval, various drafts were reviewed at USACE Headquarters by leadership of all interested Communities of Practice. This review process provided many valuable modifications to the document and to the program itself. This document will provide further guidance and information on the implementation of the program to supplement the initial

guidance first issued to the MSCs and Districts in October of 2009, which directed each MSC and District to establish a Flood Risk Management Program and identify an FRM program manager and a Silver Jackets program manager (MSC offices) or coordinator (District offices).

The PgMP provides structure and framework for the Flood Risk Management and Silver Jackets Programs. The overarching focus areas and objectives for the program are laid out within the PgMP. A variety of challenges facing the flood risk management community, the acknowledgement of which led to the development of the program, are identified. A series of initiatives and actions the program can take to contribute to addressing these challenges are also included. Due to the changing nature of these challenges, initiatives and actions with time, this PgMP is anticipated to be a working document that will be periodically updated to reflect current conditions in flood risk management. The PgMP also provides important information on the organizational structure of the program and provides an understanding of what would be considered success. This information will help ensure consistency in implementation of the program across the Corps, while allowing for the accommodation of unique circumstances and needs between MSCs and Districts. One appendix to the PgMP is a detailed Communications Strategy that will assist in both internal and external coordination on flood risk management issues.

Using information provided in the approved national PgMP as a starting point, the MSC and District Flood Risk Managers are charged with developing implementation plans for their Flood Risk Management Programs. These plans will guide the integration of the National Flood Risk Management Program into the existing MSC and District structure. To aid in this process, a working meeting will be held at IWR in late April 2013 to bring together representatives of the HQ/IWR Flood Risk Management Program team and a representative from each MSC to work through challenges and issues related to development of these implementation plans.

The approved PgMP and Communications Strategy can be found on the NFRMP website (<http://www.nfrmp.us/>) and questions can be directed to Stephanie Bray (Stephanie.N.Bray@usace.army.mil).

System-Wide Improvement Framework Regional Training Webinars Steven Fink, HQ

Recently three regional training webinars were conducted to help USACE Districts and MSCs understand the ins and outs of preparing and obtaining approval for a System-Wide Improvement Framework (SWIF) Letter of Intent. The webinars launched some tools and provided clarification. The goal was to better equip District personnel to help non-Federal sponsors who wish to participate. It also was intended to clarify, for both Districts and MSCs, the content HQ requires in the Letter of Intent from a policy standpoint.

Webinar attendees included managers from USACE Emergency Management (EM), Flood Risk Management (FRM), Levee Safety (LS), Office of Counsel, and Regional Integration Team

members. The interactive webinars were well attended. Tough questions from the field were asked and answered, resulting in excellent discussion in all three sessions.

USACE emphasis on the Levee Safety Program began in 2007 and brought a more focused look at levee conditions nationally. As a result there has been an increase in levee systems losing their P.L. 84-99 Rehabilitation and Inspection Program (RIP) eligibility due to unresolved deficiencies which resulted in an unacceptable rating. On 29 November 2011, USACE issued a new policy that was aimed at providing an opportunity for levee systems that already are (or soon will be) unacceptable and inactive in P.L. 84-99 RIP to conditionally regain their eligibility. That policy, titled Policy for Development and Implementation of System-Wide Improvement Frameworks (SWIF), has been very well received nationally.

Non-Federal levee sponsors who desire to retain or regain P.L. 84-99 RIP eligibility via the SWIF policy must complete a two step process that requires USACE approval and acceptance:

- Step 1: Sponsor must submit a Letter of Intent (LOI) to develop a SWIF, and
- Step 2: Sponsor must develop and execute the SWIF.

Letters of Intent are just beginning to roll in, and many more are expected. Both Federal and non-Federal levee systems that are registered in the P.L. 84-99 program may qualify for SWIF.

Early submittals of the SWIF LOI made it clear that some tools and guidance were needed to help clarify the policy requirements. The HQ SWIF team developed both a SWIF LOI template and an LOI Approval Process flow chart and conducted the webinars to provide the needed clarification.

In September 2012 draft versions of these tools were distributed to the Districts and Major Subordinate Commands (MSCs) Emergency Management, Levee Safety, and Flood Risk Management teams for their review and comment. The HQ SWIF team received comments from all Districts and MSCs and incorporated into the final SWIF LOI template and LOI Approval Process flow chart.

The SWIF process requires the involvement of representatives from multiple USACE programs. As manager of the P.L. 84-99 program, Emergency Management (EM) has overall responsibility for the SWIF policy. Levee Safety Program is engaged and is a key team member regarding inspection results. Levee Safety also assists EM in advising whether sponsors who submit a letter of intent are proactively working to correct deficiencies identified in annual inspections. Flood Risk Management is engaged to help ensure that flood risk is factored into sponsor plans for prioritized deficiency corrections, that interim risk reduction measures are implemented and that risk communication with the public is taking place. Silver Jackets, a key element of Flood Risk Management, has the opportunity to work at the state level to assist in identifying state flood risk priorities. In some cases, state flood risk priorities may align with rectification work by a local sponsor, potentially leading to state financial support. Although EM is responsible, this is a team effort, with many cross-cutting activities.

Many levee systems are already engaged in SWIF or soon will be. So far, 30 Letters of Intent have been submitted; some cover multiple levee systems. Considering there are almost 2500 systems in the P.L. 84-99 program, the potential for implementing the SWIF policy is high. A lot of hard work is occurring nation-wide to improve levee condition, and we are beginning to see the results. That is a great thing!

The webinar PowerPoint, SWIF Letter of Intent template, and process flow chart were distributed to all Emergency Management, Flood Risk Management and Levee Safety managers for implementation. These tools are also available on request from Steve Fink, HQ SWIF Manager, at email: steven.j.fink@usace.army.mil or phone: 509-301-5899.

Superstorm Sandy Recovery Using the National Disaster Recovery Framework **Tyrone Brumfield, HQ**

On 29 October 2012 Superstorm Sandy made landfall in the continental United States, causing massive damage to the Atlantic Coast. New Jersey and New York, including New York City, were particularly hard hit. To assist in recovering from this significant event, the Administration has provided nearly \$60 billion in emergency supplemental funds.

Sandy has become a major test of the recently developed National Disaster Recovery Framework (NDRF), which defines how the Federal agencies will organize and function to promote effective recovery in support of states affected by disasters. Through the NDRF, the entire recovery effort is coordinated by the Federal Disaster Recovery Coordinator (FDRC). Recovery Support Functions (RSFs) are used to support the recovery efforts. RSFs are sector-based coordination platforms that bring together agencies at all levels of government, the private sector, and non-profit organizations to collaborate and share information on recovery. The RSFs are to support community recovery efforts. The NDRF identified six RSFs: Community Planning and Capacity Building; Economic; Health and Social Services; Housing; Infrastructure Systems; and Natural and Cultural Resources. Each RSF has a Coordinating Agency. The Corps of Engineers is the primary Coordinating Agency for Infrastructure Systems (IS-RSF), but participates on several others as well.

USACE, along with all other primary RSF Coordinating Agencies, has identified a RSF National Coordinator. This National Coordinator oversees pre- and post-disaster activities and operations at the national level. If deployment is required, the National Coordinator designates a Field Coordinator to the Joint Field Office (JFO). The Field Coordinator is responsible for ensuring that primary and supporting agencies within the RSF share information and support the community-level efforts occurring in the field.

Recovery Operations details the occurrence of activation, field deployment, and operations of the FDRC and RSFs. Also detailed are the missing scoping assessment process and the development of the Recovery Support Strategy (RSS). The approach to providing long-term recovery support to states, communities, and tribes must be scalable, flexible, adaptable, and cost-effective. There

are two steps to developing the Mission Assessment and Support Strategy Development plans. The process is targeted for completion, through coordination with the state, tribe, or territory, within 60 days of becoming mission capable.

Step one of this process is the development of a Mission Scoping Assessment Report (MSAR). The MSAR becomes the foundation for developing a Recovery Support Strategy (RSS). To prepare the MSAR, all available data and assessment reports from the relevant RSFs should be compiled. These data and reports will be used to develop a synthesis of the disaster damage and the anticipated impact.

The development of the RSS is the second step. The RSS details the approach the FDRC will take toward providing tailored long-term recovery support to the state and local needs. It provides a strategy and a unified approach for the Federal agencies in supporting the state and local governments in recovery. The FDRC consults with the relevant State, Tribe, or Territory Disaster Recovery Coordinator (SDRC or TDRC) in the process of development. The RSS is neither a state nor a local plan, but instead is a strategy and approach for the state, local, tribal, and/or territorial governments based on a comprehensive assessment of the actual and anticipated disaster impacts and issues. The RSS identifies which federal agency or agencies will provide needed assistance as well as providing the details, structures, and protocols for coordinating recovery support from the many involved Federal agencies.

Recovery from Superstorm Sandy is on-going, especially in New York and New Jersey. The process described is being used. The JFOs for both states have already worked through the development of their MSARs and are in the process of drafting their RSS documents. The Port Authority for NY and NJ is a significant part of the transportation and energy infrastructure; therefore, it has been determined that a separate RSS be developed for the combined Port Authority. (POC: Tyrone Brumfield, Tyrone.J.Brumfield@usace.army.mil)

Flood Protection Structure Accreditation Task Force

Travis Tutka, RMC

The U.S. Army Corps of Engineers (USACE) and Federal Emergency Management Agency (FEMA) have established the Flood Protection Structure Accreditation Task Force in accordance with Section 100226 of Public Law 112-141. This Task Force is developing recommendations to align agency processes so information collected for either USACE Inspection of Completed Works (ICW) program purposes or National Flood Insurance Program (NFIP) levee accreditation purposes can be used interchangeably. Another goal is to ensure the information and data collected by the USACE ICW program is sufficient to satisfy NFIP accreditation requirements for flood protection structures (levees) specified in 44 Code of Federal Regulations (CFR) 65.10. A final report is due to Congress in July 2013. The task force is currently developing its recommendations, which fall mainly under one of two categories: data exchange and alignment.

In the data exchange category, the National Levee Database is recommended as the main forum for data exchange. Additional recommendations will address policies and procedures necessary

to define what data are exchanged, the frequency that data is to be updated, and the processes that will both trigger information exchange and the impact of new data for sponsors – USACE and FEMA.

In the alignment category, the Task Force has determined that certain elements of USACE inspections and screenings align with a subset of 44CFR65.10 criteria and may provide adequate information to inform accreditation decisions. Recommendations will include revisions to the USACE inspection checklist and screening process to better map the relationships of each to 44CFR65.10. Another recommendation is an agency-to-agency agreement between USACE and FEMA on accepting USACE inspection and screening findings as meeting specific criteria within 44CFR65.10 which communities can then use as a part of their accreditation package.

To fully meet 44CFR65.10 requirements, more information is needed than USACE inspections and screenings currently provide. Significant modifications to inspection or screening activities to produce the required information for NFIP accreditation would inherently change their scope and intent, something both USACE and FEMA leaders have discouraged. The task force is recommending that risk assessments, because of their comprehensive assessment of levee system risk, can fully satisfy the requirements of 44CFR65.10 and thereby lead to an accreditation decision. Risk assessments integrate the analytical methods of traditional engineering analyses and risk-based analyses along with the sound professional judgment of engineers, review boards, and decision-makers in determining reasonable actions to reduce risk.

The task force is gathering comments on the proposed recommendations contained in its Interim Report. Internal and external web meetings were conducted in March to obtain this feedback, and an online feedback form is available through the task force website:

<http://www.usace.army.mil/Missions/CivilWorks/LeveeSafetyProgram/TaskForce> .

The internal USACE video and presentation PowerPoint (PPT) are posted on the Levee Safety TEN site: <https://ten.usace.army.mil/TechExNet.aspx?p=s&a=CoPs;137>. Scroll down to Documents section; then open the folder, Accreditation Task Force. Rather than clicking the links to open thru TEN, please right click and “Save As” to your local drive or local network server. You are welcome to use the PPT slides for briefings you may make on related topics. Additional information on the Task Force and the form used to submit comments are available at: <http://www.usace.army.mil/Missions/CivilWorks/LeveeSafetyProgram/taskforce>.

The POC for the Task Force is Travis Tutka, Risk Management Center, travis.c.tutka@usace.army.mil.

ASBPA 2013 National Coastal Conference Call for Abstracts

The American Shore & Beach Preservation Association (ASBPA) announces the Call for Abstracts for their 2013 national coastal conference, which is being held October 23-26 at the Isla Grand Resort in South Padre Island, TX. The theme of the 2013 conference is “Responding to Waves of Change.” Technical and policy-oriented PowerPoint presentations or posters are invited for a broad range of coastal issues related to changes in coastal ecology, erosion, engineering, and economics.

Specific topics include, but are not limited to:

- Federal, State, and Local Coastal Policy, Regulatory and Legal Issues
- Regional Sediment Management
- Beach Nourishment
- Beach Water Quality
- Lagoon, Wetland, Marsh, Estuary Restoration and Enhancement
- Coastal Modeling
- Sand Investigations and Resource Management
- Climate Change and Sea Level Guidance, Planning and Adaptive Management
- Coastal Structures
- Tidal/Nearshore/Beach Survey Techniques
- Ecosystems Valuation, the Economics of Natural Resources
- The Impact of Coastal Economies
- Hurricane Response and Recovery
- Oil Spill Disaster Recovery/RESTORE/NRDA
- Legislation and Advocacy
- Environmental Characterization and Monitoring
- Coastal Protection and Funding Strategies
- Non-traditional Shoreline Stabilization Techniques
- Surfing as a Coastal Resource
- Coastal Mapping and Data Analysis
- State of the Coastal Engineering Profession in the US
- Beach Access
- Community Outreach and Education
- Managing for Threatened & Endangered Species
- Sustainable/Resilient Coastal Communities

Presentations may be PowerPoint or poster format. One page abstracts are due May 17, 2013. Submit abstracts as a PDF or Word document with a maximum file size of 1 MB to abstracts@asbpa.org. Abstracts must include the name, affiliation, address, telephone number and e-mail address of the primary corresponding author and include a brief (100 word) biography of the presenter. All expenses are the responsibility of the presenter, including travel, lodging, and registration fees. Submissions will be confirmed within a week of submittal with notification of presentation status by June 28, 2013. Additional information can be found at www.asbpa.org.

Other Links – Information, Newsletters, Fun Stuff

The **Silver Jackets** website, with newsletters – <http://www.nfrmp.us/state/>.

CIRP Newsletters are available at <http://cirp.usace.army.mil/news/>.

The **National Ocean Council**'s portal for data, information, and tools to support people engaged in planning for the future of the ocean, our coasts, and the Great Lakes. This site could become a one-stop hub to support planners and to provide useful information to the public.

<http://www.data.gov/ocean>

The New Orleans District has a Hurricane and Storm Damage Risk Reduction System (HSDRRS) website which contains a wealth of information.

<http://www.mvn.usace.army.mil/hps2/>

WRDAs and Related Laws

<http://planning.usace.army.mil/toolbox/guidance.cfm?Option=WRDALaw&Side=No>

Corps Guidance on Flood Control.

<http://operations.usace.army.mil/policy.cfm?CoP=flood>

Flood Risk Management Program (FRMP)

<http://www.nfrmp.us/>

Corps Planning Centers of Expertise: The role of the Planning Centers is to focus on plan formulation and the complex technical evaluation associated with formulation. Each Planning Center is led by a team of experts specialized in plan formulation, environmental sciences, economics, and related technical disciplines.

USACE Planning Centers of Expertise	
	Location
Flood Risk Management Center of Expertise	South Pacific Division
Ecosystem Restoration Center of Expertise	Mississippi Valley Division
Inland Navigation Center of Expertise	Huntington District http://inlandwaterways.lrh.usace.army.mil/
Deep Draft Navigation Center of Expertise	South Atlantic Division – Mobile District
Hurricane and Storm Damage Reduction Center of Expertise	North Atlantic Division
Water Management and Reallocation Center of Expertise	Southwest Division

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.

We would also appreciate your feedback. Contact Dinah McComas, Managing Editor, Dinah.N.McComas@usace.army.mil or Doyle Jones.

FY13 PROSPECT COURSES

Advanced Steady Flow with HEC-RAS	Davis, CA	3 Jun 2013 – 7 Jun 2013
Coastal Project Planning	Kitty Hawk, NC	22 Apr 2013 – 26 Apr 2013 10 Jun 2013 – 14 Jun 2013
Dam Safety	Grenada, MS	29 Apr 2013 – 2 May 2013 10 Jun 2013 – 13 Jun 2013
Dam Safety	Nashville, TN	8 Apr 2013 – 11 Apr 2013
Seismic Stability Of Earthen Dams	Huntsville, AL	15 Apr 2013 – 19 Apr 2013
For more information: http://ulc.usace.army.mil		

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. If we have failed to list a conference/meeting/symposium that would be of interest to the Flood Risk Management community, please forward the conference details to us.

9-11 April 2013 – 3rd International Conference on Physical Coastal Processes, Management and Engineering – Gran Canaria, Spain - <http://www.wessex.ac.uk/coastal2013?e=3-184019>

11-12 April 2013 – Port & Terminal Technology 2013/5th International USA Conference & Exhibition – Norfolk, VA –
<http://events.r20.constantcontact.com/register/event?oeidk=a07e6fr21v83886ebda&llr=grou8pkab>

14-19 April 2013 – Coastal Processes and Environments Under Sea-Level Rise and Changing Climate: Science to Inform Management – Galveston, TX -
<http://www.geosociety.org/penrose/13Texas.htm>

22-24 April 2013 – Sustainable Ocean Summit – Washington, DC -
http://www.oceancouncil.org/site/summit_2013/

19-23 May 2013 – ASCE Environmental and Water Resources Institute Congress – Cincinnati, OH - <http://content.asce.org/conferences/ewri2013/index.html>

21 – 23 May 2013– 7th International Conference on Sustainable Water Resources Management – New Forest, UK – <http://www.wessex.ac.uk/wrm2013cfp.html>

22-24 May 2013 – 7th International Conference on River Basin Management including all aspects of Hydrology, Ecology, Environmental Management, Flood Plains and Wetlands – New Forest, UK – <http://www.wessex.ac.uk/rbm2013cfp.html>

29-31 May 2013 – Headwaters to Ocean (H2O) Conference – San Diego, CA -
http://www.coastalconference.org/h2o_2013/index.php

3-6 June 2013 – National Hydrologic Warning Council 10th Training Conference and Exposition – Ponte Vedra, FL -
http://www.hydrologicwarning.org/content.aspx?page_id=22&club_id=617218&module_id=109790

9-14 June 2013 – ASFPM 37th Annual National Conference – Hartford, CT –
<http://www.floods.org>

10-13 June 2013 – Oceans’13 – MTS/IEEE Bergen – Norway –
www.oceans13mtsieeebergen.org

8-12 July 2013 – ESRI International User Conference – San Diego, CA -
http://www.esri.com/events/user-conference/index.html?WT.mc_id=EmailCampaign14659

21-25 July 2013 – International Congress for Conservation Biology – Baltimore, MD -
<https://www.conbio.org/mini-sites/iccb-2013>

29 July-2 August 2013 – 5th National Conference on Ecosystem Restoration (NCER) – Chicago, IL -
www.conference.ifas.ufl.edu/NCER2013

4-9 August 2013 – 98th Annual Meeting of the Ecological Society of America – Minneapolis, MN –
<http://www.esa.org/minneapolis>

4-6 September 2013 – Water and Society 2013 – 2nd International Conference on Water and Society – New Forest, UK -
<http://www.wessex.ac.uk/watersoc2013?e=2-183374>

9-11 September 2013 – Northeast Beaches Conference – Galloway, NJ –
<http://nsbpa.org>

23 -27 September 2013 – Oceans 2013 MTS/IEEE – San Diego, CA -
www.oceans13mtsieeesandiego.org

23-27 September 2013 – PIANC – SMART Rivers Conference – Maastricht, The Netherlands,
<http://smartrivers2013.org/home>

6-11 October 2013 – 5th World Conference on Ecological Restoration – Madison, WI -
<http://www.ser2013.org/>

22-25 October 2013 – ASBPA National Coastal Conference – South Padre Island, TX

14-16 May 2014 – 2nd International Conference on Environmental and Economic Impact on Sustainable Development – Ancona, Italy –
<http://www.wessex.ac.uk/14-conferences/environmental-impact-2014.html>

1-6 June 2014 – ASFPM 38th Annual National Conference – Seattle, WA –
<http://www.floods.org>

14-19 September 2014 – Oceans 2014 MTS/IEEE – St. John’s, Newfoundland and Labrador, Canada –
www.oceans14mtsieeastjohns.org

16-18 September 2014 – 6th International Conference on Flood Management (ICFM6), “Floods in a Changing Environment” – São Paulo, Brazil –
<http://icfm6.com/index.php>

1-5 November 2014 – 7th National Conference on Coastal and Estuarine Habitat Restoration – Washington, DC -
<http://www.estuaries.org/conference/>