

# Flood Risk Management Newsletter

March 2008 vol 1 no 3

## Focusing on Climate Change



As the Corps' Flood Risk Management community, we are working to find ways to best incorporate climate change considerations into our work. We are cooperating with many agencies on the science and other aspects of

climate change. ASA (CW) Woodley spoke to the House of Representatives Committee on Transportation and Infrastructure last May. Numerous workshops and committees have been formed and multiple reports have been issued as everyone tries to find the best way forward. Some reports are referenced in this issue, but by no means is this an exhaustive list.

As we continue our work, I challenge each of us to be aware of developments in our own agency, as well as other agencies, and to ensure that our flood risk management work takes into consideration climate change.

Thanks, Harry E. Kitch, P.E. Flood Risk Management Business Line Leader

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## Annual Coastal Working Group Meeting & Workshop to be Held in June

The Coastal Working Group of the USACE HH&C Community of Practice will hold its annual meeting and workshop from 3-6 June 2008 at the Coastal and Hydraulics Laboratory in Vicksburg, MS. All coastal Districts and Divisions are encouraged to send at least one representative. This year's theme is "Continuing to Strengthen Our Coastal Working Group: Challenges, Successes and Using the Right Tools." The workshop will consist of focused panel discussions, presentations and poster exhibits on practical

lessons learned, research developments, and advances in coastal engineering affecting the entire coastal community. Panel discussion topics include:

- Coastal Flooding Issues and Research Needs (including lessons learned following Hurricane Katrina),
- Technical and Policy Implications for Sea Level Rise and Climate Change,
- Navigation and Dredging Issues, and
- Coastal Numerical Model Developments and Research Needs.

Beginning Wednesday afternoon, participants can choose between various workshops:

- Estuarine Advancements, Design and Research, Wednesday afternoon;
- Spatial Data Analysis, Wednesday afternoon; and
- the CIRP Advanced Coastal Modeling System workshop, Wednesday afternoon through noon Friday.

Also on Wednesday and Thursday, there will be other Coastal-related meetings.

A block of rooms has been reserved through May 19<sup>th</sup> at the brand new Wingate Hotel in Vicksburg. For more information and online registration, visit the <http://chl.ercd.usace.army.mil/cwg2008> or contact Monica Chasten at [Monica.A.Chasten@usace.army.mil](mailto:Monica.A.Chasten@usace.army.mil).

## Got Flood Risk Management R&D Needs?

Bill Curtis, ERDC-CHL

Are you looking for a way to provide input to the Corps' R&D process? Are you aware of capability gaps based on your experience as a practitioner of disciplines that comprise the Corps' flood risk management-related mission areas? If so, then read on to learn how you can provide valuable input to the R&D program development process.



The USACE Research Directorate (CERD) has defined an approach to develop Civil Works R&D that is based on field-identified research requirements. Under this process, R&D needs and requirements are identified and prioritized by Research Area Review Groups composed of field personnel. Their prioritized requirements are routed through HQ for overall prioritization. CERD then develops a Civil Works R&D program to achieve those requirements. This process is synchronized with the two-year budget planning process of the federal government. That is, the requirements generated and prioritized by this fall (FY09) will become part of the FY11 Civil Works R&D program.

Since the Review Groups are composed of a small number of diverse members, the Corps' flood risk management community can assist them by generating R&D statements of need based on awareness of technical challenges related to flood & coastal storm damage reduction, emergency management, water supply, and recreation. The process is easy. From the FRM Gateway (<http://operations.usace.army.mil/flood.cfm>), select the "[FRM R&D Statements of Need](#)" hot link and you will be directed to a site where existing statements may be viewed and new statements submitted.

Submitted statements will be posted online and forwarded to the Review Group for prioritization. Related statements of need will be merged with others as necessary to reduce duplication and to expand the dimension of a single requirement. Statements may be generated year-round. However, only statements submitted before July 2008 will be prioritized in FY09 for FY11 program development.

Your participation in the R&D process is greatly appreciated. For additional information regarding submittal of a R&D statement of need or the R&D process, contact Dr. Jack Davis, Technical Director for Flood Damage Reduction R&D, at [Jack.E.Davis@usace.army.mil](mailto:Jack.E.Davis@usace.army.mil).

## **Climate Change and Water Management Challenges to the Columbia River Basin**      **Seshu Vaddey, Portland District**

Climatic phenomena, such as summer and wintertime droughts, floods and wind storms, have greatly affected the Pacific Northwest in the last several decades. Observed data in the West are already showing signs of global warming – reductions in spring snowpack, earlier spring snowmelt, increased runoff in winter and less runoff in summer. Over the last several years USACE has been working closely with researchers at the University of Washington Climate Impacts Group (CIG) and Environment Canada to understand these impacts on the Columbia River and its tributaries.

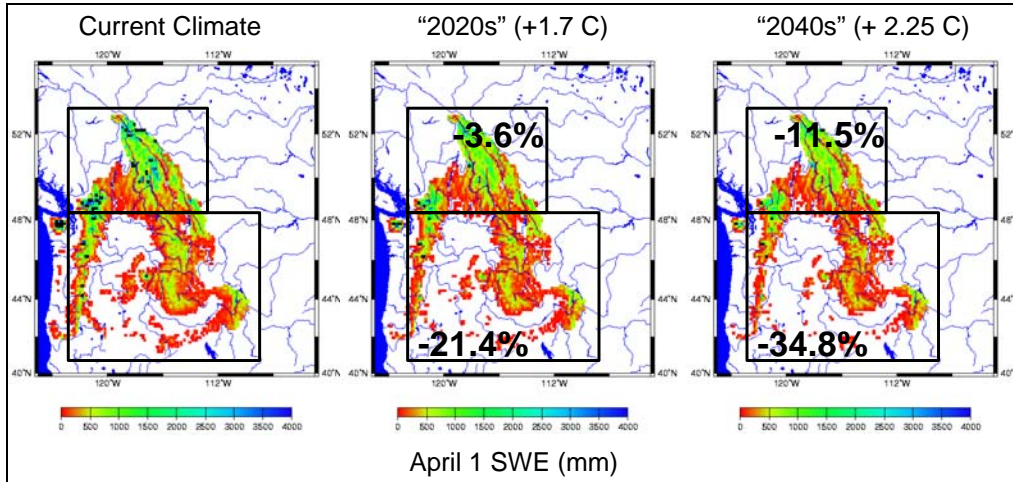
The Columbia River plays an integral role in the social, economic and environmental systems in the Pacific Northwest. Spanning seven states in the U.S. and the province of British Columbia in Canada, this natural resource has been influenced by many trans-boundary agreements. The 1964 Columbia River Treaty (CRT) and its adjunct agreements play a vital role in providing flood protection and hydropower production for the region. Even though only 30 percent of the Columbia River Basin (CRB) is located in Canada, the Canadian Rockies produce more than 50 percent of the natural summer streamflow. Research at the CIG has found that warming trends in the region will have a greater impact on snowpack in the U.S. portion of the Rockies (due to their lower elevation) than the Canadian portion. Researchers expect that by the 2040's the Canadian snowpack will decrease by almost 12 percent compared to current levels whereas the U.S. snowpack is expected to decrease up to 35 percent.

These differential changes have important planning and management implications for trans-boundary watersheds in the PNW, and particularly for the Columbia River basin:

- Differing impacts in the two countries could potentially create conflicts in the current coordination agreements, and in particular will present serious challenges to meeting summer instream flows on the U.S. side, due to conflicts with protection of Canadian lake ecosystems in the upper basin.
- Changes in flood risk management, hydropower production, and instream flow augmentation may all be needed as the flow regime changes. All of these management objectives are associated with important trans-boundary agreements in the Columbia basin.
- The Columbia and its major tributaries are operated for ESA listed fish. Changes in quantities or timing of runoff could impact amount of water available for flow augmentation. Rule curves and system flood-control regulations were set up 40+

years ago and don't reflect today's conditions. The accuracy of these curves is more in doubt when we know the timing of runoff is changing.

- Long-range planning using new approaches may be needed to address these issues in a cost-effective manner.



Changes in snowpack for two climate change scenarios in the Canadian portion (upper inset boxes) of the Columbia River basin and in the U.S. portions (lower inset boxes)

The CRT has no end date. Either country has the option to cancel the CRT after 60 years (2024), but cancellation requires that 10 years advance notice be given (2014). Some initial discussions are underway to scope out the studies and analysis that would be needed to inform such a decision. This process offers a tremendous opportunity to implement effective adaptation strategies within the basin to address climate issues. For further information, contact Seshu Vaddey, [Seshagirir.V.Vaddey@usace.army.mil](mailto:Seshagirir.V.Vaddey@usace.army.mil).

## Sacramento District Studying Future Climate Change Effects Ann Fissekis, Sacramento District

Climate change will impact California’s flood risk from the source of its rivers to the sea. That is the Sacramento District’s (SPK) conclusion drawn from examination of several projects. From the headwaters of major flood risk management projects in the Sierra Nevada to the runoff in the Delta, runoff trends are already changing. The District’s Water Management Section is addressing these changes and preparing for possible future climate trends by evaluating the curves for Shasta, Oroville and New Bullard’s Bar reservoirs.

Shasta, Oroville and New Bullard’s Bar are being studied collectively to determine how Northern California’s flood risk management projects respond individually and as a system to “climate changed” inflows. The goal of this study is to identify how flood risk managers can take advantage of data gathering and technological improvements that have occurred since the currently used curves were created in the 1950s. Partners in this study are: the Institute for Water Resources (IWR); the Bureau of Reclamation (BuRec); the California-Nevada River Forecast Center (CNRFC); the Corps of Engineers’ Hydrologic Engineering Center (HEC); and the SPK Water Management

Section. Preliminary research indicates that both temperature and precipitation changes will occur during the next 50 years. Therefore, the study is using those climate projections to test how well the rule curves respond to changes in timing and magnitudes of inflow. Since California receives virtually no runoff outside of November to May, adapting to changes in peak flow timing and snowmelt runoff is not only crucial to reserve an adequate supply of water into the summer and fall, but also to ensure adequate flood storage.

Temperature changes have already affected the ratio of rain to snow. Also, the projected increasing temperature trends indicate that larger and more frequent extreme events may occur. By using different climate projections based on a suite of global circulation models, Water Management has perturbed 50 years of historical record to create an ensemble of potential future conditions that have changes in either temperature or precipitation, or in both. These perturbed patterns were then run through the CNRFC forecasting model, NWS-RFS. That model was chosen since it has been operational for several decades and is regularly calibrated to a wide range of events. SPK is currently working on routing the resultant inflows to Shasta, Oroville and New Bullard's Bar, using HEC Res-Sim, to test the sensitivity of existing rule curves to potential future climate scenarios.

A future component of this work is to identify possible short- and long-term forecast products that may allow for adopting some form of an adaptive management process to determine an adequate amount of flood space. With California's future water resource needs, creating rule curves that can be more responsive to climate and weather conditions offers the possibility of reducing flood risk while enhancing water supply. Although no final solution has been identified, with continued research, collaboration, and a willingness to update its flood management tools, the Sacramento District will be well-positioned to adapt to any change.

## **Recent Great Lakes Studies and the Consideration of Climate Change and Variability**

**Gene Stakhiv & Anthony Eberhardt, IWR**

On the Great Lakes, the outflows of Lake Superior and Ontario are controlled and their water levels managed by operational models. Recently, the International Joint Commission (IJC) has begun two studies to address concerns expressed by stakeholders and to improve the management of Great Lakes water levels and outflows. The U.S. Army Corps of Engineers actively supports these studies providing direction, management and technical support.

One study, the 5-year, \$20 million International Lake Ontario-St. Lawrence River Study (ILOSRLS) began in December 2001 to assess how water level fluctuations affect all interests, with an emphasis on environmental factors and recreational boating which were not considered during the development of the lake's outflow management plan. In the early 1960s, the International St. Lawrence River Board of Control began outflow management. The Board has deviated from the original operational plan when required, both during low supply periods and during flood threats. Board actions have resulted in an estimated \$46.7 million in average annual benefits in terms of reduced flooding and

erosion on the Lake and the St. Lawrence River. However, their actions have reduced the range of levels on Lake Ontario from 6.09 to 4.98 feet, thus reducing wetland diversity.

Numerous plan options were developed using shared-vision planning techniques, iteratively interfacing with stakeholder groups. To test the robustness of the options, various supply scenarios were used including historic (1900-2001), stochastic (generation of 50,000 years of supply sequences) and climate change. The climate change scenarios were based on four general circulation models from the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report considering “warm and wet,” “not so warm and wet” (UK Hadley), “warm and dry” and “not so warm and dry” (Canadian Climate Centre) cases. In May 2006, three plan options were provided to the IJC which resulted in overall increased economic benefits ranging from \$6.48 to \$7.52 million considering historic supplies, and improved overall environmental conditions by 6 to 35 percent. Under climate change, the benefits vary widely (-\$1 to \$35 million) but provide an array of possible outcomes for IJC consideration when choosing an option.

The second study, the International Upper Great Lakes Study (IUGLS) began in March 2007 to investigate factors affecting recent declining Great Lakes levels. The first phase of this study is investigating whether historic changes, such as dredging, in the St. Clair River, which flows from Lake Michigan-Huron to Erie, are responsible for the declining levels or if declining levels are a result of seasonal or short- or long-term climate variability. The second phase will consider Lake Superior outflow management improvements using an array of supply scenarios, including climate change. Climate scenarios will be considered based on the IPCC Fourth Assessment Report which refines previous scenarios. All phases of this \$15 million study are to be completed by 2012. Gene Stakhiv and Anthony Eberhardt, both of the USACE Institute for Water Resources, are U.S. Director and Study Manager, respectively, of these two International Joint Commission Studies.

## Links of Interest?

[http://www.iwr.usace.army.mil/nfrmp/docs/Levee\\_Safety\\_Prgm\\_Implementation\\_16Nov2007\\_memo.pdf](http://www.iwr.usace.army.mil/nfrmp/docs/Levee_Safety_Prgm_Implementation_16Nov2007_memo.pdf) - Memorandum for Subordinate Commands and Districts - Subject: Levee Safety Program Implementation

[http://www.iwr.usace.army.mil/nfrmp/docs/Flood\\_Policy\\_White\\_Paper\\_10Oct07.pdf](http://www.iwr.usace.army.mil/nfrmp/docs/Flood_Policy_White_Paper_10Oct07.pdf) - Improving Public Safety - From Federal Protection to Shared Risk Reduction

<http://commdocs.house.gov/reports/110/h1495.pdf> - Water Resources Development Act of 2007 - (637 pages, Title IX begins on page 629)) - Title IX - National Levee Safety Program (Title IX is the section of interest)

DOT released two studies on climate change impacts to coastal areas.

-- The Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: Gulf Coast Study. The DOT Center is partnering with the U.S. Geological Survey to undertake a multi-year research program to study how short and long-term changes in climate could affect transportation systems in the U.S. central Gulf Coast region, and how transportation decision-makers could address

possible impacts. <http://www.climate-science.gov/Library/sap/sap4-7/final-report/sap4-7-final-all.pdf>

-- The Potential Impacts of Global Sea Level Rise on Transportation Infrastructure Phase 1-Final Report examines how short- and long-term changes in climate could affect transportation systems in the central gulf coast and eastern U.S. The studies also examine how transportation decision-makers could address possible impacts. <http://www.climate-science.gov/Library/sap/sap4-7/final-report/sap4-7-final-all.pdf>

DOT-affiliated workshop on Impacts of Global Climate Change on Hydraulics, Hydrology and Transportation.  
<http://itre.ncsu.edu/CTE/TechTransfer/GCCworkshop2006.asp>

TRB and the Division on Earth and Life Studies (DELS) have released the pre-publication version of TRB Special Report 290, The Potential Impacts of Climate Change on U.S. Transportation. [http://www.trb.org/news/blurb\\_detail.asp?id=8794](http://www.trb.org/news/blurb_detail.asp?id=8794)

*Dams and the World's Water*

[http://www.icold-cigb.net/images/PDF\\_EN/Dams%20&%20the%20World%20Water.pdf](http://www.icold-cigb.net/images/PDF_EN/Dams%20&%20the%20World%20Water.pdf)

The International Journal of the Tsunami Society

<http://tsunamisociety.org/OnlineJournals.html> (Current Issues)

<http://library.lanl.gov/tsunami/> (Past Issues)

### **Miscellaneous Organizations/Programs**

National Flood Risk Management Program

<http://www.iwr.usace.army.mil/nfrmp/>

Tsunami Society

<http://tsunamisociety.org/>

Florida Stormwater Association

<http://www.florida-stormwater.org/>

## **Conferences**

5-7 May 2008. Integrated Watershed Management: Reducing Nonpoint Source Pollution. San Diego, CA. <http://www.waterboards.ca.gov/nps/conference2008.html>

18-23 May 2008. Association of State Floodplain Managers Conference – A Living River Approach to Floodplain Management. Reno-Sparks, NV.  
<http://www.floods.org/Conferences,%20Calendar/Reno-Sparks.asp>

19-22 May 2008. Planning Community of Practice Conference 2008: Planners Leading Strategically. Developing Sound Water Resources Solutions. San Antonio, TX.

<http://www.usace.army.mil/cw/cecw-cp/2007pres/register.htm>

20-22 May 2008. National Environmental Conflict Resolution Conference. Tucson, AZ.

<http://www.ecr.gov/ecr.asp?link=607>

2-4 June 2008. International Short Course and Workshop on Applied Coastal Research. University of Salento, Lecce, Italy. [www.dii.unile.it](http://www.dii.unile.it)

23-27 June 2008. 20th Salt Water Intrusion Meeting. Naples, FL.

<http://conference.ifas.ufl.edu/SWIM/>

30 June – 2 July 2008. Riparian Ecosystems and Buffers: Working at the Water's Edge. Virginia Beach, VA. [http://www.awra.org/meetings/Virginia\\_Beach2008/](http://www.awra.org/meetings/Virginia_Beach2008/)

2 - 3 July 2008. Friar 2008: International Conference on Flood Recovery Innovation and Response. London, UK. <http://www.wessex.ac.uk/friar2008rem3a.html>

**Call for Papers:** View full details about the conference objectives, topics and submission requirements at: <http://www.wessex.ac.uk/friar2008rem3a.html> .

20-22 August 2008. Florida's Wildlife: On the Frontline of Climate Change.

[www.ces.fau.edu/floc](http://www.ces.fau.edu/floc)

2 – 5 September 2008. 2008 Annual Conference Floodplain Management Association.

San Diego, CA. <http://www.floodplain.org/>

15-20 September 2008. Association of Environmental & Engineering Geologists' (AEG) 51st Annual Meeting. New Orleans, LA. [www.aegweb.org](http://www.aegweb.org)

**Call for Papers:** Deadline for abstracts is May 1, 2008. Submit to Julie Keaton at [aegjuliek@aol.com](mailto:aegjuliek@aol.com) .

21 – 24 September 2008. California Stormwater Quality Association (CASQA) Annual Conference. Oakland, CA. <http://www.casqa.org/meetings/locations.php>

11-14 November 2008. Gulf Coast Hurricane Preparedness, Response, Recovery & Rebuilding Conference. Mobile, AL. <http://www.pianc.iwr.usace.army.mil/>

**Call for Papers:** Deadline for abstract submission is 15 May 2008; submit to [pianc@usace.army.mil](mailto:pianc@usace.army.mil) . See details at website.

17-20 November 2008. American Water Resources Association's 44th Annual Water Resources Conference. New Orleans, LA.

<http://www.awra.org/meetings/NewOrleans2008>

**Call for Papers:** Deadline for abstract submission is 12 May 2008. See details at website.



1-6 December 2008. International Conference on Water Scarcity, Global Changes, and Groundwater Management Responses. Irvine, CA.

<http://www.uwrc.uci.edu/documents/SCARCE-WATER-BROCHURE-Final.pdf>

2-6 December 2008. XV Panamerican Congress and I World Congress on Ocean and Coastal Engineering. Brasilia, Brazil. <http://www.wec2008.org.br/>

**Call for Papers:** Deadline for abstract submission is 30 April 2008. The abstracts must be of 15 (fifteen) lines at most and be sent by email to [cccgroup@prodigy.net.mx](mailto:cccgroup@prodigy.net.mx).

January 5-7, 2009 “Thailand 2009: An International Perspective on Environmental and Water Resources Conference.” Bangkok, Thailand at the AIT Conference Centre.

Organized by the Environmental and Water Resources Institute (EWRI) of the American Society of Civil Engineers (ASCE) and the Asian Institute of Technology (AIT).

## Upcoming PROSPECT Courses

### **Coastal Project Planning (Control Number: 11)**

21 – 25 April 2008, Duck, NC

This course provides a formal introduction to the technical and management issues important to coastal studies and projects. The course addresses the foundation areas necessary for effectively understanding and working on projects in the coastal zone and is divided into five areas addressing physical setting/location (geology and geomorphology), forcing factors (weather, tides, waves, storm surge), coastal processes (hydrodynamics and sediment transport), coastal problems and solutions, and special planning considerations (sea-level change, regional sediment management, dredging, etc.) The problems, the approach to addressing the problems, and the solutions presented in the class are particularly applicable to the Corps of Engineers' planning and environmental management missions but would be useful to project managers, planners, engineers, regulatory specialists, attorneys, and members of public stakeholder groups involved with studies and projects in the coastal zone. To attend this course or to receive additional information about his or other PROSPECT training coursed, please contact the USACE Learning Center at <http://pdsc.usace.army.mil> .

### **Dam Safety (Control Number: 28)**

5 – 8 May 2008, Grenada, MS

This course trains managers, engineers, geologists, technicians, and project operating personnel in FOA engineering, construction, and operations divisions on all aspects of the Corps of Engineers Dam Safety Program. The background and history of dam safety in the Corps is covered along with the multidiscipline design, construction, and operational considerations. Details of planning, conducting, and reporting the results of a periodic inspection are included. Guidance on project surveillance by operation personnel along

with the Dam Safety Assurance Program are covered in detail. Public awareness and preparedness are included. To attend this course or to receive additional information about his or other PROSPECT training coursed, please contact the USACE Learning Center at <http://pdsc.usace.army.mil> .

## Subscribe – Unsubscribe – Feedback

To Subscribe/unsubscribe: access the distribution list at <http://operations.usace.army.mil/flood.cfm>.

We need your input to adequately cover the varied interests and business lines involved with FRM. Recommended article length is ½ to 1 page. Article should be submitted to Mr. Doyle L. Jones, Canvassing Editor, [Doyle.L.Jones@usace.army.mil](mailto:Doyle.L.Jones@usace.army.mil) .

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:

**June 2008** – Integration of Flood Risk Management with Environmental Restoration – highlighting projects

**September 2008** – Coastal Flood Risk Management – LACPR, MSCIP, etc.

**December 2008** – Water Allocation/Water Supply

We welcome articles on any subject at any time, so please let us hear from you. For the next issue, June 2008, we ask that articles be submitted ASAP. Again, submit articles to our Canvassing Editor, [Doyle.L.Jones@usace.army.mil](mailto:Doyle.L.Jones@usace.army.mil) .