Final Program

2015 UCOWR/NIWR/CUAHSI Annual Conference

Water is Not for Gambling: Utilizing Science to Reduce Uncertainty



June 16-18, 2015
Green Valley Ranch Resort
Henderson, NV

Universities Council On Water Resources

NIWR
THE NATIONAL INSTITUTES FOR WATER RESOURCES

CUAHSI
UNIVERSITIES ALLIED FOR WATER RESEARCH

Thank you to our partners!

Co-sponsors

national ground water association®

The Brookings Institution

Groundwater Resources Association of California

SIU Southern Illinois University Carbondale

Universities WASH Network

Arizona Hydrological Society

Nevada Water Resources Association

iah aih

UNLV

AWRA
Community, Conversation, Connections

DRI
Desert Research Institute

Exhibitors

Visit their booths in Estancia F

Gold

SOUTHERN NEVADA WATER AUTHORITY

Silver



The Ivanhoe Foundation

Bronze

USGS
science for a changing world

EPSCoR
iUTAH

Welcome from UCOWR president, David Kreamer

I would like to extend a warm welcome (perhaps even hot in Las Vegas in June) to all participants in the 2015 Annual Conference of the Universities Council on Water Resources, the National Institutes for Water Resources, and the Consortium of Universities for the Advancement of Hydrologic Science, Incorporated. It is my hope that you have an excellent, entertaining, and productive experience at this conference, and find some time to enjoy the many varied sights and sounds that Las Vegas has to offer. Thanks for your participation in what is anticipated to be a fine conference.

At UCOWR, we begin our second half century of providing an interdisciplinary forum for both national and international water issues through our conferences, our journal, and many other activities and collaborations. We are grateful to have the participation of many delegates and Board members, and in particular for this conference, the joint sponsorship by NIWR and CUAHSI, the welcome co-sponsorship of many organizations, and support of generous donors. If you have not been involved in UCOWR, NIWR, or CUAHSI in the past, we invite you to participate in our many future activities.

Lastly, I hope you have time to visit the many things that makes Las Vegas a special place. Please travel with us to explore Hoover Dam, Lake Mead and the Colorado River. Las Vegas is closer to more major National Parks than any major city, and we have mountains outside of town that rise up to almost 12,000 feet above sea level. The city is home to excellent and nearby outdoor activities such as mountain biking, skiing and snowboarding (but not this time of year!), hiking, boating, water skiing, rock climbing, zip-lining, and fishing. And of course there are the shows and entertainment that make Las Vegas famous.



Thank you to all the participants, to the fine plenary speakers, and to all who made this meeting possible including: the Organizing Committee, Technical Program Review Committee, and particularly to Karl Williard, Melissa Pind, Jackie Crim and the rest of the UCOWR staff for their hard work!

Universities Council on Water Resources

Universities Council on Water Resources (UCOWR) is an organization of universities, non-academic institutions, and international affiliates leading in water resources education, research, and public service. UCOWR institutional members and delegates are at the forefront of water resources related research and education. In addition to our annual national conference, UCOWR publishes *The Journal of Contemporary Water Research and Education*. For more information, please visit www.ucowr.org.

The National Institutes for Water Resources

The National Institutes for Water Resources (NIWR) is comprised of the 54 university-based centers that were established by the Federal Water Resources Research Act. It is charged with arranging for research that addresses water problems or expands understanding of water and water-related phenomena, aiding the entry of new professionals into the water resources fields, helping to train future water scientists and engineers, and transmitting research results to water managers and the public. For more information about NIWR, visit: www.niwr.net.

CUAHSI
universities allied for water research

The Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) is a global consortium of universities and research institutes dedicated to the interdisciplinary study of water in the natural and human environment. CUAHSI operates the Water Data Center for data publication, sharing and discovery, provides instrumentation services through affiliated partners, and hosts training classes aimed at graduate students and professionals. CUAHSI also pilots a number of activities, including support of community models and various education services. More information on CUAHSI services is available at http://www.cuahsi.org.

Special Events

Monday, June 15

Early Registration
3:00 pm - 6:00 pm
Estancia Foyer

Tuesday, June 16

UCOWR Delegate Business Luncheon (see pg. 22)
11:35 pm - 12:45 pm
Estancia D
**Must be pre-registered.
Bring your ticket with you.**

Welcome Reception & Poster Session
5:45 pm - 7:30 pm
Estancia E/F
Hors d'oeuvres and cash bar

Wednesday, June 17

Awards Banquet (see pg. 22)
6:00 pm
La Sirena I (Lobby Level)
**Must be pre-registered.
Bring your ticket with you.**

Thursday, June 18

Hoover Dam Field Trip
1:30 pm
Meet in Estancia foyer
Must be pre-registered. Bring your ticket with you. Check the registration table to see if tickets are still available. Transportation provided.

Tuesday, June 16

Registration 7:30 am - 5:30 pm (Estancia Foyer)

Breakfast 7:30 am *(Estancia E/F)*

Concurrent Technical Sessions
8:30 am - 10:00 am
Agriculture & Water Resources I *(Estancia A)*
Education I *(Estancia B)*
Engineering & Sustainable Water Mgmt. *(Estancia C)*
Colorado River I - Panel Discussion *(Estancia D)*

Break 10:00 am - 10:15 am *(Estancia E/F)*

Plenary Session I
10:15 am - 11:35 am *(Estancia G)*
Welcome by Vinny Spotleson, Southern NV Energy & Public Lands Manager, on behalf of Senator Harry Reid
Terry Fulp, U.S. Bureau of Reclamation
Pat Mulroy, Brookings Institute

Lunch 11:35 pm - 12:45 pm
UCOWR Delegate Business Luncheon *(Estancia D)*
All others - lunch on your own

Concurrent Technical Sessions
1:00 pm - 2:30 pm
Agriculture & Water Resources II *(Estancia A)*
Education II *(Estancia B)*
Modeling *(Estancia C)*
Colorado River II *(Estancia D)*

Break 2:30 pm - 2:45 pm *(Estancia E/F)*

Plenary Session II - Energy & Water
2:45 pm - 4:00 pm *(Estancia G)*
Ayn Schmit, U.S. EPA, Region 8
William Alley, National Ground Water Association
Mike Wireman, U.S. EPA - retired
Mike Hightower, Sandia National Laboratories

Break 4:00 pm - 4:10 pm *(Estancia E/F)*

Concurrent Technical Sessions
4:10 pm - 5:40 pm
Agriculture & Water Resources III *(Estancia A)*
Education III *(Estancia B)*
Integrated Water Resources Mgmt. (IWRM) - Panel Discussion *(Estancia C)*
Energy & Water *(Estancia D)*

Welcome Reception & Poster Session
5:45 pm - 7:30 pm *(Estancia E/F)*

Wednesday, June 17

Registration 7:30 AM - 5:30 PM (Estancia Foyer)

Breakfast 7:30 AM *(Estancia E/F)*

Plenary Session III - Climate Change
8:30 AM - 9:40 AM *(Estancia G)*
Mark Williams, University of Colorado
Larry Stevens, Springs Stewardship Institute

Break 9:45 AM - 10:00 AM *(Estancia E/F)*

Concurrent Technical Sessions
10:00 AM - 11:30 AM
Science & Decision Making I *(Estancia A)*
Springs/Western Water Law *(Estancia B)*
Water, Health, & Sanitation for International Communities I *(Estancia C)*
Climate Change I *(Estancia D)*

Lunch 11:30 AM - 1:00 PM
On your own

Plenary Session IV
1:00 PM - 2:10 PM *(Estancia G)*
Braimah Apambire, Desert Research Institute
Jeff Brideau, Institute for Water Resources, USACE

Concurrent Technical Sessions
2:15 PM - 3:45 PM
Science & Decision Making II *(Estancia A)*
Ecosystems *(Estancia B)*
Water, Health, & Sanitation for International Communities II *(Estancia C)*
Climate Change II *(Estancia D)*

Break 3:45 PM - 4:00 PM *(Estancia E/F)*

Concurrent Technical Sessions
4:00 PM - 5:30 PM
Human Dimensions of Watershed Mgmt. *(Estancia A)*
Water Quality *(Estancia B)*
Water Data *(Estancia C)*
Groundwater *(Estancia D)*

Awards Banquet
6:00 PM *(La Sirena I - lobby level)*

Thursday, June 18

Registration 7:30 AM - 11:00 AM (Estancia Foyer)

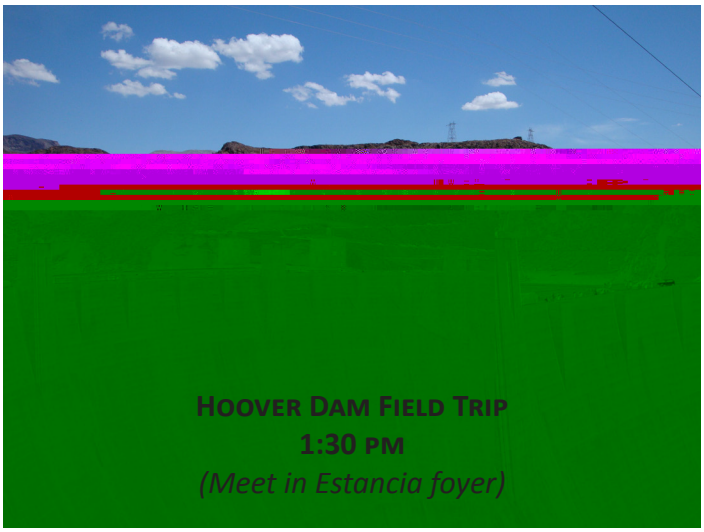
Breakfast 7:30 AM *(Estancia E/F)*

Plenary Session V
8:30 AM - 9:40 AM *(Estancia G)*
Zane Marshall, Southern Nevada Water Authority
Gary Woodard, Montgomery & Associates / University of Arizona

Break 9:45 AM - 10:00 AM *(Estancia E/F)*

Concurrent Technical Sessions
10:00 AM - 11:30 AM
Biological Water Quality *(Estancia A)*
Water Economics *(Estancia B)*
Reservoirs & Flood Control *(Estancia C)*
Urban Water Management & Green Infrastructure *(Estancia D)*

Lunch 11:30 AM - 1:00 PM
On your own



Tuesday, June 16

8:30 AM - 10:00 AM
Concurrent Technical Sessions

*Student presenter in oral presentation competition

Session 1 — **Agriculture and Water Resources I** — **Estancia A**

Moderator - Doug Parker, California Institute for Water Resources, University of California

8:30 AM **Covered agriculture for coping with climate and water availability uncertainty: A broad-brush assessment** C. Robert Taylor, Auburn University (co-authors: R. Rodriguez-Kabana, R. Lacewell)

8:50 AM **The impact of the feed grains industry in the Southern Ogallala Region** - Bridget Guerrero, West Texas A&M University (co-authors: S. Amosson, H. Graham)

9:10 AM **Optimal regional regulation of animal waste** - Doug Parker, California Institute for Water Resources, University of California (co-authors: A. Iho (1st author), D. Zilberman)

9:30 AM **The Central Arizona Groundwater Replenishment District/Yuma Mesa Irrigation and Drainage District Pilot Rotational Fallowing Program** - Perri Benemelis, Central Arizona Groundwater Replenishment District

Session 2 — **Education I** — **Estancia B**

Moderator - Natalie Carroll, Purdue University

8:30 AM **The Center for Great Lakes Literacy: Promoting informed community engagement in Great Lakes issues** - Marti Martz, Pennsylvania Sea Grant

8:50 AM **Lawn to Lake** - Adrienne Gulley, Illinois-Indiana Sea Grant College Program

9:10 AM **Protecting water resources through education and outreach about pharmaceuticals, personal care products, and other emerging contaminants** - Laura Kammin, Illinois-Indiana Sea Grant College Program

9:30 AM **Purdue Rainscaping Education Program** - Kara Salazar, Purdue University (co-author: J. Orick)

Session 3 — **Engineering and Sustainable Water Management** — **Estancia C**

Moderator - Anish Jantrania, Texas A&M University

8:30 AM **The need for a sustainable water infrastructure planning and engagement system (SWIPES)** - Anish Jantrania, Texas A&M University (co-author: J. Wolfe)

8:50 AM **Photovoltaic-powered wastewater electrolysis cell as a sustainable sanitation technology for developing countries** Kangwoo Cho, Korea Institute of Science and Technology (co-author M. Hoffmann)

9:10 AM ***Evaluating sustainability tradeoffs of integrated urban water resources management alternatives** - Erfan Goharian, University of Utah (co-authors: S.J. Burian, T. Bardsley, C. Strong, J. Niermeyer, T. Kirkham, L. Briefer)

Session 4 — **Colorado River I - Panel Discussion** — **Estancia D**

Moderator - Jason Thiriot, Colorado River Commission of Nevada

8:30 AM **"All In" Together: The role and influence of environmental programs in Colorado River water management and resource conservation**

Jason Thiriot, Colorado River Commission of Nevada

John Swett, Lower Colorado River Multi-Species Conservation Program - Bureau of Reclamation, Lower Colorado Region

Sharon Whitmore, San Juan River Recovery Implementation Program - U.S. Fish and Wildlife Service

Thomas Czapla, Upper Colorado River Endangered Fish Recovery Program - U.S. Fish and Wildlife Service

Beverley Heffernan, Adaptive Management Group - Bureau of Reclamation, Upper Colorado Region

Scott VanderKooi, Grand Canyon Monitoring and Research Center - U.S. Geological Survey

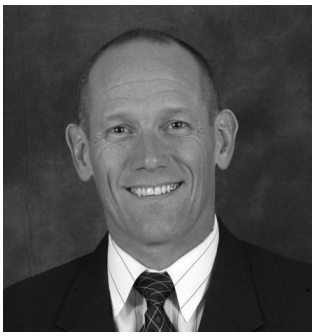
10:00 AM - 10:15 AM
Break, Estancia E/F

10:15 am - 11:35 am
Plenary Session I
Estancia G

Moderator - Sharon Megdal, University of Arizona



Welcome from **Senator Harry Reid**, the Democratic Leader in the U.S. Senate and the senior Senator from Nevada. Born in the small rural mining town of Searchlight, Harry Reid graduated from Utah State University in 1961 and went on to receive a law degree from George Washington University. After completing law school, Harry served as the City Attorney in Henderson, and then as an assemblyman in the Nevada State Assembly in 1968, at age 28. In 1970, he became the youngest Lieutenant Governor in Nevada history, and was later appointed Chairman of the Nevada Gaming Commission, where for five years he fought to clean up Nevada's gaming industry. Harry Reid served two terms in the United States House of Representatives and was elected to the U.S. Senate in 1986. He has served as the chairman or senior Democratic member on several important committees and subcommittees, advocating for important issues like quality affordable health care, protecting Social Security, building a clean energy future and ensuring the readiness of our military. Senator Reid and his wife Landra have five children and are the proud grandparents of 16 grandchildren.



Dr. Terrance (Terry) Fulp is Regional Director of the Bureau of Reclamation's Lower Colorado Region. Working closely with federal and state agencies, Native American tribes, and stakeholders throughout the region, he is responsible for programs including water delivery, contracting and accounting, and providing clean, renewable hydropower to the southwest. Terry also oversees the Lower Colorado River Multi-Species Conservation Program - a multi-agency effort funded by Reclamation and 56 other public and private partners working to protect and maintain ecosystem habitat and toward recovering populations of endangered species along the lower Colorado River. He was promoted from Deputy Regional Director to Regional Director in September of 2012. Serving previously in the region as Boulder Canyon Operations Office Chief, Terry ensured implementation of the water contracts in Arizona, California, Nevada and the annual delivery to Mexico. While leading the water operations office, Terry collaborated with stakeholders in the seven Colorado River Basin states in 2007 to develop and administer the operational guidelines for surplus and shortage conditions for Lake Powell and Lake Mead through 2026. He also had a hand in initiating the tremendous effort culminating in the Colorado River Basin Water Supply and Demand Study released in 2012. On the international stage, Terry played a key role in the negotiations and implementation of the 2012 signing of Minute 319 to the 1944 Treaty with Mexico that included historic steps in international cooperation in managing the Colorado River. Terry holds a Ph.D. in Mathematical and Computer Sciences from the Colorado School of Mines; a Masters degree in Civil Engineering from the University of Colorado; a Masters in Geophysics from Stanford University, and a B.S. in Earth Sciences from the University of Tulsa.



Pat Mulroy serves as a Senior Fellow for Climate Adaptation and Environmental Policy and also as a Practitioner in Residence for the Saltman Center for Conflict Resolution at the UNLV William S. Boyd School of Law. She also holds a faculty position at the Desert Research Institute, where she serves as the Maki Distinguished Faculty Associate. Between 1989 and early 2014, Pat Mulroy served as General Manager of both the Las Vegas Valley Water District and the Southern Nevada Water Authority (SNWA). Mulroy was a principal architect of the SNWA, helping to guide Southern Nevada through one of the worst droughts in the history of the Colorado River. At UNLV's Boyd School of Law and DRI, Mulroy's focus is on helping communities in water-stressed areas throughout both the American Southwest and the world develop strategies to address increased water resource volatility and identify solutions that balance the needs of all stakeholders.

11:35 am - 12:45 pm
UCOWR Delegate Business Luncheon, Estancia D
Must be pre-registered & bring ticket.
All others - lunch on your own
See page 26 for restaurants within walking distance.

Tuesday, June 16

1:00 PM - 2:30 PM
Concurrent Technical Sessions

*Student presenter in oral presentation competition

Session 5 — **Agriculture and Water Resources II** — **Estancia A**

Moderator - Karl W.J. Williard, Southern Illinois University

1:00 PM ***The effect of topographic position on soil properties and erosion within agricultural fields in central Illinois** Andrew Mellinger, Southern Illinois University (co-authors: J.E. Schoonover, J. Groninger, R. Cook)

1:20 PM **Indicators of soil quality in forest buffers and row-crop agriculture: Restoration of riparian function** - Karl W.J. Williard, Southern Illinois University (co-authors: N. Rahe, J.E. Schoonover)

1:40 PM ***Bio-economic farm-level analysis of growing Brassica as a biodiesel crop in the west side of the San Joaquin Valley of California** - Lucia Levers, University of California, Riverside (co-author: K. Schwabe)

2:00 PM **Drivers of the reduction in agricultural wetland loss rates in the United States 1955-2009** - Christopher Lant, Utah State University (co-author: R. Wiebusch)

Session 6 — **Education II** — **Estancia B**

Moderator - Kerry Schwartz, Water Resources Research Center at the University of Arizona

1:00 PM **Pushing the refresh button: How Project WET is innovating through expanded content, new partners and enhanced delivery strategies** - Dennis Nelson, Project Water Education for Teachers (WET) Foundation

1:20 PM **Educating today; innovative solutions tomorrow** - Kerry Schwartz, Water Resources Research Center at the University of Arizona

1:40 PM **Developing soil & water science curriculum for informal youth education** - Natalie Carroll, Purdue University

2:00 PM **One World One Water Center for Urban Water Education and Stewardship** - Sandra Haynes, Metropolitan State University of Denver (co-author: T. Cech)

2:20 PM **Developing and integrating a four-legged water curriculum in architecture education in Arid Regions** - Omar Youssef, University of Arizona (co-author: N. Chalfoun (1st author))

Session 7 — **Modeling** — **Estancia C**

Moderator - Gary Woodard, Montgomery & Associates / University of Arizona

1:00 PM ***Quantifying the uncertainty of precipitation partitioning from soil to trees to the atmosphere: An application of Bayesian hierarchical modeling** - Heather Speckman, University of Wyoming (co-authors: D. Beverly, K. Hyde, B. Ewers)

1:20 PM ***Estimating uncertainties in streamflow forecasts using a Bayesian multi-model and multi-product approach** - Tirthankar Roy, The University of Arizona (co-authors: A. Serrat-Capdevila, H. Gupta, J. Valdes)

1:40 PM ***Simulating the uncertainty in surface water and ocean topography (SWOT) observations of global reservoirs** - Kurt C. Solander, University of California, Irvine (co-authors: J. Famiglietti, J.T. Reager, C.H. David, K. Andreadis)

2:00 PM ***Soil and Water Assessment Tool (SWAT) applicability in mountainous watershed on nutrients loadings' prediction in Lower Bear Malad Watershed, Utah** - Ali Salha, Utah State University (co-author: D. Stevens)

Session 8 — **Colorado River II** — **Estancia D**

Moderator - Sonja Kokos, Lower Colorado River Multi-Species Conservation Program

1:00 PM ***Creating a virtual water complement to the Colorado River Basin: How is the Colorado River actually shared among the seven basin states?** - Richard Rushforth, Arizona State University (co-author: B. Ruddell)

1:20 PM **Using conceptual ecological models as a framework to guide decision making for the LCR MSCP** - Sonja Kokos, Lower Colorado River Multi-Species Conservation Program (co-authors: R.S. Unnasch, D.P. Braun, C.J.W. McClure)

1:40 PM ***Vegetation canopy cover effects on sediment and salinity loading in the Upper Colorado River Basin and policy implications, Price and Ferron, Utah** - Erik Cadaret, Desert Research Institute - Division of Earth and Ecosystem Sciences (co-authors: K. McGwire, R. Blank, L. Saito, M. Weltz)

2:30 PM - 2:45 PM
Break, Estancia E/F
Light refreshments available.

2:45 pm - 4:00 pm
Plenary Session II - Energy & Water
Estancia G

Moderator - Mike Wireman, USEPA - retired

Managing potential water resource impacts from oil and gas development activities



Ayn Schmit is a Water Policy Advisor for the Ecosystem Protection & Remediation Office in EPA's Denver Office, focusing on the relationship between energy development and water resources. Ayn has managed surface water and groundwater quality programs for EPA for 15 years, and has been with the EPA for 30 years serving in two Western regional offices and in various waste and water programs. Ayn has a B.S. in environmental science and a B.A. in community studies from the University of California.

Groundwater quality and shale gas development



Dr. William M. Alley is Director of Science and Technology for the National Ground Water Association (NGWA). Prior to this position, he served as Chief, Office of Groundwater for the U.S. Geological Survey (USGS) for almost two decades. Dr. Alley has published over 90 scientific publications and received several awards for his work, including the USGS Shoemaker Award for Lifetime Achievement in Communication and the Meritorious Presidential Rank Award. He holds a B.S. in Geological Engineering from the Colorado School of Mines, an M.S. in Hydrogeology from Stanford University, and a Ph.D. in Geography and Environmental Engineering from the Johns Hopkins University.

Hydrogeologic and regulatory issues related to in-situ recovery of Uranium



Mike Wireman recently retired from the US EPA where he served as a National Ground Water Expert. In this position he provided scientific support to Federal and State ground water management programs. He has extensive experience in hydrogeology of hardrock mines, mountain watersheds, DNAPL sites, nutrients in ground water, ground-water monitoring, ground-water vulnerability assessment, and source-water protection. His has worked closely with policy makers, decision makers and attorneys. He has taught classes for the National Ground Water Association, the Geological Society of America and workshops in Eastern Europe and the Middle East. He serves as an advisor to the World Bank with significant international experience in Eastern Europe, the Middle East and China. He has provided expert testimony in Federal and State court, State Water Quality Control Commission and State Water court. He is past-President of the USNC-IAH, serves as a Director on the Board of the Science and Engineering Division of NGWA and is a Board member of the GWPC – Groundwater Research & Education Foundation.

Energy water nexus and implications on energy extraction and mining



Mike Hightower is a Distinguished Member of the Technical Staff in the Military and Energy Systems Analysis Department at Sandia National Laboratories in Albuquerque, New Mexico. He is a civil and environmental engineer with over 35 years of experience in research and development projects. His current efforts include research and evaluation of innovative environmental and energy technologies and the security and protection of critical water and energy infrastructures. He conducts research on the use of distributed and renewable energy technologies and distributed water and waste water systems to enhance sustainable economic development, global public health, and infrastructure resiliency and security. Since 2006, he has supported the US Department of Energy in developing a science and technology program for addressing energy and water interdependencies. Most recently he has supported the US Senate on energy water legislation considerations, authored a research program plan on energy and water for the National Science Foundation, and assisted the National Research Council in identifying key energy water challenges and needs. Mike holds BS and MS degrees in civil engineering from New Mexico State University.

4:00 pm - 4:10 pm
Break, Estancia E/F

Tuesday, June 16

4:10 PM - 5:40 PM

Concurrent Technical Sessions

*Student presenter in oral presentation competition

Session 9 — **Agriculture and Water Resources III** — **Estancia A**

Moderator - Alfonso Torres-Rua, Utah Water Research Laboratory

4:10 PM — ***The diffusion of process innovation: The case of drip irrigation in California** - Rebecca Taylor, University of California, Berkeley (co-author: D. Zilberman)

4:30 PM — ***Climate and choice of irrigation technology** - Ting Bai, University of Arizona (co-author: G. Frisvold)

4:50 PM — ***Irrigator demand for water management information** - Ting Bai, University of Arizona (co-author: G. Frisvold)

5:10 PM — **Estimation of spatial surface soil moisture by assimilation of Landsat vegetation indices and METRIC energy balance products using relevance vector machines** - Alfonso Torres-Rua, Utah Water Research Laboratory (co-authors: A. Ticlavilca, R. Bachour, M. McKee)

Session 10 — **Education III** — **Estancia B**

Moderator - Lois Wolfson, Michigan State University

4:10 PM — **Developing local watershed capacity: Essential leadership skills and effective training approaches (Part I)** Joe Bonnell, Ohio State University (co-authors: L. Wolfson, A. Lewandowski)

4:30 PM — **Developing local watershed capacity: Essential leadership skills and effective training approaches (Part II)** Lois Wolfson, Michigan State University (co-authors: J. Bonnell, A. Lewandowski)

4:50 PM — **Developing local watershed capacity: Essential leadership skills and effective training approaches (Part III)** Ann Lewandowski, University of Minnesota (co-authors: L. Wolfson, J. Bonnell)

5:10 PM — **Water runs through it: Educating the public about the food-water-energy nexus using online tools** - Robin Madel, GRACE Communications Foundation

5:30 PM — **"I'm feeling lucky": The impact of making water resources research freely available** - Andrea Wirth, Oregon State University

Session 11 — **Integrated Water Resources Management (IWRM)** — **Estancia C**

Panel Discussion

Moderator - Brian Hurd, New Mexico State University

4:10 PM — **How to reconcile benefit cost analysis and integrated water resources management**

Jonathan Yoder, Washington State University

Ari Michelsen, Texas A&M Agrilife Research and Extension Center at El Paso

Christopher Lant, Utah State University

Session 12 — **Energy & Water** — **Estancia D**

Moderator - Mark Williams, University of Colorado

4:10 PM — **What we know, what we don't know, and what we need to know about unconventional oil and gas extraction** - Mark Williams, University of Colorado

4:30 PM — **Water/land/energy nexus for unconventional energy in Texas** - Michael Young, Bureau of Economic Geology, The University of Texas at Austin (co-authors: J. Nicot, B. Scanlon, J.P. Pierre)

4:50 PM — ***Oil production and water quality: An econometric evaluation of hydraulic fracturing** - Duran A. Fiack, University of California, Santa Cruz (co-authors: C. Speir, A. Mamula, B. Haddad)

5:10 PM — **Tools for improved in-pit dewatering optimization** - Jay Dixon, Kinross-Round Mountain Gold

5:45 pm - 7:30 pm
Welcome Reception & Poster Session
Estancia E/F
Hors d'oeuvres & Cash Bar

Poster Presentations

*Student presenter in poster competition
(In alphabetical order by presenter last name, # corresponds to location in room)

1. ***Assessing the risk of cryptosporidiosis in alternative potable reuse frameworks in Las Vegas** - Erfaneh Amoueyan, University of Nevada, Las Vegas (co-author: D. Gerrity)
2. ***The influence of crystal sedimentation speed on phosphorus recovery with struvite precipitation** - Mayara Aquino, Federal University of Rio Grande do Norte and University of Nevada, Las Vegas (co-author: H. Rodrigues do Santos)
3. **Estrogen sulfate in soil-water systems: Is it a potential source of free estrogens?** - Xuelian Bai, Desert Research Institute (co-authors: F.X.M. Casey, H. Hakk)
4. ***Rewetting of artificially desiccated soils: Effect of gravity on vapor-phase diffusion** - Taylor Ball, University of Nevada, Las Vegas (co-author: M. Nicholl)
5. ***Impacts of future changes on low flow in a highly connected river-aquifer system: A case study of the Spokane River and the Spokane Valley-Rathdrum Prairie Aquifer** - Heather Baxter, Washington State University (co-authors: T. Nguyen, J. Adam, M. Barik, M. Barber, A. Hossain)
6. ***Incorporating oceanic-atmospheric climate variability to improve the reconstructions of Sacramento and San Joaquin rivers** - Saria Bukhary, University of Nevada, Las Vegas (co-authors: A. Kalra, S. Ahmad)
7. ***Detection of Antibiotic Resistant Bacteria (ARB) in the Gallinas River** - Laurel Carr, New Mexico Highlands University
8. ***Process-based modeling for a snow dominant watershed** - Chao Chen, University of Nevada, Las Vegas (co-authors: L. Fenstermaker, H. Stephen, S. Ahmad, Y. Gao)
9. **Collaborative tribal adaptation and resiliency to climate variability and change: Pyramid Lake Paiute Tribe** - Karletta Chief, University of Arizona (co-authors: A. Serrat-Capdevila, E.S. Chew, B. Wadsworth, K. Morgan, B. Harry)
10. ***Regional geologic influence on the hydrogeochemistry of Santa Monica Mountains Watershed** - Geza I. Demeter, California State University, Los Angeles (co-author: B. Hibbs)
11. ***The influence of tillage and vegetated buffer blocks for managing concentrated flow paths in southern Illinois agricultural fields** - Matt Enger, Southern Illinois University (co-authors: J.E. Schoonover, K.W.J. Williard, R. Cook)
12. ***Bringing safe drinking water to Africa: A comparative study of water treatment technologies for communities within the Sahel** Nichole Francis, University of Nevada, Las Vegas
13. ***Influence of *Larrea tridentata* on chloride concentration in shallow desert soils** - Sara Gedo, University of Nevada, Las Vegas (co-author: M. Nicholl)
14. **Assessing the Challenges and Limitations of Reclaiming Altered and Endangered Northern Prairie Streams** - Philip J. Gerla, University of North Dakota
15. ***Cover crop and tillage impacts on nitrogen leaching from row crop agriculture in southern Illinois** - Brooke Hagarty, Southern Illinois University
16. ***Isotopic and hydrochemical identification of source waters and pollutants in Malibu Creek Watershed, CA** - Michael Harrison, California State University, Los Angeles (co-author: B. Hibbs)
17. ***Unsaturated flow in fractured rocks: Effects of matrix-matrix contacts on capillary-driven flow across a fracture** - Jeevan Jayakody, University of Nevada, Las Vegas (co-author: M. Nicholl)
18. **Changing storm properties and their impacts on the flood frequency in southern Nevada** - Peng Jiang, Desert Research Institute (co-authors: L. Chen, Z. Yu, K. Acharya)
19. **A nonlinear hydrologic river routing model integrated into HydroDesktop platform** - Dong Ha Kim, Georgia Department of Natural Resources

Tuesday, June 16

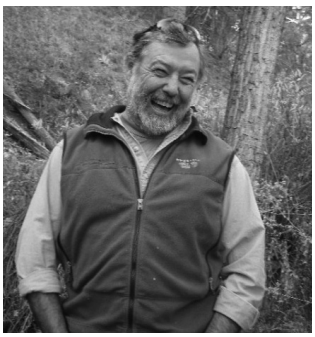
Poster Presentations

20. **Estimating urban evapotranspiration for water conservation: Make it simple and direct** - Roger Kjelgren, Utah State University (co-authors: L. Hipps, R. Beeson, D. Pittenger, A. Torres-Rua)
21. ***A feasibility study for seeding snow from winter storm clouds in southern Nevada** - Casey Korby, University of Nevada, Las Vegas
22. **Intercomparison of satellite precipitation products using an object-based evaluation approach** - Jingjing Li, California State University Los Angeles (co-author: Y. Ding)
23. ***Enhanced photocatalytic water treatment using immobilized nanocomposite thin films** - Lu Lin, New Mexico State University (co-author: P. Xu)
24. ***Biological treatment (aerobic bacteria) of wastewater with high organic matter** - Edgar Raul Lom Arredondo, Universidad Autonoma de Ciudad Juarez (co-authors: A. Dominguez Chicas, J.A. Salas Plata Mendoza, H.A. Quevedo Urias)
25. ***Water infiltration into arid soil – Experiments and numerical modeling** - Yuan Luo, University of Nevada, Las Vegas
26. ***Ozone-reactive N-nitrosodimethylamine (NDMA) precursors: Yields, factors affecting formation and implications for water reuse** - Erica Marti, University of Nevada, Las Vegas (co-authors: A. Pisarenko, E. Dickenson, J. Peller, J. Batista)
27. ***Fate of antibiotic resistant bacteria in wastewater treatment processes** - Majid Neyestani, University of Nevada, Las Vegas (co-author: D. Gerrity)
28. **Near-continuous water-quality: Lake Mead National Recreation Area** - Erin Orozco, US Geological Survey
29. ***Spatial-temporal patterns of hydrological drought indicators in major U.S. river basins** - Maryam Pournasiri Poshtiri, University of Colorado Denver (co-author: I. Pal)
30. ***Berm formation and concentrated flow paths in riparian buffer zones in the Cache River Watershed, southern Illinois** - Prabisha Shrestha, Southern Illinois University (co-authors: K.W.J. Williard, J.E. Schoonover)
31. ***Can industrial wastewater generated in Nevada be used as carbon source for perchlorate degradation?** - Sichu Shrestha, University of Nevada, Las Vegas
32. **Issues associated with the use of untreated roadside springs as a source of drinking water** - Bryan Swistock, Penn State University (co-authors: J. Clark, S. Boser, D. Oleson, A. Galford, G. Micsky, M. Madden)
33. ***Annual and seasonal fluxes of particulate matter from atmospheric deposition to Lake Tahoe: Assessment from a long-term passive monitoring program** - Ya-Chun Tai, Desert Research Institute (co-authors: L.W.A. Chen, X. Wang, J. Watson, A. Heyvaert)
34. ***Evaluating the effects of time-scales on long-term changes in streamflow** - Kazi Ali Tamaddun, University of Nevada, Las Vegas (co-authors: A. Kalra, S. Ahmad)
35. ***Assessing simulated transmissivity in flow models with complex hydrogeology** - Afan Tarar, University of Nevada, Las Vegas (co-author: D. Kreamer)

8:30 am - 9:40 am
Plenary Session III - Climate Change
Estancia G

Moderator - Jeff Johnson, Mississippi State University

Disappearing Himalayan glaciers, water security in high Asia, temples, elephants, and other wonders



Dr. Mark Williams is Professor of Geography and Fellow at the Institute of Arctic and Alpine Research, University of Colorado, Boulder. His research on snow hydrology, surface-groundwater interactions, terrestrial-aquatic interactions and biogeochemistry has won several awards, including being elected a Fellow of the American Geophysical Union, a Senior Fulbright Scholar in Nepal for 2013-2014, the US EPA Region VIII Outstanding Environmental Achievement Award, and the Denali Award for Outstanding Recent Achievement in Mountain Geography (Mountain Geography Specialty Group of the American Association of Geographers).

Springs ecosystem ecology and climate change risk in the arid Southwest



Larry Stevens attended Prescott College in Prescott, Arizona from 1970-1974. After working as a biological technician and a river guide, he undertook graduate studies in biology at the University of Arizona, Tucson, and at Northern Arizona University, where he received his doctoral degree in Zoology in 1989. He served as the ecologist for Grand Canyon National Park from 1989-1994, the editor for Red Lake Books, and served on many ecological councils and committees in Arizona. He teaches occasionally at both Prescott College and Northern Arizona University, and works as a whitewater rafting guide in Grand Canyon. He is presently the curator of ecology at the Museum of Northern Arizona in Flagstaff and is the senior ecologist for Grand Canyon Wildlands Council, in which he serves as a conservation representative for the adaptive management of Glen Canyon Dam and the Colorado River through Grand Canyon. Larry has authored many publications, recently including recent books on the ecology of springs ecosystems in North America and global biogeography.

9:45 am - 10:00 am
Break, Estancia E/F

Wednesday, June 17

10:00 AM - 11:30 AM
Concurrent Technical Sessions
*Student presenter in oral presentation competition

Session 13 — **Science and Decision Making I** — **Estancia A**
Moderator - Connie Woodhouse, University of Arizona

10:00 AM **Making your research useful for decision makers: Why it is difficult and what you can do about it** - Elizabeth McNie, University of Colorado, Boulder

10:20 AM **Water resource management and tree-ring based reconstructions of hydroclimate in Northern Utah** - Matt Bekker, Brigham Young University

10:40 AM **Providing climate services in Alaska: A case study in creating versatile snow projections** - Stephanie McAfee, University of Nevada, Reno (co-author: J. Littell)

11:00 AM **Some practical guidelines for science/decision-making collaborations** - Connie Woodhouse, University of Arizona (co-authors: D. Ferguson, J. Rice)

Session 14 — **Springs/Western Water Law** — **Estancia B**
Moderator - Abe Springer, Northern Arizona University

10:00 AM **Determining the distribution of springs ecosystems** - Abe Springer, Northern Arizona University (co-authors: L. Stevens, J. Ledbetter, K. Junghans)

10:20 AM **Springs in Mojave National Preserve, California** - Debra Hughson, Mojave National Preserve

10:40 AM **Western groundwater rights: A Colorado perspective** - Tom Cech, One World One Water Center

Session 15 — **Water, Health and Sanitation for International Communities I** — **Estancia C**
Moderator - Braimah Apambire, Desert Research Institute

10:00 AM **Safe and sustainable groundwater supply wells in developing countries** - Steve Schneider, National Ground Water Research & Educational Foundation and Schneider Water Services

10:20 AM ***Global assessment of de facto reuse: Wastewater in irrigated agriculture** - Anne Thebo, University of California, Berkeley (co-authors: K. Nelson, P. Drechsel, E. Lambin)

10:40 AM ***Hydrogeochemical controls on groundwater quality in the West Mamprusi area, Northern Ghana** - Karen Gastineau, Desert Research Institute (co-author: B. Apambire)

11:00 AM **Brazilian law and policy influencing Indigenous water quality governance** - Kate A. Berry, University of Nevada, Reno (co-author: L.C. Forline)

Session 16 — **Climate Change I** — **Estancia D**
Moderator - John Wiener, University of Colorado

10:00 AM **The landscape imperative and the research agenda** - John Wiener, University of Colorado

10:20 AM **Impacts of climate change on Southwestern working lands and water resources: A report from the inaugural year of the USDA SW Climate Hub** - Emile Elias, USDA ARS (co-authors: A. Rango, K. Havstad, C. Steele)

10:40 AM ***Impact of climate change on ecosystem management in Central Valley of California** - Karandev Singh, University of California, Davis (co-authors: M. Dogan, J. Medellín-Azuara, J. Lund)

11:00 AM **Climate change modeling and measurement in Lake Mead, Arizona-Nevada** - Todd Tietjen, Southern Nevada Water Authority (co-author: E. Schlickeisen)

11:30 AM - 1:00 PM
Lunch on your own
See page 26 for restaurants within walking distance.

1:00 pm - 2:10 pm
Plenary Session IV
Estancia G

Moderator - David Kreamer, University of Nevada, Las Vegas

The Universities WASH Network: Engaging the U.S. academic community



Dr. Braimah Apambire is a Water, Sanitation & Hygiene (WASH) and development expert with extensive field, academic, teaching and grantmaking experience. He is currently the Director of the Center for International Water and Sustainability at the Desert Research Institute (DRI), Nevada. Prior to this, Braimah was a senior advisor at the Conrad N. Hilton Foundation, where he managed the Foundation's WASH grant portfolio. Previously, he was the Director of the WASH Sector at World Vision. Early in his career, he was an assistant research professor at DRI, where he conducted research on international and Southern Nevada water issues and taught numerous classes on WASH at the University of Nevada, Reno (UNR) and other universities. Dr. Apambire also founded the Students Association for International Water Issues at UNR. He received his B.S. from the University of Ghana; M.S. from Carleton University, Canada; and his Ph.D. from the University of Nevada, Reno.

Applying lessons from two centuries of experience in water resources management



Jeff Brideau is an ORAU/ORISE postdoctoral research fellow at the Institute for Water Resources, U.S. Army Corps of Engineers. Trained as a professional historian, Dr. Brideau's research explores the histories of water resources planning and development across national and disciplinary boundaries. Jeff is a graduate of the University of Ottawa – where he received his Bachelors and Masters degrees – and the University of Maryland – where he received his doctorate in environmental history. In addition to his postdoctoral work at the Institute for Water Resources, he teaches graduate courses at Virigina Tech's Science and Technology in Society Department, as an adjunct professor. Throughout his academic and professional careers, Dr. Brideau has assiduously cultivated working relationships across the disciplinary spectrum. To this end, he has actively participated in several professional associations and water resources projects set in an array of interdisciplinary contexts and configurations, including: an independent review of FEMA's National Dam Safety Program; a global survey of nature-based solutions for reducing flood risk assembled by the Nature Conservancy; as a fellow at the Northeast Consortium for Hydrologic Synthesis; and in his current position at the Institute for Water Resources. Dr. Brideau's present work on the Corps of Engineers' 308 program – which surveyed the United States' rivers for multipurpose development – is an extension of a broader agenda to bring a historically informed perspective to water resources development and planning, and to demonstrate the value of professional history for environmental decision-making.

Wednesday, June 17

2:15 PM - 3:45 PM
Concurrent Technical Sessions

*Student presenter in oral presentation competition

Session 17 — **Science and Decision Making II** — **Estancia A**

Moderator - Tom Arsuffi, Texas Tech University Llano River Field Station

2:15 PM **Water supply planning for an uncertain future: Two case studies in Northern Utah exploring climate change and paleo drought** - Tim Bardsley, Western Water Assessment (co-authors: M. Bekker, L. Briefer, S. Paxman, S. McGettigan, D. Rosenberg)

2:35 PM **Healthy watershed approach to managing streams: Role of science, stakeholders, education and partnerships** - Tom Arsuffi, Texas Tech University Llano River Field Station (co-authors: E. Seldomridge, K. Rainwater, T. Mclendon, K. Wagner)

2:55 PM ***A 50-year projection of Colorado River water supply and demand for five Arizona tribes and the Central Arizona Project** - Carrie N. Joseph, University of Arizona (co-author: M. Mahmoud)

3:15 PM **The Las Vegas Wash: A multi-agency stakeholder process to protect and enhance a key ecological and hydrologic resource** - Jason R. Eckberg, Southern Nevada Water Authority

Session 18 — **Ecosystems** — **Estancia B**

Moderator - Dale Devitt, University of Nevada, Las Vegas

2:15 PM **Groundwater oscillations associated with the phreatophyte *Sarcobatus vermiculatus* under a falling water table in the Great Basin, NV** - Dale Devitt, University of Nevada, Las Vegas (co-authors: B. Bird, L. Fenstermaker, L. Apodaca)

2:35 PM ***Effects of the toxigenic alga *Prymnesium parvum* on a freshwater zooplankton community** - Brenda Allison Witt, University of Oklahoma (co-authors: J. Beyer, T. Hallidayschult, K.D. Hambright)

2:55 PM ***Physical, chemical, and biological cycling of selenium in Las Vegas Wash** - Sahar Ehsani, Desert Research Institute & University of Nevada, Las Vegas (co-authors: K. Acharya, D. Hayes)

3:15 PM **The environmental fate of the phytoestrogens genistein and daidzein** - Megan Kelly, Lake Superior State University

Session 19 — **Water, Health and Sanitation for International Communities II** — **Estancia C**

Moderator - Uma Seeboonruang, King Mongkut's Institute of Technology Ladkrabang

2:15 PM **Integrating water resources and demand to improve drought resilience and build water strategies: A pilot approach to Kenya's arid and semi-arid lands** - Susan Dundon, Millennium Water Alliance (co-author: S. Sparker (1st author))

2:35 PM ***Multi-criteria decision support within the robust decision making framework with an application to climate change adaptation in Lake Tana, Ethiopia** - Julie Shortridge, The Johns Hopkins University (co-author: S. Guikema)

2:55 PM **Impact assessment of illegal dumping in borrow pits on shallow groundwater in Thailand** - Uma Seeboonruang, King Mongkut's Institute of Technology Ladkrabang

Session 20 — **Climate Change II** — **Estancia D**

Moderator - David Donovan, Aqua Petrus

2:15 PM **A methodology for informing management decisions in groundwater dependent communities coping with climate uncertainty** - Susanna Eden, University of Arizona Water Resources Research Center (co-authors: S. Megdal, E. Shamir, K. Chief)

2:35 PM ***A tale of two cities: Comparison of water resource management system response under varying climate and population growth in Salt Lake City, UT, and Las Vegas, NV** - Erfan Goharian, University of Utah (co-authors: S. Dawadi, S. Ahmad, S.J. Burian)

2:55 PM ***Predicting nutrient and dissolved oxygen concentrations in the Spokane River under future development and climate conditions** - Zubayed Rakib, University of Utah (co-author: M. Barber)

3:15 PM **Hydrogeologic framework characterization in America's newest national monument: Primetime in Glitter Gulch** - David J. Donovan, Aqua Petrus

3:45 PM - 4:00 PM
Break, Estancia E/F
Light refreshments available.

4:00 PM - 5:30 PM
CONCURRENT TECHNICAL SESSIONS

*Student presenter in oral presentation competition

SESSION 21 — HUMAN DIMENSIONS OF WATERSHED MANAGEMENT — ESTANCIA A

Moderator - Kofi Akamani, Southern Illinois University

4:00 PM **Adaptive water governance: A framework for integrating the human dimensions into the governance of water resources in the face of uncertainty** - Kofi Akamani, Southern Illinois University

4:20 PM **Eliciting stakeholder knowledge for water resource decisions: The case for socio-hydrology in the Murray-Darling River basin, southeastern Australia** - Ellen Douglas, University of Massachusetts Boston (co-authors: S. Wheeler, D.J. Smith, I. Overton, N. Crossman, T. Doody)

4:40 PM **Community involvement leads to a winning hand** - Erika Wettergreen, Marstel-Day LLC

5:00 PM **Stakeholder involvement process and outcomes in developing a state-wide nutrient loss reduction strategy** - Brian Miller, University of Illinois (co-authors: M. Willhite, W. Goetsch, A. Walkenbach, L. Merrifield, C. Layfield)

SESSION 22 — WATER QUALITY — ESTANCIA B

Moderator - Heidi McMaster, US Bureau of Reclamation

4:00 PM **Enhancing the success of water quality management programs** - Kevin Wagner, Texas Water Resources Institute (co-authors: L. Gregory, A. Berthold)

4:20 PM **Lake Havasu water quality monitoring program five year study 2010-2014** - Heidi McMaster, US Bureau of Reclamation (co-authors: J. Kirsch, D. Anat, J. Stegmeier, M. Maynard)

4:40 PM **Nutrient trading – Is this a worthwhile pursuit for water pollution control?** - David Stevens, Utah State University

SESSION 23 — WATER DATA — ESTANCIA C

Moderator - James Heaney, University of Florida

4:00 PM **Discovering and interpreting time series data for interdisciplinary water science** - Jon Pollak, CUAHSI (co-authors: M. Seul, R. Hooper, E. Geosling)

4:20 PM **National Water Census: Water availability and use studies and the data portal** - Ari Michelsen, Texas A&M Agrilife Research and Extension Center at El Paso (co-authors: S. Jones, E. Evenson, D. Blodgett)

4:40 PM **Predicting and managing outdoor residential potable irrigation using parcel level databases** - Ken Friedman, Northwest Florida Water Management District (co-author: J. Heaney)

5:00 PM **Design of a probability plotting positions, of precipitation data of Galveston County, Texas, without using the traditional assigning of ranges to data and the usage of formulas to calculate return periods and probabilities of occurrence** - Hector Quevedo Urias, Universidad Autónoma de Ciudad Juárez

SESSION 24 — GROUNDWATER — ESTANCIA D

Moderator - Barry Hibbs, California State University, Los Angeles

4:00 PM **Mapping and modeling groundwater in real-time** - Val Kofoed, Willowstick Technologies (co-authors: M. Jessop, D. Bierman)

4:20 PM **Multiyear study of the binational Hueco Bolson Aquifer reformulates key conceptual models of groundwater flow** Barry Hibbs, California State University, Los Angeles

4:40 PM ***The effect of technical change on groundwater use and depletion** - Nicolas Quintana Ashwell, Kansas State University (co-author: J. Peterson)

6:00 PM
AWARDS BANQUET
LA SIRENA I (LOBBY LEVEL)

Must be pre-registered. Bring your ticket with you.

Thursday, June 18

8:30 am - 9:40 am
Plenary Session V
Estancia G

Moderator - David Kreamer, University of Nevada, Las Vegas

Southern Nevada's water resource strategy: Resilience, adaptation and risk management



Zane Marshall is the Director of the Resources & Facilities Department of the Southern Nevada Water Authority (SNWA) / Las Vegas Valley Water District (LVVWD), where he has worked for the past 20 years. A Las Vegas native, Zane leads six divisions that manage water, land and environmental resources, implement water conservation programs for southern Nevada, and manage office and building infrastructure across both organizations. Zane has a Bachelor's of Arts in Environmental Studies and Biology, and a Masters of Arts in Science in Biology and Statistics from the University of Nevada, Las Vegas. He is a member of several professional organizations, including Nevada Water Resources Association and the American Water Works Association, and he has been qualified as an expert witness by the Nevada State Engineer. Zane currently serves on the Board of Directors for the Alliance for Water Efficiency and the Great Basin Bird Observatory. He served as a National Park Service volunteer member of the Devils Hole Dive Team for over 12 years, and he served in the U.S. Marine Corps Reserve from 1990 to 1998. Zane received the UNLV Outstanding Alumni Award in 2007 for leadership, contributions and dedication to improve the environment.

Causes and consequences of declining municipal demand: An unexpected water resource challenge



Gary Woodard has addressed water resources issues as both an academic and a consultant for over 30 years. At the University of Arizona, he has brought a wide array of analytical skills to bear on a range of water policy issues. Gary has won several awards for creative outreach efforts, including a degree program for mid-career water professionals and citizen science programs. He also has chaired a water district, served as an elected official, founded a water conservation alliance, and served as president of the Universities Council on Water Resources. Woodard's work with two UNESCO water centers and the Army Corps has taken him to arid lands across the Middle East, North Africa and South America. He also helped draft Saudi Arabia's new National Water Act. As a senior water policy and economics consultant with Montgomery & Associates, he models water demand, evaluates utility assets, forecasts trends, and assesses conservation programs.

9:45 am - 10:00 am
Break, Estancia E/F

10:00 AM - 11:30 AM
CONCURRENT TECHNICAL SESSIONS

*Student presenter in oral presentation competition

SESSION 25 — BIOLOGICAL WATER QUALITY — ESTANCIA A

Moderator - Kevin Wagner, Texas Water Resources Institute

10:00 AM **Better targeting water quality remediation using bacterial source tracking** - Kevin Wagner, Texas Water Resources Institute (co-authors: T. Gentry, G. DiGiovanni)

10:20 AM ***Modeling *E. coli* levels in the Lake Erie nearshore at Cleveland, OH** - Nathan Zgnilec, Great Lakes Research Center, Michigan Technological University (co-author: M. Auer)

10:40 AM ***Assessing impacts of nutrient loading on culturable *E. coli* fate in re-created natural stream mesocosms** - Lucas Gregory, Texas A&M University (co-authors: R. Karthikeyan, J. Aitkenhead Peterson, K. Wagner, T. Gentry)

11:00 AM **Synergistic effects of radiation and temperature on microbial growth in 19 Litre water dispensing containers** - Michael Keogh, Royal College of Surgeons in Ireland - Medical University of Bahrain (co-authors: P. Borde, K. Elmusharaf)

SESSION 26 — WATER ECONOMICS — ESTANCIA B

Moderator - Jonathan Yoder, Washington State University

10:00 AM **Water storage and water markets as substitutes for drought risk mitigation** - Jonathan Yoder, Washington State University (co-authors: M. Brady, J. Cook)

10:20 AM ***An investigation into the interdependence of global water indices: A VAR analysis** - Rajibur Reza, Griffith University, Australia (co-authors: G.A. Tularam, B. Li)

10:40 AM **Implications of discounting assumptions on priority across alternative water projects** - Ronald D. Lacewell, Texas A&M AgriLife (co-authors: L. Dutton, M.E. Rister, A. Sturdivant)

11:00 AM **A survey of water experts relative to issues in discounting and appropriateness of discounting physical resources** Lindsi Dutton, Texas A&M University (co-authors: M.E. Rister, R.D. Lacewell)

SESSION 27 — RESERVOIRS & FLOOD CONTROL — ESTANCIA C

Moderator - David Stevens, Utah State University

10:00 AM **Oneida Dam – Hydro power vs. competing environmental goals** - David Stevens, Utah State University

10:20 AM ***Optimal reservoir operations policy for maximum fish survival** - Lauren Adams, University of California, Davis (co-authors: J. Lund, R. Quiñones)

10:40 AM **The use of indirect measurement to determine peak discharges of flood events in Southern Nevada** - Christopher Morris, U.S. Geological Survey

11:00 AM **Studies of stream-aquifer interactions in urban watersheds with predominately grout lined channels** - Barry Hibbs, California State University, Los Angeles

SESSION 28 — URBAN WATER MANAGEMENT & GREEN INFRASTRUCTURE — ESTANCIA D

Moderator - Tolessa Deksissa, University of the District of Columbia

10:00 AM **Assessing urban gardening as a green stormwater management** - Tolessa Deksissa, University of the District of Columbia (co-authors: Y. Assa, S. Tefera)

10:20 AM ***Hydrologic restoration via low impact design retrofit** - Tracy Fanara, University of Florida

10:40 AM **Water is not merely for human consumption; water is essential in the design, construction, and operation of the built environment** - Omar Youssef, University of Arizona (co-author: N. Chalfoun (1st author))

11:30 AM - 1:00 PM
LUNCH ON YOUR OWN

See page 26 for restaurants within walking distance.

1:30 PM
HOOVER DAM FIELD TRIP, MEET IN ESTANCIA FOYER

Must be pre-registered. Bring your ticket with you.

Presenter Index

Adams, Lauren (Session 27), University of California, Davis, leadams@ucdavis.edu

Akamani, Kofi (Session 21), Southern Illinois University, k.akamani@siu.edu

Alley, William (Plenary Session 2), National Ground Water Association, walley@ngwa.org

Allison Witt, Brenda (Session 18), University of Oklahoma, brenda.allison-1@ou.edu

Amoueyan, Erfaneh (Poster), University of Nevada, Las Vegas, amoueyan@unlv.nevada.edu

Apambire, Braimah (Plenary Session 4), Desert Research Institute, Braimah.Apambire@dri.edu

Aquino, Mayara (Poster), Federal University of Rio Grande do Norte and University of Nevada, Las Vegas, mayaraquino.ect@gmail.com

Arsuffi, Tom (Session 17), Texas Tech University Llano River Field Station, tom.arsuffi@ttu.edu

Bai, Ting (Session 9), University of Arizona, tbai@email.arizona.edu

Bai, Xuelian (Poster), Desert Research Institute, xuelian.bai@dri.edu

Ball, Taylor (Poster), University of Nevada, Las Vegas, ballt1@unlv.nevada.edu

Bardsley, Tim (Session 17), Western Water Assessment, wwa.bardsley@gmail.com

Baxter, Heather (Poster), Washington State University, heather.baxter@email.wsu.edu

Bekker, Matt (Session 13), Brigham Young University, matthew_bekker@byu.edu

Benemelis, Perri (Session 1), Central Arizona Groundwater Replenishment District, pbenemelis@cap-az.com

Berry, Kate A. (Session 15), University of Nevada, Reno, kberry@unr.edu

Bonnell, Joe (Session 10), Ohio State University, bonnell.8@osu.edu

Brideau, Jeff, (Plenary Session 4), Institute for Water Resources, USACE, jeffrey.brideau@gmail.com

Bukhary, Saria (Poster), University of Nevada, Las Vegas, bukhary2@unlv.nevada.edu

Cadaret, Erik (Session 8), Desert Research Institute, Division of Earth and Ecosystem Sciences, ecadaret@dri.edu

Carr, Laurel (Poster), New Mexico Highlands University, lcarr2@live.nmhu.edu

Carroll, Natalie (Session 6), Purdue University, ncarroll@purdue.edu

Cech, Tom (Session 14), One World One Water Center, tcech@msudenver.edu

Chen, Chao (Poster), University of Nevada, Las Vegas, chenc6@unlv.nevada.edu

Chief, Karletta (Poster), University of Arizona, kchief@email.arizona.edu

Cho, Kangwoo (Session 3), Korea Institute of Science and Technology, kangwoo.cho82@gmail.com

Czapla, Thomas (Session 4), Upper Colorado River Endangered Fish Recovery Program, U.S. Fish and Wildlife Service, tom_czapla@fws.gov

Deksissa, Tolessa (Session 28), University of the District of Columbia, tdeksissa@udc.edu

Demeter, Geza I. (Poster), California State University, Los Angeles, geza.demeter@gmail.com

Devitt, Dale (Session 18), University of Nevada, Las Vegas, dale.devitt@unlv.edu

Dixon, Jay (Session 12), Kinross-Round Mountain Gold, jay.dixon@kinross.com

Donovan, David J. (Session 20), Aqua Petrus, aquapetrus@gmail.com

Douglas, Ellen (Session 21), University of Massachusetts Boston, ellen.douglas@umb.edu

Dundon, Susan (Session 19), Millennium Water Alliance, sarah.sparker@mwawater.org

Dutton, Lindsi (Session 26), Texas A&M University, Lindsi.Dutton@breitburn.com

Eckberg, Jason R. (Session 17), Southern Nevada Water Authority, jason.eckberg@snwa.com

Eden, Susanna (Session 20), University of Arizona Water Resources Research Center, seden@email.arizona.edu

Ehsani, Sahar (Session 18), Desert Research Institute & University of Nevada, Las Vegas, ehsanis@unlv.nevada.edu

Elias, Emile (Session 16), USDA ARS, eliaseh@nmsu.edu

Enger, Matt (Poster), Southern Illinois University, matthew.enger@siu.edu

Fanara, Tracy (Session 28), University of Florida, triceratops13@yahoo.com

Fiack, Duran (Session 12), University of California, Santa Cruz, dfiack@ucsc.edu

Francis, Nichole (Poster), University of Nevada, Las Vegas, nicholepfrancis@yahoo.com

Friedman, Ken (Session 23), Northwest Florida Water Management District, Ken.Friedman@nwfwater.com

Presenter Index

Fulp, Terrance J. (Plenary Session I), U.S. Bureau of Reclamation
Gastineau, Karen (Session 15), Desert Research Institute, karen.gastineau@dri.edu
Gedo, Sara (Poster), University of Nevada, Las Vegas, gedo@unlv.nevada.edu
Gerla, Philip J. (Poster), University of North Dakota, phil.gerla@engr.und.edu
Goharian, Erfan (Sessions 3 & 20), University of Utah, erfan.goharian@utah.edu
Gomaah, Muhammad (Poster), The University of Arizona, muhammadgomaah@email.arizona.edu
Gregory, Lucas (Session 25), Texas A&M University, lfgregory@ag.tamu.edu
Guerrero, Bridget (Session 1), West Texas A&M University, bguerrero@wtamu.edu
Gulley, Adrienne (Session 2), Illinois-Indiana Sea Grant College Program, amgulley@illinois.edu
Hagarty, Brooke (Poster), Southern Illinois University, bhagarty@siu.edu
Harrison, Michael (Poster), California State University, Los Angeles, mail.mbharrison@gmail.com
Haynes, Sandra (Session 6), Metropolitan State University of Denver, hayness@msudenver.edu
Heffernan, Beverley (Session 4), Adaptive Management Group, Bureau of Reclamation, Upper Colorado Region
Hibbs, Barry (Session 24 & 27), California State University, Los Angeles, bhibbs@calstatela.edu
Hightower, Mike (Plenary Session 2), Sandia National Laboratories, mmhight@sandia.gov
Hughson, Debra (Session 14), Mojave National Preserve, debra_hughson@nps.gov
Jantrania, Anish (Session 3), Texas A&M University, ajantrania@tamu.edu
Jayakody, Jeevan (Poster), University of Nevada, Las Vegas, jayakody@unlv.nevada.edu
Jiang, Peng (Poster), Desert Research Institute, peng.jiang@dri.edu
Joseph, Carrie N. (Session 17), University of Arizona, cj25@email.arizona.edu
Kammin, Laura (Session 2), Illinois-Indiana Sea Grant College Program, lkammin@illinois.edu
Kelly, Megan (Session 18), Lake Superior State University, mkelly6@lssu.edu
Keogh, Michael (Session 25), Royal College of Surgeons in Ireland - Medical University of Bahrain, mkeogh@rcsi-mub.com
Kim, Dong Ha (Poster), Georgia Department of Natural Resources, Dongha.Kim@dnr.state.ga.us
Kjelgren, Roger (Poster), Utah State University, roger.kjelgren@usu.edu
Kofoed, Val (Session 24), Willowstick Technologies
Kokos, Sonja (Session 8), Lower Colorado River Multi-Species Conservation Program, skokos@usbr.gov
Korby, Casey (Poster), University of Nevada, Las Vegas, korby@unlv.nevada.edu
Lacewell, Ronald D. (Session 26), Texas A&M AgriLife, r-lacewell@tamu.edu
Lant, Christopher (Sessions 5 & 11), Utah State University, chris.lant@usu.edu
Levers, Lucia (Session 5), University of California, Riverside, lleve001@ucr.edu
Lewandowski, Ann (Session 10), University of Minnesota, alewand@umn.edu
Li, Jingjing (Poster), California State University Los Angeles, jli104@calstatela.edu
Lin, Lu (Poster), New Mexico State University, lulin@nmsu.edu
Lom Arredondo, Edgar Raul (Poster), Universidad Autonoma de Ciudad Juarez, lomedgar@yahoo.com.mx
Luo, Yuan (Poster), University of Nevada, Las Vegas, luoy5@unlv.nevada.edu
Madel, Robin (Session 10), GRACE Communications Foundation, robin@gracelinks.org
Marshall, Zane (Plenary Session 5), Southern Nevada Water Authority, zane.marshall@snwa.com
Marti, Erica (Poster), University of Nevada, Las Vegas, martie2@unlv.nevada.edu
Martz, Marti (Session 2), Pennsylvania Sea Grant, mam60@psu.edu
McAfee, Stephanie (Session 13), University of Nevada, Reno, smcafee@unr.edu
McMaster, Heidi (Session 22), US Bureau of Reclamation, hmcmaster@usbr.gov
McNie, Elizabeth (Session 13), University of Colorado, Boulder, mcnie@colorado.edu
Mellinger, Andrew (Session 5), Southern Illinois University, mellinger@siu.edu
Michelsen, Ari (Sessions 11 & 23), Texas A&M Agrilife Research and Extension Center at El Paso, amichelsen@ag.tamu.edu

Presenter Index

Miller, Brian (Session 21), University of Illinois, millerbk@illinois.edu

Morris, Christopher (Session 27), U.S. Geological Survey, cmmorris@usgs.gov

Mulroy, Pat (Plenary Session I), Brookings Institute

Nelson, Dennis (Session 6), Project Water Education for Teachers (WET) Foundation, Dennis.Nelson@projectwet.org

Neyestani, Majid (Poster), University of Nevada, Las Vegas, neyestan@unlv.nevada.edu

Orozco, Erin (Poster), US Geological Survey, eorozco@usgs.gov

Parker, Doug (Session 1), California Institute for Water Resources, University of California, doug.parker@ucop.edu

Pollak, Jon (Session 23), CUAHSI, jpollak@cuahsi.org

Pournasiri Poshtiri, Maryam (Poster), University of Colorado Denver, maryam.pournasiriposhtiri@ucdenver.edu

Quevedo Urias, Hector (Session 23), Universidad Autónoma de Ciudad Juárez, hquevedo@uacj.mx

Quintana Ashwell, Nicolas (Session 24), Kansas State University, nicolasq@ksu.edu

Rakib, Zubayed (Session 20), University of Utah, zubayed.rakib@utah.edu

Reza, Rajibur (Session 26), Griffith University, Australia, smrajibur.reza@griffithuni.edu.au

Roy, Tirthankar (Session 7), The University of Arizona, royt@email.arizona.edu

Rushforth, Richard (Session 8), Arizona State University, rrushfor@asu.edu

Salazar, Kara (Session 2), Purdue University, salazark@purdue.edu

Salha, Ali (Session 7), Utah State University, asalha@aggiemail.usu.edu

Schmit, Ayn (Plenary Session 2), U.S. EPA, Region 8, schmit.ayn@epa.gov

Schneider, Steve (Session 15), National Ground Water Research & Educational Foundation and Schneider Water Services, steve@schneiderwater.com

Schwartz, Kerry (Session 6), Water Resources Research Center at the University of Arizona, kschwart@cals.arizona.edu

Seeboonruang, Uma (Session 19), King Mongkut's Institute of Technology Ladkrabang, muggletong@hotmail.com

Shortridge, Julie (Session 19), The Johns Hopkins University, jshortr1@jhu.edu

Shrestha, Prabisha (Poster), Southern Illinois University, prabisha.shrestha@siu.edu

Shrestha, Sichu (Poster), University of Nevada, Las Vegas, shresth4@unlv.nevada.edu

Singh, Karandev (Session 16), University of California, Davis, kvsingh@ucdavis.edu

Solander, Kurt C. (Session 7), University of California, Irvine, ksolande@uci.edu

Speckman, Heather (Session 7), University of Wyoming, hspeckma@uwyo.edu

Springer, Abe (Session 14), Northern Arizona University, abe.springer@nau.edu

Stevens, David (Sessions 22 & 27), Utah State University, david.stevens@usu.edu

Stevens, Larry (Plenary Session 3), Springs Stewardship Institute, Larry@springstewardship.org

Swett, John (Session 4), Lower Colorado River Multi-Species Conservation Program, Bureau of Reclamation, Lower Colorado Region, jswett@usbr.gov

Swistock, Bryan (Poster), Penn State University, brs@psu.edu

Tai, Ya-Chun (Poster), Desert Research Institute, Chun.Tai@dri.edu

Tamaddun, Kazi Ali (Poster), University of Nevada, Las Vegas, tamaddun@unlv.nevada.edu

Tarar, Afan (Poster), University of Nevada, Las Vegas, tarara@unlv.nevada.edu

Taylor, C. Robert (Session 1), Auburn University, rtaylor@acesag.auburn.edu

Taylor, Rebecca (Session 9), University of California, Berkeley, becca.taylor@berkeley.edu

Thebo, Anne (Session 15), University of California, Berkeley, thebo@berkeley.edu

Thiriot, Jason (Session 4), Colorado River Commission of Nevada, jasthiriot@crc.nv.gov

Tietjen, Todd (Session 16), Southern Nevada Water Authority, todd.tietjen@snwa.com

Torres-Rua, Alfonso (Session 9), Utah Water Research Laboratory, alfonso.torres@usu.edu

VanderKooi, Scott (Session 4), Grand Canyon Monitoring and Research Center, U.S. Geological Survey, svanderkooi@usgs.gov

Wagner, Kevin (Sessions 22 & 25), Texas Water Resources Institute, klwagner@ag.tamu.edu

Presenter Index

Wettergreen, Erika (Session 21), Marstel-Day LLC, ewettergteen@marstel-day.com

Whitmore, Sharon (Session 4), San Juan River Recovery Implementation Program, U.S. Fish and Wildlife Service, sharon_whitmore@fws.gov

Wiener, John (Session 16), University of Colorado, john.wiener@colorado.edu

Williams, Mark (Plenary Session 3 & Session 12), University of Colorado, markw@snobear.colorado.edu

Williard, Karl W.J. (Session 5), Southern Illinois University, williard@siu.edu

Wireman, Mike (Plenary Session 2), U.S. EPA –retired, mikeclaudia@q.com

Wirth, Andrea (Session 10), Oregon State University, andrea.wirth@oregonstate.edu

Wolfson, Lois (Session 10), Michigan State University, wolfson1@msu.edu

Woodard, Gary (Plenary Session 5), Montgomery & Associates / University of Arizona, gary.c.woodard@gmail.com

Woodhouse, Connie (Session 13), University of Arizona, conniew1@email.arizona.edu

Yoder, Jonathan (Sessions 11 & 26), Washington State University, yoder@wsu.edu

Young, Michael (Session 12), Bureau of Economic Geology,University of Texas at Austin, michael.young@beg.utexas.edu

Youssef, Omar (Sessions 6 & 28), University of Arizona, omarmky@email.arizona.edu

Zgnilec, Nathan (Session 25), Great Lakes Research Center, Michigan Technological University, ndzgnile@mtu.edu

Congratulations to the 2015 UCOWR Award Recipients!

All recipients will be honored at the Awards Banquet on Wednesday at 6:00 PM.
Must be pre-registered to attend. Bring your ticket with you.

Warren A. Hall Medal

(recognizes distinguished achievements of an individual in the field of water resources)

Bonnie G. Colby, Professor of Agricultural and Resource Economics, The University of Arizona

Larry W. Mays, Professor of Civil and Environmental Engineering, Arizona State University

Education and Public Service

(recognizes individuals, groups, or agencies that made significant contributions to increase public awareness of water resource development, use, or management)

Llano River Field Station, led by Tom Arsuffi of Texas Tech University

Soil & Water Science (SWS) Youth Curriculum Development Team, led by Natalie Carroll of Purdue University

Friends of UCOWR

(recognizes individuals or groups who have made outstanding contributions to UCOWR)

Pat Mulroy, Senior Fellow, Brookings Institute Metropolitan Policy Program

James Dobrowolski, National Program Leader, National Institute for Food and Agriculture, USDA

Christopher Lant, Environment and Society Department Head and Professor, Utah State University

Ph.D. Dissertation

(recognizes outstanding Ph.D. dissertations in two categories)

Ken Friedman (Water Policy and Socio-Economics category)

Megan Kelly (Natural Science & Engineering category)

UCOWR Delegate Business Luncheon
Tuesday, 11:35 AM

Must be pre-registered to attend. Bring your ticket with you.

What does it mean to be a UCOWR delegate? How can you become more engaged? These questions and more will be discussed over lunch. This also serves as the Annual UCOWR Business Meeting.

Are you currently not a delegate, but interested in finding out more? See the registration desk or contact Karl Williard at williard@siu.edu.

Many Thanks

Conference Organizing Committee

David Kreamer, Chair, University of Nevada, Las Vegas
Braimah Apambire, Desert Research Institute
Elizabeth Boyer, Pennsylvania State University
Brian Hurd, New Mexico State University
Doug Kenney, University of Colorado
Zane Marshall, Southern Nevada Water Authority
Sharon Megdal, University of Arizona
Ari Michelsen, Texas A&M AgriLife Research
Tim Parker, Parker Groundwater
Abe Springer, Northern Arizona University

Technical Program Review Committee

Kofi Akamani, Southern Illinois University
Joseph Asante, Tennessee Technological University
Jeevan Jayakody, University of Nevada, Las Vegas
Jeff Johnson, Mississippi State University
David Kreamer, University of Nevada, Las Vegas
Ken McGwire, Desert Research Institute
Karl Williard, Southern Illinois University

Committee volunteers are needed for the 2016 Annual Conference in
*** Pensacola Beach, Florida. See back cover for more info. If interested, ***
contact Jeff Johnson, Conference Chair, jjohnson@drec.msstate.edu.

Thank you to all the presenters, moderators, judges, and attendees.
Each of you are vital to a successful conference!

Tell Us About Your Conference Experience

Conference evaluations forms will be handed out during the last session on Wednesday and are also available at the registration table. Return them to any session moderator or the registration table. Please provide your feedback and let's make next year's conference even better!

NOTES

NOTES

NOTES



watersmart INNOVATIONS 2015

There's no denying that if you go to Las Vegas, people will want to hear some stories when you get back. The WaterSmart Innovations Conference and Exposition is guaranteed to give them just what they're looking for. After two-and-a-half days exploring the latest in water-efficient products and attending some of the more than 130 professional sessions and panel discussions, you'll be able to regale them for hours and hours about the latest advancements in water conservation. After all, as the world's premier water conservation event, we have a reputation to uphold.

REGISTER NOW for the eighth annual WaterSmart Innovations Conferenceand Exposition – Oct. 7–9, 2015, in Las Vegas. Get more info at WaterSmartInnovations.com.

@WSIConfExpo wsiconference

Calling All Water Professionals

Need an outlet for your work?
Consider the *Journal of Contemporary Water Research and Education*

JCWRE is a peer-reviewed journal devoted to disseminating original work in water research, policy, education, and extension. The journal is published three times a year, with two themed issues comprised of invited authors and one open issue devoted to general submissions.



Interested in submitting a manuscript to our first open issue in July 2016? Visit ucowr.org for author instructions.

Have an idea for a themed issue?
Contact Karl Williard, williard@siu.edu

JCWRE is a publication of the Universities Council on Water Resources

Nearby Dining

A Few of the Many Options Located in "The District at Green Valley Ranch" (across the street from the Hotel Resort)	Inside the Hotel Resort
Balboa Pizza – beach-themed restaurant & bar	Pizza Rock
Elephant Bar – wok-fired global cuisine	Turf Grill
Rachel's Kitchen – breakfast, burgers, sandwiches, pasta, salads, smoothies	Grand Cafe
Panera Bread – sandwiches, soup, salad, bakery	Feast Buffet
King's Fish House – seafood, fish, sushi, steak, pasta, sandwiches, salads	Tides Seafood & Sushi Bar
Lucille's Smokehouse Bar-B-Que – down-home BBQ joint	Capriotti's
Crazy Pita Rotisserie & Grill – fresh casual Mediterranean	Fatburger
Josie's Frozen Yogurt	Starbucks

Getting Around

Green Valley Ranch Shuttle Schedule

First come, first serve. Must be hotel guest and present room key.
(contact the bell desk with questions at (702) 617-7745)

To and From McCarran Airport

Departs GVR	Departs Airport
Drops off at departure level	*Picks up at ground zero*
7:00 AM	7:30 AM
9:00 AM	9:30 AM
11:00 AM	11:30 AM
1:00 PM	1:30 PM
3:00 PM	3:30 PM
5:00 PM	5:30 PM
7:00 PM	7:30 PM
9:00 PM	9:30 PM

To and From the Strip

Departs GVR	Departs Mandalay Bay Hotel
Picks up at GVR Hotel Valet	*Picks up at Tour & Travel Lobby located on lower level*
12:00 PM	12:30 PM
2:00 PM	2:30 PM
4:00 PM	4:30 PM
8:00 PM	8:30 PM

Taxi Services

Desert Cab Company (702) 386-9102
Henderson Taxi Company (702) 384-2322
Lucky Cab Co. (702) 477-7555
Nellis Cab Company (702) 248-1111
Western Cab Company (702) 736-8000

Rental Cars

McCarran Airport Rent-A-Car Center (702) 261-6001
Avis (800) 331-1212
Enterprise (800) 384-2322
Hertz (800) 477-7555

Public Transportation

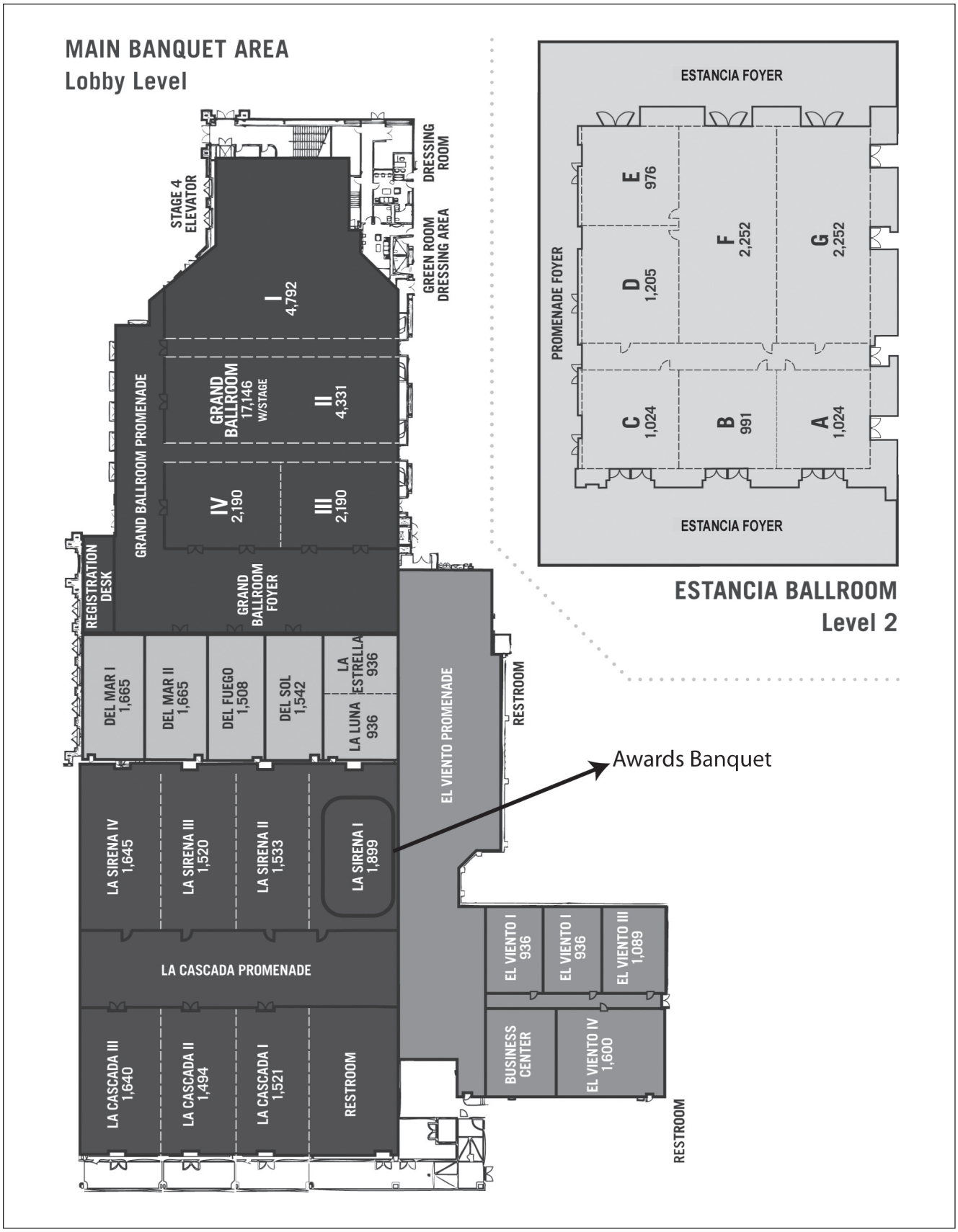
Regional Transportation Commission of Southern NV
(702) 228-7433
http://www.rtcsnv.com/

Vegas Area Attractions

Hoover Dam - http://www.usbr.gov/lc/hooverdam/service/index.html
Lake Mead National Recreation Area - http://www.nps.gov/lake/index.htm
Red Rock Canyon National Conservation Area - http://www.redrockcanyonlv.org/
Springs Preserve - http://www.springspreserve.org/
High Roller - https://www.caesars.com/thelinq/high-roller.html#.VC2m4vldUYk
Discovery Children's Museum - http://www.discoverykidslv.org/
Cirque du Soleil - http://www.cirquedusoleil.com/en/home/shows/americas/usa/nevada/las-vegas.aspx
Other Area Attractions - http://www.vegas.com/attractions/

Meeting Rooms Layout

All activities, except for the banquet, are located on level 2 in the Estancia Ballroom meeting rooms. The Awards Banquet is on the lobby level in La Sirena I.



Mark your calendars!

June 21-23, 2016

2016 UCOWR/NIWR Annual Conference
Hilton Pensacola Beach Gulf Front
Pensacola Beach, FL

Interested in serving on the conference planning committee?
Contact Jeff Johnson, Conference Chair, jjohnson@drec.msstate.edu

Have an idea for a special session?
Submit a one paragraph proposal to ucowr@siu.edu by September 25, 2015.

Online abstract submission opens in October. Abstract deadline is January 29, 2016.



For upcoming details, check our website (www.ucowr.org) and like us on Facebook (facebook.com/ucowr).

Universities Council on Water Resources
1231 Lincoln Drive, Mail Code 4526 • Southern Illinois University • Carbondale, IL 62901
Ph: 618-536-7571 • Fax: 618-453-2671 • ucowr@siu.edu • www.ucowr.org