

2019 UCOWR/NIWR Annual Water Resources Conference



June 11-13, 2019
Snowbird, Utah

UCOWR
UNIVERSITIES COUNCIL
ON WATER RESOURCES

NIWR
THE NATIONAL INSTITUTES
FOR WATER RESOURCES

SPECIAL EVENTS

----- TUESDAY -----

UCOWR Delegate Business Luncheon
11:30 AM - 12:45 PM
(see pg. 6)

CUAHSI Water Data Services Workshop
1:00 PM - 3:50 PM
(see pg. 11)

Welcome Reception & Poster Session
5:30 PM - 7:00 PM
(see pg. 11)

----- WEDNESDAY -----

Breakfast Roundtable Discussions
7:30 AM - 8:30 AM
(see pg. 13)

Awards Luncheon
12:00 PM - 1:50 PM
(see pg. 29)

**JCWRE Editors & Associate
Editors Meeting**
3:40 PM - 4:30 PM

Happy Hour Hike
5:30 PM - 6:15 PM
(see pg. 28)

**Happy Hour/Social
Networking**
6:00 PM
(see pg. 28)

----- THURSDAY -----

Field Trip: Provo River Restoration Project
12:45 PM - 5:00 PM (see pg. 27) Must be pre-registered.

Conference Sponsors

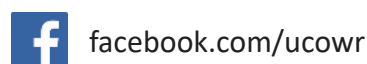


Utah State University
UTAH WATER RESEARCH LABORATORY

COLLEGE of
ENGINEERING
Utah State University

Exhibitors

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Welcome from Conference Chair, UCOWR President, and NIWR President

Dear Colleagues,

Welcome to Snowbird, Utah! We are excited for you to participate in the Annual Water Resources Conference of the Universities Council on Water Resources and the National Institutes for Water Resources. During your time here, we hope you engage with colleagues and share ideas while enjoying the beautiful surroundings. We have an exciting and informative program planned. Each day opens with a plenary session. Tuesday's plenary session includes two prominent speakers: Jack Schmidt from Utah State University who will discuss planning for the future of the Colorado River, and Robert Davies from Utah State University who will focus on finding solutions that synergistically address the environmental and social challenges we face in planning our water future. Wednesday's plenary session features the Warren A. Hall Medal recipient, Jack Webster from Virginia Tech University, whose distinguished career focused on ecosystem processes in streams. The closing plenary session features two experts in water conservation and efficiency: Amy Vickers, who will speak on the impact of water conservation on long-term drought, and Peter Mayer, who will address urban water demand trends and the future of American water use. The 39 concurrent sessions encompass an array of water resources topics and include participatory sessions, lightning talks, and panel discussions. Additionally, we offer a free workshop on Tuesday from 1:00 to 3:50 pm. Facilitated by CUAHSI, this workshop is designed to enhance your data management skills. Sign up at the Registration Desk!

The conference offers plenty of networking and socializing opportunities, including the Welcome Reception, Annual Awards Luncheon, and Happy Hour Hike. Join a Roundtable Discussion on Wednesday morning and discuss ways to collaborate with like-minded colleagues. Don't forget about the two field trips, the Wasatch Water Tunnel Tour and the Provo River Restoration Project; check with the Registration Desk for availability.

Thank you to the participants, plenary speakers, organizers, and all who made this meeting possible. Best wishes for a productive and engaging conference!

David Stevens, Conference Chair
Jeff Johnson, UCOWR President
Dan Devlin, NIWR President

David Stevens
Conference Chair



Jeff Johnson
UCOWR President



Dan Devlin
NIWR President



UNIVERSITIES COUNCIL ON WATER RESOURCES (UCOWR) is a consortium of academic institutions and affiliates invested in water resources research, education, and outreach. UCOWR expands the capacity of universities and their partners to address current water resources challenges through sharing expertise, fostering leadership, and developing interdisciplinary collaborations. 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 (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.info.

Special thanks to Southern Illinois University for their ongoing support of UCOWR.

SIU Southern Illinois University
CARBONDALE

MONDAY, JUNE 10

EARLY REGISTRATION
4:00 PM - 6:00 PM

(ATRIUM OVERLOOK - LOBBY LEVEL|L)

TUESDAY, JUNE 11

Registration 7:30 AM - 3:30 PM (ATRIUM OVERLOOK - LOBBY LEVEL|L)

OPENING PLENARY SESSION

8:30 AM - 9:50 AM

(BALLROOM 1 - LOWER LEVEL|L1)

Welcome by Conference Chair, David Stevens; UCOWR President, Jeff Johnson; NIWR President, Dan Devlin

John (Jack) C. Schmidt - Janet Quinney Lawson Chair in Colorado River Studies, Utah State University
Robert Davies - Professor of Professional Practice, Physics Department, Utah State University

7:30 AM - 8:30 AM
BREAKFAST

(ATRIUM OVERLOOK - LOBBY LEVEL|L)



9:50 AM - 10:10 AM

(ATRIUM OVERLOOK - LOBBY LEVEL)

CONCURRENT TECHNICAL SESSIONS

10:10 AM - 11:25 AM

Groundwater (Wasatch A)

Between Science and Policy: Toward Closing the Gap between Scientists and Policy-Makers in the Water-Energy-Food Nexus (Wasatch B)

Extension Education - Adapting to a Changing Audience (Superior A)

Panel Discussion: Connecting Land and Water: Research in the Colorado River Basin (White Pine)

Hydrologic Processes (Superior B)

11:30 AM - 12:45 PM

UCOWR DELEGATE

BUSINESS LUNCHEON

(MAGPIE PATIO - LOWER LEVEL|L1;
MAGPIE B IF INCLEMENT WEATHER)

Must be pre-registered and bring ticket. See pg. 6.

All others - lunch on your own

CONCURRENT TECHNICAL SESSIONS

1:00 PM - 2:15 PM

Panel Discussion: Informing the Future of Water Resources Programing Through Integration of the Social and Natural Sciences and Enhanced Trans-Organizational Collaboration (Wasatch A)

Agricultural Water Conservation I (Wasatch B)

Water Quality Monitoring and Assessment (Superior A)

Panel Discussion: Sustainable Water Resources for Irrigated Agriculture (Superior B)

CUAHSI Water Data Services Workshop (White Pine)

11:45 AM - 12:45 PM

SNOWBIRD WATER TUNNEL TOUR

(MEET AT REGISTRATION DESK)

Must be pre-registered.



2:15 PM - 2:35 PM

(ATRIUM OVERLOOK - LOBBY LEVEL|L)

CONCURRENT TECHNICAL SESSIONS

2:35 PM - 3:50 PM

Tips and Tools for Effective Visualization, Design, and Communication of Your Research (Wasatch A)

Agricultural Water Conservation II (Wasatch B)

Data Management and Modeling (Superior A)

Human Induced Planetary Change - The Broader View of Climate Change Adaptation and its Implications for Water Resources Management I (Superior B)

CUAHSI Water Data Services Workshop, Continued (White Pine)



3:50 PM - 4:10 PM

(ATRIUM OVERLOOK - LOBBY LEVEL|L)

CONCURRENT TECHNICAL SESSIONS

4:10 PM - 5:10 PM

Panel Discussion: Stakeholder Engagement in Answering to Water Quality and Quantity Problems (Wasatch A)

Water Resource Development and Environmental Quality in Developing Communities (Wasatch B)

Bacteria Sources, Fate, and Transport in Aquatic Systems (Superior A)

Human Induced Planetary Change - The Broader View of Climate Change Adaptation and its Implications for Water Resources Management II (Superior B)

5:30 PM - 7:00 PM

WELCOME RECEPTION

& POSTER SESSION

(ATRIUM OVERLOOK - LOBBY LEVEL|L)

WEDNESDAY, JUNE 12

Registration 7:30 AM - 3:30 PM (ATRIUM OVERLOOK - LOBBY LEVEL|L)

PLENARY SESSION: WARREN A. HALL MEDAL RECIPIENT

8:30 AM - 9:20 AM

(BALLROOM 1 - LOWER LEVEL|L1)

Jack Webster - Professor Emeritus of Ecology, Virginia Tech

CONCURRENT TECHNICAL SESSIONS

9:40 AM - 10:40 AM

Introducing & Exploring SMERGE: An Improved Historical U.S. Soil-Moisture Product (Wasatch A)
Water Issues in the Columbia River Basin I (Wasatch B)
Wastewater Treatment - Innovative Methods and Funding (Superior A)
Climate Change Impacts (Superior B)

CONCURRENT TECHNICAL SESSIONS

11:00 AM - 12:00 PM

Water Research and Training: Diversity and Interdisciplinary Efforts (Wasatch A)
Water Issues in the Columbia River Basin II (Wasatch B)
Panel Discussion: Illinois Stakeholder Implementation of the Nutrient Loss Reduction Strategy I (Superior A)
In-stream Flows (Superior B)

CONCURRENT TECHNICAL SESSIONS

2:00 PM - 3:15 PM

Panel Discussion: How to Have a Successful Grant Proposal - Insight from Syntheses of the USDA-NIFA Water and Climate Portfolios (Wasatch A)
Urban Water Conservation and Water Security (Wasatch B)
Illinois Stakeholder Implementation of the Nutrient Loss Reduction Strategy (Superior A)
Operational Satellite-based Remote Sensing Products to Support Agricultural Adaptation to Drought (Superior B)

CONCURRENT TECHNICAL SESSIONS

3:35 PM - 4:50 PM

The USGS Water Resources Research Act National Competitive Grants Program (104G): What Have We Learned in the Last 10 Years? (Wasatch A)
Water Reuse in Utah: Exploring Opportunities and Risks through Engineering, Extension, and Social Science (Wasatch B)
Agricultural Water Quality BMPs (Superior A)
Tools and Resources for Coping with the Impacts of Drought and Water Scarcity in a Changing Climate (Superior B)

THURSDAY, JUNE 13

Registration 7:30 AM - 10:00 AM (ATRIUM OVERLOOK - LOBBY LEVEL|L)

PLENARY SESSION

8:30 AM - 9:50 AM

(BALLROOM 1 - LOWER LEVEL|L1)

Amy Vickers - President of Amy Vickers & Associates, Inc.
Peter Mayer - Professional Engineer and Founder of WaterDM

CONCURRENT TECHNICAL SESSIONS

10:10 AM - 11:40 AM

Lightning Talk Session: WERA - Watershed Processes and Human Water Systems (Wasatch A)
Panel Discussion: Water-efficient Cities and Schools Ready To Meet Our Water-short Future (Wasatch B)
Harmful Algal Blooms (Superior A)
Predicting, Monitoring, and Responding to Drought (Superior B)

7:30 AM - 8:30 AM

BREAKFAST & ROUNDTABLE DISCUSSIONS

(ATRIUM OVERLOOK - LOBBY LEVEL|L)

See pg. 13.



9:20 AM - 9:40 AM

(ATRIUM OVERLOOK - LOBBY LEVEL|L)



10:40 AM - 11:00 AM

(ATRIUM OVERLOOK - LOBBY LEVEL|L)

12:00 PM - 1:50 PM

AWARDS LUNCHEON

(ATRIUM PATIO - LOWER LEVEL|L1;
BALLROOMS 2 & 3 IF INCLEMENT WEATHER)
Must be pre-registered and bring ticket.

See pg. 29.

All others - lunch on your own



3:15 PM - 3:35 PM

(ATRIUM OVERLOOK - LOBBY LEVEL|L)

3:40 PM - 4:30 PM

JCWRE EDITORS & ASSOCIATE EDITORS MEETING (CIRQUE - LOBBY LEVEL|L)

5:00 PM - 6:00 PM

SNOWBIRD WATER TUNNEL TOUR

(MEET AT REGISTRATION DESK)

Must be pre-registered.

5:30 PM - 6:15 PM

HAPPY HOUR HIKE

(MEET AT REGISTRATION DESK) See pg. 28.

6:00 PM

HAPPY HOUR/SOCIAL NETWORKING

(TRAM CLUB)

7:00 AM - 8:00 AM

SNOWBIRD WATER TUNNEL TOUR

(MEET AT REGISTRATION DESK)

Must be pre-registered.

7:30 AM - 8:30 AM

BREAKFAST

(ATRIUM OVERLOOK - LOBBY LEVEL|L)



9:50 AM - 10:10 AM

(ATRIUM OVERLOOK - LOBBY LEVEL|L)

12:45 PM - 5:00 PM

FIELD TRIP

PROVO RIVER RESTORATION PROJECT
(MEET AT REGISTRATION DESK) See pg. 27.
Must be pre-registered and bring ticket.

TUESDAY, JUNE 11

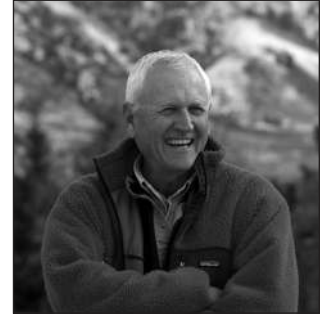
8:30 AM - 9:50 AM

**OPENING PLENARY SESSION
(BALLROOM 1 - LOWER LEVEL | L1)**

Moderator - David Stevens, Utah State University

Welcome Remarks - David Stevens, Conference Chair; Jeff Johnson, UCOWR President; Dan Devlin, NIWR President

JOHN (JACK) C. SCHMIDT is Janet Quinney Lawson Chair in Colorado River Studies at Utah State University. He leads the Center for Colorado River Studies and has been on the faculty for more than 25 years. His research is focused on describing the geomorphic history of western rivers and developing programs for rehabilitation of degraded ecosystems. Between 2011 and 2014, he served as Chief of the USGS/Grand Canyon Monitoring and Research Center.



“PLANNING FOR THE FUTURE OF THE COLORADO RIVER”

A warming climate is predicted to cause decreased runoff in the Colorado River basin, especially from the Rocky Mountains whose snowmelt comprises most of the stream flow of the mainstem river. One aspect of the impending decrease in watershed runoff is that water-supply managers will be forced to make decisions about where to store declining water supplies, especially in years of protracted drought. Should water be primarily stored in upstream reservoirs where evaporation is less or in Lakes Powell and Mead that produce large amounts of hydroelectricity? Should water be primarily stored in Lake Powell, in Lake Mead, or in equal amounts in both reservoirs? Decisions about keeping some reservoirs relatively full and others relatively empty have the potential to drastically change some of the existing novel aquatic ecosystems that have developed since construction of the large reservoirs of the Colorado River watershed.

ROBERT DAVIES is Professor of Professional Practice in the Physics Department at Utah State University, where he focuses on global environmental change and critical science communication. Over the past decade, Rob has developed and delivered hundreds of public lectures on climate change and human sustainability. Rob is also co-creator of The Crossroads Project, a “performance science” collaboration that has been performed for audiences across the nation on the critically important topic of human sustainability and vibrancy. Rob is a past associate of the Utah Climate Center; has served as a scientific liaison for NASA on the International Space Station Project; as a project scientist with Utah State University’s Space Dynamics Laboratory; and an officer and meteorologist in the United States Air Force.



“FINDING CONTEXT”

As scientists, citizens, and policymakers continue to plan our water future, it is more important than ever that these discussions take place — and these decisions are made — through a lens that recognizes and includes all pieces of the puzzle. “If a problem is too big to be solved” said Dwight Eisenhower, “make it bigger.” In this talk I will make the problem bigger; in doing so, I hope to enlarge the solution space dramatically. I will overview a developing framework of Planetary Boundaries and Social Foundations — a framework that encompasses the full context of the issues this conference seeks to address. What are the environmental challenges that are co-extant with water; what are the concomitant social challenges; and what are the solution pathways that synergistically address, rather than exacerbate, other environmental and social challenges.



9:50 AM - 10:10 AM

(ATRIUM OVERLOOK- LOBBY LEVEL | L)

10:10 AM - 11:25 AM

CONCURRENT TECHNICAL SESSIONS

*Student presenter in oral presentation competition

Session 1 **GROUNDWATER** **Wasatch A**
 Moderator - Ron Lacewell, Texas A&M AgriLife

- 10:10 AM **Understanding the Causes and Impacts of Groundwater Depletion** - John Tracy, Texas A&M AgriLife Research - TWRI (Authors: J. Tracy, L.F. Konikow, J. Johnson, S. Sibray, Z. Sheng, D. Porter)
- 10:25 AM **Linking Landscape Hydrologic Processes to Spring Ecosystem Dynamics** - Nathan Reaver, University of Florida
- 10:40 AM **Physical Processes Underlying Dramatic Structural Changes to a Mangrove Lagoon in the U.S. Virgin Islands: Surface and Groundwater Trends Surrounding Hurricane Maria and Recurring Drought** - Allie Durdall, University of the Virgin Islands, Center for Marine and Environmental Science (Authors: A. Durdall, A. Reeve, K.W. Grimes)
- 10:55 AM **Perennial Crop Dynamics May Affect Groundwater Sustainability** - Bradley Franklin, School of Public Policy, University of California-Riverside (Authors: B. Franklin, K. Schwabe, K. Knapp, L. Levers)
- 11:10 AM **Models of Nutrient Biogeochemical Processes Derived from Hyporheic Zone Studies in Coastal California Watersheds** - Barry Hibbs, California State University, Los Angeles (Authors: M. DeHoyos, D. Puga)

Session 2 **BETWEEN SCIENCE AND POLICY: TOWARD CLOSING THE GAP BETWEEN SCIENTISTS AND POLICY-MAKERS IN THE WATER-ENERGY-FOOD NEXUS** **Wasatch B**
 Moderator - Bryce Hannibal, Texas A&M University

- 10:10 AM ***Modeling the Uptake and Spread of Technological and Institutional Innovations in Managed Storage for a FEW System** - Daniel Mueller, Washington State University (Authors: M. Goldsby, D. Mueller, H. Roshan, S. Hoard, J. Padowski)
- 10:25 AM **Life Cycle Water Consumption for Transportation Fuel Production in the U.S.** - David Lampert, Oklahoma State University
- 10:40 AM **Toward Understanding the Level of Convergence between Researchers and Stakeholders Perspectives on Issues Related to Water-Energy-Food (WEF) Challenges: The Case of San Antonio, Texas** - Bryce Hannibal, Texas A&M University (Authors: B. Daher, B. Hannibal, R. Mohtar, K. Portney)
- 10:55 AM **Produced Water Reuse and Recycling in Oklahoma** - David Lampert, Oklahoma State University (Author: H. Atoufi)
- 11:10 AM **The Blue City: Urban Metabolism and the Energy-Water Nexus** - Christopher Chini, University of Illinois

Session 3 **EXTENSION EDUCATION - ADAPTING TO A CHANGING AUDIENCE** **Superior A**
 Moderator - Drew Gholson, Mississippi State University

- 10:10 AM **Texas Watershed Steward Program** - Michael Kuitu, Texas A&M AgriLife Extension (Authors: J. Mowrer, W. Ling, D. Gholson)
- 10:25 AM **The Ups and Downs of Watershed Protection Plan Implementation** - Ward Ling, Texas A&M AgriLife Extension
- 10:40 AM **Successful Watershed Management in the Midwest: Getting to Scale** - Rebecca Power, University of Wisconsin-Madison (Authors: R. Power, A.R.P. Vishweshwer)
- 10:55 AM **Oklahoma's Perspectives on Water Issues and Implications to Water Education Programs** - Kevin Wagner, Oklahoma Water Resources Center, Oklahoma State University (Authors: K. Wagner, C. Eck, B. Chapagain, O. Joshi)
- 11:10 AM **Panel Discussion with Audience**

Session 4

PANEL DISCUSSION

Superior B

CONNECTING LAND AND WATER: RESEARCH IN THE COLORADO RIVER BASIN

Moderator - Faith Sternlieb, Lincoln Institute of Land Policy

10:10 AM

Coordination of land and water use decisions is critical if we are to meet the current and future water needs of communities, economies, and environments in the rapidly urbanizing American West. Greater coordination is also needed among researchers and between researchers and practitioners to identify, implement, and share research goals, funding opportunities, and future directions for integrating land and water research that could lead to creating and facilitating sustainable land and water policies. Help us develop a research network focused on advancing the state of research and practice on linking water and land research, policy, and management in the West.

Panelists:

Sharon B. Megdal, University of Arizona Water Resources Research Center

Gretel Follingstad, University of Colorado, Denver

David Kreamer, University of Nevada, Las Vegas

Ginger Paige, University of Wyoming

Joanna Endter-Wada, Utah State University

David DuBois, New Mexico State University

Session 5

HYDROLOGIC PROCESSES

White Pine

Moderator - Rajendra Khanal, University of Utah

10:10 AM

Effects of Disturbance on Soil Hydrology in Northern Great Plains Grasslands - Laurent Ahiablame, UC Agriculture & Natural Resources (Authors: J. Comer, L. Ahiablame, L. Perkins, P. Johnson)

10:25 AM

Circular Buffer Strips to Conserve Water and Improve Water Use Efficiency of Center Pivot Irrigated Agriculture in the Southern High Plains - Sangu Angadi, New Mexico State University (Authors: S. Angadi, S. Begna, P. Singh, P. Gowda, M.R. Umesh, G. Marek)

10:40 AM

Salton Sea Solutions: Water Markets - Lucia Levers, University of Minnesota (Authors: L. Levers, K. Schwabe, T. Skaggs, D. Story)

10:55 AM

***Unimpaired Hydrologic Metric Scaling for California Streams** - Karl Christensen, Utah State University (Authors: K. Christensen, B. Lane)

11:10 AM

Brandywine and the Piedmont: Restoration and Revival of America's Most Historic Small Watershed - Jerry Kauffman, University of Delaware

11:30 AM - 12:45 PM LUNCH

**UCOWR DELEGATE BUSINESS LUNCHEON: ENGAGEMENT THROUGH ACTION
(MAGPIE PATIO - LOWER LEVEL | L1; MAGPIE B IF INCLEMENT WEATHER)**

Must be pre-registered and bring ticket.

Are you a delegate for your member institution? Hint: Check your name badge! Join the UCOWR board and fellow delegates for this interactive luncheon. No sitting through long presentations. You will enjoy lunch as we strategize and develop action plans around opportunities that expand the reach and impact of UCOWR and promote delegate engagement through important service and leadership roles.

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 ***

ALL OTHERS - LUNCH ON YOUR OWN

11:45 AM - 12:45 PM

**SNOWBIRD WATER TUNNEL TOUR
(MEET AT REGISTRATION DESK)**

Must be pre-registered.

1:00 PM - 2:15 PM

CONCURRENT TECHNICAL SESSIONS

*Student presenter in oral presentation competition

Session 6 **Wasatch A**
PANEL DISCUSSION
INFORMING THE FUTURE OF WATER RESOURCES PROGRAMING THROUGH INTEGRATION OF THE SOCIAL AND NATURAL SCIENCES AND ENHANCED TRANS-ORGANIZATIONAL COLLABORATION
 Moderator - Mary J. Donohue, University of Hawaii Water Resources Research Center

- 1:00 PM **The USGS Water Resources Research Act Program: Integrating University and Federal Research, Outreach, and Education** - Earl A. Greene, USGS Water Resources Research Act Program
- 1:15 PM **The NOAA National Sea Grant College Program and USGS Water Resources Research Act Program - A Natural Partnership** - Darren T. Lerner, University of Hawaii Water Resources Research Center (Authors: D.T. Lerner, M.J. Donohue, E.A. Greene, K. Bareford)
- 1:30 PM **Bridging the Water Information Gap: The National Water Extension Program** - Karen Bareford, NOAA and University of Alabama
- 1:45 PM **A Trans-disciplinary Faculty Cluster Hire in Energy and Water Sustainability: Developing Actionable Scholarship via Collaboration and Diversity** - Mary J. Donohue, University of Hawaii Water Resources Research Center (Authors: M.J. Donohue, D.T. Lerner)
- 2:00 PM **Panel Discussion with Audience**

Session 7 **Wasatch B**
AGRICULTURAL WATER CONSERVATION I
 Moderator - Sangu Angadi, New Mexico State University

- 1:00 PM ***Agricultural Water Management Decisions in Ungauged Semi-arid Watersheds: Value of Remote Sensing Integrated Hydrologic Modeling** - Manashi Paul, University of Maryland, College Park (Authors: M. Paul, M. Negahban-Azar)
- 1:15 PM **Impacts of Variable Irrigation Regimes on Cotton Yield and Fiber Quality** - Saleh Taghvaeian, Oklahoma State University (Authors: J. Stivers, R. Boman)
- 1:30 PM **Scarcity Amidst Plenty: Can Farm-level Profitable Water Conservation Practices Reverse the Decline of the Mississippi River Alluvial Aquifer in the Delta?** - Nicolas Quintana Ashwell, Mississippi State University, Delta Research and Extension Center
- 1:45 PM ***Conservation Management Practices in Mid-southern, USA Corn Production** - Dave Spencer, Mississippi State University (Authors: D. Spencer, J. Krutz, M. Locke, C. Bryant)
- 2:00 PM ***Increasing Mid-southern USA Furrow-Irrigation Application Efficiency through Conservation Production Systems** - Corey Bryant, Mississippi State University (Authors: C. Bryant, L.J. Krutz, M.A. Locke, B.R. Golden, D.B. Reynolds, T. Irby)

Session 8 **Superior A**
WATER QUALITY MONITORING AND ASSESSMENT
 Moderator - Carly Hansen, University of Utah

- 1:00 PM **Three Rivers QUEST – Ohio Basin Monitoring** - Melissa O’Neal, West Virginia Water Research Institute
- 1:15 PM **Native Water Protection Flows through Self-Determination: Understanding Tribal Water Quality Standards and “Treatment as a State”** - Sibyl Diver, Stanford University
- 1:30 PM **Effect of Surface Coal Mine Reforestation on Soil Water Chemistry** - Amir Hass, West Virginia State University (Authors: A. Hass, J.G. Skousen, R. Cantrell)
- 1:45 PM **Exceedence of Maximum Contaminant Level Drinking Water Standards in Grand Canyon Springs and Implications for Future Monitoring** - David Kreamer, University of Nevada, Las Vegas
- 2:00 PM **Three Rivers QUEST (3RQ) REACH 4Schools STREAMing** - Melissa O’Neal, West Virginia Water Research Institute

TUESDAY, JUNE 11

Session 9	PANEL DISCUSSION	Superior B
SUSTAINABLE WATER RESOURCES FOR IRRIGATED AGRICULTURE		
Moderator - John Tracy, Texas A&M AgriLife Research - TWRI		

1:00 PM **Evaluating Water Scarcity under Climate Change with a Basin Scale Model** - Alex Mayer, Michigan Tech University
(Authors: A. Mayer, D. Gutzler, D. Pennington, F. Ward)

1:20 PM **Evaluating Salinity and Other Water Quality Concerns with SWAT** - Zhuping Sheng, Texas AgriLife Research
(Authors: E. Ayana, Z. Sheng, R. Srinivasan, A. Mirchi, S. Ahn)


1:40 PM **Panel Discussion with Audience**
Panelists:
Bill Hargrove, University of Texas at El Paso
Ali Mirchi, Oklahoma State University
Alex Mayer, Michigan Tech University
Zhuping Sheng, Texas AgriLife Research

Session 10	CUAHSI WATER DATA SERVICES WORKSHOP	White Pine
Facilitator - CUAHSI		

1:00 PM **This workshop continues into Session 15 with a break between sessions. Participants attend both sessions. Must be pre-registered to attend. Check at the Registration Desk to see if space is available. Bring your laptop.**

Come learn about CUAHSI's Water Data Services. These services are free, open-access, and available to everyone. Learn how these services can help you and your team:

- Develop data management plans, which are now required by most funders.
- Discover and find a broad array of water data-time series, samples, spatial coverages, and more.
- Use CUAHSI apps and tools for expediting and documenting workflows.
- Share your data within a group and publish your data with a DOI.

2:15 PM - 2:35 PM
 **(ATRIUM OVERLOOK- LOBBY LEVEL | L)**
Light refreshments available.

2:35 PM - 3:50 PM
CONCURRENT TECHNICAL SESSIONS
*Student presenter in oral presentation competition

Session 11	TIPS AND TOOLS FOR EFFECTIVE VISUALIZATION, DESIGN, AND COMMUNICATION OF YOUR RESEARCH	Wasatch A
Facilitators - Nicole Wilkinson McIntosh, NC Water Resources Research Institute; Walt Gurley, Data & Visualization Librarian at NC State University		

2:35 PM Designed for students, faculty, and professionals, this workshop emphasizes effective visualization, design, and communication of your research. We will focus on poster and oral presentations for conferences, as well as overall principles for narrowing the focus of your communication, conveying key points to diverse audiences, the role of narrative in your communication, as well as fundamental design principles for visual media (posters, print, and PowerPoint presentations) that have a significant impact on how your material is received by viewers. The session will consist of presentations, group exercises, and constructive critiques of content to reinforce design principles and before and after examples of presentation materials.

Session 12 **AGRICULTURAL WATER CONSERVATION II** **Wasatch B**
 Moderator - Fengwei Hung, Utah State University

- 2:35 PM** **Stochastic Analysis of Cover Crops and Conservation Tillage Practices in Louisiana Soybean Production under Risk** - Naveen Adusumilli, LSU AgCenter (Authors: N.Adusumilli, S. Dodla, H. Wang, M. Deliberto)
- 2:50 PM** **A Dry-year Option for Irrigation in the Texas Lower Rio Grande Valley** - Ron Lacewell, Texas A&M AgriLife (Authors: N. Sinha, R. Lacewell, L. Ribera)
- 3:05 PM** **Crop Diversification and Critical Stage Based Irrigation to Sustain the Ogallala Aquifer** - Sangu Angadi, New Mexico State University (Authors: S. Angadi, S. Begna, S. Singh, K. Katuwal, P. Singh, J. Singh)
- 3:20 PM** **Evaluation of Agricultural Best Management Practices on Groundwater Recharge** - Glenn O’Neil, Institute of Water Research - Michigan State University (Author: J. Asher)
- 3:35 PM** **Testing Pivot Irrigation Innovations on Utah Farms** - Matt Yost, Utah State University

Session 13 **DATA MANAGEMENT AND MODELING** **Superior A**
 Moderator - Ginger Paige, University of Wyoming

- 2:35 PM** **The Role of Data Standardization in Support of Water Governance: An Ongoing Data Integration Experiment in the Western U.S.** - Sara Larsen, Western States Water Council (Authors: S. Larsen, A. Abdallah, T. Willardson)
- 2:50 PM** **Using HydroShare for FAIR Data Management: Improving Opportunities for Data Reuse and the Reproducibility of Research Results** - Jeffery Horsburgh, Utah State University (Authors: J. Horsburgh, D.G. Tarboton, A. Castronova, The HydroShare Development Team)
- 3:05 PM** **Effects of Point and Non-point Sources on Water Quality Short-term Assessment at the Kanawha River, West Virginia** - Fernando Rojano, West Virginia State University (Authors: F. Rojano, D.H. Huber, I.R. Ugwuanyi, V.L. Noundou, A.L. Kemajou)
- 3:20 PM** **Moving Water Quality Monitoring into the 21st Century: Timely Assessment of Minnesota’s 10,000 Lakes Using Satellite Imagery** - Jeffery Peterson, University of Minnesota (Authors: L. Olmanson, B. Page, D. Porter, M. Bauer, P. Brezonik, J. Peterson)
- 3:35 PM** **Hydrodynamic and Sediment Transport Modeling of a Large, Shallow Lake in the Semi-arid West** - Nicholas von Stackelberg, Utah Department of Environmental Quality (Authors: N. von Stackelberg, M. Barber, J. Su)

Session 14 **HUMAN INDUCED PLANETARY CHANGE - THE BROADER VIEW OF CLIMATE CHANGE ADAPTATION AND ITS IMPLICATIONS FOR WATER RESOURCES MANAGEMENT I** **Superior B**
 Moderator - Upmanu Lall, Columbia University

- 2:35 PM** **Forecasting Streamflow in Every River in the World using Global Climate Models** - Dan Ames, Brigham Young University (Authors: D. Tarboton, J. Nelson, N. Jones)
- 2:50 PM** **Adapting to Extreme Hydrologic Events in the Bear River Basin** - Connely Baldwin, PacifiCorp
- 3:05 PM** **Water Management and Policy Innovations in a Changing Climate: Integration of Resource, Hazard, and Stewardship Considerations** - Shaleen Jain, University of Maine (Authors: S. Jain, A. Lausier, M. Beyene, N. Dhakal, N. Abdullah, A. Aljoda)
- 3:20 PM** **Water Futures - Planning and Management Considering the Relative Roles of Technological, Social and Climate Change** - Upmanu Lall, Columbia University
- 3:35 PM** **Decision Framework for Infrastructure Sequencing (DFIS): A Holistic Approach for Regional Water Supply Planning** - Tirusew Asefa, Tampa Bay Water

Session 15 **CUAHSI WATER DATA SERVICES WORKSHOP, CONTINUED** **White Pine**
 Facilitator - CUAHSI

- 2:35 PM** **Continued from Session 10. Must be pre-registered to attend. Check at the Registration Desk to see if space is available. Bring your laptop.**

 **3:50 PM - 4:10 PM**
(ATRIUM OVERLOOK- LOBBY LEVEL | L)

TUESDAY, JUNE 11

4:10 PM - 5:10 PM

CONCURRENT TECHNICAL SESSIONS

*Student presenter in oral presentation competition

Session 16

PANEL DISCUSSION

Wasatch A

STAKEHOLDER ENGAGEMENT IN ANSWERING TO WATER QUALITY AND QUANTITY PROBLEMS

Moderator - Chrissie Bausch, Arizona State University

4:10 PM

Increasingly biophysical science is being asked to provide best management practices as well as a scientific basis for regulatory actions. A USDA funded project that attempts to address how best to present and conduct biophysical research to obtain stakeholder buy-in will be discussed. The research project is being conducted in five study locations located in three different states and focuses on water quantity and quality issues. Our project is premised on the notion that water quantity and quality issues can be better approached through a process where stakeholders, communities, scientists, and experts collaboratively identify, investigate, and solve water issues. We will provide an overview of the project from the perspective of the biophysical scientists called on to provide research-based data to answer the questions raised by the process.

Panelists:

Shad Nelson, Texas A&M University Kingsville

Chittaranjan Ray, Nebraska Water Center

Clinton Williams, USDA-ARS, US Arid-Land Agricultural Research Center

Daran Rudnick, University of Nebraska - Lincoln

Session 17

**WATER RESOURCE DEVELOPMENT AND ENVIRONMENTAL QUALITY
IN DEVELOPING COMMUNITIES**

Wasatch B

Moderator - Nathan Howell, West Texas A&M University

4:10 PM

Technical, Economic, and Social Viability of Low-cost Biochar for Agricultural Stormwater Treatment - Nathan Howell, West Texas A&M University (Authors: N. Howell, T. Agreda)

4:25 PM

Water Resource Development - Lessons Learned from the Kansas Ogallala Aquifer - Bill Golden, Kansas State University (Authors: B. Golden, B. Guerrero)

4:40 PM

Stakeholder Perceptions of the Importance of Groundwater for Sustaining Communities - Bridget Guerrero, West Texas A&M University (Authors: B. Guerrero, M. Sanderson, S. Lauer, B. Golden, M. Vestal)

4:55 PM

Hydrophilanthropy Gone Wrong: How Well-meaning Scientists Can Make the Situation Worse - David Kreamer, University of Nevada, Las Vegas

Session 18

BACTERIA SOURCES, FATE, AND TRANSPORT IN AQUATIC SYSTEMS

Superior A

Moderator - Fernando Rojano, West Virginia State University

4:10 PM

Evaluating Sources and Quantifying Differences in Soil *E. coli* Occurrence in Minimally Impacted Catchments - Lucas Gregory, Texas A&M AgriLife Research, Texas Water Resources Institute (Authors: L. Gregory, T. Gentry, D. Harmel, K. Wagner)

4:25 PM

Identification of Factors Affecting Fecal Pollution in Beaver Lake Reservoir - Kristen Gibson, University of Arkansas (Authors: K. Gibson, J.A. Lee, J.M. Jackson, L. Smith, G. Almeida)

4:40 PM

Streambed Sediment and *E. coli*: Variability, Attachment, and the Impact of Riparian Management - Rachel McDaniel, South Dakota State University (Authors: R. McDaniel, B. Bleakley, S. Salam, L. Amegbletor)

4:55 PM

Microbial Community Dynamics in a Karst Aquifer System and Proximal Surface Stream in Northwest Arkansas - Kristen Gibson, University of Arkansas (Authors: J. Rodriguez, M. Covington, G. Almeida, K.E. Gibson)

Session 19

**HUMAN INDUCED PLANETARY CHANGE - THE BROADER VIEW OF CLIMATE CHANGE
ADAPTATION AND ITS IMPLICATIONS FOR WATER RESOURCES MANAGEMENT II**

Superior B

Moderator - Tirusew Asefa, Tampa Bay Water

- 4:10 PM** **Observed Changes in Upper Rio Grande Snowpack Water Storage and Snowmelt Timing: 1980 to 2018** - Emile Elias, USDA ARS SW Climate Hub (Authors: E. Elias, D. James, S. Heimel)
- 4:25 PM** **Implications of Climate Variability and Change for Water Resources Management across the Conterminous US** - Upmanu Lall, Columbia University (Authors: L. Josset, J. Rising, U. Lall)
- 4:40 PM** **Long Term Climate Change Impacts on Arid Groundwater Basins - Environmental Issues Related to Aquifer Flow Capacity** - Barry Hibbs, California State University, Los Angeles
- 4:55 PM** **Evapotranspiration Adjustment Factor Study: Reducing Water Waste in Landscape Plantings** - Janet Hartin, University of California Cooperative Extension (Authors: J. Hartin, D. Fujino, L. Oki, K. Reid, D. Haver)

5:30 PM - 7:00 PM
WELCOME RECEPTION AND POSTER SESSION
(ATRIUM OVERLOOK - LOBBY LEVEL | L)
 Hors D'oeuvres and Cash Bar

POSTER PRESENTATIONS

*Student presenter in poster competition

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

1. **Environmental Systems Management Class: From Lecture to Flipped to Online** - Natalie Carroll, Purdue University
2. ***Improving Forest Water Balance Models by Quantifying Tree Species Differences in Crown Architecture and Evapotranspiration** - Brittany Casey, West Virginia University (Authors: B. Casey, B. McNeil, E.R. Brzostek, N. Zegre, L.A. Guillen, N.C. Raczka)
3. ***Dynamic Response of the Freshwater Lens to Natural Variations in Recharge; Northern Guam Lens Aquifer** - Bekah Dougher, University of Guam - Water and Environmental Research Institute of the Western Pacific (WERI) (Authors: B. Dougher, N. Habana, J. Jenson, K. Ho)
4. ***Elucidating Source Waters and Hydrochemical Processes in a Protected Ecological Habitat** - Alfredo Estrada, California State University, Los Angeles (Authors: A. Estrada, D. Stone, J. Garrison, B. Hibbs, S. Tovar, L. Zuniga)
5. ***Delineating Beaver Impoundments with High Resolution Imagery and Machine Learning** - Kyle Fitch, University of Wyoming (Authors: K. Fitch, F. Nippgen)
6. **The Two-Stage Saturated Buffer: Integrating the Use of Cover Crops into Saturated Buffer Designs for Nitrogen Mitigation in Southern Illinois Agriculture Systems** - John Gale, Southern Illinois University Carbondale (Authors: J. Gale, J.E. Schoonover, K.W.J. Williard, J. Crim)
7. ***Detecting Tile Drainage Systems in Low Relief Land Using High Resolution LiDAR Terrain Data** - Rui Gao, Utah State University (Authors: R. Gao, R. Zeng)
8. ***Snow to Streams: Using Thermal Infrared Imagery to Better Understand Snowmelt Dynamics and Runoff** - Cole Green-Smith, University of Wyoming, Watershed Management/Hydrology (Authors: C. Green-Smith, F. Nippgen)
9. **Satellite-Based Record of Changes in Ice Cover of Utah Lake** - Carly Hansen, University of Utah (Authors: C. Hansen, N. Von Stackelberg)
10. ***Groundwater Use in the Nubian Sandstone Aquifer System and the Related Impacts in Siwa Oasis, Egypt** - Noha Hossam Moghazy, Utah State University (Authors: N. Hossam Moghazy, J.J. Kaluarachchi)
11. ***Elasticity in the Colorado River Basin Using the Budyko Method** - Amber S. Jones, Utah State University (Authors: A.S. Jones, M. Alger, B. Lane)
12. ***Water Quality and Agronomic Impacts of Gypsum Applications in Southern Illinois** - Harpreet Kaur, Southern Illinois University Carbondale (Authors: H. Kaur, K.W.J. Williard, J.E. Schoonover, J. Snyder, G. Singh)

TUESDAY, JUNE 11

13. **Irrigation Initiation Timing Influence on Soybean Yield and Net Returns in Mississippi** - Gurpreet Kaur, Mississippi State University (Authors: H.C. Pringle, L.L. Falconer, D.K. Fisher, G. Kaur, L.J. Krutz)
14. ***Enhancement of the Aquifer Recharge Factor in DRASTIC Model using SWAT and GIS Techniques** - Yaser Kishawi, University of Nebraska Lincoln
15. **Python Tools for Automated Integration of Hydrologic Data into Watershed Models** - David Lampert, Oklahoma State University (Author: M. Sawtelle)
16. **The “Waters of the US” Rule and Wetland Conversion Rates** - Christopher Lant, Utah State University
17. ***Sensitivity of Closed-basin Mountain Lakes to Climate Change and Implications for Interstate Water Compacts in the West** - David Liefert, University of Wyoming (Authors: D. Liefert, B.N. Shuman, A.D. Parsekian, J.J. Mercer)
18. ***Spatiotemporal Analysis of Precipitation and Water Use in Contiguous U.S.** - Jason Levi Manley, Utah State University (Authors: J.L. Manley, R. Zeng, T. Xu)
19. ***Treating One Waste Stream with Another: Spent Grow Mats as a Carbon Source for Denitrification of Hydroponic Wastewater** - Gina Riggio, University of Arkansas (Authors: G. Riggio, K. Gibson)
20. ***Investigating Wildfire Trends in California over 32 Years** - John Salguero, California State University, Los Angeles (Authors: J. Salguero, J. Li, A. Farahmand, J.T. Reager)
21. ***Cover Crops: Solution to Sediment and Nutrient Loss? A Paired Watershed Study** - Arun Sharma, Southern Illinois University Carbondale (Authors: A. Sharma, J.E. Schoonover, K.W.J. Williard, G. Singh, J. Crim, J. Snyder)
22. **Long-term Drainage, Subirrigation, and Tile Spacing Effect on Corn Production** - Gurbir Singh, Southern Illinois University/ University of Missouri (Author: K. Nelson)
23. ***Impact of Cover Crops on Nitrate and Phosphate Leaching in the Vadose Zone** - Ashani Thilakarathne, Southern Illinois University Carbondale (Authors: A. Thilakarathne, K.W.J. Williard, G. Singh, J.E. Schoonover)

7:30 AM - 8:30 AM

BREAKFAST ROUNDTABLE DISCUSSIONS

(ATRIUM OVERLOOK & BALLROOM MEZZANINE - LOBBY LEVEL | L)

Rise and shine....get your breakfast....and join in as we discuss “Developing New Multi-institution Collaborations” to address current water issues.

- Table 1 – Communicating Science to Decision Makers – Natalie Carroll, Purdue University
- Table 2 – Water Quality and Harmful Algal Blooms – Shahram Missaghi, University of Minnesota
- Table 3 – Agriculture and Water Conservation – Jeff Johnson, Mississippi State University
- Table 4 – Urban Water Management – Amy Vickers, Amy Vickers and Associates, Inc.
- Table 5 – Envision a Research Agenda that Connects Land and Water – Faith Sternlieb, Lincoln Institute of Land Policy

EVERYONE is encouraged to join the discussion! Take advantage of having so many active water institutions in one location. Bring your ideas and suggestions and become part of a new multi-institution collaborative effort!

8:30 AM - 9:20 AM

PLENARY SESSION: WARREN A. HALL MEDAL RECIPIENT

(BALLROOM 1 - LOWER LEVEL | L1)

Moderator - Kevin Wagner, Oklahoma State University

JACK WEBSTER grew up in Indiana and attended Wabash College where he majored in biology and minored in mathematics. He started graduate school at the University of Tennessee, but after three years in the Army, he went to the University of Georgia to study ecosystem modeling with Dr. Bernard Patten. His research was on nutrient dynamics in streams at Coweeta Hydrologic Laboratory. Webster went to Virginia Tech after completing his Ph.D. and was on the faculty for 40 years until retiring in 2015. At Virginia Tech, he taught Freshwater Ecology, Ecology, Ecosystem Dynamics, Stream Ecology, and Modelling Stream Ecosystems. He also taught summer courses at Flathead Lake Biological Station in Montana and Highlands Biological Station in North Carolina. During his career, he mentored 17 masters and 9 Ph.D. students. Webster has published over 165 scientific articles including a recent book on watershed response to clearcutting. Most of his publications have been on ecosystem processes in streams and stream modelling. He conducted much of his research at Coweeta, and he continues to analyze data and write papers about Coweeta streams and watersheds. Webster was active in several professional societies, especially the Society for Freshwater Science. He was on the Editorial Board for Ecology and Ecological Monographs and was an Associate Editor for the Journal of the North American Benthological Society and for Freshwater Biology.



9:20 AM - 9:40 AM

(ATRIUM OVERLOOK - LOBBY LEVEL | L)

WEDNESDAY, JUNE 12

9:40 AM - 10:40 AM

CONCURRENT TECHNICAL SESSIONS

*Student presenter in oral presentation competition

Session 20 **INTRODUCING & EXPLORING SMERGE:** **Wasatch A**
AN IMPROVED HISTORICAL U.S. SOIL MOISTURE PRODUCT
Moderator - Dannele Peck, USDA Northern Plains Climate Hub

- 9:40 AM **Introducing SMERGE and Accessing its Data** - Dannele Peck, USDA Northern Plains Climate Hub
- 9:55 AM **Clarifying Questions about SMERGE? (Q&A with Audience)** - Dannele Peck, USDA Northern Plains Climate Hub; and Ken Tobin, Texas A&M International University
- 10:05 AM **Using SMERGE to Understand Pre-storm Soil Moisture's Effect on Post-storm Streamflow** - Ken Tobin, Texas A&M International University
- 10:15 AM **Applying SMERGE to Agricultural Drought-risk Research** - Julian Reyes, USDA Southwest Climate Hub
- 10:25 AM **How Can SMERGE be Helpful in Your Research? (Participatory Activity)** - Dannele Peck, USDA Northern Plains Climate Hub

Session 21 **WATER ISSUES IN THE COLUMBIA RIVER BASIN I** **Wasatch B**
Moderator - Kirti Rajagopalan, Washington State University

- 9:40 AM **INFWEWS Uncertainties to Solutions: Alternative Futures to Address Agricultural Runoff for Magic Valley, Idaho** - Daniel Cronan, University of Idaho, Center for Resilient Communities (Authors: D. Cronan, A. Kliskey, E.J. Trammell, P. Williams, K. Woodhouse, C. Lorentzen)
- 9:55 AM ***A Socio-hydrologic Vulnerability Index and Hotspot Map for the Columbia River Basin** - Paris Edwards, University of Idaho
- 10:10 AM ***Understanding Drought Impacts on Agricultural Water Use in the Walla Walla River Basin** - Rajendra Khanal, University of Utah (Authors: R. Khanal, S. Dhungel, M. Barber)
- 10:25 AM ***Comparative Minimum Instream Flows across States and Provinces in the Columbia River Basin: Resilience in the Face of Climate Change** - Adam Wicks-Arshack, University of Idaho (Authors: A. Wicks-Arshack, B. Luff, B. Cosens)

Session 22 **WASTEWATER TREATMENT - INNOVATIVE METHODS AND FUNDING** **Superior A**
Moderator - Kristen Gibson, University of Arkansas

- 9:40 AM **Assessment and Characterization of Hybrid Mesoporous Material MCM with Titanium Dioxide for Water Treatment** - Jiajun Xu, University of the District of Columbia (Authors: J. Xu, T. Deksissa, M. Kamen)
- 9:55 AM **Application and Quick Removal of Powdered Activated Carbon by a Cloth Media Filtration System: A Feasibility Study** - Hafiz Ahmad, Florida State University (Authors: H. Ahmad, B. Madden)
- 10:10 AM **Biobeads as Substrate to Capture and Reuse of Nutrients from Agriculture-runoff** - Srinivas Janaswamy, South Dakota State University (Authors: S. Janaswamy, M. Farzana, L. Ahiablame)
- 10:25 AM **CWSRF Loans - Do They Work?** - Kristen Hychka, NYS Water Resources Institute (Authors: E. Fenton, B.G. Rahm)

Session 23 **CLIMATE CHANGE IMPACTS** **Superior B**
Moderator - Ann Lewandowski, University of Minnesota Water Resources Center

- 9:40 AM ***Determining the Responses of Mountainous Watersheds for Water Supply under Future Climate Change Scenarios** - Mohammad Hasan, University of Utah (Authors: M. Hasan, M.E. Barber)
- 9:55 AM **A Water Quality and Climate Change Impact Modeling on Small Scale Watershed Based on Limited Climate Data Availability** - Richard C. Peralta, Utah State University (Authors: K. Asghari, R.C. Peralta, S. Kamali)
- 10:10 AM ***Water Quality Simulations over the Jordan River through the Water Quality Assessment Simulation Program (WASP)** - Juhn-Yuan Su, University of Utah
- 10:25 AM **Evidence-based Decision Making in a Post-truth World** - Christopher Scott, University of Arizona



10:40 AM - 11:00 AM

WEDNESDAY, JUNE 12

(ATRIUM OVERLOOK - LOBBY LEVEL | L)

11:00 AM - 12:00 PM

CONCURRENT TECHNICAL SESSIONS

*Student presenter in oral presentation competition

Session 24 **WATER RESEARCH AND TRAINING: DIVERSITY AND INTERDISCIPLINARY EFFORTS** **Wasatch A**
Moderator - Melissa O'Neal, West Virginia Water Research Institute

- 11:00 AM **NIFA's IBCE Kicks around Some New Twists for Programming in Water** - James Dobrowolski, USDA National Institute of Food and Agriculture
- 11:15 AM **Managing Interdisciplinary Teams: Lessons Learned from Coupled Natural and Human Systems Modeling in Lake Catchments** - Kelly Cobourn, Virginia Tech (Authors: R. Henson, K. Cobourn, C. Carey, K. Weathers, K. Farrell, N. Ward)
- 11:30 AM **Diversity, Equity, and Inclusion Efforts that Engage U.S. Virgin Islanders in the Marine Sciences: The Supporting Emerging Aquatic Scientists (SEAS) Your Tomorrow Program at the University of the Virgin Islands** - Kristin Grimes, University of the Virgin Islands (Authors: K. Grimes, M. Brandt, M. Medina, C.J. Bucklin, N. Jones, M. Guannel)
- 11:45 AM **Purdue's Efforts and Experiences to Increase Hiring, Retention, Development, and Success of Women and Minorities in STEM Faculty Positions** - Natalie Carroll, Purdue University

Session 25 **WATER ISSUES IN THE COLUMBIA RIVER BASIN II** **Wasatch B**
Moderator - Michael Barber, University of Utah

- 11:00 AM **Water Supply and Demand Forecast for the Columbia River Basin** - Jonathan Yoder, School of Economics Sciences, Washington State University (Authors: J. Adam, M. Barik)
- 11:15 AM ***On the Frontier of Water Rights: Beneficial Use and Relinquishment in Settling the Columbia River Basin** - Nicholas A. Potter, Washington State University (Authors: N. Potter, J. Yoder)
- 11:30 AM **Technology for Trade: A Conceptual Framework to Improve Water Use for Agriculture and Beyond** - Kirti Rajagopalan, Washington State University (Authors: K. Rajagopalan, J. Yoder)
- 11:45 AM **Modeling Reservoir Operators as Autonomous Agents Provides Opportunities to Elicit How Discretion is Exercised in Balancing Competing Objectives** - Alejandro Flores, Boise State University (Authors: K.E. Kaiser, A.N. Flores)

Session 26 **PANEL DISCUSSION** **Superior A**
ILLINOIS STAKEHOLDER IMPLEMENTATION OF THE NUTRIENT LOSS REDUCTION STRATEGY I
Moderator - Julie Armstrong, Illinois Nutrient Research & Education Council

- 11:00 AM **Illinois Farmer Implementation of the Nutrient Loss Reduction Strategy** - Lauren Lurkins, Illinois Farm Bureau (Authors: L. Lurkins, L. Ramsey)
- 11:15 AM **POTW Efforts and Collaborations on the Illinois Nutrient Loss Reduction Strategy** - Albert Cox, Metropolitan Water Reclamation District of Greater Chicago (Authors: A. Cox, J. Kozak, G. Tian, O. Oladeji, D. Qin, R. Manner)
- 11:30 AM **Environmental Community Activity to Support and Implement the Illinois Nutrient Loss Reduction Strategy** - Cindy Skrukud, Sierra Club, Illinois Chapter
- 11:45 AM **Panel Discussion with Audience**

Session 27 **IN-STREAM FLOWS** **Superior B**
Moderator - David Kreamer, University of Nevada, Las Vegas

- 11:00 AM **Promoting Instream Flows in Western States** - Belize Lane, Utah State University (Authors: B. Lane, D. Rosenberg)
- 11:15 AM **A Modular Integrated Modeling Framework for Ecohydraulic Analysis** - Fengwei Hung, Utah State University (Authors: F. Hung, B. Morgan, B. Lane)
- 11:30 AM ***Characterizing Streamflow and Temperature Patterns on the Blacksmith Fork River to Determine Impacts of Summer Dewatering** - Madison Alger, Utah State University (Authors: M. Alger, B. Lane)
- 11:45 AM ***Climate Impacts on Drought in the Ganges Delta, Bangladesh** - Sonia Murshed, Utah State University (Authors: S. Murshed, J.J. Kaluarachchi)

WEDNESDAY, JUNE 12

12:00 PM - 1:50 PM
AWARDS LUNCHEON
(ATRIUM PATIO - LOWER LEVEL | L1;
BALLROOMS 2 & 3 IF INCLEMENT WEATHER)
Must be pre-registered. Bring your ticket with you.
ALL OTHERS - LUNCH ON YOUR OWN

2:00 PM - 3:15 PM

CONCURRENT TECHNICAL SESSIONS

*Student presenter in oral presentation competition

Session 28

PANEL DISCUSSION

Wasatch A

HOW TO HAVE A SUCCESSFUL GRANT PROPOSAL: INSIGHT FROM SYNTHESSES OF THE USDA-NIFA WATER AND CLIMATE PORTFOLIOS

Moderator - Linda Prokopy, Purdue University

2:00 PM

We have been evaluating the USDA-NIFA Water and Climate portfolios for the last several years. As this work concludes, we will share insights about the impacts of these portfolios, how to build a successful grant team, how to maximize the effectiveness of capacity funding that land grant universities receive, and much more.

Panelists:

Jim Dobrowolski, USDA National Institute of Food and Agriculture

Mike O'Neill, University of Connecticut

Linda Prokopy, Purdue University

Session 29

URBAN WATER CONSERVATION AND WATER SECURITY

Wasatch B

Moderator - Tirusew Asefa, Tampa Bay Water

2:00 PM

Urban Response to Prolonged Drought in the Las Vegas Region - Kent Sovocool, Southern Nevada Water Authority (Authors: D. Bennett, K. Sovocool)

2:15 PM

Getting to Know Your Audience: A Performance-based Approach to Residential Outdoor Water Conservation - Ronald A. Kaiser, Texas A&M University (Authors: A. Lewis, C.P. Khedun, R.A. Kaiser)

2:30 PM

***Evaluating the Sensitivity of Residential Water Demand Estimation to Model Specification and Instrument Choices** - Roshan Puri, University of Idaho (Authors: R. Puri, A. Maas)

2:45 PM

Colorado River Drought Contingency Planning and What it Means for Municipal, Tribal, and Agricultural Water Users in Arizona - Sharon B. Megdal, University of Arizona Water Resources Research Center

3:00 PM

US Army Plans for Water Security to Sustain Critical Missions - Elisabeth Jenicek, US Army Engineer Research and Development Center (Authors: E. Jenicek, A. Hur, V. Heath, M. Mithaiwala)

Session 30

ILLINOIS STAKEHOLDER IMPLEMENTATION OF THE NUTRIENT LOSS REDUCTION STRATEGY II

Superior A

Moderator - Julie Armstrong, Illinois Nutrient Research & Education Council

2:00 PM

Agricultural Best Management Practices to Limit Nutrient Export in Southern Illinois - Gurbir Singh, Southern Illinois University/University of Missouri (Authors: J.E. Schoonover, K.W.J. Williard, G. Singh, A. Thilakarathne, A. Sharma, H. Kaur, J. Gale, J. Crim, J. Snyder, R. Lange, C. Blattel)

2:15 PM

Applying Research: Cover Crops in the Field and Policy - Jonathan Coppess, University of Illinois at Urbana-Champaign

2:30 PM

Impact of Subsurface Drainage on Field-scale Hydrology and Crop Production - Rabin Bhattarai, University of Illinois at Urbana-Champaign (Authors: R. Bhattarai, H. Jeong, R. Cooke)

2:45 PM

Toward a Regional Phosphorus (Re)cycle in the U.S. Midwest - Andrew Margenot, University of Illinois at Urbana-Champaign

3:00 PM

***Cover Crop Impact on Nitrogen Fate and Cash Crop Yield** - Richard Roth, Purdue University (Authors: S. Armstrong, R. Roth, C. Lacey)

Session 31 **OPERATIONAL SATELLITE-BASED REMOTE SENSING PRODUCTS TO SUPPORT AGRICULTURAL ADAPTATION TO DROUGHT** **Superior B**
 Moderator - Marco Maneta, University of Montana

- 2:00 PM** ***Satellite Data-driven Modeling of Field Scale Evapotranspiration in Croplands Using the MOD16 Algorithm Framework** - Colin Brust, University of Montana (Authors: M. He, J.S. Kimball, C. Brust, M. Maneta)
- 2:15 PM** **Weather Fluctuations, Expectation Formation, and Short-run Behavioral Responses to Climate Change** - Kelly Cobourn, Virginia Tech (Authors: X. Ji, K. Cobourn)
- 2:30 PM** **Evaluating the Spatial Distribution of Drought Impacts in Montana using a Remote Sensing-driven Hydro-economic Model** - Marco Maneta, University of Montana (Authors: M. Maneta, K. Cobourn, M. He, X. Ji, J. Kimball)
- 2:45 PM** **Achieving Groundwater Sustainability in the San Joaquin Valley: A Hydro-economic Approach** - Josue Medellin-Azuara, University of California, Merced (Authors: J. Medellin-Azuara, A. Escriva-Bou, J. Valero-Fandino, S. Cole)
- 3:00 PM** **Current State-of-the-Art Satellite Remote Sensing Tools for Agricultural Drought Monitoring** - Brian Wardlow, Center for Advanced Land Management Information Technologies (CALMIT), University of Nebraska-Lincoln (Authors: B. Wardlow, M. Svoboda, T. Tadesse, M. Anderson, C. Hain, J. Brown)



3:15 PM - 3:35 PM

(ATRIUM OVERLOOK - LOBBY LEVEL | L)

Light refreshments available.

3:40 PM - 4:30 PM
JCWRE EDITOR & ASSOCIATE EDITOR'S MEETING
(CIRQUE - LOBBY LEVEL | L)

3:35 PM - 4:50 PM

CONCURRENT TECHNICAL SESSIONS

*Student presenter in oral presentation competition

Session 32 **THE USGS WATER RESOURCES RESEARCH ACT NATIONAL COMPETITIVE GRANTS PROGRAM (104G): WHAT HAVE WE LEARNED IN THE LAST 10 YEARS?** **Wasatch A**
 Moderator - Earl A. Greene, USGS Water Resources Research Act Program

- 3:35 PM** **Introduction** - Earl A. Greene, USGS Water Resources Research Act Program
- 3:40 PM** **Using Weathering Geochemistry to Understand Sources of Stream Flow Generation in Streams Traversing Mountain-basin Transitions in the Upper Missouri Watershed** - Stephanie Ewing, Montana State University (Authors: S. Ewing, R.A. Payn, F.R. Miller, S. Leuthold, J.B. Paces, S.G. Custer)
- 3:50 PM** ***Calibrating NMR Logging for Estimating Hydraulic Conductivity in Glacial Aquifers** - Alexander Kendrick, Stanford University (Authors: A. Kendrick, R. Knight, C.D. Johnson, S. Phillips, G. Liu, S. Knobbe, M. Goebel, D. Hart, R.J. Hunt, J.J. Butler)
- 4:00 PM** **Recharging Near-surface Aquifers using Low-cost Direct Push Wells: A Case Study in the Lower Republican River Basin, Kansas** - Gaisheng Liu, Kansas Geological Survey, University of Kansas (Authors: G. Liu, S. Knobbe, E.C. Reboulet, D.O. Whittemore, J.J. Butler Jr.)
- 4:10 PM** **Application of a Bioaccessibility-based Method for Pyrethroid Insecticides: A Case Study** - Michael Lydy, Southern Illinois University Carbondale (Authors: M. Lydy, K. Huff Hartz)
- 4:20 PM** **Landscape and Organic Carbon Controls of Methylmercury in Stream Ecosystems** - Vivien Taylor, Dartmouth College (Authors: V. Taylor, C. Chen, K. Buckman, K. Cottingham)
- 4:30 PM** **Does the Use of a Sediment Holding Time Bias Laboratory Bioassay Results?** - Michael Lydy, Southern Illinois University Carbondale (Authors: K. Huff Hartz, M. Lydy)

WEDNESDAY, JUNE 12

Session 33

WATER REUSE IN UTAH: EXPLORING OPPORTUNITIES AND RISKS THROUGH ENGINEERING, EXTENSION, AND SOCIAL SCIENCE Moderator - Hillary Fishler, Utah State University

Wasatch B

- 3:35 PM** Pathogen Monitoring and Quantitative Microbial Risk Assessment of Secondary Water in Cache Valley, UT - Jennifer Weidhaas, University of Utah (Author: M. Olsen)
- 3:50 PM** Monitoring Pharmaceuticals and Personal Care Products in Secondary Water Distribution: Risks to Human and Environmental Health - R. Ryan Dupont, Utah State University (Authors: L. Ahmadi, K.T. Duodu, R.R. Dupont, J.E. McLean)
- 4:05 PM** Water Reuse in Utah - Is it your Water to Reuse? - Niel Allen, Utah State University
- 4:20 PM** Public Perspectives in Northern Utah on Water Reuse in Secondary Water Systems - Courtney Flint, Utah State University (Authors: C. Flint, K. Koci)
- 4:35 PM** Variations in Water Reuse Practices in Utah - Hillary K. Fishler, Utah State University (Authors: H.K. Fishler, C.G. Flint, L.N. Allen)

Session 34

AGRICULTURAL WATER QUALITY BMPs Moderator - Naveen Adusumilli, LSU AgCenter

Superior A

- 3:35 PM** Leveraging Soil Health for Watershed Health - Ann Lewandowski, University of Minnesota Water Resources Center
- 3:50 PM** Integrated Best Management Practices of Terraces, Cover Crops, and No-Tillage for Managing Nutrient Loss - Gurbir Singh, Southern Illinois University/University of Missouri (Authors: G. Singh, K.A. Nelson)
- 4:05 PM** Alternative Practices to Reduce Nutrient Pollution: A Bio-economic Spatial Model - Lucia Levers, University of Minnesota (Authors: L. Levers, B. Dalzell, J. Peterson)
- 4:20 PM** The Role of Systems Thinking in Early Adopter Conservation Behaviors: Implications for Middle Adopters - Linda S. Prokopy, Purdue University (Authors: S. Church, J. Arbuckle, K. Floress, B. Gramig)
- 4:35 PM** Meta-Review of Barriers and Motivations for Farmers to Adopt Conservation Practices - Linda S. Prokopy, Purdue University (Authors: S. Church, J. Lu, L.S. Prokopy)

Session 35

TOOLS AND RESOURCES FOR COPING WITH THE IMPACTS OF DROUGHT AND WATER SCARCITY IN A CHANGING CLIMATE Moderator - Emile Elias, USDA ARS, SW Climate Hub

Superior B

- 3:35 PM** What is the United States Drought Monitor and How Does it Identify Drought - Brian Fuchs, National Drought Mitigation Center
- 3:50 PM** Drought in New Mexico - Challenges and Opportunities for Characterizing and Communicating Drought Impacts - Dave DuBois, New Mexico State University
- 4:05 PM** Using Ecological Site Information to Develop Drought Response Strategies - Emile Elias, USDA ARS, SW Climate Hub (Authors: J. Brown, E. Elias, J. Reyes, C. Steele, A. Wyndam)
- 4:20 PM** Grass-Cast: A New Tool to Inform Drought Management in the West - Dannele Peck, USDA Northern Plains Climate Hub (Authors: W. Parton, M. Hartman, J. Derner, D. Peck, B. Fuchs, W. Smith)
- 4:35 PM** *Assessment of UAV Flight Times for Estimation of Daily High Resolution Evapotranspiration in Complex Agricultural Canopy Environments - Ayman Nassar, Utah State University (Authors: A. Nassar, A. Torres-Rua, M. McKee, W. Kustas, C. Coopmans, H. Nieto, L. Hipps)

5:00 PM - 6:00 PM

**SNOWBIRD WATER TUNNEL TOUR
(MEET AT REGISTRATION DESK)**

Must be pre-registered.

5:30 PM - 6:15 PM

HAPPY HOUR HIKE

(MEET AT REGISTRATION DESK)

See page 28 for more details.

6:00 PM HAPPY HOUR/SOCIAL NETWORKING (TRAM CLUB)

Informal gathering. Meet up with other conference goers for additional networking.

7:00 AM - 8:00 AM
SNOWBIRD WATER TUNNEL TOUR
(MEET AT REGISTRATION DESK)
Must be pre-registered.

THURSDAY, JUNE 13

8:30 AM - 9:50 AM
PLENARY SESSION
(BALLROOM 1 - LOWER LEVEL | L1)
Moderator - Natalie Carroll, Purdue University

AMY VICKERS is a nationally recognized water conservation and efficiency expert, engineer, and author of the award-winning Handbook of Water Use and Conservation: Homes, Landscapes, Businesses, Industries, Farms (WaterPlow Press). President of Amy Vickers & Associates, Inc., an independent research and consulting practice based in Amherst, Massachusetts, she has advised over 125 public and private water utilities, organizations, and industries across the United States, Canada, England, Eastern Europe, South Africa, and the Middle East. A prolific writer, Amy has published more than 100 technical papers and articles in professional publications and other media. Most recently, she is a contributing chapter author in Drought and Water Crises: Integrating Science, Management, and Policy, Second Edition (CRC Press/Taylor & Francis Group, 2018). Amy is also the author of the first U.S. national water efficiency standards for plumbing fixtures that were adopted under the U.S. Energy Policy Act of 1992, a measure that is saving the United States an estimated 7 to 9 billion gallons of water daily. She has a MS in Engineering from Dartmouth College and BA in Philosophy from New York University.



“IMPACT OF WATER CONSERVATION ON LONG-TERM DROUGHT”

Dramatic news headlines about the damages wrought by drought, such as perilously low reservoir levels, dried up rivers and wildlife die-offs easily grab the public’s emotion, but too often they divert attention away from drought solutions: efficient water use. Indeed, drought can inflict serious pain, but how much is due to Nature’s folly versus human failure, specifically water managers and public officials who fail to act early and aggressively in implementing water-saving steps that could avert drought costs? Effective conservation programs can enable water supply systems to not only withstand short- and long-term droughts but moreover can ensure ample water supplies far out into the future. Several major U.S. water suppliers have permanently reduced demands by over 25% with conservation while also increasing their drought resistance. This plenary will present an overview of the efficiency of water use today among residential, commercial, industrial, and agricultural water users as well as the state-of-the-art in water conservation and efficiency technology, policy, and practice. From highly effective urban lawn irrigation schedules and infrastructure leakage reduction to the latest in atmospheric water generation, agricultural water reuse, and smart meter technologies, the impact of water efficiency in mitigating if not averting drought will be discussed.

PETER MAYER is a professional engineer and urban water expert in the areas of water use, water efficiency, demand management, and water resource planning. For more than 20 years, Peter’s work has focused on urban water management, researching water use patterns, assessing the impact of water rate structures, evaluating water efficiency measures and programs, forecasting future demand with and without conservation, preparing water demand management plans, and conducting water supply scenario analysis. Peter was the lead author for the Water Research Foundation (WRF) “Residential End Uses of Water” studies published in 1999 and 2016 and a key contributor to the companion “Commercial and Institutional End Uses of Water” study. In 2017 Peter published ground breaking research on peak demand management through advanced irrigation control. Peter is currently leading three research studies for WRF and the Alliance for Water Efficiency (AWE) on meter sizing, outdoor water savings, and drought response, developing demand management plans with New York City Department of Environmental Protection, and a team member consultant for the Colorado State Water Supply Initiative. In 2016, Peter testified as an expert witness on municipal and industrial water use at the U.S. Supreme Court (FL v. GA, 142 Original) on behalf of the State of Georgia. In 2013, Peter founded WaterDM – Water Demand Management. WaterDM’s current clients include: the New York City Water Board, Colorado Water Conservation Board, AWE, Rachio, WRF, and Northern Water. Throughout his career Peter has worked with more than 100 water providers across the United States, Canada, and Australia. Peter is vice chair of the AWWA Customer Metering and Practices committee, and he chaired the subcommittee that prepared the 3rd edition of AWWA’s M22 Sizing of Water Service Lines and Meters manual and is leading the effort to prepare the 4th edition. He is a four time winner of AWWA and ASCE Journal “Best Paper” awards. Peter earned his MS in water resources engineering from the University of Colorado in Boulder and holds a BS from Oberlin College.



“URBAN WATER DEMAND TRENDS AND THE FUTURE OF AMERICAN WATER USE”

Water demand across the U.S. is lower today than it has been for years, a direct result of intentional water conservation and demand management programs and policies implemented across all sectors. This talk will explore how changes in water demand have been accomplished and what water planners and managers should expect in the coming years.

THURSDAY, JUNE 13



9:50 AM - 10:10 AM
(ATRIUM OVERLOOK - LOBBY LEVEL | L)

10:10 AM - 11:40 AM

CONCURRENT TECHNICAL SESSIONS

*Student presenter in oral presentation competition

Session 36

LIGHTNING TALK SESSION

Wasatch A

WERA - WATERSHED PROCESSES AND HUMAN WATER SYSTEMS

Moderator - Sam Fernald, New Mexico State University

- 10:10 AM **Western WERA - Watershed Processes and Human Water Systems** - Sam Fernald, New Mexico State University
- 10:15 AM ***Resiliency Analysis of Stormwater Drainage System under Climate and Landuse Changes in Jordan River Watershed** - Muhammad Imran Chaudhry, University of Utah
- 10:20 AM ***Agriculture as a System for Managed Aquifer Recharge for Drylands by Restoring Hydrologic Connectivity to Floodplains and Aquifers in Watersheds** - Connie Maxwell, New Mexico Water Resources Research Institute (Authors: C. Maxwell, S. Langarudi, A.S. Fernald, J.P. King, D. Cadol, A. Faist)
- 10:25 AM **California Climate Smart Agriculture** - Laurent Ahiablame, University of California, Agriculture and Natural Resources (Author: D. Parker)
- 10:30 AM **Public Perceptions of Flood Risk and Infrastructure Options** - Jamie McEvoy, Montana State University (Authors: J. McEvoy, E.A. Shanahan, N. Bergmann, E.D. Raile)
- 10:35 AM **Improving the Predictability of Actual Evapotranspiration across Different Climates and Land Uses** - Fabian Nippgen, University of Wyoming (Authors: F. Nippgen, M. Ross, P. Stoy)
- 10:40 AM **A Holistic Approach to Study Watershed-Riparian Systems in Oregon** - Carlos Ochoa, Oregon State University
- 10:45 AM **Use of Eco-hydrologic Indicators in Assessing Differences in Watershed Hydrologic Response in Wyoming** - Ginger Paige, University of Wyoming
- 10:50 AM **Panel Discussion with Audience**

Session 37

PANEL DISCUSSION

Wasatch B

WATER-EFFICIENT CITIES AND SCHOOLS READY TO MEET OUR WATER-SHORT FUTURE

Moderator - Amy Vickers, Amy Vickers & Associates, Inc.

- 10:10 AM Amidst today's unending reports of severe droughts, climate change, and dire prognostications about the world's threatened water supplies, too often missing in this collective handwringing is attention to solutions. This panel discussion will include a water conservation manager and statistician from a major U.S. water supplier, a university educator/sustainability program leader, and a college water efficiency program educator and curriculum developer, all of whom have realized significant water savings from conservation programs in cities and schools, several of which have won awards.

Panelists:
Holly R. Holt-Torres, Water Conservation Division Manager, Dallas Environmental Quality & Sustainability, City of Dallas
James McGuire, Director of the Office of Environmental Quality and Sustainability, City of Dallas
Michael P. O'Neill, Ph.D., Associate Dean & Associate Director, UConn Extension, University of Connecticut/Storrs
Roger Ebbage, CEM, Adjunct Faculty, Energy and Water Education Programs, Lane Community College (OR)

Session 38

HARMFUL ALGAL BLOOMS

Superior A

Moderator - Brian Haggard, Arkansas Water Resources Center

- 10:10 AM** **The Evolving Legal Landscape for Nutrient Pollution and Harmful Algal Blooms** - Catherine Janasie, National Sea Grant Law Center
- 10:25 AM** **Satellite Remote Sensing of Harmful Algal Blooms in the Southern Great Plains** - Abubakarr Mansaray, Oklahoma Water Resources Center (Authors: A. Mansaray, S. Stoodley, A. Dzialowski, K. Wagner, N. Torbick)
- 10:40 AM** **Comparison of Harmful Algal Blooms in Large Eastern and Western U.S. Lakes** - John Bratton, LimnoTech (Authors: J. Bratton, R. Lambert, J. Ibershoff, E. Verhamme, J. Wolfe, D. Dilks)
- 10:55 AM** **MN HAB Group: Responding to Proliferating Blue-green Algae in Minnesota Lakes** - Shahram Missaghi, University of Minnesota Extension
- 11:10 AM** **Connecting Extension and Water Resources Research Institutes to Advance Harmful Algal Bloom Research and Outreach** - Chad Cook, University of Wisconsin-Madison, Division of Extension (Author: M. Miller)
- 11:25 AM** **Occurrence of Microcystin (or Lack Thereof) across a Nutrient Gradient in Ozark Streams** - Brian Haggard, Arkansas Water Resources Center (Authors: B. Austin, D. Lee, B. Haggard)

Session 39

PREDICTING, MONITORING, AND RESPONDING TO DROUGHT

Superior B

Moderator - Caitriana Steele, USDA Southwest Climate Hub

- 10:10 AM** **Drought Insights from Retrospective Analyses of Federal Crop Insurance Payments and Causes of Loss** - Julian Reyes, USDA Southwest Climate Hub (Authors: J. Reyes, C. Steele, E. Elias)
- 10:25 AM** **Building Resilience Strategies in Times of Dwindling Water** - Amy Ganguli, New Mexico State University
- 10:40 AM** ***Landscape-scale Geospatial Modeling of Tree Mortality in North-Central New Mexico** - Skye Aney, New Mexico State University
- 10:55 AM** **Islands of Resilience: Community Challenges and Responses to the 2018 Colorado Plateau Exceptional Drought** - Emile Elias, USDA ARS SW Climate Hub (Authors: E. Elias, C. Steele, J. Reyes, D. Brown, S. Behery, E. Weight)
- 11:10 AM** **Recent Streamflow Declines and Snow Drought in Upper Rio Grande Tributary Basins** - Caitriana Steele, USDA Southwest Climate Hub (Authors: C. Steele, E. Elias, J. Reyes)

12:45 PM - 5:00 PM
POST-CONFERENCE FIELD TRIP
PROVO RIVER RESTORATION PROJECT
(MEET AT REGISTRATION DESK)
Tickets still available at Registration Desk.
Must be pre-registered. See page 22 for more details.

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FIELD TRIPS

SNOWBIRD WASATCH WATER TUNNEL TOUR

See the Registration Desk for availability.

Hard hats are provided and required.

The Wasatch Water Tunnel is a fascinating underground operation of pumps, pipes, and old mines that supply water to Snowbird Resort and cooling water to the Co-Generation Plant. Accessible from the Cliff Lodge Parking Structure, your tour of this tunnel will bring you underground through mines dug in the 1870s and 1880s. This is only a small part of the 1000 miles of mine tunnels between Snowbird and Park City. The tour will find you standing directly under Alta's Blackjack Lodge. The rock that lines the incline is called Tillite. It is over 600 million years old – Pre Cambrian. You can see the remains of ancient sea shores on the ceiling and sides. The project to harness the water run-off of Little Cottonwood Canyon was started in 1985 and completed at a cost of \$1.7 million. It is the only operation of its kind in the United States. Enjoy this unique underground engineering marvel.



POST-CONFERENCE FIELD TRIP

12:45 PM - 5:00 PM

PROVO RIVER RESTORATION PROJECT

Tickets still available at Registration Desk. Cost: \$25 (bus fee + gratuity). Must be pre-registered. Bring your ticket with you.

The Provo River Project dammed and then channelized, straightened, and diked the middle Provo River in the 1950s and 60s. Many of the river's abundant resources were lost, such as riparian forest, emergent wetland, backwater, and deep fishing holes - prime fish and wildlife habitat. In 1999, the Utah Reclamation Mitigation and Conservation Commission began the Provo River Restoration Project (PRRP). River reconstruction was completed in 2008.

The river was re-reconstructed by moving the straightened river channel into excavated meanders to historic conditions gleaned from the maps of the pioneers, reconnecting the river to existing remnants of historic secondary channels, and constructed small side channels and ponds to recreate aquatic features and provide wetland and wildlife habitat. Existing levees were set back to create a near natural flood plain and to allow the river to change course naturally. The project also entailed acquiring an 800 to 2,200-foot-wide continuous corridor the length of the middle Provo River protected for angler access and wildlife habitat.

Planting and fostering streamside vegetation needed for a healthy fishery has been ongoing since the project began. Monitoring of this habitat, as well as other physical features and sensitive species also continues. Specific studies include: monitoring native and game fish populations; monitoring macroinvertebrate (stoneflies, mayflies, midges, etc.) populations; conducting bird, including Bald Eagles, and bird habitat studies and surveys; surveying for spotted frogs, which are on Utah's Sensitive Species List; assessing native riparian and wetland areas and monitoring revegetated areas; and, monitoring hydrological conditions and conducting flow and river mechanics studies.

On this field trip we'll view the project, walk along its new restored riparian pathways, likely see some of the anglers who have returned and spend a wonderful late spring afternoon seeing, not remembering, the way things were.

Schedule

12:45 PM, Meet at the Registration Desk area at the Cliff Lodge (leaving at 1:00 PM)

1:00 PM, Bus to the Provo River Restoration Project

2:00 PM, View the restoration project from three different crossings along the river

4:00 PM, Bus departs back to Snowbird

5:00 PM, Arrive back at Snowbird

Dress: Hiking boots are recommended, but sneakers will do. Waterproof boots may be preferred. Light colored, cool clothing.

Bring: Water, sunscreen, insect repellent, hat, money for incidentals.

******* PROFESSIONAL NETWORKING/DEVELOPMENT*******
Special Events



TUESDAY, 1:00 PM - 3:50 PM
CUAHSI: WATER DATA SERVICES
(WHITE PINE - LOBBY LEVEL | L)

Did you know?

CUAHSI's Water Data Services are free, open-access, and available to everyone.

Learn how these services can help you, your students, and your colleagues:

- Develop data management plans, which are now required by most funders.
- Discover and find a broad array of water data-time series, samples, spatial coverages, and more.
- Use CUAHSI apps and tools for expediting and documenting workflows.
- Share your data within a group and publish your data with a DOI.

Funding opportunities for graduate students also will be discussed.

Must be pre-registered to attend - sign up at the Registration Desk ASAP.

First come, first served, limited to 30 attendees.

WEDNESDAY, 5:30 PM - 6:15 PM
HAPPY HOUR HIKE

Meet at the Registration Desk. All are welcome!

Come join us on the UCOWR/Snowbird Student/Professional 'Happy Hour Hike'. We will take a 45 minute hike through the pine, fir, and aspen trees and across the slopes at the base of Mount Baldy at Snowbird. This easy hike on maintained trails is design to provide an informal, relaxed, moving venue for students to get to know water resource professionals and vice-versa as we cross Little Cottonwood Creek, walk among the trees, early wildflowers, small mammals, and birds. It's the age of networking and what better way to build personal and professional relationships than during a walk in this beautiful place.

Bring sturdy shoes (boots, trail shoes), a hat, sunglasses, and a light jacket. Bottled water will be provided if needed, but we strongly encourage you to think green and bring your own water bottle!

Participants are invited to meet up with other conference goers for additional networking, food, and beverages at the Tram Club after the hike.

AWARDS LUNCHEON

**Wednesday, 12:00 PM - 1:50 PM, The Atrium Patio - Lower Level | L1
(Ballrooms 2 & 3 if inclement weather)**

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

Congratulations to the 2019 UCOWR awards recipients!

All recipients will be honored at the Awards Luncheon.

WARREN A. HALL MEDAL

Distinguished lifetime achievement in the field of water resources.

Jack Webster, Professor Emeritus of Ecology, Virginia Tech

EDUCATION AND PUBLIC SERVICE AWARD

Individuals or groups who have significantly contributed to increased public awareness of water resources issues.

The University of Minnesota Onsite Sewage Treatment Program (OSTP)

The North Central Region Water Network

FRIENDS OF UCOWR AWARD

Individuals or groups who have made outstanding contributions to UCOWR.

Karletta Chief (Diné), University of Arizona

EARLY CAREER EXTENSION/OUTREACH/ENGAGEMENT AWARD

Outstanding achievement by a professional, within six years of starting an academic position.

Saleh Taghvaeian, Oklahoma State University

EARLY CAREER APPLIED RESEARCH AWARD

Outstanding achievement by a professional, within six years of starting an academic position.

Ashlynn Stillwell, University of Illinois

JOURNAL OF CONTEMPORARY WATER RESEARCH AND EDUCATION (JCWRE) PAPER OF THE YEAR

Recognizes the most outstanding paper selected from papers published in JCWRE during the previous year.

(Two papers awarded for 2019)

**Native Water Protection Flows through Self
Determination: Understanding Tribal Water Quality
Standards and “Treatment as a State”**. Sibyl Diver.
JCWRE 163: 6-30.

**Scientist–Nonscientist Teams Explore Methane Sources
in Streams Near Oil/Gas Development**. Anna K. Wendt,
Todd Sowers, Scott Hynek, Jacob Lemon, Erika Beddings,
Guanjie Zheng, Zhenhui Li, Jennifer Z. Williams, and
Susan L. Brantley. *JCWRE* 164: 80-111.

PH.D. DISSERTATION AWARDS

Recognizes outstanding Ph.D. dissertations in two categories.

Christopher Chini, University of Illinois (Water Policy and Socioeconomics)

Nathan Reaver, University of Florida (Natural Science and Engineering)

MANY THANKS

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

Conference Planning Committee

David Stevens, Chair, Utah State University
Kevin Wagner, Technical Program, Oklahoma State University
Mac McKee, Utah State University (Retired)
Nicole Wilkinson McIntosh, NC State University
Ginger Paige, University of Wyoming
Bethany Neilson, Utah State University
Jeffery Horsburgh, Utah State University
David Rosenberg, Utah State University
Steve Burian, University of Utah
Karl Williard, Southern Illinois University
Staci Eakins, Southern Illinois University

Awards Committees

Thank you for your time and dedication to selecting deserving recipients from an excellent pool of candidates.

Warren A. Hall Medal Committee

Kevin Wagner, Chair, Oklahoma State University
Kelly Cobourn, Virginia Tech
Jonathan Yoder, Washington State University

Friends of UCOWR Award Committee

Sharon Megdal, Chair, University of Arizona
Jeff Johnson, Mississippi State University
Nicole Wilkinson McIntosh, NC State University

Ph.D. Dissertation Awards Committee

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JCWRE Paper of the Year Committee

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Kofi Akamani, Southern Illinois University
Jackie Crim, Southern Illinois University
Natalie Carroll, Purdue University
M.S. Srinivasan, New Zealand, National Institute
of Water and Atmospheric Research
Jonathan Yoder, Washington State University

Early Career Awards Committees

Applied Research:

Jonathan Yoder, Chair, Washington State University
Elizabeth Boyer, Penn State
Dan Devlin, Kansas State University

Extension/Outreach/Engagement:

Natalie Carroll, Chair, Purdue University
Jeff Johnson, Mississippi State University
Nicole Wilkinson McIntosh, NC State University

Are you interested in connecting with UCOWR and want more information?

Many people work on water, yet it can be difficult to find each other, especially when crossing disciplines. UCOWR prides itself on its professional, personalized customer service approach as we help water researchers, educators, extension specialists, and students across academia connect with each other in meaningful ways.

What we can do for you:

- Develop leadership skills, be a voice, and help shape our diverse organization.
- Receive discounts for our dynamic UCOWR/NIWR annual conference featuring career development, skill building, and research exposure.
- Connect with a growing network of over 65 institutions nationwide who are leading the way in water research, education, and policy.
- Publish in and receive the *Journal of Contemporary Water Research and Education*, the only peer-reviewed water resource journal focused on applied research, policy, education, and extension.
- Be recognized for outstanding research and early, mid, and lifetime career achievements through our prestigious annual awards and scholarships.
- Access exclusive WaterSmart Innovations conference scholarships through our partnership with Southern Nevada Water Authority.
- Advertise graduate assistantships and water resources positions via our website.

Reach out to a Board Member in your region

Kevin Wagner, President, Oklahoma State University kevin.wagner@okstate.edu
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 Jonathan Yoder, Washington State University yoder@wsu.edu
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Calling All Water Professionals

Looking for 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. One issue per year is reserved for general submissions. Two themed issues a year focus on topics that emerge from conferences, water resources organizations, national training or education programs, and research and extension teams. The next two open issues are December 2019 and August 2020. Submissions are currently being accepted.

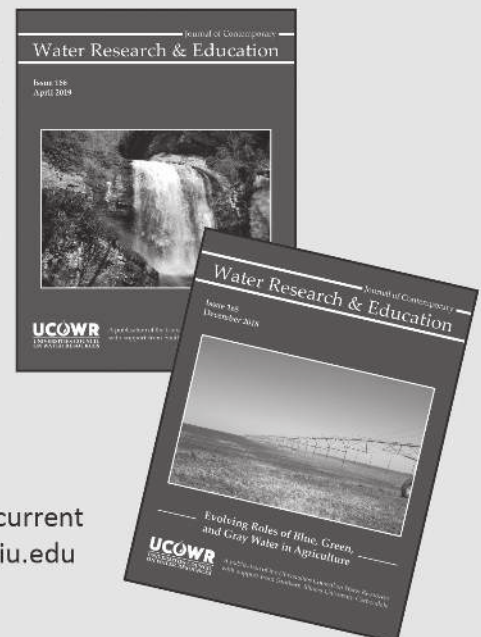
Deadlines:

Publication in December 2019 Issue - July 22, 2019

Publication in August 2020 Issue - February 3, 2020

Visit ucowr.org for author and submission instructions.

Have an idea for a themed issue? Did you see an interesting concurrent session suitable for a themed issue? Contact Karl Williard, williard@siu.edu



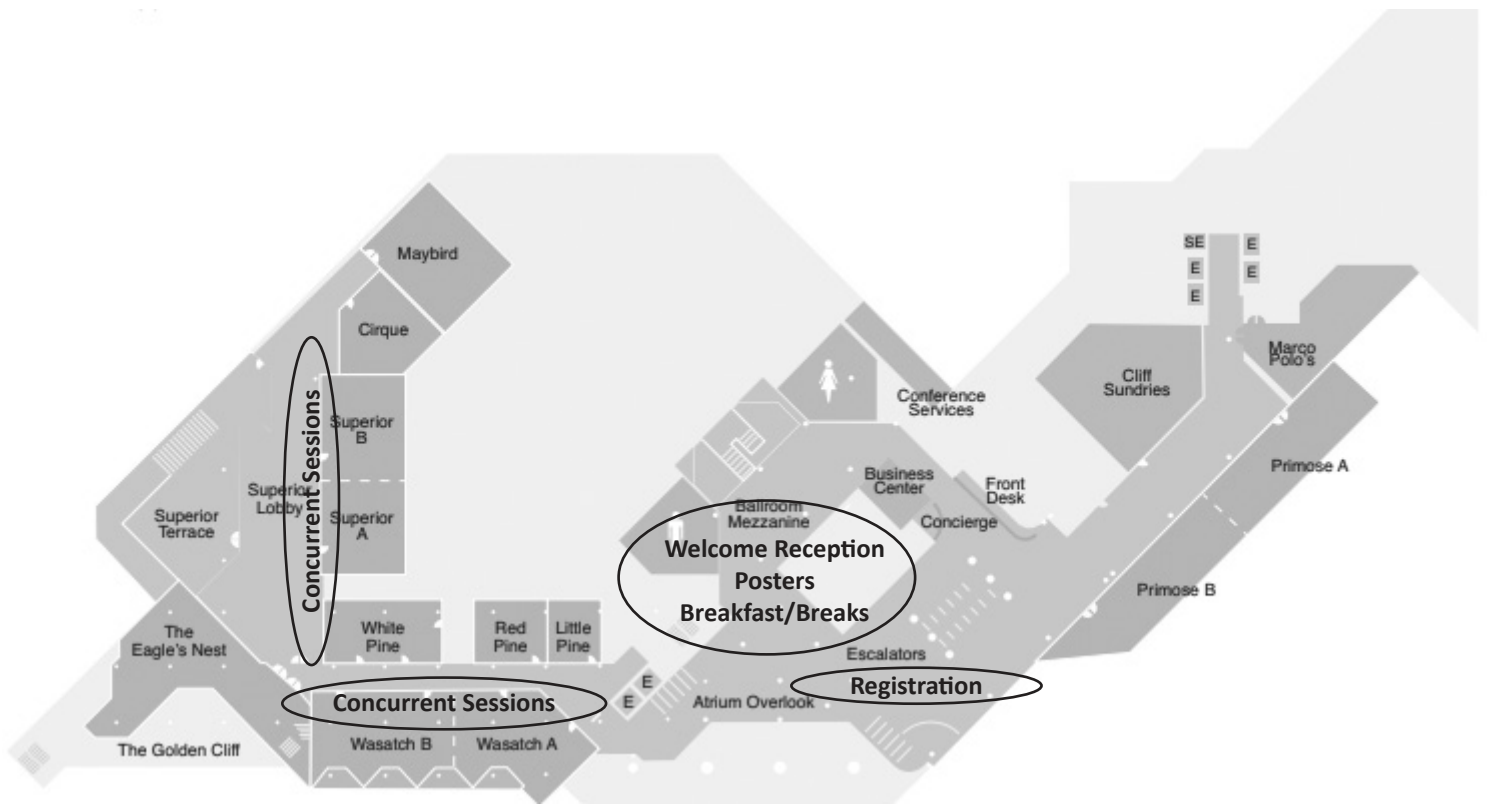
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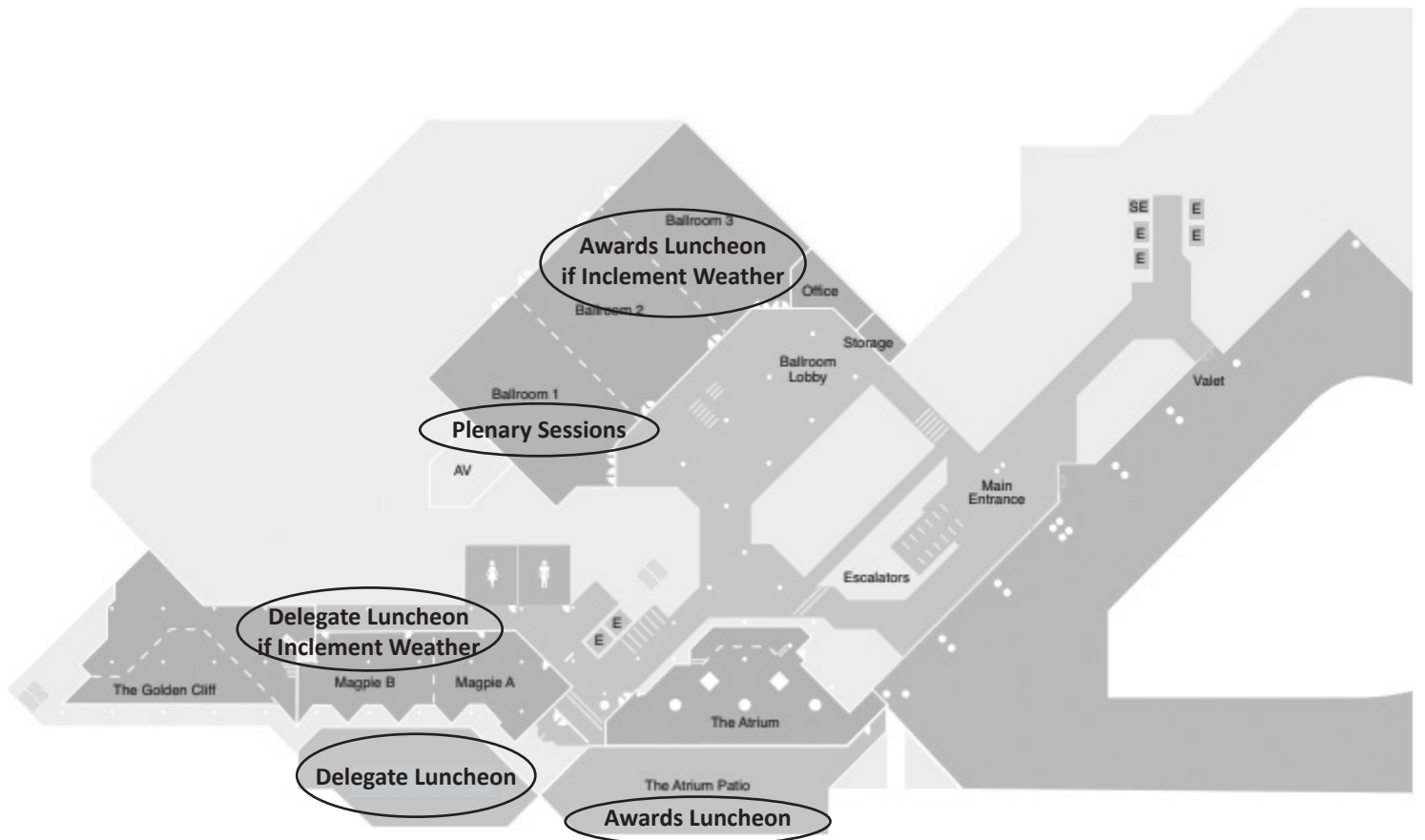
***** Tell Us About Your Conference Experience *****

All attendees will receive an email survey in the days following the conference. Please provide your feedback and let's make next year's conference even better!

THE CLIFF LODGE LOBBY LEVEL | L



THE CLIFF LODGE LOWER LEVEL | L1



**2020 UCOWR/NIWR
Annual Water Resources Conference
Minneapolis, Minnesota**

June 9-11, 2020

The Graduate Hotel, University of Minnesota



Online abstract submission opens in October. Abstract deadline is January 24, 2020.

Have an idea for a special session?

**Submit a one paragraph proposal to Jeffrey Peterson, Conference Chair, at
jmpeter@umn.edu. Deadline for submissions is September 16, 2019.**

**UCOWR | UNIVERSITIES COUNCIL
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