World Environmental and Water Resources Congress 2011 Bearing Knowledge for Sustainability

EDITED BY R. Edward Beighley II, Ph.D. Mark W. Killgore, P.E., D.WRE



ENVIRONMENTAL & WATER RESOURCES INSTITUTE

WORLD ENVIRONMENTAL AND WATER RESOURCES CONGRESS 2011

BEARING KNOWLEDGE FOR SUSTAINABILITY

PROCEEDINGS OF THE 2011 CONGRESS

May 22–26, 2011 Palm Springs, California

SPONSORED BY Environmental and Water Resources Institute (EWRI) of the American Society of Civil Engineers

> EDITED BY R. Edward Beighley II, Ph.D. Mark W. Killgore, P.E., D. WRE





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Published by the American Society of Civil Engineers

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ISBN: 978-0-7844-1173-5

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Preface

The **2011 World Environmental and Water Resources Congress** held in Palm Springs, California May 22-26, 2011, consists of over 900 presentations, posters, special sessions and workshops. The theme of the Congress is **Bearing Knowledge for Sustainability.** This theme was chosen to recognize the emergence of sustainability as a key issue in most aspects of work performed by EWRI members and colleagues. The hope is that the Congress will serve to spur the environmental and engineering community to integrate the notion of sustainability in dealing with vexing technical, economic, social, environmental, and political issues.

To that end, along with our traditional tracks we are featured eight symposia including:

- Arid Lands Symposium
- Climate Change Symposium
- Sustainability Symposium
- 6th World Water Forum Symposium: North American Regional Event
- 7th Urban Watershed Management Symposium
- 8th Groundwater, Hydrology, Quality, and Management Symposium
- 13th Water Distribution Systems
- GV Loganathan Memorial Operations Management Symposium

ASCE defines sustainability as "a set of economic, environmental, and social conditions in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely, without degrading the quantity, quality, or availability of natural resources and ecosystems. Sustainable development is the process of converting natural resources into products and services that are more profitable, productive, and useful, while maintaining or enhancing the quantity, quality, availability, and productivity of the remaining natural resource base and the ecological systems on which they depend." Opportunities to learn more about sustainability on an ongoing basis include the EWRI Sustainability Committee and the ASCE Committee on Sustainability. Short courses and field trips related to sustainability were also featured in the Congress program. You will also note a new feature in our Congress Preliminary Program – an EWRI Sustainable Conference Policy Statement. We want to be able to say that "we walk the talk".

Sustainability is not new a new concept to the Desert Southwest. It permeated the indigenous cultures that were the earliest residents of the region. We see it reflected in the water bearer logo of the Palm Springs Convention Center.



Figure 1. Water bearer logo.

"The water bearer is an archetype... with water to provide the essence of new and fuller life, an earthen vessel to contain the community's wealth. Cultural identity is derived from the local tribe's relationship to the desert oasis. Water is the source of prosperous life and community in the desert, for commerce as well as pleasure."

An additional highlight of the Congress included a special session on "The 2010 Catastrophic Monsoon Flooding in Pakistan and the Global Community's Response". This session covered the catastrophic flooding that menaced Pakistan this past summer. The flooding was characterized as the worst in 80 years. It affected over 60,000 square miles of territory and inflicted hardship on some 20 million people. More than 2,000 persons perished. Representatives from government, academia, and other organizations will discuss the event, relief efforts, and plans to address any future reoccurrence of such flooding.

A second special session featured our colleagues from the China Institute of Water Resources and Hydropower Research (IWHR) discussing Inter-Basin Water Transfer Projects in China and the challenges faced on such projects.

Another important discussion centered around arid lands and the infamous Salton Sea. A special all day field trip to the Salton Sea was organized with USGS Salton Sea Office. The sea is facing special sustainability challenges as more water is diverted and water quality is further imperiled.



Figure 2. The Salton Sea.

The **2011 World Environmental and Water Resources Congress** was the result of countless hours of work by many people. This includes those whose efforts resulted in the technical papers and presentations that will be shared at the event, those organizing the individual sessions and tracks, and those responsible for the overall conduct of the Congress. Below you will find a list of the **2011 World Environmental and Water Resources Congress Committee** and Track Chairs. Several others played essential roles in making this

Congress a success. Our gratitude goes out to all that contributed through their support and participation.

The 2011 World Environmental and Water Resources Congress Committee included:

General Congress Chair Mark W. Killgore, P.E., D.WRE, M.ASCE Puget Sound Energy mark.killgore@pse.com

Technical Program Chair

R. Edward Beighley II, Ph.D., A.M. ASCE San Diego State University beighley@mail.sdsu.edu

Technical Program Co-Chair

Richard N. Palmer, Ph.D., P.E., D.WRE, M.ASCE, University of Massachusetts, Amherst palmer@ecs.umass.edu

Local Arrangements Chair

Bill Flores Jr., P.E., CPESC, CPSWQ HDR, Inc bill.flores@hdrinc.com

Exhibits & Sponsorship Chair

Debra L. Leigh Leigh Environmental Equipment, Inc. <u>debraleigh@qwest.net</u>

Continuing Education Chair

Martin Teal, P.E., P.H., D.WRE West Consultants, Inc. mteal@westconsultants.com

Student Program Chair nagamj@yahoo.com

EWRI Director

Brian K. Parsons, P.E., M.ASCE EWRI of ASCE bparsons@asce.org

ASCE and EWRI Conference Manager and Staff

Lucy King <u>lking@asce.org</u> Jessica Johnson jjohnson@asce.org Ann Rountree <u>arountree@asce.org</u> Andrew Kropf<u>akropf@asce.org</u> Sara Hagan <u>shagan@asce.org</u>

Acknowledgments

Track Chairs and Key Organizers

The 2011 Track Chairs and other key organizers are shown below. These folks worked with our moderators and authors to create the content for technical presentations, panel discussions, and poster sessions that we all enjoy. We are indebted to them for the time and energy they have expended on the Congress. We apologize for any misspellings or omissions. We also thank our numerous moderators, presenters, and authors who are credited in the final program and these proceedings.

Symposium or Track	Chair(s)
13th Annual Water Distribution Systems	Avi Ostfeld
Analysis Symposium	
6th World Water Forum Symposium: North	Daene McKinney
American Regional Event	
8th Urban Watersheds Management	Scott Struck, Richard Field
Symposium	
9th Symposium on Groundwater Hydrology,	Amy Chan- Hilton, Abhishek Singh,
Quality and Management	Xuefeng Chu
Arid Lands Symposium	Zia Hosseinipour, Julianne Miller
ASCE-EWRI Sections and Branch Activities	Sheila Carpenter- van Dijk
California Water and Environmental Projects	Mark Norton, Pal Hegedus
and Issues	
Climate Change Symposium	Brian Roberts, Casey Brown, Levent Kavvas
Communications	Mary Thomas
Education and Research	Cassie Klumpp
Emerging and Innovative Technologies	Walter Grayman, Craig Patterson, Elizabeth
	Coyle
Environmental	Marge Bedessem
GV Loganathan Memorial Operations	George McMahon
Management Symposium	
History and Heritage	Jerry Rogers, Jay Frederich
Hydraulics and Waterways	Michael Schwar, Kelly Brennan
International	Daene McKinney, Lisa Bourget
Irrigation and Drainage	Eduardo Bautista
Planning and Management	Eric Loucks
Standards	Hugo Loaiciga
Student and New Professionals	Jamal Nagami
Student Technical Paper Competition	Kate Leonard
Sustainability Symposium	Karen Karvazy, Helene Hilger
Water Systems Security	Clifford Bowen Kenneth Thompson
Water, Wastewater, and Stormwater	Karen Karvazy, Berrin Tansel, Charlene
	Johnston, Kwabena Osei
Watersheds	Chandra Pathak, David Williams

We also acknowledge the support of the EWRI Governing Board which approved the Congress venue and provided ongoing review of progress.

Cover Photo

The cover photo features "Sunrise over the Tennessee River" by Allison M. Gilbert, University of Alabama in Huntsville. This photo was taken at dawn overlooking the Honeycomb Bay of Guntersville Lake part of the Tennessee River in northern Alabama on a chilly winter morning in January. The Appalachian Mountains are featured in the background.

The Tennessee River is the largest tributary of the Ohio River. It is approximately 652 miles (1049 km) long and is located in the southeastern United States in the Tennessee Valley. The Tennessee River is one of the world's largest irrigation and hydropower systems, as well as a major waterway in the southeastern United States.

It is an important water resource for the region and the Tennessee Valley Authority which operates 29 conventional hydroelectric dams throughout the entire river system and one pumped-storage facility for the production of electricity. There are other projects in the basin including Corps of Engineer and Alcoa owned dams. Navigation and cooling water for nuclear power and fossil fuel plants represent other important uses. Recreation use is extensive and there are several marinas and sport fishing is quite popular.



Figure 3. Sunrise over the Tennessee River

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