

**AMERICAN WATER RESOURCES ASSOCIATION**

**2009 ANNUAL WATER  
RESOURCES CONFERENCE**

**FINAL PROGRAM**

*Seattle, Washington ~ November 9-12, 2009*



**AWRA**

*Community, Conversation, Connections*

***Forty-Five Years of  
Community,  
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Connections***

# Journal of the American Water Resources Association

*Published on behalf of the American Water Resources Association*

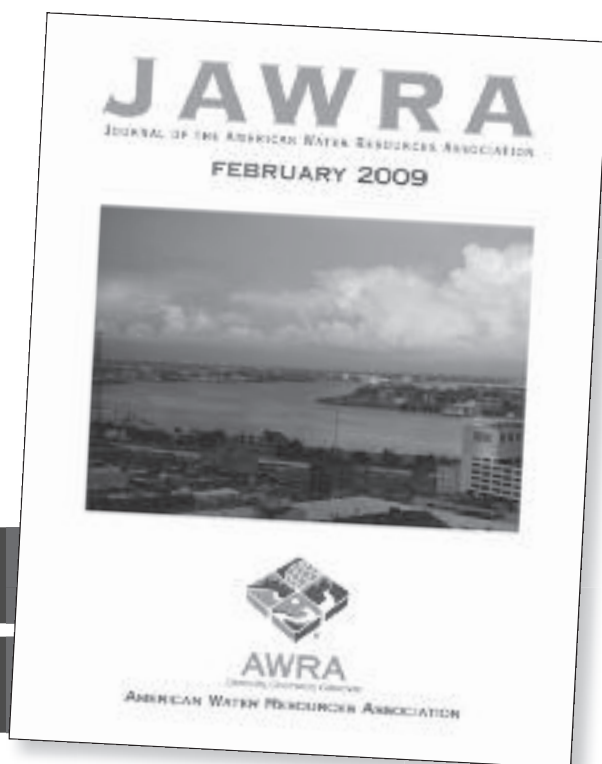
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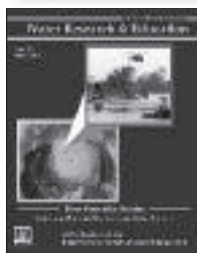
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## Journal of Contemporary Water Research & Education

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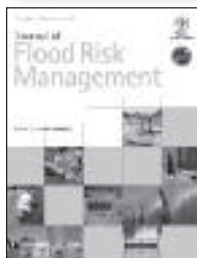
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## Journal of Flood Risk Management

*Published in partnership with the Chartered Institution of Water and Environmental Management. (CIWEM)*

Free online access in 2009 and 2010  
[www.floodriskmanagement.org](http://www.floodriskmanagement.org)



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### Water and Environment Journal

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[www.waterandenvironmentjournal.org](http://www.waterandenvironmentjournal.org)

 **WILEY-BLACKWELL**

# 2009 AWRA Annual Water Resources Conference

Red Lion Hotel  
Seattle, Washington  
November 9-12, 2009



## WELCOME TO SEATTLE, WASHINGTON, AND TO AWRA'S 2009 ANNUAL WATER RESOURCES CONFERENCE ... CLEVE STEWARD, GENERAL CHAIR



In response to the civic unrest of the 1960s, the author and activist John Gardner said, "What we have before us are some breath-taking opportunities disguised as insoluble problems." This same sentiment applies to today's world, which has been rocked to the core by economic turmoil. Gardner's words appeal to me in much the same way Barack Obama's campaign slogan "Yes, we can!" does; that is, by conveying hope and a "can do" attitude. Both are a call for action. They make me want to try harder, be socially responsible, and make a meaningful and positive contribution. From talking with many of you, I know I am not alone in these sentiments. Whether you are starting your career, contemplating retirement, or somewhere in between, many of you share a similar sense of optimism and purpose. Our goal is not so much personal reward and recognition as it is knowing that we are making a difference.

What does this have to do with the 2009 AWRA Water Resources Conference, you ask? I think it is the primary reason we are here. We not only want to talk about our work and exchange information, but also to reconnect with friends and forge new relationships. The conviviality that is a hallmark of AWRA conferences results not only from our shared interest in water resources, but also from a common desire to have a socially positive impact. The meaning of "socially positive," in the present context, ranges from the pragmatic solutions and specific benefits that accrue from solving 'insoluble problems,' to the more abstract concepts of sustainability, conservation and 'wise use' of our water resources. The presentations you will hear at this conference represent some of the most current, forward looking thinking, research, and action on these topics.

This is your conference. I encourage you to immerse yourself in it, and in so doing, to inform yourself, share ideas, and forge ties with your colleagues. These are not only like-minded people, they are potential friends that share your commitment to better understanding and positive change. As AWRA advertises, it's all about "community, conversation, and connections."

The Planning Committee for this conference included National AWRA staff and several Washington Section AWRA board members and volunteers. In particular, I would like to recognize Alan Black, who did a yeoman's job as Program Committee Co-Chair. Please take time to acknowledge the efforts of the many individuals who helped plan and organize the conference. They are listed on page 9 of this Program.

Speaking for the Planning Committee and others who have worked so hard, and to whom we are all indebted, I welcome you and thank you for the opportunity to serve on behalf of our profession and the resource. Please consider yourselves our guests and have a wonderful experience.

## AWRA'S FUTURE MEETINGS

### AWRA's 2010 SPRING SPECIALTY CONFERENCE ON GIS AND WATER RESOURCES VI

MARCH 29-31, 2010

ROSEN SHINGLE CREEK HOTEL ~ ORLANDO, FLORIDA

### AWRA's 2010 SUMMER SPECIALTY CONFERENCE ON ISLAND/CARIBBEAN TROPICAL HYDROLOGY

TBA

SAN JUAN, PUERTO RICO

### AWRA's 2010 ANNUAL WATER RESOURCES CONFERENCE

NOVEMBER 1-4, 2010

LOEWS PHILADELPHIA HOTEL ~ PHILADELPHIA, PENNSYLVANIA

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



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Community, Conversation, Connections  
AMERICAN WATER RESOURCES ASSOCIATION



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Seattle, WA

### BOOK & JOURNAL EXHIBITORS

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 12, 2009 at 11:00 a.m.**

#### CONFIRMED BOOK EXHIBITORS

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

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

**Earthscan/Stylus Publications**  
Sterling, VA

**Geotechnical Translations**  
Austin, TX

**Island Press**  
Washington, DC

**The MIT Press**  
Cambridge, MA

**The Water Report**  
Eugene, OR

**Taylor & Francis**  
Philadelphia, PA

**Walker & Company**  
New York, NY

#### BOOK DISPLAY HOURS

Monday, November 9: ..... 7:30 a.m. to 6:00 p.m.  
Tuesday, November 10: ..... 7:30 a.m. to 5:00 p.m.  
Wednesday, November 11: ..... 7:30 a.m. to 5:00 p.m.  
Thursday, November 12: ..... 7:30 a.m. to 12:00 noon

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**AWRA'S 2009 ANNUAL WATER RESOURCES CONFERENCE ~ SEATTLE, WASHINGTON  
TECHNICAL & POSTER SESSIONS AT-A-GLANCE ~ NOVEMBER 9-12**

**• MONDAY ~ NOVEMBER 9 •**

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

**OPENING PLENARY SESSION**

**DANIEL OPALSKI**

DEPUTY ADM., EPA REGION 10

**KENNETH SLATTERY**

WA DEPT. OF ECOLOGY

**DAVID DICKS**

PUGET SOUND PARTNERSHIP

**POSTER SESSION**

**8:30 AM-6:30 PM**

**LUNCH ~ ON YOUR OWN**

**12:00 NN-1:25 PM**

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

**CONCURRENT SESSIONS 1-5**

- 1 Panel: Middle East North Africa Region-Water Governance Benchmarking in the MENA Region
- 2 THIS SESSION HAS BEEN CANCELLED
- 3 Impacts of Land Use Changes
- 4 Developing Programs & Policies to Reduce Toxics in Oregon Waters
- 5 Irrigation and Erosion Control

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

**CONCURRENT SESSIONS 6-10**

- 6 Panel: Transboundary Integrated Water Resources Mgmt. - Indicators, Institutions, Constraints, & Innovations
- 7 Endangered Species Act
- 8 Panel: Evolving Guidelines for More Habitat-Friendly Floodplain Development in the Puget Sound Region
- 9 Funding, Planning, & Modeling
- 10 Controlling Nutrients

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

**CONCURRENT SESSIONS 11-15**

- 11 Panel: Impressions of the Fifth World Water Forum, Istanbul, March 2009
- 12 Panel: Combined Sewer Overflows - Going "Green" to Keep Outfalls Clean
- 13 Stormwater
- 14 Design Details
- 15 Salinity & Other Water Quality Targets

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

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

**• TUESDAY ~ NOVEMBER 10 •**

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

**CONCURRENT SESSIONS 16-20**

- 16 Panel: Water Resources IMPACT & the Next 10 Years-Part 1
- 17 Climate Change
- 18 BMP Practices
- 19 Impacts of Toxic Chemicals on Water Quality, Aquatic Biota, & Human Health
- 20 Information Management

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

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

**CONCURRENT SESSIONS 21-25**

- 21 Panel: Water Resources IMPACT & the Next 10 Years-Part 2
- 22 River Impacts
- 23 Innovative Technology
- 24 Monitoring
- 25 GIS

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

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

**CONCURRENT SESSIONS 26-30**

- 26 Water Resources & Water Supply
- 27 Modeling, Mitigation, and Adaptation for Change-I
- 28 Panel: Columbia River Treaty - From Here to Where?
- 29 Panel: Spokane River TMDLs
- 30 Modeling

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

**CONCURRENT SESSIONS 31-35**

- 31 Sustainability, Decision Making, & Education
- 32 Sea Level Concerns
- 33 Watershed Planning & Management
- 34 TMDL Issues
- 35 Modeling & Communicating Science to Policy Makers

**SPECIAL EVENT ~ SEATTLE AQUARIUM  
6:00 PM-10:00 PM**

**• WEDNESDAY ~ NOVEMBER 11 •**

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

**CONCURRENT SESSIONS 36-40**

- 36 Policy & Climate Change
- 37 Integrating Instream Flows Into Water Resource Planning
- 38 Panel: Major Water Mgmt. Projects by Seattle Public Utilities in the Cedar River/Lake Washington Basin
- 39 Surface Water/Groundwater Ecosystem Interactions
- 40 Planning-I

**AWRA AWARDS LUNCHEON  
12:00 NN-1:25 PM**

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

**CONCURRENT SESSIONS 41-45**

- 41 Water Mgmt. & Planning
- 42 Flooding & Floodplain Mgmt.
- 43 Infrastructure
- 44 ASR & Groundwater
- 45 Water Resources Planning

**STUDENT CAREER NIGHT  
5:30 PM-7:30 PM**

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

**CONCURRENT SESSIONS 46-50**

- 46 Instream Flows - Ecosystem Requirements
- 47 Flood Forecasting & Protection
- 48 Water Supply & Infrastructure
- 49 Groundwater-I
- 50 Balancing Highway Development & the Environment Through Design-Build Delivery

**FIELD TRIP ~ FERRY EXCURSION ON PUGET SOUND  
5:30 PM-9:00 PM**

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

**CONCURRENT SESSIONS 51-55**

- 51 Ecosystem Restoration/Mitigation
- 52 Surface Water/Stormwater Mgmt. Innovation
- 53 Addressing the State of Our Nation's Levees
- 54 Groundwater-II
- 55 Planning-II

**• THURSDAY ~ NOVEMBER 12 •**

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

**CONCURRENT SESSIONS 56-60**

- 56 Panel: Incorporating Ecosystem Based Mgmt. Principles Into Coastal Zone Mgmt.
- 57 Panel: An Integrated Approach to Resolving Water Use Conflicts in the Yakima River Basin
- 58 Watershed Management
- 59 Policy & Legal
- 60 Panel: The Tualatin Basin Water Supply Project, Oregon

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

**CONCURRENT SESSIONS 61-65**

- 61 Wetlands & Lakes
- 62 Water Mgmt. Planning & Partnerships
- 63 River Operations & Flow Mgmt.
- 64 Looking at the Big Picture
- 65 Water & Energy: Hydropower & Alternative Energy

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

**CONCURRENT SESSIONS 66-70**

- 66 Panel: Planning, Partnerships, Projects, Pitfalls, & Performance - The Full Cycle of River Restoration: A Case Study of the Snoqualmie Watershed
- 67 Panel: Institutional Barriers to the Use of Alternative Water Supplies
- 68 Surface Water Quality & Planning
- 69 Agricultural Hydrology
- 70 Panel: Integrating Watershed Protection & Land Use Decisions

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

**CONCURRENT SESSIONS 71-75**

- 71 Modeling, Mitigation, & Adaptation for Change-II
- 72 Water Supply Quality & Treatment
- 73 Ecosystems - Restoration & Species Interaction
- 74 Panel: Species Recovery - What Does It Mean?
- 75 Collaboration Between Nations

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

**AWRA'S 2009 ANNUAL WATER RESOURCES CONF. ~ NOVEMBER 9-12 ~ SEATTLE, WA  
TECHNICAL SESSIONS AT-A-GLANCE BY TRACK**

**MONDAY ~ NOVEMBER 9, 2009**

<b><u>INTERNATIONAL TRACK</u></b>		<b>TIME</b>
Session 1	Panel: Middle East North Africa Region - Water Governance Benchmarking in the MENA Region .....	10:30 am-12:00 noon
Session 6	Panel: Transboundary Integrated Water Resources Mgmt. - Indicators, Institutions, Constraints, and Innovations .....	1:30 pm-3:00 pm
Session 11	Panel: Impressions of the Fifth World Water Forum, Istanbul, March 2009 .....	3:30 pm-5:00 pm

**ENDANGERED SPECIES ACT TRACK**

Session 2	THIS SESSION HAS BEEN CANCELLED .....	10:30 am-12:00 noon
Session 7	Endangered Species Act .....	1:30 pm-3:00 pm
Session 8	Panel: Evolving Guidelines for More Habitat-Friendly Floodplain Development in the Puget Sound Region .....	1:30 pm-3:00 pm

**URBANIZATION TRACK**

Session 3	Impacts of Land Use Changes .....	10:30 am-12:00 noon
Session 12	Panel: Combined Sewer Overflows - Going "Green" to Keep Outfalls Clean .....	3:30 pm-5:00 pm
Session 13	Stormwater .....	3:30 pm-5:00 pm

**REDUCING TOXICS AND GREEN INFRASTRUCTURE TRACK**

Session 4	Developing Programs and Policies to Reduce Toxics in Oregon Waters .....	10:30 am-12:00 noon
Session 9	Funding, Planning, and Modeling .....	1:30 pm-3:00 pm
Session 14	Design Details .....	3:30 pm-5:00 pm

**AGRICULTURE AND WATER QUALITY TRACK**

Session 5	Irrigation and Erosion Control .....	10:30 am-12:00 noon
Session 10	Controlling Nutrients .....	1:30 pm-3:00 pm
Session 15	Salinity and Other Water Quality Targets .....	3:30 pm-5:00 pm

**TUESDAY ~ NOVEMBER 10, 2009**

**WATER IN THE NEXT DECADE TRACK**

Session 16	Panel: Water Resources IMPACT and the Next 10 Years - Part 1 .....	8:30 am-10:00 am
Session 21	Panel: Water Resources IMPACT and the Next 10 Years - Part 2 .....	10:30 am-12:00 noon
Session 26	Water Resources and Water Supply .....	1:30 pm-3:00 pm
Session 31	Sustainability, Decision Making, and Education .....	3:30 pm-5:10 pm

**CLIMATE CHANGE TRACK**

Session 17	Climate Change .....	8:30 am-10:00 am
Session 22	River Impacts .....	10:30 am-12:00 noon
Session 27	Modeling, Mitigation, and Adaptation for Change-I .....	1:30 pm-3:00 pm
Session 32	Sea Level Concerns .....	3:30 pm-5:10 pm

**SURFACE WATER TRACK**

Session 18	BMP Practices .....	8:30 am-10:00 am
Session 23	Innovative Technology .....	10:30 am-12:00 noon
Session 28	Panel: Columbia River Treaty - From Here to Where? .....	1:30 pm-3:00 pm
Session 33	Watershed Planning and Management .....	3:30 pm-5:10 pm

**WATER QUALITY TRACK**

Session 19	Impacts of Toxic Chemicals on Water Quality, Aquatic Biota, and Human Health .....	8:30 am-10:00 am
Session 24	Monitoring .....	10:30 am-12:00 noon
Session 29	Panel: Spokane River TMDLs .....	1:30 pm-3:00 pm
Session 34	TMDL Issues .....	3:00 pm-5:00 pm

**INFORMATION MANAGEMENT TRACK**

Session 20	Information Management .....	8:30 am-10:00 am
Session 25	GIS .....	10:30 am-12:00 noon
Session 30	Modeling .....	1:30 pm-3:00 pm
Session 35	Modeling and Communicating Science to Policy Makers .....	3:30 pm-5:00 pm

**WEDNESDAY ~ NOVEMBER 11, 2009**

**CLIMATE CHANGE AND ECOSYSTEMS TRACK**

Session 36	Policy and Climate Change .....	8:30 am-10:00 am
Session 41	Water Management and Planning .....	10:30 am-12:00 noon
Session 46	Instream Flows - Ecosystem Requirements .....	1:30 pm-3:00 pm
Session 51	Ecosystem Restoration/Mitigation .....	3:30 pm-5:10 pm

# AWRA'S 2009 ANNUAL WATER RESOURCES CONF. ~ NOVEMBER 9-12 ~ SEATTLE, WA TECHNICAL SESSIONS AT-A-GLANCE BY TRACK (CONTINUED)

## WEDNESDAY ~ NOVEMBER 11, 2009 (CONTINUED)

### SURFACE WATER TRACK

Session 37	Integrating Instream Flows Into Water Resource Planning .....	8:30 am-10:00 am
Session 42	Flooding and Floodplain Management .....	10:30 am-12:00 noon
Session 47	Flood Forecasting and Protection .....	1:30 pm-3:00 pm
Session 52	Surface Water/Stormwater Management Innovation .....	3:30 pm-5:00 pm

### INFRASTRUCTURE TRACK

Session 38	Panel: Major Water Management Projects by Seattle Public Utilities in the Cedar River/Lake Washington Basin .....	8:30 am-10:00 am
Session 43	Infrastructure .....	10:30 am-12:00 noon
Session 48	Water Supply and Infrastructure .....	1:30 pm-3:00 pm
Session 53	Addressing the State of Our Nation's Levees .....	3:30 pm-5:10 pm

### GROUNDWATER TRACK

Session 39	Surface Water/Groundwater Ecosystem Interactions .....	8:30 am-10:00 am
Session 44	ASR and Groundwater .....	10:30 am-12:00 noon
Session 49	Groundwater-I .....	1:30 pm-3:00 pm
Session 54	Groundwater-II .....	3:00 pm-5:00 pm

### PLANNING TRACK

Session 40	Planning-I .....	8:30 am-10:00 am
Session 45	Water Resources Planning .....	10:30 am-12:00 noon
Session 50	Balancing Highway Development and the Environment Through Design-Build Delivery .....	1:30 pm-3:00 pm
Session 55	Planning-II .....	3:30 pm-5:00 pm

## THURSDAY ~ NOVEMBER 12, 2009

### PLANNING TRACK

Session 56	Panel: Incorporating Ecosystem Based Management Principles Into Coastal Zone Management .....	8:30 am-10:00 am
Session 61	Wetlands and Lakes .....	10:30 am-12:00 noon
Session 66	Panel: Planning, Partnerships, Projects, Pitfalls, and Performance - The Full Cycle of River Restoration: A Case Study of the Snoqualmie Watershed .....	1:30 pm-3:00 pm
Session 71	Modeling, Mitigation, and Adaptation for Change-II .....	3:30 pm-5:00 pm

### WATER SUPPLY TRACK

Session 57	Panel: An Integrated Approach to Resolving Water Use Conflicts in the Yakima River Basin .....	8:30 am-10:00 am
Session 62	Water Management Planning and Partnerships .....	10:30 am-12:00 noon
Session 67	Panel: Institutional Barriers to the Use of Alternative Water Supplies .....	1:30 pm-3:00 pm
Session 72	Water Supply Quality and Treatment .....	3:30 pm-5:00 pm

### WATER QUALITY/SURFACE WATER TRACK

Session 58	Watershed Management .....	8:30 am-10:00 am
Session 63	River Operations and Flow Management .....	10:30 am-12:00 noon
Session 68	Surface Water Quality and Planning .....	1:30 pm-3:00 pm
Session 73	Ecosystems - Restoration and Species Interaction .....	3:30 pm-5:10 pm

### POLICY AND ESA TRACK

Session 59	Policy and Legal .....	8:30 am-10:00 am
Session 64	Looking at the Big Picture .....	10:30 am-12:00 noon
Session 69	Agricultural Hydrology .....	1:30 pm-3:00 pm
Session 74	Panel: Species Recovery - What Does It Mean? .....	3:00 pm-5:00 pm

### SUSTAINABILITY AND COLLABORATION TRACK

Session 60	Panel: The Tualatin Basin Water Supply Project, Oregon .....	8:30 am-10:00 am
Session 65	Water and Energy: Hydropower and Alternative Energy .....	10:30 am-12:00 noon
Session 70	Panel: Integrating Watershed Protection and Land Use Decisions .....	1:30 pm-3:00 pm
Session 75	Collaboration Between Nations .....	3:30 pm-5:00 pm

### PLEASE NOTE

The **PRESENTER** of each paper/poster is in **BOLD** type immediately following the paper title. Co-authors are then listed in parentheses. The affiliation given is that of the Presenter. **The Proceedings is available under the "Annual Conference Listing" on the AWRA website ... www.awra.org.**

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

# 2009 ANNUAL CONFERENCE PLANNING COMMITTEE

## ANNUAL CONFERENCE GENERAL CHAIR AND FINANCE COMMITTEE

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Bellevue, Washington

**BRENDA BATEMAN**

Oregon Water Resources Department  
Salem, Oregon

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**EMERALD BALLROOM FOYER - OPEN THROUGHOUT THE CONFERENCE**

The mission of the American Water Resources Association 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.

## AWRA EMPLOYMENT OPPORTUNITY BOARD

**EMERALD BALLROOM 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.

## DAY-AT-A-GLANCE / MONDAY / NOVEMBER 9, 2009

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

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

AWRA NEW MEMBER WELCOME BREAKFAST (INVITATION ONLY) / 7:00 A.M.-8:00 A.M. / LOPEZ A ROOM

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

MORNING NETWORKING BREAK / 8:00 A.M.-10:30 A.M. / EMERALD BALLROOM I

COMMERCIAL AND EDUCATIONAL EXHIBITS OPEN/8:00 A.M.-6:30 P.M. / EMERALD BALLROOM I

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

SPEAKERS' PREPARATION ROOM OPEN / 9:00 A.M.-8:00 P.M. / VASHON ROOM

CONFERENCE OPENING PLENARY SESSION / 8:00 A.M.-10:00 A.M. / EMERALD BALLROOM II & III

MORNING NETWORKING BREAK (CONT'D.) / 10:00 AM-10:30 A.M. / EMERALD BALLROOM I

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

**SESSION 1 - PANEL:**  
MIDDLE EAST NORTH  
AFRICA REGION -  
WATER GOV. BENCH.  
IN THE MENA REGION  
EMERALD BALLROOM II

SESSION 2  
  
THIS SESSION  
HAS BEEN  
CANCELLED

SESSION 3  
IMPACTS OF LAND  
USE CHANGES  
  
EMERALD BALLROOM III

SESSION 4  
DEVELOPING PROGRAMS &  
POLICIES TO REDUCE  
TOXICS IN OREGON  
WATERS  
SAN JUAN/WHIDBEY RM.

SESSION 5  
IRRIGATION &  
EROSION CONTROL  
  
ORCAS ROOM

JAWRA ASSOCIATE EDITORS' LUNCHEON MEETING (INVITATION ONLY)  
11:30 A.M.-2:00 P.M. / LOPEZ A ROOM

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.

**SESSION 6 - PANEL:**  
TRANSBOUNDARY  
INTEGRATED WATER  
RES. MGMT.-  
INDICATORS ...  
EMERALD BALLROOM II

SESSION 7  
ENDANGERED  
SPECIES ACT  
  
BAINBRIDGE ROOM

SESSION 8 - PANEL:  
EVOLVING GUIDELINES  
FOR MORE HABITAT-  
FRIENDLY FLOODPLAIN  
DEV. IN THE PUGET...  
EMERALD BALLROOM III

SESSION 9  
FUNDING, PLANNING &  
MODELING  
SAN JUAN/WHIDBEY RM.

SESSION 10  
CONTROLLING  
NUTRIENTS  
  
ORCAS ROOM

AFTERNOON NETWORKING BREAK / 3:00 PM-3:30 P.M. / EMERALD BALLROOM I

CONCURRENT SESSIONS 11, 12, 13, 14, 15 / 3:30 P.M.-5:00 P.M.

**SESSION 11- PANEL:**  
IMPRESSIONS OF THE  
FIFTH WORLD WATER  
FORUM, ISTANBUL.  
MARCH 2009  
EMERALD BALLROOM II

SESSION 12- PANEL:  
COMBINED SEWER  
OVERFLOW - GOING  
"GREEN" TO KEEP  
OUTFALLS CLEAN  
BAINBRIDGE ROOM

SESSION 13  
STORMWATER  
  
EMERALD BALLROOM III

SESSION 14  
DESIGN DETAILS  
SAN JUAN/WHIDBEY RM.

SESSION 15  
SALINITY & OTHER  
WATER QUALITY  
TARGETS  
  
ORCAS ROOM

INTERNATIONAL TECHNICAL COMMITTEE MEETING / 4:00 PM-6:00 P.M. / LOPEZ B ROOM

STUDENT ATTENDEE CONFERENCE ORIENTATION / 4:30 P.M.-5:00 P.M.  
MEET IN FRONT OF EMERALD BALLROOM I (SEE PG. 41)

OPENING NETWORKING RECEPTION / 5:00 P.M.-6:30 P.M. / EMERALD BALLROOM I  
(COMMERCIAL & EDUCATIONAL EXHIBITS OPEN - SEE PG. 41)

## **CONFERENCE OPENING PLENARY SESSION**

**MONDAY ~ NOVEMBER 9 ~ 8:30 A.M. -10:00 A.M. ~ EMERALD BALLROOMS II & III**

### **WELCOME AND OPENING REMARKS**

#### **GERALD SEHLKE**

President, American Water Resources Association  
Idaho National Laboratory • Idaho Falls, Idaho

#### **CLEVE STEWARD**

2009 Annual Conference Chair  
AMEC Earth & Environmental, Inc. • Snohomish, Washington

#### **ALAN BLACK**

2009 Annual Conference Technical Program Co-Chair  
HNTB Corporation • Bellevue, Washington

#### **BRENDA BATEMAN**

2009 Annual Conference Technical Program Co-Chair  
Oregon Water Resources Department • Salem, Oregon.

### **KEYNOTE SPEAKERS**

#### **DANIEL OPALSKI**

Deputy Administrator, EPA Region 10 • Seattle, Washington  
*EPA's National and Regional Water Resource Initiatives*

#### **KENNETH SLATTERY**

Water Resources Program Director, Washington Department of Ecology • Olympia, Washington  
*Emerging Water Resources Issues and Initiatives in Washington State*

#### **DAVID DICKS**

Executive Director, Puget Sound Partnership • Tacoma, Washington  
*Saving Puget Sound – Moving From Planning to Implementation*

**10:00 A.M.-10:30 A.M. • MORNING NETWORKING BREAK (CONT'D). • EMERALD BALLROOM I**

### **AWRA TECHNICAL COMMITTEE MEETINGS SCHEDULE**

Monday – November 9 – International Technical Committee Meeting – 4:00 p.m.-6:00 p.m. – Lopez B Room

Tuesday – November 10 – Policy Technical Committee Meeting – 7:30 a.m.-8:30 a.m. – Vashon Room

Wednesday – November 11 – Student Chapter Officers & Advisors Meeting – 3:30 p.m.-5:00 p.m. – Emerald Ballroom I

### **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 8 • 4:00 P.M. TO 6:00 P.M.**

**MONDAY • NOVEMBER 9 • 7:30 A.M. TO 6:00 P.M.**

**TUESDAY • NOVEMBER 10 • 7:30 A.M. TO 5:00 P.M.**

**WEDNESDAY • NOVEMBER 11 • 7:30 A.M. TO 5:00 P.M.**

**THURSDAY • NOVEMBER 12 • 8:00 A.M. TO 3:00 P.M.**

## POSTER PRESENTATIONS

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

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

**EMERALD BALLROOM I**

**EMERALD BALLROOM I**

**MONDAY ~ NOVEMBER 9**

**TUESDAY ~ NOVEMBER 10**

POSTER PRESENTERS WILL BE AT THEIR POSTERS DURING THE OPENING NETWORKING RECEPTION FROM 5:00 P.M. TO 6:30 P.M. ON MONDAY, NOVEMBER 9. THEY WILL ALSO BE AT THEIR POSTERS DURING THE MORNING AND AFTERNOON NETWORKING BREAKS ON MONDAY AND TUESDAY, NOVEMBER 9 AND NOVEMBER 10.

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

- 1 **Phosphorus Loss With Surface Runoff as Affected by Biomass and Nutrient Management Systems for Bioenergy Production** - Aaron A. Andrews, Iowa State University, Ames, IA (co-authors: Antonio P. Mallarino, Mazhar U. Haq, Matthew J. Helmers)
- 2 **A Volunteer Water Quality Monitoring Program in the Upper Illinois River Watershed, Northwest Arkansas** - Leslie Bartsch Massey, Arkansas Water Resources Center, Fayetteville, AR (co-author: Brian E. Haggard)
- 3 **Preferences Among Hydrologic Models for Studies Involving Climate Change?** - Levi Brekke, Bureau of Reclamation, Denver, CO (co-authors: Lauren E. Hay, Edward Clark, Nancy Parker, Tom Pruitt, Gregory J. McCabe)
- 4 **Water Quality Factors Shaping Metabolism in the Middle Rio Grande** - Roxanne Candelaria-Ley, University of New Mexico, Albuquerque, NM (co-authors: David VanHorn, Clifford N. Dahm)
- 5 **Economic Effects of Water Related Recreation at the Port of Hood River** - James Carney, Tetra Tech Surface Water Group, Seattle, WA (co-author: Ridge Robinson)
- 6 **Comparison of Reanalysis Datasets With Observed Meteorological Data in the Canadian Prairies Region** - Woonsup Choi, Department of Geography, University of Wisconsin-Milwaukee, Milwaukee, WI (co-authors: Sung Joon Kim, Peter F. Rasmussen)
- 7 **Impact of Reliability and Security on the Planning of the Kensico-City Tunnel, New York** - Eric Cole, AECOM, New York, NY (co-author: Ryan Edison)
- 8 **Deep Drilling in Tuff Conditions to Solve Challenging Groundwater Problems at Los Alamos National Laboratory** - Andy Crowder, TerraneerPMC, Los Alamos, NM (co-authors: Steve White, Ryan McGuill, Linda Fluk, Rich Leishman, Robert Stadel, Mark Everett)
- 9 **Building Toward a National Water Allocation Model on the NHDPlus Network** - Michele Cutrofello, RTI International, Washington, DC (co-authors: Brandon Bergenroth, Jay Rineer, Keith Little)
- 10 **Stream and Watershed Restoration Costs to Address a Hypothetical Mine Tailings Impoundment Failure** - Kathleen Dixon, Ecology & Environment, Seattle, WA (co-authors: Paul Cocca, Alexander Whitman, Kris Erickson)
- 11 **Retrofitting of Urban and Industrial Areas to Protect Water Quality in Puget Sound Tributary Streams** - Mike Giseburt, R.W. Beck, Inc., Seattle, WA (co-authors: Ralph D. Nelson, K.A. Ludwa, R. York, R. Duffner)
- 12 **Using LiDAR, Hydrologic Models, and Global Climate Data to Predict the Effect of Climate Change on Hydrologic Ecotones in the Lower Tualatin Watershed** - J. Ruben Gonzalez-Baird, Portland State University, Portland, OR (co-authors: Susan Wherry, Hamid Moradkhani)
- 13 **The Arizona Water-Energy Nexus** - Joseph H. Hoover, University of Denver, Denver, CO
- 14 **Bacteria Sourcing in the Central Valley (California)** - Michael Johnson, Michael L. Johnson, LLC, Davis, CA (co-authors: Elizabeth Bowen, Melissa Turner)
- 15 **Uncertainty Assessment For Two Hydrologically Distinct Watersheds in the Willamette River Basin** - Il-Won Jung, Portland State University, Portland, OR (co-authors: H. Moradkhani, H. Chang)
- 16 **Analysis of NEXRAD and Rain Gauge Precipitation Data in Northeast Indiana** - Myriam Larose, Purdue University, West Lafayette, IN (co-authors: Gary C. Heathman, Darrell Norton)
- 17 **Development of a Nearest Neighbor Resampling Model to Downscale GCM Output** - Mark Lee, University of Manitoba, Winnipeg, MB, Canada (co-author: Peter F. Rasmussen)
- 18 **Improved Snow Water Equivalent Prediction Using Ensemble Data Assimilation Methods** - Marc Leisenring, Portland State University, Portland, OR (co-author: Hamid Moradkhani)
- 19 **Groundwater Hydrology in a Small Constructed Riparian Wetland in the Ridge and Valley of Virginia** - Andrea Ludwig, Biological Systems Engineering, Virginia Tech, Blacksburg, VA (co-author: W. Cully Hession)

- 20 **Developing the LUOM in Southern Guam Watersheds Without Flow Data - Q. C. Luo**, WERI, University of Guam, Mangilao, Guam (co-author: S. Khosropanah)
- 21 **Impact of Vegetation Cover on Regime and Quality of Groundwater, Belgrade, Serbia Case Study - Dejan Milenic**, Hydrogeologist, Belgrade, Serbia (co-authors: N. Savic, Z. Veljkovic, Dj. Stanojkovic)
- 22 **Reach-Scale Effectiveness Monitoring of Stream Restoration Projects in the Pacific Northwest - Jennifer O'Neal**, Tetra Tech EC, Inc., Bothell, WA (co-author: Tricia Hoffer)
- 23 **Real Time Estimation of BOD by the Rapid Determination of Chemical Oxygen Demand (COD) - Lindsay Peddle**, ManSci Inc, Guelph, ON, Canada (co-author: Michael Essler)
- 24 **Rapid Multi-Parameter Analysis Using the New Rapidduo by Man-Tech - Lindsay Peddle**, ManSci Inc, Guelph, ON, Canada (co-author: Robert Menegotto)
- 25 **Relationship Between Rainfall and Evaporation for Urban Area in Cuiabá City, Brazil - Mariele Regina Pinheiro**, Federal University of Mato Grosso, Cuiabá, MT, Brazil (co-authors: Maricéia Tatiana Vilani, Luciana Sanches, Marcelo de Carvalho Alves, José de Souza Nogueira)
- 26 **A Pseudo-Transient Continuation Dam/Levee Failure Hydrodynamic Model - Gauarv Savant**, USACE-ERDC, Vicksburg, MS (co-authors: Charlie Berger, Tate McAlpin, Jennifer Tate)
- 27 **A Soil Moisture Point for Mature Pecan to Maintain Healthy Growth - Zhuping Sheng**, TAMU, El Paso, TX (co-authors: Yi Liu, Nicole Kyger, Frank Reyers)
- 28 **Providing Environmental Services From an Agricultural Impoundment in South Florida - Sanjay Shukla**, Ag and Bio Eng Dept, University of Florida, Immokalee, FL (co-authors: Alphonse Guzha, Patrick J Bohlen, Mark W. Clark, Sarah Lynch, Len Shabman)
- 29 **Water Quality Effectiveness of an Agricultural Stormwater Impoundment in the Everglades Watershed - Asmita Shukla**, Agricultural and Biological Engineering, University of Florida, Immokalee, FL (co-author: Sanjay Shukla)
- 30 **Storm Response to Barrier Island Restoration in Southeast Louisiana - Alison Sleath Grzegorzewski**, USACE Engineer Research & Development Center, Vicksburg, MS (co-authors: Mary Cialone, Tate McAlpin,)
- 31 **Understanding Rural Water Systems in Developing Countries: Environment, Economics, & Policy - Nick Stacey**, Lafayette College, Easton, PA (co-authors: Lindsay Weir, Anya Abseen, Ting Chiu, Sharon Jones)
- 32 **Development of a Detailed Customer Water Demand Database - Shawn Stoddard**, Truckee Meadows Water Authority, Reno, NV
- 33 **Rainfall and Land Use Effects on Water Quality in the Florida Intracoastal Waterway - Jessie Taft**, BCI Engineers and Scientists, Jacksonville, FL (co-author: Sarah Setiz)
- 34 **Correlation of Nutrients/Salts With Animal Confinement Land Uses Within the Central Valley (California) - Melissa Turner**, Michael L. Johnson, LLC, Davis, CA (co-authors: Stephanie Henderson, Michael Johnson)
- 35 **Focused Management Practice Outreach Based on Water Quality Monitoring and Pesticide Use Data - Melissa Turner**, Michael L. Johnson, LLC, Davis, CA (co-authors: Michael L. Johnson, Francisca Johnson)
- 36 **Impacts of Climate Change on Water Management in the State of Washington, USA - Julie Vano**, University of Washington, Seattle, WA (co-authors: Nathalie Voisin, Marketa Elsner McGuire, Alan Hamlet, Dennis Lettenmaier)
- 37 **Induced Complexity: Early Results From a Floodplain Connection Project in Meacham Creek, Oregon - James Webster**, Umatilla Tribes, Pendleton, OR (co-authors: Scott O'Daniel, Michael Lambert, Eric Hoverson)
- 38 **Statistical Downscaling Approaches in Analyzing Future Climate Change Impacts on Columbia River Basin - Susan Wherry**, Portland State University, Portland, OR (co-authors: Mohammad Reza Najafi, Hamid Moradkhani)

## **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 cash award and their biographical sketch and photo will be published in an upcoming issue of AWRA's *Water Resources IMPACT* magazine and put 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.**

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

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

MONDAY ~ NOVEMBER 9

### SESSION 1 • EMERALD BALLROOM II

#### **PANEL: MIDDLE EAST NORTH AFRICA REGION: WATER GOVERNANCE BENCHMARKING IN THE MENA REGION**

**PANEL MODERATOR • BRENT STEEL** • Oregon State University • Corvallis, Oregon

#### PANEL PARTICIPANTS

**MARK SVENDSEN** • International Resources Group • Washington, D.C.  
*Introduction and Overview of the Project and Its Approach to Assessing Water Governance*

**PARIS EDWARDS & AARON WOLF** • Oregon State University • Corvallis, OR  
*Analyzing the Legal and Policy Framework of Water Governance*

**BRENT STEEL** • Oregon State University • Corvallis, OR  
*Neo-Institutionalism and Actor-Centered Institutional Approaches to Water Governance*

#### **CASE STUDY PAPERS**

**ERIKA WOLTERS** (Egypt), **KRISTIN CHATFIELD** (Jordan), **SARAH KOPP** (Morocco), **KIRSTEN WINTERS** (Oman),  
**ANDRES VAUGHAN** (Turkey) • Oregon State University • Corvallis, OR

**BRIDGET BROWN & BRENT STEEL** • Oregon State University • Corvallis, OR  
*A Comparative Analysis*

Successful management of water resources requires a strong foundation of appropriate national water policies. Additionally, the national government must possess the capacity to implement those policies. Freshwater resources are scarce worldwide and becoming more so as a result of climate change, rapid population growth, and industrialization. In the MENA region, this is especially important due to low surface water supplies, aridity, and high variability in precipitation. National governments there, along with international donors and NGOs, are currently seeking to determine the most effective water policies, laws and organizational structures to ensure adequate water and effective management for future generations in the region. International Resources Group (IRG) and its partners, Oregon State University (OSU) and the International Water Management Institute (IWMI), are currently implementing a USAID-funded Regional Water Governance Benchmarking Project, targeting five Middle Eastern countries. The project aims to develop a system for measuring and benchmarking capacity for and quality of water governance in these five countries which can be applied across the MENA region. The five nations selected as case studies are Egypt, Jordan, Morocco, Oman and Turkey. This special session describes the approach employed by the project, presents a pair of policy models for considering and assessing national water governance, and illustrates the application of the models with examples from the five MENA countries. The panel will present a brief overview of each nation's water policy system, a discussion of water supply and use, and major political, social, and economic factors affecting supplies. Discussion will follow.

### SESSION 2 **CANCELLED**

### SESSION 3 • EMERALD BALLROOM III **IMPACTS OF LAND USE CHANGES**

**MODERATOR • PETER STURTEVANT** • CH2M Hill • Bellevue, Washington

- 10:30 A.M. **Impact of Residential Soil Disturbance on Infiltration and Runoff** - Christopher Woltemade, Shippensburg University, Shippensburg, PA
- 10:50 A.M. **Developing Methodology to Evaluate Urbanization's Effects on Watersheds** - Tammy Parece, Virginia Polytechnic Institute and State University, Blacksburg, VA
- 11:10 A.M. **Impact of Land Use Changes on Water Quality in Northern Georgia** - Jun Tu, Kennesaw State University, Kennesaw, GA

### SESSION 4 • SAN JUAN/WHIDBEY ROOM **DEVELOPING PROGRAMS AND POLICIES TO REDUCE TOXICS IN OREGON WATERS**

**MODERATOR • DEBRA STURDEVANT** • Oregon Department of Environmental Quality • Portland, Oregon

- 10:30 A.M. **Revising Clean Water Act Human Health Criteria Based on Local Fish Consumption Rates** - Debra Sturdevant, Oregon Department of Environmental Quality, Portland, OR
- 10:50 A.M. **Addressing Priority Persistent Pollutants in Oregon Waters – Implementing a New State Law – Cheryl Grabham**, Oregon Department of Environmental Quality, Portland, OR
- 11:10 A.M. **Oregon's Cross-Media Toxics Reduction Strategy** - Kevin Masterson, Oregon Department of Environmental Quality, Portland, OR
- 11:30 A.M. **Willamette Basin, Oregon: Mercury TMDL Phase Two** - Agnes Lut, Oregon Department of Environmental Quality, Portland, OR

SESSION 5 • ORCAS ROOM  
**IRRIGATION AND EROSION CONTROL**

MODERATOR • **DERREL MARTIN** • University of Nebraska • Lincoln, Nebraska

- 10:30 A.M. **Accuracy and Cost/Effectiveness Analysis of Various Reference Evapotranspiration Equations** - Michael Exner-Kittridge, Headwaters Hydrology, LLC, Seattle, WA (co-author: Mark Cable Rains)
- 10:50 A.M. **Influence of Irrigation Recharge on Groundwater NO<sub>3</sub>-N Concentrations in the Greenfields Bench Aquifer, Teton County, Montana** - Christian Schmidt, State of Montana Department of Agriculture, Helena, MT
- 11:10 A.M. **Assessing the Impact of Irrigation Efficiency and Farming Practices on Agricultural Hydrology and Producer Economics** - Derrel Martin, University of Nebraska, Lincoln, NE (co-authors: Dean Eisenhauer, Raymond Supalla)

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

**CONCURRENT SESSIONS 6, 7, 8, 9, 10**

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

MONDAY ~ NOVEMBER 9

SESSION 6 • EMERALD BALLROOM II

**PANEL: TRANSBOUNDARY INTEGRATED WATER RESOURCES MANAGEMENT - INDICATORS, INSTITUTIONS, CONSTRAINTS, AND INNOVATIONS**

PANEL MODERATOR • **BRUCE HOOPER** • DHI Water Environment Health • Australia

PANEL PARTICIPANTS

**BRUCE HOOPER** • DHI Water Environment Health • Australia  
**ARI MICHELSEN** • AgriLife Research, Texas A&M University • USA  
**MICHAEL CAMPANA** • Oregon State University • USA

Transboundary (across international and state/provincial borders) water management strikes at the very heart of national water management and international issues in shared water governance. It is of increasing concern, especially in regions of water stress. This panel discussion will bring together water professionals drawn from a range of disciplines to discuss their experiences with the audience in the assessment of and their own involvement in transboundary water management, including discussions on transboundary indicators and the notions of 'integrated management', 'benefit sharing' and 'equitable utilization' and constraints. The aim of the session is to share experiences and identify ways forward to strengthen governance across often competing domains and jurisdictions. Several international and intranational transboundary locations will be addressed by the panelists and include USA-Mexico, Congo, Lake Victoria, Australia and others.

SESSION 7 • BAINBRIDGE ROOM  
**ENDANGERED SPECIES ACT**

MODERATOR • **SANDRA KILROY** • King County Water and Land Resources • Seattle, Washington

- 1:30 P.M. **Classification of Physical Habitat for Pacific Salmon in the Umatilla River Watershed** - Scott O'Daniel, CTUIR, Pendleton, OR (co-authors: James Webster, Eric Hoverson)
- 1:50 P.M. **First Priority Implementation Strategies for Sediment Control in Ecologically Valuable Salmonid Watersheds** - Todd Kraemer, Pacific Watershed Associates, Arcata, CA (co-author: William Weaver)
- 2:10 P.M. **Restoring California's Second Largest River: Using a Shared Vision Process to Develop a New River's Hydrology** - Jeffrey Payne, MWH, Sacramento, CA (co-authors: Josh Yang, Dave Mooney)
- 2:30 P.M. **Planning to Implementation: Institutionalizing Watershed Protection and Salmon Recovery From Regional Forums to Local Action** - Sandra Kilroy, King County Water and Land Resources, Seattle, WA

SESSION 8 • EMERALD BALLROOM III

**PANEL: EVOLVING GUIDELINES FOR MORE HABITAT-FRIENDLY FLOODPLAIN DEVELOPMENT IN THE PUGET SOUND REGION**

PANEL MODERATOR • **PETER STURTEVANT** • CH2M Hill • Bellevue, Washington

PANEL PARTICIPANTS

**DAN SIEMANN** • National Wildlife Federation, Western Regional Center • Seattle, Washington  
**JOHN GRAVES** • FEMA Region 10 • Bothel, Washington  
**DEEANN KIRKPATRICK** • National Marine Fisheries Service • Seattle, Washington  
**HAROLD SMELT** • Pierce County Surface Water Management • Tacoma, Washington

Many of the streams and rivers in the Pacific Northwest comprise important habitat for endangered fish species. Floodplain development and floodplain protection measures frequently damage this habitat. In response to a Biological Opinion issued by the National Marine Fisheries Service (NMFS) on the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP), FEMA is developing guidelines, applicable to the Puget Sound area, to better assure that new development in floodplains in the region does not harm listed fish species. A panel of four individuals closely involved in this effort will discuss progress to date. Dan Siemann of the National Wildlife Federation, which filed the lawsuit that led to the Biological Opinion, will present the legal background for this issue on a national and local scale. He will also briefly discuss several other similar efforts underway around the Country. DeeAnn Kirkpatrick from NMFS will discuss the findings of the Biological Opinion and particularly the implementation changes required to FEMA's minimum floodplain management criteria. John Graves from FEMA Region X will discuss how FEMA is moving forward with implementation by developing guidelines and a model ordinance for NFIP communities to use in meeting the new requirements. Harold Smelt (Pierce County Surface Water Management) will discuss how the local NFIP communities are responding and the potential effects upon floodplain development. An important topic will be the shared responsibilities of federal, state and local agencies to promote development activities protective of endangered species. The Panel will provide ample time for audience questions.

**SESSION 9 • SAN JUAN/WHIDBEY ROOM**  
**FUNDING, PLANNING, AND MODELING**

**MODERATOR • TONY DUBIN • Brown and Caldwell • Seattle, Washington**

- 1:30 P.M. **Economic Aspects of Green Infrastructure: Results From the Pacific Northwest - Ed MacMullan, ECONorthwest, Eugene, OR**  
(co-authors: Sarah Reich, Bryce Ward, Mark Buckley)
- 1:50 P.M. **Design Considerations for Retrofitting LID and Green Infrastructure Into Existing Streets and Neighborhoods - Jennifer Belknap Williamson, Brown and Caldwell, Portland, OR** (co-author: Mike Prett)
- 2:10 P.M. **Developing and Calibrating Hydrologic Models for Evaluation of Green Infrastructure Options in Seattle's CSO Control Program - Dustin Atchison, CH2M Hill, Bellevue, WA**
- 2:30 P.M. **A Technically Rigorous and Easy to Apply Method for Sizing Stormwater Low-Impact Design for Stream Bank Erosion Control - Tony Dubin, Brown and Caldwell, Seattle, WA** (co-author: Eric Mosolgo)

**SESSION 10 • ORCAS ROOM**  
**CONTROLLING NUTRIENTS**

**MODERATOR • JING WU • University of Maryland • Annapolis, Maryland**

- 1:30 P.M. **A Review of Approaches Used to Establish Regional and Site-Specific Numeric Nutrient Criteria - Douglas McLaughlin, NCASI, Kalamazoo, MI**
- 1:50 P.M. **Developing Nutrient Cap Load Allocations for the Chesapeake Bay Restoration - Jing Wu, University of Maryland Center for Environmental Science, Annapolis, MD** (co-authors: Gary Shenk, Ping Wang, Lewis Linker)
- 2:10 P.M. **Nitrogen-Fixing Diatoms and Cyanobacteria as Valuable Indicators of Stream Nitrogen Availability - A. Elizabeth Fetscher, Southern California Coastal Water Research Project (SCCWRP), Costa Mesa, CA** (co-authors: Rosalina Stancheva, Berengere Laslandes, Robert Sheath, Patrick Kociolek, Martha Sutula)
- 2:30 P.M. **Phosphorus Treatment - Advanced Removal Mechanisms and Amended Design for Stormwater BMPs - Joel Garbon, Imbrium Systems, Portland, OR** (co-authors: Scott Perry, Brian Lee)

**3:00 P.M.-3:30 P.M. • AFTERNOON NETWORKING BREAK • EMERALD BALLROOM I**

**CONCURRENT SESSIONS 11, 12, 13, 14, 15**

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

**MONDAY ~ NOVEMBER 9**

**SESSION 11 • EMERALD BALLROOM II**  
**PANEL: IMPRESSIONS OF THE FIFTH WORLD WATER FORUM,**  
**ISTANBUL, TURKEY, MARCH 2009**

**PANEL MODERATOR • ARI MICHELSEN • Texas AgriLife Research, Texas A&M University • El Paso, Texas**

**PANEL PARTICIPANTS**

**KENNETH D. REID • AWRA • Middleburg, Virginia**  
*World Water Forum Introduction*

**GERALD SEHLKE • Idaho National Laboratory • Idaho Falls, Idaho**  
*Water-Energy-Food Nexus*

**MARGARET PAGELER • ICLEI-Local Governments for Sustainability • Seattle, Washington**  
*Political Process for the Fifth World Water Forum*

**ARI MICHELSEN • Texas AgriLife Research, Texas A&M University • El Paso, Texas**  
*Theme 3 Development and IWRM*

**MICHAEL CAMPANA** • Oregon State University • Corvallis, Oregon  
*Groundwater and Side Events*

**RACHEL PASCHAL OSBORN** • Center for Environmental Law and Policy • Spokane, Washington  
*Alternative Forum, Human Rights*

**KENNETH D. REID** • AWRA • Middleburg, Virginia  
*Wrap-Up: Looking Toward WWF6 in Marseilles, France*

With an estimated 33,000 participants, the Fifth World Water Forum, held in Istanbul, Turkey, on March 16-22, 2009, was the largest water-focused conference of all time. Istanbul, a beautiful city with an intriguing history based on its strategic water access, was the perfect setting for the Forum. AWRA is a member of the World Water Council, which sponsors the Forum, and AWRA staff, board, and regular members participated in many Forum activities. Members of this panel attended the Istanbul conference and present an overview of the 5th World Water Forum as an event, provide behind-the-scenes information on a few of the many topics covered at the Forum (groundwater management, water as a human right, trans-boundary watershed management, climate change effects and adaptations, integrated water resource management, and water politics), and examine the Istanbul Alternative Water Forum, a separate but simultaneous conference that tackled topics not fully covered at the main event.

**SESSION 12 • BAINBRIDGE ROOM**

**PANEL: COMBINED SEWER OVERFLOW - GOING "GREEN" TO KEEP OUTFALLS CLEAN**

**PANEL MODERATOR • ROGER WARD** • HNTB Corporation • Indianapolis, Indiana

**PANEL PARTICIPANTS**

**ROGER WARD** • HNTB Corporation • Indianapolis, Indiana

**DUSTIN ATCHISON** • CH2M Hill • Bellevue, Washington

**JENNIFER MALLOY** • U.S. Environmental Protection Agency • Washington, D.C.

The panel will highlight the current status of large CSO programs and their focus on "green" sustainable infrastructure. Around the country, municipalities are creating sustainable stormwater practices as an alternative to the generally more expensive end-of-pipe methods designed to deal with sewer overflow after it occurs. The panel will provide the opportunity for an open dialog about these "green" techniques, how they are being implemented, and results. Studies show that the most cost-efficient way to mitigate excess stormwater is by capturing it at the source through simple infrastructure such as parks, trees, green roofs and rainwater collection systems. How easy are these to implement on a scale that shows results for our water resources? HNTB works with several municipalities in the Midwest: Indianapolis, Milwaukee, Cincinnati, and Kansas City. CH2MHill works with municipalities on the east and west coasts: Philadelphia, Portland and Seattle. United States Environmental Protection Agency, Water Permits Division staff will also participate in this panel discussion to speak to their policy decisions at the national level that affect these programs. Their green infrastructure initiative which has and continues to develop tools and guidance to facilitate the use of green infrastructure in CSO and other wet weather programs will be presented. This discussion will draw from the national experts, by bringing practice leaders, to discuss a variety of CSO programs. Speakers will provide an overview of successful programs including technical focus, management, financial/cost issues, local regulatory drivers, and timelines. With that as a background, the discussion will focus on green initiatives: (1) How are they being implemented; (2) What are the preferred techniques; and (3) What results have been achieved.

**SESSION 13 • EMERALD BALLROOM III**  
**STORMWATER**

**PANEL MODERATOR • BETH PETERSON** • HDR Inc. • Bellevue, Washington

- 3:30 P.M.**    **Design of Regional Urban Watershed Dry-Weather Flow Treatment System – Talbert Lake Diversion Project - Bruce Phillips**, PACE, Fountain Valley, CA
- 3:50 P.M.**    **Characteristics of Stormwater Flow and Quality From Five Urban, Karst Watersheds - Katherine Blansett**, Department of Ag & Bio Engr, Penn State University, University Park, PA (co-author: James Hamlett)
- 4:10 P.M.**    **Watershed Health Index Based on Biological Potential - Michael Milne**, Brown and Caldwell, Seattle, WA  
(co-authors: Bob Storer, Carol Murdock, Bob Ellis)
- 4:30 P.M.**    **Effects of Urbanization on Water Quality in the Lower Kaskaskia Watershed in Southern Illinois - Charnsmorn Hwang**, Southern Illinois University Carbondale, Carbondale, IL (co-authors: Julia Friedmann, Karl Williard, Jon Schoonover)

**SESSION 14 • SAN JUAN/WHIDBEY ROOM**  
**DESIGN DETAILS**

**MODERATOR • JENNIFER WILLIAMSON** • Brown and Caldwell • Portland, Oregon

- 3:30 P.M.**    **Vegetation Growth and Success as a Function of Soil Moisture Conditions in Bioretention Cells - Jennifer Reiners**, CH2M Hill, Chicago, IL (co-author: Richard R. Horner)
- 3:50 P.M.**    **2D Modeling of Engineered Logs Jams in the Anastomosing Lower Elwha River, WA – Tim Abbe**, ENTRIX, Seattle, WA  
(co-authors: Aaron Kopp, Mike McHenry)
- 4:10 P.M.**    **Urban Roof Runoff: Green Roofs, Blue Roofs, and Wind Roofs - Charles Wisdom**, Parametrix, Bellevue, WA
- 4:30 P.M.**    **The Effectiveness of Different Low Impact Development BMPs on the West Coast - Douglas Beyerlein**, Clear Creek Solutions, Inc., Mill Creek, WA

SESSION 15 • ORCAS ROOM  
**SALINITY AND OTHER WATER QUALITY TARGETS**

MODERATOR • L. DONALD DUKE • Florida Gulf Coast University • Ft. Myers, Florida

- 3:30 P.M.    **Assessment of the Economic Impacts of Rio Grande Salinity - Zhuping Sheng**, Texas A&M AgriLife Research, El Paso, TX  
(co-authors: Ari Michelsen, Thomas McGuckin, Bobby Creel, Ron Laceywell)
- 3:50 P.M.    **Characterization of Salinity Sources in Desert Lake Complex - Said Ghabayen**, Logan, UT (co-authors: Lizzette Oman,  
Mac McKee)
- 4:10 P.M.    **Setting Water Quality Targets with Historical Data: Approaches, Problems, and Limitations – L. Donald Duke**, Florida Gulf  
Coast University, Ft. Myers, FL

**SPECIAL EVENT ~ STUDENT ATTENDEE CONFERENCE ORIENTATION**

MONDAY • NOVEMBER 9 • 4:30 P.M. TO 5:00 P.M.  
(Meet in front of Emerald Ballroom I – see pg. 41 for details)

**SPECIAL EVENT ~ OPENING NETWORKING RECEPTION**

MONDAY • NOVEMBER 9 • 5:00 P.M. TO 6:30 P.M. • EMERALD BALLROOM I  
See pg. 41 for details

**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 WILL BE AVAILABLE** – CEUs will be available for 75 **concurrent** sessions in 15 time slots from 10:30 a.m., Monday, November 9, 2009, through 5:00 p.m., Thursday, November 12, 2009. Two options for CEUs will be 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** – If you have not preregistered for CEU credit, you may sign up for CEUs on site 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 for non-members.**

**PROCEDURE** – AWRA is required to maintain very specific records for the awarding of CEUs. **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.**

**The sheet must be turned in to the AWRA Registration Desk upon its completion or faxed or mailed to AWRA within one week after the close of the Conference. AWRA cannot award CEUs without this completed form on file.**

**CEUs AWARDED AND CONFIRMING LETTERS SENT** – 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. Earned CEUs will be entered into your permanent AWRA record within two weeks following the Conference. Letters signifying the award will be provided within one month after the Conference. Please note that 0.1 CEU is the same as 1.0 Professional Development Hour (PDH).

## DAY-AT-A-GLANCE / TUESDAY / NOVEMBER 10, 2009

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

5K FUN RUN / 6:30 A.M.-7:30 A.M. / MEET IN HOTEL LOBBY AT 6:25 A.M.

SPEAKERS' PREPARATION ROOM OPEN / 7:00 A.M.-8:00 P.M. / VASHON ROOM

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

POLICY TECHNICAL COMMITTEE MEETING / 7:30 A.M.-8:30 A.M. / VASHON ROOM

BOOK & JOURNAL EXHIBIT OPEN & EMPLOYMENT OPPORTUNITY BOARD ON DISPLAY  
8:00 A.M.-5:00 P.M. / EMERALD FOYER

MORNING NETWORKING BREAK / 8:00 A.M.-10:30 A.M. / EMERALD BALLROOM I

COMMERCIAL AND EDUCATIONAL EXHIBITS OPEN / 8:00 A.M.-3:30 P.M. / EMERALD BALLROOM I

TECHNICAL POSTER SESSION / 8:00 A.M.-3:30 P.M. / EMERALD BALLROOM I  
(POSTER PRESENTERS WILL BE AT THEIR POSTERS DURING THE NETWORKING BREAKS)

CONCURRENT SESSIONS 16, 17, 18, 19, 20 / 8:30 A.M.-10:00 A.M.

**SESSION 16 - PANEL:**  
*WATER RESOURCES*  
**IMPACT AND THE**  
**NEXT TEN YEARS-I**

EMERALD BALLROOM II

**SESSION 17**  
CLIMATE CHANGE

EMERALD BALLROOM III

**SESSION 18**  
BMP PRACTICES

BAINBRIDGE ROOM

**SESSION 19**  
IMPACTS OF TOXIC  
CHEMICALS ON WATER  
QUAL., AQUATIC BIOTA,  
& HUMAN HEALTH

SAN JUAN/WHIDBEY RM.

**SESSION 20**  
INFORMATION  
MANAGEMENT

ORCAS ROOM

MORNING NETWORKING BREAK (CONT'D.) / 10:00 A.M.-10:30 P.M. / EMERALD BALLROOM I

CONCURRENT SESSIONS 21, 22, 23, 24, 25 / 10:30 A.M.-12:00 NOON

**SESSION 21 - PANEL:**  
*WATER RESOURCES*  
**IMPACT AND THE**  
**NEXT TEN YEARS-II**

EMERALD BALLROOM II

**SESSION 22**  
RIVER IMPACTS

EMERALD BALLROOM III

**SESSION 23**  
INNOVATIVE  
TECHNOLOGY

BAINBRIDGE ROOM

**SESSION 24**  
MONITORING

SAN JUAN/WHIDBEY RM.

**SESSION 25**  
GIS

ORCAS ROOM

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

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

**SESSION 26**  
WATER RESOURCES &  
WATER SUPPLY

EMERALD BALLROOM II

**SESSION 27**  
MODELING,  
MITIGATION, &  
ADAPTATION FOR  
CHANGE-I

EMERALD BALLROOM III

**SESSION 28- PANEL:**  
COLUMBIA RIVER  
TREATY -  
FROM HERE  
TO WHERE?

BAINBRIDGE ROOM

**SESSION 29**  
SPOKANE RIVER  
TMDLS

SAN JUAN/WHIDBEY RM.

**SESSION 30**  
MODELING

ORCAS ROOM

AFTERNOON NETWORKING BREAK / 3:00 PM-3:30 P.M. / EMERALD BALLROOM I

CONCURRENT SESSIONS 31, 32, 33, 34, 35 / 3:30 P.M.-5:00 P.M.

**SESSION 31**  
SUSTAINABILITY,  
DECISION MAKING, &  
EDUCATION

EMERALD BALLROOM II

**SESSION 32**  
SEA LEVEL  
CONCERNS

EMERALD BALLROOM III

**SESSION 33**  
WATERSHED  
PLANNING &  
MANAGEMENT

BAINBRIDGE ROOM

**SESSION 34**  
TMDL  
ISSUES

SAN JUAN/WHIDBEY RM.

**SESSION 35**  
MODELING &  
COMMUNICATING  
SCIENCE TO  
POLICY MAKERS

ORCAS ROOM

SPECIAL EVENT - SEATTLE AQUARIUM / 6:00 P.M.-10:00 P.M. / SPONSORED BY THE WASHINGTON STATE SECTION  
(MEET IN HOTEL LOBBY AT 5:45 P.M. - SEE PG. 42)

## CONCURRENT SESSIONS 16, 17, 18, 19, 20

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

TUESDAY ~ NOVEMBER 10

### SESSION 16 • EMERALD BALLROOM II

#### **PANEL: WATER RESOURCES IMPACT AND THE NEXT TEN YEARS-I**

**PANEL MODERATOR • EARL SPANGENBERG** • Editor-in-Chief, *Water Resources IMPACT*, University of Wisconsin, Stevens Point, Wisconsin

#### PANEL PARTICIPANTS

**ERIC FITCH** • *IMPACT* Associate Editor

Associate Professor of Biology, Environmental Science, and Leadership Director, Marietta College, Marietta, Ohio

**MICHELLE HENRIE** • *IMPACT* Associate Editor

Attorney • Albuquerque, New Mexico

**PETER BLACK** • *IMPACT Essay* Contributor

AWRA Past President, Emeritus Professor, Water and Related Land Use, SUNY College of Environment and Forestry • Saracuse, New York

**JANE ROWAN** • *IMPACT Essay* Contributor

AWRA Past President, Director, Ecological Solutions, The BioEngineering Group, Inc. • Newtown Square, Pennsylvania

This panel/discussion forum will summarize the results of *Water Resources IMPACT's* Futures Project. The project is aimed at defining the water resources problems we are likely to encounter in the next decade. Initiated in 2007 with observations by *IMPACT's* Associate Editors, the project continued in 2008 with essays from water resources professionals. This year, we sent a questionnaire to AWRA membership to determine their reaction. The forum will start with a formal summary of main points made by the participants. Following the formal presentation, a panel, consisting of Associate Editors and essay authors will react to the formal presentation, and discuss further the nature of the problems they foresee. Those essay authors not able to be present will be invited to “participate” by sending the moderator brief comments that will be shared with the panel and the audience. The focus of this first part of the forum will be “What are the problems that we see?” Panel participants will not be asked to make formal presentations, but will be encouraged to prepare short comments as a part of their participation.

### SESSION 17 • EMERALD BALLROOM III

#### **CLIMATE CHANGE**

**MODERATOR • HEEJUN CHANG** • Portland State University • Portland, Oregon

- 8:30 A.M. Land Use and Infrastructure: Revisiting the Role of Federal Authority in Light of Climate Change and Long Term Infrastructural Investment - Eric Fitch**, Marietta College Environmental Science Program, Marietta, OH
- 8:50 A.M. Climate Change Impacts on Water Resources in Northwestern Ontario, Canada: Uncertainty From Downscaling Methods - Woonsup Choi**, University of Wisconsin-Milwaukee, Milwaukee, WI (co-authors: Sung Joon Kim, Mark Lee, Kristina Koenig, Peter Rasmussen, Adam Moore)
- 9:10 A.M. Reconciling Projections of Colorado River Stream Flow Over the Next Century - Julie Vano**, University of Washington, Seattle, WA (co-authors: Tapash Das, Dennis Lettenmaier)
- 9:30 A.M. Spatial and Temporal Changes in Runoff Resulting From Climate Change in the Willamette River Basin of Oregon - Heejun Chang**, Portland State University, Portland, OR (co-author: Ilwon Jung)

### SESSION 18 • BAINBRIDGE ROOM

#### **BMP PRACTICES**

**MODERATOR • FELIX KRISTANOVICH** • Consultant • Freeland, Washington

- 8:30 A.M. Modeling Stormwater Basin Outlets for Potential Retrofit Designs - Ryan Headley**, Rowan University, Glassboro, NJ (co-author: Josh Wyrick)
- 8:50 A.M. Effectiveness of High Efficiency Street Sweeping in Seattle - Rob Zisette**, Herrera Environmental Consultants, Seattle, WA (co-authors: Beth Schmoyer, Shelly Basketfield, Terry Martin)
- 9:10 A.M. Evaluating Paired BMP Influent and Effluent Data Using Running Bootstrap Medians - Marc Leisenring**, Geosyntec Consultants, Portland, OR (co-authors: Aaron Poresky, Eric Strecker, Marcus Quigley)
- 9:30 A.M. Filterra® System Performance Monitoring in Washington State: Expanding Our Toolbox for Enhanced Treatment and Reducing Irreducible Pollutant Concentrations - Rebecca Dugopolski**, Herrera Environmental Consultants, Seattle, WA (co-authors: Mindy Ruby, John Lenth)

**SESSION 19 • SAN JUAN/WHIDBEY ROOM**  
**IMPACTS OF TOXIC CHEMICALS ON WATER QUALITY,  
AQUATIC BIOTA, AND HUMAN HEALTH**

**MODERATOR • FRANCIS SOLOMON • The Evergreen State College • Tacoma, Washington**

- 8:30 A.M. **Patterns in Soil Contamination in King County - Lee Dorigan, Public Health - Seattle & King County, Seattle, WA**
- 8:50 A.M. **Weathering the Storm: Copper Impacts Juvenile Coho Behaviour and Survival with Predators - Jenifer McIntyre, University of Washington, Seattle, WA (co-authors: D.A. Beauchamp, D.H. Baldwin, N.L. Scholz)**
- 9:10 A.M. **An Integrated Assessment of the Occurrence and Effects of Endocrine Disruptors in Puget Sound. - Irvin Schultz, Battelle Marine Science Lab Pacific NW National Lab, Sequim, WA (co-authors: Elliot Walters, James Nagler)**
- 9:30 A.M. **The Synergistic Toxicity of Pesticide Mixtures to Juvenile Salmon - Cathy Laetz, NOAA Fisheries, NWFSC, Seattle, WA (co-authors: David Baldwin, Nathaniel Scholz)**

**SESSION 20 • ORCAS ROOM**  
**INFORMATION MANAGEMENT**

**MODERATOR • EDWARD SPEER • CDM • Seattle, Washington**

- 8:30 A.M. **Multi-Criteria Decision Analysis (MCDA) to Prioritize Watershed Improvement Projects - Sandra Slayton, ENTRIX, Inc, Hood River, OR (co-authors: Douglas MacNair, Jefferson Keaton)**
- 8:50 A.M. **A Decision Support System for Optimizing Reservoir Operations Using Ensemble Streamflow Predictions (ESP) - Austin Polebitski, Department of Civil and Environmental Engineering, University of Massachusetts Amherst, Amherst, MA (co-authors: Eset T. Alemu, Richard N. Palmer, Bruce Meeker)**
- 9:10 A.M. **Web-Based Low Impact Development Decision Support and Planning Tool - James Hunter, Purdue University, West Lafayette, IN (co-authors: Bernard A. Engel, Joseph E. Quansah)**
- 9:30 A.M. **The Role of Field Operations in an Urban Watershed - Edward Speer, CDM, Seattle, WA (co-author: George Collier)**

**10:00 A.M.-10:30 A.M. • MORNING NETWORKING BREAK (CONT'D) • EMERALD BALLROOM I**

**CONCURRENT SESSIONS 21, 22, 23, 24, 25**

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

**TUESDAY ~ NOVEMBER 10**

**SESSION 21 • EMERALD BALLROOM II**  
**PANEL: WATER RESOURCES IMPACT AND THE NEXT TEN YEARS-II**

**PANEL MODERATOR • EARL SPANGENBERG • Editor-in-Chief, *Water Resources IMPACT*, University of Wisconsin, Stevens Point, Wisconsin**

**PANEL PARTICIPANTS**

**ERIC FITCH • IMPACT Associate Editor**  
Associate Professor of Biology, Environmental Science, and Leadership Director, Marietta College, Marietta, Ohio

**MICHELLE HENRIE • IMPACT Associate Editor**  
Attorney • Albuquerque, New Mexico

**PETER BLACK • IMPACT Essay Contributor**  
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**JANE ROWAN • IMPACT Essay Contributor**  
AWRA Past President, Director, Ecological Solutions, The BioEngineering Group, Inc. • Newtown Square, Pennsylvania

The second part of the forum on *Water Resources IMPACT's* Futures Project will be a session in which participants will address the question "Given the problems, what do we do now?" Panel participants and the audience will discuss the questions raised by the essay authors, Associate Editors, and survey respondents. We will make efforts to identify specific roles that AWRA can play in defining the international debate on water resources sustainability.

**SESSION 22 • EMERALD BALLROOM III**  
**RIVER IMPACTS**

**MODERATOR • TIM ABBE • ENTRIX, Inc. • Seattle, Washington**

- 10:30 A.M. **Freshwater Flow to Puget Sound is Declining. Why? - Curtis DeGasperi, King County Department of Natural Resources and Parks, Seattle, WA**
- 10:50 A.M. **Climate Change on the Colorado River: A Method to Search for Robust Management Strategies - Ryan Keefe, Pardee RAND Graduate School, Santa Monica, CA (co-author: Jordan Fischbach)**

- 11:10 A.M. **Assessing the Impacts of Changing Climate on the Future of Water Resource Management in the Snake River Plain - David Hoekema**, Boise State University, Boise, ID (co-author: Venkataramana Sridhar)
- 11:30 A.M. **Possible Signals of River Response to Climate Change in Western Washington - Tim Abbe**, ENTRIX, Inc., Seattle, WA (co-authors: Paul Kennard, Jenna Scholz, Jim Park)

**SESSION 23 • BAINBRIDGE ROOM**  
**INNOVATIVE TECHNOLOGY**

**MODERATOR • RALPH NELSON • R.W. Beck • Seattle, Washington**

- 10:30 A.M. **Challenges and Lessons Learned from Hydrologic Simulations Using HSPF and SWAT with NEXRAD Rainfall Inputs - Jae Ryu**, University of Nebraska-Lincoln, Lincoln, NE (co-author: Mauro Di Luzio)
- 10:50 A.M. **Nichols Brothers Boat Builders – Achieving New Successes in Water Quality - Tom Atkins**, Parametrix, Bellevue, WA (co-author: Jim Mothersbaugh)
- 11:10 A.M. **Designing Stormwater Treatment Approaches for Fixed Bridge Surfaces - Charlie Wisdom**, Parametrix, Bellevue, WA (co-authors: Linda Logan, Paul Bucich, Sheri Lott, Embrey Bronstad, Larry Schaffner)
- 11:30 A.M. **Retrofitting the Seattle-Tacoma International Airport to Meet Stormwater Effluent Limits – Lessons Learned – Ralph Nelson**, R.W. Beck, Seattle, WA (co-authors: Robert Duffner)

**SESSION 24 • SAN JUAN/WHIDBEY ROOM**  
**MONITORING**

**MODERATOR • STAN MILLER • Inland Northwest Water Resources • Spokane, Washington**

- 10:30 A.M. **Linked Watershed-Lake Models for the Lake Whatcom Phosphorus TMDL - Paul Pickett**, WA Dept. of Ecology, Olympia, WA (co-author: Steve Hood)
- 10:50 A.M. **Effect of an Effluent Discharge on Phosphorus Retention at Goose Creek and the Illinois River, Northwest Arkansas - Brian E. Haggard**, Arkansas Water Resources Center, Fayetteville, AR (co-authors: J.T. Scott, L.B. Massey)
- 11:10 A.M. **Bacteriological Indicators and Onshore Inputs in Tropical Waters - Graciela Ramirez Toro**, CECIA, UIPR, Lajas, PR (co-authors: Carol Ferrer, H. A. Minnigh)
- 11:30 A.M. **Surface-Water Monitoring for Pesticides in Salmonid-Bearing Streams of the Lower Yakima Valley. - Dan Dugger**, Washington State Department of Ecology, Yakima, WA (co-authors: Debby Sargeant, Paul Anderson, Dale Norton, Jim Cowles)

**SESSION 25 • ORCAS ROOM**  
**GIS**

**MODERATOR • MICHELLE CUTROFELLO • RTI International • Washington, D.C.**

- 10:30 A.M. **GIS-Based Storm Water Inventory for NPDES Phase 2, a Thurston County Washington Example - Chris Hansen**, Tetra Tech, Stanwood, WA (co-author: Ed Whitford)
- 10:50 A.M. **The Future for Hydrography in the National Map - Jeff Simley**, U.S. Geological Survey, Denver, CO
- 11:10 A.M. **Populating Watershed Models on the NHDPlus Scale Using National Data Sets: Methods and Opportunities - Michele Cutrofello**, RTI International, Washington, DC (co-authors: Brandon Bergenroth, Jay Rineer, Robert Truesdale, William Cooter)
- 11:30 A.M. **Introducing the CUAHSI Hydrologic Information System Desktop Application (HydroDesktop) and Open Development Community – Jiri Kadlec**, Idaho State University, Idaho Falls, ID (co-authors: Daniel P. Ames, Teva Veluppillai, Jeff Horsburgh)

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

**CONCURRENT SESSIONS 26, 27, 28, 29, 30**

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

**TUESDAY ~ NOVEMBER 10**

**SESSION 26 • EMERALD BALLROOM II**  
**WATER RESOURCES AND WATER SUPPLY**

**MODERATOR • DANIEL TUFFORD • University of South Carolina • Columbia, South Carolina**

- 1:30 P.M. **Regional Climate Impact Studies for Water Resources in West Texas - Spandana Tummuri**, CDM Inc, Fort Worth, TX
- 1:50 P.M. **Climate Variability and Water Infrastructure: Historical Experience in the Western United States - Scott Lowe**, Boise State University, Boise, ID (co-authors: Zeynep K. Hansen, Gary D. Libecap)
- 2:10 P.M. **Impact Assessment of Hydrothermal Dynamics in Urban Area by Using Multi-Scaled Integrated Approach - Tadanobu Nakayama**, National Institute for Environmental Studies, Tsukuba, Iba, Japan (co-authors: T. Fujita, S. Hashimoto, H. Hamano)
- 2:30 P.M. **Simulation Modeling of Large Watersheds on the US Southeast Coast - Daniel Tufford**, University of South Carolina, Columbia, SC (co-authors: Greg Carbone, Lauren Felker, Peng Gao)

**SESSION 27 • EMERALD BALLROOM III**  
**MODELING, MITIGATION, AND ADAPTATION FOR CHANGE-I**

**MODERATOR • ALAN POTOK • AECOM • Houston, Texas**

- 1:30 P.M. **Long-Range Future Water Supply Planning in the Face of Global Climate Change - David Blau, AECOM, San Francisco, CA**
- 1:50 P.M. **Sustainable Systems Integration Model (SSIM) - Gregory A. Hurst, AECOM, Fort Collins, CO**
- 2:10 P.M. **Using Uncertain Projections of Extreme Climate Indicators to Quantify the Effects of Climate Change on Extreme Event Flooding in the United States - Joshua Kollat, AECOM Water/Penn State University, State College, PA (co-authors: Joseph R. Kasprzyk, Wilbert O. Thomas)**
- 2:30 P.M. **Integration of Water Management Models and Demand Forecasts to Assess Future Water Availability - Blaine Dwyer, AECOM Water, Lakewood, CO**

**SESSION 28 • BAINBRIDGE ROOM**

**PANEL: COLUMBIA RIVER TREATY - FROM HERE TO WHERE?**

**PANEL MODERATOR • GERALD SEHLKE • AWRA President • Idaho National Laboratory • Idaho Falls, Idaho**

**PANEL PARTICIPANTS**

**JOHN M. HYDE • Bonneville Power Administration • Portland, Oregon**

**HEATHER MATTHEWS • Bonneville Power Administration • Portland, Oregon**

**MARK F. COLOSIMO • International Joint Commission-U.S. Section • Washington, D.C. (Invited)**

**JIM RUFF • NOAA Fisheries • Portland, Oregon**

**MATTHEW REA • USACE • Portland, Oregon**

The Columbia River Treaty between the USA and Canada was signed in 1961 and ratified in 1964. The treaty has been considered a model of U.S.-Canadian cooperation for 45 years. However, some policymakers, academics and others say the agreement lacks the flexibility to deal with emerging issues such as critical environmental impacts or climate change issues and, therefore, it needs to be reviewed and possibly renegotiated and rewritten to remain relevant to today's circumstances. The possibility of a renegotiated treaty is stirring great interest and some consternation on both sides of the border. Although the Columbia River Treaty doesn't have an expiration date, either country can terminate some or all of its provisions after September 2024 with a 10-year minimum notice. Therefore, if either the U.S. or Canada wants terminate the treaty or make substantive changes in 2024, they must give notice as early as 2014. Gerald Sehlke, President of AWRA, will moderate this important discussion and experts representing various Columbia River Treaty interests will provide their perspectives on the future of the Columbia River Treaty and what the major points of negotiations may be and what impacts potential changes may have on future energy and water operations and resources in the Columbia River Basin.

**SESSION 29 • SAN JUAN/WHIDBEY ROOM**

**PANEL: SPOKANE RIVER TMDLS**

**SESSION ORGANIZERS • LAURIE MANN AND JENNIFER WU**

U.S. Environmental Protection Agency • Seattle, Washington

**PANEL MODERATOR • DONALD MARTIN • U.S. Environmental Protection Agency • Seattle, Washington**

**PANEL PARTICIPANTS**

**DAVE MOORE • Washington Department of Ecology • Spokane, Washington**  
*Overview of the Spokane Project*

**BEN COPE • EPA Office of Environmental Assessment • Seattle, Washington**  
*Technical Challenges of Modeling the Spokane River Watershed*

**CHRIS BUTLER • Spokane Tribe • Wellpinit, Washington**  
*Downstream of the TMDL: Fisheries Challenges in the Spokane Arm*

**DALE ARNOLD • City of Spokane • Spokane, Washington**  
*Perspectives From the City of Spokane*

**BRIAN NICKEL • EPA NPDES Unit • Seattle, Washington**

Lake Spokane (also known as Long Lake) is a 24 mile long reservoir downstream of Washington's second largest city, Spokane, and several smaller communities. It has experienced a long history of water quality problems. Toxic algae blooms in the 1970s resulted in the court-ordered establishment of a phosphorus TMDL, which has since been shown not to be protective of water quality. In October 2004, Ecology proposed a new DO TMDL. In the summer of 2008, just prior to issuance of a final dissolved oxygen TMDL, EPA directed the Washington Department of Ecology to revise the draft Spokane River TMDL to consider the cumulative impact of nutrient-related pollutants from both Idaho and Washington sources. Since that time, EPA, Ecology, Idaho Department of Quality and the Spokane Tribe of Indians have been developing a TMDL that not only considers the cumulative impact of pollutants from both states, but considers the decrease in assimilative capacity for nutrients and oxygen demanding pollution caused by Long Lake

Dam. A recently issued 401 certification of the dam's FERC license requires the operators to comply with water quality responsibilities to be identified in the pending TMDL. The Washington State water quality standard requires near-natural conditions, which makes the available loading capacity extremely small. This capacity must be divided between Idaho and Washington. It is anticipated that the wasteload allocations in the pending TMDL will be 50 ug/L or less, among the lowest in the country. Panelists representing local, environmental, and regulatory perspectives will briefly review the development of the Spokane River dissolved oxygen TMDL, including: (1) challenges of modeling dissolved oxygen impacts in a reservoir from the discharge of three pollutants (phosphorus, BOD, ammonia) by seven point sources and three tributaries; (2) technical and cultural challenges of assigning one of most stringent wasteload allocations for phosphorus in the country; and (3) implementation of permit limits, nonpoint source reductions, 401 certification requirements – and looking ahead to water quality trading. In a moderated discussion, panelists will then share perspectives on what the focus should be and what the most important next steps are to reduce phosphorus and implement the TMDL.

### SESSION 30 • ORCAS ROOM

#### **MODELING**

**MODERATOR • HENRY HU • WEST Consultants, Inc. • Bellevue, Washington**

- 1:30 P.M.**    **Components of a Successful Flow Monitoring Program - Michael Hinson**, Seattle Public Utilities, Seattle, WA  
(co-authors: Ben Marré, Laura Reed, John Barton)
- 1:50 P.M.**    **Near-Real-Time Lake Profiling Systems for Lake Washington and Lake Sammamish - Bob Kruger**, King County  
Environmental Laboratory, Seattle, WA (co-authors: Curtis DeGasperi, Charlie Zeng)
- 2:10 P.M.**    **The New Hydrographic Paradigm: Rivers, Lakes and Watershed Boundaries - Stephen Daw**, U.S. Geological Survey, Denver,  
CO (co-author: Karen Hanson)
- 2:30 P.M.**    **State-of-the-Art Review on Real-Time Reservoir Operational Forecasting Models - Henry Hu**, WEST Consultants, Inc.,  
Bellevue, WA (co-author: Henry Tang)

**3:00 P.M.-3:30 P.M. • AFTERNOON NETWORKING BREAK • EMERALD BALLROOM I**

### CONCURRENT SESSIONS 31, 32, 33, 34, 35

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

**TUESDAY ~ NOVEMBER 10**

#### SESSION 31 • EMERALD BALLROOM II

#### **SUSTAINABILITY, DECISION MAKING, AND EDUCATION**

**MODERATOR • JAMIE MORIN • Mentor Law Group, PLLC • Seattle, Washington**

- 3:30 P.M.**    **The Role of Water Conservation Technology, Economics, and Institutions for Managing Groundwater Use Conflicts - Saichon Seedang**, Michigan State University-IWR, East Lansing, MI (co-authors: Patricia Norris, Jon Bartholic)
- 3:50 P.M.**    **Using Agent-Based Models to Study Farmer Behavior in Irrigation Water Usage - Sanyogita Andriyas**, Utah State University,  
Logan, UT (co-authors: Mac McKee, Thomas B. Hardy)
- 4:10 P.M.**    **Computer-Aided Negotiations of Water Resources Disputes: An Interdisciplinary Case Study-Based Course - Megan Rivera**,  
HydroLogics, Inc., Columbia, MD (co-authors: Daniel P. Sheer, Andrew J. Miller)
- 4:30 P.M.**    **NSF IGERT at Southern Illinois: Watershed Science and Policy - Christopher Lant**, Southern Illinois University, Carbondale,  
IL (co-authors: Nicholas Pinter, Lizette Chevalier, Matthew Whiles, Sara Baer)
- 4:50 P.M.**    **Reasons for Low Access to Water in Expanding Urban Centres - The Example of Quetta - Ian Cordery**, UNSW, Sydney,  
NSW, Australia (co-author: Kamran Asghar)

#### SESSION 32 • EMERALD BALLROOM III

#### **SEA LEVEL CONCERNS**

**MODERATOR • JOSEPH BRASCHER • Clear Creek Solutions, Inc. • Tumwater, Washington**

- 3:30 P.M.**    **A Pilot Assessment of Hydrologic and Water Quality Sensitivity to Climate and Land-Use Change in the Minnesota River - Thomas Johnson**, U.S. Environmental Protection Agency, Washington, DC (co-authors: Andrew Parker, John Butcher)
- 3:50 P.M.**    **The Influence of Sea Level Rise on Storm Surge in Southern Louisiana - Mary Cialone**, USAE-ERDC, Vicksburg, MS  
(co-authors: Alison S. Grzegorzewski, Tate O. McAlpin)
- 4:10 P.M.**    **Assessing the Future of the California Water Distribution System: The Sacramento-San Joaquin Delta - William Fleenor**, UC  
Davis, Davis, CA (co-author: Jay Lund)
- 4:30 P.M.**    **Modeling the Impact of Sea Level Rise on Urban Stormwater Systems - Joseph Brascher**, Clear Creek Solutions, Inc.,  
Tumwater, WA
- 4:50 P.M.**    **Using GRACE to Investigate the Changes in Land Water Storage, Caspian Sea Basin in Iran as a Case Study - Seyed Hamed Alemohammad**, Massachusetts Institute of Technology, Cambridge, MA (co-author: Reza Ardakanian)

SESSION 33 • BAINBRIDGE ROOM  
**WATERSHED PLANNING AND MANAGEMENT**

**MODERATOR • JANE ROWAN • The Bioengineering Group • Newtown Square, Pennsylvania**

- 3:30 P.M. **The Salt Lake Countywide Water Quality Stewardship Plan – A New Era in Watershed Planning in Utah - Nicholas Von Stackelberg**, Stantec Consulting, Salt Lake City, UT (co-authors: Neil Stack, Karen Nichols)
- 3:50 P.M. **Seasonal Streamflow Forecasting in the Columbia River Basin - Andy Wood**, 3TIER, Inc., Seattle, WA (co-authors: Matthew Wiley, Bart Nijssen)
- 4:10 P.M. **Using an Innovative Asset Management Framework to Improve Watershed Health and Program Effectiveness - Jennifer Belknap Williamson**, Brown and Caldwell, Portland, OR (co-author: Carol Murdock)
- 4:30 P.M. **Managing Floods and Droughts in an Interstate Basin - Carol Collier**, Delaware River Basin Commission, West Trenton, NJ (co-author: Amy Shallcross)
- 4:50 P.M. **The Honey Lake Project: Environmental Restoration on a Military-Impacted Unique Water Resource and the Use of a Non-Profit to Assist in Land Transfer - Jane Rowan**, The Bioengineering Group, Inc., Newtown Square, PA (co-authors: Wendi Goldsmith, Julie Africa)

SESSION 34 • SAN JUAN/WHIDBEY ROOM  
**TMDL ISSUES**

**MODERATOR • KARL WILLIARD • Southern Illinois University • Carbondale, Illinois**

- 3:30 P.M. **Union River Fecal Coliform TMDL Effectiveness Monitoring in Washington State - Scott Collyard**, WA State Department of Ecology, Olympia, WA (co-authors: George Onwumere, Markus Von Prause)
- 3:50 P.M. **Examining the Effects of TMDL Implementation on the Flow-Concentration Relationship in the Neuse River Basin - Ibrahim Alameddine**, Duke University, Durham, NC (co-authors: Song Qian, Kenneth H. Reckhow)
- 4:10 P.M. **Assessment of the Chesapeake Bay TMDL: Nutrient and Sediment Load Reductions are Needed to Restore Living Resources - Lewis Linker**, U.S. Environmental Protection Agency, Annapolis, MD (co-authors: Gary Shenk, Ping Wang Jing Wu, Richard Batiuk, Carl Cerco)
- 4:30 P.M. **Water Quality Benefits of Riparian Buffers in Agricultural Watersheds: Unanswered Questions - Karl Williard**, Southern Illinois University Carbondale, Carbondale, IL (co-author: Jon Schoonover)

SESSION 35 • ORCAS ROOM  
**MODELING AND COMMUNICATING SCIENCE TO POLICY MAKERS**

**MODERATOR • ZEYUAN QIU • New Jersey Institute of Technology • Newark, New Jersey**

- 3:30 P.M. **The Pursuit of Longer-Lead Water-Supply Forecasts -Statistical Hydrologic Models Coupled With Large-Scale Climate Predictors Derived From Independent Component Analysis - Hamid Moradkhani**, Portland State University, Portland, OR (co-authors: Matthew Meier, David Garen)
- 3:50 P.M. **Applying Water Quality Model as a Management Tool: A Case Study of Neversink River - Namsoo Suk**, Delaware River Basin Commission, West Trenton, NJ (co-author: Feng Shi)
- 4:10 P.M. **“Show Me” – Empowering Decision Makers and Stakeholders With Data Analysis Tools to Further Communicate Science - Peter Sabee**, North Jackson Company, Corvallis, OR (co-authors: Kari Paulson, Kamran Syed, Tsolmongerel Papilloud)
- 4:30 P.M. **A Community Engagement Planning Process to Connect Science and Community for Water Resource Protection - Zeyuan Qiu**, New Jersey Institute of Technology, Newark, NJ (co-authors: Christine Hall, Donna Drewes, Grace Messenger, Kathy Hale)

**SPECIAL EVENT ~ SEATTLE AQUARIUM**

**TUESDAY • NOVEMBER 10 • 6:00 P.M.-10:00 P.M.**

**(see pg. 42 for additional information)**

**HOSTED AND SPONSORED BY THE AWRA WASHINGTON STATE SECTION**

**CARBON OFFSET CREDITS AVAILABLE**

AWRA has purchased carbon offset credits from Bonneville Environmental Foundation to offset greenhouse gas emissions from this year's Annual Water Resources Conference in Seattle, Washington. AWRA's purchase of BEF Wind and Solar Energy Offsets supports new renewable electricity generation, which offsets the environmental effects of burning coal, gas, and other fossil fuels across the U.S. Go to [www.b-e-f.org/carbon/calc](http://www.b-e-f.org/carbon/calc) <<http://www.b-e-f.org/carbon/calc>> to calculate your own carbon footprint. You are also invited to offset your own travel to and from the conference through purchase of additional offset credits through BEF. As an incentive, BEF is offering a 20% discount to conference attendees, available by using the code AWRA2009.

## DAY-AT-A-GLANCE / WEDNESDAY / NOVEMBER 11, 2009

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

SPEAKERS' PREPARATION ROOM OPEN / 7:00 A.M.-5:00 P.M. / VASHON ROOM

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

PAST PRESIDENTS' BREAKFAST (INVITATION ONLY) / 7:30 A.M.-8:30 A.M. / LOPEZ B ROOM

BOOK & JOURNAL EXHIBIT OPEN & EMPLOYMENT OPPORTUNITY BOARD ON DISPLAY  
8:00 A.M.-5:00 P.M. / EMERALD FOYER

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

CONCURRENT SESSIONS 36, 37, 38, 39, 40 / 8:30 A.M.-10:00 A.M.

<u>SESSION 36</u> POLICY & CLIMATE CHANGE  EMERALD BALLROOM III	<u>SESSION 37</u> INTEGRATING INSTREAM FLOWS INTO WATER RESOURCES PLANNING BAINBRIDGE ROOM	<u>SESSION 38 - PANEL:</u> MAJOR WATER MGMT. PROJECTS BY SEATTLE PUB. UTIL. IN THE CEDAR RIVER/LAKE... EMERALD BALLROOM II	<u>SESSION 39</u> SURFACE WATER/ GROUNDWATER ECOSYSTEMS INTERACTIONS ORCAS ROOM	<u>SESSION 40</u> PLANNING-I  SAN JUAN/WHIDBEY RM.
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MORNING NETWORKING BREAK (CONT'D.) / 10:00 A.M.-10:30 P.M. / EMERALD BALLROOM I

CONCURRENT SESSIONS 41, 42, 43, 44, 45 / 10:30 A.M.-12:00 NOON

<u>SESSION 41</u> WATER MANAGEMENT & PLANNING  EMERALD BALLROOM III	<u>SESSION 42</u> FLOODING & FLOODPLAIN MANAGEMENT BAINBRIDGE ROOM	<u>SESSION 43</u> INFRASTRUCTURE  EMERALD BALLROOM II	<u>SESSION 44</u> ASR & GROUNDWATER  ORCAS ROOM	<u>SESSION 45</u> WATER RESOURCES PLANNING  SAN JUAN/WHIDBEY RM.
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SPECIAL EVENT - AWRA AWARDS LUNCHEON / 12:00 NOON-1:25 P.M. (SEE PG. 42)  
SPONSORED BY BLACK & VEATCH • OFFICES WORLDWIDE  
GUEST SPEAKER • COL. ANTHONY WRIGHT • DISTRICT COMMANDER, USACE • SEATTLE, WASHINGTON

CONCURRENT SESSIONS 46, 47, 48, 49, 50 / 1:30 P.M.-3:00 P.M.

<u>SESSION 46</u> INSTREAM FLOWS - ECOSYSTEM REQUIREMENTS  EMERALD BALLROOM III	<u>SESSION 47</u> FLOOD FORECASTING & PROTECTION BAINBRIDGE ROOM	<u>SESSION 48</u> WATER SUPPLY & INFRASTRUCTURE  EMERALD BALLROOM II	<u>SESSION 49</u> GROUNDWATER-I  ORCAS ROOM	<u>SESSION 50</u> BALANCING HWY. DEV. & THE ENV. THROUGH DESIGN- BUILD DELIVERY SAN JUAN/WHIDBEY RM.
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AFTERNOON NETWORKING BREAK / 3:00 PM-3:30 P.M. / EMERALD BALLROOM I

CONCURRENT SESSIONS 51, 52, 53, 54, 55 / 3:30 P.M.-5:00 P.M.

<u>SESSION 51</u> ECOSYSTEM RESTORATION/ MITIGATION  EMERALD BALLROOM III	<u>SESSION 52</u> SURFACE WATER/ STORMWATER MANAGEMENT INNOVATION BAINBRIDGE ROOM	<u>SESSION 53</u> ADDRESSING THE STATE OF OUR NATION'S LEVEES  EMERALD BALLROOM II	<u>SESSION 54</u> GROUNDWATER-II  ORCAS ROOM	<u>SESSION 55</u> PLANNING-II  SAN JUAN/WHIDBEY RM.
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AWRA STUDENT CHAPTER OFFICERS & ADVISORS MEETING / 3:30 P.M.-5:00 P.M. / EMERALD BALLROOM I

SPECIAL EVENT - STUDENT CAREER NIGHT AND SPEED NETWORKING / 5:30 P.M.-7:30 P.M.  
SPONSORED BY THE BIOENGINEERING GROUP • SALEM, MASSACHUSETTS (SEE PG. 41)

FIELD TRIP ~ FERRY EXCURSION ON PUGET SOUND / 5:30 P.M.-9:00 P.M.  
(MEET IN HOTEL LOBBY AT 5:30 P.M. ... WE WILL WALK ABOUT ONE MILE TO THE FERRY TERMINAL - SEE PG. 42)

## CONCURRENT SESSIONS 36, 37, 38, 39, 40

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

WEDNESDAY ~ NOVEMBER 11

### SESSION 36 • EMERALD BALLROOM III **POLICY AND CLIMATE CHANGE**

**MODERATOR • BRENDA BATEMAN • Oregon Water Resources Department • Salem, Oregon**

- 8:30 A.M. **Adapting Water Resources Management to Climate Change: The Role of State Public Trust Doctrines - Robin Craig**, Florida State University College of Law, Tallahassee, FL
- 8:50 A.M. **Are You Looking Forward to a Water-Constrained Future? – Jim Scholl**, Malcolm Pirnie, Lansing, MI (co-authors: Craig Clifton, Carl Daamen, Suse Hayes, Greg Hoxley, John Sherwood)
- 9:10 A.M. **Potential Economic Costs of a Business-as-Usual Approach to Climate Change: Implications for Water Resources in Three Western States - Mark Buckley**, ECONorthwest, Portland, OR (co-authors: Sarah Reich, Cleo Neculae)
- 9:30 A.M. **Tap Runs Dry: Managing Urban Water Supply Now and in the Future in Canada - Grace Koshida**, Environment Canada, Toronto, ON, Canada (co-authors: Erin Stratton, Joan Klaassen, Marci Vanhoucke, Sadia Butt)

### SESSION 37 • BAINBRIDGE ROOM **INTEGRATING INSTREAM FLOWS INTO WATER RESOURCE PLANNING**

**MODERATOR • AMANDA CRONIN • Washington Water Trust • Seattle, Washington**

- 8:30 A.M. **Market-Based Strategies for Stream Flow Restoration and Mitigation - Amanda Cronin**, WA Water Trust, Seattle, WA
- 8:50 A.M. **Washington Water Law and Instream Flow - Lisa Pelly**, Washington Rivers Conservancy, Wenatchee, WA (co-author: Tom McDonald)
- 9:10 A.M. **Maximizing Groundwater Recharge Opportunities in Glaciated Terrain through Basin-Level Stormwater Planning: Case Histories From Eastern King County, Washington – Curtis Koger**, Associated Earth Sciences, Inc., Kirkland, WA (co-author: Jennifer Saltonstall)
- 9:30 A.M. **King County's Perspectives and Interests for Instream Flow Management - Stephen Hirschey**, King County, Seattle, WA (co-author: Dave Monthie)

### SESSION 38 • EMERALD BALLROOM II **PANEL: MAJOR WATER MANAGEMENT PROJECTS BY SEATTLE PUBLIC UTILITIES IN THE CEDAR RIVER/LAKE WASHINGTON BASIN**

**PANEL MODERATOR • MICHAEL WERT • AMEC Earth & Environmental • Bothell, Washington**

#### PANEL PARTICIPANTS

**GREG HARRIS • MWH Americas • Bellevue, Washington**

**CLINT SMITH • MWH Americas • Bellevue, Washington**

**RAND LITTLE • Seattle Public Utilities • Seattle, Washington**

**GARY SPRAGUE • Seattle Public Utilities • Seattle, Washington**

**CHRISTOPHER MAGIRL • U.S. Geological Survey • Tacoma, Washington**

This panel will involve presentations of three major water management projects by Seattle Public Utilities (SPU). The projects address key challenges related to fish passage, drought management, and flooding. The panelists will describe three projects being implanted to maintain the beneficial uses of the City's water supply. Landsburg Fish Passage Project: Since the early 1900's, the Landsburg Diversion Dam has been a key component of Seattle's municipal water supply. The facility has been a barrier to salmon and steelhead passage for nearly a century. In 2000, Seattle began implementing the Cedar River Habitat Conservation Plan (HCP). Mitigating fish barriers at Landsburg was a key component of the HCP. Primary features of the Landsburg Mitigation Program involve upstream and downstream fish passage via fish ladder, sorting facility, and fish screens. In addition, the river bed downstream was re-constructed to bury a large-diameter pipeline that created a secondary downstream fish barrier due to creation of an elevated scour pool. As a result of this project, anadromous fish access is restored to nearly 20 miles of the upper Cedar River drainage. Morse Lake Pump Plant: Chester Morse Lake serves as the Seattle area's primary storage reservoir for drinking water supply. It also provides flows for the Cedar River's salmon and steelhead and other in-stream flow needs. Withdrawal of water from lowered levels of Morse Lake occurs only by way of temporary pumping plants. This requires use of barge-mounted pump plants powered by shore-based diesel generators. To avoid risks of diesel fuel and periodic need for the temporary pump plants, the City is planning to construct a permanent land-based pump plant with water intake in Morse Lake, a mile-long 72-inch diameter pipeline, and a discharge structure in Masonry Pool. These improvements will reduce risk to the environment by avoiding the need for diesel-fueled generators and other logistical requirements associated with periodic mobilization of the temporary pumping plants. Development of an Adaptive Approach to Managing Peak Flows in the Cedar River, Washington: The current Cedar River instream-flow management program is a key component of the Cedar River Watershed HCP. The program provides a relatively complex set of guaranteed base flows for each year, combined with limitations on municipal diversions and flexibility in the management of elevated flows that can frequently occur.

Floodplain development and changes to the hydrologic regime from flow regulation have affected the riparian and aquatic habitat along the river corridor. Water-resource managers are seeking additional information to guide river-flow management during storm-driven peak-flow events. Concerns for protecting biological functions, such as intra-gravel incubation of salmon eggs, must be balanced with efforts to encourage natural geomorphic processes that maintain high-quality habitat and promote river health. These instream-resource objectives must be integrated with efforts to protect existing human development and occupation of the floodplain. Under the guidance of the interagency Cedar River Instream Flow Commission, SPU and U.S. Geological Survey are developing a Peak Flow Adaptive Management Project for the Cedar River. The project will build on the flexibility provided by the current instream-flow management program. During the project, a conceptual model and associated monitoring program will be developed along with a numerical model and analysis of historical data to: provide an assessment of the current geomorphic state of the river; determine the magnitude of geomorphic resetting flood events; establish linkages between peak-flow characteristics and biological and geomorphic processes in the currently altered river channel; compare varying effects of peak-flow magnitude with peak-flow duration; and establish desired inter-annual target ranges for peak-flow magnitudes, durations, and frequencies.

**SESSION 39 • ORCAS ROOM**  
**SURFACE WATER/GROUNDWATER ECOSYSTEM INTERACTIONS**

**MODERATOR • SAID GHABAYEN • Utah State University • Logan, Utah**

- 8:30 A.M. The Priestley-Taylor Coefficient Estimated for Vochysia Divergens Monospecific Forests in Pantanal, Brazil - Marcelo de Carvalho Alves, Federal University of Mato Grosso, Cuiabá, MT, Brazil (co-authors: Luciana Sanches José Holanda Campelo Filho, José de Souza Nogueira)**
- 8:50 A.M. Modeling Hydrologic Interactions Between Karstic Aquifer and Lakes in Florida Using HSPF - Zhulu Lin, North Dakota State University, Fargo, ND (co-authors: David Clapp, Tom Jobes)**
- 9:10 A.M. Interaction of the Soil Water Content and Vegetation Dynamics of a Tropical Semi-Deciduous Forest of the Southern Amazon Basin, Brazil - Marcelo de Carvalho Alves, Federal University of Mato Grosso, Cuiabá, MT, Brazil (co-authors: Luciana Sanches, Osvaldo Borges Pinto Júnior, José de Souza Nogueira)**
- 9:30 A.M. Characterization of Groundwater-Surface Water Interactions Using GMS and Differential Gauging Approaches - Said Ghabayen, Utah Water Research Laboratory, Utah State University, Logan, UT (co-authors: Noah Schmadel, Bethany T. Neilson)**

**SESSION 40 • SAN JUAN/WHIDBEY ROOM**  
**PLANNING-I**

**MODERATOR • WILLIAM JORDAN • Washington Department of Transportation • Bellevue, Washington**

- 8:30 A.M. Assessing Vulnerability to Natural Hazards: An Impact-Based Method and Application to Drought in Washington State - Matthew Fontaine, Herrera Environmental Consultants, Inc, Seattle, WA (co-author: Anne C. Steinemann)**
- 8:50 A.M. New Approaches for Allocating Costs and Capacities in Regional Infrastructure Projects - N. Jordan Dimick, CDM, Denver, CO (co-author: John Rehring)**
- 9:10 A.M. Using Multiple Research Methods to Assess Conflict and Common Ground in Storm and Wastewater Management in the Lower Kaskaskia River Basin - Mae Davenport, Department of Forestry, Southern Illinois University Carbondale, Carbondale, IL (co-authors: Erin Seekamp, Christopher Slemph, Joan Brehm)**
- 9:30 A.M. Real-Time Conjunctive Water Administration in Large Interconnected Arid River Basins - John Koreny, HDR, Seattle, WA (co-authors: Steve Thurin, Emily Larson)**

**10:00 A.M.-10:30 A.M. • MORNING NETWORKING BREAK (CONT'D). • EMERALD FOYER**

**CONCURRENT SESSIONS 41, 42, 43, 44, 45**

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

**WEDNESDAY ~ NOVEMBER 11**

**SESSION 41 • EMERALD BALLROOM III**  
**WATER MANAGEMENT AND PLANNING**

**MODERATOR • RAFAEL E. FRIAS • Black & Veatch • Tampa, Florida**

- 10:30 A.M. Contrasting Climate and Land Use Changes With Local Perceptions: A Case Study of Water Management Adaptation in the Andes of Colombia - Felipe Murtinho, University California Santa Barbara, Seattle, WA (co-author: Christina Tague)**
- 10:50 A.M. Managing Water in the Connecticut River Watershed - Richard Palmer, Civil and Env. Engineering, University of Massachusetts Amherst, Amherst, MA (co-authors: Austin Polebitski, David Ahlfeld, Casey Brown)**
- 11:10 A.M. Analyzing Uncertainty and Risk in the Management of Water Resources for the State of Texas - Abhishek Singh, INTERA, Inc., Austin, TX (co-authors: Richard Hoffpauir, Srikanta Mishra, Marsh Lavenue)**
- 11:30 A.M. Sustainable Water Planning: A Comprehensive Planning Approach for 'Green' Utilities - Rafael E. Frias, Black & Veatch, Tampa, FL (co-author: Peter Binney)**

SESSION 42 • BAINBRIDGE ROOM  
**FLOODING AND FLOODPLAIN MANAGEMENT**

**MODERATOR • JOHN COBOURN** • University of Nevada Cooperative Extension • Incline Village, Nevada

- 10:30 A.M. **An Integrated Model for Herbert Hoover Dam Breaching and Flooding - Michael Kabiling**, Taylor Engineering, Inc., Jacksonville, FL (co-authors: Michael DelCharco, Guillermo Simon, Maurice B. Vaughan, Robert C. Tucker, Thomas Spencer)
- 10:50 A.M. **Developing and Testing Adaptation Baselines for Flood Hazards: Case Studies From Canada and Bangladesh - M. Monirul Q. Mirza**, Environment Canada Adaptation and Impacts Research Division, Toronto, ON, Canada (co-authors: Grace Koshida, Daria T. Smeh)
- 11:10 A.M. **One-Dimensional Hydraulic Modeling of the Lower Skokomish River, Washington - Raymond Walton**, WEST Consultants, Inc., Bellevue, WA (co-authors: John Howard, Jim Park)
- 11:30 A.M. **The Living River Approach to Floodplain Management on the Carson River - John Cobourn**, University of Nevada Cooperative Extension, Incline Village, NV

SESSION 43 • EMERALD BALLROOM II  
**INFRASTRUCTURE**

**MODERATOR • FELIX KRISTANOVICH** • Consultant • Freeland, Washington

- 10:30 A.M. **The Three Gorges Project - The World's Largest Hydropower Plant: Part I - Song-kai Yan**, Shaw Environmental and Infrastructure, Inc, Baton Rouge, LA
- 10:50 A.M. **The Three Gorges Project - The World's Largest Hydropower Plant: Part II- Song-kai Yan**, Shaw Environmental and Infrastructure, Inc, Baton Rouge, LA
- 11:10 A.M. **Changes to Hydrologic Ecosystems Services Following Dam Removal: A Case Study of Marmot Dam on the Sandy River - Terrance Anthony**, Portland State Univ, Portland, OR
- 11:30 A.M. **Ochoa Foods Dam Failure Analysis and Design of Secondary Containment Berm - Felix Kristanovich**, Consultant, Freeland, WA (co-authors: Stewart Hilmes, Robert Montgomery)

SESSION 44 • ORCAS ROOM  
**ASR AND GROUNDWATER**

**MODERATOR • ROBERT H. ANDERSON** • Golder Associates, Inc. • Redmond, Washington

- 10:30 A.M. **Recharge Master Planning in the Chino Basin, California - Mark Wildermuth**, Wildermuth Environmental, Inc., Lake Forest, CA (co-authors: Ken Manning, Tom McCarthy)
- 10:50 A.M. **SPWSD ASR Program - Five Years of Operation - Scott Coffey**, CDM, Seattle, WA (co-author: John Anderson)
- 11:10 A.M. **Solving the ASR Arsenic Problem: Pilot-Tested Approach Shows Promising Results - Barika Poole**, CDM, Maitland, FL (co-authors: Leslie Turner, Lee Wiseman, Doug Munch, Glenn Forrest, Migdalia Hernandez)
- 11:30 A.M. **Underground Injection Control (UIC) Wells for Stormwater Infiltration - J. Scott Kindred**, Associated Earth Sciences, Inc., Kirkland, WA (co-author: Curtis Koger)

SESSION 45 • SAN JUAN/WHIDBEY ROOM  
**WATER RESOURCES PLANNING**

**MODERATOR • MICHAEL CAMPANA** • Oregon State University • Corvallis, Oregon

- 10:30 A.M. **The Impact of Temperature, Demographics, and Land Use on Residential Water Consumption: An Empirical Assessment of the Portland (OR) Region - Vivek Shandas**, Portland State University, Portland, OR (co-authors: G. Hossein Parandvash, Heejun Chang)
- 10:50 A.M. **Protection of Critical Source Areas for Water Resource Protection Through Community-Based Land Use Planning and Ordinances - Zeyuan Qiu**, New Jersey Institute of Technology, Newark, NJ (co-authors: Christine Hall, Donna Drewes, Grace Messinger, Kathy Hale)
- 11:10 A.M. **Innovative Approaches in Subwatershed Management Using a Systems Based Approach - Ray Tufgar**, AECOM, Kitchener, ON, Canada (co-author: John Kwast)
- 11:30 A.M. **Statewide Water Roundtables: Taking Oregon's Water Pulse - Michael Campana**, Oregon State University, Corvallis, OR (co-authors: W. Todd Jarvis, Gail Achterman, Megan Kleibacker)

**SPECIAL EVENT ~ AWRA CONFERENCE ANNUAL AWARDS LUNCHEON**

**SPONSORED BY BLACK & VEATCH • OFFICES WORLDWIDE**

**WEDNESDAY • NOVEMBER 11 • 12:00 NOON. TO 1:25 P.M. • EMERALD BALLROOM I**

ALL CONFERENCE ATTENDEES ARE INVITED TO ATTEND (INCLUDED WITH REGISTRATION) ~ SEE PG. 42 FOR DETAILS

## CONCURRENT SESSIONS 46, 47, 48, 49, 50

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

WEDNESDAY ~ NOVEMBER 11

### SESSION 46 • EMERALD BALLROOM III **INSTREAM FLOWS - ECOSYSTEM REQUIREMENTS**

**MODERATOR • ELOISE KENDY • The Nature Conservancy • Helena, Montana**

- 1:30 P.M. Investigating Ecosystems Services in the Arid Southwest - Nita Tallent-Halsell, U.S. Environmental Protection Agency, Las Vegas, NV (co-authors: Donald Ebert, Caroline Erickson, William Kepner, Ric Lopez, Yongping Yuan, Matt Weber)**
- 1:50 P.M. Markets and Incentives for Restoring Water Quality in Puget Sound - Mark Buckley, ECONorthwest, Portland, OR (co-author: Ernie Niemi)**
- 2:10 P.M. Generalizing Ecological Responses to Hydrologic Alteration for Setting Environmental Flow Standards – Christopher Konrad, The Nature Conservancy, Seattle, WA**
- 2:30 P.M. Statewide Ecologically-Based Instream Flow Standards: Michigan Versus Connecticut - Eloise Kendy, The Nature Conservancy, Helena, MT (co-authors: Colin Apse, Richard Bowman, Mark P. Smith)**

### SESSION 47 • BAINBRIDGE ROOM **FLOOD FORECASTING AND PROTECTION**

**MODERATOR • STEVE BURIAN • University of Utah • Salt Lake City, Utah**

- 1:30 P.M. Short Range Operational Streamflow Forecasting in Western Washington State, USA - Matthew Wiley, 3TIER, Inc., Seattle, WA (co-authors: Andy Wood, Pascal Storck, Bart Nijssen)**
- 1:50 P.M. Hydraulic Boundary Conditions for the Inhc Storm Surge Barrier - Mathijs Van Ledden, Haskoning, Inc. Metairie, LA (co-authors: Jena Gilman, Scotty Emmons)**
- 2:10 P.M. Assessment of Satellite-Based Rainfall Observations for Urban Flood Modeling - Steve Burian, University of Utah, Salt Lake City, UT (co-authors: Woo Suk Han, J. Marshall Shepherd)**

### SESSION 48 • EMERALD BALLROOM II **WATER SUPPLY AND INFRASTRUCTURE**

**MODERATOR • JUNESEOK LEE • San Jose State University • San Jose, California**

- 1:30 P.M. Impacts of Salmon Carcass Decomposition on Reservoir Eutrophication and Drinking Water Quality in Seattle, Washington - Rebecca Dugopolski, Herrera Environmental Consultants, Seattle, WA (co-author: Rob Zisette)**
- 1:50 P.M. How to Provide 3 Million San Diegans a Safe and Reliable Water Supply - A Case Study on Southern California's Imported Water System and the New San Diego Pipeline 6 Project - Steve Simon, San Diego County Water Authority, San Diego, CA**
- 2:10 P.M. Determining the Optimal Investment Plan for Water Utilities: The Case of Three Valleys Water - Jon Hecht, ICF International, Fairfax, VA (co-authors: Scott Reid, Ali Chalak)**
- 2:30 P.M. Gaseous Cavitation Phenomenon Within Drinking Water Infrastructures - Juneseok Lee, San Jose State University, San Jose, CA**

### SESSION 49 • ORCAS ROOM **GROUNDWATER-I**

**MODERATOR • J. SCOTT KINDRED • Associated Earth Sciences, Inc. • Kirkland, Washington**

- 1:30 P.M. Groundwater Supplies in Colorado's Front Range – Challenges and Opportunities for Municipalities - N. Jordan Dimick, CDM, Denver, CO (co-author: John Rehring)**
- 1:50 P.M. Hyperalkaline Mineral Waters of Zlatibor Ultramafic Massif in Western Serbia, Europe - Dejan Milenic, Hydrogeologist, Belgrade, Serbia (co-authors: V. Dragisic, M. Vrvic, Di. Milankovic, A. Vranjes)**
- 2:10 P.M. Is Nitrate Contamination Likely in Private Wells in the Glacial Aquifer System? - Kelly Warner, U.S. Geological Survey, Urbana, IL (co-authors: Kelly L. Warner, Terri L. Arnold, George E. Groschen)**
- 2:30 P.M. Arsenic in the Chamokane Valley Aquifers – Michael Klisch, Golder Associates Inc., Redmond, WA (co-authors: Bryony Stasney, Alex Dailey, Robert Anderson,)**

**SESSION 50 • SAN JUAN/WHIDBEY ROOM**  
**BALANCING HIGHWAY DEVELOPMENT AND THE ENVIRONMENT THROUGH DESIGN-BUILD DELIVERY**

**MODERATOR • WILLIAM JORDAN** • Washington Department of Transportation • Bellevue, Washington

- 1:30 P.M. **Balancing Highway Development and the Environment Through Design-Build Delivery** - Alan Black, HNTB Corporation, Bellevue, WA
- 1:50 P.M. **NEPA/SEPA/ESA Clearance and Permit Acquisition for Design Build Projects in Washington State** - William Jordan, WSDOT I-405 Project Office, Bellevue, WA
- 2:10 P.M. **Adaptive Management for Environmental Compliance and Design-Build Projects** - Eric Wolin, WSDOT Environmental Services Office, Olympia, WA
- 2:30 P.M. **I405 Kirkland – Environmental Compliance** - Jim Shellooe, AMEC Earth and Environmental, Bothell, WA

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

**CONCURRENT SESSIONS 51, 52, 53, 54, 55**

**3:30 P.M. – 5:00 P.M.**

**WEDNESDAY ~ NOVEMBER 11**

**SESSION 51 • EMERALD BALLROOM III**  
**ECOSYSTEM RESTORATION/MITIGATION**

**MODERATOR • CHERYL ULRICH** • Weston Solutions, Inc. • Atlantic Beach, Florida

- 3:30 P.M. **Missouri River Recovery Program: Progress and Challenges in Creating Shallow Water Habitat for the Endangered Pallid Sturgeon** - Michael Gossenauer, U.S. Army Corps of Engineers, Kansas City District, Kansas City, MO
- 3:50 P.M. **Development and Field Validation of an Indicator-Based Method for Evaluating the Duration of Streamflow in Oregon** - Tracie-Lynn Nadeau, U.S. Environmental Protection Agency, Portland, OR (co-author: Parker J. Wigington, Jr.)
- 4:10 P.M. **Development of a Coordinated Watershed Approach for Linking Compensatory Mitigation and Tampa Bay Habitat Restoration Goals** - Valerie Seidel, The Balmoral Group, Maitland, FL (co-authors: Chris DeBodisco, Paul Yacobellis)
- 4:30 P.M. **Natural Gas Well Drilling - Mitigating Impacts to Water Resources** - Carol Collier, Delaware River Basin Commission, West Trenton, NJ (co-author: Chad Pindar)
- 4:50 P.M. **Creation of a National Coalition for Ecosystem Restoration** - Cheryl Ulrich, Weston Solutions, Inc., Atlantic Beach, FL (co-authors: Tom St. Clair, David J. Tazik)

**SESSION 52 • BAINBRIDGE ROOM**  
**SURFACE WATER/STORMWATER MANAGEMENT INNOVATION**

**MODERATOR • J. SCOTT KINDRED** • Associated Earth Sciences, Inc. • Kirkland, Washington

- 3:30 P.M. **Sustainable Stormwater: Optimized Management of Ponds and Other BMPs** - Ann Shortelle, MACTEC Engineering and Consulting, Inc., Newberry, FL (co-author: Shannon Carter-Wetzel)
- 3:50 P.M. **Urban Stormwater Modeling Using YouTube Videos** - Joseph Brascher, Clear Creek Solutions, Inc., Tumwater, WA
- 4:10 P.M. **Lakewood Raincatchers: Reducing Combined Sewer Overflows to South Lake Washington by Constructing Rain Gardens and Cisterns to Manage Rooftop Runoff from Private Property** - Matthew Fontaine, Herrera Environmental Consultants, Inc., Seattle, WA (co-authors: Bob Spencer, Robin Kirschbaum)
- 4:30 P.M. **Muskingum Optimization for Analysis of Regionalized Stormwater Detention** - John McEnery, University of Texas at Arlington, Arlington, TX

**SESSION 53 • EMERALD BALLROOM II**  
**ADDRESSING THE STATE OF OUR NATION'S LEVEES**

**MODERATOR • ROBERT IVERSON** • HNTB Corporation • Chicago, Illinois

- 3:30 P.M. **Addressing the State of Our Nation's Levees – Investment Priorities and Approaches** - Rob Vining, HNTB Federal, Baton Rouge, LA
- 3:50 P.M. **Flood Risk Management and Innovative Technology Applications: How the Latest Advances in Levee Technology Can Help Agencies Plan and Prioritize and Understand Their Projects** - Tom Poer, HNTB, Kansas City, MO
- 4:10 P.M. **Implementing Levees, Reservoirs and Stream and Floodplain Restoration in Concert to Reduce Flood Risk** - Michael Schwar, HNTB, Milwaukee, WI
- 4:30 P.M. **Westbank and Vicinity, New Orleans, Louisiana Hurricane Protection Project's West Closure Complex, Interior Drainage Pump Station Design and Construction** - Robert Ivarson, HNTB Corporation, Chicago, IL
- 4:50 P.M. **Modeling Dam/Levee Breach Scenarios Using the Finite Element Code Developed by the U.S. Army Engineer Research and Development Center** - Jennifer Tate, USACE-ERDC, Vicksburg, MS (co-authors: Tate McAlpin, Gaurav Savant, Robert McAdory)

**SESSION 54 • ORCAS ROOM**  
**GROUNDWATER-II**

**MODERATOR • THOMAS RING • Yakima Nation • Toppenish, Washington**

- 3:30 P.M. Aquifer Storage and Recovery for Tualatin Valley Water District, Washington County, Oregon - Kenny Janssen, Golder Associates Inc., Lake Oswego, OR (co-authors: Mark Wirganowicz, Joel Cary)**
- 3:50 P.M. Patterns of Ground Water Movement in a Portion of the Willamette River Floodplain, Oregon - Barton R. Faulkner, U.S. Environmental Protection Agency, ORD, Ada, OK (co-authors: Renee J. Brooks, Kenneth J. Forshay)**
- 4:10 P.M. An Integrated Surface Water-Groundwater Modeling to Study the Basin Hydrology in the Snake River Basin, Idaho - Xin Jin, Boise State University, Boise, ID (co-author: Venkataramana Sridhar)**
- 4:30 P.M. Henry Darcy's Public Fountains of the City of Dijon - Patricia Bobeck, Geotechnical Translations, Austin, TX**

**SESSION 55 • SAN JUAN/WHIDBEY ROOM**  
**PLANNING-II**

**MODERATOR • CYNTHIA CARLSTAD • Tetra Tech • Seattle, Washington**

- 3:30 P.M. Sustainable Water Planning for a New Urban Town Center - Erin Nelson, Parametrix, Bellevue, WA (co-author: Eric LaFrance)**
- 3:50 P.M. Triple Bottom Line and Life-Cycle Cost Assessment of Sustainable Resource Management in Boston, MA - Joseph Farah, R.W. Beck, Inc., Seattle, WA**
- 4:10 P.M. Regional Watershed Management Planning for a Multi-Jurisdiction Urban Area - Kimberly Z. Shorter and Steve Haubner, AECOM, Atlanta, GA and Atlanta Regional Commission, Atlanta, GA respectively (co-author: Pamela Burnett)**
- 4:30 P.M. Adopting the Stepchild: Ecosystem Planning in Seattle's 'Other' Municipal Watershed - Cynthia Carlstad, Tetra Tech, Seattle, WA (co-authors: Brent Lackey, Michael Kern)**

**SPECIAL EVENT ~ STUDENT CAREER NIGHT AND SPEED NETWORKING**

**SPONSORED BY THE BIOENGINEERING GROUP • SALEM, MASSACHUSETTS**  
**WEDNESDAY • NOVEMBER 11 • 5:30 P.M.-7:30 P.M. (see on pg. 41)**

**SPECIAL EVENT ~ FERRY EXCURSION ON PUGET SOUND**

**CONFERENCE FIELD TRIP • WEDNESDAY • NOVEMBER 11 • 5:30 P.M.-9:00 P.M.**  
**(Meet in Hotel Lobby at 5:30 p.m. – see pg. 42)**

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## DAY-AT-A-GLANCE / THURSDAY / NOVEMBER 12, 2009

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

SPEAKERS' PREPARATION ROOM OPEN / 7:00 A.M.-3:30 P.M. / VASHON ROOM

REGISTRATION DESK OPEN / 8:00 A.M.-3:30 P.M. / EMERALD FOYER

BOOK & JOURNAL EXHIBIT OPEN & EMPLOYMENT OPPORTUNITY BOARD ON DISPLAY  
8:00 A.M.-12:00 NOON / EMERALD FOYER

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

CONCURRENT SESSIONS 56, 57, 58, 59, 60 / 8:30 A.M.-10:00 A.M.

<u>SESSION 56 - PANEL:</u> INCORPORATING ECOSYSTEM BASED MGMT. PRINCIPLES INTO COASTAL ... EMERALD BALLROOM II	<u>SESSION 57 - PANEL:</u> AN INTEGRATED APPROACH TO RESOLVING WATER USE CONFLICTS IN THE YAKIMA RIVER ... EMERALD BALLROOM III	<u>SESSION 58</u> WATERSHED MANAGEMENT SAN JUAN/WHIDBEY RM.	<u>SESSION 59</u> POLICY & LEGAL ORCAS ROOM	<u>SESSION 60 - PANEL:</u> THE TUALATIN BASIN WATER SUPPLY PROJECT, OREGON BAINBRIDGE ROOM
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MORNING NETWORKING BREAK (CONT'D.) / 10:00 A.M.-10:30 P.M. / EMERALD FOYER

CONCURRENT SESSIONS 61, 62, 63, 64, 65 / 10:30 A.M.-12:00 NOON

<u>SESSION 61</u> WETLANDS & LAKES EMERALD BALLROOM II	<u>SESSION 62</u> WATER MANAGEMENT PLANNING & PARTNERSHIPS EMERALD BALLROOM III	<u>SESSION 63</u> RIVER OPERATIONS & FLOW MANAGEMENT SAN JUAN/WHIDBEY RM.	<u>SESSION 64</u> LOOKING AT THE BIG PICTURE ORCAS ROOM	<u>SESSION 65</u> WATER & ENERGY: HYDROPOWER & ALTERNATIVE ENERGY BAINBRIDGE ROOM
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LUNCH BREAK / 12:00 NOON-1:25 P.M. / ON YOUR OWN

CONCURRENT SESSIONS 66, 67, 68, 69, 70 / 1:30 P.M.-3:00 P.M.

<u>SESSION 66 - PANEL:</u> PLAN., PARTNERSHIPS, PROJ., PITFALLS, & PERFORMANCE - THE FULL CYCLE OF ... EMERALD BALLROOM II	<u>SESSION 67 - PANEL:</u> INSTITUTIONAL BARRIERS TO THE USE OF ALTERNATIVE WATER SUPPLIES EMERALD BALLROOM III	<u>SESSION 68</u> SURFACE WATER QUALITY & PLANNING SAN JUAN/WHIDBEY RM.	<u>SESSION 69</u> AGRICULTURAL HYDROLOGY ORCAS ROOM	<u>SESSION 70 - PANEL:</u> INTEGRATING WATERSHED PROT. & LAND USE DECISIONS BAINBRIDGE ROOM
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AFTERNOON NETWORKING BREAK / 3:00 PM-3:30 P.M. / EMERALD FOYER

CONCURRENT SESSIONS 71, 72, 73, 74, 75 / 3:30 P.M.-5:00 P.M.

<u>SESSION 71</u> MODELING, MITIGATION, & ADAPTATION FOR CHANGE-II EMERALD BALLROOM II	<u>SESSION 72</u> WATER SUPPLY QUALITY & TREATMENT EMERALD BALLROOM III	<u>SESSION 73</u> ECOSYSTEMS - RESTORATION & SPECIES INTERACTION SAN JUAN/WHIDBEY RM.	<u>SESSION 74 - PANEL:</u> SPECIES RECOVERY - WHAT DOES IT MEAN? ORCAS ROOM	<u>SESSION 75</u> COLLABORATION BETWEEN NATIONS BAINBRIDGE ROOM
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AWRA HOPES THAT WE HAVE MET YOUR EXPECTATIONS DURING  
 OUR 2009 ANNUAL WATER RESOURCES CONFERENCE. MAKE PLANS NOW TO ATTEND  
 ANY ONE (OR ALL) OF OUR CONFERENCES BEING HELD IN 2010. PLEASE SEE PG. 1  
 FOR A LISTING OF OUR 2010 MEETINGS. FOR ADDITIONAL INFORMATION  
 VISIT OUR WEBSITE AT [WWW.AWRA.ORG](http://WWW.AWRA.ORG).

## CONCURRENT SESSIONS 56, 57, 58, 59, 60

8:30 A.M. – 10:00 A.M.

THURSDAY ~ NOVEMBER 12

### SESSION 56 • EMERALD BALLROOM II

#### **PANEL: INCORPORATING ECOSYSTEM BASED MANAGEMENT PRINCIPLES INTO COASTAL ZONE MANAGEMENT**

**PANEL MODERATOR • RALPH CANTRAL** • NOAA Office of Ocean and Coastal Resources Mgmt. • Silver Spring, Maryland  
*Problems With Existing CZM Structures and Describe NOAA's Proposed Reauthorization Efforts*

#### PANEL PARTICIPANTS

**KATHRYN MENGERINK** • Director of Ocean Programs for the Environmental Law Institute • LaJolla, California  
*The Need for Incorporating EBM Techniques Into the CZMA*

**SUSAN WHITE** • Senior Scientist, NOAA's National Centers for Coastal Ocean Science • Charleston, South Carolina  
*The Difficulties of Implementing EBM Programs*

**ROBERT BAILEY** • Director, Oregon's Coastal and Ocean Management Program • Salem, Oregon  
*The Problems Faced by States in Implementing EBM Programs*

The Coastal Zone Management Act was originally adopted in 1972 in an effort to create a state federal partnership to accomplish a great number of things. The act focused on, among other things, habitat protection, public access, water quality, waterfront revitalization, and coastal hazard reduction. Although 34 of the 35 coastal states have adopted programs under the CZMA, each program has different goals and priorities, and few states have similar criteria for boundaries. To better achieve measurable results at the national level, NOAA is proposing to focus the reauthorization of the CZMA on three distinct goals: providing for sustainable coastal and ocean ecosystems; reducing the impacts of climate change on coastal areas; and ensuring safe, sustainable, and resilient coastal communities and economies. To accomplish these goals, NOAA will need to work closely with the traditional state government partners but also improve the ability to work with local governments and coordinate better with other federal agencies and the states to address some issues at the regional level. New techniques will be especially important when attempting to preserve sustainable ecosystems. One of the desired methods for improving coastal and ocean resource management is to incorporate ecosystem based management (EBM) principles into coastal zone management (CZM). To date, most EBM efforts have attempted to improve knowledge of a particular area and then to apply the knowledge gained to planning and managing focused on the natural environment. CZM efforts, on the other hand, have focused primarily on planning and regulatory structures to control land use to address a broad range of issues. Using EBM effectively at a broad scale throughout the nation's coastal zone will be difficult for a number of reasons, including lack of good information about the current state of the ecosystem at a scale that supports management; lack of a good definition of what the bounds of the coastal area should be, the perceived lack of transferability of ecosystem management tools across ecosystems, and handling the expectations of success from federal and state managers as well as stakeholders.

### SESSION 57 • EMERALD BALLROOM III

#### **PANEL: AN INTEGRATED APPROACH TO RESOLVING WATER USE CONFLICTS IN THE YAKIMA RIVER BASIN**

**PANEL MODERATOR • ROBERT MONTGOMERY** • Anchor QEA, LLC • Kirkland, Washington

#### PANEL PARTICIPANTS

**ANN ROOT** • ESA Adolfsen • Seattle, Washington

**ROBERT MONTGOMERY** • Anchor QEA • Kirkland, Washington

**DEREK SANDISON** • Office of Columbia River, Washington Department of Ecology • Wenatchee, Washington

**ROBERT ANDERSON** • Golder Associates • Redmond, Washington

**THOMAS RING** • Yakima Nation • Toppenish, Washington

The Yakima River basin is one of the most productive irrigated agricultural areas in the West and historically supported large runs of anadromous salmonids. However, salmon runs have declined drastically and farmers experience water shortages during drought years. Over the years, a number of solutions have been proposed to address water resource problems in the basin, including the Yakima River Basin Water Enhancement Program (YRBWEP) which has provided state and federal funding for projects, including conservation and water rights acquisition. Recently the Washington State Department of Ecology (Ecology) and the U.S. Bureau of Reclamation (Reclamation) evaluated opportunities for increased storage in the basin. As part of the Draft Planning Report/Environmental Impact Statement (EIS) released in January 2008, they jointly evaluated traditional storage facilities – Black Rock and Wymer Reservoirs – and Ecology evaluated the nonstorage options of enhanced water conservation, groundwater storage, and water marketing. Comments on the Draft EIS stated that the agencies had not considered a broad enough range of alternatives and that the alternatives had not included actions that would improve fish passage or habitat. The comments advocated an integrated approach to benefit all resources in the basin. In response to those comments, Ecology facilitated the development of an integrated approach to improve habitat for anadromous and resident fish and water supply for irrigated agriculture and future municipal needs in the basin. The integrated approach includes fish passage at existing dams to open up high quality habitat, new surface water and groundwater storage facilities, modifications to existing operations, fish habitat improvements, an aggressive program of water conservation, and water marketing. The integrated approach was developed in cooperation with rep-

representatives from the Yakama Nation, Reclamation, basin irrigation districts, and fisheries managers. The elements of the integrated approach were evaluated in an EIS released in June 2009. Ecology and Reclamation are currently working with other stakeholders in the Yakima basin to propose Phase III of YRBWEP for Congressional authorization and funding. The panel, who are involved in the project, will describe the individual elements of the alternative and the challenges of developing and implementing an integrated approach to water resource problems.

**SESSION 58 • SAN JUAN/WHIDBEY ROOM**  
**WATERSHED MANAGEMENT**

**MODERATOR • JENNIFER BENAMAN • Anchor QEA • Glen Falls, New York**

- 8:30 A.M. Natural Background of Indicator Species in Stormwater - Brad Wilson, University of Alabama, Tuscaloosa, AL**  
(co-author: Robert Pitt)
- 8:50 A.M. Leveraging Resources from Multiple Partners to Advance Low Impact Development and Ecological Restoration in the Lockwoods Folly River Watershed - Jason Doll, Stantec Consulting, Raleigh, NC**
- 9:10 A.M. Recast of Computer Model in Water Clarity Simulation for Management Decision - Ping Wang, UMCES, Annapolis, MD**  
(co-authors: Lewis C. Linker, Richard A. Batiuck)
- 9:30 A.M. Evaluating Future Policies Using A Proactive Basin Management Tool - Jennifer Benaman, Anchor QEA, Glen Falls, NY**  
(co-authors: Emily Chen, Jim Patek, Harry Zahakos, In Cooperation with the Lower Colorado River Authority )

**SESSION 59 • ORCAS ROOM**  
**POLICY AND LEGAL**

**MODERATOR • CLAUDIA BORCHERT • City of Santa Fe Water Division • Santa Fe, New Mexico**

- 8:30 A.M. Comparative International Water Law and Management: The Asia-Kansas Program - John C. Peck, University of Kansas School of Law, Lawrence, KS**
- 8:50 A.M. Price Determinants for Ditch Company Shares in Colorado's South Platte Basin - Matthew Payne, WestWater Research, LLC, Boise, ID**  
(co-authors: Mark Griffin Smith, Clay J. Landry)
- 9:10 A.M. Residential Water Demand Estimations Using a Large Panel of Monthly Water Use - Shawn Stoddard, Truckee Meadows Water Authority, Reno, NV**
- 9:30 A.M. Wanted – Alive: The Santa Fe River - Claudia Borchert, City of Santa Fe Water Division, Santa Fe, NM**

**SESSION 60 • BAINBRIDGE ROOM**  
**PANEL: THE TUALATIN BASIN WATER SUPPLY PROJECT, OREGON**

**PANEL MODERATOR • BILL SWANSON • MWH Americas, Inc. • Sacramento, California**

**PANEL PARTICIPANTS**

**KEVIN HANWAY • Water Director, City of Hillsboro • Hillsboro, Oregon**

**BARTHOLOMEW “MAC” MARTIN • Clean Water Services • Hillsboro, Oregon**

**BILL SWANSON • MWH Americas, Inc. • Sacramento, California**

**RYAN MURDOCK • MWH Americas, Inc. • Sacramento, California**

**Overview.** The Tualatin River Basin in the western Portland metropolitan area is home to some of the fastest growing communities in Oregon. The nearly 500,000 residents in and around 13 communities rely heavily upon their local environment to provide safe and dependable water supply while ensuring the long-term health and vitality of the region. Projections for the next 50 years reveal a need for significant additional water supplies to serve municipal and industrial demands while preserving and enhancing the ecosystem functions and values of the watershed.

The Tualatin Basin Water Supply Project (TBWSP) is a collaborative effort among local agencies to comprehensively address these needs. Project partners include the regional waste water utility (Clean Water Services), three municipal water providers (Tualatin Valley Water District, City of Hillsboro, and City of Beaverton) and the owner of Hagg Lake (U.S. Bureau of Reclamation), the only large water supply reservoir within the Tualatin River Basin.

**Project Formulation and Issue Resolution.** A wide range of regional water supply options, including additional storage, conveyance, and exchanges were evaluated for their ability to meet the long-term water needs in the Tualatin River Basin. The evaluations revealed that increasing reservoir storage capacity alone would not meet future needs. The partners selected a project involving the enlargement of Hagg Lake storage capacity, pumping surplus water from a downstream location to supplement reservoir storage, a raw water delivery pipeline, and expanded water treatment capacity. The project also would include transferring ownership of Hagg Lake and related facilities and lands from the federal government to local ownership.

The TBWSP will involve modifications to the configuration of and operation of the existing Hagg Lake project. Water contractors not involved in the project expansion needed confidence that future project operations would preserve the reliability of their existing water supplies. In response to these concerns, a detailed assessment and presentation tool was developed to simulate and visualize the effects of daily operating decisions, particularly decisions on pumping and releases, on water supply allocations and project operations. This customized model and interface provided trans-

parency and clarity, and allowed all parties to better understand that accounting practices could be implemented to preserve existing project benefits and protect new user investments in the expanded project.

**Implementation.** Successful implementation of the TBWSP will require flexibility, adaptive management, strong strategies for resolving anticipated challenges, and preserving a continued, strong partnership. Title transfer of Scoggins Dam will require formation of a new governmental entity to own and operate the existing and expanded project. In light of new seismic design criteria, project alternatives and associated cost estimates are being re-evaluated. TBWSP partners will continue to emphasize strategies that provide the greatest implementation flexibility as project demands develop over the next few decades.

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

## CONCURRENT SESSIONS 61, 62, 63, 64, 65

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

THURSDAY ~ NOVEMBER 12

### SESSION 61 • EMERALD BALLROOM II

#### **WETLANDS AND LAKES**

**MODERATOR • HARRY GIBBONS • Tetra Tech • Seattle, Washington**

- 10:30 A.M. **Wetland Hydrology: Performing Wetland Delineation Using a Hydrogeomorphic Approach and Continuous Hydrological Data - Daniel Wiitala**, North Jackson Company, Marquette, MI (co-authors: Peter Sabee, Kari Paulson)
- 10:50 A.M. **Marsh Restoration/Degradation Methodology Used With the ADCIRC Numerical Model - Tate McAlpin**, USACE-ERDC, Vicksburg, MS (co-authors: Mary Cialone, Alison Sleath Grzegorzewski)
- 11:10 A.M. **Assessing Wetland Hydroperiod Restoration Alternatives in the Myakka River Watershed, Southwest Florida - John Loper**, Interflow Engineering LLC, Tampa, FL (co-authors: Lisann Morris, B.J. Bukata, Susan Gerena)
- 11:30 A.M. **Integrated Management of Long Lake, Kitsap County, Washington – Harry Gibbons**, Tetra Tech, Seattle, WA

### SESSION 62 • EMERALD BALLROOM III

#### **WATER MANAGEMENT PLANNING AND PARTNERSHIPS**

**MODERATOR • DANIEL REISINGER • CDM • Denver, Colorado**

- 10:30 A.M. **Oregon's Integrated Water Resources Strategy: Planning to Meet Water Quantity, Quality, and Ecosystem Needs - Brenda Bateman**, Oregon Water Resources Department, Salem, Oregon
- 10:50 A.M. **Conjunctive Use: An Improved Approach for Streamlined Water Management, With Solutions for the Rio Grande Watershed - Susan V. Roberts**, Texas State University-San Marcos, San Marcos, TX (co-author: Walter Rast)
- 11:10 A.M. **Oklahoma Comprehensive Water Plan Update's Provisional Water Supply Availability – A Statewide Look Through the Oklahoma H2O Tool (Part 1) - Daniel Reisinger**, CDM, Denver, CO (co-authors: Kyle Arthur, Cynthia Kitchens, Gene Lilly, Travis Bogan)
- 11:30 A.M. **Oklahoma Comprehensive Water Plan Update's Provisional Water Supply Availability – A Statewide Look Through the Oklahoma H2O Tool (Part 2) - Daniel Reisinger**, CDM, Denver, CO (co-authors: Kyle Arthur, Cynthia Kitchens, Gene Lilly, Travis Bogan)

### SESSION 63 • SAN JUAN/WHIDBEY ROOM

#### **RIVER OPERATIONS AND FLOW MANAGEMENT**

**MODERATOR • NATHAN FOGED • Brown and Caldwell • Seattle, Washington**

- 10:30 A.M. **Minimizing Erosion Hazards in a Dynamic River System - Mike Gregory**, AECOM, Kitchener, ON, Canada (co-authors: Ray Tufgar, Alec Scott, Stu Seabrook)
- 10:50 A.M. **Flow Upstream of Sluice Gate - Md Rashedul Islam**, University of Alberta, Edmonton, AB, Canada (co-author: David Z Zhu)
- 11:10 A.M. **Application of Multi-Objective Genetic Algorithms in the Apalachicola Basin - Daniel Sheer**, HydroLogics, Columbia, MD
- 11:30 A.M. **New User-Defined Gate Controlling Capabilities in HEC-RAS Version 4.0; Hydraulic Modeling of the Drop 2 Storage Reservoir System - Nathan Foged**, Brown and Caldwell, Seattle, WA (co-author: Tony Dubin)

### SESSION 64 • ORCAS ROOM

#### **LOOKING AT THE BIG PICTURE**

**MODERATOR • CHRIS CORBIN • Lotic LLC • Missoula, Montana**

- 10:30 A.M. **A Watershed Scale Assessment of the Water Quality Impacts of Riparian Buffers in Southern Illinois - William Beck**, Southern Illinois University Carbondale, Carbondale, IL (co-authors: J.E. Schoonover, K.W.J. Williard, J.J. Zaczek)
- 10:50 A.M. **Stream Flows for Fish: Balancing Resource Protection With Hydropower Needs - Cleve Steward**, AMEC Earth & Environmental, Inc., Snohomish, WA (co-authors: Daryl Williams, Anne Savery, Abby Hook)

- 11:10 A.M. **How to Obtain Funding for Your Utility Program - Steven Swenson**, R.W. Beck, Inc., Seattle, WA  
 11:30 A.M. **You Can Bank On It: Utilizing Private Water Banks to Mitigate Groundwater Development- Chris Corbin**, Lotic LLC - Water Marketing, Missoula, MT

**SESSION 65 • BAINBRIDGE ROOM**

**WATER AND ENERGY: HYDROPOWER AND ALTERNATIVE ENERGY**

**MODERATOR • ANDY WOOD • 3TIER, Inc. • Seattle, Washington**

- 10:30 A.M. **Offset Rising Energy Costs and Reduce Your Carbon Footprint With Small Hydropower Facilities on Existing Infrastructure - Pete Oveson**, Brown and Caldwell, Portland, OR (co-author: Jennifer Belknap Williamson)  
 10:50 A.M. **Renewable Energy Applications for Water Operations - Les Lampe**, Black & Veatch, Kansas City, MO (co-authors: Pamela Kenel, Rafael Frias)  
 11:10 A.M. **FirstLook Hydro: An Online Tool for Small-Scale Hydro Resource Identification - Andy Wood**, 3TIER, Inc., Seattle, WA (co-authors: Jessemine Fung, Matthew Wiley, Kenneth Westrick)  
 11:30 A.M. **Sustainable Hydropower Development and Adaptation to Climate Change Impacts in the Himalayan Region - Ramesh Vaidya**, International Centre for Integrated Mountain Development, Kathmandu

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

**CONCURRENT SESSIONS 66, 67, 68, 69, 70**

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

**THURSDAY ~ NOVEMBER 12**

**SESSION 66 • EMERALD BALLROOM II**

**PANEL: PLANNING, PARTNERSHIPS, PROJECTS, PITFALLS, AND PERFORMANCE - THE FULL CYCLE OF RIVER RESTORATION: A CASE STUDY OF THE SNOQUALMIE WATERSHED**

**PANEL MODERATOR • SANDRA KILROY • King County Water and Land Resources • Seattle, Washington**

**PANEL PARTICIPANTS**

**SANDRA KILROY • Manager, Rural & Regional Services, King County Water & Land Resources • Seattle, Washington**

**MICAH WAIT • Conservation Biologist, Wild Fish Conservancy • Seattle, Washington**

**BRENT LACKEY • Watersheds Strategic Advisor, Drinking Water Division, City of Seattle Public Utilities • Seattle, Washington**

**DANIEL EASTMAN • Senior Ecologist, Ecological Restoration & Environmental Services, King County Water & Land Resources • Seattle, Washington**

**JOSH LATTEREL • Senior Ecologist, Watershed & Ecological Assessment Team, King County Water & Land Resources • Seattle, Washington**

The Snoqualmie Watershed is a critical, but imperiled, resource in a quickly urbanizing region. At 700 square miles, this rural watershed contains natural lands, agriculture, forestry, rural communities, and recreation. However, even the Snoqualmie has experienced the pressure of increased human populations, with two million people living within a sixty mile radius. Chinook salmon have declined to less than 10% of historic levels and in 2001 American Rivers listed the Snoqualmie as one of the nation's most endangered rivers.

Over the last decade, governments, nonprofits and others have mobilized to protect and restore this watershed. With solid technical information and problem identification, years of planning, and thousands of hours of building capacity and partnerships for implementation, river habitat restoration is now well underway. This progress however, was not accomplished without significant challenges and creative solutions.

Five projects have been completed or are currently in-progress including the: Raging River-Carlin levee removal, Camp Gilead reconnection, Lower Tolt River Floodplain Reconnection, Chinook Bend Restoration, and Stillwater Restoration. A number of others are in the planning stage. As we implement projects and monitor performance, we increase our understanding of the effects of floodplain reconnection efforts and how multiple restoration projects in close proximity interact to achieve our overall watershed objectives.

This Panel Session will address both the process and challenges associated with the full cycle of watershed restoration including: (1) taking a plan into action: planning, project selection, prioritization of watershed protection and restoration; (2) design and construction of river restoration projects to enhance floodplain and riverine habitat by restoring fluvial processes; (3) how to achieve restoration goals while balancing community and private property interests and protecting public infrastructure; and (4) comprehensive project effectiveness monitoring based on remote sensing and field surveys of key processes, habitat formation, and fish utilization.

**SESSION 67 • EMERALD BALLROOM III**

**PANEL: INSTITUTIONAL BARRIERS TO THE USE OF ALTERNATIVE WATER SUPPLIES**

**PANEL MODERATOR • JOE MENTOR • Mentor Law Group, PLLC • Seattle, Washington**

**PANEL PARTICIPANTS**

**JOE MENTOR • Mentor Law Group, PLLC • Seattle, Washington**

**JOEL SISOLAK • Cascadia Region Green Building • Council, Washington**

**GINNY STERN • Safe Drinking Water Division, Washington State Department of Health • Seattle, Washington**

**KURT UNGER • Washington Department of Ecology • Seattle, Washington**

**DALE WENTWORTH • Washington State Building Code Council • Seattle, Washington**

The average per capita water use in the United States is about 100 gallons per day. A significant portion of this water is used for nonpotable purposes. Yet most American homes provide water from a single, potable source. Increasingly, concerns about climate change, and about the environmental consequences of meeting growing water supply needs, lead to the promotion of sustainable development practices. In the Pacific Northwest, these include The Living Building Challenge, which is a rigorous performance standard prepared by the Cascadia Region Green Building Council to define the closest measure of true sustainability in the built environment. A significant feature of any comprehensive strategy to promote sustainable development practices is a strong emphasis on water conservation, and on promoting water use efficiency. This includes the use of alternative water supplies, specifically reclaimed water, gray water, and rainwater. Yet, significant institutional barriers prevent the widespread use of alternative water supplies. This session will identify and discuss the regulatory barriers in Washington state to the use of alternative water supplies. The panel will use as a case study a report entitled Code and Regulatory Barriers to the Living Building Challenge for Sustainable, Affordable, Residential Development (SARD), prepared by the Cascadia as a demonstration project to identify barriers to permitting “net zero water use” projects in Clark County, Washington. Joe Mentor, will present an overview of the legal framework in Washington for the use of alternative water supplies, and will moderate the panel; Joel Sisolak will describe the Clark County study, and will identify key obstacles; Ginny Stern will discuss barriers to the use of gray water; Kurt Unger will discuss barriers to the use of rainwater and reclaimed water; and Dale Wentworth will discuss treatment of alternative water supplies under the Washington State Plumbing Code.

**SESSION 68 • SAN JUAN/WHIDBEY ROOM**

**SURFACE WATER QUALITY AND PLANNING**

**MODERATOR • ROBERT D. CHANDLER • Public Works Department • Salem, Oregon**

- 1:30 P.M. Building a Foundation for Coordinated Water Quality Monitoring in the Klamath River Basin - Chantell Royer, Humboldt State University, Arcata, CA (co-authors: Andrew P. Stubblefield, Steve Steinberg, Terry Uyeki, Sara Eliason)**
- 1:50 P.M. Spatial and Temporal Variations in Model Performance at Different Soil Data Resolution - Harsh Vardhan Singh, Auburn University, Auburn, AL (co-author: Latif Kalin)**
- 2:10 P.M. Rewriting Seattle’s Stormwater Ordinance - Robert Chandler, Public Works Department, Salem, OR (co-authors: Judy K. Nishimoto, Craig P. Doberstein)**
- 2:30 P.M. Watershed Specific and Regional Scale Suspended Sediment Load Estimates for Bay Area Small Tributaries - Mikolaj Lewicki, Polish Geographical Survey, Wroclaw, Poland (co-author: Lester McKee )**

**SESSION 69 • ORCAS ROOM**

**AGRICULTURAL HYDROLOGY**

**MODERATOR • MATTHEW BLISS • CDM • Denver, Colorado**

- 1:30 P.M. Erosion and Sedimentation Associated With Tracked Vehicle Training at Ft. Knox, Kentucky - Jon Schoonover, Southern Illinois University Carbondale, Carbondale, IL (co-authors: Karl W.J. Williard, Jackie Crim)**
- 1:50 P.M. Agricultural Water Needs Assessment and Multi-Benefit, Multi-Party Solutions in Northwestern Colorado - Matthew Bliss, CDM, Denver, CO**
- 2:10 P.M. Riparian Buffer Impacts on Water Quality at the Watershed Scale - Julia D. Friedmann, Southern Illinois University Carbondale, Carbondale, IL (co-authors: Charnsmorn R. Hwang, Jon E. Schoonover, Karl W.J. Williard)**

**SESSION 70 • BAINBRIDGE ROOM**

**PANEL: INTEGRATING WATERSHED PROTECTION AND LAND USE DECISIONS**

**SESSION ORGANIZERS • LISA CHANG AND JENNIFER WU**

U.S. Environmental Protection Agency • Seattle, Washington

**PANEL MODERATOR • STEPHEN STANLEY** • Washington Department of Ecology • Bellevue, Washington

**PANEL PARTICIPANTS**

**BARBARA WOODS** • Thurston County, Water and Waste Management • Olympia, Washington  
*Landscape Characterization in Thurston County*

**JOHN KONOVSKY** • Squaxin Island Tribe • Shelton, Washington  
*Social Marketing and Bacteria Source Controls in Oakland Bay*

**GREG RABOURN** • King County Water and Land Resources • Seattle, Washington  
*Targeted Stewardship in the Snoqualmie Basin*

**DOUG PETERS** • Washington State Department of Commerce • Olympia, Washington  
*Puget Sound-Wide Context and Risk Management, Adaptive Management, and Other Supporting Tools and Concepts*

In various areas around the country, local governments are attempting to manage the patterns of development to ensure long-term protection of vital watershed processes and resources even as they gain population. This is true in the Puget Sound area as well. It has also been observed that in the Puget Sound area, there is a need both to improve our understanding of what actions will produce the best results and to more effectively share knowledge that jurisdictions already have or are gaining. The purpose of this panel session is to showcase several examples of how local jurisdictions in the Puget Sound region have been working to integrate the protection of watershed processes and services to guide and support land use and planning processes facing them. Outcomes of the session include a greater awareness among attendees of: (1) case studies where this work is occurring in the Puget Sound region; and (2) common steps, basic framework, and tools and concepts useful in supporting this work.

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

**CONCURRENT SESSIONS 71, 72, 73, 74, 75**

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

**THURSDAY ~ NOVEMBER 12**

**SESSION 71 • EMERALD BALLROOM II**

**MODELING, MITIGATION, AND ADAPTATION FOR CHANGE-II**

**MODERATOR • ART MILLER** • AECOM • State College, Pennsylvania

- 3:30 P.M.** **Coastal Flood Risk: Estimating the Influence of Climate Change - David Divoky**, AECOM, Atlanta, GA  
(co-authors: Steve Eberbach, Sunanu Agbley,)
- 3:50 P.M.** **Designing for Climate Change, Impacts to a Creek Restoration Project, City of Toronto, Ontario - Wolfgang Wolter**, AECOM, Kitchener, ON, Canada (co-authors: John Parish, Bruce Kilgour)
- 4:10 P.M.** **An Integrated Approach toward the Journey to Sustainable Development - James Weinbauer**, AECOM, Stevens Point, WI
- 4:30 P.M.** **Carbon Footprint as a Strategic Tool - James Weinbauer**, AECOM, Stevens Point, WI

**SESSION 72 • EMERALD BALLROOM III**

**WATER SUPPLY QUALITY AND TREATMENT**

**MODERATOR • RYAN EDISON** • AECOM • Grand Rapids, Michigan

- 3:30 P.M.** **Finding Water Quality Advantages for New York City's Proposed Kensico Reservoir Water Supply Intake by Using 2D/3D Numerical Surface Water Quality Models - Ryan Edison**, AECOM, Grand Rapids, MI (co-author: Eric Cole)
- 3:50 P.M.** **Unpacking Participation: Social Learning in Multi-Stakeholder Platforms for Drinking Water Source Protection in Ontario, Canada - Gemma Boag**, University of Oxford, Oxford, United Kingdom
- 4:10 P.M.** **Surface Water Quality and Microfiltration Membrane Material Properties: Effects on Membrane Fouling - Erin McDonald**, University of Alaska Fairbanks, Fairbanks, AK (co-authors: Silke Schiewer, William Schnabel)

**SESSION 73 • SAN JUAN/WHIDBEY ROOM**  
**ECOSYSTEMS - RESTORATION AND SPECIES INTERACTION**

**MODERATOR • ALAN BLACK • HNTB • Bellevue, Washington**

- 3:30 P.M. Potential Economic Impacts of Aquatic Invasive Species at Lake Tahoe - Ridge Robinson, Tetra Tech, Inc., Seattle, WA**  
(co-author: James Carney)
- 3:50 P.M. Zebra Mussel Invasion and Zooplankton in a Great Plains Reservoir: A Cause for Concern? - Andrea M Severson, Kansas State University, Manhattan, KS**  
(co-author: Craig P Paukert)
- 4:10 P.M. Effects of Stream and Elevation Resolution on Riparian Metrics and Restoration Site Identification - Jay Christensen, U.S. Environmental Protection Agency ORD-NERL, Las Vegas, NV**  
(co-author: Donald Ebert)
- 4:30 P.M. Stream Community Responses to Riparian Recovery in an Agricultural Watershed - S. Conor Keitzer, Purdue University, West Lafayette, IN**  
(co-author: Reuben Goforth)
- 4:50 P.M. The Role of Movement to Stream Salamander X Fish Coexistence: On a Road to Nowhere? – Adam Sepulveda, University of Montana, Missoula, MT**  
(2nd Place winner of AWRA Montana State Section Conference Student Presenter Competition)

**SESSION 74 • ORCAS ROOM**

**PANEL: SPECIES RECOVERY - WHAT DOES IT MEAN?**

**PANEL MODERATOR • WAYNE WRIGHT • GeoEngineers, Inc. • Tacoma, Washington**

**PANEL PARTICIPANTS**

**PAUL HENSEN • U.S. Fish & Wildlife Service • Portland, Oregon**

**WILLIAM STELLE • K&L Gates • Seattle, Washington**

**CHAD COLTER (Invited) • Shoshone Bannock Tribes • Fort Hall, Idaho**

Experts with the Endangered Species Act and regional policies will share their insights about species recovery and how we are defining recovery in the Pacific Northwest. We will explore how species recovery is defined and discuss various perspectives about species recovery. Invited speakers are: Power Planning Council Representative TBD Tribal Representative TBD Legal/Regional Representative Will Stelle - K&L Gates - A nationally recognized authority in endangered species issues, he spearheads the firm's Endangered Species Act practice group, which advises large and small public and private clients locally and nationally on ESA-related compliance issues. NOAA Representative Bruce Suzumoto - head of NOAA Fisheries' hydro division in Portland USFWS Representative Rollie White/TBD – Division Supervisor Responsible for conservation and recovery of species protected under the federal Endangered Species Act; Section 7 consultations; recovery planning implementation; recovery permits; listing, delisting, and critical habitat designations; five-year reviews; candidate species assessments; and support for scientific research.

**SESSION 75 • BAINBRIDGE ROOM**

**COLLABORATION BETWEEN NATIONS**

**MODERATOR • CLEVE STEWARD • AMEC Earth & Environmental, Inc. • Lynnwood, Washington**

- 3:30 P.M. Hydrography Mapping between the U.S., Canada, and Mexico - Jeff Simley, U.S. Geological Survey, Denver, CO**  
(co-authors: Pete Steeves, Paul Kimley)
- 3:50 P.M. CHANGE (Climate and Hydrology Academic Network for Governance and the Environment) - Gregg Garfin, Institute of the Environment, Tucson, AZ**  
(co-authors: Nancy Lee, Terry Rolfe)

**WASHINGTON STATE SECTION OF AWRA PHOTO CONTEST**

This year's photo contest will be conducted in conjunction with AWRA's Annual Water Resources Conference being held in Seattle November 9-12, 2009. Photos were submitted and will be judged in the following categories:

- **The American West and Water**
- **Humans and Water (includes infrastructure)**
- **Wildlife and Water**

Recognition will be given for the top three overall winners and the best in each category. The five best photos in each category will be displayed during the Conference at the Washington State Section booth. Conference participants will choose the top three photos in each category. Voting ends at 3:30 p.m., Tuesday, November 10. Winners will be announced Wednesday at the AWRA Awards Luncheon.

**GRAND PRIZE – PHOTO DISPLAYED ON THE COVER OF A FUTURE ISSUE OF JAWRA**  
**FIRST PRIZE IN EACH CATEGORY – \$100**

## **STUDENT CAREER PROGRAM**

**MONDAY • NOVEMBER 9 • 4:30 P.M. TO 5:00 P.M.**

**MEET IN FRONT OF EMERALD BALLROOM I**

### **STUDENT ATTENDEE CONFERENCE ORIENTATION**

**MODERATOR ~ GARRETT WALLACE**

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

This conference session is open to students and other first-time professional conference attendees. The goal of the session is to teach students how to “design” their own conference experience and learn proper networking techniques that will offer the opportunity to experience all that the AWRA National Conference has to offer. Additionally, each session attendee will be asked to spend a moment or two and describe what expectations each has from the conference and the moderator will assist in realizing these expectations.

**WEDNESDAY • NOVEMBER 11 • 5:30 P.M. TO 7:30 P.M. • EMERALD BALLROOM I**

### **STUDENT CAREER NIGHT AND SPEED NETWORKING**

**SPONSORED BY THE BIOENGINEERING GROUP • SALEM, MASSACHUSETTS**

**MODERATOR ~ JANE ROWAN • THE BIOENGINEERING GROUP • NEWTOWN SQUARE • PENNSYLVANIA**

#### **PANEL**

**JACQUELINE KLUG • Watershed Lead, Washington Department of Ecology • Bellevue, Washington**

**TYLER JANTZEN • Staff Engineer, CH2M Hill • Bellevue, Washington**

**CLEVE STEWARD • Senior Fisheries Scientist, AMEC Earth & Environmental, Inc. and  
Executive Director, Sustainable Fisheries Foundation • Snohomish, Washington**

**MICHAEL CAMPANA • Professor, Oregon State University • Corvallis, Oregon**

**JOE MENTOR • Attorney & Principal, Mentor Law Group, PLLC • Seattle, Washington**

**STEVE HIRSCHY • Regional Water Policy Analyst, King County Dept. of Natural Resources & Parks • Seattle, Washington**

An opportunity such as this comes once in a lifetime! The Student Career Night will begin with a short presentation of success stories from a panel of professionals 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 (non-profit 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. Students will learn about what experiences and opportunities are available in various water resources occupations and will learn how water, as a career, is evolving.

Following the panel presentation, this session will host an inaugural “Speed Networking” session that will allow students to quickly meet and network with a variety of professionals from the water resources discipline. Students will be paired with a professional member and will have 2-3 minutes to meet each other and to talk about their interests, professional aspirations, and career goals. Unlike “Speed Dating,” the objective of Speed Networking is to expand one’s professional network, so as to maximize one’s ability to refer colleagues to each other. Students will receive practical experience in meeting and talking with water resources professionals from a variety of fields, and will have the chance to exchange business cards. Students will be rotated every 2-3 minutes until they have had the opportunity to meet 20 or more professional members! Following the Speed Networking session, a 30 minute closing social will allow students and professional members to further develop their new connections. A “night on the town” for students will be led by the University of Washington AWRA Student Chapter after the career night, with the fun commencing at the nearby Pike Brewing Company Pub. Both events are free to student AWRA Conference attendees, with the exception of the “night on the town” (you are responsible for your expenditures at that point).

## **SPECIAL EVENTS**

**MONDAY • NOVEMBER 9 • 5:00 P.M. TO 6:30 P.M. • EMERALD BALLROOM I**

### **OPENING NETWORKING RECEPTION**

**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 questions about their presentations. Additional tickets for accompanying guests may be purchased on site at the AWRA Registration Desk. **The cost for each additional ticket is \$30.00.**

**TUESDAY • NOVEMBER 10 • 6:30 A.M. TO 8:00 A.M.**

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

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

All pre-registered participants are welcome to join us for a beautiful, casual 5K Fun Run led by Pete Sturtevant, CH2M Hill, Bellevue, Washington! The run will follow a course that will take in sights near the hotel. After the race, visit awhile and enjoy refreshments. There is no charge for this event but please sign up prior to the conference using the Conference Registration Form. (Please meet in hotel lobby at 6:25 a.m.)

**TUESDAY • NOVEMBER 10 • 6:00 P.M. TO 10:00 P.M.**

**SEATTLE AQUARIUM**

**HOSTED AND SPONSORED BY THE AWRA WASHINGTON STATE SECTION**

Come down to Seattle's colorful waterfront and join us Tuesday night for an unforgettable evening at one of Seattle's most entertaining attractions: the Seattle Aquarium, perched over Elliott Bay on Seattle's beautiful downtown waterfront. You will gain access to the entire facility, delicious hors d'oeuvres and plenty of friendly banter with your colleagues and friends. The Aquarium offers a sea chest of wonderful experiences: • **see** playful otters, sensuous octopus, flashy fish, and other amazing sea creatures in award-winning natural exhibits; • **touch** live sea stars, urchins and more in the "Life on the Edge" exhibit, where you can feel the surge of Washington's wild outer coast and the calm majesty of her inland seas; • **explore** the wonders of the Pacific Northwest's marine ecosystem with the 120,000 gallon "Window on Washington Waters" exhibit, and go nose to nose with the colorful inhabitants of a tropical Pacific coral reef; and • **stand** in the center of a giant suspended aquarium while exotic fish and other denizens of the deep swim around you. As a special treat, there will be an otter feeding at 8 p.m., a real high point with all visitors to the Aquarium. Join us and your colleagues for a fun-filled evening spent "at sea." More information on the Seattle Aquarium can be found at: <http://www.seattleaquarium.org>. **The cost of this event is \$50 and tickets may be purchased at the AWRA Registration Desk.** (Please meet in hotel lobby promptly at 5:45 p.m.)

**WEDNESDAY • SEPTEMBER 11 • 12:00 NOON TO 1:15 P.M. • EMERALD BALLROOM I**

**AWRA AWARDS LUNCHEON**

**SPONSORED BY BLACK & VEATCH ~ OFFICES WORLDWIDE**

**GUEST SPEAKER ~ COL. ANTHONY WRIGHT**

**District Commander, USACE • Seattle, Washington**

**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, Col. Anthony Wright. Col. Wright's presentation is "Reducing the Risk of Flooding Below Howard Hanson Dam." 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.** (Note: If you are a vegetarian, ask your server for a vegetarian meal.)

**WEDNESDAY • SEPTEMBER 11 • 5:30 P.M. TO 9:00 P.M.**

**CONFERENCE FIELD TRIP ~ FERRY EXCURSION ON PUGET SOUND**

The Washington State Ferry System offers a number of walk-on ferry rides on Puget Sound. Your guide for this popular activity will be Pete Sturtevant, Conference Planning Committee Member of CH2M Hill, who will accompany you on one of the loveliest rides – the Seattle-to-Bremerton Ferry. This route leaves from downtown Seattle, crossing Seattle's busy Elliott Bay and the central portion of Puget Sound. The ferry passes through scenic Rich and Sinclair Inlets before docking at Bremerton. Returning aboard the same ferry, this 2+-hour roundtrip boat ride provides a great opportunity to relax and chat with other conference attendees. Aboard the ferry, on the way across to Bremerton, we'll have an informal discussion about the origins of Puget Sound (carved by glaciers a mile thick), our local population of Orca whales and the present-day challenges of maintaining water quality and migrating salmon populations in the face of large population increases. The trip will culminate with an incomparable view of downtown Seattle at nighttime, as the ferry docks a final time. You get all this for the cost of a \$10 round-trip ferry ticket (purchased before boarding the ferry). You'll arrive back in downtown Seattle around 9:00 p.m. and still have time to explore the city's nightlife (if you so choose). Meet at 5:30 p.m. in the Red Lion Lobby. We will walk a bit less than one mile to the ferry terminal.

**GENERAL CONFERENCE INFORMATION**

**REFUNDS** – Cancellations must have been received in writing at the AWRA Headquarters by Monday, October 19, 2009. No refunds will be issued after October 19, 2009. All cancellations received prior to October 19, 2009, are subject to an administrative fee of 25% of the total registration fees. No refunds will be given for ticketed events purchased after October 19, 2009.

**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.

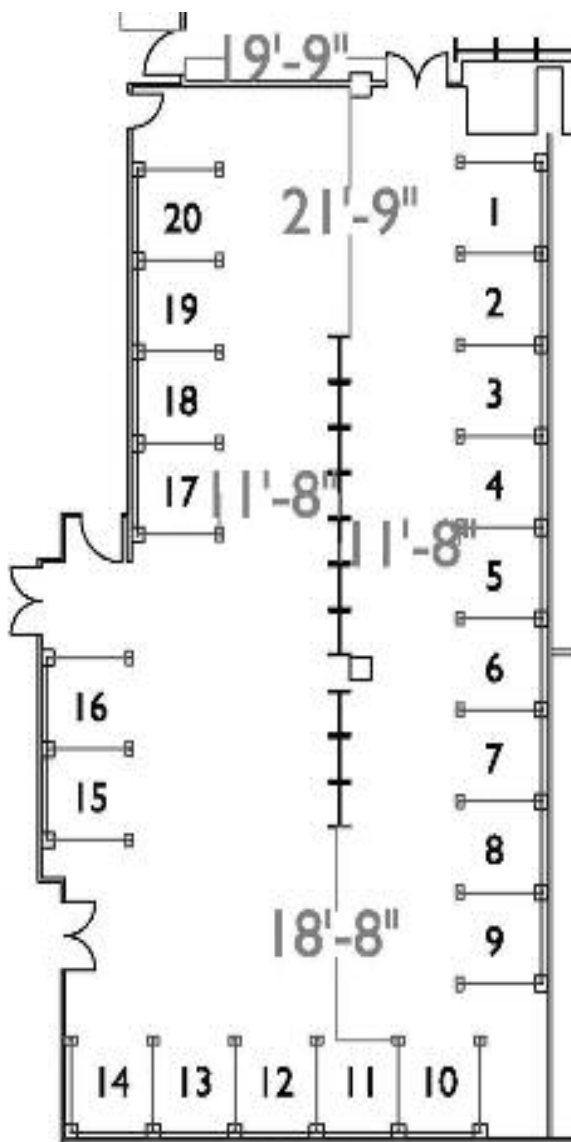
**SESSION PARTICIPANTS** – Authors, panelists, and moderators are requested to meet in their respective meeting rooms 10 minutes prior to the start of their session. All participants are required to register PRIOR to their sessions.

**SPEAKERS' PREPARATION ROOM** – The Vashon Room will be available for presenters to review their presentations during the conference. The room will be open on **Monday, November 9**, from 9:00 a.m. to 8:00 p.m.; on **Tuesday, November 10**, from 7:00 a.m. to 8:00 p.m.; on **Wednesday, November 11**, from 7:00 a.m. to 5:00 p.m.; and on **Thursday, November 12**, from 7:00 a.m. to 3:30 p.m.

## COMMERCIAL & EDUCATIONAL EXHIBITORS

The following organizations will be exhibiting in the Emerald I Ballroom during the conference.  
Please be sure to visit them during exhibit hours:

**Monday, November 9:** 8:00 a.m. to 3:30 p.m.  
& 5:00 p.m. to 6:30 p.m.  
**Tuesday, November 10:** 8:00 a.m. to 3:30 p.m.



**EMERALD BALLROOM I**

- |   |   |
|---|---|
| <b>AECOM</b><br>Houston, TX<br>Booth 20                               | <b>North Jackson Company</b><br>Corvallis, Or<br>Booth 13         |
| <b>AMEC Earth &amp; Environmental, Inc.</b><br>Bothell, WA<br>Booth 2 | <b>Sequoia Scientific, Inc.</b><br>Bellevue, WA<br>Booth 7        |
| <b>Aquatic Informatics</b><br>Vancouver, BC, Canada<br>Booth 12       | <b>Stevens Water Monitoring, Inc.</b><br>Portland, OR<br>Booth 17 |
| <b>Campbell Scientific</b><br>Logan, UT<br>Booth 5                    | <b>Sutron Corporation</b><br>Sterling, VA<br>Booth 15             |
| <b>FTS</b><br>Victoria, BC, Canada<br>Booth 14                        | <b>AWRA Washington State Section</b><br>Seattle, WA<br>Booth 11   |
| <b>GeoEngineers, Inc.</b><br>Seattle, WA<br>Booth 18                  | <b>WEST Consultants</b><br>Bellevue, WA<br>Booth 8                |
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| <b>In-Situ</b><br>Fort Collins, CO<br>Booth 6                         | <b>YSI, Inc.</b><br>Yellow Springs, OH<br>Booth 19                |
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## FIRE EMERGENCY INFORMATION ~ PREPAREDNESS IN HOTELS

**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.

## FLU PREVENTION

### TAKE THESE EVERYDAY STEPS TO PROTECT YOUR HEALTH

- Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in the trash after you use it.
- Wash your hands often with soap and water. If soap and water are not available, use an alcohol-based hand rub.
- Avoid touching your eyes, nose, or mouth. Germs spread this way.
- Try to avoid close contact with sick people.
- If you are sick with flu-like illness, CDC recommends that you stay home for at least 24 hours after your fever is gone except to get medical care or for other necessities. (Your fever should be gone without the use of a fever-reducing medicine.) Keep away from others as much as possible to keep from making others sick.

### HOW DO I KNOW IF I HAVE THE FLU?

You may have the flu if you have some or all of these symptoms:

- fever (it's important to note that not everyone with the flu will have a fever)
- cough
- sore throat
- runny or stuffy nose
- body aches
- headache
- chills
- fatigue
- sometimes diarrhea and vomiting

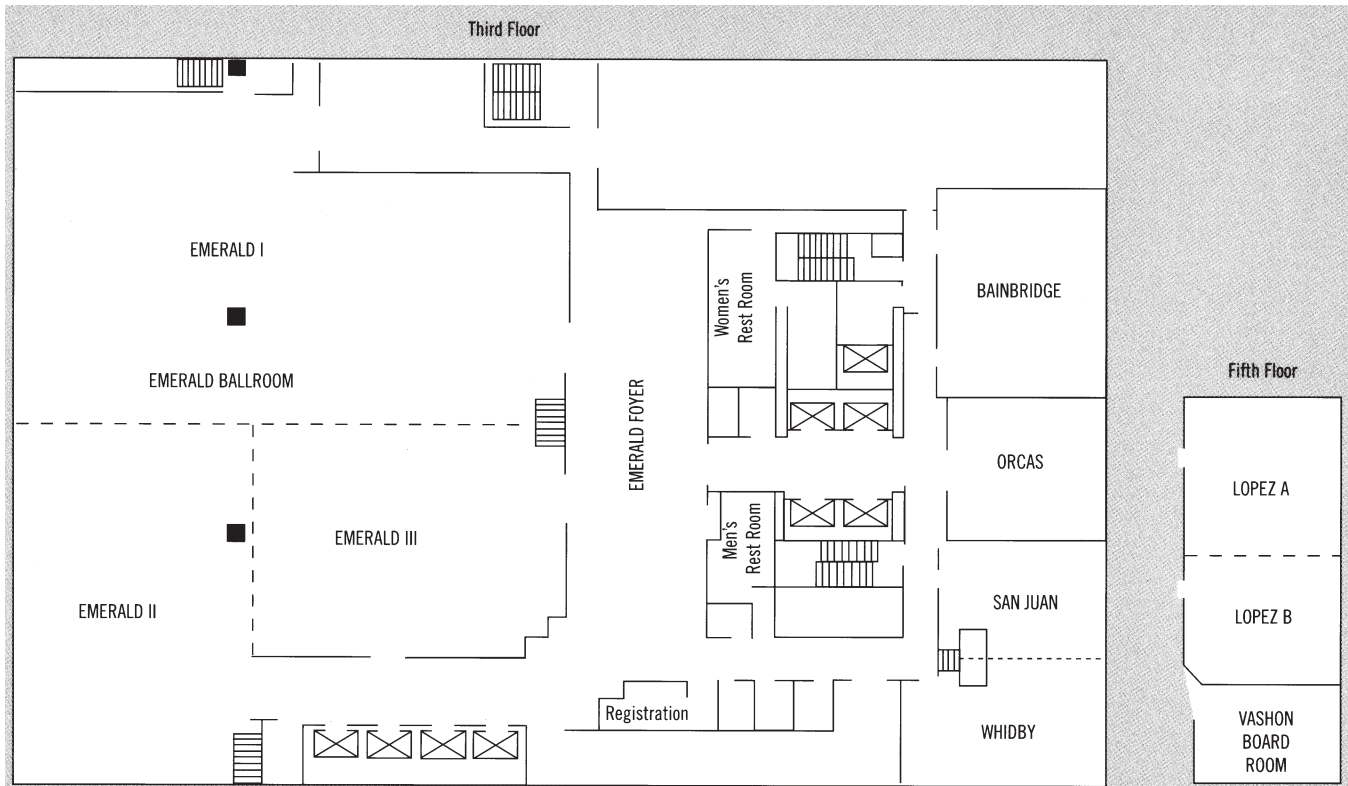
### WHAT ARE THE EMERGENCY WARNING SIGNS?

- difficulty breathing or shortness of breath
- pain or pressure in the chest or abdomen
- sudden dizziness
- confusion
- severe or persistent vomiting

### WHAT SHOULD I DO IF I GET SICK?

If you get sick with flu-like symptoms this flu season, you should stay home and avoid contact with other people except to get medical care. Most people with 2009 H1N1 have had mild illness and have not needed medical care or antiviral drugs and the same is true of seasonal flu. If you are already at the hotel, please call the Hotel's Physician for assistance. You might also want to contact someone you know who is attending the conference and let them know you are ill. Also contact one of the AWRA Conference organizers (Ken Reid, Mike Kowalski, Cleve Steward, or Alan Black), to let them know. (Leave a message at their hotel room or email [ken@awra.org](mailto:ken@awra.org), [mike@awra.org](mailto:mike@awra.org), [cleve.steward@amec.com](mailto:cleve.steward@amec.com)), or [ablack@hntb.com](mailto:ablack@hntb.com).)

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**RED LION HOTEL ON FIFTH AVENUE**  
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Located on Fifth Avenue between Pike and Union Streets, downtown Seattle's most popular attractions are right outside the door ... Pike Place Market, the Space Needle, Seattle Art Museum, Pioneer Square, Benaroya Symphony Hall, and Nordstrom's flagship store.

The Terrace Garden Restaurant & Lounge offers the best in northwest cuisine and boasts Seattle's largest outdoor patio. The Elephant Castle Restaurant is downtown Seattle's only authentic English pub.



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