

**American Water Resources Association**

**2008 ANNUAL WATER  
RESOURCES CONFERENCE**

**FINAL PROGRAM**

**November 17-20, 2008  
New Orleans, Louisiana**



**AWRA**

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Community  
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Connections**



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## 2008 AWRA Annual Water Resources Conference



### **WELCOME TO THE "BIG EASY" AND TO AWRA'S 2008 ANNUAL WATER RESOURCES CONFERENCE ... DAVID R. WATT, GENERAL CHAIR**

This year our conference is located at the beautiful Sheraton New Orleans Hotel. The hotel is located on historic Canal Street just steps from the French Quarter and within walking distance to *beignets* and *café au lait*, Royal Street, the French Market, Jackson Square, Bourbon Street, the Aquarium of the Americas, an IMAX Theater, Riverwalk Marketplace, and all the world-famous restaurants and live music clubs of the *Vieux Carré*.

But more than the excitement of the city draws AWRA to New Orleans. The Mississippi River Delta, the Louisiana coastline and the entire southeast are at the center of some of the most serious water resources challenges in the United States. New Orleans is the perfect location to focus our attention on current water resources issues at the local, regional, national, and international levels. This year's conference promises to live up to the excellent benchmark set by previous conferences with a little *lagniappe* thrown in for good measure! Our technical sessions promise to be informative and thought provoking. They will cover topics as diverse as our multidisciplinary members. You will find our keynote speakers are second to none when it comes to federal, state, and local perspectives on New Orleans and coastal Louisiana water resources issues. We will again be hosting the popular Awards Luncheon, Student Career Night, and a Tuesday evening *Fais Do-do* that you will not want to miss! We know you will have a great time while learning about the latest in water resources research, management, and technology.



I want to take this opportunity to express my gratitude to the AWRA staff and the volunteers on the conference planning committee and their employers. Of course, we need to thank the keynote speakers, presenters, and moderators for the quality content of the conference. I also appreciate the financial support of our many sponsors. During the conference, please take a moment to thank those people who are wearing a special ribbon on their nametag indicating their participation in this fine event. Finally, I want to thank you for your financial and time commitment to attend this conference. I hope you enjoy your conference experience and take full advantage of the opportunities to build *Community*, participate in *Conversations*, and make *Connections* in a way that only an AWRA annual conference can provide!

*Laissez les bon temps rouler! . . . Dave*

### **WATER TV AT THE 2008 AWRA ANNUAL WATER RESOURCES CONFERENCE**

For the first time Water TV will be broadcasting at the AWRA Annual Conference, brought to you by **WebsEdge** – a leading TV Production Company based in the UK. Water TV will film all the action at the venue and pick up on the key issues affecting you! Look out for key interviews and documentaries on the latest developments in water issues and management. You can watch each day's program on Water TV plasma screens around the venue, from the comfort of your hotel room, and also afterwards on a specially created Internet TV channel.

#### **Participating Organizations**

Arizona Dept. of Water Resources  
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Metropolitan Water District of Southern California  
USDA Agriculture Research Service  
United Water  
University of Arizona, Water Resources Research Institute  
Washington County Conservancy District  
Western Municipal Water District, California  
Zone 7 Water Agency, Livermore, California

**AWRA ACKNOWLEDGES AND IS GRATEFUL FOR THE SUPPORT GIVEN BY THE SPONSORS OF INDIVIDUAL EVENTS. THEY ARE RECOGNIZED THROUGHOUT THE FINAL PROGRAM. PLEASE SUPPORT ALL OF OUR SPONSORS ... THEY ARE HELPING TO SUPPORT AWRA'S COMMUNITY, CONVERSATION, AND CONNECTIONS!**



**AWRA**  
Community. Conversation. Connections.  
AMERICAN WATER RESOURCES ASSOCIATION

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advancing multidisciplinary water resources education, management, and research.

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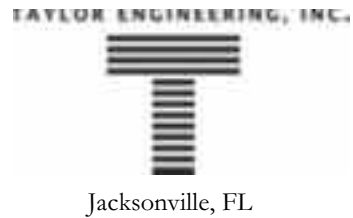
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## BOOK & JOURNAL EXHIBITORS NAPOLEON FOYER

During the conference there will be a display of publications from a variety of publishers on numerous aspects of water resources, education, conservation, and technology. This is a unique opportunity for you to review new literature in the field. **Display copies may be purchased at a discounted price, and must be picked up at the AWRA Registration Desk by Thursday, November 20 at 11:00 a.m.**

### CONFIRMED BOOK EXHIBITORS

*(at the time of the printing of the final program)*

**American Water Works Association** ~ Denver, CO

**Envirotech Publications, Inc.** ~ Eugene, OR.

**E. Schweizerbart'sche** ~ Stuttgart, Germany

**Geotechnical Translations** ~ Austin, TX

**Oxford University Press** ~ New York, NY

**Stylus Publications** ~ Sterling, VA

**The MIT Press** ~ Cambridge, MA

**University of California, Agriculture & Natural Resources Community Services** ~ Davis, CA

**University Press of Colorado** ~ Boulder, CO

**Water Resources Publications, LLC** ~ Littleton, CO

### BOOK DISPLAY HOURS

**Monday, November 17:** 7:30 a.m. – 6:00 p.m.

**Tuesday, November 18:** 7:30 a.m. – 5:00 p.m.

**Wednesday, November 19:** 7:30 a.m. – 5:00 p.m.

**Thursday, November 20:** 7:30 a.m. – 12:00 noon

## 2008 ANNUAL CONFERENCE ORGANIZING COMMITTEE

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St. Johns River Water Management District • Palatka, Florida

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### **AWRA INTERNATIONAL AFFAIRS COMMITTEE (IAC) SENDING BOOKS TO FOREIGN COUNTRIES**

This year the AWRA International Affairs Committee (IAC) will launch an effort to get good science into the hands of professors, students, and government workers in developing nations who struggle with water related issues. Many of these people cannot afford to come to conferences or purchase textbooks and other scientific materials that they need. If you have recent book collections or old books, periodicals, journals, governmental reports, research and technical reports, or reprints with lasting application value related to the water sciences and engineering please **contact Don Young at [westwater@cox.net](mailto:westwater@cox.net)**. IAC also needs to collect funds for shipping materials to these countries. So far we have sent books to Ethiopia, with future shipments planned for Iraq, Kenya, and Ecuador. Please be a part of this important charitable effort and **visit the [registration table to make a contribution](#)**.

### **AWRA CONVERSATION CORNER**

NAPOLEON FOYER

The American Water Resources Association's mission is to foster communication across all disciplines involved in the water resources community thereby creating lasting connections which will help forge solutions to our nation's ever increasing water resources challenges. A "Conversation Corner" has been set aside to provide a space to engage your colleagues in meaningful dialogues. Internet connections will also be available to check email. Opening times are listed in each Day-at-a-Glance listing in the Final Program.

### **MEETING REGISTRATION INFORMATION**

**REGISTRATION – ALL PERSONS INCLUDING PRESENTERS ARE REQUIRED TO REGISTER FOR THIS MEETING AND MUST PAY THE APPROPRIATE REGISTRATION FEE.**

#### **REGISTRATION DESK HOURS OF OPERATION**

**SUNDAY • NOVEMBER 16 • 4:00 P.M. TO 6:00 P.M.**

**MONDAY • NOVEMBER 17 • 7:30 A.M. TO 6:00 P.M.**

**TUESDAY • NOVEMBER 18 • 7:30 A.M. TO 5:00 P.M.**

**WEDNESDAY • NOVEMBER 19 • 7:30 A.M. TO 5:00 P.M.**

**THURSDAY • NOVEMBER 20 • 7:30 A.M. TO 12:00 NOON**

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| CONCURRENT SESSIONS 30, 31, 32, 33, 34 / 3:30 P.M.-5:00 P.M. ....   | 21,22      |
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| CONCURRENT SESSIONS 45, 46, 47, 48, 49 / 1:30 P.M.-3:00 P.M. ....   | 26,27      |
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### PLEASE NOTE

This printed version of the Final Program contains all changes as of October 27, 2008. Additional changes may have been necessary after the program was sent to press. Late changes will be announced during the Conference or will be noted on session signs that will be in front of assigned rooms.



**AWRA'S 2008 ANNUAL WATER RESOURCES CONFERENCE  
TECHNICAL & POSTER SESSIONS AT-A-GLANCE**

**• MONDAY ~ NOVEMBER 17 •**

**8:00 AM-10:00 AM**

**OPENING PLENARY SESSION**

**SPEAKERS**

**LT. GENERAL**

**ROBERT VAN ANTWERP  
WASHINGTON, DC**

**HONORABLE GARRETT GRAVES  
BATON ROUGE, LA**

**DR. EARTHEA NANCE  
NEW ORLEANS, LA**

**DENNIS KAMBER  
ROCKVILLE, MD**

**10:30 AM-12:00 NOON**

**CONCURRENT SESSIONS 1-5**

- 1 Integrated Water Resources Planning-I
- 2 Watershed Planning & Mgmt.: Hydrologic Data
- 3 Rainfall Issues & Climate Chg.
- 4 Approaches to Nonpoint Source TMDL Implementation
- 5 Panel: Waterlogged: Water in the Blogosphere

**POSTER SESSION  
8:00 AM-6:30 PM**

**LUNCH ~ ON YOUR OWN  
12:00 NN-1:25 PM**

**1:30 PM-3:00 PM**

**CONCURRENT SESSIONS 6-10**

- 6 Market Based Solution & Financing
- 7 Watershed Planning & Mgmt.-I
- 8 Effects of Climate Change-I
- 9 Impact & Mgmt. of Nonpoint Source Pollution-I
- 10 Panel: Sustainability – What Does It Mean To You? Different Viewpoints & Case Studies

**3:30 PM-5:00 PM**

**CONCURRENT SESSIONS 11-14**

- 11 Integrated Water Resources Planning-II
- 12 Watershed Planning & Mgmt.-II
- 13 Effects of Climate Change-II
- 14 Impact & Mgmt. of Nonpoint Source Pollution-II

**STUDENT CONFERENCE ORIENTATION  
4:30 PM-5:00 PM**

**OPENING NETWORKING RECEPTION  
5:00 PM-6:30 PM**

**WOMEN IN THE ENVIRONMENT NETWORKING EVENT ~ 7:00 PM**

**• TUESDAY ~ NOVEMBER 18 •**

**8:30 AM-10:00 AM**

**CONCURRENT SESSIONS 15-19**

- 15 Policy & Market Solution to Water Issues
- 16 Watershed Planning & Mgmt.-III
- 17 Effects of Urbanization-I
- 18 Emerging Contaminants & Nonpoint Source Pollution
- 19 New Orleans Restoration & Future Protection

**POSTER SESSION  
8:30 AM-3:30 PM**

**10:30 AM-12:00 NOON**

**CONCURRENT SESSIONS 20-24**

- 20 Emerging Issues
- 21 Water Demand & Drought Planning Mgmt.
- 22 Urban Stormwater Impacts
- 23 Water Quality & Groundwater Contamination
- 24 Louisiana Coastal Restoration

**LUNCH ~ ON YOUR OWN  
12:00 NN-1:25 PM**

**1:30 PM-3:00 PM**

**CONCURRENT SESSIONS 25-29**

- 25 Infrastructure Planning & Implementation
- 26 Flooding & Floodplain Mgmt.-I
- 27 Effects of Urbanization-II
- 28 Water Quality Monitoring & Analysis
- 29 Panel: Coastal Restoration & Protection Effort in LA– How Do You Keep America's Premier Below Sea Level City From Drowning?

**SPECIAL EVENT ~ 6:00 PM-9:00 PM  
AN EVENING AT THE AUDUBON ZOO  
LOUISIANA SWAMP EXHIBIT**

**3:30 PM-5:00 PM**

**CONCURRENT SESSIONS 30-34**

- 30 Panel: Meeting Future Water Demands-I
- 31 Flooding & Floodplain Mgmt.-II
- 32 Effects of Urbanization on Water Resources-I
- 33 Water Quality Monitoring
- 34 Lower Mississippi Flood Control

**• WEDNESDAY ~ NOVEMBER 19 •**

**8:30 AM-10:00 AM**

**CONCURRENT SESSIONS 35-39**

- 35 Water Rights and Community Empowerment
- 36 Flood Forecasting & Warning
- 37 Effect of Urbanization on Water Resources-II
- 38 Sediments, Nutrients, & Coastal Issues
- 39 GIS, Remote Sensing, & Modeling

**STUDENT CAREER NIGHT  
5:00 PM-7:00 PM**

**10:30 AM-12:00 NOON**

**CONCURRENT SESSIONS 40-44**

- 40 Meeting Future Water Demands-II
- 41 Flooding & Floodplain Mgmt.-III
- 42 Water Supply Issues
- 43 Pathogens Source & Control in Watersheds
- 44 Panel: Dredged Material Mgmt.: From the Open Water to Mine Reclamation, Wetlands Construction, and an Operational Outlook for Louisiana

**1:30 PM-3:00 PM**

**CONCURRENT SESSIONS 45-49**

- 45 Meeting Future Water Demands-III
- 46 Stormwater Mgmt. LID BMPs
- 47 Source Water Protection
- 48 Riparian & Aquatic Ecosystem Restoration
- 49 GIS, Remote Sensing, and Hydrologic Data Sets

**CONFERENCE AWARDS LUNCHEON ~ 12:00 NN-1:25 PM  
SPEAKER ~ ABIGAIL KIMBELL  
CHIEF, U.S. FOREST SERVICE ~ WASHINGTON, DC**

**3:30 PM-5:00 PM**

**CONCURRENT SESSIONS 50-54**

- 50 Water Quality Trading & Effect of Urbanization
- 51 Stormwater Mgmt. BMP Performance
- 52 Stream Channel Processes
- 53 Riparian Buffer & Stream Ecology
- 54 Surface Water & Groundwater Interaction

**• THURSDAY ~ NOVEMBER 20 •**

**8:30 AM-10:00 AM**

**CONCURRENT SESSIONS 55-59**

- 55 Water Conservation
- 56 Stormwater Mgmt. Low Impact Development
- 57 Impacts & Mgmt. of Agricultural Sources
- 58 Wetlands Restoration, Protection, and Design
- 59 Panel – Extreme Environmental Makeover: Florida's Model Approach to Water Quality Improvement & Environmental Restoration

**10:30 AM-12:00 NOON**

**CONCURRENT SESSIONS 60-63**

- 60 Community Involvement & Watershed Planning
- 61 Stormwater Mgmt. & Reservoir Modeling
- 62 Agricultural BMPs & Modeling
- 63 Riparian & Aquatic Ecosystem Restoration

**1:30 PM-3:00 PM**

**CONCURRENT SESSIONS 64-67**

- 64 Decision Support
- 65 Stormwater Mgmt. Nutrient, Hydrology, Hydraulic
- 66 Agricultural Hydrology
- 67 National & International Ecosystems Restoration

**LUNCH ~ ON YOUR OWN  
12:00 NN-1:25 PM**

**AWRA'S 2008 ANNUAL WATER RESOURCES CONF. ~ NOV. 17-20 ~ NEW ORLEANS, LOUISIANA  
TECHNICAL SESSIONS AT-A-GLANCE BY TRACK**

**POLICY AND PLANNING TRACK**

|            |  | <b>DAY</b> | <b>TIME</b>         |
|------------|--|------------|---------------------|
| Session 1  | Integrated Water Resources Planning-I  | Monday     | 10:30 am-12:00 noon |
| Session 5  | Panel: Waterlogged – Water in the Blogosphere  | Monday     | 10:30 am-12:00 noon |
| Session 6  | Market Based Solution & Financing  | Monday     | 1:30 pm-3:00 pm     |
| Session 10 | Panel: Sustainability- What Does It Mean To You? Different Viewpoints & Case Studies | Monday     | 1:30 pm-3:00 pm     |
| Session 11 | Integrated Water Resources Planning-II   | Monday     | 3:30 pm-5:00 pm     |
| Session 15 | Policy & Market Solution to Water Issues   | Tuesday    | 8:30 am-10:00 am    |
| Session 20 | Emerging Issues  | Tuesday    | 10:30 am-12:00 noon |
| Session 25 | Infrastructure Planning & Implementation   | Tuesday    | 1:30 pm-3:00 pm     |
| Session 30 | Panel: Meeting Future Water Demands-I  | Tuesday    | 3:30 pm-5:00 pm     |
| Session 35 | Water Rights & Community Empowerment   | Wednesday  | 8:30 am-10:00 am    |
| Session 40 | Meeting Future Water Demands-II  | Wednesday  | 10:30 am-12:00 noon |
| Session 45 | Meeting Future Water Demands-III   | Wednesday  | 1:30 pm-3:00 pm     |
| Session 50 | Water Quality Trading & Effect of Urbanization                                       | Wednesday  | 3:30 pm-5:00 pm     |
| Session 55 | Water Conservation   | Thursday   | 8:30 am-10:00 am    |
| Session 60 | Community Involvement & Watershed Planning   | Thursday   | 10:30 am-12:00 noon |
| Session 64 | Decision Support   | Thursday   | 1:30 pm-3:00 pm     |

**MANAGEMENT TRACK**

|            |   | <b>DAY</b> | <b>TIME</b>         |
|------------|---|------------|---------------------|
| Session 2  | Watershed Planning & Mgmt.: Hydrologic Data     | Monday     | 10:30 am-12:00 noon |
| Session 7  | Watershed Planning & Mgmt.-I                    | Monday     | 1:30 pm-3:00 pm     |
| Session 12 | Watershed Planning & Mgmt.-II                   | Monday     | 3:30 pm-5:00 pm     |
| Session 16 | Watershed Planning & Mgmt.-III                  | Tuesday    | 8:30 am-10:00 am    |
| Session 21 | Water Demand & Drought Planning Mgmt.           | Tuesday    | 10:30 am-12:00 noon |
| Session 26 | Flooding & Floodplain Mgmt.-I                   | Tuesday    | 1:30 pm-3:00 pm     |
| Session 31 | Flooding & Floodplain Mgmt.-II                  | Tuesday    | 3:30 pm-5:00 pm     |
| Session 36 | Flood Forecasting & Warning                     | Wednesday  | 8:30 am-10:00 am    |
| Session 41 | Flooding & Floodplain Mgmt.-III                 | Wednesday  | 10:30 am-12:00 noon |
| Session 46 | Stormwater Mgmt. LID BMPs                       | Wednesday  | 1:30 pm-3:00 pm     |
| Session 51 | Stormwater Mgmt. BMP Performance                | Wednesday  | 3:30 pm-5:00 pm     |
| Session 56 | Stormwater Mgmt. Low Impact Development         | Thursday   | 8:30 am-10:00 am    |
| Session 61 | Stormwater Mgmt. & Reservoir Modeling           | Thursday   | 10:30 am-12:00 noon |
| Session 65 | Stormwater Mgmt. Nutrient, Hydrology, Hydraulic | Thursday   | 1:30 pm-3:00 pm     |

**CLIMATE CHANGE TRACK**

|            |                                  | <b>DAY</b> | <b>TIME</b>         |
|------------|----------------------------------|------------|---------------------|
| Session 3  | Rainfall Issues & Climate Change | Monday     | 10:30 am-12:00 noon |
| Session 8  | Effects of Climate Change-I      | Monday     | 1:30 pm-3:00 pm     |
| Session 13 | Effects of Climate Change-II     | Monday     | 3:30 pm-5:00 pm     |

**URBANIZATION TRACK**

|            |  | <b>DAY</b> | <b>TIME</b>         |
|------------|--|------------|---------------------|
| Session 17 | Effects of Urbanization-I                    | Tuesday    | 8:30 am-10:00 am    |
| Session 22 | Urban Stormwater Impacts                     | Tuesday    | 10:30 am-12:00 noon |
| Session 27 | Effects of Urbanization-II                   | Tuesday    | 1:30 pm-3:00 pm     |
| Session 32 | Effects of Urbanization on Water Resources-I | Tuesday    | 3:30 pm-5:00 pm     |
| Session 37 | Effect of Urbanization on Water Resources-II | Wednesday  | 8:30 am-10:00 am    |

**WATER SUPPLY TRACK**

|            |                          | <b>DAY</b> | <b>TIME</b>         |
|------------|--------------------------|------------|---------------------|
| Session 42 | Water Supply Issues      | Wednesday  | 10:30 am-12:00 noon |
| Session 47 | Source Water Protection  | Wednesday  | 1:30 pm-3:00 pm     |
| Session 52 | Stream Channel Processes | Wednesday  | 3:30 pm-5:00 pm     |

**AGRICULTURE TRACK**

|            |   | <b>DAY</b> | <b>TIME</b>         |
|------------|---|------------|---------------------|
| Session 57 | Impacts & Mgmt. of Agricultural Sources | Thursday   | 8:30 am-10:00 am    |
| Session 62 | Agricultural BMPs & Modeling            | Thursday   | 10:30 am-12:00 noon |
| Session 66 | Agricultural Hydrology                  | Thursday   | 1:30 pm-3:00 pm     |

**WATER QUALITY & ECOLOGY TRACK**

|            |  | <b>DAY</b> | <b>TIME</b>         |
|------------|--|------------|---------------------|
| Session 4  | Approaches to Nonpoint Source TMDL Implementation  | Monday     | 10:30 am-12:00 noon |
| Session 9  | Impact & Mgmt. of Nonpoint Source Pollution-I  | Monday     | 1:30 pm-3:00 pm     |
| Session 14 | Impact & Mgmt. of Nonpoint Source Pollution-II   | Monday     | 3:30 pm-5:00 pm     |
| Session 18 | Emerging Contaminants & Nonpoint Source Pollution  | Tuesday    | 8:30 am-10:00 am    |
| Session 23 | Water Quality & Groundwater Contamination  | Tuesday    | 10:30 am-12:00 noon |
| Session 28 | Water Quality Monitoring & Analysis  | Tuesday    | 1:30 pm-3:00 pm     |
| Session 33 | Water Quality Monitoring   | Tuesday    | 3:30 pm-5:00 pm     |
| Session 38 | Sediments, Nutrients, & Coastal Issues   | Wednesday  | 8:30 am-10:00 am    |
| Session 43 | Pathogens Source & Control in Watersheds   | Wednesday  | 10:30 am-12:00 noon |
| Session 48 | Riparian & Aquatic Ecosystem Restoration   | Wednesday  | 1:30 pm-3:00 pm     |
| Session 53 | Riparian Buffer & Stream Ecology   | Wednesday  | 3:30 pm-5:00 pm     |
| Session 58 | Wetlands Restoration, Protection, and Design   | Thursday   | 8:30 am-10:00 am    |
| Session 59 | Panel-Extreme Env. Makeover: FL's Model Approach to Water Quality Improvement & Env. Restoration | Thursday   | 8:30 am-10:00 am    |
| Session 63 | Riparian & Aquatic Ecosystem Restoration   | Thursday   | 10:30 am-12:00 noon |
| Session 67 | National & International Ecosystems Restoration  | Thursday   | 1:30 pm-3:00 pm     |

**LOUISIANA & NEW ORLEANS TRACK**

|            |   | <b>DAY</b> | <b>TIME</b>         |
|------------|---|------------|---------------------|
| Session 19 | New Orleans Restoration & Future Protection   | Tuesday    | 8:30 am-10:00 am    |
| Session 24 | Louisiana Coastal Restoration   | Tuesday    | 10:30 am-12:00 noon |
| Session 29 | Panel: Coastal Restoration & Protection Effort in Louisiana – How Do You Keep America's Premier ... | Tuesday    | 1:30 pm-3:00 pm     |
| Session 34 | Lower Mississippi Flood Control   | Tuesday    | 3:30 pm-5:00 pm     |
| Session 39 | GIS, Remote Sensing, & Modeling   | Wednesday  | 8:30 am-10:00 am    |
| Session 44 | Panel: Dredged Material Mgmt.: From the Open Water to Mine Reclamation ...                          | Wednesday  | 10:30 am-12:00 noon |
| Session 49 | GIS, Remote Sensing, and Hydrologic Data Sets   | Wednesday  | 1:30 pm-3:00 pm     |
| Session 54 | Surface Water & Groundwater Interaction   | Wednesday  | 3:30 pm-5:00 pm     |



**American households use an average of 350 gallons of water a day which adds up to a staggering 127,750 gallons a year. The South Florida Water Management District developed a year-round water conservation program to encourage responsible water use.**

**Rise and shine**

Water your lawn during the early morning hours when temperatures and wind speed are the lowest. This reduces evaporation and wasteful watering.

**How much is enough?**

Watering less frequently with the right amount of water is better than watering often with small amounts. Water thoroughly so water will reach deeper portions of the soil. Deeper grass roots will grow, and grass will stay greener and healthier. Most of the year, lawns only need one inch of water per week.

**Shut it off!**

Simply shutting the water off while brushing your teeth or taking a shorter shower can save hundreds of gallons of water a month. Saving 10 gallons a day saves 3,650 gallons a year.

For more ways to conserve water – both indoors and out – and to help protect our resources, visit the South Florida Water Management District's water conservation web site at [www.savewaterfl.com](http://www.savewaterfl.com)



**Who we are...**

**WE MANAGE** the water resources for over 7.5 million people living in south Florida.

**WE PROVIDE** water when there is not enough and take it away when there is too much.

**WE SAFEGUARD** the region's water quality to ensure enough usable water now and 50 years from now.

**WE ARE REVITALIZING** one of the most diverse ecosystems in the world stretching 240 miles from Orlando to the Florida Keys and accelerating the restoration of Florida's Everglades.



South Florida Water Management District  
 3301 Gun Club Road • West Palm Beach, Florida 33406  
 561-686-8800 • FL WATS 1-800-432-2045 • [www.sfwmd.gov](http://www.sfwmd.gov)  
 MAILING ADDRESS: P.O. Box 24680 • West Palm Beach, FL 33416-4680

[sfwmd.gov](http://sfwmd.gov)

## DAY-AT-A-GLANCE / MONDAY / NOVEMBER 17, 2008

AWRA CONVERSATION CORNER OPEN / 6:00 A.M.-7:00 P.M. / NAPOLEON FOYER

REGISTRATION DESK OPEN / 7:30 A.M.-6:00 P.M. / MEETINGS REGISTRATION DESK / NAPOLEON FOYER

AWRA NEW MEMBER WELCOME BREAKFAST (INVITATION ONLY) / 7:00 A.M.-8:00 A.M./MAUREPAS ROOM (3RD FLOOR)

BOOK & JOURNAL EXHIBIT OPEN & EMPLOYMENT OPPORTUNITY BOARD ON DISPLAY  
8:00 A.M.-6:30 P.M. / NAPOLEON FOYER

MORNING NETWORKING BREAK / 8:00 A.M.-10:30 A.M. / NAPOLEON CD123 & NAPOLEON CORRIDOR

COMMERCIAL AND EDUCATIONAL EXHIBITS OPEN/8:00 A.M.-6:30 P.M./NAPOLEON CD123 & NAPOLEON CORRIDOR

TECHNICAL POSTER SESSION / 8:00 A.M.-6:30 P.M. / NAPOLEON CD123  
(POSTER PRESENTERS WILL BE AT THEIR POSTERS DURING THE OPENING NETWORKING RECEPTION AND NETWORKING BREAKS)

ORGANIZATIONAL DISPLAYS OPEN / 8:30 A.M.-6:30 P.M. / NAPOLEON FOYER

SPEAKERS' PREPARATION ROOM OPEN / 9:00 A.M.-8:00 P.M. / CRESCENT ROOM (4TH FLOOR)

CONFERENCE OPENING PLENARY SESSION / 8:00 A.M.-10:00 A.M. / NAPOLEON B123

CONCURRENT SESSIONS 1, 2, 3, 4, 5 / 10:30 A.M.-12:00 NOON

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|--|--|---|---|--|
| <p style="text-align: center;"><u>SESSION 1</u><br/>INTEGRATED WATER<br/>RESOURCES<br/>PLANNING-I<br/><br/>NAPOLEON B1</p> | <p style="text-align: center;"><u>SESSION 2</u><br/>WATERSHED<br/>PLANNING AND<br/>MANAGEMENT:<br/>HYDROLOGIC DATA<br/>NAPOLEON A1&amp;2</p> | <p style="text-align: center;"><u>SESSION 3</u><br/>RAINFALL ISSUES<br/>AND CLIMATE<br/>CHANGE<br/><br/>NAPOLEON B2</p> | <p style="text-align: center;"><u>SESSION 4</u><br/>APPROACHES TO<br/>NONPOINT SOURCE<br/>TMDL<br/>IMPLEMENTATION<br/>NAPOLEON A3</p> | <p style="text-align: center;"><u>SESSION 5</u><br/>PANEL<br/>WATERBLOGGED:<br/>WATER IN THE<br/>BLOGOSPHERE<br/>NAPOLEON B3</p> |
|--|--|---|---|--|

JAWRA ASSOCIATE EDITORS' LUNCHEON MEETING (INVITATION ONLY)  
11:30 A.M.-2:00 P.M. / GALLIER AB (4TH FLOOR)

LUNCH BREAK / 12:00 NOON-1:25 P.M. / ON YOUR OWN

CONCURRENT SESSIONS 6, 7, 8, 9, 10 / 1:30 P.M.-3:00 P.M.

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| <p style="text-align: center;"><u>SESSION 6</u><br/>MARKET BASED<br/>SOLUTION AND<br/>FINANCING<br/><br/>NAPOLEON B1</p> | <p style="text-align: center;"><u>SESSION 7</u><br/>WATERSHED<br/>PLANNING AND<br/>MANAGEMENT-I<br/><br/>NAPOLEON A1&amp;2</p> | <p style="text-align: center;"><u>SESSION 8</u><br/>EFFECTS OF<br/>CLIMATE CHANGE-I<br/><br/>NAPOLEON B2</p> | <p style="text-align: center;"><u>SESSION 9</u><br/>IMPACT AND<br/>MANAGEMENT OF<br/>NONPOINT SOURCE<br/>POLLUTION-I<br/>NAPOLEON A3</p> | <p style="text-align: center;"><u>SESSION 10</u><br/>PANEL-SUSTAINABILITY:<br/>WHAT DOES IT MEAN<br/>TO YOU? DIFFERENT<br/>VIEWPOINTS &amp; CASE<br/>STUDIES<br/>NAPOLEON B3</p> |
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AFTERNOON NETWORKING BREAK / 3:00 PM-3:30 P.M. / NAPOLEON CD123 & NAPOLEON CORRIDOR

CONCURRENT SESSIONS 11, 12, 13, 14, 14A / 3:30 P.M.-5:00 P.M.

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| <p style="text-align: center;"><u>SESSION 11</u><br/>INTEGRATED WATER<br/>RESOURCES<br/>PLANNING-II<br/><br/>NAPOLEON B1</p> | <p style="text-align: center;"><u>SESSION 12</u><br/>WATERSHED<br/>PLANNING AND<br/>MANAGEMENT-II<br/><br/>NAPOLEON A1&amp;2</p> | <p style="text-align: center;"><u>SESSION 13</u><br/>EFFECTS OF<br/>CLIMATE CHANGE-II<br/><br/>NAPOLEON B2</p> | <p style="text-align: center;"><u>SESSION 14</u><br/>IMPACT AND<br/>MANAGEMENT OF<br/>NONPOINT SOURCE<br/>POLLUTION-II<br/>NAPOLEON A3</p> |
|--|--|--|--|

STUDENT ATTENDEE CONFERENCE ORIENTATION / 4:30 P.M.-5:00 P.M.  
MEET IN FRONT OF NAPOLEON C1 (SEE PG. 35)

OPENING NETWORKING RECEPTION / 5:00 P.M.-6:30 P.M. / NAPOLEON CD123 & NAPOLEON CORRIDOR  
(COMMERCIAL & EDUCATIONAL EXHIBITS OPEN - SEE PG. 35)

WOMEN IN THE ENVIRONMENT NETWORKING EVENT / 7:00 PM / MAUREPAS ROOM (3RD FLOOR) (SEE PG. 35)

**CONFERENCE OPENING PLENARY SESSION**  
**MONDAY ~ NOVEMBER 17 ~ 8:00 A.M. -10:00 A.M. ~ NAPOLEON B123**

**WELCOME AND OPENING REMARKS**

**JANE O. ROWAN**

President, American Water Resources Association  
The Bioengineering Group ~ Newtown Square, Pennsylvania

**DAVID R. WATT**

Conference General Chair  
St. Johns River Water Management District ~ Palatka, Florida

**PATRICK VICTOR**

Conference Technical Program Chair  
CDM ~ Jacksonville, Florida

**KEYNOTE SPEAKERS**

**LT. GENERAL ROBERT VAN ANTWERP**

U.S. Army Corps of Engineers ~ Washington, D.C.

**HONORABLE GARRETT GRAVES**

Director for Coastal Activities ~ Office of the Governor ~ Baton Rouge, Louisiana

**DR. EARTHEA NANCE**

Director Infrastructure and Planning ~ New Orleans Recovery and Management Office ~ New Orleans, Louisiana

**DENNIS KAMBER**

Senior Vice President ~ ARCADIS ~ Rockville, Maryland

(Note: The Plenary presentations will provide a perspective on the status of the recovery after Katrina from a Federal (Lt. General Van Antwerp), State (Honorable Garrett Graves), local (Dr. Earthea Nance), and private sector (Mr. Dennis Kamber) standpoint with a focus on water resources.)

**10:00 A.M.-10:30 A.M. • MORNING NETWORKING BREAK • NAPOLEON CD123 & NAPOLEON CORRIDOR**

**STUDENT PRESENTER COMPETITION**

Through the "Outstanding Student Presentation Award," AWRA recognizes exceptional student contributions to this Conference. Conference presentations are an important aspect of professional development and AWRA seeks to encourage and support student participation at its meetings, both at the undergraduate and graduate levels. Significance and originality of the material will be fundamental in evaluating the student presentations, which will be judged by the session attendees. There will be an Oral and a Poster winner. Each winner will receive a check for \$100 and their biographical sketch and photo in an upcoming issue of AWRA's Water Resources IMPACT magazine and on the AWRA website. Please be sure to complete the Evaluation Forms that will be available in the session rooms and at the posters wherever a student presenter is on the program.

**AWRA EMPLOYMENT OPPORTUNITY BOARD**

NAPOLEON FOYER • OPEN THROUGHOUT THE CONFERENCE

All jobs listed on the AWRA website Career Page will be printed and displayed for your perusal. If you have an opening at your place of employment, you are encouraged to put an announcement on the Board. If you are currently seeking a position, you are encouraged to put a copy of your resume on the Board and to have some for distribution. Forms will be available at the conference for recent position openings. This service is available to everyone and is not contingent upon registering for the meeting.

**★ ★ PLEASE TURN OFF YOUR CELL PHONES WHEN ENTERING THE SESSION ROOMS! ★ ★**

**PLEASE NOTE ...** Throughout the Technical Program the **PRESENTER** of each paper/poster is in **BOLD** type immediately following the paper title. The affiliation given is that of the Presenter. Co-authors are then listed in parentheses.

## POSTER PRESENTATIONS

**8:00 A.M. - 6:30 P.M.**

**NAPOLEON CD123**

**MONDAY ~ NOVEMBER 17**

**8:30 A.M. - 3:30 P.M.**

**NAPOLEON CD123**

**TUESDAY ~ NOVEMBER 18**

POSTER PRESENTERS WILL BE AT THEIR POSTERS FROM 5:00 P.M. TO 6:30 P.M. ON MONDAY, NOVEMBER 17, DURING THE OPENING NETWORKING RECEPTION AND DURING THE NETWORKING BREAKS ON MONDAY AND TUESDAY, NOVEMBER 17 AND 18.

NOTE: THE PRESENTER OF EACH POSTER IS IN BOLD TYPE IMMEDIATELY FOLLOWING THE POSTER TITLE. CO-AUTHORS ARE THEN LISTED IN PARENTHESES. POSTERS ARE LISTED IN ALPHABETICAL ORDER BY NAME OF PRESENTER.

1. **Site-Specific Design and Evaluation of Vegetative Buffers Utilizing GIS to Incorporate Physical Parameter Layers** - Aslan Aslan, University of Missouri, Columbia, MO (co-author: Kathleen M. Trauth)
2. **Pharmaceuticals and Organic Wastewater Compounds in Water and Bed Material Downstream of Three Municipal Effluent Discharges** - Leslie Bartsch, University of Arkansas, Fayetteville, AR (co-authors: Brian E. Haggard, Joel M. Galloway)
3. **Selenium and Physical Habitat Influences on Fish Assemblages in the Arkansas River and Selected Tributaries, Colorado** - Ashley Ficke for Lee Bergstedt, GEI Consultants, Inc., Littleton, CO (co-authors: Steven P. Canton, James W. Chadwick, Lareina Wall)
4. **Impact of Stream Network Detail on Automated Watershed Delineation and Hydrologic Process Modeling** - Jason Braud, Louisiana State University, Prairieville, LA (co-authors: Clinton S. Willson)
5. **Sustainable Assessment of the Coastal Dune Lakes of Florida** - Gordon Brown, University of Florida, Gainesville, FL (co-authors: Jehanghir Bhadha, James Jawitz, Aaron Bunch, Mark Brenner, David Kaplan)
6. **Comparing Two Methods of Calculating Open-Water Evaporation for a Shallow, Subtropical Lake** - Kristopher Brown, School of Renewable Natural Resources, Louisiana State University, Baton Rouge, LA (co-authors: Y. Jun Xu, Philip Saks, Ryan Mesmer)
7. **Fully Integrated Surficial Aquifer Groundwater Flow and Wetland Overland Flow Modeling for Hydraulic Analysis and Design of Lake Okeechobee Fast Track (LOFT) Stormwater Treatment Areas** - H. Harry Cheng, CDM, Orlando, FL (co-authors: Lee P. Wiseman, Larry N. Schwartz, Michael F. Schmidt, Mark A. Long)
8. **The Role of America's Wetland Conservation Corps in Wetland Restoration Through Volunteerism, Education, and Outreach** - Marcus Colligan, Tetra Tech, Inc., Baton Rouge, LA (co-author: Hillary Collis)
9. **Export of Nitrogen, Carbon and Total Suspended Solids During the 2008 Mississippi River Flood** - Den Davis, Louisiana State University Agricultural Center, Baton Rouge, LA (co-author: Y. Jun Xu)
10. **Dissolved Oxygen Response to Rain Events in a Shallow Eutrophic Urban Lake** - Den Davis, Louisiana State University Ag Center, Baton Rouge, LA (co-authors: Y. Jun Xu, Philip Saks)
11. **Measuring Surface Soil Moisture Based on RGB-NIR Images: A Correlation Analysis With Ground Soil Moisture Probe Data** - Huifang Dou, Electrical and Computer Engineering Dept., Utah State University, Logan, UT (co-authors: Bin Wang; Bushra Zaman; Mac McKee)
12. **Impacts of Climatic Change on Water Resources: Some Considerations Stemming From the Revision of Scenarios Proposed in the 1990s for Central Italy** - Walter Dragoni, Dipartimento Scienze Terra - Perugia University, Perugia, Italy (co-authors: Daniela Valigi, Massimo Melillo)
13. **Determining Origins of Impaired Water Quality at Backbone State Park, Iowa** - Dale Easley, University of Dubuque, Dubuque, IA (co-authors: Oliver de Silva, Maria Husheena)
14. **Development of Regression-Based Models to Predict Fecal Indicator Bacteria at the Illinois River Basin, Arkansas and Oklahoma** - Brian Haggard, University of Arkansas, Fayetteville, AR
15. **Multiple Micro Aerial Vehicles for Applications in Real-Time Remote Sensing** - Yang Quan Chen, Utah State University, Logan, UT (co-authors: Christopher Hall, Daniel Morgan, Austin M. Jensen, Haiyang Chao, Mac McKee)
16. **Occurrence of Methyl Tert-Butyl Ether in a Small Drinking-Water Supply Reservoir in Southern California** - Greg Mendez, USGS, San Diego, CA (co-author: Michael S. Majewski)
17. **Tidally Influenced New Orleans Canal Network Benefits From Accurate Water Level, Conductivity, and Temperature Data** - Robert Mooney, In-Situ Inc., Fort Collins, CO
18. **An Exploratory Analysis of the Rural Population and Their Attitudes Toward Water Management and Conservation** - Morgan Newsom, Texas Tech University, Lubbock, TX (co-authors: David L. Doerfert, Jessica Carr)
19. **Integrated Water Resources Management in the Upper and Middle Niger River** - Emmanuel Nzewi, NC A&T State University, Greensboro, NC (co-author: Georgette Koty)
20. **Solute Transfer by Pressure Induced Flows Into the Sediment Beds of Streams and Lakes** - Qin Qian, University of Minnesota, Minneapolis, MN (co-authors: V.R. Voller, H.G. Stefan)
21. **The Impact of the Lake Borgne Barrier on Storm Surge and Wave Energy in the Inner Harbor Navigation Canal** - Alison Sleath, U.S. Army Corps of Engineers, New Orleans, LA (co-author: MAJ Jeremy Chapman)
22. **Evaluation of Groundwater Resources for Sustainable Development El Toro Planning Area, Monterey County, California** - Gordon Thrupp, Geosyntec Consultants, Oakland, CA (co-authors: John Fortuna, Howard Franklin, Peter Kwiek)
23. **Urban Expansion Dynamic and Its Impact on Water Infiltration and Stream-Flow in Huntsville City, AL** - Mezemir F. Wagaw, Alabama A&M University, Normal, AL (co-authors: Girma Kebede, Teshome Gabre, Gete Bekele, W. Tadesse)
24. **The Critical Role of the Community Coordinator in Facilitating an Agriculture Water Management and Conservation Community of Practice** - Jarrott Wilkinson, Texas Tech University, Lubbock, TX (co-author: David L. Doerfert)
25. **Developing Tomorrow's Water Researchers Today** - Claire Williams, Texas Tech University, Lubbock, TX (co-authors: David L. Doerfert, Matt Baker, Cindy Akers)
26. **Prediction of Fate of Polychlorinated Biphenyls and Source Contribution in Small Coastal Basins the Chesapeake Bay: A Case Study in the Northeast River, Maryland, USA** - Yuan Zhao, College of William and Mary, Gloucester Point, VA (co-authors: Leonard Schugam, Anna Soehl, Jian Shen)

## CONCURRENT SESSIONS 1,2,3,4,5, POSTER PRESENTATIONS

10:30 A.M. - 12:00 NOON

MONDAY ~ NOVEMBER 17

### SESSION 1 • NAPOLEON B1

#### **INTEGRATED WATER RESOURCES PLANNING-I**

MODERATOR • AMY CARLSON • CH2M HILL • BELLEVUE, WASHINGTON

- 10:30 AM **To B/C or Not to B/C: Developing a Benefit/Cost Process for Storm Water Capital Improvement Projects - Matthew Gustis**, City of Charlotte, Charlotte, NC (co-authors: Neal Banerjee, Rajender Gaddam)
- 10:50 AM **Quantification of the Relationship Between Environmental Benefits and Project Costs for a Major Everglades Restoration Project - Lewis Hornung**, HDR Engineering Inc., West Palm Beach, FL (co-author: Anwar Khan)
- 11:10 AM **Assessing Sustainability of Water Programs and Projects - Les Lampe**, Black & Veatch, Kansas City, MO (co-author: Laura Adams)
- 11:30 AM **Water Resources Prioritization for Local Government: Optimizing Return on Investment Using an Objective Process and Shared Vision - Amy Carlson**, CH2M HILL, Bellevue, WA (co-authors: Roland Middleton, Paula Cooper)

### SESSION 2 • NAPOLEON A1&2

#### **WATERSHED PLANNING AND MANAGEMENT: HYDROLOGIC DATA**

MODERATOR • PATRICK TARA • INTERA • LUTZ, FLORIDA

- 10:30 AM **Trends in the Hydrological Cycle Components: An Assessment Based on Long-Term Observations and Modeling - Anurag Nayak**, Dept. of Civil Eng., Boise State University, Boise, ID (co-authors: Venkataramana Sridhar, Danny Marks)
- 10:50 AM **A Meteorological Network Design for Prediction and Recovery Efforts for a Coastal City - Mitali Goel**, URS Corporation, Santa Ana, CA (co-authors: Seshadri S. Iyer, Steve McLaughlin)
- 11:10 AM **The Influence of Precipitation Record Length on Watershed Management in the State of California - Saad Merayyan**, California State University, Sacramento, CA (co-author: Syada Most Ara)
- 11:30 AM **Temporal Aggregation of Rainfall and Its Impact on Hydrologic Modeling - Patrick Tara**, INTERA, Lutz, FL (co-author: Renee Murch)

### SESSION 3 • NAPOLEON B2

#### **RAINFALL ISSUES AND CLIMATE CHANGE**

MODERATOR • GARRETT WALLACE • SOUTH FLORIDA WATER MANAGEMENT DISTRICT • WEST PALM BEACH, FLORIDA

- 10:30 AM **Climate Change and Land Management Impacts on Soil Erosion Across the Southern US - Emrys Treasure**, USDA Forest Service, Raleigh, NC (co-authors: Steven McNulty, Erika Cohen, Ge Sun)
- 10:50 AM **Can Large Water Supply Projects Be Permitted in Today's Climate? - Bruce Lytle**, Lytle Water Solutions, LLC, Highlands Ranch, CO
- 11:10 AM **Incorporating the Implications of Climate Change Into Water Supply Planning Using the Latest Methods and Technology - Aaron Hope**, RMC Water & Environment, San Francisco, CA (co-authors: Leslie Dumas, Alyson Watson)

### SESSION 4 • NAPOLEON A3

#### **APPROACHES TO NONPOINT SOURCE TMDL IMPLEMENTATION**

MODERATOR • THOMAS AMIDON • OMNI ENVIRONMENTAL • PRINCETON, NEW JERSEY

- 10:30 AM **Phased Approach to Addressing a Bacteria TMDL for a South Texas Watershed - Joanna Mott**, Texas A&M University, Corpus Christi, TX (co-author: Richard Hay)
- 10:50 AM **Integrated Shellfish Bed Pathogen TMDL Development Protocol - Edward Moye**, Tetra Tech, Atlanta, GA
- 11:10 AM **Kissimmee River Watershed: Recommendations for Data and Model Refinement from a Florida TMDL Case Study - Lena Rivera**, CDM, Maitland, FL (co-authors: Michael Schmidt, Silong Lu, Rich Wagner, Douglas Gilbert, Xueqing Gao)
- 11:30 AM **Innovative Nutrient TMDL for a Large Diverse Basin - Thomas Amidon**, Omni Environmental, Princeton, NJ (co-author: James F. Cosgrove, Jr.)

### SESSION 5 • NAPOLEON B3

#### **PANEL - WATERBLOGGED: WATER IN THE BLOGOSPHERE**

MODERATOR • MICHAEL E. CAMPANA • OREGON STATE UNIVERSITY • CORVALLIS, OREGON

The number of water blogs continues to increase. Some focus on information, some provide analysis and commentary, and some are social book marking sites. What motivates individuals and organizations to become bloggers? What roles do bloggers play in the water sphere? Can water blogs "make a difference"? What are the ethical issues? What is the future of water blogs? Will they evolve into more sophisticated media? These are some of the questions we will address with some of the profession's best-known water bloggers.

#### PANELISTS

**ROBERT OSBORNE** • *Watercrunch* (osbornerr@gmail.com)

**JARED SIMPSON** • *Waterblogged.info* (jared@jaredsimpson.com)

**ABIGAIL BROWN** • *Water For The Ages* (abigaileigh@gmail.com)

**KAVEH MADANI** • *WaterSISWEB*, Univ. of California-Davis

(kavehmadani@gmail.com)

**JANE ROWAN** • *AWRA Blog, President, AWRA* (janeorowan@comcast.net)

**MICHAEL E. CAMPANA** • *WaterWired* (aquadoc@oregonstate.edu)

**12:00 NOON-1:25 P.M. • LUNCH BREAK • ON YOUR OWN**

## CONCURRENT SESSIONS 6,7,8,9,10, POSTER PRESENTATIONS

1:30 P.M. - 3:00 P.M.

MONDAY ~ NOVEMBER 17

### SESSION 6 • NAPOLEON B1

#### **MARKET BASED SOLUTION AND FINANCING**

MODERATOR • GERALD KAUFFMAN • UNIVERSITY OF DELAWARE WATER RESOURCES AGENCY • NEWARK, DELAWARE

- 1:30 PM **Willingness to Pay: Septic Tank to Sanitary Sewer Conversion** - Leeann DeMouche, New Mexico State University, Las Cruces, NM (co-author: Adrian Hansen)
- 1:50 PM **Evidence Supporting Cap and Trade as a Groundwater Policy Option in Nebraska** - Chris Thompson, University of Nebraska, Lincoln, NE (co-authors: Ray Supalla, Derrel Martin, Brian McMullen)
- 2:10 PM **Conserve to Enhance: Voluntary Municipal Conservation to Support Environmental Restoration** - Sharon B. Megdal, University of Arizona - Water Resources Research Center, Tucson, AZ (co-authors: Andrew Schwarz, Joanna Bate)
- 2:30 PM **Economic Value of the Christina Basin in Delaware and Pennsylvania** - Gerald Kauffman, University of Delaware Water Resources Agency, Newark, DE (co-authors: Laura Yayac, Martha Corrozi Narvaez)

### SESSION 7 • NAPOLEON A1&2

#### **WATERSHED PLANNING AND MANAGEMENT-I**

MODERATOR • LEWIS HORNUNG • HDR ENGINEERING, INC. • WEST PALM BEACH, FLORIDA

- 1:30 PM **Water Conservation in Agriculture: How Much More Water Can Be Saved?** - Ari Michelsen, Texas A&M AgriLife Research, El Paso, TX (co-authors: Ron Lacewell, James Gilley, Zhuping Sheng, Marissa Chavez)
- 1:50 PM **Effect of Spatial Configuration of Watershed Land Use on Hydrology** - Paul Ekness, University of Massachusetts, Amherst, MA (co-author: Timothy Randhir)
- 2:10 PM **Standard Error Parameter Development for Double-Ringed Infiltration Procedure** - Veronica Alba, University of Wisconsin - Stevens Point, Stevens Point, WI (co-author: Katherine F. Clancy)
- 2:30 PM **Integration of Flood Protection and Coastal Restoration Efforts in Louisiana** - Luke E. LeBas, Louisiana Department of Natural Resources, Baton Rouge, LA (co-authors: Christopher Knotts, Chris L. Williams)

### SESSION 8 • NAPOLEON B2

#### **EFFECTS OF CLIMATE CHANGE-I**

MODERATOR • SAAD MERAYYAN • CALIFORNIA STATE UNIVERSITY • SACRAMENTO, CALIFORNIA

- 1:30 PM **Hydrologic Effects of Climate Change in a Tropical, Glaciated Watershed in Peru** - Timothy Randhir, University of Massachusetts, Amherst, MA (co-author: Meagan Mazzarino)
- 1:50 PM **Monitoring and Evaluation of Road Removal in the Clearwater National Forests** - Rebecca Lloyd, Nez Perce Tribe, Lolo, MT (co-author: Anne Connor)
- 2:10 PM **Assessing Performance of Climate Change Adaptation Measures in the Okanagan Region** - Stewart Cohen, Environment Canada, Vancouver, BC, Canada (co-author: Stacy Langsdale)

### SESSION 9 • NAPOLEON A3

#### **IMPACT AND MANAGEMENT OF NONPOINT SOURCE POLLUTION-I**

MODERATOR • JOHN WESTRA • LOUISIANA STATE UNIVERSITY • BATON ROUGE, LOUISIANA

- 1:30 PM **An Interstate Focus on Nutrient Criteria Development for the Red River Watershed: Database Development, Data Properties, and Preliminary Analyses** - Scott Longing, UADivision of Agriculture, Fayetteville, AR (co-author: Brian E Haggard)
- 1:50 PM **McKenzie River Septic System Assistance Project** - Karl Morgenstern, Eugene Water & Electric Board, Eugene, OR
- 2:10 PM **Utilization of Water Treatment Residuals to Reduce Phosphorus Runoff from Land Applied Biosolids** - Rodney Williams, University of Arkansas, Fayetteville, AR (co-author: Philip A Moore Jr.)
- 2:30 PM **Biophysical Economic Analysis of Drainage Management Systems in the Mississippi River Basin** - John Westra, Louisiana State University, Baton Rouge, LA (co-authors: Augustus Matekole)

### SESSION 10 • NAPOLEON B3

#### **PANEL - SUSTAINABILITY: WHAT DOES IT MEAN TO YOU? DIFFERENT VIEWPOINTS AND CASE STUDIES**

MODERATOR • MICHAEL F. SCHMIDT • CDM • JACKSONVILLE, FLORIDA

SPONSORED BY THE AWRA POLICY TECHNICAL COMMITTEE

Sustainability is often referred to as a guiding principle in environmental programs, and we see evidence of it in water, energy, and carbon management programs. Sustainability has different meanings to various people. This panel discussion will present several viewpoints from local government actions to develop sustainable municipal programs and cities, a State water management district undertaking the largest ecosystem restoration project in the world, a city working to participate in ecosystem restoration while developing sustainable water resources for the long term, sustainability in South Florida with tremendous growth in water and ecosystem needs, and what individual communities and homeowners can do to be part of the plan.



## PANELISTS

**AMELIA RAVIN** • International Council for Local Environmental Initiatives-Local Governments for Sustainability  
*Local Government Perspective on Sustainability, Climate Change, and Energy*

**PAUL WARNER** • SFWMD • West Palm Beach, Florida  
*A Sustainable Approach for Ecosystem Restoration in the Everglades*

**PATRICK J. GLEASON** • CDM • Lake Worth, Florida  
*Is South Florida Sustainable?*

**LARRY W. SCHWARTZ AND LEE P. WISEMAN** • CDM • Maitland, Florida  
*City of West Palm Beach Wetlands Based Water Reclamation Project –  
How Local and Regional Water Resource Projects Can Bring Multiple Sustainable Benefits*

**MICHAEL F. SCHMIDT** • CDM • Jacksonville, Florida  
*What Municipalities and Homeowners Can Do For Low Impact Development  
and Sustainable Stormwater Management*

**3:00 P.M. - 3:30 P.M. • AFTERNOON NETWORKING BREAK • NAPOLEON CD123 AND NAPOLEON CORRIDOR**

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## CONCURRENT SESSIONS 11,12,13,14, POSTER PRESENTATIONS

**3:30 P.M. - 5:00 P.M.**

**MONDAY ~ NOVEMBER 17**

### SESSION 11 • NAPOLEON B1

#### **INTEGRATED WATER RESOURCES PLANNING-II**

MODERATOR • CAROL COLLIER • DELAWARE RIVER BASIN COMMISSION • WEST TRENTON, NEW JERSEY

- 3:30 PM** Sustainability of the Everglades Ecosystem: Dependence on Streamlining Planning, Funding and Implementation Processes -  
**Paul Warner**, South Florida Water Mgmt. District, West Palm Beach, FL (co-authors: Kenneth G. Ammon, Patrick Gleason)
- 3:50 PM** Planning for Change in a World of Unknowns - **Steve Ritchie**, California Coastal Conservancy, West Palm Beach, FL  
(co-author: Khalil Abusaba)
- 4:10 PM** Increasing Uncertainty in the Integrated Water Resources Management of the Delaware River Basin - **Carol Collier**, Delaware  
River Basin Commission, West Trenton, NJ
- 4:30 PM** Integrated Water Resources Management and Adaptation to Climate Change Impacts on Floods in Bangladesh and Nepal -  
**Ramesh Vaidya**, International Centre for Integrated Mountain Development, Kathmandu, Nepal

### SESSION 12 • NAPOLEON A1&2

#### **WATERSHED PLANNING AND MANAGEMENT-II**

MODERATOR • EDWARD MOYE • TETRA TECH • ATLANTA, GEORGIA

- 3:30 PM** Recharge Analyses in a Desert Groundwater Basin - **Daniel B. Stephens**, Daniel B. Stephens & Associates, Inc., Albuquerque, NM  
(co-author: Todd Umstot)
- 3:50 PM** River Basin Management in West Africa: Status, Challenges, and Opportunities - **Georgette Koty**, North Carolina A&T State  
University, Greensboro, NC (co-author: Emmanuel U. Nzewi)
- 4:10 PM** Distributed Parameter Modeling of an Arid Watershed to Assess Net Infiltration - **Todd Umstot**, Daniel B. Stephens & Assoc.,  
Inc., Albuquerque, NM (co-author: Daniel B. Stephens)
- 4:30 PM** Developing a Basin-Wide Water Supply Management Model - **Hayden Strickland**, Lytle Water Solutions, LLC, Highlands Ranch,  
CO (co-author: William F. Hahn)

### SESSION 13 • NAPOLEON B2

#### **EFFECTS OF CLIMATE CHANGE-II**

MODERATOR • KATHLEEN O'NEIL • PBS&J • ORLANDO, FLORIDA

- 3:30 PM** Scenario-Based Assessment of Sea-Level Rise Impacts: A Method for Planning Under Uncertain Conditions - **Kris Esterson**,  
PBS&J, Orlando, FL
- 3:50 PM** Long Term Adaptation to Climate Change: Infrastructure Investment in the Coastal Zone and the Drying Interior -  
**Eric Fitch**, Marietta College – Environmental Science, Marietta, OH
- 4:10 PM** The Climate Change Factor: Water Utilities Research and Planning - **Susan Turnquist**, AWWA Research Foundation, Denver, CO  
(co-authors: Kenan Ozekin, Linda Reekie)
- 4:30 PM** Scenario Planning Under Uncertainty Using a Dynamic DSS (D2S2) - **Kathleen O'Neil**, PBS&J, Orlando, FL  
(co-authors: Kris Esterson, Greg Kiker)

## SESSION 14 • NAPOLEON A3

### IMPACT AND MANAGEMENT OF NONPOINT SOURCE POLLUTION-II

MODERATOR • SHAYNE WOOD • CMD • JACKSONVILLE, FLORIDA

- 3:30 PM** A Modeling Study of Impacts of Human and Natural Condition on Dissolved Oxygen in Unnamed Tributary to Pitts Creek, Accomack County, Virginia – Jian Shen, Virginia Institute of Marine Science, Gloucester Point, VA (co-authors: Yuan Zhao, Taiping Wang)
- 3:50 PM** Impact of Groundwater Seepage Flow on the Development of TMDL for the Upper Kissimmee River Watershed in Florida – Silong Lu, CDM Inc, Maitland, FL (co-authors: Rich Wagner, Michael Schmidt, Xueqing Gao, Lee Wiseman, Lena Rivera)
- 4:10 PM** Uncertainty and Variability in Fecal Indicator Bacteria-Based Water Quality Standard Compliance and Impacts on Pollutant Loading Reduction Estimates – Andrew Gronewold, Duke University, Durham, NC (co-authors: Mark E. Borsuk, Robert L. Wolpert, Kenneth H. Reckhow)
- 4:30 PM** Estimation of the Impact of Land Use Changes on Hydrology in the Occoquan Watershed, Virginia, Using a Complexly-Linked Watershed-Reservoir Model – Adil N. Godrej, Occoquan Monitoring Laboratory, Virginia Tech, Manassas, VA (co-author: Zhongyan Xu)

### STUDENT ATTENDEE CONFERENCE ORIENTATION

MONDAY • NOVEMBER 17 • 4:30 P.M. TO 5:00 P.M. • MEET IN FRONT OF NAPOLEON C1  
See "Student Career Program" on pg. 35 for details

### SPECIAL EVENT

### OPENING NETWORKING RECEPTION

MONDAY • NOVEMBER 17 • 5:00 P.M. TO 6:30 P.M. • NAPOLEON CD123 & NAPOLEON CORRIDOR  
See "Special Events" on pg. 35 for details

### GREENING OF THE CONFERENCE

The American Water Resources Association is proud to be an international water association using green practices for its national conference. The conference organizers are committed to making the conference as sustainable as possible. Following are some factors taken into consideration when setting up the conference.

**Convening the Conference at a Central Location for Conference Attendees** – New Orleans is conveniently located in the southeastern United States. Locating our conference in New Orleans was a conscious decision made to help the economy after Katrina hit in 2005.

**Selecting a City That Offers Mass Transit Systems** – New Orleans NORTA provides bus and streetcar services to the New Orleans community. For our guest programs, a tour line will be at registration for individual sign-ups.

**Selecting a Hotel That Practices Environmental Best Management Practices (guest room initiatives)** – (1) motioned censored HVAC controls; (2) energy Star rated shower heads; (3) Green guest linen and terry program; (4) new guest room drinking glasses cleaning program to reduce water consumption; (5) six Sigma reduce energy consumption project for kilowatt hours, water and sewer, and gas; (6) new guest room lock trouble-shooting process connected to our property management system reducing elevator and escalator use for general service calls; (7) phase in of MERV 13 filters with more improved filtration; (8) and beginning applications using low VOC paints.

**Use of Electronic Communication** – (1) e-mail marketing to communicate conference information to attendees; (2) secure online registration; (3) providing updated conference information online; (4) publicizing mass transit options and providing shuttle service from airport to hotel; (5) gathering speakers' information online and sending notification by email; (6) posting Power Point presentations on conference Web site at conclusion of conference; and (7) requesting presenters minimize paper hand-outs (make double sided if necessary)

**Conference On-Site Practices** – (1) using totebags and badgeholders made from 50% recycled materials for the conference (sponsored by Stevens Water Monitoring, Inc., YSI, Inc., and Schnabel Engineering); (2) Conference proceedings distributed at the conference on CD-rom; (3) collecting recyclable and/or reusable products; and offsetting the carbon emissions from the conference.

**Food and Beverage Practices** – (1) no bottled water will be served and (2) water glasses at lunch will be filled as needed – not pre-filled.

**Community Service Project (sponsored by Brown & Caldwell)** – On Sunday, November 16, conference attendees had the opportunity to participate in a community restoration and carbon off-set event at the Audubon Louisiana Nature Center. The Nature Center suffered considerable damage from Hurricane Katrina that devastated its interpretive center, exhibits, and natural forests. The 86 acres of bottomland hardwoods and bald cypress-tupelo swamp were damaged by Katrina's hurricane force winds, several micro bursts (mini tornadoes), and a storm surge of approximately 10 to 12 feet. The swamps were inundated with muddy saltwater for nearly a month and an estimated 75 percent of the forest was destroyed. The Nature Center has not reopened to the public since August 2005 and the resident and migrant wildlife that once flourished in this area have yet to return in large numbers. AWRA volunteers helped reduce the intrusion of the Chinese tallow tree (*Sapium sebiferum*) that was a hindrance before the storm, but has grown into a huge problem and impedes the growth of natural vegetation. The AWRA volunteers participation helped to revive a degraded forest, provided a seed base for natural restoration, improved fish and wildlife habitat, and educated them about the region's coastal land loss issues. **Conference attendees who were unable to attend may make donations to the Nature Center during the conference. Alternatively, you can mail a donation directly to the Audubon Louisiana Nature Center to the attention of Amy LeGaux, Disaster Recovery Coordinator, Audubon Nature Institute, 5700 Read Boulevard, New Orleans, LA 70127.**

## DAY-AT-A-GLANCE / TUESDAY / NOVEMBER 18, 2008

AWRA CONVERSATION CORNER OPEN / 6:00 A.M.-7:00 P.M. / NAPOLEON FOYER

AWRA 5K FUN RUN / 6:30 A.M.-8:00 A.M. (SEE PG. 35 FOR DETAILS)  
SPONSORED BY GROUNDS ANDERSON LLC • HOUSTON, TEXAS (MEET IN HOTEL LOBBY AT 6:20 A.M.)

SPEAKERS' PREPARATION ROOM OPEN / 7:00 A.M.-8:00 P.M. / CRESCENT ROOM (4TH FLOOR)

BOOK & JOURNAL EXHIBIT OPEN & EMPLOYMENT OPPORTUNITY BOARD ON DISPLAY  
7:30 A.M.-5:00 P.M. / NAPOLEON FOYER

REGISTRATION DESK OPEN / 7:30 A.M.-5:00 P.M. / NAPOLEON FOYER

MORNING NETWORKING BREAK / 8:00 A.M.-10:30 A.M. / NAPOLEON CD123 & NAPOLEON CORRIDOR

COMMERCIAL AND EDUCATIONAL EXHIBITS OPEN/8:00 A.M.-3:30 P.M./NAPOLEON CD123 & NAPOLEON CORRIDOR

TECHNICAL POSTER SESSION / 8:30 A.M.-3:30 P.M. / NAPOLEON CD123 & NAPOLEON CORRIDOR  
(POSTER PRESENTERS WILL BE AT THEIR POSTERS DURING THE NETWORKING BREAKS)

ORGANIZATIONAL DISPLAYS OPEN / 8:30 A.M.-3:30 P.M. / NAPOLEON FOYER

CONCURRENT SESSIONS 15, 16, 17, 18, 19 / 8:30 A.M.-10:00 A.M.

|  |   |   |  |   |
|--|---|---|--|---|
| <p><u>SESSION 15</u><br/>POLICY AND MARKET SOLUTION TO WATER ISSUES<br/><br/>NAPOLEON B1</p> | <p><u>SESSION 16</u><br/>WATERSHED PLANNING AND MANAGEMENT-III<br/><br/>NAPOLEON B2</p> | <p><u>SESSION 17</u><br/>EFFECTS OF URBANIZATION-I<br/><br/>NAPOLEON A3</p> | <p><u>SESSION 18</u><br/>EMERGING CONTAMINANTS AND NONPOINT SOURCE POLLUTON<br/><br/>NAPOLEON A1&amp;2</p> | <p><u>SESSION 19</u><br/>NEW ORLEANS RESTORATION AND FUTURE PROTECTION<br/><br/>NAPOLEON B3</p> |
|--|---|---|--|---|

MORNING NETWORKING BREAK (CONT'D.) / 10:00 A.M.-10:30 A.M. / NAPOLEON CD123 & NAPOLEON CORRIDOR

CONCURRENT SESSIONS 20, 21, 22, 23, 24 / 10:30 A.M.-12:00 NOON

|   |  |  |   |   |
|---|--|--|---|---|
| <p><u>SESSION 20</u><br/>EMERGING ISSUES<br/><br/>NAPOLEON B1</p> | <p><u>SESSION 21</u><br/>WATER DEMAND AND DROUGHT PLANNING MANAGEMENT<br/><br/>NAPOLEON B2</p> | <p><u>SESSION 22</u><br/>URBAN STORMWATER IMPACTS<br/><br/>NAPOLEON A3</p> | <p><u>SESSION 23</u><br/>WATER QUALITY AND GROUNDWATER CONTAMINATION<br/><br/>NAPOLEON A1&amp;2</p> | <p><u>SESSION 24</u><br/>LOUISIANA COASTAL RESTORATION<br/><br/>NAPOLEON B3</p> |
|---|--|--|---|---|

LUNCH BREAK / 12:00 NOON-1:25 P.M. / ON YOUR OWN

CONCURRENT SESSIONS 25, 26, 27, 28, 29 / 1:30 P.M.-3:00 P.M.

|  |  |  |   |  |
|--|--|--|---|--|
| <p><u>SESSION 25</u><br/>INFRASTRUCTURE PLANNING AND IMPLEMENTATION<br/><br/>NAPOLEON B1</p> | <p><u>SESSION 26</u><br/>FLOODING AND FLOODPLAIN MANAGEMENT-I<br/><br/>NAPOLEON B2</p> | <p><u>SESSION 27</u><br/>EFFECTS OF URBANIZATION-II<br/><br/>NAPOLEON A3</p> | <p><u>SESSION 28</u><br/>WATER QUALITY MONITORING AND ANALYSIS<br/><br/>NAPOLEON A1&amp;2</p> | <p><u>SESSION 29</u><br/>PANEL-COASTAL RESTOR. &amp; PROT. EFFORT IN LA? HOW DO YOU....<br/><br/>NAPOLEON B3</p> |
|--|--|--|---|--|

AFTERNOON NETWORKING BREAK / 3:00 P.M.-3:30 P.M. / NAPOLEON CD123 & NAPOLEON CORRIDOR

CONCURRENT SESSIONS 30, 31, 32, 33, 34 / 3:30 P.M.-5:00 P.M.

|  |   |  |  |   |
|--|---|--|--|---|
| <p><u>SESSION 30</u><br/>PANEL - MEETING FUTURE WATER DEMANDS-I<br/><br/>NAPOLEON B1</p> | <p><u>SESSION 31</u><br/>FLOODING AND FLOODPLAIN MANAGEMENT-II<br/><br/>NAPOLEON B2</p> | <p><u>SESSION 32</u><br/>EFFECTS OF URBANIZATION ON WATER RESOURCES-I<br/><br/>NAPOLEON A3</p> | <p><u>SESSION 33</u><br/>WATER QUALITY MONITORING<br/><br/>NAPOLEON A1&amp;2</p> | <p><u>SESSION 34</u><br/>LOWER MISSISSIPPI FLOOD CONTROL<br/><br/>NAPOLEON B3</p> |
|--|---|--|--|---|

SPECIAL EVENT / AUDUBON ZOO, LOUISIANA SWAMP EXHIBIT  
6:00 P.M.-9:00 P.M. (MEET IN HOTEL LOBBY AT 5:45 P.M.) (SEE PG. 36)

## CONCURRENT SESSIONS 15,16,17,18,19, POSTER PRESENTATIONS

8:30 A.M. - 10:00 A.M.

TUESDAY ~ NOVEMBER 18

### SESSION 15 • NAPOLEON B1

#### **POLICY AND MARKET SOLUTION TO WATER ISSUES**

MODERATOR • DANIEL SHEER • HYDROLOGICS INC. • COLUMBIA, MARYLAND

- 8:30 AM **Promoting Water Resource Conflict Resolution: The Emerging Role of the Private Sector - Hope Herron**, Tetra Tech, Inc., Baton Rouge, LA (co-author: Elicia Blumberg)
- 8:50 AM **Water Management: Planning for Health and Equity - J. Terry Rolfe**, Arizona State University, Tempe, AZ
- 9:10 AM **Ecosystem Service Markets and Potential for Water - Albert H. Todd**, U.S. Forest Service, Washington, DC (co-author: Elizabeth Larry)
- 9:30 AM **Experimental Alternative Dispute Resolution for the South Saskatchewan River Basin - Daniel Sheer**, HydroLogics Inc., Columbia, MD (co-author: David J. Eaton)

### SESSION 16 • NAPOLEON B2

#### **WATERSHED PLANNING AND MANAGEMENT-III**

MODERATOR • MICHAEL CULLUM • ST. JOHNS RIVER WATER MANAGEMENT DISTRICT • PALATKA, FLORIDA

- 8:30 AM **Assessing the Impact of Development and Customizing Mitigation Practices Using a Distributed Hydrologic Model on Cypress Creek Watershed - Hilary Robinson**, Rice University, Houston, TX (co-authors: Andrea Zimmer, Philip B. Bedient)
- 8:50 AM **Watershed-Scale Riparian and Aquatic Resource Habitat Protection and Restoration Prioritization: Geospatial Solutions to Ecological Resource Challenges - John Monahan**, GeoEngineers, Inc., Bellingham, WA (co-author: Wayne S. Wright)
- 9:10 AM **Effects on Mean Annual Flow to USJRB Due to Boundary Changes in the Interbasin Diversion Unit - Tom Jobs**, St. Johns River Water Management District, Palatka, FL
- 9:30 AM **Tropical Storm Fay, Effective Water Management With a Major Civil Works Project - Michael Cullum**, St. Johns River Water Management District, Palatka, FL

### SESSION 17 • NAPOLEON A3

#### **EFFECTS OF URBANIZATION-I**

MODERATOR • JOHN GROUNDS • GROUNDS ANDERSON, LLC • HOUSTON, TEXAS

- 8:30 AM **Remote Sensing Based Urban Water Stress Analysis and Drought Management - Indumathi Jeyachandran**, University of Utah, Salt Lake City, UT (co-authors: Meichun Yan, Steven J. Burian)
- 8:50 AM **Study of Water System Planning for China's Urban Areas - Ming Jiang**, EDAW, Beijing, China (co-author: Echo Jiang)
- 9:10 AM **Drainage Master Plan for Bush Intercontinental Airport - John Grounds**, Grounds Anderson, LLC, Houston, TX (co-authors: Beecroft Shittu, Tanu Hiremath)

### SESSION 18 • NAPOLEON A1&2

#### **EMERGING CONTAMINANTS AND NONPOINT SOURCE POLLUTION**

MODERATOR • MARK DIBLIN • MACTEC ENGINEERING AND CONSULTING, INC. • NEWBERRY, FLORIDA

- 8:30 AM **Effectiveness of Chlorination and Ozonation For Removing Organic Wastewater-Related Contaminants at a Drinking-Water-Treatment Plant - Jeffrey Fischer**, U.S. Geological Survey, West Trenton, NJ (co-authors: Paul Stackelberg, Kristin Romanok, Jacob Gibbs, R. Lee Lippincott)
- 8:50 AM **Evaluating Errors in the Sampling and Measurement of Solids - Christina Siu**, Penn State Harrisburg, Middletown, PA (co-author: Shirley E. Clark, Robert Pitt)
- 9:10 AM **Clean Up of PCBs in the Delaware Estuary - Adaptive Implementation is the Key - Carol Collier**, DRBC, West Trenton, NJ
- 9:30 AM **Practical Strategies for Load Reduction of Emerging Microbial Contaminants - Mark Diblin**, MACTEC Engineering and Consulting, Inc, Newberry, FL (co-authors: Ann Shortelle, Brandon Jarvis)

### SESSION 19 • NAPOLEON B3

#### **NEW ORLEANS RESTORATION AND FUTURE PROTECTION**

MODERATOR • KRISTIN BENNETT • TETRA TECH EC INC. • STUART, FLORIDA

- 8:30 AM **Unwatering New Orleans - Harley Winer**, PBS&J, Metairie, LA
- 8:50 AM **Designing Inland Levees for Coastal Storms: Considerations and Challenges - Todd DeMunda**, PBS&J, Tampa, FL (co-authors: Jeff Tabar, Durund F. Elzey, Sr.)
- 9:10 AM **Risk-Based Analysis for the New Orleans East Polder - Mathijs van Ledden**, Haskoning Inc, Metairie, LA (co-authors: Anja Bos, Bas Jonkman)

**10:00 A.M. - 10:30 A.M. • MORNING NETWORKING BREAK • NAPOLEON CD123 AND NAPOLEON CORRIDOR**

**CONCURRENT SESSIONS 20,21,22,23,24, POSTER PRESENTATIONS**

**10:30 A.M. - 12:00 NOON**

**TUESDAY ~ NOVEMBER 18**

**SESSION 20 • NAPOLEON B1**

**EMERGING ISSUES**

MODERATOR • ROBERT J. MORESI • BLACK & VEATCH • LUTZ, FLORIDA

- 10:30 AM **Efficiency of Small-Scale, Storage Networks in India - Timothy Randhir**, University of Massachusetts, Amherst, MA (co-authors: I. Sekar, Iyyapazham Sekar)
- 10:50 AM **Microbiological Indicators, Frank Pathogens and Disease in Very Small Potable Water Systems - Graciela I. Ramirez Toro**, CECIA, UIPR, San Germán, PR (co-authors: Paul Hunter, H A Minnigh, Diane Herson, Kathleen Verweille)
- 11:10 AM **Multi-Scale Variability and Water Resources Vulnerability - Shama Perveen**, University of South Carolina, Department of Geography, Columbia, SC
- 11:30 AM **AFRICOM and Water: Mitigating Future Conflicts - Hope Herron**, TetraTech, Baton Rouge, LA (co-author: Jay Singh)

**SESSION 21 • NAPOLEON B2**

**WATER DEMAND AND DROUGHT PLANNING MANAGEMENT**

MODERATOR • MELISSA MEEKER • SOUTH FLORIDA WATER MANAGEMENT DISTRICT • WEST PALM BEACH, FLORIDA

- 10:30 AM **Semiparametric Estimation of Community Water Demand with Instrumental Price - David Bell**, Texas A&M University, College Station, TX (co-author: Ron C. Griffin)
- 10:50 AM **Drought Management in San Diego County: Regional Actions to Effectively Manage Water Supply Shortages - Dana Frieauf**, San Diego County Water Authority, San Diego, CA (co-author: Tim Bombardier)
- 11:10 AM **Weathering the Challenge of Drought Management in South Florida - Melissa Meeker**, South Florida Water Management District, West Palm Beach, FL
- 11:30 AM **Field Observations and Groundwater Modeling as Tools to Mitigate Groundwater Supply Impacts During the Removal of Milltown Dam, Western Montana - Antony Berthelote**, University of Montana, Missoula, MT (co-author: William Woessner)

**SESSION 22 • NAPOLEON A3**

**URBAN STORMWATER IMPACTS**

MODERATOR • DANIEL L. REISINGER • CDM • JACKSONVILLE, FLORIDA

- 10:30 AM **Closing the Gap in NPDES Stormwater Permitting - Christopher Kilian**, Conservation Law Foundation, Montpelier, VT
- 10:50 AM **Floodplain Acquisition and Restoration as a Local Government Tool for Achieving Water Quality Standards and TMDL Compliance - Dan Wrye**, Pierce County PW&U - Surface Water Management, Tacoma, WA (co-author: Mike Milne)
- 11:30 AM **Characterization of an Urban Stream for Stormwater Control - Christina Siu**, Penn State Harrisburg, Middletown, PA (co-authors: Katherine H. Baker, Shirley E. Clark)
- 11:30 AM **Integrating Water Quality and Water Quantity Into Stormwater Capital Improvement Planning in the City of Jacksonville - Daniel L. Reisinger**, Camp Dresser & McKee, Jacksonville, FL (co-authors: William T. Joyce, Richard A. Wagner, Patrick R. Victor, Michael F. Schmidt)

**SESSION 23 • NAPOLEON A1&2**

**WATER QUALITY AND GROUNDWATER CONTAMINATION**

MODERATOR • MICHELE MINIHANE • STANFORD UNIVERSITY • STANFORD, CALIFORNIA

- 10:30 AM **Response of *Didymosphenia geminata* to Nutrient Dosing in an Oligotrophic Stream - Bruce Berdanier**, South Dakota State University, Brookings, SD and **P.V. Sundareshwar**, South Dakota School of Mines and Technology, Rapid City, SD
- 10:50 AM **Groundwater Contamination and Water Quality Trends in the Gulf Coast Aquifer of Texas - Stephanie Glenn**, Houston Advanced Research Center, The Woodlands, TX (co-author: Jim Lester)
- 11:10 AM **Saving the Planet With a Bar of Soap and a Truck That Smells Like French Fries ~ How Oil Recycling and Biodiesel Programs Can Protect Drinking Water Sources - Rob McElroy**, Daphne Utilities, Daphne, AL
- 11:30 AM **Groundwater Vulnerability in Sandy Soil Under Tropical Climate Conditions - Michele Minihane**, Stanford University, Stanford, CA (co-author: David Freyberg)

**SESSION 24 • NAPOLEON B3**

**LOUISIANA COASTAL RESTORATION**

MODERATOR • GARY HOWALT • ENVIRONMENTAL SERVICES, INC. • JACKSONVILLE, FLORIDA

- 10:30 AM **Quantifying Benefits of Freshwater Flow Diversion to Coastal Marshes - S. Kyle McKay**, U.S. Army Corps of Engineers, Athens, GA (co-authors: Craig Fischenich, Ronald Paille, Tamiaka Armstrong)
- 10:50 AM **An ADCIRC Analysis of Variance in Marshland Hydroperiod Induced by Flood Protection Barriers - Hugh Roberts**, ARCADIS, Boulder, CO (co-authors: J. Atkinson, F.R. Clark, J.J. Westerink, A. Sleath)
- 11:10 AM **A Numerical Model Study of the Davis Pond Floating Marsh - Tate McAlpin**, U.S. Army Corp of Engineers, Vicksburg, MS (co-authors: Joseph V. Letter, S. Keith Martin)
- 11:30 AM **An Adaptive Hydrodynamic and Sediment Transport Model for Freshwater Diversions - Erol Karadogan**, Louisiana State University, Baton Rouge, LA (co-authors: Charlie R. Berger, Gary L. Brown, Clinton S. Willson)

**12:00 NOON-1:25 P.M. • LUNCH BREAK • ON YOUR OWN**

## CONCURRENT SESSIONS 25,26,27,28,29, POSTER PRESENTATIONS

1:30 P.M. - 3:00 P.M.

TUESDAY ~ NOVEMBER 18

### SESSION 25 • NAPOLEON B1

#### **INFRASTRUCTURE PLANNING AND IMPLEMENTATION**

MODERATOR • BRUCE BERDANIER • SOUTH DAKOTA STATE UNIVERSITY • BROOKINGS, SOUTH DAKOTA

- 1:30 PM **The Third Straw: Public Outreach for Lake Mead Intake No. 3 - Robin Rockey**, Katz & Assoc./Southern Nevada Water Authority, Las Vegas, NV
- 1:50 PM **Sewer Tunnel Stabilization and Pipeline Replacement Project - Joe McDivitt**, South Coast Water District, Laguna Beach, CA (co-authors: David Jurich, Hatch Mott MacDonald)
- 2:10 PM **Rethinking Dams: Efforts in the Midwest to Remove, Revitalize and Remake Our Dams - Michael Hrzic**, HNTB Companies, Chicago, IL (co-authors: W. Robert Iverson, Michael Schwar)

### SESSION 26 • NAPOLEON B2

#### **FLOODING AND FLOODPLAIN MANAGEMENT-I**

MODERATOR • JAMES E. HATHORN • CE-SAM-ENY, U.S. ARMY CORPS OF ENGINEERS, MOBILE DISTRICT • MOBILE, ALABAMA

- 1:30 PM **A Tale of Two Models - Marlene Tomaszewicz**, Michael Baker, Alexandria, VA
- 1:50 PM **Emergency Flood Management Using Computational Fluid Dynamics - David Judi**, Los Alamos National Lab, Salt Lake City, UT (co-authors: Steven Burian, Brett Okhuysen, Tim McPherson)
- 2:10 PM **Visualization of the Floods Using Advances in Hydraulics - Ataul Hannan**, Harris County Flood Control District, Houston, TX (co-authors: Burton Johnson, Sujeeth Draksharam)
- 2:30 PM **Internet Map Serving the Hurricane Katrina Storm Tide Crest in Alabama, Mississippi, and Louisiana - James E. Hathorn**, CE-SAM-ENY, U.S. Army Corps of Engineers, Mobile District, Mobile, AL (co-authors: D. Phil Turnipseed, K. Van Wilson, , Dean Tyler, Jason Stoker, Robert R. Mason, Jr.)

### SESSION 27 • NAPOLEON A3

#### **EFFECTS OF URBANIZATION-II**

MODERATOR • GERALD McMAHON • U.S. GEOLOGICAL SURVEY • RALEIGH, NORTH CAROLINA

- 1:30 PM **Modeling the Interactions Between Urbanization and Stream Biota - Gerard McMahon**, U.S. Geological Survey, Raleigh, NC (co-author: Thomas F. Cuffney)
- 1:50 PM **What is Multilevel Modeling and Why it is Effective for Analyzing the Effects of Urbanization on Stream Ecosystems? - Song Qian**, Duke University, Durham, NC (co-authors: Thomas F. Cuffney, Ibrahim Alameddine, Gerard McMahon)
- 2:10 PM **Multilevel Modeling Clarifies Effects of Urbanization on Stream Macroinvertebrates - Roxolana Kashuba**, Duke University, Durham, NC (co-authors: Boknam Lee, Yoon Kyung Cha, Ibrahim Alameddine)
- 2:30 PM **Multilevel Models of Urbanization Effects on Algae and Fish Assemblages - Yoon Kyung Cha**, Duke University, Durham, NC (co-authors: Ibrahim Alameddine, Boknam Lee, Roxolana Kashuba)

### SESSION 28 • NAPOLEON A1&2

#### **WATER QUALITY MONITORING AND ANALYSIS**

MODERATOR • MARGARET TANNER • MACTEC ENGINEERING AND CONSULTING, INC. • KENNESAW, GEORGIA

- 1:30 PM **Seasonal Variation of Nitrogen Isotope Chemistry of the Mississippi-Atchafalaya River System - April Bryant Mason**, Louisiana State University, Baton Rouge, LA (co-authors: Y. Jun Xu, Mark Altabet)
- 1:50 PM **Evaluating Nutrient Flux From Canals Discharging to Biscayne Bay, South Florida - Richard O. Carey**, University of Florida, School of Natural Resources and Environment, Homestead, FL (co-authors: Kati W. Migliaccio, Mark T. Brown)
- 2:10 PM **A Statistical Analysis of the Effects of River Flow on Downstream Water Quality in the Lower Roanoke River, North Carolina - Christopher Wu**, ENSR, Raleigh, NC (co-authors: Steve Cibik, Mark Gerath, Jennifer Cassada, Michelle Woolfolk, Martin Lebo)
- 2:30 PM **The Savannah Harbor ReOxygenation Demonstration Project - Margaret Tanner**, MACTEC Engineering and Consulting, Inc., Kennesaw, GA (co-authors: Tanya Kinnard, Larry A. Neal, Hope Moorer)

### SESSION 29 • NAPOLEON B3

#### **PANEL - COASTAL RESTORATION AND PROTECTION EFFORT IN LOUISIANA - HOW DO YOU KEEP AMERICA'S PREMIER BELOW SEA LEVEL CITY FROM DROWNING?**

MODERATOR • STEVE MATHIES • CH2M HILL • NEW ORLEANS, LOUISIANA

From a national perspective, there is no better place to discuss the complicated and sometimes confusing array of issues that face our coastal communities than in Louisiana. Louisiana is home to 40% of the coastal wetlands in the contiguous United States, but it is saddled with a devastating land loss rate that accounts for nearly 80% of the wetland loss experienced in the entire country. This panel discussion is dedicated exclusively to the plight of coastal Louisiana. Discussions will focus on ongoing restoration efforts, hurricane protection efforts after Katrina, and how the loss of coastal wetlands is a national problem and not just a problem for Louisiana.

There are a number of efforts underway to protect New Orleans from the physical challenges associated the flooding threats of the Mississippi River, seasonal storm events, and hurricanes. Panel members will provide a brief overview of historical lessons learned and what their organization is doing to protect the City from devastating events in the future.

The session will begin with a 15-minute overview and introduction of speakers by the moderator. Each panel member will provide a 15-minute presentation. A 15-minute question/answer session will follow the presentations.

#### PANELISTS

**DON DAVIS** • Louisiana State University • New Orleans, Louisiana  
*How We Came to Be – The History and Geology of Coastal Louisiana*

**GARRET GRAVES** • Director of the Governor's Office of Coastal Activities • New Orleans, Louisiana  
*What Are We Doing to Protect the Surrounding Coastal Landscape*

**JOSEPH R. BECKER** • Deputy General Superintendent, Sewerage and Water Board of New Orleans • New Orleans, Louisiana  
*What the City Did to Drain New Orleans After Katrina*

**RICHMOND R. KENDRICK** • Director of Implementation, Hurricane Protection Office, USACE • New Orleans, Louisiana  
*What the USACE is Doing to Provide Protection and What Happened During Katrina*

**3:00 P.M. - 3:30 P.M. • AFTERNOON NETWORKING BREAK • NAPOLEON CD123 AND NAPOLEON CORRIDOR**

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### CONCURRENT SESSIONS 30,31,32,33,34, POSTER PRESENTATIONS

**3:30 P.M. - 5:00 P.M.**

**TUESDAY ~ NOVEMBER 18**

#### SESSION 30 • NAPOLEON B1

#### **PANEL - MEETING FUTURE WATER DEMANDS-I**

MODERATOR • BRENDA BATEMAN • WATER RESOURCES DEPARTMENT • SALEM, OREGON

**HOSTED BY THE AWRA POLICY TECHNICAL COMMITTEE**

State Water Resources Plans: Expensive Doorstops or Valuable Tools? Across the United States, our state governments are in different evolutionary stages when it comes to formal state-wide water planning. While some have not yet begun, other states are in their fourth or fifth decade of planning. The impetus behind water supply planning is likewise varied, with states responding to growing pressures, including: legislative mandates, Endangered Species Act (ESA) listings, drought, climate change conditions, and projected population growth. Our changing times are reflected in the process of creating these plans, with ever-increasing emphasis on public participation and integrated water management concepts. Some results are quite prescriptive, while others provide more general guidance. This panel discussion features four experts who vary greatly in their geography and approach to statewide water planning. The panelists will share brief (five-to-ten minute) case studies, describing the process and content of their plans and how these have changed over time. The moderator will then facilitate a panel discussion that begins to identify the usefulness of the resulting products, and whether the "best-laid plans" provide any measure of certainty in the face of interstate disputes, court decisions, high-paced urban development, and growing state and federal requirements. The session will conclude with a useful "Top Ten List for Future State Water Planners."

#### PANELISTS

#### **BRENDA BATEMAN**

Water Resources Department • Salem, Oregon

#### **DANIEL R. HALLER**

Columbia River Unit Supervisor Department of Ecology, Central Region Office • Yakima, Washington

#### **CAROL R. COLLIER**

Executive Director, Delaware River Basin Commission • West Trenton, New Jersey

#### **JAMES E. KUNDELL**

Professor and Director of Environmental Policy, Vinson Institute, University of Georgia • Athens, Georgia

#### **LISA BEUTLER**

Associate Director, Center for Collaborative Policy, California State University • Sacramento, California

#### SESSION 31 • NAPOLEON B2

#### **FLOODING AND FLOODPLAIN MANAGEMENT-II**

MODERATOR • SONG QIAN • DUKE UNIVERSITY • DURHAM, NORTH CAROLINA

**3:30 PM Incorporating Coastal Storm Processes in Southern Louisiana Parish FIRMs - Jessica Mason, Louisiana State University, Baton Rouge, LA**

**3:50 PM Stability and Failure of Vegetation in Arid Regions - S. Kyle McKay, U.S. Army Corps of Engineers, Athens, GA**  
(co-authors: Craig Fischenich, Mark Stone, Kumud Acharya, John Goreham)

**4:10 PM Impacts of Channel Morphology Data Automation on Wide-Area Flood Inundation and Infrastructure Analysis - David Judi, LANL, Salt Lake City, UT** (co-authors: Alfred Kalyanapu, Steven Burian, Amanda Gilliland, Timothy McPherson)

**4:30 PM Accounting for the Effect of Reservoirs in Flood Risk Assessment – Luis Garrote, Technical University of Madrid, Madrid, Spain**  
(co-authors: Alvaro Sordo, Francisco Martin-Carrasco, Antonio Jimenez)

**SESSION 32 • NAPOLEON A3**

**EFFECTS OF URBANIZATION ON WATER RESOURCES-I**

MODERATOR • CALVIN SAWYER • CLEMSON UNIVERSITY • CLEMSON, SOUTH CAROLINA

- 3:30 PM** Selection of Sediment Transport Functions for St. Thomas Guts - Walter Silva-Araya, University of Puerto Rico, Mayaguez, PR  
(co-authors: Gabriel Garcia Medina, Roy Ruiz)
- 3:50 PM** Flood and Drought Management for Resort Planning in Central Vietnam – Vivian Lee, EDAW Ltd., Hong Kong  
(co-author: Stephane Asselin)
- 4:10 PM** Water Sensor Time Series Validation Using a Parity Space Method – Peter Hudson, Aquatic Informatics, Inc., Vancouver, British Columbia, Canada (co-authors: Ed Quilty, Touraj Farahmand)
- 4:30 PM** Indicator Bacteria and Sediment Associations Within Retention Pond Best Management Practices - Calvin Sawyer, Clemson University, Clemson, SC (co-authors: John C. Hayes, William R. English, Louwanda Jolley, Christopher Post)

**SESSION 33 • NAPOLEON A1&2**

**WATER QUALITY MONITORING**

MODERATOR • STEPHANIE GLENN • HOUSTON ADVANCED RESEARCH CENTER • THE WOODLANDS, TEXAS

- 3:30 PM** Trend Analysis of Water Quality Data of Watershed Flowing Into Lake Houston - Aarin Teague, Rice University, Houston, TX  
(co-authors: Birnur Buzcu-Guven, Philip B. Bedient)
- 3:50 PM** A Malmquist-Based Water Quality Index (WQI) - Remegio Confesor, Oregon State University, Corvallis, OR  
(co-authors: Gerald Whittaker, Rolf Fare, Shawna Grosskopf)
- 4:10 PM** High-Frequency In-Situ Nitrate Measurements using Commercial Sensors Based on Flow-Injection Analysis and UV Spectroscopy Technology - Travis Rayfield, U.S. Military Academy, West Point, NY (co-authors: Ray G. Thomas, Jason Gulley, J.J. Delfino, Jonathon Martin, Matt Cohen, Jim Heffernan)
- 4:30 PM** Dissolved Oxygen Dynamics and Hypoxia in Shallow Estuaries: Findings From High-frequency Field Water Quality Monitoring Practices - Taiping Wang, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA  
(co-author: Harry V. Wang)

**SESSION 34 • NAPOLEON B3**

**LOWER MISSISSIPPI FLOOD CONTROL**

MODERATOR • ROBERT IVARSON • HNTB COMPANIES • CHICAGO, ILLINOIS

- 3:30 PM** Flood Protection Impacts in the Lake Pontchartrain System - Keith Martin, U.S. Army Corps of Engineers, Vicksburg, MS  
(co-authors: Tate O. McAlpin, Jennifer N. Tate)
- 3:50 PM** Storm Surge Propagation in the Lower Mississippi River - Rosanne Martyr, University of Notre Dame, Notre Dame, IN  
(co-authors: Mark Hope, Casey Dietrich, Joannes Westerink, John Atkinson, Hugh Roberts, Chris Szpilka)
- 4:10 PM** Robust Modeling Leads to Improved Feasibility - Randall Graham, PBS&J, Inc., Omaha, NE (co-authors: Anthony J. Risko, Durund F. Elzey, Sr.)
- 4:30 PM** New Orleans and Vicinity, Perimeter Hurricane Protection Pump Stations Design - Robert Ivarson, HNTB Companies, Chicago, IL

**SPECIAL EVENT**

**AUDUBON ZOO, LOUISIANA SWAMP EXHIBIT**

TUESDAY • NOVEMBER 18 • 6:00 P.M. TO 9:00 P.M. (MEET IN HOTEL LOBBY AT 5:45 P.M.)

See "Special Events" on pg. 36 for details

**AWRA'S 2009 MEETINGS**

**AWRA's 2009 SPRING SPECIALTY CONFERENCE**

MAY 4-6, 2009 ~ ANCHORAGE MARRIOTT DOWNTOWN ~ ANCHORAGE, ALASKA

"MANAGING WATER RESOURCES AND DEVELOPMENT IN A CHANGING CLIMATE"

**AWRA's 2009 SUMMER SPECIALTY CONFERENCE**

JUNE 29-JULY 1, 2009 ~ SNOWBIRD SKI AND SUMMER RESORT ~ SNOWBIRD, UTAH

"ADAPTIVE MANAGEMENT OF WATER RESOURCES II"

**AWRA's 2009 ANNUAL WATER RESOURCES CONFERENCE**

NOVEMBER 9-12, 2009 ~ RED LION HOTEL ON FIFTH AVENUE SEATTLE ~ SEATTLE, WASHINGTON

CHECK OUT AWRA'S WEBSITE FOR ADDITIONAL INFORMATION ON ANY OF THESE MEETINGS! . . . [www.awra.org](http://www.awra.org)



## DAY-AT-A-GLANCE / WEDNESDAY / NOVEMBER 19, 2008

AWRA CONVERSATION CORNER OPEN / 6:00 A.M.-7:00 P.M. / NAPOLEON FOYER

SPEAKERS' PREPARATION ROOM OPEN / 7:00 A.M.-5:00 P.M. / CRESCENT ROOM (4TH FLOOR)

REGISTRATION DESK OPEN / 7:30 A.M.-5:00 P.M. / NAPOLEON FOYER

BOOK & JOURNAL EXHIBIT OPEN & EMPLOYMENT OPPORTUNITY BOARD ON DISPLAY  
7:30 A.M.-5:00 P.M. / NAPOLEON FOYER

MORNING NETWORKING BREAK / 8:00 A.M.-10:30 A.M. / NAPOLEON FOYER

CONCURRENT SESSIONS 35, 36, 37, 38, 39 / 8:30 A.M.-10:00 A.M.

SESSION 35  
WATER RIGHTS AND  
COMMUNITY  
EMPOWERMENT  
  
NAPOLEON A3

SESSION 36  
FLOOD  
FORECASTING AND  
WARNING  
  
NAPOLEON B3

SESSION 37  
EFFECT OF  
URBANIZATION ON  
WATER  
RESOURCES-II  
NAPOLEON A2

SESSION 38  
SEDIMENTS,  
NUTRIENTS, AND  
COASTAL ISSUES  
  
NAPOLEON B2

SESSION 39  
GIS, REMOTE  
SENSING, AND  
MODELING  
  
NAPOLEON B1

MORNING NETWORKING BREAK (CONT'D.) / 10:00 A.M.-10:30 A.M. / NAPOLEON FOYER

CONCURRENT SESSIONS 40, 41, 42, 43, 44 / 10:30 A.M.-12:00 NOON

SESSION 40  
MEETING FUTURE  
WATER DEMANDS-II  
  
NAPOLEON A3

SESSION 41  
FLOODING AND  
FLOODPLAIN  
MANAGEMENT-III  
  
NAPOLEON B3

SESSION 42  
WATER SUPPLY  
ISSUES  
  
NAPOLEON A2

SESSION 43  
PATHOGENS SOURCE  
AND CONTROL IN  
WATERSHEDS  
  
NAPOLEON B2

SESSION 44  
PANEL-DREDGED MATL.  
MGMT.:FROM THE  
OPEN WATER TO  
MINE RECLAMATION...  
NAPOLEON B1

AWRA AWARDS LUNCHEON / 12:00 NOON-1:25 P.M. / NAPOLEON C123 (SEE PG. 36)  
SPONSORED BY BLACK & VEATCH • OFFICES WORLD WIDE  
SPEAKER ~ ABIGAIL KIMBELL ~ CHIEF, U.S. FOREST SERVICE ~ WASHINGTON, D.C.

CONCURRENT SESSIONS 45, 46, 47, 48, 49 / 1:30 P.M.-3:00 P.M.

SESSION 45  
MEETING FUTURE  
WATER DEMANDS-III  
  
NAPOLEON A3

SESSION 46  
STORMWATER  
MANAGEMENT  
LID BMPs  
  
NAPOLEON B3

SESSION 47  
SOURCE WATER  
PROTECTION  
  
NAPOLEON A2

SESSION 48  
RIPARIAN AND  
AQUATIC ECOSYSTEM  
RESTORATION  
  
NAPOLEON B2

SESSION 49  
GIS, REMOTE  
SENSING, AND  
HYDROLOGIC  
DATA SETS  
NAPOLEON B1

AFTERNOON NETWORKING BREAK / 3:00 P.M.-3:30 P.M. / NAPOLEON FOYER

CONCURRENT SESSIONS 50, 51, 52, 53, 54 / 1:30 P.M.-3:00 P.M.

SESSION 50  
WATER QUALITY  
TRADING AND  
EFFECT OF  
URBANIZATION  
NAPOLEON A3

SESSION 51  
STORMWATER  
MANAGEMENT  
BMP PERFORMANCE  
  
NAPOLEON B3

SESSION 52  
STREAM CHANNEL  
PROCESSES  
  
NAPOLEON A2

SESSION 53  
RIPARIAN BUFFER  
AND STREAM  
ECOLOGY  
  
NAPOLEON B2

SESSION 54  
SURFACE WATER  
AND GROUNDWATER  
INTERACTION  
  
NAPOLEON B1

STUDENT CAREER NIGHT / 5:00 P.M.-7:00 P.M. / MAUREPAS ROOM (3RD FLOOR) (SEE PG. 35)  
SPONSORED BY HIGGINS ENGINEERING, INC. • WEST PALM BEACH, FLORIDA

## CONCURRENT SESSIONS 35,36,37,38,39

8:30 A.M. - 10:00 A.M.

WEDNESDAY ~ NOVEMBER 19

### SESSION 35 • NAPOLEON A3

#### **WATER RIGHTS AND COMMUNITY EMPOWERMENT**

MODERATOR • MICHAEL E. CAMPANA • OREGON STATE UNIVERSITY • CORVALLIS, OREGON

- 8:30 AM **The International Law of Transboundary Aquifers - Joseph Dellapenna**, Villanova University School of Law, Villanova, PA
- 8:50 AM **The Yellow River Law: A Proposed Framework for Integrated River Basin Management - George McMahon**, ARCADIS-US, Inc., Atlanta, GA (co-author: Ian Hannam)
- 9:10 AM **The Community is the Key - Generating Environmental Data with Communities - Harvey Minnigh**, The Gabriella and Paul Rosenbaum Fdn., Bryn Mawr, PA (co-authors: G.I. Ramirez Toro, Bob Christian, Mark Brinson, Heidi Hertler)
- 9:30 AM **Potable Water and Empowerment for the Epera Indians - Michael E. Campana**, Oregon State University, Institute for Water and Watersheds, Corvallis, OR

### SESSION 36 • NAPOLEON B3

#### **FLOOD FORECASTING AND WARNING**

MODERATOR • DOUGLAS A. MOULTON • CDM • MAITLAND, FLORIDA

- 8:30 AM **Advanced Flood Alert System With Hydraulic Prediction for a Major Evacuation Route in Houston - Zheng Fang**, Rice University Civil and Environmental Engineering Dept., Houston, TX (co-author: Philip B. Bedient)
- 8:50 AM **Times-Series River Runoff Forecasting: Case of the Upper and Inland Niger River Basin - Georgette Koty**, North Carolina State University, Greensboro, NC
- 9:10 AM **Comparison of 1-D and 2-D Models for Floodplain Flow - Ruth Clarke**, Wallingford Software Ltd, Wallingford, Oxford, UK
- 9:30 AM **Teach an Old Dog a New Trick: Using the Palmer Drought Severity Index to Predict Rising and Falling Lake Levels - Douglas A. Moulton**, Camp Dresser and McKee, Maitland, FL (co-authors: Clyde Dabbs Jr., Penny Post, Robert P Schreiber)

### SESSION 37 • NAPOLEON A2

#### **EFFECT OF URBANIZATION ON WATER RESOURCES-II**

MODERATOR • BRAD ASHBURN • THE OHIO STATE UNIVERSITY • COLUMBUS, OHIO

- 8:30 AM **Trust, Learning and Success of Regional Watershed Partnerships - Lynn Mandarano**, Temple University, Ambler, PA
- 8:50 AM **Challenges of Drainage Improvements in Old Residential Neighborhoods - Andres Salazar**, Water Resources, Fort Worth, TX (co-author: Steve Eubanks)
- 9:10 AM **Urban Landscape and Climate Influences on Urban Water Cycle - Indumathi Jeyachandran**, University of Utah, Salt Lake City, UT (co-authors: Steven J. Burian, Nick Augustus, Eric Pardyjak, Prathap Ramamurthy, Craig Forster)
- 9:30 AM **The National Estuary Program: Pathways and Roadblocks to Collaboration and Implementation - Brad Ashburn**, The Ohio State University, School of Environment and Natural Resources, Wilmington, NC

### SESSION 38 • NAPOLEON B2

#### **SEDIMENTS, NUTRIENTS, AND COASTAL ISSUES**

MODERATOR • JOHN ENGEL • HDR • OMAHA, NEBRASKA

- 8:30 AM **Storm Protection Benefits of Barrier Island Restoration - Alison Sleath**, U.S. Army Corps of Engineers, Hurricane Protection Office, New Orleans, LA (co-authors: Mary Cialone, Tate McAlpin)
- 8:50 AM **Analysis of Current and Historical Sediment Loads in the Mississippi River to Support Restoration of the Delta - Richard Measures**, Halcrow, Tampa, FL (co-authors: Oliver Harmar, Colin Thorne, Kevin Knuuti, Chester Watson, David Biedenharn, Richard Harpin, Nick Clifford)
- 9:10 AM **Changes in Streamflow and the Flux of Nutrients in the Mississippi-Atchafalaya River Basin, USA, 1980-2007 - William Battaglin**, U.S. Geological Survey, Lakewood, CO (co-author: Brent T Aulenbach)
- 9:30 AM **Sediment Ecosystem Restoration - Thomas Kryzak**, ELBT LLC, Altamont, NY

### SESSION 39 • NAPOLEON B1

#### **GIS, REMOTE SENSING, AND MODELING**

MODERATOR • ROGER RUGGLES • LAFAYETTE COLLEGE • EASTON, PENNSYLVANIA

- 8:30 AM **Virtual Watershed - Christopher Lant**, Southern Illinois University, Carbondale, IL (co-authors: Steven Kraft, Jeff Beaulieu, John Nicklow, Seth Soman, Girmay Misgna, Raja Sengupta, George Malanson)
- 8:50 AM **Incorporating Root Zone Soil Moisture Using Two Modeling Approaches and a Data Assimilation Technique in Different Climatic Divisions of Nebraska - Venkataramana Sridhar**, Boise State University, Boise, ID (co-authors: Sumathy Sinnathamby, Anurag Nayak, Kenneth G. Hubbard)
- 9:10 AM **Developing a GIS-Based Suitability Model for Rural Water Supply in Rwanda - Maxwell Baber**, University of Redlands, Redlands, CA (co-author: Katherine Noble-Goodman)
- 9:30 AM **Radar Estimations for Assessing Runoff in the Delaware Watershed - Roger Ruggles**, Lafayette College, Easton, PA (co-author: Christa Kelleher)

**10:00 A.M. - 10:30 A.M. • MORNING NETWORKING BREAK • NAPOLEON FOYER**

## CONCURRENT SESSIONS 40,41,42,43,44

10:30 A.M. - 12:00 NOON

TUESDAY ~ NOVEMBER 18

### SESSION 40 • NAPOLEON A3

#### **MEETING FUTURE WATER DEMANDS-II**

MODERATOR • LESLIE DUMAS • RMC WATER & ENVIRONMENT • WALNUT CREEK, CALIFORNIA

- 10:30 AM **Building a Framework for Sustainable Allocation of Water Resources - John Wells**, Minnesota Environmental Quality Board, St. Paul, MN (co-author: Princesa VanBuren)
- 10:50 AM **A Preliminary Screening Methodology for Water Supply Reservoirs - Tanya Kinnard**, MACTEC, Kennesaw, GA (co-authors: Margaret Tanner, Trish Reifenberger, David Sample)
- 11:10 AM **Impact of Lateral Flow on Open Channel Flow - Roger Ruggles**, Lafayette College, Easton, PA

### SESSION 41 • NAPOLEON B3

#### **FLOODING AND FLOODPLAIN MANAGEMENT-III**

MODERATOR • MICHAEL DELCHARCO • TAYLOR ENGINEERING • JACKSONVILLE, FLORIDA

- 10:30 AM **Coastal Hazards in Louisiana - Guillermo Simon**, Taylor Engineering, Jacksonville, FL (co-author: Michael DelCharco)
- 10:50 AM **Estimation of Streambank Lateral Migration and Erosion Hazard Boundaries - Bruce Phillips**, Pacific Advanced Civil Engineering, Inc., Fountain Valley, CA
- 11:10 AM **St. Petersburg Flood Protection Barrier - David Edwards**, Halcrow, Tampa, FL
- 11:30 AM **Flood Control Study for Rio de la Plata, Puerto Rico - Michael DelCharco**, Taylor Engineering, Jacksonville, FL (co-authors: John Hashtak, Rahul Parab)

### SESSION 42 • NAPOLEON A2

#### **WATER SUPPLY ISSUES**

MODERATOR • LAUREL STADJUJAR • BISHOP-BROGDEN ASSOCIATES, INC. • ENGLEWOOD, COLORADO

- 10:30 AM **Meeting Future Needs: Looking for Storage in Unusual Places - Nishant Parulekar**, RMC Water & Environment, San Jose, CA (co-author: Leslie Dumas)
- 10:50 AM **The Quest for Long-Term Water Resource Planning - Sharon B. Megdal**, The University of Arizona, Tucson, AZ (co-author: Aaron Lien)
- 11:10 AM **Water Requirements for Energy Generation: Opportunities for Combined Efficiencies - Les Lampe**, Black & Veatch, Kansas City, MO (co-authors: Richard Hayslett, Clint Reedy)
- 11:30 AM **Groundwater Management and Administration Incorporation Into States' Water Laws - Laurel Stadjujar**, Bishop-Brogden Associates, Inc., Englewood, CO (co-author: Kristina Wynne)

### SESSION 43 • NAPOLEON B2

#### **PATHOGENS SOURCE AND CONTROL IN WATERSHEDS**

MODERATOR • STEVEN WOLOSOFF • CDM • RANCHO CUCAMONGA, CALIFORNIA

- 10:30 AM **Using Microbial Source Tracking and HSPF to Improve Bacterial TMDL Analyses - Matthew Morrison**, U.S. Environmental Protection Agency, Cincinnati, OH (co-authors: Orin Shanks, James V. Bonta, Katharine G. Field, Trent Schade)
- 10:50 AM **An Evaluation of Dual Bacteria Indicators for Urban Storm Water Control - Anthony (Tony) Bennett**, TCB, Austin, TX
- 11:10 AM **Treatment of Stormwater Runoff at Public Bathing Beaches - Jaren Hiller**, Earth Tech AECOM, Milwaukee, WI
- 11:30 AM **Evaluation of Urban Sources of Bacteria in the Middle Santa Ana River Watershed - Steven Wolosoff**, CDM, Rancho Cucamonga, CA (co-authors: Middle Santa Ana River Watershed TMDL Task Force, Richard Meyerhoff, Thomas Lo)

### SESSION 44 • NAPOLEON B1

#### **PANEL - DREDGED MATERIAL MANAGEMENT: FROM THE OPEN WATER TO MINE RECLAMATION, WETLANDS CONSTRUCTION, AND AN OPERATIONAL OUTLOOK FOR LOUISIANA**

MODERATOR • DENNIS G. GRUBB • SCHNABEL ENGINEERING, LLC • WEST CHESTER, PENNSYLVANIA

With current projections topping 150 million cubic yards (CY) of construction material required for dike and levee construction for lower Louisiana, this panel session will address dredged material (DM) management and its potential relation to the future land reclamation; dike, levee, and wetlands construction; and hurricane protection strategies for Louisiana. The first talk involves a discussion on the challenges in DM management from the perspective of a major port authority, regulatory issues, and the experiences and needs related to the upland disposal of DM. Included in this presentation is an overview of the Pennsylvania Bark Camp project in which 500,000 CY of contaminated DM from the New York/New Jersey Harbor were pozzolanically stabilized and beneficially used for mine reclamation. Shifting focus to lightly to noncontaminated DM management, we provide an overview of the recently completed Fort Mifflin Renewable Capacity project (Philadelphia) in which 530,000 CY of DM were excavated (unamended) from an existing confined disposal facility for several beneficial uses including mine reclamation, fill construction, and landfill daily cover. An overview of the necessary geotechnical enhancements of DM for large scale construction involving recycled materials (alternate pozzolans and crushed glass) is then provided. The third talk describes the use of DM in wetlands construction and the importance of wetlands to Louisiana flood protection activities. Drawing on prior themes, we conclude with a presentation on the importance of an integrated and regional program for DM management for Louisiana. A general discussion will follow.

PANELISTS

**ANDREW VOROS** • Columbia University • New York, New York  
*Regional DM Management Issues: The Port Authority of New York/New Jersey  
and Successful Mine Reclamation in Pennsylvania*

**DENNIS GRUBB** • Schnabel Engineering, LLC • West Chester, Pennsylvania  
*Beneficial Use Options for Dredged Material (DM) – From Uncontaminated Dewatered to Fresh Contaminated DM*

**WENDI GOLDSMITH** • Bioengineering Group, Inc.. • Salem, Massachusetts  
*Barrier Island and Wetlands Construction Using DM and Its Relation to Flood Protection*

**MAJOR GENERAL (RETIRED) THOMAS A. SANDS** • New Orleans, Louisiana  
*Regional DM Management: Issues, Challenges, Opportunities for Southern Louisiana*

**SPECIAL EVENT ~ SPONSORED BY BLACK & VEATCH ~ OFFICES WORLDWIDE  
AWRA AWARDS LUNCHEON**

**SPEAKER ~ Abigail Kimbell ~ CHIEF, U.S. FOREST SERVICE, WASHINGTON, D.C.**

**WEDNESDAY • NOVEMBER 19 • 12:00 NOON. TO 1:25 P.M. • NAPOLEON C123**

**ALL CONFERENCE ATTENDEES ARE INVITED TO ATTEND (INCLUDED WITH REGISTRATION)**

**(SEE "SPECIAL EVENTS" ON PG. 36 FOR DETAILS)**

**CONCURRENT SESSIONS 45,46,47,48,49**

**1:30 P.M. – 3:00 P.M.**

**WEDNESDAY ~ NOVEMBER 19**

**SESSION 45 • NAPOLEON A3**

**MEETING FUTURE WATER DEMANDS-III**

**MODERATOR • RAFAEL E. FRIAS III • BLACK & VEATCH • TAMPA, FLORIDA**

- 1:30 PM Integrated Surface and Ground Water Model for Conjunctive Water Resource Manage – John Engel, HDR, Omaha, NE**  
(co-authors: Allison MacEwan, Duane Woodward)
- 1:50 PM Water Supply Portfolio Development for Future Management in the San Francisco Bay Area - Leslie Dumas, RMC**  
Water & Environment, Walnut Creek, CA (co-authors: Aaron Hope, Marcia Tobin)
- 2:10 PM Water Demand Forecasting for a Sustainable Residential Development in California - Elizabeth Flegel, Erler & Kalinowski, Inc.,**  
Burlingame, CA (co-author: Anona L. Dutton)
- 2:30 PM Optimization of Reservoir Operations to Meet Multiple Water Supply Demands in Puerto Rico - Rafael E. Frias III,**  
Black & Veatch, Tampa, FL (co-authors: Gerard Miller, Perri Standish-Lee, Pedro M. Garcia, Adamaris Quiñones)

**SESSION 46 • NAPOLEON B3**

**STORMWATER MANAGEMENT LID BMPs**

**MODERATOR • JOE BERG • BIOHABITATS • BALTIMORE, MARYLAND**

- 1:30 PM Do We Really Need Another Model: Designing a Tool to Assess the Effectiveness of Best Management Practices - Austin Moore,**  
Mississippi State University, Mississippi State, MS (co-author: Wayne Wilkerson)
- 1:50 PM Evolution of the Beaufort County BMP Manual - Richard Wagner, CDM, Jacksonville, FL (co-authors: Robert Klink, Dan Ahern)**
- 2:10 PM Impacts of Urban Runoff on Bioretention Basins Planted With Native Vegetation vs. Cool Season Turf Grass - Tiffany Short,**  
University of Wisconsin-Stevens Point AWRA Student Chapter, Poynette, WI (co-authors: Katherine Clancy, Les Werner,  
Cory Wallschalger)
- 2:30 PM Regenerative Stormwater Conveyance: An Innovative Approach to Open Channel Conveyance of Stormwater - Joe Berg,**  
Biohabitats, Baltimore, MD (co-authors: Ted Brown, Keith Underwood)

**SESSION 47 • NAPOLEON A2**

**SOURCE WATER PROTECTION**

**MODERATOR • WILLIAM BATTAGLIN • U.S. GEOLOGICAL SURVEY • LAKEWOOD, COLORADO**

- 1:30 PM Raisin Region/South Nation Source Water Protection Region - Eastern Ontario Esker Characterization Project - Nathan Farrell,**  
South Nation Conservation, Berwick, ON, Canada (co-author: Sandra Mancini)
- 1:50 PM Development of Pesticide Tracking Methodology for Source Water Protection Programs - Sarah Nash, PBS&J, Sacramento, CA**  
(co-authors: Jordan Smith, Elissa Callman, Kelly Moran)
- 2:10 PM From Forest to the Faucet: Connecting Forests, Water, and People - Albert Todd, U.S. Forest Service, Annapolis, MD**  
(co-authors: Martina Barnes, Rebecca Whitney, Paul Barten)
- 2:30 PM Evaluating Nonpoint Sources of Pollution Activities and Prioritizing Drinking Water Source Protection Efforts -**  
**Karl Morgenstern, Eugene Water & Electric Board, Eugene, OR**

**SESSION 48 • NAPOLEON B2**

**RIPARIAN AND AQUATIC ECOSYSTEM RESTORATION**

MODERATOR • LAUREL STADJUJAR • BISHOP-BROGDEN ASSOCIATES, INC. • ENGLEWOOD, COLORADO

- 1:30 PM **Integration of Hydrodynamic, Water Quality, and Habitat Modeling to Evaluate Oyster Restoration Alternatives in the Neuse River Estuary** - Yuri Plis, Tetra Tech Inc, Atlanta, GA (co-authors: Charles R. Wilson, John M. Hazelton, Gregory D. Sousa)
- 1:50 PM **River Bottom Restoration and Enhancement Plan on the 45 Ranch: South Fork Owyhee River, Idaho** – Michael Homza, GeoEngineers, Inc., Boise, ID (co-authors: Wayne S. Wright, Rob Richardson)
- 2:10 PM **Developing Alternatives for Fish Passage at the Belvidere Dam (Belvidere, IL)** - Heather Schwar, HNTB, Milwaukee, WI
- 2:30 PM **Effect of Mountain Pine Beetle Infestation on Water Supply** - Laurel Stadjuhar and Kristina Wynne, Bishop-Brogden Associates, Inc., Englewood, CO; Mike McHugh, City of Aurora, Aurora, CO; and Matt Bliss, CDM, Denver, CO

**SESSION 49 • NAPOLEON B1**

**GIS, REMOTE SENSING, AND HYDROLOGIC DATA SETS**

MODERATOR • MICHAEL CULLUM • ST. JOHNS RIVER WATER MANAGEMENT DISTRICT • PALATKA, FLORIDA

- 1:30 PM **GIS Based Spatial Precipitation Estimation Using Raingauge Data and NEXRAD** - Xuesong Zhang, Texas A&M University, College Station, TX (co-author: Raghavan Srinivasan)
- 1:50 PM **Information Infrastructure for the Conserve Florida Water Clearinghouse Digital Library** - Lukasz Ziemba, University of Florida, Gainesville, FL (co-authors: Camilo Cornejo, Howard W. Beck )
- 2:10 PM **The National Hydrography Dataset** - Jeffrey Simley, U.S. Geological Survey, Denver, CO
- 2:30 PM **Remotely Sensed Data Fusion for Soil Moisture Prediction Using Relevance Vector and Support Vector Machines** - Bushra Zaman, Utah Water Research Laboratory, Logan, UT (co-author: Mac McKee)

3:00 P.M. - 3:30 P.M. • AFTERNOON NETWORKING BREAK • NAPOLEON FOYER

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**CONCURRENT SESSIONS 50, 51, 52, 53, 54**

**3:30 P.M. - 5:00 P.M.**

**WEDNESDAY ~ NOVEMBER 19**

**SESSION 50 • NAPOLEON A3**

**WATER QUALITY TRADING AND EFFECT OF URBANIZATION**

MODERATOR • MATTHEW HEBERLING • USEPA • CINCINNATI, OHIO

- 3:30 PM **Encouraging the Use of Wetlands in Water Quality Trading Programs** - Matthew Heberling, USEPA, Cincinnati, OH (co-authors: Jorge Garcia, Hale W. Thurston)
- 3:50 PM **Economic and Ecological Perspectives on the Design of Water Quality Markets** - James Shortle, Penn State University, University Park, PA (co-author: Richard Horan)
- 4:10 PM **Point/Nonpoint Trading: Can it Work?** - Marc Ribaud, Economic Research Service, Washington, DC

**SESSION 51 • NAPOLEON B3**

**STORMWATER MANAGEMENT BMP PERFORMANCE**

MODERATOR • DENNIS A. MOULTON • CDM • MAITLAND, FLORIDA

- 3:30 PM **Is Your Design Manual Presuming Too Much?** - Alan Black, HNTB Corporation, Bellevue, WA (co-author: Philip Bloch)
- 3:50 PM **Simulating Stormwater Treatment Performance of Man-Made Lake BMPs** - Ron Rovanse, Pacific Advanced Civil Engineering, Inc., Fountain Valley, CA
- 4:10 PM **Assessing Hydrodynamic Separators Under High Water Flow Conditions** - David Sadoris, Department of Civil Engineering, University of Minnesota, Minneapolis, MN (co-authors: Omid Mohseni, John Gulliver)
- 4:30 PM **Combination of Two Existing Groundwater/Surface Water Models to Illustrate the Effects of a Proposed Development** - Douglas A. Moulton, CDM, Maitland, FL (co-author: Robert P. Schreiber)

**SESSION 52 • NAPOLEON A2**

**STREAM CHANNEL PROCESSES**

MODERATOR • PEGGY JOHNSON • THE PENNSYLVANIA STATE UNIVERSITY • UNIVERSITY PARK, PENNSYLVANIA

- 3:30 PM **Hydraulic Carving as a Stream Restoration Technology: CF Industries DB-2 Case Study** – Karen Warner, BCI Engineers & Scientists, Inc., Lakeland, FL (co-authors: John Kiefer, Melissa Marshall)
- 3:50 PM **Sediment Transport Characterization for Bridge Crossing Design or Maintenance** - Jessica Newlin, Bucknell University, Lewisburg, PA (co-authors: Peggy Johnson, Arthur Miller, Kristin Fecko)
- 4:10 PM **An Assessment of Downstream Changes in Transport Capacity of South Boulder Creek, Colorado as a Result of River Diversions** - Kristina Wynne, Bishop-Brogden Associates, Englewood, CO (co-author: John Pitlick)
- 4:30 PM **Creating Stable Waterway Transitions at Bridges** - Peggy Johnson, Dept. of Civil and Environmental Engineering, The Pennsylvania State University, University Park, PA (co-authors: Jessica Newlin, Scott Sheeder)

**SESSION 53 • NAPOLEON B2**

**RIPARIAN BUFFER AND STREAM ECOLOGY**

MODERATOR • ANDREW DOLLOFF • USDA-FS SOUTHERN RESEARCH STATION • BLACKSBURG, VIRGINIA

- 3:30 PM** Abiotic Factors Structure Native Fish Assemblages in an Urban Stream - Ashley Ficke, GEI Consultants, Inc, Littleton, CO (co-authors: L.C. Bergstedt, D.C. Conklin, Jr., J.W. Chadwick)
- 3:50 PM** Nutrient Chemistry and Microbial Activity in the Upper Mississippi River Basin: Stoichiometry and Downstream Patterns - Brian Hill, U.S. Environmental Protection Agency, Duluth, MN (co-authors: Colleen Elonen, Terri Jicha, David Bolgrien)
- 4:10 PM** Streamside Management Zones and Water Quality in the Virginia Piedmont - Andrew Dolloff, USDA-FS Southern Research Station, Blacksburg, VA (co-authors: William Lakel, Michael Aust)

**SESSION 54 • NAPOLEON B1**

**SURFACE WATER AND GROUNDWATER INTERACTION**

MODERATOR • MICHAEL WALTERS • ADA ENGINEERING • TAMPA, FLORIDA

- 3:30 PM** Effects of Groundwater Pumping on the Regulated Stream Flow in an Arid Region - Zhuping Sheng, Texas A&M University, El Paso, TX (co-authors: Yi Liu, Estrella Herrera)
- 3:50 PM** Simulation of Anthropogenic Effects on Hydrologic Cycle in Changjiang and Yellow River Catchments, China - Tadanobu Nakayama, National Institute for Environmental Studies (NIES), Tsukuba, Ib, China
- 4:10 PM** Development of Minimum Flows for the Rainbow River, a First Magnitude Spring System in Southwest Florida - Adam Munson, Southwest Florida Water Management District, Brooksville, FL (co-authors: Marty Kelly, Doug Leeper, Jonathan Morales, Jason Hood)
- 4:30 PM** Calibration of an Integrated Surface Water Groundwater Model in a Low-Lying Area in Florida - Michael Walters, ADA Engineering, Tampa, Fl (co-author: James L. Greco III)

**COMMUNITY EDUCATION PROJECT**

WEDNESDAY • NOVEMBER 19 • 4:00 P.M.-5:30 P.M. • SEE CONTACT BELOW

The AWRA Florida State Section and the University of Florida Student Chapter of AWRA are working with Desire Street Academy on an after school educational session on water resources and water resource careers on Tuesday, November 18, from 4:00-5:30. This session will educate and inspire students in water resource careers. **The session will cover: (1) the water cycle, (2) water properties, (3) Earth's water, (4) ground water, (5) surface water, and (6) careers in water resources.**

Desire Street Academy (DSA) provides an excellent education for junior and senior high African American urban males. Most of DSA's students come from underserved neighborhoods where poverty and crime are part of their everyday life. An important aspect of the students' education is programming that prepares each student to go to college or trade school (<http://www.desirestreet.org/>). **To participate or sponsor contact Carol Hinton at [chinton@treeo.ufl.edu](mailto:chinton@treeo.ufl.edu) or Shayne Wood at [WoodSH@cdm.com](mailto:WoodSH@cdm.com).**

**SPECIAL EVENT ~ STUDENT CAREER NIGHT**

WEDNESDAY • NOVEMBER 19 • 5:00 P.M.-7:00 P.M. • MAUREPAS ROOM (3RD FLOOR)

SPONSORED BY HIGGINS ENGINEERING, INC. • WEST PALM BEACH, FLORIDA

(SEE "STUDENT CAREER PROGRAM" ON PG. 35 FOR DETAILS)

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## DAY-AT-A-GLANCE / THURSDAY / NOVEMBER 20, 2008

AWRA CONVERSATION CORNER OPEN / 6:00 A.M.-3:30 P.M. / NAPOLEON FOYER

SPEAKERS' PREPARATION ROOM OPEN / 7:00 A.M.-3:30 P.M. / CRESCENT ROOM (4TH FLOOR)

REGISTRATION DESK OPEN / 7:30 A.M.-12:00 NOON / NAPOLEON FOYER

BOOK & JOURNAL EXHIBIT OPEN / EMPLOYMENT OPPORTUNITY BOARD ON DISPLAY  
7:30 A.M.-12:00 NOON / NAPOLEON FOYER

MORNING NETWORKING BREAK / 8:00 A.M.-10:30 A.M. / NAPOLEON FOYER

CONCURRENT SESSIONS 55, 56, 57, 58, 59 / 8:30 A.M.-10:00 A.M.

|  |  |  |  |   |
|--|--|--|--|---|
| <p><u>SESSION 55</u><br/>WATER<br/>CONSERVATION<br/><br/>NAPOLEON A2</p> | <p><u>SESSION 56</u><br/>STORMWATER<br/>MANAGEMENT LOW<br/>IMPACT<br/>DEVELOPMENT<br/><br/>NAPOLEON B1</p> | <p><u>SESSION 57</u><br/>IMPACTS AND<br/>MANAGEMENT OF<br/>AGRICULTURAL<br/>SOURCES<br/><br/>NAPOLEON B2</p> | <p><u>SESSION 58</u><br/>WETLANDS<br/>RESTORATION,<br/>PROTECTION, AND<br/>DESIGN<br/><br/>NAPOLEON B3</p> | <p><u>SESSION 59</u><br/>PANEL-EXTREME<br/>ENV. MAKEOVER:<br/>FLORIDA'S MODEL<br/>APPROACH TO WATER...<br/><br/>NAPOLEON A3</p> |
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MORNING NETWORKING BREAK (CONT'D.) / 10:00 A.M.-10:30 A.M. / NAPOLEON FOYER

CONCURRENT SESSIONS 60, 61, 62, 63 / 10:30 A.M.-12:00 NOON

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| <p><u>SESSION 60</u><br/>COMMUNITY<br/>INVOLVEMENT AND<br/>WATERSHED PLANNING<br/><br/>NAPOLEON A2</p> | <p><u>SESSION 61</u><br/>STORMWATER<br/>MANAGEMENT AND<br/>RESERVOIR<br/>MODELING<br/><br/>NAPOLEON B1</p> | <p><u>SESSION 62</u><br/>AGRICULTURAL<br/>BMPs AND<br/>MODELING<br/><br/>NAPOLEON B2</p> | <p><u>SESSION 63</u><br/>RIPARIAN AND<br/>AQUATIC ECOSYSTEM<br/>RESTORATION<br/><br/>NAPOLEON B3</p> |
|--|--|--|--|

LUNCH BREAK / 12:00 NOON-1:25 P.M. / ON YOUR OWN

CONCURRENT SESSIONS 64, 65, 66, 67 / 1:30 P.M.-3:00 P.M.

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| <p><u>SESSION 64</u><br/>DECISION SUPPORT<br/><br/>NAPOLEON A2</p> | <p><u>SESSION 65</u><br/>STORMWATER<br/>MANAGEMENT<br/>NUTRIENT, HYDROLOGY,<br/>HYDRAULIC<br/><br/>NAPOLEON B1</p> | <p><u>SESSION 66</u><br/>AGRICULTURAL<br/>HYDROLOGY<br/><br/>NAPOLEON B2</p> | <p><u>SESSION 67</u><br/>NATIONAL AND<br/>INTERNATIONAL<br/>ECOSYSTEMS<br/>RESTORATION<br/><br/>NAPOLEON B3</p> |
|--|--|--|---|

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## CONCURRENT SESSIONS 55,56,57,58,59

8:30 A.M. - 10:00 A.M.

THURSDAY ~ NOVEMBER 20

### SESSION 55 • NAPOLEON A2

#### **WATER CONSERVATION**

MODERATOR • JAY YINGLING • SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT • BROOKS, FLORIDA

- 8:30 AM **Conserving Water in the Urban Landscape Through Application of Soil Moisture Sensors for Irrigation - Kati Migliaccio**, University of Florida, Homestead, FL (co-authors: M. D. Dukes, S. M. Gutierrez, L. Vasquez, M. Balbin)
- 8:50 AM **Use and Perception of Graywater in Berkeley, CA - Chung Khong and Katherine Cushing**, Dept. of Environmental Studies, San Jose State University, San Jose, CA
- 9:10 AM **Every Little Bit Helps: Developing Integrated Water Resource Alternatives in Lake Arrowhead, CA - Persephene St. Charles**, RMC Water & Environment, Santa Monica, CA
- 9:30 AM **Statistical Analysis of Utility Per Capita Water Demand in the Southwest Florida Water Management District – Jay Yingling**, Southwest Florida Water Management District, Brooks, FL (co-authors: Grace John, John Whitcomb)

### SESSION 56 • NAPOLEON B1

#### **STORMWATER MANAGEMENT LOW IMPACT DEVELOPMENT**

MODERATOR • JOHN HAYES • CLEMSON UNIVERSITY • CLEMSON, SOUTH CAROLINA

- 8:30 AM **Design Scenarios for Low Impact Development in Ultra-Urban Watershed-Scale Redevelopment Projects: Case Studies From Boston's Charles River - Stephanie Hurley**, Harvard University Graduate School of Design, Montpelier, VT
- 8:50 AM **Using Modeling Results to Improve Future Management: The Case in the Clinton River Watershed - Part II - Stephen Pennington**, Tetra Tech, Lansing, MI (co-author: Scott Job)
- 9:10 AM **Solar Power Plants: A Natural Match for Water Distribution Facilities - Gary T. Sheehan**, SunTechnics Energy Systems, Paoli, PA (co-authors: Rick Holz, Dan Herman, Andrew Begley, Sarah Hetznecker)
- 9:30 AM **LID Decision Making to Model Treatment Train Impacts on Runoff and Water Quality - John Hayes**, Clemson University, Clemson, SC (co-authors: S. J. Klaine, C. B. Sawyer)

### SESSION 57 • NAPOLEON B2

#### **IMPACTS AND MANAGEMENT OF AGRICULTURAL SOURCES**

MODERATOR • SHAYNE WOOD • CDM • JACKSONVILLE, FLORIDA

- 8:30 AM **The Non-Point Source Pollution in the Portneuf Watershed: Modeling With SWAT - Sumathy Sinnathamby**, Department of Civil Engineering, Boise, ID (co-author: Venkataramana Sridhar)
- 8:50 AM **Adoption of Environmental Management Systems on Animal Feeding Operations in the Upper Mississippi River Basin to Decrease Nutrient Loadings Into the Gulf of Mexico - Thomas Davenport**, U.S. EPA, Chicago, IL (co-authors: Anna Corro, Bruce A. Kirschner)
- 9:10 AM **The Lake Okeechobee Fast Track (LOFT) Project – A Watershed Approach to Phosphorus Removal for a Complex System - Michael Schmidt**, CDM, Jacksonville, FL (co-authors: William K. Taylor, Mark A. Long, Larry N. Schwartz, Kirk S. Westphal)
- 9:30 AM **Reducing Tri-County Agricultural Area Pollutant Loads to the Lower St. Johns River in Florida - Shayne Wood**, CDM, Jacksonville, FL (co-authors: B. Kraig McLane, Pam Livingston Way, Alicia Steinmetz, Patrick R. Victor)

### SESSION 58 • NAPOLEON B3

#### **WETLANDS RESTORATION, PROTECTION, AND DESIGN**

MODERATOR • MEIFA CHEN • CDM • MAITLAND, FLORIDA

- 8:30 AM **Urban Wetland Restoration in Southwest Florida - John Murray**, Southern Utah University, Cedar City, UT (co-author: Clyde Dabbs)
- 8:50 AM **Wetland Restoration in South Florida - John Duncan**, HNTB Corporation, Indianapolis, IN (co-authors: Michael Schwar, Michael Hrzic)
- 9:10 AM **Sustainable Golf in Wetland Communities: An Asian Perspective - Vivian Lee for Sylvain Dulong**, EDAW, Singapore (co-authors: The Kyi Soe, David Gallacher, Kimberlee Myers)
- 9:30 AM **Analytical Estimation of Water Surface Profiles in Stormwater Treatment Areas - Meifa Chen**, CDM, Maitland, FL (co-authors: John Ladner, Lee Wiseman, Larry Schwartz)

### SESSION 59 • NAPOLEON A3

#### **PANEL - EXTREME ENVIRONMENTAL MAKEOVER: FLORIDA'S MODEL APPROACH TO WATER QUALITY IMPROVEMENT AND ENVIRONMENTAL RESTORATION**

MODERATOR • CAROL ANN WEHLE • SOUTH FLORIDA WATER MANAGEMENT DISTRICT • WEST PALM BEACH, FLORIDA

From strategic planning, policy formulation and innovative financing to land acquisition, engineering, construction and operations, the South Florida Water Management District is implementing the largest water quality improvement and environmental restoration program in the world.

As the principle force behind the restoration of America's Everglades, the District was the first agency in the United States to utilize Certificates of Participation – an innovative bonding technique – to finance the construction of massive water treatment and storage facilities to clean water and



restore a unique and vast natural system. Improving water quality and returning a more historic flow of water to the 2.4 million-acre Everglades is not only reviving the native habitat for 68 threatened and endangered species, it is also naturally replenishing the underground aquifers that supply drinking water to an urban and agricultural population of more than 7.5 million.

With overlapping political boundaries, the District is charged with balancing competing interests, managing public involvement and building consensus at both the local, state and federal level to achieve success. Most recently, the regional water management agency began negotiating one of the largest and most complex business transactions in the history of government for the purposes of water quality and environmental improvement. If successful, the real estate transaction stands poised to forever change government's approach to ecosystem management and restoration.

**PANELISTS**

**CAROL ANN WEHLE**

Executive Director • South Florida Water Management District • West Palm Beach, Florida

**THOMAS W. OLLIFF**

Assistant Executive Director • South Florida Water Management District • West Palm Beach, Florida

**KENNETH G. AMMON**

Deputy Executive Director, Everglades Restoration Resource Area •  
South Florida Water Management District • West Palm Beach, Florida

**TOMMY STROWD**

Assistant Deputy Executive Director • Everglades Restoration Resource Area •  
South Florida Water Management District • West Palm Beach, Florida

**10:00 A.M. - 10:30 A.M. • MORNING NETWORKING BREAK • NAPOLEON FOYER**

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**CONCURRENT SESSIONS 60, 61, 62, 63**

**10:30 A.M. - 12:00 NOON**

**THURSDAY ~ NOVEMBER 20**

**SESSION 60 • NAPOLEON A2**

**COMMUNITY INVOLVEMENT AND WATERSHED PLANNING**

MODERATOR • W, DEAN HIVELY • USDA-ARS-HRSL • BELTSVILLE, MARYLAND

- 10:30 AM Kentucky Institute for Watershed Management Support - Alanna Storey**, Center for Water Resource Studies, Bowling Green, KY  
(co-authors: Andrew Ernest, Jana Fattic)
- 10:50 AM The White Clay Creek State of the Watershed Report - Martha Corrozi Narvaez**, University of Delaware, Newark, DE  
(co-authors: Gerald Kauffman, Andrew Homsey, Maureen Nelson, Erika Farris)
- 11:10 AM Developing a Regional and Carbon Neutral Water Supply for the Monterey Area - Ryan Alameda**, RMC Water and Environment, San Francisco, CA
- 11:30 AM Protection of Ground Water and Dependent Aquatic Ecosystems During a Two-Decade Long Tunnel Construction Project in a Complex Hydrogeologic Setting in Southern California - John Chatoian**, Chatoian Consulting, San Mateo, CA  
(co-authors: Neil Berg)

**SESSION 61 • NAPOLEON B1**

**STORMWATER MANAGEMENT AND RESERVOIR MODELING**

MODERATOR • ANDRES SALAZAR • FREESE AND NICHOLS, INC. • FORT WORTH, TEXAS

- 10:30 AM Development of a Water and Salt Balance Model to Estimate Potential Future Water Demands and Salinity of a Lake in a Semi-Arid Region - Anona L. Dutton**, Erler & Kalinowski, Inc., Burlingame, CA (co-authors: Adrienne Carr, Vera H. Nelson)
- 10:50 AM Bayesian Learning Machine Approach to Optimize Operation of a Multiple Reservoir System - Andres Ticlavlilca**, Utah Water Research Laboratory, Logan, UT (co-author: Mac McKee)
- 11:10 AM Multi-Objective Non-Linear Programming for the Optimization of Reservoir Operations - Emmanuel Nzewi**, North Carolina A&T State University, Greensboro, NC (co-author: Birhanu Mengistu)
- 11:30 AM Basics of Water Accounting and Its Implications for Raw Water Supply Operations - Andres Salazar**, Freese and Nichols, Inc., Fort Worth, TX (co-authors: Tom Gooch, Kathy Alexander)

**REMINDER . . . WILL YOU BE NEEDING A WRITTEN RECEIPT FOR YOUR REGISTRATION FEES? IF YOU DO, PLEASE STOP BY THE AWRA REGISTRATION DESK TO OBTAIN ONE SOMETIME BEFORE 12:00 NOON ON THURSDAY, NOVEMBER 19.**

**SESSION 62 • NAPOLEON B2**

**AGRICULTURAL BMPs AND MODELING**

MODERATOR • JIM BOLLETER • ECOLOGY AND ENVIRONMENT • WEST PALM BEACH, FLORIDA

- 10:30 AM **Utilizing WAM to Evaluate Local and Regional Agricultural BMPs - Brent Whitfield**, ADA Engineering, Inc, West Palm Beach, FL (co-authors: Carmela Bedregal, Alex Vazquez, Del Bottcher, Barry Jacobson)
- 10:50 AM **Assessing Best Management Practices - Adam Baumgart-Getz**, Purdue University, West Lafayette, IN (co-author: Linda Stalker Prokopy)
- 11:10 AM **Forecasting Weather Parameters to Estimate Reference Evapotranspiration Using Multivariate Relevance Vector Machines - Alfonso Torres**, Utah State University, Logan, UT (co-authors: Wynn R. Walker, Mac McKee)
- 11:30 AM **Application of an Enhanced Version of SWAT to a Complex Agricultural Watershed - Kenneth Heim**, ENSR Corporation, Westford, MA (co-author: Michael Winchell)

**SESSION 63 • NAPOLEON B3**

**RIPARIAN AND AQUATIC ECOSYSTEM RESTORATION**

MODERATOR • JOE BERG • BIOHABITATS, INC. • BALTIMORE, MARYLAND

- 10:30 AM **Twenty Years of Progress at Bluewater Creek, New Mexico - Russell LaFayette**, USDA Forest Service, Milwaukee, WI (co-authors: Larry J. Schmidt, William Zeedyk, David Pawelek)
- 10:50 AM **Effect of State Policies on the Success of Stream Restoration - Scott Sheeder**, Penn State University, University Park, PA (co-author: Peggy A. Johnson)
- 11:10 AM **The Napa River Project – Achieving the Living River Solution to Ecosystem Restoration and Flood Protection - Mia O’Connell**, Carmen Group, Inc., Washington, DC
- 11:30 AM **Storing Water on the Landscape to Optimize Riparian and Aquatic System Restoration - Joe Berg**, Biohabitats, Inc., Baltimore, MD (co-author: Keith Underwood)

12:00 NOON-1:25 P.M. • LUNCH BREAK • ON YOUR OWN

**CONCURRENT SESSIONS 64,65,66,67**

**1:30 P.M. -3:00 P.M.**

**THURSDAY ~ NOVEMBER 20**

**SESSION 64 • NAPOLEON A2**

**DECISION SUPPORT**

MODERATOR • JOSE MARIA GUZMAN • CDM • JACKSONVILLE, FLORIDA

- 1:30 PM **Water Optimizer: A Deficit Irrigation Management Tool - Chris Thompson**, University of Nebraska - Lincoln, Department of Agriculture Economics, Lincoln, NE (co-authors: Derrel Martin, Ray Supalla, Brian McMullen, Paul Burgener, Gary Hergert)
- 1:50 PM **Farm-Based Water Management Research Shared Through a Community of Practice Model- Katie Leigh**, Texas Tech University, Lubbock, TX (co-authors: David Doerfert)
- 2:10 PM **Determining a Framework for Modeling Probabilistic Uncertainty in Scenario Analysis - Seyed Hamed Alemohammad**, Sharif University of Technology, Karaj, Iran (co-authors: Reza Ardakanian, Akbar Karimi)
- 2:30 PM **Watershed Information Management and Modeling With Spatial Database Engine (SDE) - Jose Maria Guzman**, CDM, Jacksonville, FL (co-authors: Bill Joyce, Erin Hardin)

**SESSION 65 • NAPOLEON B1**

**STORMWATER MANAGEMENT NUTRIENT, HYDROLOGY, HYDRAULIC**

MODERATOR • DAVID POWERS • MICHAEL BAKER CORPORATION • RICHMOND, VIRGINIA

- 1:30 PM **Application of a Monte Carlo Framework for Long-Term SWMM Simulations to Evaluate Stormwater Runoff Quality - Adrienne Carr**, Eler & Kalinowski, Inc., Burlingame, CA (co-authors: Katherine Heidel, Matt Zucca)
- 1:50 PM **A Freehand Sketching Approach for Hydrologic Modeling - Joshua Peschel**, Texas A&M University, College Station, TX (co-authors: Tracy Hammond, Kelly Brumbelow, Anthony T. Cahill)
- 2:10 PM **Incorporation of Uncertainty Analysis Into the Preliminary Design of a Storm Water Treatment Area - Renee Murch**, INTERA, Lutz, FL (co-authors: Patrick Tara, Akin Owosina)
- 2:30 PM **Stormwater BMPs and Managing Phosphorus Loads From Stream Banks in Virginia - David Powers**, Michael Baker Corporation, Richmond, VA (co-author: Joanna Curran)

**AWRA INTERNATIONAL AFFAIRS COMMITTEE (IAC) SENDING BOOKS TO FOREIGN COUNTRIES**

This year the AWRA International Affairs Committee (IAC) will launch an effort to get good science into the hands of professors, students, and government workers in developing nations who struggle with water related issues. Many of these people cannot afford to come to conferences or purchase textbooks and other scientific materials that they need. If you have recent book collections or old books, periodicals, journals, governmental reports, research and technical reports, or reprints with lasting application value related to the water sciences and engineering please **contact Don Young at westwater@cox.net**. IAC also needs to collect funds for shipping materials to these countries. So far we have sent books to Ethiopia, with future shipments planned for Iraq, Kenya, and Ecuador. Please be a part of this important charitable effort and **visit the registration table to make a contribution**.

## SESSION 66 • NAPOLEON B2

### **AGRICULTURAL HYDROLOGY**

MODERATOR • MICHAEL PENN • UNIVERSITY OF WISCONSIN • PLATTEVILLE, WISCONSIN

- 1:30 PM A Surface Energy Balance Method to Model Evapotranspiration of Partial Canopy/Residue/Soil Covered Fields - Luis Octavio Lagos**, University of Nebraska, Lincoln, NE (co-authors: D. Martin, S. Irmak, S. Verma, A. Suyker.)
- 1:50 PM Using Satellite Remote Sensing to Estimate Winter Cover Crop Nutrient Uptake Efficiency - W. Dean Hively**, USDA-ARS-HRSL, Beltsville, MD (co-authors: Megan Lang, Gregory McCarty, Jason Keppler, Ali Sadeghi)
- 2:10 PM Hydraulic Model Development for Robust Simulation of Border Irrigation - Jorge Ecurra**, Utah State University, Logan, UT (co-author: Gary P Merkley)
- 2:30 PM Intensive Monitoring and Quantification of Sediment and Nutrient Runoff Resulting from Snowmelt at the Pioneer Farm in Platteville, Wisconsin - Michael Penn**, University of Wisconsin, Platteville, WI (co-authors: Dennis Busch, Randy Mentz)

## SESSION 67 • NAPOLEON B3

### **NATIONAL AND INTERNATIONAL ECOSYSTEMS RESTORATION**

MODERATOR • DAVID DICKSON • ENVIRONMENTAL SERVICES, INC. • ST. AUGUSTINE, FLORIDA

- 1:30 PM Hydrodynamic and Water Quality Modeling of the A.R.M. Loxahatchee National Wildlife Refuge, Northern Everglades, Florida - Ehab Meselhe**, University of Louisiana, Lafayette, LA (co-authors: Michael G. Waldon, Chunfang Chen, William Roth, Hongqing Wang, Matthew C. Harwell, Jeanne Arceneaux)
- 1:50 PM The Nation's Largest Wetland Restoration Projects and Their Approaches to Common Considerations - Laura Marshall Belden**, Brown and Caldwell, Walnut Creek, CA
- 2:10 PM Real World Issues in Implementing a Large Scale Environmental Restoration Project - Jim Bolleter**, Ecology and Environment, West Palm Beach, FL (co-author: Beth Kacvinsky)
- 2:30 PM The Landscape Ecosystem Classification (LEC) Model: Using Northeast Florida Wetland Mitigation Bank as a Case Study - David Dickson**, Environmental Services, Inc., St. Augustine, FL (co-authors: Gary Howalt, Jon Barmore)

## CONTINUING EDUCATION UNITS (CEUs)

AWRA is pleased to offer the opportunity for **attendees of concurrent sessions** to earn **Continuing Education Units (CEUs)**. AWRA is an authorized provider of CEUs by the International Association of Continuing Education and Training (IACET).

**SESSIONS FOR WHICH CEUs ARE AVAILABLE** – CEUs will be available for attendance of **concurrent sessions** in 14 time slots from 10:30 a.m., Monday, November 17, through 3:00 p.m., Thursday, November 20, 2008. There will be 5 concurrent sessions in the time slots on Monday, Tuesday, and Wednesday, and 4 concurrent sessions in the time slots on Thursday. Two options for CEUs are available:

**OPTION 1:** 1.05 CEUs will be awarded for attendance at concurrent sessions in **7 (seven)** time slots of your choice.

**OPTION 2:** 1.5 CEUs will be awarded for attendance at concurrent sessions in **10 (ten)** time slots of your choice.

**Please note that CEUs are not available for the Plenary Session, the Poster Sessions, or any other scheduled events. Note also that CEUs are not available for one-day attendees.**

**SIGN UP AND COSTS** – You may sign up for CEU credit at the AWRA Registration Desk. **The Cost for OPTION 1 is \$22.00 for AWRA members and \$26.00 for non-members. The cost for OPTION 2 is \$25.00 for AWRA members and \$30.00 for non-members.**

**PROCEDURE** – IACET requires AWRA to maintain very specific records for the awarding of CEUs. **If you have pre-registered for CEU credits, your conference registration packet will include an attendance sheet on which you must enter the Session Number of each concurrent session that you attend either under OPTION 1 or OPTION 2. You also must have the sheet signed by the Moderator of each concurrent session that you attend. If you register for CEUs on-site, the sheet will be given to you at that time.** If you move between sessions during a given time slot, please have your attendance sheet signed by the moderator of the last session you attend in that time slot.

**Your attendance sheet MUST be turned in to the AWRA Registration Desk when you have completed it, or faxed to AWRA (540/687-8395) within one week after the close of the Conference. AWRA cannot award CEUs without this completed form on file.**

**CEUs AND CERTIFICATES AWARDED** – AWRA will award a total of 1.05 CEUs (representing 10.5 hours of attendance) to those persons who selected **OPTION 1**; or 1.5 CEUs (representing 15 hours of attendance) to those persons who selected **OPTION 2**. Certificates signifying the award will be provided within two months after the Conference. Please note that 0.1 CEU is the same as 1.0 Professional Development Hour (PDH).

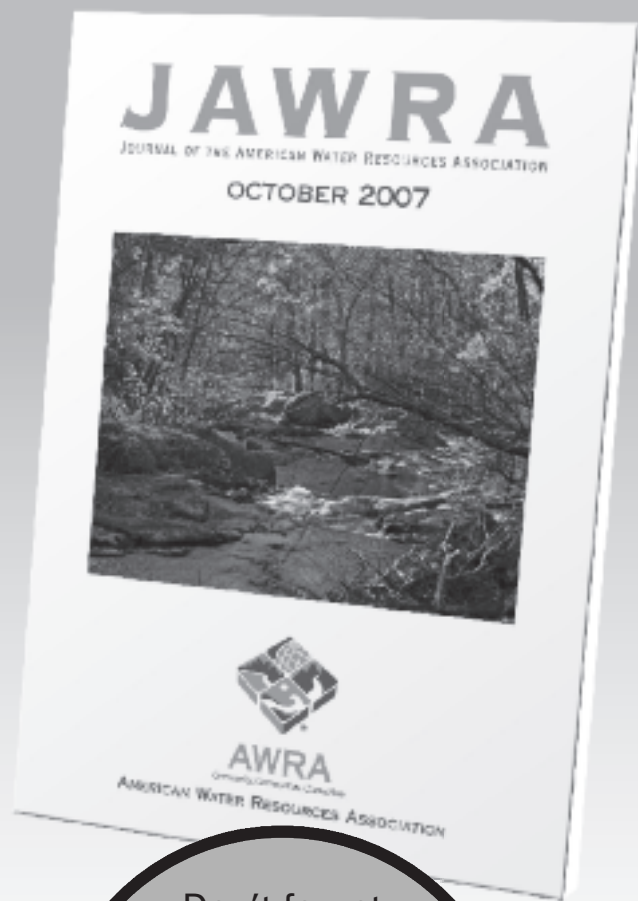
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## STUDENT CAREER PROGRAM

### **STUDENT ATTENDEE CONFERENCE ORIENTATION**

**MONDAY • NOVEMBER 17 • 4:30 P.M. TO 5:00 P.M. • MEET IN FRONT OF NAPOLEON C1**

**FACILITATOR ~ GARRETT W. WALLACE, JR.**

**SOUTH FLORIDA WATER MANAGEMENT DISTRICT • WEST PALM BEACH, FLORIDA**

Students who are interested in maximizing their conference experience are welcome to attend this orientation session. It will be structured in the format of a charette (the term “charette” is often used in architecture to describe an intense, creative, on-the-spot design project). As the architect of your career, this session will offer students the opportunity to network with other attendees while providing the information they need to design their own conference experience: learn about all the conference has to offer, network with students from around the country, envision a format that fits your personal needs, and design a plan of action that will help you make the most of your conference experience.

### **STUDENT CAREER NIGHT**

**WEDNESDAY • NOVEMBER 19 • 5:00 P.M. TO 7:00 P.M. • MAUREPAS ROOM (3RD FLOOR)**

**SPONSORED BY HIGGINS ENGINEERING, INC. ~ WEST PALM BEACH, FLORIDA**

An opportunity such as this comes once in a lifetime! Students will be interacting with professionals from all disciplines of water resources to learn how water, as a career, is evolving. The evening will provide a rare opportunity to hear stories of success from experts and gain experience not found in the classroom. Students are encouraged to create their business cards beforehand and bring them and learn a skill typically not taught ... networking. A panel of experts will be available spanning a breadth of water resources careers. Based on feedback from last year’s workshop, this year’s session will focus on a wide variety of career options (nonprofit to corporate) and will cater to both students just starting to explore their career options, and to undergraduate and graduate students who are ready for work.

#### MODERATOR

**ROBERT W. HIGGINS ~ HIGGINS ENGINEERING, INC. • WEST PALM BEACH, FLORIDA**

#### PANELISTS

**KRISTEN BENNETT ~ TETRA TECH • STUART, FLORIDA**

**MELISSA MEEKER ~ WOMEN IN THE ENVIRONMENT/TETRA TECH • WEST PALM BEACH, FLORIDA**

**DANIEL REISINGER ~ CDM • JACKSONVILLE, FLORIDA**

**KENNETH J. LANFEAR ~ RETIRED • U.S. GEOLOGICAL SURVEY • RESTON, VIRGINIA**

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## SPECIAL EVENTS

### **OPENING NETWORKING RECEPTION**

**MONDAY • NOVEMBER 17 • 5:00 P.M. TO 6:30 P.M. • NAPOLEON CD123 & NAPOLEON CORRIDOR**

**This event is included in the Registration Fee.** All registered conference participants are invited to attend the Opening Networking Reception. Come greet old colleagues and make new acquaintances. Also, during the Reception, the Poster Session participants will be at their posters to answer any questions. Additional tickets for accompanying guests may be purchased on site at the AWRA Registration Desk. **The cost for each additional ticket is \$30.00.**

### **WOMEN IN THE ENVIRONMENT NETWORKING EVENT**

**MONDAY • NOVEMBER 17 • 7:00 P.M. • MAUREPAS ROOM (3RD FLOOR)**

Network with other female colleagues from around the world and listen to an exciting panel discussion highlighting successful women in our field. Don’t miss this opportunity to increase your contacts and learn from others like you. **Separate registration required.**

### **AWRA 5K FUN RUN**

**TUESDAY • NOVEMBER 18 • 6:30 A.M. TO 8:00 A.M.**

**SPONSORED BY GROUNDS ANDERSON, LLC • HOUSTON, TEXAS**

All **pre-registered participants** are welcome to join us for a beautiful, casual 5K Fun Run! The run will follow a course (TBD) that will take in sights near the hotel. After the race, enjoy refreshments and AWRA door prizes! **There is no charge for this event but if you have not pre-registered, please do so at the AWRA Registration Desk by noon on Monday, November 17. (Please meet in hotel lobby at 6:20 a.m.)**

## AUDUBON ZOO, LOUISIANA SWAMP EXHIBIT

TUESDAY • NOVEMBER 18 • 6:00 P.M. TO 9:00 P.M.

Join us for an evening at the Audubon Nature Institute's Louisiana Swamp Exhibit. With cypress knees, Spanish moss, and swamp favorites like the white alligator, this exhibit is a slice out of a Louisiana bayou. We'll gather for a scrumptious Cajun meal with entertainment provided by a local Zydeco band. You will be able to enjoy Chicken and Andouille Sausage Jamabalaya, Grillades and Grits, Crawfish Audubon Pasta, Red Beans and Rice, Mini Muffulettas, Spinach Audubon, and Bread Pudding with Rum Sauce. Join us for an experience you will not forget! **The cost for this event is \$49.50.** Tickets may be purchased on site at the AWRA conference registration desk.

### AWRA AWARDS LUNCHEON

WEDNESDAY • NOVEMBER 19 • 12:00 NOON TO 1:25 P.M. • NAPOLEON C123

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SERVICES FOR ENERGY - WATER - INFORMATION - GOVERNMENT

GUEST SPEAKER ~ ABIGAIL KIMBELL

Chief ~ U.S. Forest Service ~ Washington, D.C.

*Securing Our Nation's Water Resources Through Effective Land Management and Ecological Restoration*

**This event is included in the Registration Fee.** Annually the American Water Resources Association recognizes those persons who have achieved excellence in water resources research, management, and education. In addition, we are honored to have as luncheon speaker, Abigail Kimbell, Chief of the U.S. Forest Service since February 2007. All Conference participants are invited to attend. Additional tickets for accompanying guests may be purchased on site at the AWRA Registration Desk. **The cost of an additional ticket is \$40.00.**

### AWRA ANNUAL BUSINESS MEETING

WEDNESDAY • NOVEMBER 19 • 1:25 P.M. • NAPOLEON C123

(IMMEDIATELY FOLLOWING THE AWARDS LUNCHEON)

PRESIDENT'S REPORT

JANE O. ROWAN

PRESIDENT

SECRETARY/TREASURER'S REPORT

ROBERT MORESI

SECRETARY/TREASURER

REPORT OF THE TELLER'S COMMITTEE

HAROLD POST

COMMITTEE CHAIR

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### GENERAL CONFERENCE INFORMATION

**REFUNDS** – Cancellations must have been received in writing at the AWRA HQ by Monday, October 27, 2008. No refunds will be issued after October 27, 2008. All cancellations received prior to October 27, 2008, are subject to an administrative fee of 25% of the total registration fees. No refunds will be given for ticketed events purchased after October 27, 2008.

**BADGES** – It is important that the official badge supplied at the time of registration be worn at all times. This practice is a courtesy to your fellow registrants. It also indicates that you have completed registration and may participate in the scheduled events. **Admission to all technical sessions and breaks will be by badge only.**

**INFORMATION DESK** – Please consult the staff at the AWRA Registration Desk if you have any questions regarding the events at the meeting.

**SESSION PARTICIPANTS** – Authors, panelists, and moderators are requested to meet in their respective meeting rooms 10 minutes prior to the start of their session. All participants are required to register PRIOR to their sessions.

**SPEAKERS' PREPARATION ROOM** – The CRESCENT Room (4th Floor) will be available for presenters to review their presentations during the conference. **Monday, November 17**, the room will be open from 9:00 a.m. to 8:00 p.m.; on **Tuesday, November 18**, it will be open from 7:00 a.m. to 8:00 p.m.; on **Wednesday, November 19**, it will be open from 7:00 a.m. to 5:00 p.m.; and on **Thursday, November 20**, it will be open from 7:00 a.m. to 3:30 p.m.

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### BOOK AND JOURNAL EXHIBITORS

NAPOLEON FOYER

During the Conference there will be a display of publications from a variety of publishers on numerous aspects of water resources, education, conservation, and technology. This is a unique opportunity for you to review new literature in the field. Hours for the Book Display will be from 7:30 a.m.-6:00 p.m. on **Mon., Nov. 17**; from 7:30 a.m.-5:00 p.m. on **Tues., Nov. 18** and **Wed., Nov. 19**; and from 7:30 a.m.-12:00 noon on **Thurs., Nov. 20**. **The display copies may be purchased at a discounted price and must be picked up at the AWRA Registration Desk by 11:00 a.m. on Thurs., Nov. 20.** Confirmed exhibitors at the time of the printing of the final program can be found on pg. 4.

## COMMERCIAL & EDUCATIONAL EXHIBITORS

The following organizations will be exhibiting in the Napoleon Ballroom C-D during the conference.  
Please be sure to visit them during exhibit hours:

**Monday, November 17:** 8:00 a.m. to 3:30 p.m.  
& 5:00 p.m. to 6:30 p.m.  
**Tuesday, November 18 :** 8:00 a.m. to 3:30 p.m.

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|--|---|---|
| <p><b>Aquatic In</b> listing of exhibitors<br/>Vancouver,<br/>Booth from terry</p> | <p><b>HNTB</b><br/>Kansas City, MO<br/>Booth 300</p>                                    | <p><b>Stevens Water Monitoring, Inc.</b><br/>Portland, OR<br/>Booth 205</p> |
| <p><b>ARC/</b> pdf file<br/>Highlands<br/>Booth</p>                                | <p><b>In-Situ</b><br/>Fort Collins, CO<br/>Booth 301</p>                                | <p><b>Sutron Corporation</b><br/>Sterling, VA<br/>Booth 313</p>             |
| <p><b>Dynamic Sol</b><br/>Knoxvi<br/>Booth</p>                                     | <p><b>INTERA, Inc.</b><br/>Austin, TX<br/>Booth 312</p>                                 | <p><b>Taylor Engineering</b><br/>Jacksonville, FL<br/>Booth 101</p>         |
| <p><b>Ecology &amp; E</b><br/>Lancaster, NY<br/>Booth 412</p>                      | <p><b>ters North America</b><br/>Citrus Heights, CA<br/>Booth 303</p>                   | <p><b>Tennessee Valley Authority</b><br/>Chattanooga, TN<br/>Booth 201</p>  |
| <p><b>GEC, Inc.</b><br/>Baton Rouge, LA<br/>Booth 311</p>                          | <p><b>MACTEC Engineering &amp; Consulting, Inc.</b><br/>Kennesaw, GA<br/>Booth #204</p> | <p><b>Tetra Tech</b><br/>Stuart, FL<br/>Booth 202</p>                       |
| <p><b>Hach Environmental</b><br/>Loveland, CO<br/>Booth 209 &amp; 213</p>          | <p><b>Rickly Hydrological Co., Inc .</b><br/>Columbus, OH<br/>Booth 305</p>             | <p><b>Wallingford Software</b><br/>Fort Worth, TX<br/>Booth 400</p>         |
|  |   | <p><b>Wiley-Blackwell</b><br/>Ames, IA<br/>Booth 203</p>                    |
|  |   | <p><b>Women in the Environment</b><br/>Stuart, FL<br/>Booth 200</p>         |
|  |   | <p><b>YSI, Inc .</b><br/>Yellow Springs, OH<br/>Booth 113</p>               |



## DIRECTORY OF PRESENTERS

- Alameda, Ryan (Session 60)**, Project Engineer, RMC Water and Environment, 222 Sutter Street, Suite 700, San Francisco, CA 94108 USA, Phone: 415-321-3400, Email: ralameda@rmcwater.com (Abstract)
- Alba, Veronica (Session 7)**, Undergraduate Student, University of Wisconsin - Stevens Point, Stevens Point, WI 54481-4404 USA, Phone: 715-630-4659, Email: Veronica.M.Alba@uwsp.edu (Abstract)
- Alemohammad, Seyed Hamed (Session 64)**, Graduate Student, Department of Civil Engineering, Sharif University of Technology, Tehran 11155-9313 Iran, Phone: +98 (912) 207833 Email: h.alemohammad@gmail.com (Abstract)
- Amidon, Thomas (Session 4)**, Associate, Omni Environmental, 321 Wall Street, Princeton, NJ 08540 USA, Phone: 609-924-8821 x28, Fax: 609-924-8831, Email: TAmidon@Omni-Env.com (Abstract)
- Ammon, Kenneth G. (Session 59)**, Deputy Executive Director, Everglades Restoration Resource Area, South Florida Water Management District, 3301 Gun Club Rd., West Palm Beach, FL 33406 USA, Phone: 561-242-5520, Fax: 561-682-5488, Email: kammon@sfwmd.gov
- Ashburn, Brad (Session 37)**, Graduate Research Assistant, The Ohio State University, School of Environment and Natural Resources, Wilmington, NC 28405 USA, Phone: 910-547-2462, Email: ashburn.6@osu.edu (Abstract)
- Aslan, Aslan (Poster Session)**, Research Assistant, University of Missouri, Dept. of Civil and Environmental Engineering, E2509 Lafferre Hall, Columbia, MO 65211-2200 USA, Phone: 573-884-7861, Fax: 573-882-4784, Email: aa5m3@mizzou.edu (Abstract)
- Atkinson, John (Session 19)**, Computational Fluid Dynamicist, Ayres Associates, 3665 JFK Parkway, Building 2, Suite 200, Fort Collins, CO 80525 USA, Phone: 970-223-5556, Email: atkinsonj@ayresassociates.com (Abstract)
- Baber, Maxwell (Session 39)**, Associate Professor, University of Redlands, PO Box 3080, Redlands, CA 92373-0999 USA, Phone: 909-748-8525, Fax: 909-335-5388, Email: Max\_Baber@redlands.edu (Abstract)
- Bartsch, Leslie (Poster Session)**, Program Associate, University of Arkansas, 203 Engineering Hall, Fayetteville, AR 72701 USA, Phone: 479-575-2840, Fax: 479-575-2846, Email: lbartsc@uark.edu (Abstract)
- Bateman, Brenda (Session 30)**, Senior Policy Coordinator, Water Resources Dept., 725 Summer St. NE, Suite A, Salem, OR 97301 USA, Phone: 503-986-0879, Fax: 503-986-0903, Email: Brenda.O.Bateman@wrds.state.or.us (Abstract)
- Battaglin, William (Session 38)**, Research Hydrologist, U.S. Geological Survey, Box 25046, MS 415, Lakewood, CO 80225 USA, Phone: 303-226-4882, x256, Email: wbattagl@usgs.gov (Abstract)
- Baumgart-Getz, Adam (Session 62)**, Purdue University, Pfendler Hall of Agriculture, G004715 W. State Street, West Lafayette, IN 47906-2011 USA, Phone: 765-427-9568, Email: adam@purdue.edu (Abstract)
- Bell, David (Session 21)**, Project Leader, Texas A&M University, 2124 TAMU, College Station, TX 77843 USA, Phone: 979-458-8860, Email: belldr@tamu.edu (Abstract)
- Bennett, Anthony (Tony) (Session 43)**, Technical Director, TCB, 400 West 15th St., Ste. 500, Austin, TX 78701 USA, Phone: 512-457-7766, Fax: 512-472-7519, Email: anthony.bennett@tcb.aecom.com (Abstract)
- Berdanier Bruce (Session 23)**, Professor and Head, Dept. of Civil and Environmental Engineering, South Dakota State University, 118 Crothers Engineering Hall, Brookings, SD 57007 USA, Phone: 6005-688-6307, Email: bruce.berdanier@sdsu.edu (Abstract)
- Berg, Joe (Sessions 46, 63)**, Biohabitats, Inc., 2081 Clipper Park Road, Baltimore, MD 21211 USA, Phone: 410-554-0156, Email: jberg@biohabitats.com (Abstracts)
- Bergstedt, Lee (Poster Session)**, GEI Consultants, Inc., 5575 S. Sycamore St. Suite 101, Littleton, CO 80120 USA, Phone: 303-794-5530, Fax: 303-794-5041, Email: lbergstedt@geiconsultants.com (Abstract)
- Berthelote, Antony (Session 21)**, University of Montana, 32 Campus Drive, Clapp Bldg, Rm. 311, Missoula, MT 59812-1296 USA, Phone: 406-243-2341, Fax: 406-243-4028, Email: aberthelote@yahoo.com (Abstract)
- Black, Alan (Session 51)**, Section Manager, HNTB Corporation, 600 108th Avenue NE, Suite 900, Bellevue, WA 98004 USA, Phone: 425-450-2515, Fax: 425-453-9179, Email: ablack@hntb.com (Abstract)
- Bolleter, Jim (Session 67)**, Manager, Ecology and Environment, 1665 Palm Beach Lakes Blvd, Suite 500, West Palm Beach, FL 33401 USA, Phone: 561-640-6552, Fax: 561-640-6551, Email: jbolleter@ene.com (Abstract)
- Braud, Jason (Poster Session)**, Graduate Student, Louisiana State University, Baton Rouge, LA 70769 USA, Phone: 225-223-7680, Email: ja\_braud@yahoo.com (Abstract)
- Brown, Gordon (Poster Session)**, Research Assistant, University of Florida, 216 Black Hall, Environmental Engineering Sciences, Gainesville, FL 32611 USA, Phone: 352-846-3036, Fax: 352-392-3076, Email: ghbrown@ufl.edu (Abstract)
- Brown, Kristopher (Poster Session)**, Graduate Research Assistant, School of Renewable Natural Resources, Louisiana State University, Baton Rouge, LA 70803 USA, Phone: 717-816-0974, Email: brownkr3@gmail.com (Abstract)
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- Bryant Mason, April (Session 28)**, Graduate Research Assistant, Louisiana State University, Baton Rouge, LA 70803 USA, Phone: 225-578-0783, Email: aemason5@gmail.com (Abstract)
- Campana, Michael (Sessions 5, 35)**, Director and Professor, Inst. Water and Watersheds, 210 Strand Agric. Hall, Oregon State University, Corvallis, OR 97331-2208 USA, Phone: 541-737-2413, Fax: 541-737-1887, Email: aquadoc@oregonstate.edu (Abstract)
- Carey, Richard O. (Session 28)**, PhD Candidate, University of Florida, School of Natural Resources and Environment, Gainesville, FL 32611 USA, Phone: 305-246-7001, x288, Fax: 305-246-7003, Email: rcarey@ufl.edu (Abstract)
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- Cha, Yoon Kyung (Session 27)**, Student, Duke University, Box 90328, Durham, NC 27705 USA, Phone: 919-943-6456, Email: yc49@duke.edu (Abstract)



**DIRECTORY OF PRESENTERS (CONT'D.)**

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- Chen, Meifa (Session 58)**, Sr. Water Resources Engineer, CDM, 2301 Maitland Center Parkway, Suite 300, Maitland, FL 32751 USA, Phone: 407-660-6380, Fax: 407-875-1161, Email: Chenme@cdm.com (Abstract)
- Cheng, H. Harry (Poster Session)**, Senior Engineer, Project Manager, GW Modeling Technical Director, CDM, 2301 Maitland Center Parkway, Suite 300, Orlando, FL 32751 USA, Phone: 407-660-2552, Fax: 407-875-1161, Email: chenghh@cdm.com (Abstract)
- Clarke, Ruth (Session 36)**, Senior Support Engineer, Wallingford Software Ltd., Howbery Park, Wallingford, Oxford OX10 8BA UK, Phone: 4.477539027e+011, Fax: 4.4149182639e+011, Email: ruth.clarke@wallingfordsoftware.com (Abstract)
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- Collier, Carol (Sessions 11, 18)**, Executive Director, Delaware River Basin Commission, P.O. Box 7360, West Trenton, NJ 08628-0360 USA, Phone: 609-883-9500, Email: carol.collier@drbc.state.nj.us (Abstracts)
- Colligan, Marcus (Poster Session)**, Environmental Scientist, Tetra Tech, Inc., 748 Main Street, Baton Rouge, LA 70806, USA, Phone: 225-383-1780, Email: marcus.colligan@tetrattech.com (Abstract)
- Confesor, Remegio (Session 33)**, Postdoctorate Research Associate, Oregon State University, 3450 SW Campus Way, Corvallis, OR 97330 USA, Phone: 541-738-4163, Fax: 541-738-4160, Email: confesor@onid.orst.edu (Abstract)
- Cooper, Paula (Session 1)**, Whatcom County, WA, Phone: 360-676-6876 (Abstract)
- Cullum, Michael (Session 16)**, Director, Engineering, St. Johns River Water Management District, 4049 Reid Street, Palatka, FL 32177 USA, Phone: 386-312-2351, Email: mcullum@sjrwm.com (Abstract)
- Cushing, Katherine (Session 55)**, Associate Professor, Department of Environmental Studies, San Jose State University, 1 Washington Square Hall, San Jose, CA 95192-0115, Phone: 408-924-6348, Fax: 408-924-5477, Email: kcushing@email.sjsu.edu (Abstract)
- Davenport, Thomas (Session 57)**, NPS Expert, U.S. EPA, 77 W Jackson St.(WW-16J), Chicago, IL 60604 USA, Phone: 312-886-0209, Fax: 312-886-7804, Email: davenport.thomas@epa.gov (Abstract)
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- DelCharco, Michael (Session 41)**, Associate Vice President, Taylor Engineering, 10151 Deerwood Park Blvd., Bldg. 300, Suite 300, Jacksonville, FL 32256 USA, Phone: 904-731-7040, Fax: 904-731-9847, Email: mdelcharco@tayloengineering.com (Abstract)
- Dellapenna, Joseph (Session 35)**, Professor of Law, Villanova University School of Law, 299 North Spring Mill Road, Villanova, PA 19085-1682 USA, Phone: 610-519-7075, Fax: 610-519-6282, Email: dellapen@law.villanova.edu (Abstract)
- DeMouche, Leeann (Session 6)**, Water Resource Specialist, New Mexico State University, P. O. Box 30003, MSC 3AE, Las Cruces, NM 88003 USA, Phone: 575-646-3973, Fax: 575-646-8085, Email: Idemouch@nmsu.edu (Abstract)
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- Diblin, Mark (Session 18)**, Principal Geologist MACTEC Engineering and Consulting, Inc, 404 SW 140th Terrace, Newberry, FL 32669 USA, Phone: 352-333-2621, Fax: 352-333-6622, Email: mcdiblin@mactec.com (Abstract)
- Dickson, David (Session 67)**, Division Manager of Ecology, Environmental Services, Inc, 2825 Lewis Speedway, Suite 107, St. Augustine, FL 32084 USA, Phone: 904-824-5494, Email: ddickson@esinc.cc (Abstract)
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**Plan Ahead** - When you check into your room, check the location of exits. Walk to the nearest exit, learn the route, obstacles, etc. Keep your room key on the night stand when you are in your room. Examine your room. Check the windows to see if they open and how. Examine the area outside your window.

**In Case of a Fire ... Evacuation Procedures** - Immediately investigate all odors, smoke, and/or disturbances. If you smell smoke, grab your key, roll out of bed, and crawl to the door. Feel the door. If the door facing or knob is hot, don't open it. If the hall is clear of fire, crawl toward the exit after closing your door. Stay against the exit side of the wall. Keep as close to the floor as possible. When you reach the exit, walk down the stairs holding the handrail.

**Survival Techniques in the Room** - If the door is warm or hot, or if the hallway is filled with smoke, you can still defend yourself effectively in your room. Call the front desk to report the fire and let someone know your location. Vent the room. Use the bathroom vent fan or open the window if there is smoke in your room. Don't open the window if there is smoke outside. Fill the bathtub with water for firefighting. Don't get in the tub! Use wet sheets or towels to stuff the cracks around the door. Use the ice bucket to drench the walls, mattresses, rugs, drapes, etc. While waiting to be rescued, do not hide from the fire. Stay out of closets and out from under the bed. Keep fighting until help arrives. Place a towel, sheet, or other items in the window to let firemen know that someone is in the room.

**Other Tips - Jumping** ... If you jump from higher than the third floor, chances are you won't survive the fall. **Elevators** ... Never enter an elevator during a fire alert. **Don't Panic** ... It is contagious and almost irreversible once it sets in. If you understand what is happening, what to do, where to go and how to get there, you are unlikely to panic.



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