

WORLD ENVIRONMENTAL AND WATER RESOURCES CONGRESS 2010

CHALLENGES OF CHANGE

PROCEEDINGS OF THE CONGRESS

May 16–20, 2010
Providence, Rhode Island

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

EDITED BY
Richard N. Palmer, Ph.D., P.E., D.WRE



ENVIRONMENTAL &
WATER RESOURCES
INSTITUTE

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Preface

The 2010 World Environmental and Water Resources Congress held in Providence, Rhode Island May 16-20, 2010, consists of over 700 presentations, special sessions and workshops. The theme of the Congress is the **Challenges of Change**. This theme was chosen to recognize that we live in a world facing tremendous changes: climate, economic, cultural, social, and natural. How our professional community responds to these changes will affect us today and the generations that follow. It is only through the collective wisdom of all of the Environmental and Water Resources Community that we can address these challenges and create a world that is resilient to change.

This Congress, with over 180 sessions, addresses a wide range of areas that will see dramatic change in the future. Perhaps first and foremost among these topics is climate change. This year, some 50 papers addressed the need to evaluate, respond, and plan for the impacts of climate change. Another topic of continued interest is how best to deal with managing the ever growing conflicts associated with sustaining our nation's water. As in the past, there was continued interest in the systematic management of our resources, the efficient and safe transmission of water through our distribution systems, low-impact development of water resources, groundwater management, and urban hydrology. This Congress continues the long tradition of these national meetings in exploring well-defined challenges that have yet to be solved, updating researchers and practitioners on recent accomplishments, and identifying emerging challenges both to this nation and the world.

The 2010 World Environmental and Water Resources Congress is the result of countless hours of work by many people. This includes those whose efforts result 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 2010 World Environmental and Water Resources Congress Committee and Track Chairs. Many others played essential roles in making this Congress a success. My deepest and most sincere thanks go out to all that contributed through their support and participation. Everyone was a critical component to the Congress being a success.

The 2010 World Environmental and Water Resources Congress Committee was:

General Congress Chair

Don Phelps, P.E., D.WRE, M.ASCE

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Technical Program Chair

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Stacey Ann P. Gardiner, CMP

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The key 20010 Track Chairs and their conference co-workers follow. My humblest apologies for anyone that has been inadvertently been omitted. Everyone's contribution was greatly appreciated.

Education and Research - **Cassie Klumpp**

Climate Change – **Brian Roberts, Richard Palmer**

Communications – **Mary Thomas**

Emerging & Innovative Technologies – **Lily Anne Baldwin, Laurel Saito**

Environmental Council – **Marge Bedessem**

8th Groundwater Hydrology, Quality, and Management Symposium – **Amy Chan-**

Hilton, Zhuping Sheng, Abhishek Singh

History and Heritage – **Jerry Rogers, Cassie Klumpp**

International Issues – **Daene McKinney, David Watkins**

Hydraulics and Waterways – **Jennifer Duan, David Admiraal, Thanos Papanicolaou,**

George Constantinescu, Yifan Zheng

Irrigation & Drainage – **Anastasia Chirnside**

Planning and Management - **Eric Loucks, Stacy Langsdale, Richard Palmer, John**

Nicklow, Paul Kirshen, Veronica Griffis, Ximing Cai

Probabilistic Approaches – **Christina Tsai**

Section and Branch Activities – **Sheila Carpenter-Van Dijk**

7th Urban Watershed Management Symposium - **Scott Struck, Richard Field**

Water, Wastewater & Stormwater - **Richard Tsang, Karen Karvazy, Charlene**

Johnston, Robert Traver, Kenneth Thompson, Van Frenkel, Conrad Keyes, Jr.

12th Water Distribution System Analysis Symposium - **Avi Ostfeld**

Watershed Council – **Levent Kavvas, Chandra Pathak**

Cover Photo

The Chamelecon River in this photograph near Macuelizo, Honduras is a valuable environmental resource to the adjacent rural communities, but it also presents a challenge. Lacking a bridge, it is particularly difficult to cross in the rainy season, preventing travel to and from the local town center and nearby cities. Even though global needs and challenges are varied, increasing worldwide connectedness means that cooperation and collaboration are needed for navigating the challenges of change in our world, which makes the leadership of the environmental and engineering community evermore important.

Kelly Donmoyer, EIT

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