5th National Partnership Conference

“Celebrating A Decade of Success with a Vision To The Future”

November 15 - 18, 2011  Memphis, TN

US Army Corps of Engineers

The Nature Conservancy
Protecting nature. Preserving life.

THE CONSERVATION FUND
America’s Partner in Conservation
Dear Conference Attendee:

It is with great pleasure that we welcome you to the Fifth National Partnership Conference sponsored by the US Army Corps of Engineers (USACE). We are fortunate to hold this exciting event in Memphis, TN, the home of the Delta Blues. This year, three additional National Conservation Partners will take part. In addition to the Nature Conservancy, current USACE national MOU partners include Ducks Unlimited, National Audubon, and our most recent partner, The Conservation Fund. We are excited to have such diverse, expert partners to help the Corps execute its mission.

We have worked over the past year with our dedicated Steering Committee to put together an exciting and focused agenda on issues critical to ensuring a balanced approach to sound water resources development and conservation. We would like to thank the Committee members for their dedicated efforts to develop a thoughtful and robust conference agenda.

The next three days will provide an excellent opportunity for you to see old friends, make new ones, learn from our expert panel of speakers, and lend your own thoughts and experience in discussions on creating sustainable systems for future generations. We will have a technical field tour on the Mississippi River, and the historic Spring Floods of 2011 will be highlighted during this rare opportunity to get out on the river and hear from scientists about river ecology, the Loosahatchie Bar Restoration and to see impacts from the historic floods.

We are honored to have Ms Jo-Ellen Darcy, Assistant Secretary of the Army for Civil Works provide welcoming remarks. Ms Darcy serves as the Administration’s leader of the USACE. We are also pleased to have David Yarnold, President and CEO of National Audubon and Larry Selzer, President and CEO of The Conservation Fund on our agenda.

We are excited to announce our Keynote Speaker Ms Patty Calkins, Global Vice President of Environment, Health and Safety and Xerox Sustainability Thought Leader. One of the pioneers in the corporate sustainability world, Patty will speak from decades of experience on how sustainability can drive new business opportunities and savings that provide triple bottom line returns.

We hope you will have an interesting, challenging and educational few days.

Sincerely,

Lisa T. Morales     Andy Warner    Erik Meyers
Co-Chair      Co-Chair    Co-Chair
US Army Corps of Engineers   The Nature Conservancy   The Conservation Fund
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Host Organization

The US Army Corps of Engineers (USACE) is made up of approximately 34,600 Civilian and 650 military members. Our military and civilian engineers, scientists, and other specialists work hand in hand as leaders in engineering and environmental matters. Our diverse workforce of biologists, engineers, geologists, hydrologists, natural resource managers, and other professionals meets the demands of changing times and requirements as a vital part of America's Army. Our mission is to provide quality, responsive engineering services to the nation including: Planning, designing, building, and operating water resources and other civil works projects (navigation, flood control, environmental protection, disaster response, etc.); designing and managing the construction of military facilities for the Army and Air Force (military construction); providing design and construction management support for other Defense and federal agencies (Interagency and International Services). The Corps’s environmental mission has two major focus areas: restoration and stewardship. Efforts in both areas are guided by the Corps environmental operating principles, which help us balance economic and environmental concerns. We support or manage numerous environmental programs that run the gamut from cleaning up areas on former military installations contaminated by hazardous waste or munitions to helping establish a small wetland that helps endangered species survive.

Partner Organizations

The Nature Conservancy is the leading conservation organization working around the world to protect ecologically important lands and waters for nature and people. Since our inception, we’ve protected more than 119 million acres of land and 5,000 miles of rivers worldwide — and we operate more than 100 marine conservation projects globally. We have more than 1 million members and work in all 50 states and more than 30 countries — protecting habitats from grasslands to coral reefs, from Australia to Alaska to Zambia. We address threats to conservation involving climate change, fire, fresh water, forests, invasive species, and marine ecosystems. We use a science-based approach — aided by our more than 700 staff scientists, and pursue non-confrontational, pragmatic solutions to conservation challenges. We partner — with indigenous communities, businesses, governments, multilateral institutions, other non-profit organizations. We protect Earth’s most important natural places — for you and future generations — through great science and smart partnerships.

The Conservation Fund combines a passion for conservation with an entrepreneurial spirit to protect America’s favorite places before they become just memories. A hallmark of our work is our deep, unwavering understanding that for conservation solutions to last, they need to make economic sense. Our land and water conservation work often has economic benefits, whether we’re saving recreation destinations that attract tourists or protecting working forests that provide timber and jobs. We partner with communities, government and businesses to protect favorite outdoor places and build healthy, sustainable communities. We provide the skills, strategies and funds that our partners need to fulfill conservation priorities swiftly and successfully.

Our focus is the United States. We work in all 50 states and have conserved nearly 7 million acres for wild havens, working lands, and vibrant communities. The Conservation Fund focuses on efficient and effective results, shaping innovative solutions to meet the need. We have been consistently recognized by charity watchdogs for having the highest program allocation and lowest fundraising costs in the field. Revolving and Land Trust Loan Funds provide flexible investment capital to move quickly on behalf of our partners’ priorities. In the Mississippi River valley, in the salt marshes of the Chesapeake and around the Great Lakes, we are addressing the conservation needs of tomorrow as well as today.
Steering Committee

Lisa T Morales, Co-Chair
US Army Corps of Engineers
Lisa.T.Morales@usace.army.mil

Erik Meyers, Co-Chair
The Conservation Fund
emeyers@conservationfund.org

David Vigh
Mississippi Valley Division
US Army Corps of Engineers
David.A.Vigh@usace.army.mil

Patrick Deliman
Engineering Research & Development Center
US Army Corps of Engineers
Patrick.N.Deliman@usace.army.mil

Vechere Lampley
South Atlantic Division
US Army Corps of Engineers
Vechere.V.Lampley@usace.army.mil

Edward Lambert
Memphis District
US Army Corps of Engineers
Edward.P.Lambert@usace.army.mil

Mark R. Smith
Memphis District
US Army Corps of Engineers
Mark.R.Smith@usace.army.mil

Andy Warner, Co-Chair
The Nature Conservancy
awarner@tnc.org

Mark P. Smith
North American Freshwater Program
The Nature Conservancy
mpsmith@tnc.org

Gretchen Benjamin
Great Rivers Partnership
The Nature Conservancy
gbenjamin@tnc.org

Kim Lutz
Connecticut River Program
The Nature Conservancy
klutz@tnc.org

Will Murtha
Government Relations
The Nature Conservancy
wmurtha@tnc.org
USACE and the Conservation Fund Map
Memoranda of Understanding and Agreements

The Nature Conservancy

The first Memorandum of Understanding (MOU) between the U.S. Army Corps of Engineers and The Nature Conservancy was signed in December 2000, covering the nation and highlighting the spectrum of work the two institutions were pursuing as well as aspiring to accomplish together. This MOU was ground-breaking as the first such agreement between the Corps and a conservation organization and laid the foundation for the continued growth of the partnership. Since that time, a dozen more geographically focused MOUs have been signed between the Corps and Conservancy, reiterating and expanding upon the content of work outlined in the National MOU.

Current Corps-Conservancy MOUs include:

Division MOUs
• Southwestern Division & local TNC chapters Regional MOU (2004)
• Mississippi Valley Division & local TNC chapters Regional MOU (2004)
• North Atlantic Division & local TNC chapters Regional MOU (2005)
• South Pacific Division & local TNC chapters Regional MOU (2009)
• Northwestern Division & local TNC chapters Regional MOU (2009)
• South Atlantic Division & local TNC Chapters Regional MOU (2010)

District MOUs
• Omaha District MOU with Nebraska Chapter (2003)
• New York District MOU with Long Island Chapter (2004)
• Portland and Walla Walla Districts & Oregon Chapter (2006)

Additional MOUs / Agreements
• USACE TNC Magdelena River CRADA
• SWF, DOD, TNC, TX Parks MOA
• Cooperative Mollusk Management Strategy

MOU’s under Development
• Great Lakes and Ohio River Division & local TNC Chapters

Audubon MOUs
• Regional Aububon MOU
• National Audubon MOU

Ducks Unlimited MOUs
• National Ducks Unlimited MOU
• MVD-Ducks Unlimited Regional MOU

The Conservation Fund
• National TCF MOU
Sustainable Rivers Project

Launched in 2002, the Sustainable Rivers Project (SRP) is a nationwide collaboration between the Corps and Conservancy focused on changing Corps dam operations to achieve environmental benefits, while maintaining or enhancing authorized project purposes. The SRP currently involves work encompassing 29 Corps dams in eight river basins across the country and has engaged more than 50 other partner institutions. This work is expanding to other locations – such as the Susquehanna and Potomac rivers, and across the Corps’ Huntington District – and to include a broadening range of operational changes that bring about environmental and other socio-economic benefits. More information can be found in the Sustainable Rivers Project Background and Status reports, as well as at the Conservancy’s SRP page.

Great Rivers Partnership

Introduction

The 21st century presents unprecedented challenges to the long-term viability of the world’s great rivers. These systems are vital to human health, economic prosperity, and the cultural heritage of billions of people worldwide. The rivers also sustain a rich diversity of life that is dependent upon fundamental processes such as the seasonal inundation of their floodplains and normalized hydrology of their watersheds.

Established in 2005, the Great Rivers Partnership (GRP) has contributed to the conservation and sustainable development of great rivers globally. A distinctive component of the program has been facilitation of international learning exchanges to encourage the sharing of solutions across continents. The GRP currently works at the scale of the entire Mississippi River and supports programs on China’s Yangtze, Colombia’s Magdalena, and Brazil’s Amazon. As part of the GRP’s second phase (GRP II), a focus on advancing whole-basin management will drive the identification and engagement of seven or more great rivers globally that can support system-wide strategies and measurable outcomes.

A Partnership Approach

Since its inception, the GRP has grown to encompass more than 100 donors and partners, including federal agencies; companies, such as Caterpillar Inc., IBM, Monsanto, Cargill, Goldman Sachs, Wells Fargo, YSI, and Ingram Barge Co.; numerous local, municipal, and state governments; foundations and individuals; universities and research institutions; and Conservancy programs in the U.S., Africa, South America, and Asia.

The GRP has collaborated extensively with these partners to:

1. call attention to the plight of the world’s great rivers;
2. develop new, innovative approaches to sustainable development and management of great rivers and establish projects on the Yangtze, Paraguay-Paraná, Mississippi, Magdalena, and Zambezi rivers;
3. promote and demonstrate a systems approach to the management of the Mississippi River and position the river as one hub within an emerging global network of policy, science, and management expertise related to great river systems; and
4. engage diverse stakeholders—including governmental and non-governmental organizations and various business sectors—in a sustainability agenda.
Fifth National Partnership Conference

Strategy Through 2016

The GRP continues to view sustainable river basin management as the seminal issue of great rivers in the 21st century—with the Mississippi as only one potential hub within an emerging global network of policy, science, and management expertise working on great river systems.

The vision for GRP II is to mobilize the world’s leading institutions, governments, corporations, organizations, experts, and multi-lateral and regional development banks in advancing whole-basin models of water sustainability.

To achieve its mission, the following GRP strategies have been identified:

- Advance comprehensive, basin-wide approaches for at least three great rivers. The GRP will develop a suite of criteria to determine which rivers are best positioned to advance whole-basin management.
- Then, a selection of at least three basins will be made using these criteria and the GRP will support basin-wide strategies and tactics to achieve pre-determined and measurable outcomes. These sites, in turn, will inform and encourage the development of basin-wide approaches globally.
- Build “readiness” for sustainable river-basin management in three to five additional basins. The GRP will develop criteria for another tier of basins where there is an opportunity for success on a few key issues (such as water scarcity) or sectors (such as hydropower), but where there may not be sufficient conditions to achieve basin-wide management in the mid-term. Working primarily in developing nations, the GRP would develop and advance basin-wide strategies while educating stakeholders in the whole-basin approach.
- Leverage GRP experience and that of others to replicate best practices for basin-wide management globally. The GRP will speed global replication by convening experts, exchanging knowledge, and increasing resources for large-scale projects. Currently, a variety of organizations offer data-bases, websites, and conferences to distribute information. Partnering with institutions like these and others, the GRP will work to establish a unified voice that collects and synthesizes knowledge, encourages innovation, and serves as a recognized resource for basin-wide solutions.

Conclusion

The Nature Conservancy has embraced the GRP and its second phase of work by designating it as a freshwater priority for the North America region, as well as one of four organizational global freshwater strategies. Through this institutional commitment, the GRP has been positioned to activate its strategies and leverage them in a way that will benefit great river stakeholders around the world. To be supplied
Training

Hydrologic Engineering Center (HEC) and Engineering research and Design Center (ERDC). Two courses on which the Corps and Conservancy have been collaborating for the past seven years are:

- **Hydrologic Analysis for Ecosystem Restoration**: This course provides participants with an understanding of the role of hydrologic engineering in ecosystem restoration and mitigation studies. It also equips the participants with the tools for the various hydrologic engineering analyses necessary in planning and design of these features.

- **Water and Watersheds**: This course provides participants with an understanding of the physical nature of the water of the watershed and the conceptual, technical and institutional tools available for planning and management. Watershed planning and management requires assessment of the existing system and evaluation of potential alternatives. Conceptual tools include: accessing data and information; methods and models available to simulate watershed processes; GIS and data management tools for analysis and presentations.

In addition, the Corps and Conservancy have conducted joint international training courses, including at the International Rivers Symposium (Brisbane, Australia, 20), and the World Water Forum (Mexico City, 2006 and Istanbul, Turkey, 2009).

Software

The Regime Prescription Tool (HEC-RPT), the first software jointly developed by the Corps and the Conservancy, is designed to facilitate entry, viewing, and documentation of environmental flow recommendations in real-time, public settings. The recommendations are subsequently used to help guide operational changes in Corps dams to improve environmental conditions while continuing to meet or enhance other existing project purposes. HEC-RPT seeks to improve: 1) communications in group settings by allowing real-time recording and plotting of the recommendations as they are developed and 2) the recommendations produced by making hydrologic information more immediately accessible to scientists, engineers, and water managers during the formulation process.
Conservation Innovation Training

The following are collaborations between USACE and The Conservation Fund dating back more than six years concerning essential skills development for Corps personnel charged with implementing innovative conservation initiatives:

- **Interagency Review Team (IRT) Training for Wetland Mitigation Banking** - Organized by IWR and TCF’s Conservation Leadership Network, in cooperation with the US Environmental Protection Agency, this annual week long intensive training experience brings key IRT members from districts around the country to the National Conservation Training Center to learn with their peers from the Corps, US EPA, USFWS, NMFS and state agencies. Participants collectively are agency personnel charged with administering the review of proposed private party wetland mitigation banks and state or NGO in lieu fee programs.

  New regulations issued in 2008 make third party banks and in lieu programs the preferred methods of mitigating unavoidable impacts to the nation’s waters, including wetlands, from actions permitted under section 404 of the Clean Water Act. With thousands of permit actions annually subject to mitigation, the IRTs play a critical role in assuring water resource protection.

- **Conservation Banking Training** - TCF and USACE have collaborated with USFWS, the Federal Highway Administration and other agencies in planning and delivering an innovative course aimed at federal and state programs that allow unavoidable adverse impacts on listed, threatened or endangered species to be compensated for through restoration and protection projects implemented by third parties. Participants from private sector banking businesses, regulating agencies and prospective permittees attend this intensive course at the National Conservation Training center to learn from experienced instructors and each other.

- **National Conservation Forums** - USACE is a regular partner of The Conservation Fund in focused national issues forums. In 2009 USACE joined TCF to sponsor the National Forum on Infrastructure and the Environment which explored case studies and proposed mechanisms for improving the outcomes for the environment and the human economy through planning and permitting process for critical energy, transportation and water infrastructure. More recently, USACE and TCF have cooperated on the National Mitigation and Ecosystem Banking Conference and National Conference on Ecosystem Restoration.
Work Groups

The Fifth National Partnership Conference not only celebrates a decade of success collaborating on substantial ecosystem restoration projects, this conference is an opportunity for us to examine the future of this partnershipcollaboration and leveraging the strengths of many partners in meeting its the partner missions and goals.

To that end, attendees, will be assigned to specific Work Groups to participate in interactive dialogue during a working session to identify problems and potential solutions, and build consensus on key findings of important relevance. Each working group will be led by a facilitator who is responsible for contributing structure so each working group functions effectively and makes high-quality decisions when identifying potential opportunities and outcomes.

The goal of each work group is to formulate recommendations for future activities, projects and partnerships from the perspective of that topical assignment. The facilitator will work with an official recorder to make sure these important thoughts and ideas are recorded for later discussion and formation into a summary of key points, which will then be presented during the plenary session.

Work Group Sections

Work Group 1 – The Challenge of Sustainability [Memphis Cook Convention Center (L 10)]
Facilitator: Joe Manous – USACE; Recorder: Joe Hankins – The Conservation Fund

- Effectively addressing the Three Pillars of Sustainability in future projects and restudy of existing projects
  1. Economic
  2. Environmental
  3. Social
- Develop a common understanding of “sustainability” in the water resources context.
- How to achieve sustainability in light of growing fiscal constraints, changing social values and demands, and aging infrastructure.
- Working at scale: working across broad geographies and for the long-haul
- Limits to Sustainability: have we reached or surpassed and how to integrate into project development.

Work Group 2 – Integrating and Organizing Stakeholders [Memphis Cook Convention Center (L 8)]

- Watershed Approaches (Integrated Water Resources Management)
- Consensus engagement with stakeholders and setting realistic expectations in light of fiscal constraints
- Developing a common vision and developing communication strategies
- Collaborative decision-making
- How to bring multiple stakeholders and partners together throughout a projects lifespan
- Policy; identifying challenges as well as positives
Work Group 3 – Building Integrated Science and Approaches  
Facilitator: Jonathan Higgins – The Nature Conservancy;  Recorder: John Hickey - USACE

- Addressing shifts in regional climates and changing weather patterns in light of aging infrastructure and growing fiscal constraints
- Impacts on current infrastructure and operations.
- Integration of science & water management
- Adaptation, monitoring, and limits on adaptation

Work Group 4 – Integrated Floodplain Management
Facilitator: Al Cofrancesco – USACE;  Recorder: Clint Miller – The Conservation Fund

- Floodplain ecosystem services & water management
- Nexus between FEMA/NFIP and Corps;
- Effective multi-agency collaboration in floodplain management
- Balancing the use of grey and green infrastructure
- Floodplain integration
- Explore competing needs and uses
- Connections to NRCS

Work Group 5 – Integrated Coastal Management
Facilitator: Debbie Larson-Salvatore – USACE;  Recorder: Dave Curson – National Audubon

- Coastal ecosystem services and water management
- Working with and planning for sea level rise
- Explore coastal priorities for sustainability and how are these connected and ordered
- Balancing the use of grey and green infrastructure
- Connections and considerations of ocean policy and coastal zones
- Working the considerations of coastal zone management including no build or restricted build zones or identifying areas for retreat
- Unique aspects of the land-sea interface and the estuary zone

Work Group 6 – International Engagements and Actions
Facilitator: Randy Curtis – TNC;  Recorder: Lauren Leuck – USACE

- International partnerships, removing barriers, lessons learned, similarities and differences
- Tools for international success - international agreements, awards, recognition, special status, protection and restoration, conferences
- Needs of the future for successful international efforts
- Future international trends in sustainable ecosystems
- Multi-partner approach for future success
Work Group 7 – Effective Communication

Facilitator: Roselle Henn – USACE; Recorder: Jay Harrod – The Nature Conservancy

- Identifying key audiences; What do they need/want to know? Discuss using several scenarios to illustrate how audience may change and, among other aspects, how key audience may be one not traditionally included in water resource/conservation policy matters and present special challenges in reaching, e.g., lower income and/or non-native English speaking communities.
- Collaboration & stakeholder engagement in communications
- Biggest “successes” and “failures”: case studies for learning how to most effectively collaborate
- Elements of successful communication and communication plans
- Proactive and visionary outreach
- How to tell the story
- Explore options for various social media methods: facebook, Twitter, websites, blogs, and more
Program Agenda

Tuesday, November 15, 2011

11:00a – 1:00p  Partnership Conference Registration  [Memphis Cook Convention Center (L 4)]

11:00a – 1:00p  Poster Presenters Set-up Displays*  [Memphis Cook Convention Center (L 5-7)]

* Please make plans to have your poster placed on the display board well before the start of the Opening Session and Welcome Address.

1:00p – 1:15p  Welcome Address  [Memphis Marriott – Heritage Ballroom]
Colonel Vernie Reichling, Commander, Memphis District, USACE

1:15p – 1:45p  Opening Remarks
The Honorable Jo Ellen Darcy, Assistant Secretary of the Army (Civil Works)

Moderator: David Yarnold, Audubon, President and CEO

- Historical Perspective: Top 5 lessons on managing water we can learn from history — Steve Solomon (Writer)
- International Perspective: Challenges and Opportunities Facing World Water Resources — Brian Richter (The Nature Conservancy Global Freshwater Program)
- U.S. Perspective: Top 5 challenges and opportunities facing US water resources — Gerry Galloway (University of Maryland)

3:30p – 4:00p  NETWORKING BREAK – A la carte beverages are available in the hotel coffee shop.

4:00p – 5:15p  Plenary B: Visioning for the Future  [Memphis Marriott – Heritage Ballroom] (2nd Level)
Moderator: Pat Nunnally, University of Minnesota

- “Reflections on Sustainability: Torches, Wisdom and the Capacity to Endure.” - Mark Gorman, Northeast-Midwest Institute
- “Case Study: Charting a New Course for the Mississippi-Missouri River System” – Michael Reuter, The Nature Conservancy; Witt Anderson, USACE

5:15p – 6:00p  Wrap Up: The Power of Partnerships  [Memphis Marriott – Heritage Ballroom]
Larry Selzer, President and CEO, The Conservation Fund

6:00p – 8:00p  Poster Session Reception & Light Dinner  [Memphis Cook Convention Center (L 5-7)]
Wednesday, November 16, 2011

8:00a – 9:00a  Attendees on own for Breakfast or Morning Refreshments

9:00a – 10:00a  **TWO Concurrent Training Sessions [Memphis Cook Convention Center]**

- **Training 101 [Memphis Cook Convention Center (L 3)]**  
  *Shawn Phillips*, USACE  
  *Mark P. Smith*, TNC  
  USACE – Appropriations, Authorizations, Studies (Recon, Watershed, Feasibility) to Chief’s Report, with lessons learned from Corps conservation partners.

- **Training 201 [Memphis Cook Convention Center (L 2)]**  
  *Bret Walters*, MVM, USACE  
  *Dan Borges*, TNC  
  USACE/TNC – How the Corps negotiates contracts, in-kind services, limits and sources of funding, with lessons learned from Corps conservation partners.

10:00a – 10:30a  **NETWORKING BREAK** – A la carte beverages are available in the hotel coffee shop.

10:30a – 12:00p  **TWO Concurrent Sessions [Memphis Cook Convention Center]**

- **Climate Change: Adapting to the New Frontier [Memphis Cook Convention Center (L 3)]**
  **Moderator:** *Sarah Murdock*, The Nature Conservancy
  - Integration of climate change issues into Corps Processes – *Jeff Arnold*, USACE
  - Opportunities for Climate Change Adaption – *Chuck Theiling*, USACE
  - Chesapeake Bay Adaption: Designing Marshes for 2100 – *Erik Meyers*, The Conservation Fund  
  - *David Curson*, Audubon MD/DC

- **Innovations in Aquatic Ecosystem Restoration**
  **Moderator:** *Joe Hankins*, The Conservation Fund
  - Hudson/Raritan Estuary Ecosystem Restoration – *Peter Weppler*, USACE
  - Innovations in Managing Water Infrastructure – *Jerry Webb*, USACE  
  - *Andrew Warner*, The Nature Conservancy
  - Watershed Approach to Wetlands Mitigation – *Mark P. Smith*, The Nature Conservancy

12:00p – 1:30p  **Attendees on own for Lunch** (A Lunch Buffet is available at federal per diem in the Memphis Marriott restaurant.)

1:30p – 5:30p  **Working Group Meetings** (7 total)
(See page xiii for detailed Work Group Topics and meeting room locations)
Facilitated working groups will be tasked with exploring and developing priorities for work between the Corps and its conservation partners for the coming decade. Working groups will be organized around thematic areas and will report back in plenary on Friday morning.

6:30p – 7:00p  **No Host Reception / Cash Bar [Pre-function Area of Cotton Row Room – Mezzanine Level; Memphis Cook Convention Center]**

7:00p – 9:00p  **Conservation Partnership Dinner Celebration [Cotton Row Room – Mezzanine Level]**
Keynote Speaker: *Patty Calkins*, Global Vice President of Environment, Health and Safety, Xerox Corporation
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**Thursday, November 17, 2011**

7:30a – 8:30a  Attendees on own for Breakfast or Morning Refreshments

8:30a – 10:00a  **General Session – Historic Spring Floods of 2011**  
[Memphis Cook Convention Center (L 2 & 3)]

*Moderator: Gretchen Benjamin, The Nature Conservancy*

- Mississippi River Flooding – **COL Vernie Reichling**, USACE
- Missouri River Flooding – **Brad Thompson**, USACE

10:00a – 10:30a  **Load Buses Technical Field Tour**  
[Street level entrance to Memphis Cook Convention Center] – **Buses depart promptly at 10:30am.**

10:30a – 5:30p  **Technical Field Tour of the Mississippi River on the USACE Barge**

12noon  **Catfish Luncheon Provided During Field Trip**

6:00p  **Group Returns to Marriott Hotel – Dinner on Own**

**Friday, November 19, 2011**

8:00a – 9:00a  Attendees on own for Breakfast or Morning Refreshments*

*If you want to check out of the hotel before the morning session, you may store your luggage at the Bell Stand by the Front Desk. Check-out time is at 12noon, so you will also have time to do so after the meeting concludes at 11:30.

9:00a – 11:00a  **General Session – Work Group Presentations**  
[Memphis Marriott – Heritage Ballroom]

*Moderator: Pat Nunnally, Professor, University of Minnesota River of Life*

Each work group has 15- minutes to present their key findings and recommendations based on their work group discussions followed by Q&A. Summaries of these reports will be compiled into a Final Report and posted on the conference web site upon conclusion. These reports will also help project leaders ensure greater future collaboration, and help facilitate the exchange of information regarding progress, barriers, and constraints on current projects, programs, and activities among partners.

11:00a – 11:15a  “A Message on Maps and Men — The Importance of Communication and Collaboration” — **Mark Gorman**, Northeast-Midwest Institute

11:15a – 11:30a  Closing Remarks

11:30a  Conference Concludes
Keynote Speaker Biographies

Patricia A. Calkins
Vice President
Global Environment, Health, Safety & Sustainability
Xerox Corporation

Patricia A. Calkins is the vice president of Global Environment, Health, Safety & Sustainability for Xerox Corporation. She is responsible for developing and implementing sustainability policies and strategies throughout Xerox that help save hundreds of millions of dollars annually for the company worldwide. She is dedicated to strengthening Xerox’s position as a pioneer in sustainability and is committed to smart environmental management that demonstrates that doing what’s right for the environment is not a cost of doing business, but an opportunity to benefit the world in which we work and live.

Calkins joined Xerox in 1993 as a manager of resource conservation, developing plans to help the company capture energy and materials savings through more sustainable and efficient processes, facilities and product design. Since then, she has assumed increasingly responsible management positions in quality, business process management and product design, enabling the company to remain at the forefront of driving environmental improvement throughout the value chain.

Before joining Xerox, Calkins began her career as a chemist for AT&T and then moved on to initiate many of the company’s sustainability initiatives. During her tenure, she focused on how changes in product and process design could eliminate many environmental challenges, including eradicating the use of toxic chemicals in the electronics manufacturing process. For her efforts, she was recognized for her engineering excellence. In 1992, she joined Abt Associates as a senior scientist where she worked directly with US Environmental Protection Agency in developing market-based voluntary sustainability programs. She also provided consulting services to corporations developing environmental leadership strategies.

Calkins earned a Bachelor of Arts degree in biology from Merrimack College, North Andover, Massachusetts, and a Master of Science degree in civil/environmental engineering from Tufts University. In 2001, she received an M.B.A. from the University of Rochester. Calkins currently serves as a member of several advisory boards including the Golisano Institute for Sustainability at the Rochester Institute of Technology, the University of Michigan’s Center for Sustainable Systems and the American University Center for Environmental Policy and is a Trustee for Second Nature and the Central and Western New York Chapter of the Nature Conservancy.

To learn more about Patricia’s work visit, www.xerox.com/thoughtleadership
Honorable Jo-Ellen Darcy
Assistant Secretary of the Army (Civil Works)

Ms. Jo-Ellen Darcy, the Assistant Secretary of the Army (Civil Works), establishes policy direction and provides supervision of the Department of the Army functions relating to all aspects of the U.S. Army Corps of Engineers’ Civil Works program, including all reimbursable work performed on behalf of Federal and non-Federal entities. These responsibilities include programs for conservation and development of the nation’s water and wetland resources, flood control, navigation, and shore protection.

On August 11, 2009 President Barack Obama appointed Jo-Ellen Darcy as Assistant Secretary of the Army (Civil Works) following confirmation by the Senate. Prior to her appointment, Jo-Ellen Darcy was the Senior Environmental Advisor to the Senate Finance Committee, responsible for environment, conservation and energy issues. Previously, she was Senior Policy Advisor to the Senate Environment and Public Works (EPW) Committee, concentrating on water resource and conservation issues involving the Army Corps of Engineers and the U.S. Fish and Wildlife Service, as well as nominations for presidentially-appointed positions. At the start of the 107th Congress, she was the Deputy Staff Director for the EPW Committee. From 1993 through 2000, she served as a professional staff member on the EPW Committee, working on a variety of issues, including the Safe Drinking Water Act, Army Corps of Engineers programs, FEMA, Everglades restoration and the Clean Water Act.

Before joining the EPW Committee, Jo-Ellen was legislative representative for the Investment Company Institute, the trade association representing the mutual fund industry. She worked on water resources and transportation issues for Governor Jim Blanchard of Michigan in both Lansing and Washington, D.C. Previously, she worked for the Subcommittee on Economic Stabilization of the House Banking Committee and was an elementary school teacher.

She hails from Fitchburg, Massachusetts, and has a B.A. in philosophy and sociology from Boston College and a M.S. in resource development from Michigan State University.
Larry Selzer
President and Chief Executive Officer
The Conservation Fund
conservationfund.org

Education:
University of Virginia: MBA
Wesleyan University: B.S., Environmental Studies

Larry Selzer is president and CEO of The Conservation Fund, one of the nation’s top-ranked environmental nonprofits, based in Washington, DC. The Conservation Fund combines a passion for conservation with an entrepreneurial spirit to protect America’s favorite places, from city parks to historic battlefields to wilderness. Since 1985, the Fund has protected nearly seven million acres.

Prior to being named president and CEO in 2001, Selzer led the Fund’s efforts to integrate economic and environmental goals, launching the Fund’s training, leadership and climate programs, mitigation banking efforts and its Natural Capital Investment Fund.

A hallmark of the Fund’s work is a deep, unwavering understanding that for conservation solutions to last, they need to make economic sense. The Fund finds solutions that maximize benefits for surrounding communities – like local jobs, clean water and air and natural areas. Small and savvy by design, the Fund directs 97% of spending to programs and just 1% to fundraising—generating top rankings from the American Institute of Philanthropy and Charity Navigator.

Selzer spent the first part of his professional career at the Manomet Center for Conservation Science, conducting research on marine mammal and seabird populations on the eastern outer continental shelf. Selzer serves on the boards of the American Bird Conservancy, The Outdoor Foundation, Sustainable Forestry Initiative and Wildlife Habitat Council, as well as the National Academies’ Transportation Research Board.
David Yarnold
President & CEO, National Audubon Society

In September of 2010, David Yarnold became the 10th president of the National Audubon Society. Founded in 1905, Audubon has a national network of nature centers, chapters, and programs engaging millions of people from all walks of life in conservation. www.audubon.org

Background

Yarnold was executive director at Environmental Defense Fund for five years, where he headed EDF’s signature corporate partnerships programs with companies ranging from Walmart to KKR and Cisco Systems. At EDF, he also helped pioneer the creation of environmental markets in China. A Pulitzer Prize-winning editor, Yarnold worked for 26 years at the San Jose Mercury News, one of the nation’s premier newspapers. He was executive editor at the newspaper of Silicon Valley and was also the first corporate executive responsible for online content for a newspaper company. David is known for his understanding of climate science, his passion for diversity and his unique boundary-crossing career.

Yarnold will lead Audubon’s powerful grassroots network of nearly 500 local Chapters, state offices and Audubon Centers across the country, using science, advocacy and education to connect people with nature and the power to protect it. His experience with climate and other global issues will enhance Audubon’s alliances with BirdLife International and other partners united to tackle major threats, environmental health and to protect birds as they migrate across hemispheric flyways.
Witt Anderson
Senior Executive Service
Regional Director of Programs
Northwestern Division
US Army Corps of Engineers

Witt Anderson entered the Senior Executive Service on January 20, 2008 as the Regional Director of Programs, Northwestern Division, US Army Corps of Engineers.

Through the Division's headquarters in Portland, Oregon, and a Missouri River regional office in Omaha, Nebraska, Anderson oversees approximately a $3 billion annual program of water resource projects, military construction, and environmental restoration activities throughout the Columbia and Missouri river basins in an area comprising about a fourth of the continental U.S.

A large part of the $800 million annual civil works mission is earmarked for maintaining and operating Corps projects for hydroelectric, navigation, and flood damage reduction purposes, disaster response, and enhancing fish and wildlife activities in 12 states. The program also includes implementation of the Clean Water Act 404(b) regulatory permit program, and emergency response to natural and man-made disasters. The program is implemented through five district offices in Kansas City, Mo.; Omaha, Neb.; Portland; and Seattle and Walla Walla, Wash. A nearly $2 billion military construction program, among the largest since World War II, supports Army Transformation, Modularity and Base Realignment and Closure activities. An annual $460 million environmental clean-up program, which includes cleanup of formerly used defense sites, encompasses 14 states.

Anderson, a 33-year Corps veteran, previously served as Chief of Planning, Environmental Resources and Fish Policy for Northwestern Division with a focus on regional salmon recovery programs. From June 2009-Feb 2010, he served as the Director, Joint Programs Integration Office, Joint Forces Engineer Command, U.S. Forces-Afghanistan. He earned a bachelor’s degree in biology from the University of Maine (1976), a master’s degree in natural resources management from the University of Idaho (1984), and served a year with the House Appropriations Energy and Water Development Subcommittee.

His awards include the Superior Civilian Service Award and the Commander’s Award for Civilian Service, among numerous others. Mr. Anderson, who officially retired in April 2011, is serving a short-term assignment as a rehired annuitant in his present position.
Gretchen L. Benjamin
Director
The Nature Conservancy
Great River Partnership (GRP) Large Rivers Program

Gretchen Benjamin serves as director of The Nature Conservancy’s Great River Partnership (GRP) Large Rivers Program. In this role, Gretchen provides leadership for the GRP’s North American work on the Mississippi River – including science-based programs, policies, and partnerships that focus on achieving integrated river basin management. Gretchen was honored to join the Conservancy three years ago, after working on the Mississippi River for the Wisconsin Department of Natural Resources. There, she spent nearly 25 years as a field biologist, river planner and basin policy advisor. Her experience was highlighted by field monitoring; working with the US Army Corps of Engineers to minimize the impacts of channel maintenance activities, as well as restoring structural and functional elements to the river floodplain for the benefit of river ecology; and working on federal policy to promote restoration of the Upper Mississippi River through legislative authorizations and appropriations.

Gretchen is recognized for her leadership of multiple stakeholders to encourage the US Army Corps of Engineers to implement the first successful multi-year drawdowns in Upper Mississippi River, Pool 8. This demonstration lead to additional drawdowns in other pools, providing ample data on the primary attribute of restoring more natural summer flows – which benefit aquatic vegetation, sediment oxidation and consolidation while creating little or no impact to commercial and recreational use of the water body. Currently, she is working with multiple partners to establish a blueprint for restoration in the Lower Mississippi River in conjunction with the Corps of Engineers.

Gretchen was the founding board member of the Mississippi Valley Conservancy, a Wisconsin land trust working in six of the state’s counties. She has received recognition for contributions in UMR ecological restoration from the State of Wisconsin, the Upper Mississippi River Conservation Committee, the Upper Mississippi River Basin Association and the Environmental Management Program – Coordinating Committee. Gretchen holds a B.S. degree in Natural Resource Management from University of Montana and post graduate work at the University of Wisconsin – La Crosse in aquatic ecology. She lives on the banks of the Mississippi River in La Crosse, Wisconsin, with her husband and one grown son. She is a certified SCUBA Dive Master and Master Diver, and travels globally pursuing a life list of marine biodiversity.
David Richard Curson
Director of Bird Conservation
Audubon Maryland-DC (state office)
National Audubon Society

David Curson has worked as Director of Bird Conservation for Audubon Maryland-DC, since 2004, overseeing the MD-DC Important Bird Areas Program and designing and implementing conservation projects for birds and their habitats in Maryland and DC. Dave grew up in London, England. In 1985 he received his BSc in Ecology at the University of East Anglia and began a career in conservation biology, working as a Habitat Survey Ecologist for local government and NGOs in London. He came to the United States in 1993 to begin graduate studies and received MS and PhD degrees in the Department of Wildlife Ecology at the University of Wisconsin-Madison. His graduate research focused on the ecology and behavior of Brown-headed Cowbirds and their hosts in northern New Mexico.

Dr. Paul DuBowy
Environmental Program Manager
Mississippi Valley Division
US Army Corps of Engineers

Dr. Paul DuBowy is Environmental Program Manager for the US Army Corps of Engineers Mississippi Valley Division, Vicksburg MS, where he provides technical guidance, quality assurance and regional interface on ecosystem sustainability, endangered species and other environmental issues relating to river structures, levees and tributary improvements which maintain navigation and provide flood control along approximately 1,200 miles of the lower and middle Mississippi River. Paul recently returned from a Fulbright Specialists Fellowship to Poland where he taught Ecosystem Planning and Restoration in the UNESCO-sponsored Erasmus Mundus Master’s Programme in Ecohydrology as an Adjunct Professor at the University of Łódź. He also serves on the ASCE Environmental and Water Resources Institute’s Eco-Hydraulics Committee and chairs the Task Committee on In-Stream Structures for Aquatic Habitat Restoration. Previously (2003-07), Paul was Senior Ecologist in the Jacksonville (FL) District, where he served as Technical Specialist for the Comprehensive Everglades Restoration Plan and USACE Representative on both the Science Coordination Group for the South Florida Ecosystem Restoration Task Force and on the Technical Oversight Committee for the Federal Settlement Agreement/Consent Decree on Phosphorus Allowances to the Everglades. Earlier (2001-03), Dr. DuBowy was a Research Ecologist at US Army Engineer Research and Development Center, Waterways Experiment Station, Vicksburg MS, where he was Principal Investigator, Technical Standards and Guidelines for Wetlands Restoration Work Unit. Prior to working for the Corps Dr. DuBowy was Director, Research Group in Restoration Ecology, at The University of Newcastle, Australia (1998-2001), Associate Professor of Wildlife Science at Texas A&M University (1994-98), Assistant Professor of Wildlife Ecology at Purdue University (1989-94), and Visiting Assistant Professor of Biology at Franklin and Marshall College (1987-89). He holds a Ph.D. in Zoology from the University of California, Davis (1987), an M.S. in Wildlife Biology/Statistics from the University of North Dakota (1980) and a B.S. in Natural Resources from Cornell University (1975).
Brigadier General (US Army-Retired) Gerald E. Galloway, Jr., P.E., Ph.D.
Glenn L. Martin Institute Professor of Engineering and an affiliate professor of Public Policy
University of Maryland, College Park

Gerry Galloway is a Glenn L. Martin Institute Professor of Engineering and an affiliate professor of Public Policy at the University of Maryland, College Park. A civil engineer, public administrator and geographer, has served as a water resources and flood mitigation consultant to a variety of national and international government and business organizations, is a member of the Louisiana Governor’s Advisory Commission on Coastal Protection, Restoration and Conservation, and recently chaired an Interagency National Levee Policy Review Team for FEMA and an independent review panel examining flood challenges in California’s Central Valley. He was a principal investigator for FEMA in the 2006 study of the adequacy of the National Flood Insurance Program’s 1% flood standard. From 2004 -2009 he was a Visiting Scholar at the Corps of Engineers’ Institute for Water Resources.

He has served as a Presidential appointee to the Mississippi River Commission from 1988 to 2005 and the American Heritage Rivers Advisory Committee from 2006 to 2008. In 1994, he was assigned to the White House to lead a committee in assessing the causes of the 1993 Mississippi River Flood. During a 38-year career in the military he served in various command and staff assignments in Germany, Southeast Asia and the United States, retiring in 1995 as a brigadier general. Prior to the University of Maryland, he was Vice President for Geospatial Strategies, ES3 Sector of the Titan Corporation. From 1998-2003, he served as Secretary of the United States Section of the International Joint Commission (IJC), Washington, DC, an independent binational organization charged with preventing and resolving transboundary air and water quality issues disputes between the US and Canada. He has testified before committees of the US Congress, and state legislatures, appeared on national television and radio and has spoken to numerous organizations in the US and abroad. He has lectured and written extensively on the management of water resources and public involvement in water resources decision making.

He is an Honorary Diplomate of the American Academy of Water Resources Engineering, a Distinguished Member and Fellow of the American Society of Civil Engineers, a Fellow of the Society of American Military Engineers, and a member of Association of American Geographers. In 2007 he served as president of the American Water Resources Association. He is a Chairman of the Board of Trustees of the Natural Heritage Institute. He has served on ten committees of the National Research Council and has been a member of its Water Science and Technology Board. He is a graduate of the Military Academy and holds Masters Degrees from Princeton and Pennsylvania State Universities and the US Army Command and General Staff College, and a doctorate in Geography from the University of North Carolina at Chapel Hill.

In 1991, he was presented the SAME Bliss Medal for contributions to engineering education and, in 1995, the Silver DeFleury Medal by the Army Engineer Association. In 1998, he was given the Association of State Flood Managers’ Goddard-White Award. In 2001, ASCE presented him the Civil Government Engineer of the year, in 2002 the Presidents’ Award for service to the country, in 2008 the OPAL award for lifetime achievement. In 2004 he received the US Geological Survey’s John Wesley Powell Award, the Golden Eagle Award from the SAME Academy of Fellows, and the Julian Hinds Award from the Environmental and Water Resources Institute of ASCE. In 2008 he received the Norm Augustine Award from the American Association of Engineering Societies and in 2011 he received the ASCE President’s medal. He is a member of Phi Kappa Phi, national academic honor society and the National Academy of Engineering and a fellow of the National Academy of Public Administration.

He is married to the former Diane Messinger and they have six children: Laura Chadwell; Colonel Gerald E. Galloway III, US. Army; Colonel Kevin T. Galloway, US Army; Hillary Davis, Esq.; John and Gregory; and 14 grandchildren.
Mark E. Gorman  
Northeast-Midwest Institute

Mark Gorman serves as Policy Analyst for the Northeast-Midwest Institute, focusing on Water and Watershed issues. For four years prior to joining the Institute in 2009, Gorman directed the Northwest Office of the Pennsylvania Environmental Council's (PEC), based in Meadville. While there, Gorman worked with numerous partners from the private sector, government, communities and individuals in the upper Allegheny River and Great Lakes basins to promote the sustainable use of built and natural landscapes, particularly by focusing on links between the environment, the economy and quality of life.

Before working for PEC, Gorman served for over 22 years with the Northwest Region of the Pennsylvania Department of Environmental Protection (PADEP). There, he helped to launch PADEP’s new Hazardous Sites Cleanup Program statewide and directed that Program in PADEP’s Northwest Region. He was co-leader of the a pilot PADEP regional watershed team effort (focused on the internationally-renowned French Creek watershed), and later co-chaired PADEP’s Lake Erie, French Creek and Oil Creek watershed team.

Mr. Gorman is a trained mediator and facilitator, and served in that capacity for seven years on the PADEP’s statewide Alternative Dispute Resolution team. He worked in the water quality program of the Allegheny County Health Department in Pittsburgh for two years before joining PADEP. He also served a three-year term as a member of the Northeast SARE (Sustainable Agriculture Research and Education Program) Advisory Council (2006 to 2008), and two-year term on Pennsylvania’s Water Resources Planning Committee for the Lake Erie basin (2007-2008).

Mr. Gorman is an active supporter of many local, statewide and national civic and conservation organizations. He holds a B.S. in Biology from King’s College in Wilkes-Barre, Pennsylvania, an M.S. in Biological Oceanography from the University of South Florida, and an M.S. in Freshwater System’s Ecology from Kent State University in Ohio. Except for those brief periods out of state for graduate education, he was a life-long Pennsylvania resident before moving to the Washington, DC area in 2008.

Joseph Andrew Hankins  
Vice President  
The Conservation Fund

Joseph Andrew Hankins is a Vice President of The Conservation Fund based in Arlington, Va., and is the Director of The Freshwater Institute, a field office and program of The Fund. Mr. Hankins holds a BS in General Science from Purdue University and a Masters in Environmental Biology from Hood College. In 1992, Mr. Hankins joined the Fund and the research team at Freshwater Institute to lead or manage projects in aquaculture, sustainable rural economic development and technology outreach, constructed wetland treatment systems, community and on-site waste-water engineering and acid mine drainage treatment. Mr. Hankins currently serves on the Board of the Natural Capital Investment Fund, a source of capital for socially and environmentally responsible business lending. Mr. Hankins is personally active in local and national workgroups focused on the strategic importance of water, water quality standards and community water infrastructure planning. Mr. Hankins lives in Rockymarsh Run watershed and works from Shepherdstown, WV.
Erik J. Meyers  
Vice President for Sustainable Programs  
The Conservation Fund

A top-rated national charitable organization, The Conservation Fund pursues its mission of environmental protection and sustainable economic and community development. Erik leads the Fund’s programs that advance economic and community development; increase conservation leadership and capacity; offer mitigation services and sustainability guidance; and provide strategic conservation and development planning. Erik was a principal investigator in recent projects assessing the state of Chesapeake watershed forests supported by the US Forest Service and a recent project supported by NOAA looking at the impact of climate-driven sea level rise and storm surge on Chesapeake coastal ecosystems and infrastructure.


Prior to joining the staff of The Conservation Fund, Erik was Vice President and General Counsel for the Environmental Law Institute. During his tenure the Institute, Erik directed ELI’s Wetlands Program and its environmental law, policy and management education program. He previously held other law, policy and management positions with national non-profit organizations.

Meyers earned his law degree from the Fordham University School of Law and bachelor’s degree from Georgetown University’s School of Foreign Service. He is a member of New York, District of Columbia, and Virginia bars.
Sarah Woodhouse Murdock
Senior Policy Advisor
Climate Change Policy Team
The Nature Conservancy

Sarah Woodhouse Murdock serves as a Senior Policy Advisor on the Climate Change Policy Team. In the past seven years working at the Conservancy, she has spent her time focused on policy, advocacy, communications and education related activities, and executing projects that inform our climate policy work. She has represented the Conservancy in federal processes related to informing the development of climate change adaptation strategies. Currently she focuses her time developing and implementing Conservancy policy positions and strategy related to federal hazard risk reduction and informing and proofing this work through illustrative Conservancy place-based conservation efforts. Prior to working at the Nature Conservancy, Ms. Woodhouse Murdock served as a consultant working with environmental and energy clients to develop strategic solutions to government, regulatory, and community outreach challenges. As a consultant working at KEMA, Inc. and prior to that at Environmental Futures, Inc., Ms. Woodhouse Murdock worked extensively with business associations, public entities, non-governmental organizations and advocacy groups to advance her client’s concerns. Much of her work focused on public education and research related to renewable energy and green power projects. Prior to being a consultant, she served on the staff of United States Senator John F. Kerry of Massachusetts concentrating on environmental and energy policy. While working with Senator Kerry, Ms. Woodhouse Murdock worked on a range of environmental policy and legislative issues involving air, energy, water, land use planning and fisheries. Ms. Woodhouse Murdock serves as an Overseer for Sea Education Association. She earned her BA degree in Environmental Science with a concentration in Ecology from Colby College and MA degree in Urban and Environmental Policy with a concentration in Land Use and Resource Management from Tufts University.

Pat Nunnally
Coordinator
River Life Program
Institute on the Environment (IonE)
University of Minnesota

As the coordinator for the Institute on the Environment’s River Life program, Pat Nunnally works to establish lasting relationships among the University of Minnesota and groups working on river sustainability and inclusive planning. Nunnally’s work matches the research, teaching, and program development at universities with agency and nonprofits off campus working on solving long term river problems. Nunnally’s writings have appeared in a variety of forms, including the ongoing blog River Talk, found at www.riverlife.umn.edu/rivertalk . His latest published pieces are contained in The City, the River, the Bridge, a collection of essays that he edited examining the consequences and aftermath of the I-35W bridge collapse. The book appeared in February 2011. Since 1999, Nunnally has served on the University of Minnesota faculty, teaching classes in landscape planning and urban studies, and in the University Honors Program. He holds graduate degrees in English, American Studies and landscape architecture from Vanderbilt University, the University of Iowa and the University of Minnesota.
COL Vernie L. Reichling Jr.
Commander
Memphis District
US Army Corps of Engineers

Col. Vernie L. Reichling Jr., took command of the Memphis District, US Army Corps of Engineers, July 9, 2010, following an assignment at Headquarters, Department of the Army where he served as the Division Chief for Leader Development in the G-3/5/7. Col. Reichling graduated from the Virginia Military Institute in 1987 with a Bachelor’s of Science degree in Civil Engineering and was commissioned as an Engineer Officer.

As Memphis District Commander, he is responsible for flood risk management, navigation, environmental stewardship, emergency operations, other authorized civil works, and work for others along 610 miles of the Mississippi and White Rivers, encompassing a 25,000 square mile area in six states — Illinois, Missouri, Arkansas, Kentucky, Tennessee, and Mississippi.

Upon graduating from the Engineer Officer Basic Course, he was assigned to the 307th Engineer Battalion, 82nd Airborne Division where he served as a Platoon Leader and led his platoon in the initial parachute assault into Panama during Operation Just Cause. He also served as a Company Executive Officer, deploying to support Operation Desert Shield and Desert Storm in Southwest Asia.

After completing the Engineer Officer Advance Course, he was assigned to the 23rd Engineer Battalion, 1st Armored Division in Friedberg, Germany where he served as the Battalion Maintenance Officer and later, Commander of Company C. He was selected as the Aide-de-Camp to the Commanding General of the 1st Armored Division, where he deployed as part of the Implementation Force (IFOR) for Operation Joint Endeavor in Bosnia-Herzegovina.

After earning a master of science degree in Architectural Engineering from the University of Kansas and graduating from the Army Command and General Staff College, Col. Reichling was assigned to the 937th Engineer Group at Fort Riley, Kan., where he served as the Adjutant. He then was assigned to the 70th Engineer Battalion, 1st Armored Division and served as the Battalion Operations and Executive Officer.

Col. Reichling was next assigned to Headquarters, United States Army Corps of Engineers in Washington, D.C., where he served as the Secretary of the General Staff and as the Special Assistant to the Commanding General and Chief of Engineers. He then served as the Installation Branch Chief, Office of the Chief of Engineers in the Pentagon.

On May 15, 2006, Col. Reichling assumed command of the 70th Engineer Battalion "KODIAKS" at Fort Riley, Kan. After ten months of training, he deployed the battalion to Afghanistan as part of Operation Enduring Freedom 06-08. For 15 months, Task Force Kodiak conducted route and area clearance missions, cleared more than 100,000 kilometers of roads, located more than 300 Improvised Explosive Devices and cleared more than 2.7 million square meters in and around Bagram Airfield. For its service the battalion earned the Meritorious Unit Citation and Combat Action Streamer.

His awards and decorations include the Bronze Star (2nd Award), the Meritorious Service Medal (5th Award), the Armed Forces Expeditionary Medal with Arrowhead Device, the NATO Medal (2nd Award), the Combat Action Badge, the Ranger Tab and the Senior Parachutist Badge with Combat Jump Star.

Col. Reichling is married to the former Julie E. Roy of Lenexa, Kan. They have a daughter, Jamie, who is an Elementary Teacher in Kansas and a son, Eric who is attending the University of Kansas.

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Mr. Michael Reuter
Director, North American Freshwater Program
Central US Conservation Strategies
Executive Director, Great Rivers Partnership
The Nature Conservancy
nature.org/greatriversnews

Michael Reuter has worked for TNC for 20 years, providing leadership in program development, public policy, science, and external affairs across the Central United States. He is particularly focused on the conservation and sustainable management of the Mississippi River, with emphasis on agricultural issues and linking this nation’s experience to the Yangtze, Paraguay-Parana, Zambezi, Magdalena, and other large working rivers around the world through the Great Rivers Partnership.

Brian Richter
Director of Freshwater Strategies
Global Freshwater Program
The Nature Conservancy

Brian Richter has been a leader in river science and conservation for more than 20 years. He is the Director of Freshwater Strategies for The Nature Conservancy's Global Freshwater Program, which promotes sustainable water management with governments, corporations, and local communities. Brian has consulted on more than 120 river projects worldwide, with a focus on the challenge of meeting human needs for water and energy while sustaining healthy rivers and lakes. Brian serves as a water advisor to some of the world’s largest corporations and investment banks. Brian has developed numerous scientific tools and methods to support river protection and restoration efforts, including the Indicators of Hydrologic Alteration software that is being used by water managers and ecologists worldwide. He has published many scientific papers on the importance of ecologically sustainable water management in international science journals, and co-authored a book with Sandra Postel entitled “Rivers for Life: Managing Water for People and Nature” (Island Press, 2003).
Mark P. Smith
Deputy Director
North American Freshwater Program
The Nature Conservancy

Mark P. Smith is the Deputy Director of the North America Freshwater Program and Great Rivers Partnership for North America for The Nature Conservancy (TNC). In this role he works with TNC staff and with partners from across North America to demonstrate how environmental needs can be integrated into the everyday decisions of water and land managers as they work to meet the needs of people and nature. Prior to joining The Nature Conservancy, Mark spent six years as the Director of Water Policy at the Massachusetts Executive Office of Environmental Affairs (EOEA) where he worked on a broad range of water issues, including helping to establish a statewide watershed management program. Before working for state government, Mark spent six years with the US Environmental Protection Agency (EPA) in Boston as the project manager for the Casco Bay Estuary Project, part of EPA’s National Estuary Program. He has a master’s degree in Urban and Environmental Policy from Tufts University and a bachelor’s degree from Washington University in St. Louis.

Steven Solomon
Author
Water: The Epic Struggle for Wealth, Power, and Civilization and The Confidence Game

Steven Solomon has written for The New York Times, BusinessWeek, The Economist, Forbes, and Esquire. He has been a regular commentator on NPR’s Marketplace, and has appeared as a featured guest on the late the CBS Evening News, BBC-TV, Morning Joe (MSNBC), Al Jazeera, Tavis Smiley, Tim Russert’s CNBC show, Diane Rehm, NPR’s Talk of the Nation and All Things Considered, Bloomberg TV, and various other news programs.

He has addressed the Carnegie Council, Center for Strategic and International Studies (CSIS), World Affairs Council, Zocalo Public Square, World Policy Institute, LA Times Book Festival, university forums, numerous water, environmental, and agricultural industry groups.

He is the author of Water: The Epic Struggle for Wealth, Power, and Civilization and The Confidence Game, which presciently warned about building dangers in the volatile global financial system. He lives in Washington, D.C., with his family.
Charles Theiling Ph.D.
Large River Ecologist
Rock Island District
US Army Corps of Engineers

I came to the Upper Mississippi River in 1990 and have worked as a large river ecologist for the Illinois Natural History Survey, a private consultant, the USGS, and most recently the Corps of Engineers since 2000. My experience in ecosystem restoration has been to integrate the physical factors driving ecological outcomes into restoration project planning and design over large spatial scales. I was hired by Mississippi Valley Division as a Regional Technical Specialist to help implement ecological model certification and review in 2008. I completed my PhD in interdisciplinary landscape ecology in 2010 using an Upper Mississippi River case study. I’ve been involved with ecological restoration benefits assessment for many years and am currently investigating the effects of climate change on a range of ecosystem services relevant to Corps missions in flood risk reduction and ecosystem restoration.

Brad Thompson
Chief, Environmental, Economics, and Cultural Resources Section Planning Branch
Omaha District
US Army Corps of Engineers

Brad Thompson is the Chief, Environmental Resources and Missouri River Recovery Program Plan Formulation Section, US Army Corps of Engineers, Omaha District.

Brad’s responsibilities include ensuring environmental compliance and completion of technical environmental analysis of projects. He oversees technical staff developing the Missouri River Ecosystem Recovery Plan; working on planning, monitoring and adaptive management of the Missouri River Recovery Program; and completing environmental analyses for other studies within the basin.

Prior to coming to the Omaha District, Brad served as a Supervisor in the Plan Formulation Branch at the Rock Island District. Over his career there he provided plan formulation and project management expertise and oversight for ecosystem restoration and multi-purpose watershed studies. He has served as lead planner for the Upper Mississippi River Navigation and Ecosystem Sustainability Program ecosystem planning efforts, led the development of the Illinois River Basin Restoration Comprehensive Plan, and completed a developmental assignment with the Jacksonville District in 2006 assisting with Everglades modeling and report preparation.

Brad earned a bachelor’s degree in Business Administration from Wartburg College, Waverly, Iowa, in 1991, and a master’s in Urban and Regional Planning from the University of Iowa, Iowa City, Iowa, in 1994. He has professional registration with the American Institute of Certified Planners and completed the Corps Planning Associates Program in 2003.
Andy Warner
The Nature Conservancy
National Coordinator of the Sustainable Rivers Project

Andy Warner has more than 20 years of experience on environmental and conservation projects and policy relating to water, water quality, and floodplain management, including 12 years with The Nature Conservancy working on rivers in the United States, Asia, Latin America, and Africa. Andy is currently a Senior Advisor for Water Management with the Conservancy’s North America and Global Freshwater Programs, where he works with government agencies and other managers to implement innovative water management strategies that meet human demands while maintaining healthy ecosystems. One of Andy’s roles is as the Conservancy’s National Coordinator of the Sustainable Rivers Project, a river restoration program run jointly with the US Army Corps of Engineers. Sustainable Rivers focuses on defining and implementing environmental flows through adaptive reservoir management, and currently involves 36 Corps dams in eight river basins across the United States. The Program also involves joint Corps-Conservancy training and software development, staff exchanges, and publications. Andy has held an affiliate faculty position at The Pennsylvania State University since 2000.
Jerry W. Webb  
Principal Hydrologic and Hydraulic Engineer  
Headquarters, Washington, DC.  
US Army Corps of Engineers

Mr. Webb earned a B.S. Degree in Civil Engineering from Memphis State University in 1974 and a M.S. Degree in River Mechanics and Sedimentation from Colorado State University in 1979. His 37+ year career in water resources with USACE began in Memphis District from 1974-1991 and continued in Huntington District, USACE from 1991-2003. He assumed the position of Principal Hydrologic and Hydraulic Engineer and Community of Practice Leader for Hydrology, Hydraulics and Coastal Engineering at Headquarters in January 2003. He is a registered professional engineer in the state of Tennessee and was awarded the level of AAWRE Diplomate in Water Resources by eminence in 2005. He served as an engineering officer for 23+ years and achieved the rank of Lieutenant Colonel in the West Virginia Air National Guard, where he retired as Commander, 130th Civil Engineering Squadron. Mr. Webb served as the Senior Advisor to the Ministry of Water Resources (MoWR) September 2003 through February 2004. Mr. Webb was appointed to serve in the Iraq Reconstruction effort as the Senior Advisor where he was responsible for an organization of 12000+ personnel that operates the oldest water resources systems in the world. Mr. Webb also served as the interim Senior Advisor to the Ministry of Environment for the period January-February 2004. Prior to his assignment at HQUSACE, he was the Chief of Water Resources Engineering Branch in Huntington District, where he was a key member of the Dam Safety Committee and was responsible for water management activities associated with thirty five reservoirs and nine navigation locks and dams. In his current assignment at HQUASCE, his duties encompass all aspects of hydrologic, hydraulic and coastal engineering. In this position, he is responsible for technical policy concerning design, construction, and maintenance of dams and appurtenant structures. He is an active proponent of research and development in all areas of dam safety and has been involved in development of risk assessment procedures within USACE and is currently serving on the senior oversight committee. He has served as the Chairman of the Columbia River Treaty PEB Engineering Committee since Feb 2003 and is responsible for coordinating water control operations in accordance with the Treaty. He is an active member of United States Society of Dams and serves as the Chairman, Hydraulics Committee. He currently serves as the USACE representative to the Advisory Committee on Water Information (ACWI) and the national subcommittees on Hydrology and Sedimentation. He has served as the DOD representative to the National Dam Safety Review Board and is an active member of ASDSO, USSD and EWRI. He is currently serving in his second three year term as a USSD Board member and first term as a board member for AAWRE.
Peter Weppler is the Coastal Ecosystem Section Chief within the US Army Corps of Engineers-NY District’s Planning Division. Among his many projects, Peter is the Environmental Team Lead for multiple ecosystem restoration projects including the Jamaica Bay Marsh Islands Restoration and Hudson-Raritan Estuary Ecosystem Restoration Study which developed the Comprehensive Restoration Plan (CRP) for the NY/NJ Harbor. He has 20 years of experience which includes ecosystem restoration initiatives and flood and coastal storm damage reduction. Peter has an extensive background in ecological investigations in coastal and riverine systems throughout the New York/New Jersey Bight. In his early years at the Corps, Peter gained his experience in biological monitoring and NEPA Compliance. Later, Peter briefly stepped away from the Corps to work at a water supply commission in NJ before returning as a Section Chief.
Poster Displays

POSTER DISPLAY HOURS

Posters will be on display throughout the conference in Rooms L5-7 located on the lobby level of the Cook Convention Center. The poster session provides a forum to share ideas, network, and hopefully, create new initiatives for projects or programs so we may increase awareness of sustainability and restoration issues and to disseminate successful ideas and methods.

- **POSTER SET UP & MOVE-IN:** Tuesday, November 15, 11am – 1pm
  
  *(Please register and put up your poster in time to be seated before the opening session begins at 1pm in the Heritage Ballroom of the Marriott.)*

- **POSTER SESSION RECEPTION:** Tuesday, November 15, 6pm – 8pm
  
  *(a light dinner will be served)*

- **POSTER REMOVAL:** Thursday, November 16
  
  *(posters to be removed by 10am)*

POSTER TOPICAL ASSIGNMENTS

- Case Studies/Projects (Poster numbers 1-5)
- Climate Change (Poster number 6)
- Water Infrastructure/SRP (Poster numbers 7-15)
- Partnering & Process (Poster numbers 16-18)
- Coastal/Marine (Poster numbers 19 & 20)
- Models/Tools (Poster numbers 31-35)
- Planning & Working at Scale (large rivers/basins) (Poster numbers 21-30)
- Floodplains (Poster numbers 36-39)

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<td>Chris Budai</td>
<td>USACE, Portland, OR</td>
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Kelly Burks-Copes – USACE Engineer Research and Development Center, Vicksburg, MS
HEAT: Habitat Evaluation and Assessment Tools

Seth Cohen – USACE, Alexandria, VA
USACE Case Studies on Collaboration: The Middle Mississippi River Partnership (MMRP)

Deron Davis – The Nature Conservancy in GA, Atlanta, GA
Living Shorelines: Estuarine erosion control engineering that provides robust habitat benefits

Gary Dick – USACE-ERDC, Lewisville, TX
Great Lakes Restoration Initiative: Demonstrations of Combined Invasive Plant Management and Native Plant Re-establishment at Selected Sites

Matilda Evoy-Mount – U.S. Army Corps of Engineers, Sacramento, CA
McCormack-Williamson Tract Project

Matt Fisher – The Nature Conservancy, Letts, IA
Capacity-building for Integrated Water Resources Management in the Iowa-Cedar Basin of Eastern Iowa through Ecosystem Services Evaluations and Collaborative Modeling

Paul Freeman – The Nature Conservancy, Birmingham, AL
Aquatic Ecosystem Restoration and Biological Response to a Low-Head Dam Removal in Alabama

Paul Freeman – The Nature Conservancy, Birmingham, AL
“He Conservation Locking”: Opening the Door to Fish Passage at Claiborne and Millers Ferry Lock and Dams in Alabama

David Galat – The Nature Conservancy, Columbia, MO
Mississippi Watershed Initiative: Applying Principles of Integrated River Basin Management to Americas Great River

Lyle Guyon – National Great Rivers Research and Education Center, East Alton, IL
Upper Mississippi River Systemic Forest Management Plan

Steve Haase – The Nature Conservancy, Baton Rouge, LA
Floodplain Restoration at Upper Ouachita National Wildlife Refuge, Louisiana

Patricia Hagen – The Audubon Center at Riverlands, West Alton, MO
A Partnership Model to Enhance Systemic Stewardship and Conservation Objectives

Leigh Ann Hale – Ingram Marine Group, Nashville, TN
Corporate Shared Value

Steven Herrington – The Nature Conservancy, Panama City, FL
“Conservation Locking”: Opening the Door to Fish Passage at Jim Woodruff Lock and Dam in Alabama/Florida/Georgia

John Hickey – USACE - HEC, Davis, CA
HEC Software Tools for Ecosystem Restoration and Management

Eric Krueger – The Nature Conservancy, Charleston, SC
Savannah River Sustainable Rivers Project: Data, Tools, and People forming the Next Steps

Jason Lauritsen – National Audubon Society, Naples, FL
Curbing Wetland Losses through Better Accounting of Wetland Functions
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<td>30</td>
<td>Le Zhu</td>
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<td>Conservation Beyond Borders (CBB): Delivering Cross-Regional Conservation Solutions in a Globalized World</td>
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Technical Field Tour of Mississippi River
Thursday, November 17, 2011
10:30am – 5:30pm

The Mississippi River is the third longest river in the world, flowing for more than 2,350 miles from its headwaters in Lake Itasca, Minnesota to the Gulf of Mexico. Its 1.2 million square mile watershed includes about 41 percent of the continental United States and a small area of Canada. Of the world’s rivers, the Mississippi River has the fourth largest drainage basin, produces the seventh highest average discharge, and is generally accepted that “It is not a commonplace river, but on the contrary is in all ways remarkable”.

Historically the Lower Mississippi River overflowed onto a 30-125 mile wide alluvial valley and, along with its tributaries, encompassed the largest floodplain fishery in North America. Because the river was continually creating and abandoning channels in its 15-30 mile wide meander belt, the area was interspersed with permanent and seasonal wetlands. These wetlands flooded for extended periods almost annually, and there was a great diversity of aquatic habitat types. Today, more than 150 species of fishes are present in the river and its tributaries including paddlefish and endangered sturgeon.

Thursday’s program features a technical tour of the river with Jack Killgore and the Fish Ecology Team from the Corps’ Engineering Research and Development Center who will provide an in-depth look at fisheries located on the river. We will board an inspection barge at the Mud Island landing and spend the afternoon on the river learning about fisheries and fish communities of the Mississippi River Basin. Different species of fish caught in the Mississippi River will be presented along with information on their life history and population status. We will return to the hotel at 5:30pm and the group will be on their own for dinner the remainder of the evening.

Please be aware that the weather in November varies greatly and can range from sunny and in the 60’s to rain or snow and in the 30’s. Suggested attire for the field trip would be to dress in layers and have rain gear available.

1 Mark Twain, *Life on the Mississippi*

**SPECIAL INSTRUCTIONS:**
We will return to the hotel at roughly 5:30pm and the group will be on their own for dinner the remainder of the evening.

Please be aware that the weather in November varies greatly and can range from sunny and in the 60’s to rain or snow and in the 30’s. Suggested attire for the field trip would be to dress in layers and have comfortable shoes and rain gear available. (POSTER PRESENTERS: Be sure to remove your displays by 10am before we depart on the field trip.)

**IMPORTANT NOTE:** Buses Board at 10:20am sharp outside the street entrance to the Cook Convention Center. We depart at 10:30 for Mud Island. If you miss the bus, alternate transportation is not available.
List of Participants

(Names of individuals registered as of October 31, 2011)
Minas Arabatzis
US Army Corps of Engineers
Chief, Planning Division
Wanamaker Bldg 100 Penn Square East
Philadelphia, PA 19107
PH: 215-656-6540 | FX: 215-656-6543
Email: minas.m.arabatzis@usace.army.mil

Steve Ashby
US Army Corps of Engineers - ERDC
3909 Halls Ferry Rd
Vicksburg, MS 39180
PH: 601-634-2387
Email: steven.l.ashby@usace.army.mil

Leslie Bach
The Nature Conservancy
821 SE 14th Avenue
Portland, OR 97214
PH: 503-802-8146 | FX: 503-802-8199
Email: lbach@tnc.org

Lisa Baron
US Army Corps of Engineers
Programs & Project Management Division
26 Federal Plaza
New York, NY 10278
PH: 212-316-8306
Email: lisa.a.baron@usace.army.mil

Robert Bendick
The Nature Conservancy
Government Relations
4245 N Fairfax Drive
Arlington, VA 22203
PH: 703-841-4582 | FX: 703-841-4864
Email: rbendick@tnc.org

Joel Benegar
US Army Corps of Engineers
Project Planning
1455 Market Street
San Francisco, CA 94103
PH: 415-503-6848
Email: jbenegar@tnc.org

Gretchen Benjamin
The Nature Conservancy
Great Rivers Partnership
801 W Main Street
Peoria, IL 61606
PH: 608-397-1140
Email: gbenjamin@tnc.org

Jim Bergan
The Nature Conservancy
Louisiana Program
721 Government Street
Baton Rouge, LA 70821
PH: 225-338-1040 x2011 | FX: 225-338-0103
Email: jbergan@tnc.org

K Douglas Blodgett
The Nature Conservancy
11304 N Prairie Road
Lewistown, IL 61542
PH: 309-547-2730 x112 | FX: 309-547-2731
Email: dblodgett@tnc.org

Dan Borges
The Nature Conservancy
4245 Fairfax Drive
Arlington, VA 22203
PH: 703-841-4115 | FX: 703-841-7400
Email: dborges@tnc.org

Chris Bridges
The Nature Conservancy
Tennessee
1285 Wake Forest Rd
Sardis, TN 38371
PH: 731-614-1417
Email: cbridges@tnc.org

Chris Budai
US Army Corps of Engineers
Portland District
PO Box 2946
Portland, OR 97208
PH: 503-808-4725 | FX: 503-808-4756
Email: christine.m.budai@usace.army.mil

Kelly Burks-Copes
US Army Corps of Engineers - ERDC
3909 Halls Ferry Road
Vicksburg, MS 39180
PH: 601-618-5565
Email: Kelly.A.Burks-Copes@usace.army.mil

Patty Calkins
Xerox Corporation
Environment, Health, Safety & Sustainability
800 Phillips Road
Webster, NY 14580
PH: 585-422-2473
Email: Patricia.Calkins@xerox.com

Chris Canfield
National Audubon Society
Gulf Coast/ Mississippi Flyway
51 Park Lane
Folsom, LA 70437
PH: 504-344-4328
Email: ccanfield@audubon.org

Bob Carey
The Nature Conservancy
Puget Sound Program
3909 Halls Ferry Road
Vicksburg, MS 39180
PH: 601-618-5565
Email: bcarey@tnc.org

Darian Chasteen
US Army Corps of Engineers
Memphis District
167 N Main Street
Memphis, TN 38103
PH: 901-544-3218
Email: Darian.S.Chasteen@usace.army.mil

Al Cofrancesco
US Army Corps of Engineers - ERDC
3909 Halls Ferry Road
Vicksburg, MS 39180
PH: 601-618-5565
Email: Al.Cofrancesco@usace.army.mil

Seth Cohen
US Army Corps of Engineers
Conflict Resolution & Public Participation CX
1285 Wake Forest Rd
Alexandria, VA 22315
PH: 703-428-8047
Email: Seth.B.Cohen@usace.army.mil

Bill Crouch
The Conservation Fund
410 Severn Ave Suite 204
Annapolis, MD 21403
PH: 410-274-8421
Email: bcrouch@mdtcf.org

David Curson
Audubon Maryland-DC
2901 Baltimore St
Baltimore, MD 21224
PH: 410-558-2473
Email: dcursen@audubon.org

Randall Curtis
The Nature Conservancy
International Government Relations
4245 N Fairfax Dr
Arlington, VA 22203
PH: 703-841-4864
Email: rcurtis@tnc.org

Gary Dick
US Army Corps of Engineers - ERDC
201 E Jones
Lewisville, TX 75057
PH: 972-436-2215 | FX: 972-436-1402
Email: garydick@laerf.org

Patty Doerr
The Nature Conservancy
New Jersey Chapter
2350 Route 47
Delmont, NJ 08314
PH: 609-861-4123
Email: pdoerr@tnc.org

Paul DuBowy
US Army Corps of Engineers
Mississippi Valley Division
PO Box 80
Vicksburg, MS 39181
PH: 601-634-5930
Email: paulj.dubowy@usace.army.mil

Tom Duffus
The Conservation Fund
Upper Midwest
394 Lake Ave South
Duluth, MN 55802
PH: 218-722-2393
Email: tduffus@conservationfund.org

Tim Dunn
US Army Corps of Engineers
Nashville District
PO Box 1070
Nashville, TN 37202
PH: 615-812-2866 | FX: 615-749-6015
Email: tduffus@conservationfund.org

Joyce Dunning
US Army Corps of Engineers
9273 E Hwy 21
Boise, ID 83716
PH: 208-343-0671 | FX: 208-343-9914
Email: joyce.m.dunning@usace.army.mil

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<table>
<thead>
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<th>Name</th>
<th>Organization</th>
<th>Address</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matty Evoy-Mount</td>
<td>US Army Corps of Engineers</td>
<td>1325 J Street, Sacramento, CA 95814</td>
<td>916-557-5322</td>
<td><a href="mailto:Mattilda.L.Evoy-Mount@usace.army.mil">Mattilda.L.Evoy-Mount@usace.army.mil</a></td>
</tr>
<tr>
<td>Laurie Farmer</td>
<td>US Army Corps of Engineers</td>
<td>1222 Spruce Street, St Louis, MO 63103</td>
<td>314-331-8479</td>
<td><a href="mailto:laurie.m.farmer@usace.army.mil">laurie.m.farmer@usace.army.mil</a></td>
</tr>
<tr>
<td>Steve Fischer</td>
<td>US Army Corps of Engineers</td>
<td>601 E 12th St, Kansas City, MO 64106</td>
<td>816-389-3220</td>
<td><a href="mailto:steven.a.fischer@usace.army.mil">steven.a.fischer@usace.army.mil</a></td>
</tr>
<tr>
<td>Matt Fisher</td>
<td>The Nature Conservancy</td>
<td>1620 231st Street, Letts, IA 52754</td>
<td>319-215-7214</td>
<td><a href="mailto:matt_fisher@tnc.org">matt_fisher@tnc.org</a></td>
</tr>
<tr>
<td>Kim Franklin</td>
<td>US Army Corps of Engineers</td>
<td>PO Box 1070, Nashville, TN 37202</td>
<td>615-736-7954</td>
<td><a href="mailto:kimberly.s.franklin@usace.army.mil">kimberly.s.franklin@usace.army.mil</a></td>
</tr>
<tr>
<td>Paul Freeman</td>
<td>The Nature Conservancy</td>
<td>2100 First Ave N Suite 500, Birmingham, AL 35203</td>
<td>205-251-1155</td>
<td><a href="mailto:pfreeman@tnc.org">pfreeman@tnc.org</a></td>
</tr>
<tr>
<td>David Galat</td>
<td>The Nature Conservancy</td>
<td>302 ABNR Building - Univ of Missouri Columbia, MO 65211</td>
<td>573-999-1663</td>
<td><a href="mailto:galatd@missouri.edu">galatd@missouri.edu</a></td>
</tr>
<tr>
<td>Gerald Galloway</td>
<td>Univ of Maryland</td>
<td>1173 Glenn L Martin Hall, College Park, MD 20742</td>
<td>571-334-2103</td>
<td><a href="mailto:gegallo@umd.edu">gegallo@umd.edu</a></td>
</tr>
<tr>
<td>Karen Gautreaux</td>
<td>The Nature Conservancy</td>
<td>PO Box 4125, Baton Rouge, LA 70821</td>
<td>225-338-1040</td>
<td><a href="mailto:kgautreaux@tnc.org">kgautreaux@tnc.org</a></td>
</tr>
<tr>
<td>Leslie Gillette</td>
<td>The Nature Conservancy</td>
<td>1101 West River Parkway Suite 200, Minneapolis, MN 55415</td>
<td>612-331-0722</td>
<td><a href="mailto:lgillette@tnc.org">lgillette@tnc.org</a></td>
</tr>
<tr>
<td>Mark Gorman</td>
<td>Northeast-Midwest Institute</td>
<td>50 F St NW Suite 950, Washington, DC 20001</td>
<td>202-464-4015</td>
<td><a href="mailto:mgorman@nemw.org">mgorman@nemw.org</a></td>
</tr>
<tr>
<td>David Gruszksni</td>
<td>The Conservation Fund</td>
<td>Milwaukee Office, 260 W Seebot Milwaukee, WI 53204</td>
<td>414-225-2272</td>
<td><a href="mailto:dgruszksni@mmsd.com">dgruszksni@mmsd.com</a></td>
</tr>
<tr>
<td>Lyle Guyon</td>
<td>National Great Rivers Research &amp; Education Center</td>
<td>One Confluence Way, East Alton, IL 60204</td>
<td>618-468-2870</td>
<td><a href="mailto:lguyon@lc.edu">lguyon@lc.edu</a></td>
</tr>
<tr>
<td>Marcia Hackett</td>
<td>US Army Corps of Engineers</td>
<td>819 Taylor Street, Fort Worth, TX 76102</td>
<td>817-886-1373</td>
<td><a href="mailto:marcia.r.hackett@usace.army.mil">marcia.r.hackett@usace.army.mil</a></td>
</tr>
<tr>
<td>Patricia Hagen</td>
<td>The Audubon Center at Riverlands</td>
<td>301 Riverlands Way, West Alton, MO 63366</td>
<td>314-223-1350</td>
<td><a href="mailto:phagen@audubon.org">phagen@audubon.org</a></td>
</tr>
<tr>
<td>Leigh Ann Hale</td>
<td>Ingram Marine Group</td>
<td>4400 Harding Road, Nashville, TN 37205</td>
<td>615-298-8350</td>
<td>leighann.hale@ Ingrambarge.com</td>
</tr>
<tr>
<td>Paul Hamm</td>
<td>US Army Corps of Engineers</td>
<td>167 N Main Street, Memphis, TN 38103</td>
<td>901-544-4229</td>
<td><a href="mailto:paul.f.hamm@usace.army.mil">paul.f.hamm@usace.army.mil</a></td>
</tr>
<tr>
<td>Joe Hankins</td>
<td>The Conservation Fund</td>
<td>1098 Turner Rd, Shepherdstown, WV 25443</td>
<td>304-876-2815</td>
<td><a href="mailto:j.hankins@freshwaterinstitute.org">j.hankins@freshwaterinstitute.org</a></td>
</tr>
<tr>
<td>Jay Harrod</td>
<td>The Nature Conservancy</td>
<td>601 North University Ave, Little Rock, AR 72205</td>
<td>501-920-8006</td>
<td><a href="mailto:jharrod@tnc.org">jharrod@tnc.org</a></td>
</tr>
<tr>
<td>Chris Hatfield</td>
<td>US Army Corps of Engineers</td>
<td>696 Concord Road, Concord, MA 01742</td>
<td>978-318-8520</td>
<td><a href="mailto:christopher.L.Hatfield@usace.army.mil">christopher.L.Hatfield@usace.army.mil</a></td>
</tr>
<tr>
<td>Chris Heishman</td>
<td>The Nature Conservancy</td>
<td>4245 N Fairfax Drive, Arlington, VA 22203</td>
<td>703-841-3921</td>
<td><a href="mailto:cheishman@tnc.org">cheishman@tnc.org</a></td>
</tr>
<tr>
<td>Mike Hensley</td>
<td>The Nature Conservancy</td>
<td>642 West Main Street, Lexington, KY 40508</td>
<td>270-576-4790</td>
<td><a href="mailto:mhensley@tnc.org">mhensley@tnc.org</a></td>
</tr>
<tr>
<td>Ray Hermdon</td>
<td>The Conservation Fund</td>
<td>895 Park Ave Suite D, Panama City, FL 32405</td>
<td>850-381-1147</td>
<td><a href="mailto:rherndon@conservationfund.org">rherndon@conservationfund.org</a></td>
</tr>
<tr>
<td>Steve Herrington</td>
<td>The Nature Conservancy</td>
<td>129 Harrison Place, Davis, CA 95616</td>
<td>530-756-1104</td>
<td><a href="mailto:sherrington@tnc.org">sherrington@tnc.org</a></td>
</tr>
<tr>
<td>John Hickey</td>
<td>US Army Corps of Engineers</td>
<td>609 Second Street, Chicago, IL 60603</td>
<td>847-651-8507</td>
<td><a href="mailto:john.hickey@usace.army.mil">john.hickey@usace.army.mil</a></td>
</tr>
<tr>
<td>Jonathan Higgins</td>
<td>The Nature Conservancy</td>
<td>8 S Michigan Ave Suite 2301, Chicago, IL 60603</td>
<td>850-381-1147</td>
<td><a href="mailto:jhiggins@tnc.org">jhiggins@tnc.org</a></td>
</tr>
<tr>
<td>Tim Higgs</td>
<td>US Army Corps of Engineers</td>
<td>PO Box 1070, Nashville, TN 37202</td>
<td>615-736-7863</td>
<td><a href="mailto:timothy.a.higgs@usace.army.mil">timothy.a.higgs@usace.army.mil</a></td>
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Abstracts

(Alphabetical by presenting author’s last name)
Modeling in Support of Restoration of Large Aquatic Ecosystems

Steven L. Ashby¹, Gaurav Savant¹, Carl F. Cerco¹ and Steven M. Bartell²

¹US Army Engineer Research and Development Center, Vicksburg, MS, USA
²Cardno ENTRIX, Maryville, TN, USA

The U.S. Army Corps of Engineers (COE) has been tasked with missions to provide navigable waterways, reduce the risk of flooding, and provide environmental sustainability for the Nation’s water resources. Maintenance of navigable waterways and flood risk reduction alters flow regimes and can have adverse impacts on ecosystems such as change in habitat quantity, quality, type, and distribution. These impacts result in changes in ecosystems such as community structure, population densities and biomass, biodiversity, and increased opportunity for invasive species. As a result of navigation and flood risk reduction activities, many aquatic ecosystems have experienced degradation and efforts to restore or rehabilitate these systems are increasing as part of the COE mission. An understanding of ecological response to hydrodynamic processes such as flow and circulation in complex aquatic systems is important for sound management and restoration. One approach to increased understanding is to use simulation and forecasting with coupled hydrodynamic and ecological models to meet management objectives. The U.S. Army Corps of Engineers Adaptive Hydraulics (ADH) model has been linked to the Comprehensive Aquatic Systems Model (CASM) and individual-based modeling with bioenergetics to evaluate potential restoration and management actions in the Upper and Lower Mississippi River. Simulations indicate that restoration of islands increases biomass of some algal species and submerged aquatic vegetation but results in decreased biomass of blue gill. The Corps of Engineers’ Integrated Compartment Model (ICM) has been coupled to an individual-based bioenergetics model for applications in Chesapeake Bay. Preliminary simulations demonstrate that the filter feeding of menhaden clearly reduces algal biomass. The use of coupled hydrodynamic and ecological response modeling approach has wide applicability for restoration design and decision-making and can be expanded to evaluate benefits of restoration and quantification of ecosystem goods and services.

Contact Information: Steven L. Ashby, USACE/ERDC, Vicksburg, MS 39180 USA, Phone: 601634-2387, Email: steven.l.ashby@usace.army.mil
Experimental Reintroduction of Complex Wood Jams in a Redwood Coastal Stream in Northern California

Joél R. Benegar¹, Rocco Fiori² and Andrew Stubblefield³
¹California State Parks and U.S. Army Corps of Engineers, San Francisco District
²California State Parks
³Humboldt State University, Department of Forestry and Wildland Resources

Whole tree materials are vital physical components of streams flowing through the coastal redwood forests of Northern California. However, such wood materials are missing from many streams due to wood-removal associated with past timber harvest and stream cleaning practices. To counteract these historical practices, scientists and managers now advocate for the re-introduction of wood directly into stream and floodplain ecosystems. The purpose of this type of wood loading has been to re-establish natural processes that create and sustain physical and biologic complexity necessary for salmonid and other aquatic species. This poster will present two instream wood restoration case studies. The two case studies were located at the same stream location on East Fork Mill Creek, a third-order tributary to Mill Creek, located in northwest coastal California near the Oregon border (Figure 3). The first case study is based on a 1995 Department of Fish and Game (DFG) fish habitat structure. The structure was constructed with logs that were anchored with cable to large imported boulders (Figure 4a). The second case study is a California State Parks 2008 complex wood jam that was built to incorporate the 1995 structure. The jam was constructed with whole tree material and was geomorphically designed to mimic natural wood jams and provide fish habitat and refuge during all seasons and flow regimes. Results were based on physical changes that occurred at the study sites during water year 2009 (1 Oct 2008 - 30 Sept 2009). Primary field methods included: (1) measurements of jam wood materials; (2) total station surveys of wood position and channel and floodplain topography; and (3) facies mapping of distinct textural sediment patches within the active channel (i.e. mapping of surface sediment patches). Results confirm that the 2008 complex wood jam was more effective than the 1995 simple fish habitat structure at increasing the percentage pool cover, increasing pool depth and habitat, metering and sorting salmon spawning gravels, and improving habitat heterogeneity. Today, salmonid recovery in the Pacific Northwest, and especially within California, will require wood loading strategies aimed at restoring the hydraulic and geomorphic conditions necessary for creating and sustaining complex habitat (e.g. rearing, holding, and spawning) that salmonids rely on for survival. Like natural jams, these constructed jams should be composed of whole wood material and they will shift, accumulate wood, and deteriorate overtime. While most wood loading efforts should be viewed as a short-term solution, these efforts may need to be supplemented until natural loading levels are reached. Ultimately, stream restoration for the benefit of salmonid populations depends on riparian forest successional processes that will naturally provide wood to streams. This poster represents a portion of a graduate-level thesis project through Humboldt State University and supported by the California State Parks.

Contact Information: Joel Benegarm, USACE, 1455 Market Street, San Francisco, CA 94103, Phone: 415-503-6848, Email: joel.r.benegar@usace.army.mil
Applying Principles of Integrated River Basin Management - Innovative Channel Management with Multiple Benefits

Gretchen Benjamin, Paul Machajewski (USACE), Brian Johnson (USACE) and Ron Nassar (USFWS)
Great Rivers Partnership, The Nature Conservancy, Peoria, IL, USA

Integrated River Basin Management requires the blending of social, economic and environmental needs in a manner that does not jeopardize any one of the uses for a river system. For the Mississippi River’s mainstem navigation corridor, this means blending the needs of commercial navigation, flood control, recreation and the environment to create balance. In the past, the environmental aspects of this equation have not received appropriate attention but today that picture is changing.

Over the last 35+ years the Corps of Engineers – St. Paul District, has been adapting new practices for channel management that maintain the commercial navigation channel while helping to minimize the negative impact to the river’s ecosystem. In the early 1980’s, the Corps of Engineers and interagency partners established new practices for dredging and disposal on the Upper Mississippi River (UMR) to design reusable disposal sites, create beneficial use of dredge material and encourage environmental placement of dredge material for habitat creation.

Today these changes have become a routine way to conduct channel maintenance and the resultant partnership has become a solid foundation for working together on difficult issues that continues to provide opportunities to blend the ecological needs of the river with the commercial navigation uses and flood control measures along the river. In UMR Pools 5, 6, 8, 13, 24, 25 and, 26 natural resources managers have worked with Corps of Engineers to conduct demonstrations to lower water levels in the summer to mimic more natural conditions to benefit the ecosystem while at the same time maintaining the navigation channel. These demonstrations have provided most of the anticipated benefits for habitat and caused little or no impact to commercial traffic. The Avoid and Minimize program allows the St. Louis District of Corps to invest in different solutions for channel management activities. Unique micro-modeling tools were designed to simulate how river training structures would work led to the design and construction of new structures that provide better habitat like chevrons, round point wingdams, and other improvements on traditional wingdam design.

Conservation partners teamed up with the Memphis District of Corps of Engineers to reopen side channels in an effort to reestablish diverse riverine habitats that will benefit native aquatic and terrestrial species. Memphis District staff are closely monitoring the commercial channel conditions adjacent to the reconnected side channels and have found no impact to their ability to maintain the channel as a result of these actions. They are also using the knowledge from the St Louis District to build non-traditional channel training structures to manage the main channel.

Across the country, the Corps of Engineers is attempting to balance the multiple uses of rivers for people and nature. The Nature Conservancy applauds their innovative changes and will work to expand these practices in an effort to make this work standard practice for channel maintenance so we can continue to provide the values necessary for social, economic and environmental needs of our Nation’s rivers.

Contact Information: Gretchen L. Benjamin, TNC-GRP, Program Director Large Rivers, 5605 Meir Court, La Crosse, WI 54601 USA, Phone: 608-397-1140, Fax: 573-884-5070, Email: gbenjamin@tnc.org
The Willamette River in western Oregon is home to the majority of Oregon’s population, and also supports a rich diversity of aquatic flora and fauna. The U.S. Army Corps of Engineers operates 13 dams in the Willamette Basin, with flood risk management a primary purpose, along with numerous other authorized purposes. Operation of these dams has resulted in flow regime alterations, resulting in impacts to fish and wildlife populations.

To address this issue, the Corps and The Nature Conservancy are partnering to determine environmental flow requirements downstream of the dams and to identify opportunities to restore the flow regime. Initial efforts resulted in a set of environmental flow targets for the Middle Fork Willamette River, including fall and winter high flow pulses, winter bankfull flows, and summer low flows. Flow recommendations for the remaining tributaries are under development. Since 2008 the Corps has been implementing environmental flow releases on the Middle Fork to evaluate and test the process.

The adaptive management program includes a monitoring plan that evaluates both physical and biological benefits of the flow releases. Physical monitoring includes measuring the movement of sediment, gravel, and wood, evaluating water temperature conditions, and determining side channel connectivity and floodplain inundation. Biological analysis focuses on evaluating whether the environmental flows are providing improvements in fish spawning and rearing habitats, western pond turtle habitat, and recruitment of cottonwood and other riparian plant species. Implementation of the monitoring plan began in 2010, and will be continued and expanded over the next several years.

Contact Information: Chris Budai, U.S. Army Corps of Engineers, Portland District, Portland, OR 97204, USA, Phone: 503-808-4725, Email: christine.m.budai@usace.army.mil
HEAT: Habitat Evaluation and Assessment Tools

Kelly A. Burks-Copes and Antisa C. Webb
U.S. Army Corps of Engineers Research and Development Center (ERDC), Vicksburg, MS, USA

The rapid assessment of changing habitat conditions and the evaluation of the effects these changes have on species, communities and ecosystem functions must be determined by planners, resource managers, and field ecologists on a day-to-day basis. Until now, the US Army Corps of Engineers and its partners have been forced to develop standalone spreadsheets to handle these increasingly difficult evaluations. Their efforts have been fraught with quality control issues, software limitations, and a general lack of integration with the traditional project planning paradigm. In response to an overwhelming demand for standardized, easy-to-use, and readily available software to assist in these endeavors, the US Army Engineer Research and Development Center has developed the Habitat Evaluation and Assessment Tools (HEAT) software. HEAT was created to perform Habitat Evaluation Procedures (HEP) and Hydrogeomorphic Wetland Assessments (HGM) in an interactive Microsoft Access relational database that offers a user-friendly (intuitive), flexible, and efficient means to quantify benefits and impacts to ecosystems at any scale. To date, no other software exists on the market to match the capabilities of this unique tool, and no other database or spreadsheet developed thus far has the USACE-based planning process built directly into its architecture. The software has been transferred to the field via regional workshops and reimbursable endeavors over the course of the last 15 years. As a direct result of this effort, planners and resources managers across the community are now assessing comprehensive watershed-based planning and management initiatives using HEAT’s innovative suite of tools. Here we will present several success stories of HEAT applications and offer live demonstrations of the system via the newly developed HEAT on the Hub community website.

Contact Information: Kelly A. Burks-Copes, USAE Engineer Research and Development Center, Environmental Laboratory, 3909 Halls Ferry Road, Vicksburg, MS 39180, Phone: 601-634-2290, Fax: 601-634-3725, Email: Kelly.A.Burks-Copes@usace.army.mil
Collaboration for Watershed Planning in the Ohio River Basin

Beth Cade1, R. Gus Drum1, Rob Simmonds2 and John Stark3
1US Army Corps of Engineers, Huntington District, Huntington, WV, USA
2US Fish and Wildlife Service, Carterville Fish and Wildlife Conservation Office, Carterville, IL, USA
3The Nature Conservancy, Dublin, OH, USA

The Ohio River Basin Comprehensive (ORBC) Reconnaissance Report is a multi-faceted watershed approach to planning. The basin covers approximately 204,000 square miles and portions of 15 states. The study presented a challenging opportunity to effectively collaborate with Federal, state, regional and local agencies, NGO’s and the public. Using a watershed approach, the report evaluated the needs, problems and opportunities of water resources across the basin and working with partners to develop alternatives that addressed the issues and concerns of the basin population. Many pressing issues were raised. The Corps’ strategic planning efforts are beginning to chart a new course of land stewardship, watershed management strategies and multi-agency programs that will be geared towards sustainability of the basin land and water resources as well as protection of sensitive ecosystems.

Through the public outreach portion of the ORBC an important partnership was developed with Ohio River Basin Fish Habitat Partnership (ORBFHP). The ORBFHP mission is to restore aquatic habitat for fish and mussels in the upper Ohio River basin. It resulted in the development of a strategic plan for addressing many of the ecosystem issues identified by the Corps, the US Fish and Wildlife Service and The Nature Conservancy. Early actions for restoration in that strategic plan coincide with recommended actions for ecosystem restoration in the Corps’ reconnaissance plan. Collaborative efforts by the Corps the Ohio River Basin Fish Habitat Partnership and the Partnership members will be focused on restoring the diversity and productivity of the basin ecosystems.

Contact Information: Beth Cade, Community Planner, US Army Corps of Engineers, Huntington, WV USA, Phone: 304-399-5848, Fax: 304-399-5136, Email: beth.a.cade@usace.army.mil
USACE Case Studies on Collaboration: The Middle Mississippi River Partnership (MMRP)

Seth B. Cohen\textsuperscript{1}, Todd Strole\textsuperscript{2} and Brian Johnson\textsuperscript{3}
\textsuperscript{1}Conflict Resolution and Public Participation Center of Expertise (CPC), USACE
\textsuperscript{2}The Nature Conservancy, Great Rivers Partnership
\textsuperscript{3}Chief of Environmental Planning Section, MVS; Chair of MMRP

The Middle Mississippi River Partnership is a collaboration of twenty-three federal and state agencies and not-for-profit organizations working to restore and enhance the natural resources of the Mississippi River corridor through public and private resource management, compatible economic development, private lands conservation, and education and outreach to the citizens of the region. The MMRP was not an effort born out of controversy or contention, but rather out of shared enthusiasm and interest, and the recognition of the collective strength of partners to work together to improve the region. The majority of the Partnership’s work is focused on ecosystem restoration and natural resource management. The Partnership is a standalone entity and is not a USACE or TNC project; but both organizations have key leadership roles. This poster will primarily focus on the MMRP as a case study in successful collaboration with an emphasis on relaying the lessons learned and best practices employed by the MMRP that have contributed to its success. By example, non-government partners, like the American Land Conservancy, Ducks Unlimited and The Nature Conservancy contribute greatly to the partnership efforts, filling roles (including land acquisition, emerging science development, and outreach) not always readily available or easily filled by government agencies, whereas government agencies like USACE, NRCS, and others have been able to provide watershed planning and technical expertise to the partnership.

Contact Information: Seth Cohen, CPC, IWR, USACE, 7701 Telegraph Rd, Alexandria, VA, Phone: 505-660-0447, Email: seth.b.cohen@usace.army.mil
Great Lakes Restoration Initiative: Demonstrations of Combined Invasive Plant Management and Native Plant Re-establishment at Selected Sites

LeeAnn Glomski¹, Gary Dick¹ and Judy Shearer²
¹U.S. Army Engineer Research and Development Center, Lewisville, TX, USA
²U.S. Army Engineer Research and Development Center, Vicksburg, MS, USA

Under Environmental Protection Agency (EPA) Great Lakes Restoration Initiative (GLRI) funding, the U.S. Army Corps of Engineer Buffalo District and the Engineer Research and Development Center (ERDC) Environmental Lab (EL) have proposed to demonstrate an integrated approach to restoring high quality habitat at two Lake Erie shoreline sites: Walnut Beach and Times Beach. The sites are listed by EPA as either an Area of Concern (AOC) or are adjacent to an AOC and are represented by degraded ecological conditions, primarily due to infestation by Phragmites australis. Project cooperators will include EPA, USACE Buffalo District, ERDC-EL and local participants. The approach will include intensive initial management of Phragmites and other invasive species by combinations of mowing, herbicide applications, and mechanical removal. Following significant removal of invasive species, we will employ several techniques for promoting re-establishment of native vegetation, including recovery from existing seed banks and active re-introduction of historically appropriate species. Simultaneous to re-establishing native vegetation, monitoring of success of invasive species management applications will be made to ascertain the need to implement additional but less intrusive measures for their continued control with minimum damage to restoration efforts.

Contact Information: Gary Dick, U.S. Army Engineer Research and Development Center, Lewisville, TX, 75507 USA, Phone: 972-436-2215, Fax: 972-436-1402, Email: garydick@laerf.org
Navigation, Flood Risk Management and Mississippi River Ecosystem Sustainability

Paul J. DuBowy
Mississippi Valley Division, U.S. Army Corps of Engineers, CEMVD-PD-KM, Vicksburg, MS

The Mississippi River is one of the world’s great rivers and is the only river in the United States to be formally recognized by Congress as both a nationally significant ecosystem and commercial navigation system. The river has a long and colorful history and has played a significant role in shaping the region’s social and economic development. However, the Mississippi River is not a single homogeneous unit. From its source in northern Minnesota to the Gulf of Mexico one can identify at least five distinct Mississippi Rivers based on geomorphology and hydraulics. Concomitant with these hydrological differences in the river are variations in navigation and flood risk management that result in divergent river management strategies. Levees, wing dikes, floodways, dams, pools and locks are some of the different structures that are in place on various reaches of the river to address the concerns of flood risk management and navigation. The effects of river regulation, floodplain development and watershed modifications present constant challenges to ecosystem sustainability along the Mississippi River. Consequently, floodplain and wetland rehabilitation must be developed within the context of the extremely different directions that navigation and flood management have taken the river. Because the Mississippi system varies widely in hydraulics and hydrology from source to the Gulf, ecosystem rehabilitation likewise takes different forms in different regions along the river. Moreover, the goals, targets and metrics of ecosystem sustainability are not constant across the entire river system. A holistic view of the Mississippi River and its contributions to the economic and environmental health of the United States must be developed and implemented to insure the sustainability of this important ecosystem.

Contact Information: Paul J. DuBowy, Mississippi Valley Division, U.S. Army Corps of Engineers, CEMVD-PD-KM, Vicksburg, MS 39181-0080 USA, Phone: 1.601.634.5930, Fax 1.601.634.7073, Email: paul.j.dubowy@usace.army.mil
McCormack-Williamson Tract Project

Matilda Evoy-Mount\textsuperscript{1}, Brooke Schlenker\textsuperscript{1} and Leo Winternitz\textsuperscript{2}

\textsuperscript{1}U.S. Army Corps of Engineers, Sacramento District, CA, USA
\textsuperscript{2}The Nature Conservancy, Sacramento, CA, USA

The USACE CALFED LSP provides a short-term strategy to address flood management and ecosystem restoration projects within the Sacramento-San Joaquin Delta. McCormack-Williamson Tract was purchased by TNC for ecosystem restoration and the protection of wildlife in the study area and a Final EIR was prepared by DWR (in coordination with TNC) to specifically address flood risk and ecosystem restoration.

The McCormack-Williamson Tract levees are constrained in height by a legal agreement and as a result the tract floods during high water events. If sufficient water accumulates, a downstream flood surge occurs when other portions of the levees are overtopped or fail. This flood surge poses a risk to lives, property, and infrastructure in adjacent areas. With this project there is an opportunity to reduce the risk to life and property from flooding or catastrophic breaching of the McCormack-Williamson Tract levee and to provide ecosystem restoration. One alternative for consideration is to lower the height of the eastern levees (which would induce controlled flooding of the tract), reduce the height of the southwestern levee (which would reduce the potential for a flood surge when those levees are overtopped), increase the height of levees on adjacent islands to reduce flood risk, and install a new levee to protect the transmission tower. This alternative would create tidal, intertidal, and shaded riverine habitat, providing ecosystem restoration benefits.

Contact Information: Matilda Evoy-Mount, U.S. Army Corps of Engineers, Sacramento District, Sacramento, CA 95814 USA, Phone: 916-557-5322, Fax: 916-557-7856, Email: Matilda.L.Evoy-Mount@usace.army.mil
Capacity-building for Integrated Water Resources Management in the Iowa-Cedar Basin of Eastern Iowa through Ecosystem Services Evaluations and Collaborative Modeling

Matt Fisher\textsuperscript{1}, Jennifer Filipiak\textsuperscript{1}, Jason Smith\textsuperscript{2}, Stacy Langsdale\textsuperscript{2}, Marian Muste\textsuperscript{3}, Jennifer Harrison-Cox\textsuperscript{4}, Mary Beth Stevenson\textsuperscript{5} and Shana Udvardy\textsuperscript{6}

\textsuperscript{1}The Nature Conservancy, Des Moines, Iowa, USA
\textsuperscript{2}U.S. Army Corps of Engineers, Rock Island District, Rock Island, Illinois, USA
\textsuperscript{3}IIHR-Hydroscience and Engineering, University of Iowa, Iowa City, Iowa, USA
\textsuperscript{4}Earth Economics, Tacoma, Washington, USA
\textsuperscript{5}Iowa Department of Natural Resources, Des Moines, Iowa, USA
\textsuperscript{6}American Rivers, Washington D.C., USA

Following catastrophic flooding in 2008, Iowa’s institutions and communities are rethinking their relationship with their rivers and watersheds and boldly embracing new ways of managing water resources, with flood mitigation and watershed sustainability as priorities. The Iowa-Cedar Rivers Basin Interagency Watershed Coordination Team (the “Team”, \url{http://iowacedarbasin.org}) has emerged as a unique collaborative action involving federal and local management agencies, research institutions and communities. The Team is led by the US Army Corps of Engineers and the Iowa Department of Natural Resources. Our goal is to address water resources problems and opportunities in the Basin in the interest of increasing social and economic values, restoring ecological integrity, and managing risk. The initial priority is on managing flood risk using Integrated Water Resources Management (IWRM) concepts. Team members are engaged in several projects to support the development of a basin-wide management plan, including the development of decision-support tools to support integrated decision making and enable action at multiple watershed scales. However, effective implementation of the project as a whole is dependent on effective coordination of the many competing water uses at multiple scales, integrated with true stakeholder engagement throughout the 12,600 mi\textsuperscript{2} basin. The experiences of this large interagency team will certainly inform future similar initiatives and we will share initial lessons learned and plans for the future. We will focus on two efforts in particular: meaningful stakeholder engagement in plan development through a collaborative modeling process, and a coarse scale evaluation of ecosystem services in the basin.

Contact Information: Matt Fisher, The Nature Conservancy, Eastern Iowa Field Office, 1620 231st Street, Letts, IA 52754 USA, Phone: 319-726-3041, Fax: 515-244-8890, Email: matt_fisher@tnc.org
Aquatic Ecosystem Restoration and Biological Response to a Low-Head Dam Removal in Alabama

Paul L. Freeman\textsuperscript{1} and Beverley H. Stout\textsuperscript{2}
\textsuperscript{1}The Nature Conservancy in Alabama, Birmingham, AL USA
\textsuperscript{2}Mobile District, U.S. Army Corps of Engineers, Mobile, AL USA

Low-head dams on streams are known to alter habitat, depth and velocity of water, and serve as a break in connectivity between populations of animals dependent on the physical movement or genetic exchange through aquatic ecosystems. In central Alabama, on the Cahaba River of the Mobile River Basin, a structure originally constructed as a bridge for large mining trucks, functioned ecologically like a low-head dam by altering habitat and flow conditions in one of the most biologically important river reaches. Populations of seven aquatic species protected under the Endangered Species Act are found in the vicinity of the structure. The Marvel Slab dam only impounded about 1 km of stream, but the fragmentation affected over 200 km of river. Utilizing a Section 206 Aquatic Ecosystem Restoration program and a unique partnership, the US Army Corps of Engineers, The Nature Conservancy and other stakeholders removed this barrier in 2004.

Monitoring the biological response to the restoration efforts included an assessment of the fish and molluscan community prior to deconstruction and then follow-up surveys from 2005 to 2011. To date, 22 partner agencies, groups and universities have worked collaboratively to document an increase in the fish diversity, observed evidence of mussel reproduction, and recorded increases in snail densities that were up to 5000 times greater than pre-removal observations. Sampling efforts at the site include collecting and releasing over 17,000 fish, 900 mussels and 110,000 aquatic snails. The restoration activities occurred at a very local scale but the impacts are far reaching.

Contact Information: Paul L. Freeman, The Nature Conservancy in Alabama, 2100 First Avenue North, Suite 500, Birmingham, AL 35203 USA, Phone: 205-251-1155, Fax: 205-251-4444, Email: pfreeman@tnc.org
“Conservation Locking”: Opening the Door to Fish Passage at Claiborne and Millers Ferry Lock and Dams in Alabama

Paul L. Freeman¹, S. J. Herrington², B.A. Zettle³, C. Sumner³ and B. Simcox⁴

¹The Nature Conservancy in Alabama, Birmingham, AL, USA
²The Nature Conservancy in Florida, Bristol, FL, USA
³U.S. Army Corps of Engineers, Mobile District, Environment and Resources Branch, Planning and Environmental Division, Mobile, AL, USA
⁴Department of Fisheries and Allied Aquacultures, Auburn University, Auburn, AL USA

The Nature Conservancy is a coordinator for the Alabama Fish Passage Working Group, a collaboration among the U.S. Army Corps of Engineers, Mobile District (USACE), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Alabama Department of Conservation and Natural Resources (ADCNR), Geological Survey of Alabama (GSA), Auburn University (AU) and World Wildlife Fund (WWF). This Working Group is making recommendations and evaluating the effectiveness of fish passage efforts for migrating fishes arriving at Claiborne Lock and Dam (CLD) and Miller’s Ferry Lock and Dam (MFLD) on the Alabama River in the Mobile River Basin.

During every spring since 2009, the USACE has used the locks at CLD and MFLD to pass these fishes in the same way it passes barges and boats. This “conservation locking” provides migrating fishes access to over 250 miles of historic fish spawning grounds at little additional cost to operations.

Monitoring of sonic tagged fish is underway and includes over 170 fish representing 15 species. These fish are being tracked with an array of 19 Submersible Ultrasonic Receivers. Preliminary results indicate fish moving into lock chambers.

The USACE began providing similar fish passage support at Jim Woodruff Lock and Dam on the Apalachicola River in Florida in 2005 and the success there influenced the decision to begin conservation lockages on the Alabama River.

These projects demonstrate effective operation and management for low-cost recovery of migratory fishes and provide a template for future “conservation locking” at other USACE lock and dams nationwide.

Contact Information: Paul L Freeman, The Nature Conservancy in Alabama, 2100 1st Ave. North, Suite 500, Birmingham, AL 35203 USA, Phone: 205-251-1155, Fax: 205-251-4444, Email: pfreeman@tnc.org
Mississippi Watershed Initiative: Applying Principles of Integrated River Basin Management to America's Great River

David L. Galat, Michael A. Reuter and G. L. Benjamin
Great Rivers Partnership, The Nature Conservancy, Peoria, IL, USA

The 21st century presents unprecedented challenges and opportunities for sustainability of the largest river system in North America. The Mississippi Watershed Initiative (MWI) is poised to meet the multiple demands on this vast system by integrating issues, partners and ideas at the watershed scale, and building on equally important partnerships and leadership at sub-basin and local scales. Goals of the MWI are to catalyze and nurture: (1) a shared vision and greater sense of ownership of the watershed; (2) increased visibility, recognition and support for projects and organizations that make a difference; (3) better communication, collaboration, and strategic partnerships, and; (4) mechanisms that foster systemic, integrated, adaptive approaches to complex issues and opportunities.

Integrated River Basin Management (IRBM) provides a framework to help realize these goals. IRBM is the process of coordinating conservation, management and development of water, land and related resources across sectors within a basin to improve economic and social benefits of water resources in an equitable manner while preserving and, where necessary, restoring freshwater ecosystems. We review nine best-practice IRBM principles that may aid progress on MWI: (1) engagement and ownership by relevant decision-makers; (2) improved river basin management design; (3) application of diverse institutional arrangements; (4) clear definition of the role and structure of a river basin organization; (5) strong river basin advocacy; (6) prioritizing actions through a River Basin Management Plan; (7) accountability through a river basin-based report card; (8) local government partnerships to effect implementation, and; (9) identifying and driving collaboration among strategic stakeholders.

Contact Information: David L. Galat, TNC-GRP, Department of Fisheries & Wildlife Sciences, 302 ABNR Building, University of Missouri, Columbia, MO 65211 USA, Phone: 573-882-9426, Fax: 573-884-5070, Email: dgalat@tnc.org
Upper Mississippi River Systemic Forest Management Plan

Lyle Guyon1, Randy Urich2, Joseph Lundh3 and Charlie Deutsch4

1National Great Rivers Research and Education Center, East Alton, IL, USA
2U.S. Army Corps of Engineers, St. Paul District Recreation and Natural Resource Project, La Crescent, MN, USA
3U.S. Army Corps of Engineers, Rock Island District Mississippi River Project, Pleasant Valley, IA, USA
4U.S. Army Corps of Engineers, St. Louis District Rivers Project Office, West Alton, MO, USA

The Upper Mississippi River Systemic Forest Management Plan was developed to provide a guide for the sustainable management of Upper Mississippi River System (UMRS) forests, including opportunities for their restoration, and to ensure that the UMRS maintains its recognition as a nationally treasured ecological resource. The Plan accomplishes this by developing a better understanding of the state of the resource and its ecological stressors; providing guidance for forest restoration activities; establishing goals and objectives; identifying opportunities and data needs; establishing a monitoring strategy through an adaptive management framework; and developing additional recommendations that will ensure the long-term sustainability of this critical component of the UMRS ecosystem. The Plan’s footprint includes the UMRS 500-year floodplain, regardless of ownership, which contains approximately 2.6 million acres.

Development of the Plan followed from Agency and stakeholder recognition of the need for a framework of coordinated management at a system level to advance the overarching ecosystem goal of conserving, restoring, and maintaining the ecological structure and function of the UMRS. The Plan establishes a foundation for the Corps, partner agencies and stakeholders to more effectively collaborate on and implement environmental stewardship activities in UMRS forests.

The Plan was developed through a coordinated effort guided by a Product Delivery Team (PDT) consisting of members from the three UMRS Corps of Engineers Districts, five UMRS States, multiple Federal Agencies, non-governmental organizations, and additional stakeholders. The Systemic Forest Management Plan is one of 23 initial ecosystem restoration components being implemented under the Navigation and Ecosystem Sustainability Program (NESP).

Contact Information: Lyle Guyon, National Great Rivers Research and Education Center, One Confluence Way, East Alton, IL 62024 USA, Phone: 618-468-2870, Fax: 618-468-7222, Email: lguyon@lc.edu
Floodplain Restoration at Upper Ouachita National Wildlife Refuge, Louisiana

Daniel Weber, Steve Haase and Jim Bergan
The Nature Conservancy - Louisiana, Baton Rouge, LA, USA

The Nature Conservancy and the U.S. Fish and Wildlife Service have partnered to implement a floodplain restoration project on the 20,000 acre Mollicy Farms Unit of Upper Ouachita National Wildlife Refuge in northeastern Louisiana. The partnership has selectively breached 16 miles of 25-ft-high levee in order to reestablish flood pulses from the adjacent Ouachita River, thereby reconnecting the river with its historic floodplain. A multi-year monitoring program will document long-term trends in water quality, ecosystem services, and biological community condition. Fish and aquatic invertebrates are sampled biannually within the site and on the adjacent forested floodplain. Water samples are taken using ISCO carrousel samplers and tracked using YSI sondes. Initial water chemistry results indicate that trends for sediment, oxidized nitrogen and soluble phosphorous increase as water reenters the Ouachita from the site. The apparent correlation between increasing turbidity and nutrient levels and the tail end of the flood period suggests that flood recession may be a time of significant release of these potential contaminants from Mollicy Farms into the Ouachita River. Ongoing restoration of former watersheds and streams interior to the tract is intended to reduce sedimentation and improve water quality in the future. Expected outcomes include a reduction in nutrients and sediments exported to the Ouachita River, which is 303d-listed as impaired by these contaminants, and increased productivity of the existing bottomland hardwood forest resulting from re-establishment of floodplain functions and processes. Given its size, Mollicy Farms can serve as an “at-scale” demonstration site for future floodplain restoration.

Contact Information: Steve Haase, The Nature Conservancy, Louisiana Chapter and the Great Rivers Partnership, c/o 632 Catoosa Ridge Road, Rockwood, TN 37854, Phone: 865-809-4719, Email: shaase@tnc.org
A Partnership Model to Enhance Systemic Stewardship and Conservation Objectives

Patricia Hagen¹ and Charlie Deutsch²

¹The Audubon Center at Riverlands, West Alton, MO, USA
²U.S. Army Corps of Engineers, St. Louis District Rivers Project Office, West Alton, MO, USA

The Audubon Center at Riverlands represents a unique partnership between the National Audubon Society and the U.S. Army Corps of Engineers. In this partnership, each organization leverages its expertise in shared goals for education, outreach, and conservation. By sharing physical and financial resources, both organizations maximize their resources and investments. Audubon provides important outreach and increased connections for securing funding, educational outreach, and citizen science programming. The Corps provides physical space, extraordinary expertise, and the opportunity to partner on large landscape-based conservation initiatives.

The Rivers Project Office (RPO) of the US Army Corps of Engineers’ St. Louis District manages close to 110,000 acres of land and water along the Mississippi River. The land management objectives of the RPO include the preservation and restoration of important habitat to maintain and increase the diversity of species of birds and other wildlife along the river. These objectives, along with the significant acreage under Corps management, result in a vitally important land stewardship and wildlife preservation role within the Upper Mississippi Flyway system for the Rivers Project Office.

The Audubon Center at Riverlands is a recent development of the National Audubon Society and is a centerpiece of the National Audubon Society’s Mississippi River Initiative. The Center is located in the Corps of Engineers’ Riverlands Migratory Bird Sanctuary, and is co-located with the Corps’ Rivers Project Office. The partnership has had significant success in addressing both organizations’ conservation objectives by applying innovative approaches to administrative infrastructure and resource management.

Contact Information: Patricia Hagen, The Audubon Center at Riverlands, 301 Riverlands Way, West Alton, MO 63386 USA, Phone: 314-223-1350, Email: phagen@audubon.org
Integrated partnership for shared value and improved performance is the model for continued environmental improvements. The Corporate Shared Value (CSV) approach engages diverse partners – including governmental and non-governmental organizations, and various business sectors to advance sustainability strategy and growth. The principal of shared value involves creating economic value in a way that also creates value for society by addressing it needs and challenges.

Ingram’s strategic partnership success includes the Mississippi River Corridor-Tennessee, Emisstar, Alfa Laval, Environmental Solutions Worldwide, The Nature Conservancy (TNC), The Great Rivers Partnership, America’s Watershed Initiative, and academia. One partnership resulted in the 2011 EPA Southeast Diesel Collaborative Award for Industry. An ongoing successful CVS partnership started with Ingram’s financial contribution to TNC for a 500 acre bottomland forest and wetland restoration project in Western Kentucky. This shared value continued with the awarding of an additional $14.4 million from the U.S. Department of Agriculture’s Natural Resources Conservation Service to expand upon the original project footprint. These partnerships have demonstrated not only value to the Ingram organization but more importantly to the natural environment.

Ingram day to day operations are intricately tied to our natural resources. Ingram’s commitment to CSV is interwoven into the strategic plan by focusing on sustainability and collaboration initiatives and focus areas to include navigation, flood control, cultural and social resources as well as the environment. Vigorously engaging in sustainable practices using integrated partnerships can help protect the natural resources which allow Ingram to do our business now and in the future.

**Contact Information:** Leigh Ann Hale, Assistant Vice President, Sustainability and Tax, Ingram Marine Group, Nashville, TN 37205 USA, Phone: 615-298-8350, Fax: 615-695-3350, Email: LeighAnn.Hale@ingrambarge.com
“Conservation Locking”: Opening the Door to Fish Passage at Jim Woodruff Lock and Dam in Alabama/Florida/Georgia

S. J. Herrington¹, P. L. Freeman², B. A. Zettle³ and C. Sumner³
¹The Nature Conservancy, Florida Chapter, Panama City, FL, USA
²The Nature Conservancy, Alabama Chapter, Birmingham, AL, USA
³U.S. Army Corps of Engineers, Mobile District, Mobile, AL, USA

The Nature Conservancy is the central coordinator for the Jim Woodruff Lock and Dam Fish Passage Partnership, a collaboration among the U.S. Army Corps of Engineers, Mobile District (USACE), U.S. Fish and Wildlife Service, National Marine Fisheries Service (NMFS), and states of Florida, Alabama, and Georgia, which provides passage for migrating fishes arriving at Jim Woodruff Lock and Dam (JWLD) in the Apalachicola River Basin. During every spring since 2005, the USACE has used the lock at JWLD to pass these fishes in the exact same way it passes barges and boats. This “conservation locking” provides migrating fishes access to over 150 miles of historic fish spawning grounds at little additional cost to operations. Research has confirmed that Alabama shad – a fish recently petitioned to be listed under the Endangered Species Act because of dramatic declines nationwide and currently listed as a NMFS “Species of Concern” – now spawn successfully upriver of JWLD, and recent population estimates suggest that the population has increased as much as four-fold since beginning fish passage operations. Because of this success the USACE is providing similar fish passage support at two other lock and dams on the Alabama River in Alabama. In addition, agency partners are entering into an agreement to formalize the JWLD Fish Passage Partnership, to be executed circa December 2011. These projects demonstrate effective operation and management for low-cost recovery of migratory fishes and provide a template for future “conservation locking” at other USACE lock and dams nationwide.

Contact Information: Steven J. Herrington, The Nature Conservancy, Florida Chapter, 129 Harrison Place, Panama City, FL 32321 USA, Phone: 850-381-1147, Fax: 850-643-5246, Email: sherrington@tnc.org
HEC Software Tools (EFM, GeoEFM, and EFMSim) for Ecosystem Restoration and Management

John T. Hickey
Water Resources Division, Hydrologic Engineering Center, Institute for Water Resources,
U. S. Army Corps of Engineers, Davis, CA, USA

The Hydrologic Engineering Center (HEC) of the U.S. Army Corps of Engineers (USACE) is actively developing new software tools in the ecosystem restoration and management arena. This presentation provides an overview of RPT (Regime Prescription Tool), EFM (Ecosystem Functions Model), GeoEFM, and EFMSim.

RPT helps different interest groups reach consensus about how rivers should be managed. It does this by plotting and comparing desired river flows from a range of perspectives (e.g., flood damage reduction, water supply, hydropower, navigation, and ecosystem maintenance). These flows are defined by the interest groups and presented in a common format, which provides a foundation for resolving conflict. RPT is the first joint software development project by the Corps and The Nature Conservancy.

EFM is a software tool designed to help planners, biologists, and engineers determine ecosystem responses to changes in the flow regime. EFM analyses involve: 1) statistical analyses of relationships between hydrology, hydraulics, and ecology, 2) hydraulic modeling, and 3) GIS programs to display results and other relevant spatial data.

GeoEFM is the spatial component of EFM. It is programmed as an ArcMap extension and is being developed through a partnership between HEC and the Environmental Systems Research Institute (ESRI). GeoEFM computes and compares habitat areas for different water management policies, provides GIS calculators for querying spatial data sets, and offers a patch tool for looking at habitat connectivity.

EFMSim is being developed to simulate ecosystems spatially (for tens of millions of user defined pieces) and temporally (for tens to hundreds of years). Spatial data sets are used to describe the environmental conditions in which ecological communities exist. Communities respond (recruit, consume, grow, die, move, transition) according to rules defined by the user as a function of those environmental conditions. EFMSim is being applied to simulate restoration scenarios for a riparian and aquatic habitat restoration project on the Truckee River, Nevada.

RPT, EFM, and GeoEFM are now available (free of cost) via the web at http://www.hec.usace.army.mil/. Since going online in 2006 and 2008, respectively, RPT and EFM have had more than 120,000 visits and 10,000 downloads.

Contact Information: John T. Hickey, Water Resources Division, Hydrologic Engineering Center, Institute for Water Resources, U. S. Army Corps of Engineers, Davis, CA 95616 USA, Phone: 530-756-1104, Fax: 530-756-8250, Email: john.t.hickey@usace.army.mil
Savannah River Sustainable Rivers Project: Data, Tools, and People Forming the Next Steps

Eric Krueger¹, Jason Ward², Will Duncan³ and Rhett Jackson⁴

¹The Nature Conservancy, Charleston, SC, USA
²US Army Corps of Engineers, Savannah, GA, USA
³US Fish and Wildlife Service, Athens, GA, USA
⁴University of Georgia-Athens, Athens, GA, USA

The Savannah River Sustainable Rivers Project site was catalyzed in 2003 with flow recommendations derived from 55 river scientists and review of over 900 studies and papers relevant to the Savannah’s shoals, floodplain and estuary resources. High-pulse test flows from Thurmond Dam under temporary deviations, associated monitoring and data gathering, and research targeted at data gaps identified in the original workshops ensued. Measured response variables for high pulses include fish passage and migratory behavior, floodplain invertebrate and fish communities, and estuarine salinity front positions. Examination of floodplain elevation-vegetation relationships was also conducted, along with water quality monitoring, habitat mapping and telemetry of federally endangered shortnose sturgeon, and surveys of imperiled freshwater mussels.

New data and ecological flow tools present the opportunity to apply adaptive management to the Savannah River ecosystem. The Nature Conservancy, US Army Corps of Engineers, US Fish and Wildlife Service, and University of Georgia-Athens are organizing an effort to update the flow prescription, and calibrate the recommended flows to a single release point: Thurmond Dam. In a parallel effort, the Corps, TNC, and state water managers from Georgia and South Carolina agencies are developing a drought management plan under Phase II of a Comprehensive Basin Study. An ecological flow workshop is planned for early 2012 to revise the flow prescription, and enhance the quality of the drought management plan developed under Phase II. The HEC Regime Prescription Tool and Ecosystems Function Model are being deployed here, along with an updated ResSim model incorporating droughts-of-record through 2009.

Contact Information: Eric Krueger, The Nature Conservancy, Charleston, SC 29413 USA, Phone: 843-937-8807, Fax: 843-937-6735, Email: ekrueger@tnc.org
Living Shorelines: Estuarine Erosion Control Engineering that Provides Robust Habitat Benefits

Dorset Hurley1, C. Lambert2, J. Kanes3, D. Harris4, F. Hay5 and J. McKinnon6

1The Sapelo Island National Estuarine Research Reserve, Sapelo Island, GA, USA
2The Nature Conservancy in Georgia, Darien GA, USA
3The FL Department of Environmental Protection: Apalachi NERR, Eastpoint, FL, USA
4The University of Georgia: Marine Extension Service, Savannah GA, USA
5The GA Department of Natural Resources: Wildlife Resources Division, Sapelo Island GA, USA
6The GA Department of Natural Resources: Coastal Resources Division, Brunswick GA, USA

Introduction and Methods: Conventional shoreline armoring technology used for the protection of property and infrastructure values within estuaries of the South Atlantic Bight has traditionally consisted of vertical bulk-heading: concrete, steel, treated timber or recycled rip-rap constituting low habitat values. This Living Shoreline project infuses comparative treatments of oyster shell, gabion and granite rock within an estuarine, inter-tidal setting at two nearby sites. The project included multiple partnering agencies, the use of native plantings for extra-tidal shoreline stabilization and a direct public volunteer component. The general public’s significant fabrication contribution was also used very effectively in promoting educational, outreach and awareness benefits for the project. Pre and post-construction (year 1) habitat analysis was conducted using oyster (Crassostrea virginica) recruitment and native plant coverage values as a primary efficacy indexes. Comparative costs with conventional engineering, expected longevity, 2nd season oyster recruitment and plant coverage values analysis are still underway at the time of this presentation.

Results and Discussion: Habitat efficacy metrics based upon oyster recruitment numbers from time 0 to 1 year post-construction demonstrate that the Ashentilly site using only oyster bags laid against a 2 to 1 graded bank and secured with stakes, out-preformed all other treatments. Likewise, Ashentilly demonstrated higher success rates (survival and total coverage) of native plantings by the end of year 1 with seasonal timing believed to have been the largest factor in survival.

Conclusion and Future Direction: The use of this newly developed, science-based alternative sediment control technique shows considerable promise for use within GA estuaries. The burgeoning need to establish better shoreline technologies to meet growing state marshland permit requests coupled with enhanced development and a predicted sea level rise of 12-16 inches by 2100 (Craft et. al; 2008) make this project a high public policy priority for the GA coastal regulation community. Current GA marshland policy implications include a suggested streamlining for applicants of state permits that employ similar technology within saline marsh settings. Comparative cost analysis, essential fisheries habitat studies and two similar projects are being planned for Georgia in 2012-2013.

Reference:

Contact Information: Christi Lambert, The Nature Conservancy in GA, P.O. Box 484, Darien, GA 31305 USA, Phone 912-617-0143, Fax: 912-437-5368, Email: clambert@tnc.org
Curbing Wetland Losses through Better Accounting of Wetland Functions

Jason A. Lauritsen
National Audubon Society, Florida Audubon, Naples, FL, USA

A comparison of the Southwest Florida Predevelopment land cover map with the 2004 Land Use Land Cover map developed by the South Florida Water management District reveals that over 60 mi² of wet prairie has been lost within the Core Foraging Area (CFA) of the Corkscrew Swamp wood stork colony. That is over 82% of these shallow important short hydroperiod wetlands which providing foraging opportunity early in the stork breeding season. Approximately 270 mi² of wetlands have been lost within the CFA, the vast majority of losses are to short hydroperiod wetlands. A review of the South Florida Water management District permits under the Uniform Mitigation Assessment Method (UMAM) indicates that short hydroperiod wetlands continue to be lost at greater rates than long hydroperiod wetlands. Mitigation approved to offset these shallow wetland impacts often occurs in long hydroperiod wetlands providing foraging opportunity later in the breeding season. Numerous species are dependent on the functions provided by short hydroperiod wetlands. Failure to mitigate for these functional losses continues to threaten the recovery of wood storks and puts other wildlife at risk of cumulative impacts.

We have developed a tracking tool which provides regulatory staff implementing UMAM with a means of quantifying impacts and mitigation lift according to a number of ecologically defined categories, including hydroperiod class. This allows reviewers to readily assess whether a mitigation proposal offsets impacts according to categories of functions and will improve our ability compliance with the no net loss of wetland functions policy.

Contact Information: Jason Lauritsen, Corkscrew Swamp Sanctuary, Naples, FL USA, Phone: 239-229-8170, Fax: 239-348-1522, Email: jlauritsen@audubon.org
Hamilton City Set Back Levee and Riparian Habitat Restoration Project

Ryan Luster\(^1\), William Paris\(^2\) and Tom Karvonen\(^3\)
\(^1\)The Nature Conservancy, Chico, CA  
\(^2\)O’Laughlin & Paris, LLP, Chico, CA  
\(^3\)USACE Sacramento District, Sacramento, CA

The Hamilton City Flood Damage Reduction and Ecosystem Restoration Project includes: 1) construction of a new 6.8 mile set-back levee, and 2) the reconnection of 1,450 acres to floodplain between the new set-back levee and the river of which approximately 1,361 acres will be restored to native riparian habitat.

This project represents a novel approach for how the Corps can design multi-benefit floodplain projects. In order to economically justify the project, in addition to quantifying the flood damage reduction benefits, the Corps has also included ecosystem benefits in its benefit to cost ratio analysis. 90% of the benefits of this project are ecosystem restoration benefits while 10% are flood damage reduction benefits.

Flood Damage Reduction Benefits: Hamilton City and the surrounding agricultural lands are subject to frequent flooding from the Sacramento River. The only existing protection is from the substandard, private J Levee built in 1904. The Project would protect approximately 3,700 acres, including the town of Hamilton City and it will benefit both Glenn and Butte Counties by reducing water surface elevations in virtually all flood events and will provide regional benefits downstream by increasing flood storage in the system.

Ecosystem Restoration Benefits: Adding 1,361 acres of restored riparian habitat in the Project will significantly add ecological benefit to existing riparian habitats by filling in gaps between existing remnant and restored riparian habitats along the Sacramento River. Project completion will result in the largest area of connected, viable wildlife habitat (approximately 4,000 acres) in the middle Sacramento River.

Contact Information: Ryan Luster, The Nature Conservancy, 500 Main Street, Chico, CA 95928, Phone: 530-897-6370, Email: rluster@tnc.org
Landscape Scale Restoration Planning in North Maumee Bay, Lake Erie

Christopher A. May
The Nature Conservancy in Michigan, Lansing, MI, USA

The Nature Conservancy hosted a series of three workshops to develop a comprehensive, landscape-scale restoration and management plan for North Maumee Bay along the coast of western Lake Erie, Michigan. Historically, North Maumee Bay consisted of a productive wetland complex of shrub swamp, emergent marsh, and wet prairie. However, wetlands in the bay have been largely lost or degraded due to altered sediment patterns, invasive species (e.g., *Phragmites*), and poor water quality. The comprehensive plan was developed in partnership with state and federal agencies, academic institutions, and other stakeholders. These experts considered historical conditions and future desired conditions, taking into account current threats and barriers to success, and provided input on restoration goals for habitat types and species, threats, restoration sites, and best practices. The planning process included development of prescriptions for restoration and management of wetland types within a diked wetland. The predicted impacts of climate change were incorporated into the planning process. Partners now have a coordinated plan for project implementation and targeting future funding opportunities. Several collaborative restoration projects are being implemented, including a 950-acre diked wetland restoration, and landscape-scale management of invasive *Phragmites*.

Contact Information: Christopher A. May, The Nature Conservancy in Michigan, Lansing, MI 48906 USA, Phone: 517-316-2274, Fax: 517-316-9886, Email: cmay@tnc.org
Retrospective Evaluation of Aquatic Ecosystem Restoration Projects Completed by the US Army Corps of Engineers

David J. Tazik, Erynn Maynard, Justin Gardner and J. Craig Fischenich
Environmental Laboratory, US Army Engineer Research and Development Center, Vicksburg, MS, USA

Despite substantial investments in aquatic ecosystem restoration nationally, there is little or no quantitative basis upon which to assess project and program success, and few national databases have been developed. While the Corps of Engineers has made substantial investments in restoration over the past 20 years, monitoring and assessment efforts within the Corps largely reflect this pattern. Better data and information is needed to evaluate the outcomes of these projects and ensure that restoration investments maximize environmental benefits to the Nation. This poster describes an effort to develop and evaluate a database of ecosystem restoration projects completed by the Corps. Specific objectives are to evaluate the benefits realized and the performance of selected restoration techniques and practices applied in various aquatic ecosystems. Information is being compiled on over 235 restoration projects that represent an investment of more than $660M. Projects included in the evaluation range widely in size, geographic location, habitat and ecosystem type, restoration features, funding authorities and partnerships. The poster will illustrate the scope and diversity of the Corps ecosystem restoration program and summarize information evaluated to date.

Contact Information: Erynn Maynard, Environmental Laboratory, US Army Engineer Research and Development Center, Vicksburg, MS USA Phone: 601-634-5387; Fax: 601-634-4838; Email: erynn.e.maynard@usace.army.mil
Missouri River Recovery Program—Partnership with Purpose

Steve A. Fischer\textsuperscript{1} and Clint K. Miller\textsuperscript{2}

\textsuperscript{1}United States Army Corps of Engineers, Northwest Division, Kansas City, MO, USA
\textsuperscript{2}The Conservation Fund, Upper Midwest Office, Pine Island, MN, USA

The Missouri River, America’s longest river, has been significantly altered from its original state to provide a variety of benefits to the communities in its watershed, including agriculture, energy, navigation and recreation. Three million acres of natural river habitat have been altered, an impact that, among other things, means that 51 of 67 the River’s native fish species are rare, uncommon or declining. In response, the US Army Corps of Engineers (USACE) initiated the Missouri River Recovery Program to target opportunities to restore and maintain at risk species. The program relies on public/private cooperation involving conservation organizations, private landowners, state and other federal agencies, and the USACE. USACE and The Conservation Fund recently partnered on projects involving local landowners and implemented solutions that conserved nearly 4,000 acres. We outline the goals of the Missouri River Recovery Program (MRRP) for fish and wildlife habitat recovery and describe how partnerships play a critical role for USACE efforts to balance its multiple missions and restore more of the natural heritage of the Missouri River. We provide a summary of the recent catastrophic flooding in 2011 and explore recent implementation projects and the successful partnership strategies behind them.

Contact Information: Clint K. Miller, The Conservation Fund, Upper Midwest Office, 807 Rodeo Drive SE, Pine Island, MN, 55963, USA, Phone: 507-356-6301, Fax: 507-356-6302, Email: cmiller@conservationfund.org
Freshwater biodiversity in the United States has been disproportionately impaired, and changes in natural river flow patterns rise to the top as the most pervasive cause of this impairment. And while flow alteration can result from ground water pumping and surface water diversions, land use changes, and the construction and operation of dams, dams have had a particularly systemic impact not only on the nation’s rivers but also their associated floodplain, wetland, and estuarine systems. Only two percent of major U.S. rivers remain free-flowing. Recognizing the ubiquitous need for innovative ways to restore and maintain ecological health while meeting human demands for water, the U.S. Army Corps of Engineers and The Nature Conservancy formed a unique partnership in the summer of 2002.

Known as the Sustainable Rivers Project (SRP), the partnership involves working side-by-side to define and implement environmental flows at demonstration sites across the country and to constructively link ecologists and engineers in support of both long-term and real-time adaptive reservoir management. The SRP currently involves work on 29 Corps dams in eight river basins; has organized the efforts of nearly 300 scientists and engineers from state and federal agencies, universities, non-governmental organizations, and consultants; coordinated resource allocation across agencies; and fostered staff sharing, joint training and joint software development. Moreover, work under the SRP is expanding integration between river and floodplain management, and is not only restoring ecosystem health and services but also providing opportunities to improve social and ecological resiliency to climate change. The design of the SRP involves enrolling additional sites and exporting lessons learned to the more than 600 dams operated by the Corps, as well as further transferring these lessons to other water managers globally.

Contact Information: Lisa Morales, U.S. Army Corps of Engineers, 441 G Street, NW, Washington, DC 20314-1000, Phone: 202-761-7664, Email: Lisa.T.Morales@usace.army.mil
Building Scientific Rigor into the Missouri River Natural Resource Baseline Assessment

Wayne Nelson-Stastny and Karla Sparks

1US Fish and Wildlife, Missouri River Coordinator, Yankton, SD, USA
2US Army Corps of Engineers, Environmental Resource Specialist, Kansas City, MO, USA

As directed by Congress in 2007, the Missouri River Ecosystem Restoration Plan (MRERP) will “mitigate for lost habitats; recover federally listed species; and restore the ecosystem to prevent further declines of native species” within the Missouri River and its tributaries. When completed, the plan will guide future activities of the MRRP. The scale and scope of this planning effort is unprecedented, with 30+ Cooperating Agencies (CAT), 29 tribes, a 70-member stakeholder committee (MRRIC), 60+ member basin-wide technical team and the lead agencies (USACE and USFWS) working collaboratively across a basin that spans 1/6 of the lower US. To ensure the highest scientific standards and best planning principles are employed in the planning process, input and review of scientific and technical data and information are being conducted on multiple fronts, using multiple partners and processes. For example, in developing the focal natural resources (FNRs) for the planning process, the CAT, in collaboration with the project team, crafted the preliminary delineation of the FNRs. Technical teams refined and updated the FNRs, and final reviews of the FNRs were provided by the USACE review process and an Independent External Peer Review (a three-member scientific panel), held as a public meeting. Ultimately, this collaborative approach will help ensure scientific rigor in the planning process.

Contact Information: Wayne Nelson-Stastny, US Fish and Wildlife, Missouri River Coordinator, Yankton, SD USA, Phone: 402-667-2884, Email: Wayne_NelsonStastny@fws.gov
Restoring Aquatic Habitat at Emiquon by Reconnecting this Large Backwater Complex with the Illinois River

Jason T. Smith\textsuperscript{1}, Kara N. Mitvalsky\textsuperscript{1} and D. Blodgett\textsuperscript{2}

\textsuperscript{1}U.S. Army Corps of Engineers, Rock Island District, Rock Island, IL, USA
\textsuperscript{2}The Nature Conservancy, Illinois Chapter, Lewistown, IL, USA

Introduction and Methods: A former backwater complex (6,700 acre Emiquon Preserve) has been isolated from the river by a levee for nearly 100 years. Proposed restoration efforts will provide a managed reconnection. This poster addresses issues associated with quantifying habitat benefits, technical design considerations, and real estate and partnership issues associated with lands with NRCS/TNC and Corps interest.

Results and Discussion: In partnership with the Conservancy, the Corps identified a Federal interest at the Emiquon Preserve for restoring aquatic habitat through design and construction of a Water Control Structure, Pumping System and Wind Fetch Islands. A need remains for additional coordination with NRCS to address concerns with invasive species and nutrients' entering the backwater area from the river since this land is under an NRCS Wetland Reserve Program 30-year Conservation Easement.

Conclusion and Future Direction: Emiquon is a scientifically feasible project based on a Federal interest for restoring aquatic habitat through a managed reconnection with the Illinois River. However, continued coordination is necessary with the NRCS to assure project is construction feasible based on the ability to obtain land rights. There are numerous lessons learned from this project that would aid other projects with TNC/Corps partnerships.

Reference:

Contact Information: Jason T. Smith, USACE, Rock Island District, Clocktower Building, P.O. Box 2004, Rock Island, IL 61204 USA, Phone: 309-794-5690, Fax: 309-794-5110, Email: Jason.t.smith2@usace.army.mil
Lateral Connectivity - Inundation of Bottomland Hardwood Forests from High Flow Events in the Cypress Basin

Joe Trungale¹, Tom Hayes² and Ryan Smith³

¹Trungale Engineering and Science, Austin, TX, USA
²Environmental Conservation Alliance, Inc., Austin, TX, USA
³The Nature Conservancy, Austin, TX, USA

Seasonal flooding of riparian and wetland areas has been recognized as an important ecological function of high flow events for maintaining a sound environment. In Big Cypress Creek, an upstream reservoir captures high flows and proposed future projects have the potential to disrupt the natural flood dynamics in the other major tributaries in this system. This study analyzed satellite imagery, collected over a full range of flow magnitudes, to produce inundation maps for study areas in the Cypress Basin. Inundation maps were combined with available vegetation maps to calculate areas inundated for each vegetation type. Regression analysis was used to relate flow magnitude to percent of available habitat inundated for Swamp and Flooded Forest vegetation types. These relationships were applied to historical flow data to create inundation time series and calculate frequency and duration statistics. These results were evaluated with respect to the life history needs of the plant species that use these habitats to estimate the flows needed to maintain a sound environment. The results of this analysis suggest that the regulated flows in Big Cypress appear to provide the flows need to meet the natural inundation frequencies for lowland swamps but leave a majority of the previously flooded forest dry. The analysis also provides a means to quantify targets for currently unregulated steams as they face potential future flow modifications. Finally, the spatial specificity of this study provides a means to precisely target future monitoring and adaptive management activities.

Contact Information: Ryan Smith, The Nature Conservancy, Austin, TX 78205 USA, Phone: 210-301-5771, Fax: 210-228-9805, Email: ryan_smith@tnc.org
Natural Resource Baseline Assessment Preliminary Results of the Missouri River

Wayne Nelson-Stastny\textsuperscript{1} and Karla Sparks\textsuperscript{2}
\textsuperscript{1}US Fish and Wildlife, Missouri River Coordinator, Yankton, SD, USA
\textsuperscript{2}US Army Corps of Engineers, Environmental Resource Specialist, Kansas City, MO, USA

The effort to develop the Missouri River Ecosystem Restoration Plan (MRERP) was launched in 2007 with authorization from Congress to develop a plan for the 2500 mile-long Missouri River and its tributaries to “mitigate for lost habitats; recover federally listed species; and restore the ecosystem to prevent further declines of native species.” To date, 30+ Cooperating Agencies, 29 tribes, a 70-member stakeholder committee, 60+ member basin-wide technical team, and the lead agencies (USACE and USFWS) have collaboratively established the broad study purpose, need and goals, and completed preliminary evaluations of the current conditions of Focal Natural Resources (native river ecosystems and their associated habitats and species). The current condition evaluation of Focal Natural Resources has included identification of Key Ecological Attributes (the critical processes and conditions required to sustain the ecosystems and their components – e.g., river flows, sediment, water quality), selection of a set of indicators appropriate for regional-scale assessment of the Key Ecological Attributes, and evaluation of the current status of the indicators. The product of this effort is a scorecard of the current status of Key Ecological Attributes within each of the focal natural resource ecosystems. This evaluation will inform numerous future planning steps, including the development of restoration, mitigation and recovery objectives, formulation of alternatives, assessment of the impacts of alternatives, and the development of an adaptive management plan.

Contact Information: Karla Sparks, US Army Corps of Engineers, Kansas City, MO, 64063, Phone: 816-509-7794, Email: karla.k.sparks@usace.army.mil
Modeling USACE Oyster Restoration Efforts across Spatial Scales

Todd M. Swannack and Candice D. Piercy
Environmental Laboratory, US Army Engineer Research and Development Center, Vicksburg, MS, USA

Eastern oysters (Crassotrea virginica) are an estuarine benthic species that are native to the shallow, coastal waters of Eastern North America and the Gulf of Mexico and provide both ecological and economic services throughout their distribution. Oyster abundance is at its nadir, estimated at approximately 1% of historical levels. USACE is currently involved in oyster restoration efforts throughout the country, with the majority of the efforts occurring in the Northeastern US. In an effort to maximize restoration benefits, the ERDC is developing a suite of integrated quantitative models that can assist in planning and restoration efforts across many spatial scales. Currently, we are developing a spatially-explicit habitat suitability model that will be able to identify suitable locations for oyster reef placement. We are also developing coupled hydrodynamic-ecological modeling capabilities that incorporate a two-dimensional finite-element hydrodynamic model and an oyster bioenergetics-based food web model. Preliminary results, taken from small-scale simulations, indicate that reef structure plays a role in the removal rate of total suspended solids and phytoplankton in the vicinity of oyster reefs. Future work will include simulating the effects of reef structure at larger spatial scales and with more reefs in the Great Wicomico and Rappahannock Rivers, which are tributaries of the Chesapeake Bay.

Contact Information: Todd Swannack, US Army Corps of Engineers - ERDC, 3909 Halls Ferry Rd. (CEERD EE-W), Vicksburg, MS 39180, Phone: 601-634-2068, Email: todd.m.swannack@usace.army.mil
Missouri River Floodplain Partnership Opportunities

Brad Thompson1 and Jason Skold2
1US Army Corps of Engineers, Omaha District
2The Nature Conservancy, Missouri River Program Manager

The Missouri River experienced period of record flooding in 2011. Flooding impacted thousands of acres of land; resulted in closings of reaches of Interstate 29 and 680, numerous state and county roads and bridges; and threatened and impacted cities and towns. This event raised awareness of floodplain land use and questions on the potential for more economically and environmentally efficient alternatives. USACE and TNC are exploring partnership opportunities that would provide additional options to effected land owners, levee districts, and state and local governments. The presentation will highlight options that could be consideration as part of a post flood assessment including refinements in floodplain management and ecosystem restoration (use of farm bill programs, potential levee setbacks at constriction points, acquisitions from willing sellers, etc.). This presentation will provide the latest status of these activities and options moving forward given that the flooding ended in October.

Contact Information: Brad Thompson, Environmental Resources Section Chief, US Army Corps of Engineering, Omaha District, Omaha, NE 68102 USA, Phone: 402-995-2678, Email: Bradley.e.thompson@usace.army.mil
Jason Skold, Missouri River Program Manager, The Nature Conservancy, 1007 Leavenworth Street, Omaha, NE 68102, Phone: 402-342-0282X1006, Email: jskold@tnc.org
Coupling RESSIM AND CE-QUAL-W2 for Better Management of Watershed Water Quality

Dorothy H. Tillman1, Todd E. Steissberg2, Scott A. Wells3, John F. DeGeorge4 and George C. Modini2

1 U.S. Army Engineer Research and Development Center, Vicksburg, MS, USA
2 Hydrologic Engineering Center, Davis, CA, USA
3 Department of Civil Engineering, Portland State University, Portland, OR, USA
4 Resource Management Associates, Fairfield, CA

Managing reservoirs for reasons other than and including the traditional goals (i.e., maximizing power production, water supply, flood control) was the impetus for the integration of two well-known models. A coupled analysis system was developed that combines the water quality simulation strengths of the CE-QUAL-W2 (W2) numerical model with the management strengths of the HEC-ResSim (ResSim) reservoir operations model. Combination of these two programs allows a more complete operational scenario to be simulated in a watershed so that additional environmental parameters such as temperature, dissolved oxygen, and phosphorous can be considered in reservoir system decision-making.

Future goal for this system is to be able to operate the ResSim and W2 models more closely, allowing W2 water quality results to be iteratively incorporated into ResSim’s logic to better meet water quality targets. Here we present the results of the project to link the two models to run sequentially within the ResSim environment. Integration of W2 with ResSim is handled through a “plug-in” to ResSim. Data exchange between the models is handled through the HEC Data Storage System (HEC-DSS). Two plug-ins, DSSIN and DSSOUT, were written to exchange data between DSS and W2’s ASCII files.

Sections of the Willamette River system (Oregon) and the Lehigh River system (Pennsylvania) were used as demonstration sites to test the capabilities of the integrated ResSim-W2 model system. New capabilities have been added to improve data exchange and visualization and to interface with the new habitat volume, selective withdrawal, and restart features of CE-QUAL-W2 Version 3.7.

Contact Information: Dorothy H. Tillman, U.S. Army Engineer Research and Development Center, Vicksburg, MS, 39180-6199 USA, Phone: 601-634-2676, Fax: 601-634-3129, Email: Dorothy.H.Tillman@usace.army.mil
Collaborative Efforts in the Green River, Kentucky

W. Michael Turner¹, Ken Meffert², Jeffery Sole³, Michael Hensley⁴ and Nathan Moulder⁵

¹Environmental Resources Section, U.S. Army Corps of Engineers, Louisville District, Louisville, KY, USA
²Plan Formulation Section, U.S. Army Corps of Engineers, Louisville District, Louisville, KY, USA
³Conservation Programs, The Nature Conservancy of Kentucky, Lexington, KY, USA
⁴Green River Project Director, The Nature Conservancy of Kentucky, Lexington, KY, USA
⁵Plan Formulation Section, U.S. Army Corps of Engineers, Louisville District, Louisville, KY, USA

Introduction
The Green River is rated fourth highest in aquatic biodiversity in the United States. A critical stretch is 114 miles long between Mammoth Cave National Park and Green River Lake Dam. Enhancement and preservation of this stretch of river is a priority for conservation professionals.

Results and Discussion
Economic Impact Analysis of the Reoperation of Green River Lake, KY - Since reoperation was initiated at Green River Lake in 2002, total visitation to the project site has increased by 6.29% indicating reoperation had no adverse impacts on recreation and its associated regional economic activity.

Green River Lake Dam Outlet Modification Study - Temperature control of water releases is a significant problem of dam operations to be addressed. Installation of a curtain around the existing outlet works tower will address this issue.

The Green River Corridor Protection Prioritization Project - Creation of this dynamic map provides conservation professionals with a powerful new tool. Land conservation efforts are now better focused on areas that will result in the most protection.

Green River Initial Watershed Assessment - Based on stakeholder outreach, the assessment will provide a water resource management strategy for the Green River Watershed that protects water quality while allowing for economic development.

Conclusion
Collaboration between The Nature Conservancy and the Louisville Districts U.S. Army Corps of Engineers has resulted in significant ecological benefits for the Green River.

Contact Information: W. Michael Turner, Environmental Resources Section, U.S. Army Corps of Engineers, Louisville District, Louisville, KY 40202 USA, Phone: 502-315-6900, Fax: 502-315-6864, Email: michael.turner@usace.army.mil
Adaptive Management Implementation Process: Not Just an Approach...The Preferred Alternative

Timothy M. Fleeger and Cynthia S. Upah
US Army Corps of Engineers, Omaha, NE, USA

The Biological Opinion (BiOp) on the Operation of the Missouri River Mainstem System (USFWS, 2003) calls for an Adaptive Management (AM) approach to implement actions to restore habitat for federally-listed species. Pursuant to compliance with this BiOp, the US Army Corps of Engineers constructs nesting habitat for two bird species - least terns and piping plovers – under its Emergent Sandbar Habitat (ESH) program. As part of a Programmatic Environmental Impact Statement (PEIS) on the ESH program (USACE, 2011), the Corps recently completed an AM strategy for this multi-million dollar program implemented annually on the riverine reaches of the upper Missouri River. The PEIS features a unique integration of NEPA and AM. The Adaptive Management Implementation Process (AMIP) is selected as the Preferred Alternative within the document and a maximum potential area of impact is disclosed. Proposed actions would be progressively implemented until the desired biological response is attained/sustained. The AMIP: 1) allows flexibility in implementation; 2) minimizes environmental impacts; 3) reduces risk and 4) maximizes the amount of habitat gained for each dollar spent.

This poster will present this innovative AM strategy to habitat restoration which focuses on the use of management-relevant science to influence decisions on an annual basis. The strategy addresses adaptation at programmatic, regional and site-specific levels, features measurable objectives (metrics), and identifies and prioritizes monitoring and research needs. This AM Strategy is helping decision makers adjust and learn while facing the uncertainties of the dynamic upper Missouri River and corresponding biological response of two species.

Contact Information: Cynthia S. Upah, US Army Corps of Engineers, Omaha District, CENWO-PM-AC, 1616 Capitol Avenue, Omaha, Nebraska 68102 USA, Phone: 402-995-2672, Fax: 402-995-2697, Email: cynthia.s.upah@usace.army.mil
Integrating Reservoir-Floodplain Management as an Adaptation Strategy to Climate Change

Andrew Warner¹, Jason Ward², Nathan Burley³ and Evan Girvetz⁴

¹The Nature Conservancy, University Park, PA USA
²U.S. Army Corps of Engineers, Savannah, GA USA
³University of California-Davis, Davis, CA USA
⁴The Nature Conservancy, Seattle, WA USA

Climate change is projected to disrupt historical hydrological patterns and increase risks of hydrological extremes, including both floods and droughts. Even without climate change, water management systems are increasingly stressed due to growing and competing demands, while flood risk is rising due to changing land-use patterns and aging infrastructure (e.g., levees). This presentation outlines the use of floodplain conservation—maintenance of existing floodplains or reconnection of disconnected floodplains—as an important adaptation strategy for addressing hydrological perturbations and associated risks to people. Floodplains can store and convey floodwaters and thus provide an alternative to additional dams and levees and floodplain restoration can produce significant benefits to ecosystems and the services they provide to people. Beyond those benefits, adaptation projects involving floodplains below dams have the potential to increase the operational flexibility of multipurpose reservoirs and thus the resiliency of water-management systems to hydrological disruptions from climate change. Hydrologically connected floodplains can complement or even partially substitute for reservoir-based flood-risk management. Reducing a reservoir’s flood-management obligation would allow reallocation of reservoir storage toward other benefits such as water supply, hydropower and environmental flows. Described here are several case studies that explore the potential water-management benefits of using floodplain reconnection as a central component of a broader flood-management strategy. The case studies and preliminary research results indicate that re-allocating existing reservoir flood storage to other purposes, in coordination with changes in downstream floodplain management, can increase the capacity of water-management systems to adapt to hydrological disruptions from climate change.

Contact Information: Andrew Warner, The Nature Conservancy, 406 Forest Resources Building, University Park, PA 16802, Phone: 814-863-2506, Email: awarner@tnc.org
Review of Impacts to the Lower Roanoke River Basin Floodplain Due to Flow Regulation

Timothy C. Wilder\textsuperscript{1}, Candice D. Piercy\textsuperscript{1}, Todd M. Swannack\textsuperscript{1} and Chuck Peoples\textsuperscript{2}

\textsuperscript{1}Engineer Research and Development Center, Environmental Laboratory, Vicksburg, MS, USA
\textsuperscript{2}The Nature Conservancy, Roanoke River Field Office, Halifax, NC, USA

The bottomland forests on the floodplain of the Lower Roanoke River Basin in North Carolina, beginning below the Fall Line and extending across the Inner and Outer Coastal Plain to Albemarle Sound, comprise approximately 100,000 hectares (Pearsall, McCrodden et al. 2005) and represent the largest, contiguous bottomland forest ecosystem remaining in the Mid-Atlantic region. Since 1953, the hydrology of much of the floodplain has been significantly modified by regulation of flow through a series of dams at and above the Fall Line (Pearsall, McCrodden et al. 2005). The operation of the largest of these, at John H. Kerr reservoir, is under review by the Wilmington District Corps of Engineers. We reviewed proposed changes to the dam’s operation to assess the potential for environmental benefits to the lower Roanoke River floodplain ecology. The current condition of the floodplain ecology was assessed by comparing Roanoke River data collected by the ERDC-EL and The Nature Conservancy to reference data. Reference data were collected from an adjacent watershed within the ecoregion and data from the Roanoke and other river floodplains in North and South Carolina were obtained from the US Forest Service’s Forest Inventory and Analysis Database and compared. Both approaches support the conclusion that the vegetation of the lower Roanoke River floodplain is under stress from prolonged inundation due to flow regulation.

Reference:


Contact Information: Tim Wilder, US Army Corps of Engineers, Engineer Research and Development Center Environmental Laboratory, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199 USA, Phone: 601-634-2342, Fax: 601-634-3205, Email: Timothy.C.Wilder@usace.army.mil
China’s ascendant role on the world stage is reshaping global economic and political dynamics. It is also motivating conservation organizations to confront the environmental realities of an increasingly interconnected global economy. One of TNC’s responses to the globalization of conservation is a new China-based cross-regional initiative, Conservation Beyond Borders, that will connect on-the-ground projects in Africa, Latin America, and Asia Pacific with Chinese businesses, lenders and agencies with vested economic interests in those regions.

We believe that China’s economic development offers a unique conservation opportunity recently. We plan to focus our efforts in four areas we believe will provide the greatest return on investment: Green Development, Project Financing, Responsible Sourcing, and China’s Overseas Aid. As Chinese investment and influence continue to grow, we believe that the Conservancy can play a role in moving China’s development trajectory towards a greener future.

Cooperation between Chinese construction companies and banks has been key for the expansion of Chinese global economic influence. Conservation organizations need to understand this kind of collaboration to enter into productive working relationships with SOE’s and financing entities and achieve biodiversity protection goals.

On Chinese international projects, e.g. hydropower projects or thermal power station projects, a lot of stakeholders are involved at different stages. We will focus on one of the special export intend project organizations here, a model which has been used in recent years by Chinese development companies and banks.

This presentation will focus primarily on the case of working with Chinese dam builders to achieve conservation objectives.

Contact Information: Le Zhu, TNC North Asia Region, B4-2 Jianwai Dajie 9#, Qijiayuan Diplomatic Compound, Beijing, 100600, China, Phone: +8610-85319572, Fax: +8610-85323922, Email: lzhu@tnc.org
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