

2006 UCOWR/NIWR ANNUAL CONFERENCE INCREASING FRESHWATER SUPPLIES

SANTA FE,
NEW MEXICO

JULY 18-20, 2006



PROGRAM



**Universities
Council
On
Water
Resources**



**The National
Institutes for
Water Resources**

Increasing Freshwater Supplies

 <p>Universities Council On Water Resources</p>	<p>SPECIAL EVENTS <i>See inside back cover for details.</i></p>	<p>TUESDAY July 18 REGISTRATION 7:00AM-4:00PM</p>
		<p>CONT. BREAKFAST 7:15AM-8:00AM PLENARY SESSION I 8:00AM-10:00AM</p>
 <p>SouthernTM Illinois University Carbondale</p>	<p>MONDAY July 17 Registration 4:00PM-7:00PM</p>	<p>Welcome Keynote Speakers - NM Sen. Jeff Bingaman (Invited) - Pat Mulroy - Rochelle Araujo</p>
	<p>TUESDAY July 18 Welcome Reception & Social Georgia O’Keeffe Museum 5:30PM-8:00PM</p>	<p>BREAK 10:00AM-10:30AM TECHNICAL SESSIONS 10:30AM-12:00PM</p> <ol style="list-style-type: none"> 1 Desalination Concepts 2 Reclaimed Water Quality 3 Water Harvesting 4 Reservoir Storage & Quality 5 Water Marketing & Transfers
 <p>Texas Agricultural Experiment Station <small>THE TEXAS A&M UNIVERSITY SYSTEM</small></p>	<p>WEDNESDAY July 19 UCOWR Awards & Banquet La Terraza Banquet Room Open Bar 6:30PM Banquet 7:00PM-9:00PM</p>	<p>LUNCH ON YOUR OWN & POSTER SESSION 12:00PM-1:30PM TECHNICAL SESSIONS 1:30PM-3:00PM</p> <ol style="list-style-type: none"> 6 Desalination Innovations & Issues 7 Reclaimed Water Use: Potable 8 Water Reuse 9 Interbasin Transfers 10 Education & Community Programs
 <p>Sandia National Laboratories</p>	<p>THURSDAY July 20 Half-Day Rafting Trip Pilar Racecourse, Rio Grande 12:30PM-5:00PM</p>	<p>BREAK 3:00PM-3:30PM TECHNICAL SESSIONS 3:30PM-5:00PM</p> <ol style="list-style-type: none"> 11 Future of Desalination 12 Aquifer Storage & Recovery 13 Water Quality Management 14 ASCE/EWRI Water Standards
 <p>Los Alamos NATIONAL LABORATORY <small>EST. 1943</small></p>	<p>Valles Caldera Technical Tour 2:00PM-9:00PM</p>	<p>WELCOME RECEPTION AND SOCIAL</p>
 <p>NIWR The National Institutes for Water Resources</p>		<p>Georgia O’Keeffe Museum 5:30PM-8:00PM TUESDAY JULY 18</p> 

Welcome

One constant that has endured the test of time – from ancient civilizations to modern times – is the need for freshwater supplies that will support life and enhance human welfare. Increased industrial and agricultural water demand combined with urbanization and population growth have taxed global water resources in a significant way and created a gathering storm that poses a serious threat to availability of water supplies in coming decades. The 2006 annual UCOWR/NIWR conference facilitates an opportunity for interdisciplinary interaction between scientists and decision makers to present and discuss an important global agenda: increasing freshwater supplies.

I welcome you to this significant and timely conference. As a presenter or as an attendee, your participation will increase knowledge and facilitate better decision making in an area of national and global need.



Tamim Younos

President, Universities Council on Water Resources
Virginia Polytechnic Institute and State University

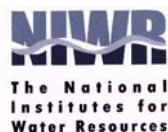


CONFERENCE COMMITTEE

KARL WOOD, New Mexico State University, Chair
BOBBY CREEL, New Mexico State University
MICHAEL HIGHTOWER, Sandia National Laboratories
ARI MICHELSEN, Texas A&M University
CATHY ORTEGA KLETT, New Mexico State University
GARY WOODARD, University of Arizona
CHRISTOPHER LANT, SIUC, UCOWR Executive Director
ROSIE GARD, SIUC, Program Administrative Assistant
MICHAEL PEASE, SIUC, A/V Technical Assistant
PAYAL SINGH, SIUC, Conference Program Designer



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*. If you would like to join UCOWR, please visit our website at: www.ucowr.siu.edu or call (618) 536-7571.



NATIONAL INSTITUTES FOR WATER RESOURCES (NIWR) are the 54 university-based centers that were established by the federal Water Resources Research Act. They are 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.

Plenary Speakers

Plenary Session I Tuesday July 18, 8:00-10:00am	Plenary Session II Wednesday July 19, 8:30-10:00am	Plenary Session III Thursday July 20, 8:30-10:00am
<p>Senator Jeff Bingaman (Invited)</p>  <p>U.S. Senator Jeff Bingaman is the Deputy Democratic Whip and a Ranking Member of the Senate Energy and Natural Resources Committee which has jurisdiction over national energy policy and the nation's public lands. He serves on the Finance Committee; Health Education, Labor, and Pensions Committee; and is a senior member of the Joint Economic Committee, a bicameral congressional committee.</p>	<p>Callie Gibson (with a message from Senator Pete Domenici)</p>  <p>has worked as a field representative for Senator Pete Domenici since August of 2003. She is responsible for keeping the Senator and senior staff informed on land and water issues, and problems and events across the state. Before going to work for the Senator, she worked for four years as the Communications Assistant for the New Mexico Cattle Growers Association and Executive Director for the New Mexico Wool Growers, Inc.</p>	<p>Les E. Shephard</p>  <p>is Vice President of Energy, Security, and Defense Technologies at Sandia National Laboratories. He leads the \$210 million Energy and Infrastructure Assurance Strategic Management Unit. His programmatic responsibilities include basic energy science; fossil, renewable and nuclear energy; nuclear power safety and repositories; information technology and programs responsible for the safety and security of commercial aviation; and infrastructure protection.</p>
 <p>Pat Mulroy</p> <p>was appointed general manager of the Las Vegas Valley Water District in 1980 after serving as deputy general manager for four years. In 1991, she was also appointed general manager of the Southern Nevada Water Authority and chosen to serve on the governor's negotiating team on the Colorado River. In 1992, she helped found and was the original chairperson of the Western Urban Water Coalition. She continues to be active in regional and national water issues.</p>	 <p>Edmund G. "Ed" Archuleta</p> <p>has been general manager of the El Paso Water Utilities since January 1989. He is responsible for all aspects of water, wastewater, and reclaimed water service to the greater El Paso metropolitan area. He reports to and implements strategic policies set by the five-member Public Service Board. He previously planned and designed water and wastewater projects while working as a consulting engineer at firms in Iowa and in Albuquerque.</p>	 <p>Jeff Mosher</p> <p>is the Acting Executive Director of the National Water Research Institute (NWRI), a nonprofit public-private partnership in Fountain Valley, California. He manages NWRI's research program, identifying funding opportunities and partners, and communicates the results of research to the water community and public. He has worked in the water industry for over 18 years for both private sectors and nonprofit organizations providing scientific, technical, and policy support on water-related issues.</p>
<p>Rochelle Araujo</p>  <p>is the Associate Director of the National Exposure Research Laboratory within the EPA's Office of Research and Development, located in Research Triangle Park, North Carolina. During her sixteen years with EPA, she has conducted research on ecosystems and water quality, with an emphasis on microbial processes. She is a member of the Ecological Society of America and serves on ORD's Science Council. She co-chairs, with Dr. Robert Hirsch of the USGS, the Subcommittee on Water Availability and Quality.</p>	<p>Mike O'Neill</p>  <p>is the National Program Leader for Water Resources in the USDA Cooperative State Research, Education, and Extension Service. He was co-leader of the USDA effort to explore new opportunities for research, education, and economics in Agricultural Water Security. He administers the National Integrated Water Quality Program for CSREES and co-chairs the USDA Working Group on Water Resources. Prior to joining USDA, he was on the Watershed Science and Geography faculty at Utah State University.</p>	<p>Michael Gabaldon</p>  <p>is the Director of Policy, Management, and Technical Services for the Bureau of Reclamation headquartered in Washington, DC. He began his career with the BOR in 1982. In 1988, he was selected as the Area Manager for one of Reclamation's largest area offices, the Albuquerque Area Office. He was responsible for Reclamation program activities in the Rio Grande Basin, the Pecos River Basin, and the Canadian River Basin - spanning three states from southeastern Colorado through New Mexico south to west Texas.</p>

PLENARY SESSION I**8:00 am – 10:00 am****ROOM: BALLROOM SOUTH****MODERATOR: KARL WOOD**, NEW MEXICO STATE UNIVERSITY**Welcome and Introductions***Tamim Younos*, UCOWR President, Virginia Polytechnic Institute and State University*Gretchen Rupp*, NIWR President, Montana State University*Karl Wood*, Conference Chair, New Mexico State University**Keynote Speakers***Message from New Mexico Senator Jeff Bingaman*, Santa Fe, NM (Invited)*Pat Mulroy*, General Manager, Las Vegas Valley Water District, Las Vegas, NV*Rochelle Araujo*, Associate Director, National Exposure Research Laboratory, Office of Research and Development, Environmental Protection Agency, Triangle Park, NC----- **BREAK 10:00 am – 10:30 am** -----**CONCURRENT SESSIONS****10:30 am – 12:00 pm****Session 1 Desalination: Advanced Concepts and Economics****ROOM: BALLROOM SOUTH****MODERATOR: TAMIM YOUNOS**, VIRGINIA POLYTECHNIC INST. & STATE UNIV.**Brackish Groundwater Desalination: Innovation and Opportunities for Successful and Economical Project Implementation.***Joseph W. Norris*, NRS Consultant Engineers, Harlingen, TX**Economic Implications of Desalination in South Texas.** *Allen W. Sturdivant* and Ronald D. Lacewell, Texas Water Resources Institute, Weslaco, TX; M. Edward Rister, Texas Agricultural Experiment Station, College Station, TX; Joseph W. Norris, NRS Consulting Engineers, Harlingen, TX**Advanced Concepts in Desalination.** *T.M. Mayer*, R.W. Kottenstette, and P.V. Brady, Sandia National Laboratories, Albuquerque, NM**Modeling of Desalination Concentrate Storage Options for Future Recovery and Use.** *Charles D. Turner*, Edward Hamlyn, and Gabriel Trejo, University of Texas, El Paso, TX; Alfredo Granados Olivas, Universidad Autonoma de Ciudad Juarez, Ciudad Juarez, Chihuahua, Mexico; Bill Hutchinson, El Paso Water Utilities, El Paso, TX**Session 2 Reclaimed Water: Quality Considerations****ROOM: BALLROOM NORTH****MODERATOR: PAULA STURDEVANT REES**, UNIV. OF MASSACHUSETTS, AMHERST**Microbial Pathogens in Reclaimed Water and Their Persistence and Fate in the Environment.** *George D. Di Giovanni*, Texas Agricultural Experiment Station - El Paso, Texas A&M University, El Paso, TX**Appraising the Salinity Hazard to Landscape Plants and Soil from the Use of Reclaimed Water.** *Seiichi Miyamoto*, Texas Agricultural Experiment Station - El Paso, Texas A&M University, El Paso, TX**Selection of Urban Landscape Plants for Irrigation with Reclaimed Water.** *Genhua Niu*, Texas Agricultural Experiment Station - El Paso, Texas A&M University, El Paso, TX**Salinity Effects and Salt Movement from Surface Applied Gray Water.** *Zhuping Sheng*, Texas Agricultural Experiment Station - El Paso, Texas A&M University, El Paso, TX**Session 3 Water Harvesting****ROOM: STIHA ROOM****MODERATOR: PHILLIP POHL**, SANDIA NATIONAL LABORATORIES**Rainwater Harvesting for Enhanced Groundwater Recharge through Capture of Increased Runoff from Site Development.***Mark Miller*, Daniel B. Stephens and Associates Inc., Albuquerque, NM**The Potential of Water Saving and Water Capturing Innovations in Albuquerque Single Family Homes.** *Andrew Funk*, University of New Mexico, Albuquerque, NM**Rainwater Harvesting Education in Texas.** *Billy Kniffen*, Texas Cooperative Extension, Menard, TX**An Examination of the Legal Issues in Municipal Water Reuse.** *Ronald A. Kaiser*, Texas A&M University, College Station, TX

Session 4 Reservoir Storage and Quality Management

ROOM: NEW MEXICO ROOM

MODERATOR: VELIMIR VESSELINOV, LOS ALAMOS NATIONAL LABORATORY

Salinization of a Desert Reservoir: Inflows, Solutes and Mixing in Lake Amistad. *A. W. Groeger*, R.H. Kamps, M. Cave, J. Branom, D. Woodward, V. Fulcher, and Michele Funk, Texas State University, San Marcos, TX

Simulation of Impacts of Water Availability and Weather Conditions on a Management Plan for Amistad Reservoir. *Rajendra Shrestha*, Xing Fang, Jerry Lin, and Mien Jao, Lamar University, Beaumont, TX; Alan W. Groeger, Texas State University, San Marcos, TX

Influence of Goodenough Spring on Amistad Reservoir, Texas. *R.H. Kamps* and Alan W. Groeger, Texas State University, San Marcos, TX

Adding Efficiency and Reducing Conflict in Reallocation Decisions of Federal Reservoirs Using Existing Rules: Some Insights from Economic Bargaining Theory. *Michael C. Farmer*, George McMahon, Texas State University, Lubbock, TX

Session 5 Water Marketing and Transfers

ROOM: SANTA FE ROOM

MODERATOR: ARI MICHELSEN, TEXAS A&M UNIVERSITY

Moving towards More Efficient Water Markets: Institutional Barriers and Innovations. *John D. Wiener* and Charles W. Howe, University of Colorado, Boulder, CO

The Evolving State of Ground Water Right Transfers in Idaho. *Gary Johnson* and Donna Cosgrove, University of Idaho, Idaho Falls, ID; Bryce Contor, Idaho Water Resources Research Institute, Idaho Falls, ID

Structuring Dry Year Land Fallowing to Improve Supply Reliability. *Bonnie G. Colby*, University of Arizona, Tucson, AZ

The Dominant Water Estate. *Olen Paul Matthews*, University of New Mexico, Albuquerque, NM

----- **LUNCH ON YOUR OWN 12:00 pm – 1:30 pm** -----

POSTER SESSION

12:00 pm – 1:30 pm

Measuring Evapotranspiration in Agricultural and Riparian Vegetation. *Rhonda Skaggs*, Salim Bawazir, Zohrab Samani, Max Bleiweiss, and Robert Sanderson, New Mexico State University, Las Cruces, NM

Comparing Crop Evapotranspiration & Irrigation Practices in New Mexico's Elephant Butte Irrigation District. *Zohrab Samani* and Rhonda Skaggs, New Mexico State University, Las Cruces, NM

The Shower Water Conservation System. *Andrew Funk*, University of New Mexico, Albuquerque, NM

Evaluation of Hydrologic Dynamics of Forest Floor Litter in Northern New Mexico Ponderosa Pine and Mixed Conifer Stands. *Joaquin A. Gallegos*, Alexander G. Fernald, and Dawn M. VanLeeuwen, New Mexico State University, Las Cruces, NM

Acequia Ditch and Field Seepage Effects on Shallow Groundwater, Groundwater Return Flow, and the Hydrologic Budget. *Steve Guldán*, NMSU Alcalde Research Center, Alcalde, NM; Alexander G. Fernald, New Mexico State University, Las Cruces, NM

Digital Hydrogeologic Models of Basin-Fill Aquifer Systems in the Rio Grande Valley/Paso del Norte Region—A Powerful New Tool in Water Resources Education and Management. *John F. Kennedy*, Marquita Ortiz, and John W. Hawley, New Mexico Water Resources Research Institute, Las Cruces, NM

Survey of Bacterial Pathogens within the Rio Grande Basin. *Keith L. Sternes* and Tammy Hartke-Quiett, Sul Ross State University, Alpine, TX

Groundwater Chemistry of the Igneous Aquifer in the Alpine, Texas Area. *Kevin Urbanczyk*, Sul Ross State University, Alpine, TX; Chris Ervin and John White, Eastern Kentucky University, Richmond, KY

Characterization of Igneous Aquifer in the Alpine, Texas Area. *Kevin Urbanczyk* and Tony Giles, Sul Ross State University, Alpine, TX

GOES Groundwater Monitoring. *Matt O'Toole*, Tony Giles, Kevin Urbanczyk, and Billie Braunch, Sul Ross State University, Alpine, TX

Harvest the Rains! *Mike Mecke*, Texas Water Resources Institute, Fort Stockton, TX; Billy Kniffen, Texas Cooperative Extension, Menard, TX

Supporting Community Water Harvesting Efforts: Impact of Water Harvesting on Street Runoff Volume and Quality. *D. W. Brosnihan*, J. J. Riley, and G.C. Woodard, University of Arizona, Tucson, AZ

CONCURRENT SESSIONS

1:30 pm – 3:00 pm

Session 6 Desalination Innovations and Issues

ROOM: BALLROOM SOUTH

MODERATOR: **RON LACEWELL**, TEXAS A&M UNIVERSITY

Desalination Using Low-Grade Heat Sources. *Veera Gnanaswar Gude* and N. Nirmal Khandan, New Mexico State University, Las Cruces, NM

Wind and Solar Energy Driven RO Brackish Water Desalination. *Clark C.K. Liu* and Krispin Fernandes, University of Hawaii, Honolulu, HI

A Comparative Study of Inorganic Fouling by Calcium Sulphate and Calcium Phosphate on Nanofiltration Membranes. *C. Jerry Lin* and Saqib Shirazi, Lamar University, Beaumont, TX

Session 7 Reclaimed Water Use: Potable Water

ROOM: BALLROOM NORTH

MODERATOR: **B. L. HARRIS**, TEXAS A&M UNIVERSITY

Potable Re-Use of Treated Wastewater. *Adrian Hanson*, New Mexico State University, Las Cruces, NM; Eddie Livingston, Livingston and Associates, Alamogordo, NM; Michael Vision, City of Cloudcroft, Cloudcroft, NM

A Comparative Analysis of Wastewater Reuse as a Possible Solution to Drought Crisis. *Doron Lavee* and Nir Becker, Tel Hai College, Upper Galilee, Israel

Microbial Challenges to Extending Uses of Rio Grande River Water. *George D. Di Giovanni* and Joe Hernandez, Texas Agricultural Experiment Station - El Paso, Texas A&M University, El Paso, TX

Indirect Reuse of Reclaimed Wastewater for Potable Supply: Regulatory Considerations. *Bruce M. Thomson*, University of New Mexico, Albuquerque, NM; Charles Thomas, New Mexico Environment Department, Santa Fe, NM

Session 8 Water Reuse

ROOM: STIHA ROOM

MODERATOR: **GARY JOHNSON**, UNIVERSITY OF IDAHO

Urban Lawn Irrigation Using Non-Potable Water. *Bernd Leinauer*, Casey Johnson, and April Ulery, New Mexico State University, Las Cruces, NM

Key Requirements for Successful Use of Moderately Saline Water for Landscape Irrigation: Southwestern Experience. *S. Miyamoto*, Texas A&M Research and Extension Center, El Paso, TX

The Decentralized Concept: The Key to Proliferating Reclamation and Reuse. *David Venhuizen*, David Venhuizen PE, Austin, TX
Using Coal Bed Methane Produced Saltwater from Well-Sites for Native and Non-Native Grass Stand Establishment. *Richard N. Arnold*, Mick O'Neill, and Dan Smeal, New Mexico State University, Farmington, NM

Session 9 Interbasin Transfers

ROOM: NEW MEXICO ROOM

MODERATOR: **DAVID DEWALLE**, THE PENNSYLVANIA STATE UNIVERSITY

Interbasin Transfers to Reduce Flooding: The Case of Devils Lake, North Dakota. *Robert R. Hearne*, North Dakota State University, Fargo, ND

Canada's Fresh Water in a Continental Context. *Frank Quinn*, Environment Canada, Ottawa, Ontario, Canada

Libyan Water: An Example of Management in the Desert. *Phillip Pohl*, Sandia National Laboratories, Albuquerque, NM

Session 10 Water Education and Community Programs

ROOM: SANTA FE ROOM

MODERATOR: **ROBERT EMANUEL**, UNIVERSITY OF ARIZONA

An Update on the Texas A&M University Interdisciplinary Graduate Water Degree. *Valeen Silvy* and Ronald A. Kaiser, Texas A&M University, College Station, TX

Multi-Disciplinary Masters Degrees in Water Resources Management for Mid-Career Professionals: An Update and Future Strategies.

Gary Woodard, University of Arizona, Tuscon, AZ

Opportunities for the Water Resources Community to Participate in NASA's Applied Science Program. *David Toll* and Ted Engman, Goddard Space Center, Greenbelt, MD; Mayra Montrose and Jared Entin, NASA Headquarters, Washington D.C.

----- **BREAK 3:00 pm – 3:30 pm** -----

CONCURRENT SESSIONS

3:30 pm – 5:00 pm

Session 11 PANEL - Future of Desalination: Potential and Challenges

ROOM: BALLROOM SOUTH

MODERATOR: KARL WOOD, NEW MEXICO STATE UNIVERSITY

Michael Hightower and Thomas Mayer, Sandia National Laboratories, Albuquerque, NM

Mac McKee, Utah State University, Logan, UT

James Moncur, University of Hawaii, Honolulu, HI

Tamim Younos, Virginia Polytechnic Institute and State University, Blacksburg, VA

Session 12 Aquifer Storage and Recovery

ROOM: BALLROOM NORTH

MODERATOR: A. W. GROEGER, TEXAS STATE UNIVERSITY

Overview of Artificial Recharge Projects: Planning and Implementation Challenges. *Daniel B. Stephens*, Daniel B. Stephens and Associates Inc., Albuquerque, NM

Monitoring Methods for Enhanced Aquifer Recharge Projects. *Stephanie J. Moore*, John T. Kay, and James A. Kelsey, Daniel B. Stephens and Associates Inc., Albuquerque, NM

An Examination of the Viability of ASR through Well Injections in the Albuquerque Area. *Phillip Pohl* and Carl Axness, Sandia National Laboratories, Albuquerque, NM

Lessons Learned from a Review of 50 ASR Projects from the United States, England, Australia, India, and Africa. *Christopher J. Brown*, Kirk Hatfield, and Mark Newman, University of Florida, Gainesville, FL

Session 13 PANEL - Water Quality Management: La Escondida Lagoon

ROOM: STIHA ROOM

MODERATOR: GEORGE D. DI GIOVANNI, TEXAS A&M UNIVERSITY

Diana Garcia Hernandez, Universidad Academica Multidisciplinaria Reynosa Aztlan, Universidad Autonoma de Tamaulipas, Mexico

Raul Herrera Mendoza, Corporacion Mexicana de Investigacion en Materiales S.A. de C.V., Saltillo, Mexico

Jesus Castrejon, Universidad Academica Multidisciplinaria Reynosa Aztlan, Universidad Autonoma de Tamaulipas, Mexico

Mary Sanchez, Universidad Academica Multidisciplinaria Reynosa Aztlan, Universidad Autonoma de Tamaulipas, Mexico

Session 14 PANEL - American Society of Civil Engineers / Environmental and Water Resources Institute Water Standards

ROOM: NEW MEXICO ROOM

MODERATOR: DAVID JORDAN, INTERA INCORPORATED

General EWRI Standards Development Process. *Conrad G. Keyes, Jr.*, EWRI of ASCE Standards Development Council, Mesilla Park, NM

Standard Practice of Atmospheric Water Management Projects. *George Bomar*, Atmospheric Water Management Standards Committee, Texas Department of Licensure, Austin, TX

Water Subsurface and Surface Drainage Systems. *Bill Archdeacon*, ARCADIS, Inc., Denver, CO

Model Water Codes. *Joe Dellapenna*, Water Regulatory Standards Committee, Villanova University, Philadelphia, PA

RECEPTION AT GEORGIA O'KEEFFE MUSEUM

5:30 pm – 8:00 pm

WEDNESDAY, JULY 19, 2006

PLENARY SESSION II

8:30 am – 10:00 am

ROOM: BALLROOM SOUTH

MODERATOR: ARI MICHELSEN, TEXAS A&M UNIVERSITY

Callie Gibson, Field Representative for New Mexico Senator Pete Domenici, Santa Fe, NM
(A Message from the Senator) Current Water Congressional Issues

Edmund G. "Ed" Archuleta, General Manager, El Paso Water Utilities, El Paso, TX
El Paso Plans, Develops, and Implements a Sustainable Water Program

Mike O'Neill, National Program Leader for Water Resources, USDA CSREES, Washington D.C.
Future Directions for the CSREES Water Program

----- **BREAK 10:00 am – 10:30 am** -----

CONCURRENT SESSIONS

10:30 am – 12:00 pm

Session 15 Federal/University Stakeholder Partnerships

ROOM: BALLROOM SOUTH

MODERATOR: O. P. MATTHEWS, UNIVERSITY OF NEW MEXICO

Efficient Irrigation for Water Conservation in the Rio Grande Basin. *B.L. Harris*, C. Allan Jones, and Danielle Supercinski, Texas Water Resources Institute, College Station, TX

The Water Utilities of Ciudad Juarez (JMAS), Chihuahua, Mexico: Water Management and the Modality of Decentralization. *Jorge A. Salas Plata M.* and Hector Quevedo Urias, Universidad Autonoma de Ciudad Juarez, Ciudad Juarez, Chihuahua, Mexico

Sustainable Agricultural Water Conservation Research Program Trans-Boundary Diagnostic Outline. *Walter Rast* and Andrew Sansom, Texas State University, San Marcos, TX; Kevin Urbanczyk, Sul Ross State University, Alpine, TX

Session 16 Groundwater Recharge

ROOM: BALLROOM NORTH

MODERATOR: JOHN KENNEDY, NEW MEXICO WATER RESOURCES RESEARCH INST.

Quantifying Return Flow to Groundwater: What's in the Tool Box? *Daniel B. Stephens*, Neil Blandford, Dominique Catron, and Stephanie J. Moore, Daniel B. Stephens and Associates Inc., Albuquerque, NM

Uncertainties in the Transient Capture-Zones of Groundwater Supply Wells. *Velimir V. Vesselinov*, Los Alamos National Laboratory, Los Alamos, NM

University Research Supports Groundwater Availability Studies of the Hueco Bolson Aquifer, El Paso/Juarez Area. *Barry Hibbs*, California State University, Los Angeles, CA; Chris Eastoe, University of Arizona, Tucson, AZ; John Hawley, New Mexico Water Resources Research Institute, Las Cruces, NM; Alfredo Granados, Universidad Autonoma de Ciudad Juarez, Ciudad Juarez, Chihuahua, Mexico; Bill Hutchinson, El Paso Water Utilities, El Paso, TX

Forensic Isotope Hydrology as a Support to Complex Water Issues in the Arid Southwestern US. *R. L. Bassett*, Geochemical Technologies Corporation, Wheat Ridge, CO; Saeed Jorat, Los Angeles Department of Water and Power, Los Angeles, CA; Christian E. Petersen, MWH Americas, Inc., Sacramento, CA; Aaron Steinward, Inyo County Water Department, Bishop, CA

Hydrogeochemical Distribution Due to Tsunami Wave in the Weligama Bay Area, Southern Sri Lanka. *Ranjana U.K. Piyadasa* and K.D.N. Weerasinghe, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka; Janitha Liyanage, University of Kelaniya, Sri Lanka

Session 17 State Planning for Future Water Supplies

ROOM: STIHA ROOM

MODERATOR: JAY LUND, UNIVERSITY OF CALIFORNIA, DAVIS

Drought and Growth Considerations in Long Range Municipal Water Resource Planning. *Steve Rossi*, City of Phoenix Water Services Department, Phoenix, AZ

Texas 50-Year Regional Water Plans. *John Ashworth*, LBG-Guyton Associates, Austin, TX

Integrated Water Management Strategies for the City and County of El Paso. *Bill Hutchison*, El Paso Water Utilities, El Paso, TX

The Lower Rio Grande Regional Water Plan Experience. *J. Phillip King*, New Mexico State University, Las Cruces, NM

Session 18 Integrated Modeling: Leasing/Banking

ROOM: NEW MEXICO ROOM

MODERATOR: CHUCK HOWE, UNIVERSITY OF COLORADO

SAHRA Integrated Modeling Approach towards Basin-Scale Water Resources Management. *Yuqiong Liu* and Hoshin V. Gupta, University of Arizona, Tucson, AZ; Everett P. Springer, Los Alamos National Laboratory, Los Alamos, NM

Issues of Coupling Physical/Hydrological Economic Models in Water Resources. *Jesse Roach*, University of Arizona, Tucson, AZ; David Brookshire and Craig Broadbent, University of New Mexico, Albuquerque, NM; Vince Tidwell, Sandia National Laboratories, Albuquerque, NM; Don Coursey, University of Chicago, Chicago, IL

Towards a Water Leasing/Banking System on the Middle Rio Grande. *David Brookshire* and Craig Broadbent, University of New Mexico, Albuquerque, NM; Vince Tidwell, Sandia National Laboratories, Albuquerque, NM; Don Coursey, University of Chicago, Chicago, IL

Sustainable Policy Design through Integrated Basin Models: Findings from the Rio Grande. *Frank Ward*, New Mexico State University, Las Cruces, NM; James F. Booker, Siena College, Loudonville, NY; Ari M. Michelsen, Texas A&M University, El Paso, TX

Session 19 Watershed Management and Restoration

ROOM: SANTA FE ROOM

MODERATOR: KARL WOOD, NEW MEXICO STATE UNIVERSITY

Towards Greater Certainty in Upper Klamath Basin Water Management. *Brent Boehlert* and William K. Jaeger, Oregon State University, Corvallis, OR

Evaluating Diversion Alternatives Affecting Environmental Flows and Temperatures. *Michael E. Barber*, Washington State University, Pullman, WA; Robert J. Bower, Walla Walla Basin Watershed Council, Milton-Freewater, OR

Restoration Preferences and Management for the Middle Rio Grande. *Matthew A. Weber* and Steve Stewart, University of Arizona, Tucson, AZ

More and Cleaner Water through Better Watershed Management. *Sterling Grogan*, Middle Rio Grande Conservancy District, Albuquerque, NM; Anne Watkins, New Mexico Office of the State Engineer, Albuquerque, NM

----- **LUNCH ON YOUR OWN 12:00 pm – 1:30 pm** -----

CONCURRENT SESSIONS

1:30 pm – 3:00 pm

Session 20 Water Treatment Systems and Regulations

ROOM: BALLROOM SOUTH

MODERATOR: J. PHILLIP KING, NEW MEXICO STATE UNIVERSITY

Cost Comparisons of Water Treatment Systems to Improve Water Quality for Municipal Use. *Lal K. Almas* and Naveen C. Adusumilli, West Texas A&M University, Canyon, TX

Evaluation of the Water Purification Process of a Vending Machine Company in Ciudad Juarez. *Ma. Teresa Escobedo Portillo*, Jorge Salas Plata, and Griego Enrique Munoz, Universidad Autonoma de Ciudad Juarez, Ciudad Juarez, Chihuahua, Mexico

Restoring of Filter Properties of Rocks in a Well Zone. *Abror N. Gadaev* and Abdukodir Paradaev, Samarkand State Civil Engineering Institute, Samarkand, Uzbekistan

The Impact of Endocrine Disrupting Chemicals on Freshwater Supplies: CWA and SDWA Revisited. *Christine Kirchhoff* and Jonathan Bulkley, University of Michigan, Ann Arbor, MI

Session 21 Groundwater Recharge

ROOM: BALLROOM NORTH

MODERATOR: BRUCE THOMSON, UNIVERSITY OF NEW MEXICO

Estimating Aquifer Recharge through Playas of the Great Plains Using Temperature Probes. *Ken Rainwater*, Wayne Hudnall, Loren Smith, and Richard Zartman, Texas Tech University, Lubbock, TX; Dennis Gitz, USDA-ARS, Lubbock, TX

Hydrological Analysis of Conjunctive Management Approaches to Increase Freshwater Supplies on the Lower South Platte River, Colorado. *James T. McCord* and Jennifer Smith, Hydrosphere Resource Consultants, Socorro, NM; Lee Rozaklis and Shaden Musleh, Hydrosphere Resource Consultants, Boulder, CO

WEDNESDAY, JULY 19, 2006

Underground Storage of Recoverable Water Systems: A Management Tool for Conjunctive Uses of Surface Water and Groundwater in an Arid Region. *Zhuping Sheng* and Joshua Villalobos, Texas A&M University, El Paso, TX

Economic and Hydrologic Implications of Selected Water Policy Alternatives for the Southern Ogallala Aquifer. *Erin Wheeler*, Eduardo Segarra, Phillip Johnson, Jeffrey Johnson, and David Willis, Texas Tech University, Lubbock, TX

Session 22 Improving Water Management through Education

ROOM: STIHA ROOM

MODERATOR: PAULA STURDEVANT REES, UNIV. OF MASSACHUSETTS, AMHERST

Involving Citizens in Watershed Management: The Arizona Master Watershed Steward Program. *Robert M. Emanuel* and George Zaimes, University of Arizona Cooperative Extension, Tucson, AZ

Improving Water Management through Education. *Kim McReynolds*, George Zaimes, Jim Sprinkle, Jeff Schaulau, Barbara Hutchinson, and Rob Grumbles, University of Arizona, Tucson, AZ

Water Conservation and Drought Management in Arid Lands: An Open Systems Theory-Based Model for Sustainable Strategic Plan Development. *Rossana Alvarez-Diemer*, Colaine Curtis, and Leeann DeMouche, New Mexico State University, Las Cruces, NM

Session 23 Modeling Impacts and Options

ROOM: NEW MEXICO ROOM

MODERATOR: CHRISTOPHER LANT, SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

Water Options in California: Effective Management of Supply-Side Risk. *Kristiana Hansen*, Richard Howitt and Jeffrey Williams, University of California, Davis, CA

An Economic-Engineering Optimization for the Binational Mexico-US Lower Colorado River Delta: The Mexicali Valley Case Study. *Jay R. Lund* and Josue Medellin-Azuara, University of California, Davis, CA

Short-Term Water Consumption Patterns in Ciudad Juarez. *Tom Fullerton* and Roberto Tinajero, University of Texas El Paso, El Paso, TX; Martha Patricia Barraza de Anda, Universidad Autonoma de Ciudad Juarez, Ciudad Juarez, Chihuahua, Mexico

Assessment of the Impact of Airborne Pollutants on the Rio Grande Basin Watershed. *J.K. Upadhyay*, S. Chandru, C.J. Lin, H.W. Chu, and T.C. Ho, Lamar University, Beaumont, TX

----- **BREAK 3:00 pm – 3:30 pm** -----

CONCURRENT SESSIONS

3:30 pm – 5:00 pm

Session 24 Groundwater Management Strategies

ROOM: BALLROOM SOUTH

MODERATOR: GRETCHEN RUPP, MONTANA STATE UNIVERSITY

Observations of Surface Water Extent for the Elephant Butte Reservoir in New Mexico. *T. Schmutge* and Max Bleiweiss, New Mexico State University, Las Cruces, NM

Comparison of Groundwater Rights in the United States: Lessons for Texas. *Ken Rainwater*, Sanjaya Joshi, and John McEnery, Texas Tech University, Lubbock, TX

Water Management Strategies to Conserve Groundwater in Texas' Region A. *Stephen Amosson*, Thomas Marek, Dustin Gaskins, Fran Bretz, Bridget Guerrero and DeDe Jones, Texas A&M University, Amarillo, TX

Groundwater Irrigation Management under Variable Risk Preferences. *Jeffrey M. Peterson* and Sreedhar Upendram, Kansas State University, Manhattan, KS

Session 25 Agricultural Water Conservation

ROOM: BALLROOM NORTH

MODERATOR: CHRISTINE KIRCHOFF, UNIVERSITY OF MICHIGAN

Beef Management Flexibility with WW-B Dahl Pastures: A Conceptual Framework for Water Conservation in Intensive Agriculture in Semi-Arid Regions. *Carlos Ortega-Ochoa*, Carlos Villalobos, and Micheal C. Farmer, Texas Tech University, Lubbock, TX

To What Extent Does the Gross Water Requirement for Feeding Beef Cattle Contribute to a Cattle Feedyard's Ecological Footprint? *Brent W. Auvermann* and Gary W. Marek, Texas A&M University, Amarillo, TX

Wheat Production and Profit Optimization with Alternative Water Management Strategies in the Texas Panhandle. *Lal K. Almas* and W. Arden Colette, West Texas A&M University, Canyon, TX

Assessment and Impact of Water Conservation Policies in Texas High Plains. *Robert H. Taylor* and Lal K. Almas, West Texas A&M University, Canyon, TX

Session 26 Water Education and Training

ROOM: STIHA ROOM

MODERATOR: KEITH STERNES, SUL ROSS STATE UNIVERSITY

Education to Increase Water Availability to Pennsylvania Homeowners. *Bryan Swistock* and William Sharpe, Penn State University, University Park, PA

Rain Gauge Training Influences on Master Gardeners' Water Conservation Practices. *Leeann DeMouche* and Deborah Bathke, New Mexico State University, Las Cruces, NM; Nolan Doesken, Colorado State University, Fort Collins, CO

The Role of Citizen Scientists in Water Resources Research and Knowledge Transfer. *Gary Woodard*, University of Arizona, Tucson, AZ

Source to Tap: Virtual Management of a Water Delivery System. *Leroy Heitz* and Shahram Khosrowpanah, University of Guam, Mangilao, Guam; Ernie Villarin and Mariano Iglecias, Commonwealth Utility Corporation, Saipan, Commonwealth of the Northern Marianas Islands

Session 27 Integrative Modeling

ROOM: NEW MEXICO ROOM

MODERATOR: MICHAEL BARBER, WASHINGTON STATE UNIVERSITY

What Should We Do This Year? Enlisting Santa Fe's Water Managing and Planning Simulation (WaterMAPS) Model to Help. *Claudia Borchert*, City of Santa Fe Water Division, Santa Fe, NM; Enrique Lopez-Calva, CDM, Carlsbad, CA; John Rehring, CDM, Denver, CO

Water Resources Supply Decision Support System for Santa Fe County. *David Jordan* and Cynthia Ardito, INTERA, Albuquerque, NM; Stephen Wust, Santa Fe Utilities Department, Santa Fe, NM; Van Kelley, INTERA, Austin, TX

Reliability as a Performance Metric in Water Resource Management. *Benjamin L. Harding* and Subhrendu Gangopadhyay, Hydrosphere Resource Consultants, Boulder, CO

BANQUET & AWARDS CEREMONY

7:00 pm – 9:00 pm

La Terraza Banquet Room, La Fonda

Open Bar at 6:30 pm

THURSDAY, JULY 20, 2006

PLENARY SESSION III

8:30 am – 10:00 am

ROOM: BALLROOM SOUTH

MODERATOR: RON LACEWELL, TEXAS A&M UNIVERSITY

Les Shephard, Vice President of Energy, Security, and Defense Technologies, Sandia National Laboratories, Albuquerque, NM
"Water, Water Everywhere, How Many Drops to Drink?" The Role of Technology in Creating America's Water Supply

Jeff Mosher, Acting Executive Director, National Water Research Institute, Fountain Valley, CA

Creating New Sources of Water Supply: Use and Reuse of Non-Traditional Water

Michael Gabaldon, Director of Policy, Management, and Technical Services, Bureau of Reclamation, Washington DC

----- **BREAK 10:00 am – 10:30 am** -----

CONCURRENT SESSIONS

10:30 am – 12:00 pm

Session 28 PANEL - Energy-Water Nexus

ROOM: BALLROOM SOUTH

MODERATOR: BOBBY CREEL, NEW MEXICO STATE UNIVERSITY

Defining R&D Needs at the Energy-Water Nexus. *Mike Hightower*, Sandia National Laboratories, Albuquerque, NM
Innovative Materials and Separations Science. *Bill Bourcier*, Lawrence Livermore National Laboratory, Livermore, CA
Innovations for Thermoelectric Cooling Technologies. *John R. Gasper*, Argonne National Laboratory, Argonne, IL
Innovations for Hydropower and Other Renewables. *Michael J. Sale*, Oak Ridge National Laboratory, Oak Ridge, TN

Session 29 Climate

ROOM: BALLROOM NORTH

CONSERVANCY DISTRICT, RETIRED

MODERATOR: STERLING GROGAN, MIDDLE RIO GRANDE

Fog as a Water Supply in Desert Environments. *Robert Schemenauer*, Dept. of Environment and FogQuest, Kamloops, BC, Canada; Pablo Osses and Pillar Cereceda, Pontifical Catholic University of Chile, Santiago, Chile

Precipitation Enhancement: Water Management Strategy in Texas Panhandle Region. *Lal K. Almas*, West Texas A&M University, Canyon, TX

Climate Change and Water Supply Adaptation in California 2050. *Jay R. Lund*, Josue Medellin-Azuara, Julien Harou, and Marcelo Olivares, University of California, Davis, CA

Impact of Climate Change on New Mexico's Water Resources. *Anne Watkins*, New Mexico Office of the State Engineer, Albuquerque, NM

Session 30 Land Use and Water

ROOM: STIHA ROOM

MODERATOR: MAC MCKEE, UTAH STATE UNIVERSITY

Restoring a Forest Watershed and Adding Water Back to the Land. *Dan C. Abercrombie*, Alamogordo, NM

Thinning and Prescribed Fire in the Santa Fe Municipal Watershed: Protecting Water Quality; Increasing Water Yield? *Paige Grant*, Watershed West, Santa Fe, NM

The Impacts of Land Use Change on Water Resources and Traditional Acequia Culture in North Central New Mexico. *Marquita Ortiz*, Christopher Brown, Alexander G. Fernald, Bobby Creel, and Terrell T. "Red" Baker, New Mexico State University, Las Cruces, NM; Steve Guldán, NMSU Alcalde Research Center, Alcalde, NM

Central Asian Water Management and Environmental Training Project. *Abror N. Gadaev* and Abdurakhman Okhunjanov, Samarkand State Civil Engineering Institute, Samarkand, Uzbekistan

Session 31 Institutions and Policy

ROOM: NEW MEXICO ROOM

MODERATOR: JAY LUND, UNIVERSITY OF CALIFORNIA, DAVIS

The Water Infrastructure Challenge in Victoria. *Robin McLeod*, Department of Sustainability and Environment, Melbourne, Australia

How Inefficient are Rules for Distributing and Pricing Water at the Metropolitan Water District of Southern California? Can We Improve on Them? *David Zetland* and Richard Howitt, University of California, Davis, CA

END OF TECHNICAL PROGRAM

HALF-DAY RIO GRANDE RAFTING TRIP

12:30 pm – 5:00 pm

VALLES CALDERA TECHNICAL TOUR

2:00 pm – 9:00 pm

Welcome Reception

GEORGIA O'KEEFFE MUSEUM

Tuesday July 18, 5:30PM-8:00PM

This year's welcome reception will truly be a special event. It is being held at the Georgia O'Keeffe Museum, located at 217 Johnson, within easy walking distance from La Fonda.



UCOWR Banquet & Awards Ceremony

LA TERRAZA BANQUET ROOM, LA FONDA HOTEL

Wednesday July 19, Open Bar 6:30PM, Banquet 7:00PM-9:00PM

- **Dissertation Awards**-UCOWR recognizes two outstanding Ph.D. dissertations in (1) water policy and socio-economics and (2) natural science and engineering.
- **Education and Public Service Awards**-These awards are given to recognize individuals, groups, or agencies that have made significant contributions to increased public awareness of water resources development, use, or management.
- **Friends of UCOWR Award**-UCOWR recognizes individuals or groups who have made outstanding contributions to the organization and names them 'Friends of UCOWR.'
- **Warren Hall Medal**-UCOWR presents the Warren A. Hall Medal to recognize distinguished achievements of an individual in the field of water resources.

Recreational Trip



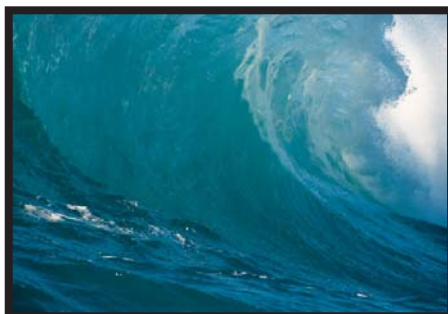
Half-Day Trip, Rio Grande Pilar Racecourse – Thursday, July 20, 12:30PM – 5:00PM

Naturalist and conservation interpreters will accompany you on this guided rafting trip which is appropriate for ages 6 through 90. Splash suits, life jackets, helmets, snacks and beverages will be provided. Participants should bring sneakers, cap or hat, shorts, sunglasses and retaining strap, sunscreen lotion and a sense of adventure. There is a maximum of 30 participants on this trip. Fees will be fully refunded if water flows are too low or if a minimum participation of 15 per trip is not met. More information can be found at the UCOWR website, www.ucowr.siu.edu.

Technical Tour

Valles Caldera Technical Tour – Thursday, July 20, 2:00PM – 9:00PM

The Valles Caldera National Preserve is a massive collapsed crater studded with eruptive domes and features the 11,254-foot Redondo peak in New Mexico's Jemez Mountains. The historic 89,000 Baca Ranch, purchased by Congress in 2000, is being used to explore how science-based adaptive management can be used to monitor the preserve and improve decision making. The preserve is open to the public, but don't expect crowds or a shop full of trinkets. Instead, you'll experience a sense of solitude, take in beautiful vistas, observe elk and other wildlife, and learn about the preserve's rich history and geology. The tour fee includes entrance to the preserve; water and snacks will be provided. On the trip back to La Fonda, the motor coach will stop at a restaurant near Los Alamos, where you may purchase dinner.



2007 UCOWR/NIWR Annual Conference

July 24-26, 2007

Boise, Idaho

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2006 UCOWR/NIWR Conference

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