

**Plenary Session 1    Water in the West    8:30 am – 10 am**

***Tom Eisman***

Tom Eisman is the Program Director for Water Policy and Implementation and Climate Change for the Western Governors' Association. He received a Bachelor of Arts degree in history from Princeton University (focusing on Western water issues) and a Master of Science in freshwater ecology from the University of Michigan. From 2001-2009, Tom managed the water program for The Nature Conservancy in Colorado, where he worked to protect rivers and wetlands and contributed to statewide and regional water supply planning efforts, including Colorado's Statewide Water Supply Initiative and the Upper Colorado River Endangered Fish Recovery Program. Prior to working with TNC, Tom worked for the Department of the Interior in Washington, D.C., focusing on water and hydropower issues for the Office of Policy.

***Roger S. Pulwarty***

Roger S. Pulwarty is Climate and Societal Interactions Division Chief and the Director of the multi-agency National Integrated Drought Information System at the National Oceanic and Atmospheric Administration (NOAA) in Boulder, Colorado. He holds a Ph.D. in Climatology (1994) from the University of Colorado, Boulder. His research focuses on climate risk assessment and adaptation in the Western US, Latin America, and the Caribbean. Roger leads the Vulnerability and Capacity Assessments component of the World Bank/GEF-funded project on the multi-country "Mainstreaming Adaptation to Climate Change in the Caribbean." He is a Convening Lead Author on the forthcoming UN International Strategy for Disaster Reduction Global Assessment of Disasters (2011), the IPCC Special Report on Extremes and on Adaptation Planning and Implementation in the Fifth Assessment Report Working Group II (2014).

**Session 2    Exempt Domestic Wells I    10:30 am - Noon**

***Dr. John Tracy – Issues and Solutions for Managing Exempt Domestic Wells*    10:30 – 10:45**

Dr. Tracy is the Director of the Idaho Water Resources Research Institute at the University of Idaho. Dr. Tracy also served as the Vice President for Research at the University of Idaho in 2007 and 2008. He received his B.S. degree in Civil Engineering at Colorado State University in 1980, and his M.S. and Ph.D. degrees in Civil Engineering at the University of California at Davis in 1986 and 1989 respectively. He has held academic positions at Kansas State University (Civil Engineering 1989 to 1992), South Dakota State University (Civil Engineering 1992 to 1996) the Desert Research Institute (Hydrologic Sciences 1997 to 2004). Dr. Tracy has worked on numerous research projects and authored or co-authored over 70 technical publications in the areas of watershed planning, watershed restoration, the development of modeling tools for environmental systems, the role of science in watershed management, and the development of adaptive management systems.

***Jesse Richardson – Exempt Well Statutes in the United States*    10:50 – 11:05**

Jesse J. Richardson, Jr. is the Policy and Research Advisor for Water Systems Council, an Associate Professor in Urban Affairs and Planning at Virginia Tech, and an attorney in private practice. Prior to his appointment at Virginia Tech, he practiced law in his hometown of Winchester, Virginia both with a large firm and, later, as a sole practitioner. He is admitted to practice in both Virginia and West Virginia. Richardson focuses on water rights, real estate, land use, and environmental issues. Richard's teaching at Virginia Tech includes courses in Principles of Real Estate, Urban Growth Management, Land Use Law, and the Law of Critical Environmental Areas. He received his B.S in Agricultural Economics, magna cum laude, and his M.S in Agricultural and Applied Economics from Virginia Tech. He received his J.D. from the University of Virginia School of Law, where he received the Edwin S. Cohen Tax Scholarship.

***Dr. W. Todd Jarvis – Shootout at the Exempt Well Corral: A Spaghetti Western Water War*  
11:10 – 11:25**

Dr. W. Todd Jarvis is the Associate Director of the Institute for Water & Watersheds and Assistant Professor in the Department of Geosciences at Oregon State University.

***Nathan Bracken – Exempt Wells in the West*    11:30 – 11:45**

Mr. Bracken is the Legal Counsel for the Western States Water Council, which advises the governors of 18 western states on water policy issues. As Legal Counsel, he works with Council members, who are appointed by their respective governors, to develop and implement Council policies and initiatives on water issues affecting the Western United States. He has prepared and published a number of articles, reports, and white papers on western water issues, including an extensive report on exempt wells published in Environmental Law. He is also the Editor of the

Council's weekly newsletter, *Western States Water*. Prior to joining the Council, Mr. Bracken worked in private practice as an attorney and mediator. He has a B.A. in English from Brigham Young University and a J.D. from the University of Utah.

***Discussion***    **11:45 - Noon**

**Session 3    Snowpack & Snowmelt I    10:30 am - Noon**

***Dr. John Sansalone – Snowmelt Particulate Matter Fate Impacted by Anthropogenic Activities in Lake Tahoe Watershed*    10:30 – 10:45**

John Sansalone is a Professor in the Department of Environmental Engineering Sciences at the University of Florida. He has expertise in hydrologic processes and monitoring coupled with unit operations and processes for treatment of rainfall-runoff and snowmelt. His modeling expertise includes physical models integrated with computational fluid dynamics.

***Dr. Paul Stoy – Effects of Mountain Pine Beetle on Snowpack Dynamics in the Northern Rockies*    10:50 – 11:05**

Dr. Paul Stoy's research interests include the biosphere atmosphere exchange of mass and energy with an emphasis on modeling long-term (inter-annual) CO<sub>2</sub> and H<sub>2</sub>O flux at the plot, regional and global scale, and with respect to land use change, collaboration with the international terrestrial carbon cycle community (FLUXNET), quantifying biosphere-climate feedbacks, eddy covariance, sap flow, respiration chamber and flux-gradient methodologies, wavelet and data assimilation techniques, information theory, and ecosystem thermodynamics. In 2006, he received his Ph.D. in Ecology with a minor in Environmental Engineering at Duke University. He graduated with a bachelor's of arts degree with a double major in Botany and Zoology with a certificate in Environmental Studies from the University of Wisconsin in 2001.

***Dr. Gregory Pederson – Long-term Snowpack Variability and Change in the North American Cordillera*    11:10 – 11:25**

Greg Pederson is currently a U.S. Geological Survey Research Scientist located at the Northern Rocky Mountain Science Center in Bozeman, Montana. His educational background includes a B.S. degree in Ecology and Evolution from Michigan State University, an M.S. degree in Environmental Science from Montana State University, and a Ph.D. from the School of Natural Resources at the University of Arizona. His current and past research has been focused primarily on past, present, and projected future climate variability and its role in driving biophysical processes with a focus on water resources of mountainous regions of western North America.

***Maria Milanes-Murcia – Forests and Watersheds: Sustainable Timber Practices Protecting Water Resources*    11:30 – 11:45**

Maria Milanes-Murcia, a Spanish environmental law attorney who holds a Master in Economics from New Mexico State University, a LL.M. in International Water Resources from University of the Pacific, McGeorge School of Law, and is working on her JSD. Currently she works for the California Department of Forestry and Fire Protection and teaches Environmental Law at California State University, Sacramento.

***Discussion*    11:45 - Noon**

**Session 4    Coping with Water Supply Uncertainty    10:30 am - Noon**

***Romano Foti – Vulnerability of Future U.S. Water Supply to Shortage*    10:30 – 10:45**

Romano Foti received his B.S. and M.S. degrees in civil engineering from the University of Catania (2005) and the School of Excellence of the University of Catania (2006) in Catania, Italy. He first came to Colorado State University as a visiting scholar during the 2006 Spring semester to work on his master's degree dissertation. After a year spent practicing as a civil engineer, he enrolled in the Ph.D. program in hydrologic science at CSU in the Fall 2007. Romano is currently working on a project to assess the vulnerability of U.S. water supplies to water shortage and climatic changes sponsored by the U.S. Forest Service. His research interests also cover land-atmosphere interactions and vegetation thermodynamics. In particular, he is interested in investigating the water dynamics across the land-atmosphere interface and their impact on the spatial distribution of soil moisture and vegetation.

***John Wiener – Civil Defense for U.S. Western and Plains Agricultural Regions***

**10:50 – 11:05**

John D. Wiener worked for environmental organizations in energy development and social impacts issues in Wyoming and the West until undertaking graduate school at University of Wyoming and subsequently the University of Colorado. His dissertation and subsequent work for some years concerned property rights and resource management issues related to cultural continuity and sustainability, including common property resource management. Other work included natural hazards, social creation of vulnerability, flood and multi-hazard planning, and drought, with the NHRAIC, and consulting work. A third major focus is application of those perspectives to climate responsiveness and water management. Other interests include rangelands and riparian areas as hybrid ecologies demanding novel management strategies, and the intersection of legal ideas and property rights ideas with resource management.

***Gary W. Hergert – Cropping Systems and Deficit Irrigation for Conserving Water in the High Plains*    11:10 – 11:25**

Gary W. Hergert is a professor (50% research, 50% extension) at the University of Nebraska Panhandle Center located in Scottsbluff, NE. He joined UNL in 1975 as a soil specialist at North Platte, NE where he also served as District Director (1997-2004) before returning to the academic ranks. A native of Colorado, he received his B.S. and M.S. from CSU (1967 & 1970), and Ph.D. from Cornell University (1975). He is a member and Fellow of the American Society of Agronomy and the Soil Science Society of America. His current research and extension efforts focus on soil and fertilizer management to improve crop production efficiency in western NE (corn, dry beans, winter wheat, brassicas, sugar beets, grasses). He leads major grant-funded projects on limited irrigation no-till cropping systems plus a remote sensing project that measures evapotranspiration using Landsat imagery.

***Dr. Stephen W. Smith – On-farm Strategies for Deficit Irrigation to Maximize Operational Profit Potential***      **11:30 – 11:45**

Dr. Smith manages engineering and technical process development at Regensis Management Group in Fort Collins, Colorado. He has spent 35 years in the irrigation engineering and water resources arena, beginning with the founding of Aqua Engineering in 1975. In addition to his responsibilities at Regensis, he serves on the board of the Loudon Irrigating Canal and Reservoir Company in northeastern Colorado. Dr. Smith's experience includes irrigation projects throughout the United States and eight countries in Europe, the Far East, and the Middle East. He served on the faculty at Colorado State University where he taught irrigation design for almost 20 years. Dr. Smith has been an active professional member and past national president of the American Society of Irrigation Consultants and, in 1999, he was made a fellow member. From 2001 to 2009, Dr. Smith served on the board of directors of the Irrigation Association and was President of the association in 2008.

***Discussion***      **11:45 - Noon**

**Session 5      Crop Water Use & Management I**

**10:30 am - Noon**

***Rick Kellison – Texas Alliance for Water Conservation: An Innovative Approach to Water Conservation      10:30 – 10:45***

Rick Kellison is the project director for the Texas Alliance for water conservation. He has been active in the agricultural community of West Texas serving as a fertilizer and chemical dealer as well as managing his own irrigated farming operation.

***Dr. Justin Weinheimer – Economic Considerations for Water Conservation: The Texas Alliance for Water Conservation      10:50 – 11:05***

Justin Weinheimer is a research associate in the Department of Agricultural and Applied Economics at Texas Tech University. His current research interests and expertise include agricultural issues of declining water resources, economic sustainability of agriculture on the Texas High Plains and risk management in commercial agriculture.

***Dr. Stephen Maas – Determining Crop Water Use in the Texas Alliance for Water Conservation Project      11:10 – 11:25***

As a member of the faculty in the Department of Plant and Soil Science at Texas Tech, Dr. Maas is responsible for teaching graduate-level courses involving microclimatology, crop modeling, remote sensing, and precision agriculture. He also conducts research under a joint appointment with Texas AgriLife Research and as a visiting scientist at the USDA-ARS Plant Stress Laboratory in Lubbock, TX, where he specializes in the interactions of crop plants with their environment. Prior to coming to Texas Tech in 2000, Dr. Maas worked for 16 years as a Plant Physiologist with USDA-ARS at its laboratories in Weslaco, TX, and Shafter, CA. He received his B.S. and M.S. degrees in meteorology from Texas A&M University, and his Ph.D. in Agronomy from that same university.

***Dr. David Doefert – What We Know about Disseminating Water Management Information to Various Stakeholders      11:30 – 11:45***

David Doefert is a professor in the Department of Agricultural Education and Communication at Texas Tech University. His primary research interests include agricultural communication strategies and methods with special interest in decision making.

***Discussion      11:45 - Noon***

**Session 6    Snowpack and Snowmelt II****1:30 pm – 3 pm*****Dr. Adrian Harpold – Trends in Snowpack Depths and the Timing of Snowmelt in the River Basins of the Intermountain West                    1:30 – 1:45***

The presenter and first author Dr. A.A. Harpold is a postdoctoral researcher in the Hydrology and Water Resources Department at the University of Arizona. Dr. Harpold is involved in two projects at U of A: a study on the effects of bark beetles on water and carbon cycling, and a critical zone observatory (CZO) funded by NSF. Before U of A, he was at Cornell University working on a Ph.D. in Biological and Environmental Engineering. Dr. Harpold's B.S. and M.S. degrees are from Virginia Tech in Biological Systems Engineering.

***Jason Lillywhite – A Probabilistic Approach to the NRCS Snowmelt-Runoff Model (WinSRM) for Risk Analysis                    1:50 – 2:05***

Jason is a water resources engineer with 10 years experience working as a consultant on modeling, design, and construction services projects. Experienced in water resources modeling applications including water supply and demand simulation and forecasting, reservoir operations, water rights allocation, pump station operations, pipe hydraulics, unsteady open channel flow modeling, dam break analysis, and other applications related to stormwater, rainfall runoff, pipe networks, and water reuse analysis. Degrees in: M.S., Civil Engineering with Water Resources emphasis, University of Utah, 2008 B.S., Civil and Environmental Engineering, Brigham Young University, 2000. He currently lives in Sandy, Utah, and is married with four kids and enjoys skiing and mountain biking.

***Dr. Roy Rasmussen – High-Resolution Simulation of Seasonal Snowfall Over the Colorado Headwaters Region and Some Impacts of Climate Change                    2:10 – 2:25***

Roy Rasmussen received a B.S. degree in Physics and Mathematics from Wheaton College, Illinois in 1978, and a M.S and Ph.D. from the University of California, Los Angeles in Atmospheric Sciences in 1980 and 1982, respectively, specializing in cloud physics. After receiving his doctorate, he was an Advanced Study Program postdoctoral researcher at NCAR, studying the formation of hail in severe storms. Following his postdoctoral studies he spent three years working at the Bureau of Reclamation at Denver, Colorado evaluating weather modification efforts around the world. He is now at the National Center for Atmospheric Research (NCAR) and is the Director of the Hydrometeorology Applications Program at the Research Applications Laboratory. His scientific research has encompassed studies of climate change on winter storms, studies of hail storms, mesoscale flow past topography, winter weather nowcasting, aircraft icing, improving parameterizations for precipitation formation in weather and climate models and the relationship between snowfall rate and visibility. He is currently the lead of the NCAR Water Systems Program and an American Meteorological Society Fellow. He has five patents and over 50 peer reviewed journal papers.

***Dr. David Clow – Influence of Windblown Dust on Snowmelt Timing in the Rocky Mountains***

**2:30 – 2:45**

Dr. David Clow began working for the USGS in 1990. He received a Ph.D. in Geochemistry from University of Wyoming in 1992. His main area of focus is on water resources in mountain environments. His research interests include the effects of climate change on water resources, and effects of natural and anthropogenic disturbances on water quality.

***Discussion* 2:45 - 3**

***A Panel Discussion of State Approaches to Managing Exempt Wells***

***Jesse Richardson***

Jesse J. Richardson, Jr. is the Policy and Research Advisor for Water Systems Council, an Associate Professor in Urban Affairs and Planning at Virginia Tech, and an attorney in private practice. Prior to his appointment at Virginia Tech, he practiced law in his hometown of Winchester, Virginia both with a large firm and, later, as a sole practitioner. He is admitted to practice in both Virginia and West Virginia. Richardson focuses on water rights, real estate, land use, and environmental issues. Richard's teaching at Virginia Tech includes courses in Principles of Real Estate, Urban Growth Management, Land Use Law, and the Law of Critical Environmental Areas. He received his B.S. in Agricultural Economics, magna cum laude, and his M.S. in Agricultural and Applied Economics from Virginia Tech. He received his J.D. from the University of Virginia School of Law, where he received the Edwin S. Cohen Tax Scholarship.

***Kevin Rein***

Kevin Rein is a Water Resource Engineer at the Colorado Division of Water Resources in Denver.

***Dr. W. Todd Jarvis***

Dr. W. Todd Jarvis is the Associate Director of the Institute for Water & Watersheds and Assistant Professor in the Department of Geosciences at Oregon State University.

***Dr. John Tracy***

Dr. Tracy is the Director of the Idaho Water Resources Research Institute at the University of Idaho. Dr. Tracy also served as the Vice President for Research at the University of Idaho in 2007 and 2008. He received his B.S. degree in Civil Engineering at Colorado State University in 1980, and his M.S. and Ph.D. degrees in Civil Engineering at the University of California at Davis in 1986 and 1989 respectively. He has held academic positions at Kansas State University (Civil Engineering 1989 to 1992), South Dakota State University (Civil Engineering 1992 to 1996) the Desert Research Institute (Hydrologic Sciences 1997 to 2004). Dr. Tracy has worked on numerous research projects and authored or co-authored over 70 technical publications in the areas of watershed planning, watershed restoration, the development of modeling tools for environmental systems, the role of science in watershed management, and the development of adaptive management systems.

***Trisha Macomber – An Introduction to Rainwater Harvesting for Potable Use***

Trisha Macomber works as a cooperative extension educator for the University of Hawaii. For the past eleven years she has run a highly successful water quality/quantity program that addresses the needs and concerns of people dependent on rainwater catchment systems for domestic, agricultural, and commercial water supply. She has received the University of Hawaii Outstanding Service Award and a Hawaii State Senate Certificate of Recognition for her rainwater catchment program. She has acted as an advisor for government officials and is on the Governor and County's emergency task force and response team for water related emergency response. She has been a board member on local, National and International rainwater catchment associations and has taught rainwater catchment nationally and abroad. Macomber is the author of Guidelines on Rainwater Catchment Systems for Hawaii, which has been adopted by Hawaii County and the Hawaii State Department of Health.

**Session 9      Crop Water Use & Management**

**1:30 pm – 3 pm**

***Rick Kellison – Assessment of Improved Pasture Alternatives on Texas Alliance for Water Conservation***                      **1:30 – 1:45**

Rick Kellison is the project director for the Texas Alliance for water conservation. He has been active in the agricultural community of West Texas serving as a fertilizer and chemical dealer as well as managing his own irrigated farming operation.

***Phil Brown – Integrating Forages and Grazing Animals to Reduce Agricultural Water Use***

**1:50 – 2:05**

A native of Corsicana, Texas, Philip Brown received a B.S. degree from Tarleton State University (1983) and a M.S. degree from Texas Tech (1987). He has served as the Senior Forage Research Associate in the Thornton Distinguished Chair research program at Texas Tech since 1989 and currently serves in this capacity for the Texas Coalition for Sustainable Integrated Systems and the Texas Alliance for Water Conservation. Awards include the College of Agriculture's Outstanding Achievement and Contribution to the Advancement of Agricultural Science Award in 2003, the Top Techsan Staff Award in 2005, and the CASNR Research Staff Award in 2009.

***Jeff Pate – Sunflowers as an Alternative Irrigated Crop on the Southern High Plains***

**2:10 – 2:25**

Jeff Pate is a risk management economist with Texas AgriLife Extension in Lubbock, Texas. His activities focus on analyzing financial performance and measuring alternative risk strategies for area producers in cooperation with the Texas Alliance for Water Conservation demonstration project.

***Justin Weinheimer & Rick Kellison – Session Wrap-up***

**2:30 – 2:45**

Dr. Justin Weinheimer is a research associate in the Department of Agricultural and Applied Economics at Texas Tech University. His current research interests and expertise include agricultural issues of declining water resources, economic sustainability of agriculture on the Texas High Plains and risk management in commercial agriculture.

Rick Kellison is the project director for the Texas Alliance for water conservation. He has been active in the agricultural community of West Texas serving as a fertilizer and chemical dealer as well as managing his own irrigated farming operation.

***Discussion***                      **2:45 - 3**

***Dr. Douglas Kenney – Policy and Legal Implications of Reduced Colorado River Flows*****3:30 – 3:45**

Doug Kenney is a Senior Research Associate at the University of Colorado's Natural Resources Law Center, where he directs the Western Water Policy Program. He has written extensively on several water-related issues, including law and policy reform, river basin and watershed-level planning, the design of institutional arrangements, water resource economics, and alternative strategies for solving complex resource issues. Among his publications are: *In Search of Sustainable Water Management: International Lessons for the American West and Beyond* (2005, Edward Elgar Publishing). Dr. Kenney has served as a consultant to a variety of local, state, multi-state, and federal agencies, and has made presentations in (at least) 17 states, six nations, and four continents. He has a B.A. in biology from the University of Colorado, a M.S. in Natural Resources Policy and Administration from the University of Michigan, and a Ph.D. in Renewable Natural Resource Studies from the University of Arizona.

***Kenneth Nowak – Colorado River Decadal Flow Projections: A Spectral Approach*****3:50 – 4:05**

Ken Nowak is a Ph.D. student in the water resources subgroup of Civil Engineering at the University of Colorado. He is advised by Balaji Rajagopalan and Edith Zagona. Ken completed his M.S. in 2008 at CU, focusing on streamflow simulation methods and reservoir operations in the Gunnison River Basin. His Ph.D. work is concentrated on understanding decadal scale flow variability in the Colorado River Basin for the purpose of improved management. In 2010, he served as a climate/water resource speaker on the Water Education Foundation's Lower Colorado River tour. Ken is a native of Massachusetts and holds a B.S. from Rensselaer Polytechnic Institute in Troy, NY.

***Joseph Barsugli – Does the Downscaling Method Matter for Climate Change Adaptation on the Colorado River?*** **4:10 – 4:25**

Joe Barsugli is a Research Scientist at the Cooperative Institute for Research in the Environmental Sciences (CIRES) at the University of Colorado, Boulder and with the Western Water Assessment. Trained in climate modeling and theory, he works on applications of climate information to land and water management problems. He is one of the lead authors of *Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation* and of a white paper for the Water Utility Climate Alliance on improving climate modeling to better serve water utility planning.

***Jeffrey Deems – Desert Dust Impacts on Snowmelt and Runoff in the Upper Colorado River Basin***      **4:30 – 4:45**

Jeffrey Deems is a Research Scientist at the NOAA Western Water Assessment and the National Snow and Ice Data Center, at the University of Colorado at Boulder.

***Discussion***      **4:50 – 5:30**

***Dr. Ronald D. Lacewell – Biofuel Crop Production Demand on Land and Water Resources***

**3:30 – 3:45**

Ronald Lacewell's publications' include over 100 refereed journal articles, over 200 bulletins, and numerous invited and contributed professional papers. He is the principal and co-principal investigator for contracts totaling several million dollars. Also, he served as economist of several multi-disciplinary, multi-state contracts which have exceeded \$50 million. His research areas have included water, energy, integrated pest management, fisheries, recreation, weather modification and new crops.

***Naveen Adusumilli – Impacts of Biofuel Crop Production on Water Quality*      **3:50 – 4:05****

Naveen Adusumilli is a Ph.D. student in the Department of Agricultural Economics at Texas A & M University.

***Dr. C. Robert Taylor – Biodiesel and Corn Ethanol: Water and Net Energy Considerations***

**4:10 – 4:25**

Dr. C. Robert Taylor is the Alfa Eminent Scholar (Distinguished University Professor) in Agricultural Economics and Public Policy in the College of Agriculture at Auburn University. Prior to joining the Auburn faculty in 1988, he held faculty positions at the University of Illinois, Texas A&M University, and Montana State University. He has conducted applied research on a wide variety of topics, including market concentration, conservation, buyer power, bioenergy, and sustainable agriculture. He has authored or coauthored five books and over 200 articles and reports. He has testified to Congress on concentration and consolidation of the food system and, in 2010, was invited by the U.S. Department of Justice and USDA to testify at two of their Joint Workshops on Competition Issues in Agriculture.

***Kendall DeJonge – Field Experiments, Instrumentation, and Modeling in Water-Limited Cropping Systems*      **4:30 – 4:45****

Kendall DeJonge grew up on an irrigated farm near Minden, Nebraska. He holds a B.S. and M.S. in Agricultural Engineering from Iowa State University. He worked for two years as a Hydraulic Engineer for the Omaha District of the U.S. Army Corps of Engineers, and is a registered Professional Agricultural Engineer. Kendall is currently pursuing a Ph.D. in Civil and Environmental Engineering from Colorado State University, where he is employed as a Graduate Research Assistant for the Soil and Crop Sciences Department, and plans to graduate in August 2011. His research combines field experiments of full and limited irrigation with emerging instrumentation technologies and crop modeling.

***Michael Davidson – Empirical Evidence of Improper Specification and Selection Bias in the EPA Specification for Weather-Based Irrigation Controller*      4:50 – 5:05**

Michael Davidson is a Ph.D. student in World Politics and Public Policy at Claremont Graduate University. He is engaged in research projects on the social benefits of the energy/water nexus in the Middle East. He is also a partner in Spec Management Group which is a manufacturer's Representative Agency specializing in the promotion of water conservation irrigation products and tools.

***Discussion*                      5:05 – 5:30**

**Session 12    Water Governance I**

**3:30 pm – 5:30 pm**

***Dr. Channah Rock – Public Perceptions Regarding Water Reuse in Arizona: Challenges and Opportunities*                      3:30 – 3:45**

Dr. Channah Rock is an Assistant Professor at the University of Arizona in the Department of Soil, Water, and Environmental Science. Dr. Rock also maintains a joint appointment as a University Extension faculty and is currently facilitating the Water Quality Extension Program on a statewide basis throughout Arizona. Currently, Dr. Rock is working on the evaluation of reclaimed water quality as well as promoting water reuse as a safe and practical resource for the southwest. Dr. Rock focuses on adult education on water quality related issues across the state with the main focus to create awareness on applicable water conservation practices for citizens of the southwest. Additionally, Dr. Rock currently works with stakeholder engagement to facilitate awareness and drive water quality improvements in surface waters of Arizona. She is extensively involved in detection of pathogens using molecular technologies and has experience relating to the evaluation of environmental water samples.

***Maria Milanes-Murcia – The All-American Canal: A Conflict with International Solution***

**3:50 – 4:05**

Maria Milanes-Murcia is a Spanish environmental law attorney who holds a Master's in Economics from New Mexico State University, a LL.M. in International Water Resources from University of the Pacific, McGeorge School of Law, and is currently working on her JSD. She works for the California Department of Forestry and Fire Protection and teaches Environmental Law at California State University, Sacramento.

***Dr. Sharon Megdal - The Challenge of Binational Decision-Making in Arizona-Sonora Transboundary Watersheds*                      4:10 – 4:25**

Dr. Sharon B. Megdal is Director of The University of Arizona Water Resources Research Center and C.W. and Modene Neely Endowed Professor in the College of Agriculture and Life Sciences and serves as Director the University of Arizona Water Sustainability Program. Her work focuses on state and regional water resources management and policy. Dr. Megdal teaches the multi-disciplinary graduate course Arizona Water Policy and serves as an elected member of the Central Arizona Project Board of Directors. In 2010, she was named Distinguished Outreach Professor. Sharon B. Megdal holds a Ph.D. degree in Economics from Princeton University.

***Dr. Paul Koch – Development of a Water Security Strategy for the U.S. Army*                      4:30 – 4:45**

Paul Koch, a specialist in water resources management, has over 16 years of experience in research, engineering, consulting and teaching. Recently he completed the development of a spreadsheet-based water demand forecast model for Fort Bragg. Previously he developed computer simulations for irrigated agriculture and stormwater management, and has managed

large-scale hydrologic and hydraulic analysis for floodplain mapping. As a technical presenter and teacher, Dr. Koch has supported clients in the areas of stakeholder meeting facilitation and by providing formal instruction in hydrology, environmental science, and environmental economics. He received his Ph.D. from the University of Nebraska, where his dissertation research tested an application of artificial neural networks in agricultural water resources management.

*Discussion*

**4:45 -5:30**

***Cado Daily – Taking Landscape Irrigation by Storm, Or How to Sop It Up with a Sponge***

Cado is a Senior Program Coordinator for the University of Arizona Cochise County Cooperative Extension Water Wise program. A graduate of Boston University, she holds a University of Arizona Water Policy Certificate, is an American Rainwater Catchment Systems Association Accredited Rainwater Professional, coordinates and teaches the Water Wise Rainwater Harvesters Certificate and Demonstration Program, is a Watershed Management Group Advisor, conducts annual rainwater tours in the Sierra Vista Subwatershed, provides consultations on rainwater and gray water systems, advises on Xeriscape landscaping, has developed the concept of RainScape landscaping, and has been harvesting water at her home for the past 10 years. She only uses rainwater for her vegetable garden, and rain, gray and storm water for all landscape water needs. Cado tries to walk her talk!

***Tory Syracuse – Community-Based Approaches to Stormwater Harvesting in the Arid Southwest***

Tory Syracuse is a project manager at Watershed Management Group (WMG), a non-profit organization based in Tucson, Arizona, that provides community-based solutions to ensure the long-term prosperity of people and health of the environment. Tory works within WMG's Green Streets-Green Neighborhoods program to implement neighborhood-level green infrastructure projects through the hands-on participation of neighborhood residents. She holds a Master's degree in Urban Planning from the University of Arizona.

***Colorado Supreme Court Justice Greg Hobbs***

Greg Hobbs is vice president of the Colorado Foundation for Water Education and a co-convenor of the western water judges' educational project, Dividing the Waters. He earned his J.D. from U-Cal Berkeley in 1971. During his legal career, he worked as a law clerk at the United States Court of Appeals for the Tenth Circuit, an enforcement attorney for the Environmental Protection Agency, a Colorado First Assistant Attorney General for Natural Resources, and a partner with the law firms of Davis, Graham & Stubbs and Hobbs, Trout & Raley. His hobbies include poetry and history of the American Southwest. In addition to *The Public's Water Resource* and *Living the Four Corners*, published by the Colorado Bar Association CLE, he is the author of *In Praise of Fair Colorado, The Practice of Poetry, History, and Judging* (Bradford Publishing Co., 2004) and *Colorado Mother of Rivers, Water Poems* (Colorado Foundation for Water Education, 2005).

***Steve Solomon***

Steve Solomon has written for The New York Times, Business Week, Forbes, Esquire, and has been a regular commentator on NPR's Marketplace. He has appeared on BBC-TV, CBS Evening News, 'Morning Joe', the late Tim Russert's CNBC show, Fox News, PBS' Tavis Smiley, Al-Jazeera, among others. He has been a featured radio guest on NPR's All Things Considered, Diane Rehm, The World, and Talk of the Nation, Larry Mantle's AirTalk, and the Jim Bohannon Show. He has addressed the Carnegie Council, Center for Strategic and International Studies (CSIS), NYU's Law and Security Institute, World Policy Institute, World Affairs Council, Zócalo Public Square, and delivered keynotes to the Water Environment Federation, WaterSmart Innovation. He is author of *Water: The Epic Struggle for Wealth, Power, and Civilization* (HarperCollins 2010), which was a Finalist for the prestigious Los Angeles Times Book Prize. A previous book, *The Confidence Game* (Simon & Schuster 1995), presciently warned about mounting dangers in the volatile global financial system. He lives in Washington, D.C. with his family.

**Session 15 Planning & Management**

**10 am - Noon**

***Shama Perveen – Climate Variability, Water Stress, and Planning for Storage: Hard or Soft Path Management?* 10 – 10:15**

Shama Perveen is a research scientist at the Earth Institute's water center at Columbia University. Her areas of research include integrated and sustainable water resources management and policy, multiscale assessments and GIS modeling of vulnerability and change, climate variability and impacts; supply chain corporate water risks; and industrial ecology. Shama came to the Water Center from the University of Nevada, Las Vegas (UNLV) where she was on the faculty in the School of Environmental and Public Affairs. At the Columbia Water Center, Shama is currently working on climate-informed modeling, and assessments of the water crises facing India and analysis of supply chain water risks for business.

***Kathleen Miller – Confronting Climate Change: Planning Tools for Urban Providers***

**10:20 – 10:35**

Dr. Kathleen Miller is an economist who works with the Climate Science and Applications Program at the National Center for Atmospheric Research. She served as a lead author of Chapter 3, "Water Resources and Their Management", in the IPCC Working Group II, Fourth Assessment Report, and as a lead author of the IPCC Technical Paper on Climate Change and Water. She also co-authored a book on the implications of climate change for urban water utilities: *Climate Change and Water Resources: A Primer for Municipal Water Providers* (Awwa Research Foundation, 2006). Her research focuses on human exploitation of climate-sensitive natural resources, and the socioeconomic and institutional factors affecting resource management decisions in the context of uncertainty and competing interests. She received a B.A. in anthropology and M.A. and Ph.D. in economics from the University of Washington.

***Tolessa Deksissa – The DC Area Water Issues Program***

**10:40 – 10:55**

Dr. Tolessa Deksissa is the Director of the Professional Master's Degree in Water Resources Management at the University of the District of Columbia's College for Agriculture, Urban Sustainability, and Environmental Science. Dr. Deksissa holds a Ph.D. in Applied Biological Sciences: Environmental Technology and M.S. in Environmental Science from Ghent University, Belgium; and a B.S. in Crop Science from Alemaya University.

***Charles Howe – Water Pollution Trading Systems for Unlike Pollutants: The Case of Orphan Mines* 11 – 11:15**

Chuck Howe is Professor Emeritus of Economics and continues as a member of the Professional Staff, Institute of Behavioral Science, at University of Colorado-Boulder. He is a Fellow of the American Geophysical Union and the Association of Environmental and Resource Economists and has specialized in the water resources field for the past 50 years. Currently he is working on

the relationship between the appropriations legal framework and the economic efficiency of resultant water allocations.

***David Freeman – Implementing the Endangered Species Act on the Platte Basin Water Commons***                    **11:20 – 11:35**

David Freeman has worked for over forty years on social organization for irrigation systems in South Asia and in the Western United States. Dr. Freeman earned his B.A. with honors at Rocky Mountain College in Billings, Montana, a Masters of Public and International Affairs at the Graduate School of International Affairs, University of Pittsburgh, and a Ph.D. in International Studies at the University of Denver. He then undertook a career in social organizational aspects of societal development in the Department of Sociology beginning in 1967 continuing until retirement in 2005. He now is continuing work on organizational aspects of water development, most specifically regarding the flows of the Platte river system in Colorado, Wyoming, and Nebraska. Dr. Freeman has published many journal articles and technical reports. He recently published a book entitled: *Platte River Struggle: Mobilizing Water Users to Implement the Endangered Species Act on the Platte River Basin.*

***Discussion***                    **11:35 - Noon**

**Session 16    Ogallala I**

**10 am - Noon**

***Lal Almas – Does Irrigation Technology Help in Conserving Ogallala Aquifer in Texas?***

**10 – 10:15**

Dr. Almas is an associate professor of Agricultural Business and Economics at West Texas A&M University. He teaches marketing of agricultural products, agricultural business management, farm and ranch management, quantitative business analysis, agricultural production economics, financial analysis and management, agricultural risk management and advanced agricultural statistics. He has authored several publications and has made numerous invited presentations at regional, national and international conferences. Dr. Almas is a member of the Southern Agricultural Economics Association, Academy of Marketing Science, Global Economic Modeling Network, Rotary Club of Canyon and serves as the adviser for the WTAMU Agribusiness Club, Alpha Zeta and ROTARACT.

***Weiwei Wang – Groundwater Use and Economic Implications of Climate Change in Ogallala Aquifer Region***            **10:20 – 10:35**

Weiwei Wang graduated in University of Science and Technology of China in 2007 with a M.S. in Applied Mathematics. She is a third-year Ph.D. student in Department of Agricultural Economics, Texas A&M University. The title of her thesis is *Three Essays on Climate Change Impacts, Adaptation and Mitigation in Agriculture*. Her research interests include climate change mitigation and adaptation economics, water economics and mathematic programming. Her research interests are developing integrated optimization models to simulate sustainable groundwater use, economic implications of climate change, and bioenergy feedstock production in Southern Ogallala Aquifer Panhandle Region.

***Steven Shultz – Comparing In and Out-of-Stream Aquifer Water Uses in the Niobara River Basin***            **10:40 – 10:55**

Steven Shultz is the Baright Professor of Real Estate and Land Use Economics at the University of Nebraska at Omaha. His research focuses on using GIS technologies and data along with hedonic price models to quantify the determinants of agricultural land sale values and in particular, the estimation of site specific irrigation values in order to facilitate water resources management activities. Funding for this research has been provided by the USDA Water and Watersheds Program, the USGS 104b Program and the Nebraska University Water Center.

***Ken Rainwater – When is the Aquifer Officially Depleted?***            **11 – 11:15**

After receiving his Master's and Ph.D. in Civil Engineering from the University of Texas, Dr. Rainwater joined Texas Tech University in 1985 and has served as the Director for the Texas Tech University Water Resources Center since 2002. Dr. Rainwater's research focuses on water resources management, groundwater flow and contaminant transport, groundwater rights,

remediation of contaminated soil and groundwater, and watershed management. He is the principal or co-principal investigator on several ongoing projects, which include field observations of recharge to the Ogallala aquifer, impacts of climate variability on surface and groundwater resources, and watershed management through removal of invasive vegetation.

***Michael Barber – Aquifer Storage and Natural Recovery: The Spokane Valley Rathdrum Prairie Project***      **11:20 – 11:35**

Dr. Michael Barber is Director of the State of Washington Water Research Center and Professor of Civil and Environmental Engineering. He has been actively engaged in applied water resources research for over 20 years.

***Discussion***      **11:35 - Noon**

**Session 17    Water Governance II**

**10 am - Noon**

***Dr. Vincent Tidwell – Modeling the Physical/Social/Cultural Dynamics of Small Scale Community Irrigation Systems (Acequias)***                      **10 – 10:15**

Vince Tidwell is a Principal Member of the Technical Staff at Sandia National Laboratories. He has 20 years experience conducting and managing research on basic and applied projects in water resource management, nuclear and hazardous waste storage/remediation, and petroleum recovery. Most recently efforts have focused on establishing a multi-agency, multi-university center devoted to the creation and application of computer-aided decision support tools and stakeholder mediated decision processes. Focus of this effort is on water resource management and planning and integration of the broad physical and social processes important to water planning.

***Quita Ortiz – Acequia Communities in Northern New Mexico and the Role of Water***

**10:20 – 10:35**

Quita Ortiz is a graduate of New Mexico State University. She received a Master of Applied Geography in 2007 and a B.S. in Geography in 2004. She is currently employed at the New Mexico Acequia Association where she manages the organization's Land and Water Program. She is focused on acequia mapping and restoration planning, farmland conservation, cultural preservation, and protecting acequia water rights.

***Elizabeth Samson – Coupled Natural and Human Systems: Changes in Biodiversity Metrics Based On Climate and Land Use Changes at Watershed and Basin Landscape Scales***

**10:40 – 10:55**

Elizabeth Samson received her Bachelor's degree from Kansas State University in Geography and Natural Resource Environmental Science. Following her Bachelor's completion she worked as a geographic specialist for the Department of Commerce in Denver, Colorado. Currently she is a Master's student at New Mexico State University in the Fish, Wildlife, and Conservation Ecology Department studying the effect human population growth and development will have on biodiversity in riparian areas in the desert southwest.

***Dr. Alexander Fernald – Acequia Water Systems Linking Culture and Nature: Integrated Analysis of Community Resilience to Climate and Land Use Changes***                      **11 – 11:15**

Dr. Sam Fernald is the Interim Director of the New Mexico Water Resources Research Institute. He is an Assistant Professor of Watershed Management, Animal and Range Sciences at New Mexico State University. He received his B.A. in International Relations at Stanford University, his M.E.M. in Water and Air Resources at Duke University, and his Ph.D. in Watershed Science at Colorado State University. His primary research interests are water quality hydrology; land

use effects on infiltration, runoff, sediment yield, and nonpoint source pollution; effects of surface water/groundwater exchange on water availability and water quality.

***Dr. Brian Hurd – Adapting Water, Economy, and Values in Small Community Irrigation (Acequia) Systems to the Challenges of Regional Economic Growth and Climate Change***

**11:20 – 11:35**

Brian Hurd is an Associate Professor of Agricultural Economics and Agricultural Business at New Mexico State University. He earned his M.S. and Ph.D. at the University of California, Davis, and a BA with high honors in Environmental Conservation and Economics from the University of Colorado, Boulder. He teaches and conducts research on the economics of natural resources, watersheds, food security and the agro-environment. Through his research he aims to improve the economy and performance of water and agricultural systems, policies and institutions across New Mexico, the region, and globally by better managing weather and climate risk. His research includes cost-benefit assessment and non-market valuation of natural and environmental resources, economics of production agriculture, and the assessment of impacts and adaptation of water and agricultural systems to climate change.

***Discussion***

**11:35 - Noon**

**Session 18 Remote Sensing**

**10 am - Noon**

***Dr. Jeppe Kjaersgaard – Adjusting for Background Soil Evaporation When Interpolating Evapotranspiration between Satellite Overpass Dates***      **10 – 10:15**

Jeppe Kjaersgaard is an Assistant Professor at the South Dakota Water Resources Institute at the Department of Agricultural and Biosystems Engineering at South Dakota State University.

***Dr. Pamela Nagler – Vegetation Index Methods for Estimating Evapotranspiration by Remote Sensing***      **10:20 – 10:35**

Pamela's graduate degrees were from the University of Maryland at College Park in Dept. Geography, Remote Sensing (1987) and from the University of Arizona in the Department of Soil, Water, and Environmental Science (2001). Her research uses remote sensing as an application to environmental assessments for the U.S. Geological Survey. She currently works with the Southwest Biological Science Center in Tucson, AZ. The main focus of her research is scaling ground measurements of evapotranspiration using vegetation index methods from satellite data for wide area estimates of evapotranspiration. She recently was awarded the Presidential Early Career Award for Scientists and Engineers by President Obama.

***Anthony Morse – Applications of Maps of Evapotranspiration Estimated from Satellite-Based Surface Energy Balance Models***      **10:40 – 10:55**

Anthony Morse is the former geospatial analysis section director at the Idaho Department of Water Resources, and current director of the Spatial Analysis Group located in Boise, Idaho.

***Dr. Richard Allen – Mapping Evapotranspiration at High Resolution with Internalized Calibration (METRIC) Model Overview***      **11 – 11:15**

Richard Allen is a professor of Water Resources Engineering at the University of Idaho and has worked as the primary developer of the METRIC model for the past 10 years.

***Ahmed Eldeiry – Using Linear and Nonlinear Kriging and Cokriging Techniques with Remote Sensing Data to Estimate Soil Salinity***      **11:20 – 11:35**

Ahmed Eldeiry is working towards his Ph.D. in Civil Engineering at Colorado State University. He graduated in 1980 from the Faculty of Engineering, Civil Dept., University of Cairo. He has worked for the Egyptian army's construction department, private construction companies, and Egypt's Ministry of Irrigation. In 1992, Ahmed received a degree in irrigation and drainage followed by a Master's degree in irrigation in 1995.

***Discussion***      **11:35 - Noon**

***Dr. Laura Leff – Environmental Aquatic Resources Sensing (EARS): Basic Science, Business Education and Outreach*                    10 – 10:15**

Laura Leff, Professor and assistant chair in Biological Sciences at Kent State University, received her Ph.D. from the University of Georgia, M.S. from Iowa State University, and B.S. from the University of Maryland. She is an aquatic microbial ecologist focused on bacterial communities in streams. One of the ultimate goals of her research is to integrate different fields (i.e., ecology, microbiology, molecular biology) to provide insight into aquatic ecosystems. Leff has advised/co-advised 21 graduate students and authored/co-authored 85 publications. Her research has been funded by NSF, NASA, and EPA. Her focus includes programs which strive to integrate research into education including: Young Women's Summer Institute, NSF Research Experiences for Undergraduate Site, NSF Undergraduate Mentoring in Environmental Biology Site and NSF Integrative Graduate Education and Research Training Site. In addition, she was editor of *Applied and Environmental Microbiology* (2001-2011), and currently serves on the editorial board of *Microbial Ecology* and the *International Society for Microbial Ecology*.

***Dr. Jorge A. Ramirez – I-WATER Integrated Water Atmosphere Ecosystems Education and Research Program*                    10:20 – 10:35**

Dr. Jorge A. Ramirez is Professor of Civil and Environmental Engineering at Colorado State University. He received a Doctor of Philosophy in hydrometeorology from MIT in 1988, a Master of Science in hydrology and water resources from MIT in 1982, and a BS in civil engineering from the School of Mines of the National University of Colombia in Medellin in 1981. Dr. Ramírez has consulted for United Nations Development Program at the National Institute of Hydrology in India, the Korean Water Resources Corporation, the hydroelectric power sector of Colombia, and has vast international experience, holding positions most recently with renowned institutions such as the Swiss Federal Institute of Technology in Switzerland and the Center for Environmental Research and Monitoring (CIMA) in Italy. His research interests include hydrometeorology, large-scale hydrology, climate variability, climate change, ecohydrology, river basin geomorphology, surface interactions in overland flow, hydroclimatic upscaling and downscaling, vulnerability and sustainability analysis, and the modeling, optimization, and control of water resource systems.

***Dr. Christopher Lant – IGERT: Multidisciplinary Term-Based Training in Watershed Science and Policy*                    10:40 – 10:55**

Dr. Christopher Lant is Professor of Geography and Environmental Resources at Southern Illinois University Carbondale and Executive Director of the Universities Council on Water Resources. His current projects include an NSF IGERT on Watershed Science and Policy, and an NSF Couple Natural and Human System project on Climate Change, Hydrology, and

Landscapes of America's Heartland. He teaches and does research in ecosystem services and wind energy as well. He can be reached at 618-453-6020 or at clant@siu.edu.

***Dr. Christine J. Krichhoff – The Promise and Limits of the Interactive Research Model: Why Water Managers Use Climate Information***                      **11 – 11:15**

Christine Kirchhoff, winner of the 2011 UCOWR Ph.D. Dissertation Award in Water Policy and Socioeconomics, has a master's in Environmental and Water Resources Engineering and a B.S. in Civil Engineering from the University of Texas at Austin. In 2010, she completed her Ph.D. at the University of Michigan's School of Natural Resources and Environment. Besides completing a Ph.D., while at Michigan she also taught Water Resource Policy for two years and served as a teaching assistant for a Science and Technology Policy Seminar. Prior to enrolling at the University of Michigan, Christine was a practicing professional engineer in Austin, Texas. In that capacity, she was responsible for the design and project management of several multi-million dollar water and wastewater treatment plant projects as well as several distribution systems and water resource planning efforts for municipal clients throughout Texas. Christine is presently a Research Associate at the Center for Science and Technology Policy Research at the University of Colorado, Boulder.

***Discussion***                      **11:20 - Noon**

***Dr. Sharon Megdal – Quantifying and Funding Water for the Environment: Researchers Assisting Practitioners            1:30 – 1:45***

Sharon B. Megdal is Director of The University of Arizona Water Resources Research Center and C.W. and Modene Neely Endowed Professor in the College of Agriculture and Life Sciences and serves as Director the University of Arizona Water Sustainability Program. Her work focuses on state and regional water resources management and policy. Dr. Megdal teaches the multi-disciplinary graduate course Arizona Water Policy and serves as an elected member of the Central Arizona Project Board of Directors. In 2010, she was named Distinguished Outreach Professor. Sharon B. Megdal holds a Ph.D. degree in Economics from Princeton University.

***Dr. Ari Michelsen – A Water Resources Decision Support System for the Paso Del Norte Region*****1:50 – 2:05**

Dr. Michelsen is Research Director, Texas AgriLife Research and Extension Center at El Paso, and Professor of Agricultural Economics, Texas A&M University System, specializing in water resources integrated management, valuation, conservation, markets and policy analysis. As Center Director he is responsible for strategic planning and direction of research programs, fiscal affairs, facilities and overall personnel management. His research includes studies on the effectiveness of agricultural and residential water conservation programs, water markets and prices, impacts of endangered species water acquisition programs, air and water quality regulatory impacts and decision support systems for river basin resource management and water policy analysis in the U.S., China and Chile. He has authored or co-authored over 140 publications and technical reports. He is Past-President and Board of Directors member of the American Water Resources Association and the Universities Council on Water Resources. He serves on the National Water Census Advisory Committee, Paso del Norte Watershed Council Executive Committee and Rio Grande Salinity Management Coalition. Prior to joining Texas A&M University, Dr. Michelsen was faculty in the Department of Economics at Washington State University, Associate Director of the Wyoming Water Resources Center, and Senior Associate at RCG/Hagler, Bailly Inc. He holds a B.S. in Conservation and Resource Management from the University of Maryland, M.S. in Economics and Ph.D. in Agricultural and Resource Economics from Colorado State University.

***Dr. Cat Shrier – The “Water Supply Life Cycle” Framework for Incorporating “Alternative” Water Supply Methods            2:10 – 2:25***

Cat Shrier is President and Founder of Watercat Consulting LLC, based on Capitol Hill in Washington, DC. Watercat was created to serve as a catalyst for innovative approaches to sustainable water planning and management. Cat has a broad background that encompasses

public policy, hydrogeology, water planning and systems engineering. For more than 20 years, she has worked with large and small environmental consulting firms, water institutes, federal and state legislative offices and regulatory agencies on conjunctive use of groundwater and surface water resources; water and wastewater reuse; watershed planning programs; and water policy development, analysis and implementation. Cat received her Ph.D. in Civil Engineering/Water Resources Planning & Management from Colorado State University; with an M.S. in Environmental Management & Policy from University of North Carolina-Chapel Hill, and bachelor's degrees in Geology (North Carolina State) and Government (Dartmouth).

***Discussion***    **2:25 - 3**

**Session 21 Ag Water & Conservation II**

**1:30 pm – 3 pm**

***Thomas Trout – Sustaining Irrigated Agriculture in the Central High Plains with Limited Irrigation Water*** **1:30 – 1:45**

Thomas Trout is the Agricultural Engineer and Research Leader of the USDA-Agricultural Research Service Water Management Research Unit in Fort Collins, CO. His research interests include farm scale irrigation water productivity, crop water requirements, and irrigation efficiency. Previously, he has researched at Mid-Snake River in southern Idaho, and San Joaquin Valley, CA.

***Dr. Norman Klocke – Corn Response to Irrigation in Central Great Plains*** **1:50 – 2:05**

Dr. Norman Klocke grew up on grain and livestock farm in east-central Illinois. He completed undergraduate and graduate degrees in Agricultural, Water Resources, and Irrigation Engineering at the University of Illinois, University of Kansas and Colorado State University. He conducted research, extension, and public service programs concerning limited irrigation, water conservation, and environmental protection for 37 years. Currently, he is a professor of water resources engineering at the Kansas State University's, Southwest Research and Extension Center in Garden City, Kansas

***Haley Paul – Agricultural Water Use and the 1980 Groundwater Management Act: Institutional Change and Water Conservation in South Central Arizona, USA*** **2:10 – 2:25**

Haley Paul holds an M.S. in Sustainability from the School of Sustainability at Arizona State University. Her master's thesis, presented at this conference, focuses on agricultural water conservation in an institutional context. She is currently a program coordinator at the University of Arizona Cooperative Extension, Maricopa County, where she manages an educational program for landscape professionals on the principles of Xeriscape and other landscape water conservation measures.

***Dr. Aymn Elhaddad – Evaluating the Accuracy of Using a Surface Energy Balance Model (ReSET) to Estimate Water Use in Agricultural Fields*** **2:30 – 2:45**

Aymn Elhaddad is a Research Scientist in the Civil and Environmental Engineering Department at Colorado State University. He received his Bachelor's degree from Alexandria University in 1988, his Masters in 1998 and his Ph.D. in 2007 from CSU. He has numerous publications, including a book on Remote Sensing Application in Agriculture, published in 2009.

***Discussion*** **2:45 - 3**

***Richard Koehler – Using Visualization Techniques to Improve the Quality and Understanding of Hydroclimatological Data                    1:30 – 1:45***

Rick Koehler is the National Hydrologic and Geospatial Sciences Training Coordinator with NOAA's National Weather Service training branch in Boulder, co-located with the National Center for Atmospheric Research (NCAR) and the COMET program. His doctoral research at the University of Arizona focused on a better way to understand a river's temporal signature. He combined aspects of remote sensing and landscape ecology to develop a "raster plot" technique. This innovative visualization approach is extremely flexible and provides insights into the data not possible with more traditional methods.

***Juliane Brown – Modeling Nutrient Transport in the Missouri River Basin with the Watershed Model SPARROW: Applications and Management Implications                    1:50 – 2:05***

Juliane Brown is a Hydrologist with the U.S. Geological Survey, Colorado Water Science Center. She joined the USGS in Colorado in 2000 and has 15 years experience and education in hydrology. Her principal focus has been on water-quality data compilation, analysis, and modeling with particular interests in contaminants of emerging concern, collaborative watershed organizations, and water-quality monitoring plan design. She earned her B.S. degree in Geology and a Certificate in Environmental Studies from Dickinson College in 1994 and an M.S. degree in Watershed Science from Colorado State University in 2002. Currently she is the lead scientist for the Missouri River Basin SPARROW modeling project, which is part of the USGS National Water Quality Assessment Program.

***Dr. David Yates – A Climate Driven Water Resources Planning Model for Colorado Springs Utilities                    2:10 – 2:25***

David Yates is a scientist in the Research Applications Laboratory at the National Center for Atmospheric Research, Boulder Colorado and an SEI Associate located in Boulder, Colorado. His research has focused both on local scale hydrologic problems (flash floods, land use-land cover, climate change), as well as climate change impacts and adaptation on water and agricultural systems. Dr. Yates has been a part of the development team of SEI's Water Evaluation and Planning model and has focused on applying WEAP to help water utilities with long-range planning that includes climate change impacts and adaptation strategies. With his NCAR colleague, Kathleen Miller and support from the Water Research Foundation, Dr. Yates developed an educational primer for use by the drinking water utility industry that outlines the current state of scientific knowledge regarding the potential impacts of global climate change on water utilities, including impacts on water supply, demand and relevant water quality characteristics.

***Discussion                    2:25 - 3***

**Session 23    Water Economics**

**1:30 pm – 3 pm**

***Dr. John Loomis – Economic Effects of Reduced Instream Flows from Diversions for Proposed Off-Channel Reservoir    1:30 – 1:45***

Dr. John Loomis is a professor in the Department of Agricultural and Resource Economics at Colorado State University. He is the author of three books (*Integrated Public Lands Management*, 2nd edition, *Environmental Policy Analysis for Decision Making*, and *Recreation Economic Decisions*, 2nd edition) as well as more than 200 journal articles dealing with economic valuation of non-marketed natural resources such as fishing and recreation. He is a Distinguished Scholar of the Western Agricultural Economics Association. Prior to coming to Colorado State University, Dr. Loomis was an Associate Professor at University of California-Davis.

***Getachew Nigatu – The Welfare Value of “Allocate-and-Trade” in Addressing Efficiency, Equity, and Externality    1:50 – 2:05***

Getachew is currently a Ph.D. student in the department of Economics, University of California, Riverside. Environment and Resource Economics is his major, and Econometrics and development economics are his minor fields of study. He received his undergraduate degree in agricultural economics from Alemaya University, Ethiopia. After working three years at a development bank and research organization in Ethiopia, he received a scholarship to study for his Master’s degree in development studies at University of Antwerp, Belgium. Getachew has developed an interest in water economics in general, and the Nile River in particular. He wrote his master thesis on the hydro-politics of the Nile. Currently he is working with Professor Ariel Dinar on the optimal allocation of the Eastern Nile River basin by taking into account climate change and resource degradation (erosion and siltation).

***Mark Musumba – Economics Analysis of Water Reuse in Egypt    2:10-2:25***

Mark Musumba holds a Master’s degree in Agricultural Economics from Texas A&M University.

***Dr. Christopher Lant – Virtual Water Trade: An Alternative Strategic Water Planning Instrument for Water Scarce U.S. Regions    2:30 – 2:45***

Dr. Christopher Lant is Professor of Geography and Environmental Resources at Southern Illinois University Carbondale and Executive Director of the Universities Council on Water Resources. His current projects include an NSF IGERT on Watershed Science and Policy, and an NSF Couple Natural and Human System project on Climate Change, Hydrology, and Landscapes of America's Heartland. He teaches and does research in ecosystem services and wind energy as well. He can be reached at 618-453-6020 or at [clant@siu.edu](mailto:clant@siu.edu).

***Discussion    2:45 – 3***

***USACE Institute for Water Resources Topics of Interest***

***Robert Pietrowsky***

As Director of the U.S. Army Institute for Water Resources (IWR), Bob oversees a broad program of planning, policy & decision-support model development, capacity building, and national interface activities. IWR's mission niche emphasizes the linkage of economic, social, environmental, hydrologic, and public safety considerations within a contemporary framework for water resources systems, global change, and collaborative problem solving. IWR has five offices: its headquarters in Alexandria, VA, which hosts the U.N.'s International Center for Integrated Water Resources Management; the Hydrologic Engineering Center, Davis, CA; the Waterborne Commerce Statistics Center, New Orleans; and the Risk Management Center in Denver, CO & Pittsburgh, PA.

***Dr. Joe Manous***

Dr. Joe Manous serves as a Group Manager and the Future Directions Team Leader for the Institute for Water Resources, US Army Corps of Engineers, but has been on detail to the Office of the Assistant Secretary of the Army for Civil Works since April 2009. Dr Manous is a civil engineer specializing in the areas of water resources and environmental security issues associated with water. He recently served as an Academy Professor at the United States Military Academy at West Point from 2000 through 2008, where he taught courses in environmental engineering, water resources, and environmental security. He retired from active duty in the grade of Colonel in 2008 with 28+ years of service in the US Army Corps of Engineers. Dr. Manous has been actively involved with the "professional" aspects of the engineering profession particularly through ASCE and the National Institute for Engineering Ethics.

**Session 25    Climate & Water II**

**3:30 pm – 5 pm**

***Dannele Peck – Farm-Level Impacts of Water Supply Uncertainty: Weather Variability vs. Climate Change*                      3:30 – 3:45**

The presenter and first author is an assistant professor of agricultural and applied economics at the University of Wyoming in Laramie, Wyoming. Her research interests include agricultural production and natural resource issues, with emphases in decision-making under uncertainty, water resources, and diseases at the wildlife-livestock interface.

***Dr. Chris Hay – Climate Patterns in the Northwestern Corn Belt and Impacts on Water Management*                      3:50 – 4:05**

Dr. Chris Hay is an Assistant Professor and Extension Water Management Specialist in the Department of Agricultural and Biosystems Engineering at South Dakota State University, where he teaches and conducts research in the areas of soil and water engineering and agricultural hydrology. He holds B.S. and M.S. degrees in Agricultural and Bioresource Engineering from Colorado State University and a Ph.D. in Agricultural and Biological Systems Engineering from the University of Nebraska-Lincoln. In addition to his academic training, Dr. Hay has several years of experience in consulting, industry, and government in the areas of water resources engineering and environmental management. He is a licensed Professional Engineer in the State of Nebraska.

***Dr. Venkat Sridhar – Enhanced Hydrologic Predictions for Assessing the Water Availability Under Uncertain Climate Conditions*                      4:10 – 4:25**

Dr. Venkat Sridhar's primary research interest is in understanding the effects of land surface heterogeneity at the sub-GCM grid level and their effect on the land-atmosphere exchange phenomena. His group studies eco-hydrological modeling of complex mountainous terrain, sustainability, irrigated agriculture, and natural grasslands/sagebrush ecosystems, and the impacts of climate change on the regional hydrology and water resources in Idaho and the Pacific Northwest region. Dr. Sridhar earned his Ph.D. in Biosystems and Agricultural Engineering from Oklahoma State University

***Dr. Laurel Saito – Water Balance Modeling with Tree-Ring Records to Improve Water Resource Variability Estimation*                      4:30 – 4:45**

Dr. Saito is an Associate Professor at the University of Nevada-Reno. She is a CIRES Visiting Fellow at the University of Colorado for Summer 2011.

***Discussion*                      4:45 - 5**

***Dr. Tanya Heikkila – A Framework for Assessing the Adaptive Capacity of Water Management Institutions*                      3:30 – 3:45**

Tanya Heikkila joined the faculty of the School of Public Affairs at the University of Colorado Denver in the fall of 2009. Previously, she was an assistant professor at Columbia University's School of International and Public Affairs and the Associate Director of the Columbia Water Center. Heikkila's research has looked at institutions for coordinating groundwater and surface water in the western United States, interstate water conflicts and cooperation, the organization of collaborative ecosystem restoration programs, as well as the performance of special purpose governments. Her research has been funded by the National Science Foundation, the Sloan Foundation, and the PepsiCo Foundation. Heikkila has published numerous articles and co-authored a book titled *Common Waters Diverging Streams: Linking Institutions and Water Management in Arizona, California, and Colorado*. She holds an M.P.A. and Ph.D. from the University of Arizona, School of Public Administration and Policy (1998, 2001).

***Shama Perveen – Reversing Groundwater Depletion in India: Case Studies from Punjab and Gujarat*                      3:50 – 4:05**

Shama Perveen is a research scientist at the Earth Institute's water center at Columbia University. Her areas of research include integrated and sustainable water resources management and policy, multiscale assessments and GIS modeling of vulnerability and change, climate variability and impacts; supply chain corporate water risks; and industrial ecology. Shama came to the Water Center from the University of Nevada, Las Vegas (UNLV) where she was on the faculty in the School of Environmental and Public Affairs. At the Columbia Water Center, Shama is currently working on climate-informed modeling, and assessments of the water crises facing India and analysis of supply chain water risks for business

***Mark Davis – Case Study: Denver Water Conservation Planning: Planning for Tomorrow via Demand Control*                      4:10 – 4:25**

Mark Davis is a Ph.D. Student in Public Affairs and IGERT Researcher in Sustainable Urban Infrastructure at the University of Colorado Denver in the School of Public Affairs. Mr. Davis earned his Master's of Public Affairs from Indiana University - School of Public and Environmental Affairs in 2009 and his Bachelor's of Science from Washington University in St. Louis in 1992. Mr. Davis has extensive experience in public policy and environmental policy at the state and local level.

***Samuel Gallaher – A Qualitative Analysis of Colorado Water Policy Change between 1931 and 2006***                    **4:30 – 4:45**

Sam Gallaher is a Master's degree candidate at University of Colorado-Denver's School of Public Affairs. He also holds a dual degree in Industrial and Manufacturing engineering from Oregon State University. Sam worked as a research process engineer for three years at Johns Manville before returning to school in 2008. Since then he worked on a variety of projects at UC Denver and has been involved in Colorado water policy research for the past two years.

***Discussion***                    **4:45 - 5**

**Session 27    Ogallala II**

**3:30 pm – 5 pm**

***Shiliang Zhao – Estimating Spatial Water Demand Distributions in the Texas High Plains***

**3:30 – 3:45**

Shiliang Zhao is a doctoral student in the Department of Agricultural and Applied Economics at Texas Tech University.

***Dr. Bill Golden – Impact Analysis of the Wet Walnut Creek Intensive Groundwater Use Control Area***            **3:50 – 4:05**

Dr. Bill Golden is a research scientist in the Department of Agricultural Economics at Kansas State University.

***Dr. Bridget Guerrero – Economic Evaluation of Water Conservation Strategies for North Plains Groundwater Conservation District***            **4:10 – 4:25**

Dr. Bridget Guerrero is a research associate at Texas AgriLife Extension Service in Lubbock, Texas.

***Rachna Terwari – Impacts of Climate Change on Groundwater Use on Texas Southern High Plains***            **4:30 – 4:45**

Rachna Tewari is a doctoral student in the Department of Agricultural and Applied Economics at Texas Tech University.

***Discussion***            **4:45 - 5**

***Andrew Leidner – An Investigation of Water Resource Management and Water-borne Health Impacts Issues            3:30 – 3:45***

Andrew Leidner is originally from Georgia, received degrees in English and Economics from the University of Georgia, and is currently in the 3rd year of his Ph.D. program in Agricultural Economics at Texas A&M University. Andrew has worked as a research assistant for Dr. Ed Rister and Dr. Ron Lacewell at Texas A&M University on several water-related projects. The research he is reporting on in this paper is related to his dissertation.

***Dr. David Kreamer – Improving Water Quality and Promoting University Educational Efforts in the Developing World            3:50 – 4:05***

David Kreamer is a Professor of Geoscience, Graduate Faculty in Civil and Environmental Engineering, and the former Director of the Interdisciplinary Water Resources Management Graduate Program at the University of Nevada, Las Vegas. His Ph.D. is in Hydrology from the University of Arizona, and was an Assistant Professor in Civil Engineering at Arizona State. David's research includes environmental contaminants, spring sustainability, and clean water supply in developing nations. He has given over 150 invited lectures, seminars and workshops in recent years for U.S. Environmental Protection Agency, U.S. Bureau of Land Management, the National Ground Water Association, Superfund University Training Institute, and short courses for over half the States or Commonwealths in the United States; and for other groups such as University of California Extension, and Hanford Nuclear Site. He has given presentations at over 40 Universities, and has spoken in Europe, Asia, the Caribbean, South America, Africa and the Middle East.

***Michael Wireman – Water Resource Characterization and Risk Assessment: Tchiatura Mining District, Republic of Georgia            4:10 – 4:25***

Michael Wireman is a hydrogeologist currently employed by the EPA in Denver, CO, where he serves as a National Ground-Water Expert. In his current position he provides technical and scientific support to several EPA programs, other Federal agencies, International programs and to ground-water protection / management programs in several western states. He has significant experience in the legal, scientific and programmatic aspects of ground-water resource management. He also has extensive experience in ground-water related work in the Baltic countries, Ukraine, Romania, and Georgia. He has served as an adjunct professor at Metropolitan State College in Denver where he taught a class on Contaminant Hydrology and he teaches a class on fractured rock hydrology for the NGWA. He is a member of the Colorado Ground-Water Association, the National Ground Water Association, the Geological Society of America, and is the Chair of the North American Chapter of the International Association of Hydrogeologists.

***Abu Khan – Water Use Dynamics in the Indigenous Community: A Case Study of Chittagong Hill Tracts in Bangladesh***                      **4:30-4:45**

Abu completed his Master's in Natural Resources Management from the Asian Institute of Technology in Bangkok. Currently he is pursuing his Ph.D. in Environmental Resources and Policy at Southern Illinois University Carbondale. Abu served at the International Union for Conservation of Nature (IUCN) for more than three years. He also worked for the United Nations Development Program (UNDP) and the Asian Institute of Technology in Bangkok.

***Discussion***                      **4:45 - 5**

**Session 29 Energy & Water**

**3:30 pm – 5 pm**

***Dr. Katta Jayaram Reddy – The Energy and Water Connection* 3:30 – 3:45**

Dr. K.J. Reddy was born and raised in Hyderabad, India and received his undergraduate and Master's degree from Andhra Pradesh Agricultural University, Hyderabad, India. He joined Distinguished Professor Willard Lindsay's research group at Colorado State University, earning his doctorate degree in Environmental Quality in 1986. He then joined Distinguished Professor James Drever at the University of Wyoming as a post-doctoral geochemist. From 1989-2000 he worked as research scientist at the University of Wyoming Water Research Center. In 2000 Dr. Reddy joined the Department of Renewable Resources as an Assistant Professor and was promoted to full professor in 2005. From 2000-2010 he chaired the campus-wide Water Resources interdisciplinary graduate degree program. He also served as Associate Director for University of Wyoming School of Energy Resources from 2008-2010. Currently, Dr. Reddy is a professor in the Department of Renewable Resources. Professor Reddy is a world-renowned scientist in Energy and Environmental areas and received three US patents and one Australian patent for his discoveries. University of Wyoming named Dr. Reddy as George Duke Humphrey Distinguished Faculty in 2010. This is the highest University of Wyoming honor given to a faculty member for scholarly contributions to research, teaching and advising, and outreach programs.

***Dr. Roger Coupal – Economic Impacts of CBM Water Management Mechanisms***

**3:50 – 4:05**

Roger Coupal is the Head of the Agricultural and Applied Economics Department at the University of Wyoming. Before becoming Department Head, he had a faculty extension appointment working in energy economics and community development. His areas of expertise include regional economics, natural resource economics, and energy economics. For the past few years he has worked on issues related to the economics of energy development, reclamation economics, and the impacts of exurban development on local government finance and the environment.

***Dr. Thijs Kelleners – The Effects of Coalbed Natural Gas Produced Water on Infiltration***

**4:10 – 4:25**

Thijs Kelleners is an assistant professor of soil physics at the University of Wyoming. He obtained a M.S. in soil physics in 1993 and a Ph.D. in Environmental Sciences in 2001 from Wageningen University in the Netherlands. His main research interest is the measurement and modeling of soil water flow, heat transport, solute transport, and gaseous exchange in the groundwater-soil-plant-atmosphere continuum.

***Dr. Michael Urynowicz – Evaluation of Zeolite-lined Surface Impoundments for the Management of CBM Produced Waters***                      **4:30 – 4:45**

Dr. Urynowicz is a Licensed Professional Engineer, Associate Professor of Environmental Engineering within the Department of Civil & Architectural Engineering and Director of the Center of Excellence for Coal Bed Natural Gas at the University of Wyoming. He is also the Founder and Managing Partner of Enwyo LLC, an energy company specializing in the enhanced secondary biogenic coal bed natural gas. He received his Bachelor of Science in Chemical Engineering from Michigan State University, his Master of Science in Civil & Environmental Engineering from the University of Wisconsin, and his second Masters of Science and Ph.D. in Environmental Science & Engineering from the Colorado School of Mines. During his career, Dr. Urynowicz has been involved in a wide range of research related to groundwater remediation and coal bed natural gas. He has also published numerous technical papers and reports and has given invited lectures across the United States and abroad.

***Discussion***                      **4:45 - 5**

**Session 31    Groundwater Management**

**8 am – 10 am**

***Dr. Suzanne Paschke – Effects of Development on Groundwater Availability in the Denver Basin Aquifer System, Colorado***                      **8 – 8:15**

Suzanne Paschke is the Associate Director for Hydrologic Studies for the U.S. Geological Survey Colorado Water Science Center. Dr. Paschke has over twenty five years of experience in hydrogeologic evaluation and water-quality assessments including development of regional computer simulations of groundwater flow for the Denver Basin, Colorado and evaluation of groundwater quality in the South Platte River basin as part of the USGS National Water-Quality Assessment Program. Previous experience includes software development and teaching at the International Ground-Water Modeling Center as well as hydrogeologic site investigations and modeling projects for private and government clients. Dr. Paschke holds a B.S. in Geology from the University of Wyoming and M.E. and Ph.D. degrees in Geological Engineering from the Colorado School of Mines.

***Peter McMahon – Sources and Sinks of Nitrate and Methane in Groundwater, Garfield County, Colorado***                      **8:20 – 8:35**

Peter McMahon works for the United States Geological Survey.

***Moira Zellner – Resilience in Groundwater Management: Learning and Planning through Participatory Modeling***                      **8:40 – 8:55**

Moira Zellner is an Assistant Professor in the Department of Urban Planning and Policy and a Research Assistant Professor in the Institute for Environmental Science and Policy at the University of Illinois at Chicago. Having completed her undergraduate degree in ecology in Argentina, she pursued graduate studies in urban and regional planning and in complex systems at the University of Michigan. Her research involves assessing the environmental impacts of urbanization, and exploring how to enhance the sustainability and resilience of urban areas. The focus is on how specific policy and behavioral changes can effectively address complex environmental problems, in which decentralized decisions result in regional land-use and consumption patterns that negatively affect resource availability and quality. Her research also examines the applicability of complexity theory and complexity-based models to policy exploration and social learning.

***Dr. Encarna Esteban – Sequencing and Packaging Policy Interventions for Sustainable Groundwater Management***                      **9 – 9:15**

Dr. Esteban is post-doctoral researcher at the University of California-Riverside Water Science and Policy Center. She holds a Ph.D. in Economics from the University of Zaragoza (Spain), a Master of Science in Agricultural and Resource Economics from the University of Connecticut, and B.S. in Economics (with a specialization in Economic Analysis) from the University of

Zaragoza. Her main area of research covers the study of water bodies, analyzing both quality and quantity aspects. She has studied the problem of groundwater management worldwide and the necessity of regulation in those water bodies. She has analyzed theoretically and empirically the case of two aquifers in Spain justifying the necessity of cooperation in groundwater management. Her other research focus is the study of non-point source pollution and the application of several policies in order to avoid and mitigate these contaminant emissions. Her work includes environmental economics, natural resources, mathematical optimization, simulation and modeling applied to water problems.

*Discussion*

**9:15 - 10**

***Dr. Ralph Wurbs – Modeling Reservoirs from a Water Allocations Perspective*                      8 – 8:15**

Dr. Ralph Wurbs' education includes a B.S. Degree in Civil Engineering from Texas A&M University (1971), MSCE in Water Resources Engineering from the University of Texas at Arlington (1974), and Ph.D. Degree in Civil Engineering (Water Resources Systems Planning and Management) from Colorado State University (1978). He has served as faculty of Texas A&M University Civil Engineering Department since 1980, the Associate Director for Engineering of Texas Water Resources Institute since 2007, and professor in the departmental Graduate Program in Water Management and Hydrologic Science since its creation in 2005.

***Farhat Chowdhury – Augmenting Water Supply by U.S. Cities: The Choices, Strategies, and Interventions*                      8:20 – 8:35**

Farhat Chowdhury is a Ph.D. student in the Environmental Resources and Policy program at Southern Illinois University Carbondale.

***Brian Haggard – Sediment Phosphorus Dynamics in Drinking Water Supply Reservoirs: Importance and Management*                      8:40 – 8:55**

Brian Haggard has completed degree requirements in three different programs ranging from biology to biosystems engineering. After school, he was hired by the U.S. Geological Survey as a hydrologist focused on regional water quality issues. After two years with the USGS, he was hired as a hydrologist with the USDA ARS, where his research focused on the identification of nutrient sources at the watershed-scale and the effect of catchment land use on nutrient concentrations and export in regional streams. In 2006, he left the USDA ARS for employment with the University of Arkansas Division of Agriculture and assumed teaching responsibilities in the Biological Engineering Program. His research focus has remained on water quality and watershed-scale processes, and he has integrated this into the classroom where possible.

***Omar Alminagorta – Simple Optimization Method to Determine Best Management Practices to Reduce Phosphorus Loading in Echo Reservoir, Utah*                      9 – 9:15**

Omar Alminagorta is a Ph.D. candidate in Civil and Environmental Engineering at Utah Water Research Laboratory. His research interests have focused on optimization and simulation modeling and data management for water and resources management.

***Jeff Rieker – Reinforcement Learning Strategy for Optimal Stochastic Reservoir Operations to Enhance Riverine Water Quality*                      9:20 – 9:35**

Jeffrey Rieker is manager of the Special Studies Division at the Bureau of Reclamation's Lahontan Basin Area Office in Carson City, Nevada. Jeff oversees a variety of water resource planning and management issues related to the Truckee River as well as Reclamation's

Newlands Project. Jeff began with Reclamation in 1999 as a hydraulic engineer in Reclamation's Technical Services Center in Denver, Colorado, and transferred to Carson City in 2006 where he initially served as a modeler and forecaster of river and reservoir operations. Jeff holds a B.S. in Civil Engineering from the University of Missouri at Rolla (now the Missouri University of Science and Technology); an M.S. in Civil Engineering with an emphasis in Water Resources Planning and Management from Colorado State University, and is currently pursuing a Ph.D. in the same subject from Colorado State University. Jeff is a registered Professional Engineer in the State of Nevada.

*Discussion*

**9:35 - 10**

***Michelle Chapman – Inland Brackish Groundwater as a Resource: Federal Research, Issues, and Challenges            8 – 8:15***

Michelle Chapman has twenty years of experience with advanced treatment processes for impaired water sources with the Bureau of Reclamation. Over the years, she has participated in field-testing of several pilot processes, including Environmental Technology Validation of disaster response treatment systems for the Defense Department. She is currently project manager for the Brackish Groundwater National Desalination Research Facility with oversight of the facility research program.

***Katherine Guerra – Assessment of Ceramic Membranes for Water Treatment Applications: Experimental Results and Economic Evaluation            8:20 – 8:35***

Katherine Guerra is a Chemical Engineer in the Environmental Applications Research Group at the Bureau of Reclamation in Denver, Colorado. Katie’s research focus is the on development and application of advanced water treatment technologies to meet the Bureau of Reclamation’s mission to increase water supplies in the Western US.

***Malynda Cappelle – Zero Discharge Desalination: Efficient Brackish Groundwater Desalination Demonstration at the BGNDRF            8:40 – 8:55***

Malynda Cappelle is the Associate Director at the Center for Inland Desalination Systems (CIDS) at the University of Texas at El Paso (UTEP). Ms. Cappelle received her B.S. in Chemical Engineering from the University of New Mexico and M.S. in Chemical Engineering from the University of California at Davis. CIDS is researching technologies and approaches that will maximize the benefits of desalination, while minimizing the input energy and negative environmental impacts. Malynda has over ten years of experience in industrial water treatment, arsenic removal from drinking water and desalination. Her current areas of focus are ZDD, produced water desalination, and inland desalination issues. Prior to working at UTEP, Ms. Cappelle worked at Sandia National Laboratories as an engineer and project manager.

***Hari Krishnan Venkatesh – Tularosa Basin Desalination Study of Electrodialysis Reversal and Pulsed Electrodialysis            9 – 9:15***

Hari Krishnan Venkatesh is currently working on his Master's degree in Chemical Engineering at New Mexico State University. He also works as a graduate research assistant at the Institute for Energy and Environment (IEE). He earned his bachelor's degree from Anna University, in India. His research focus is on developing novel membrane separation processes for water desalination.

***Andrew Leidner – Seawater Desalination for Municipal Water Production***

**9:20 – 9:35**

Andrew Leidner is originally from Georgia, received degrees in English and Economics from the University of Georgia, and is currently in the 3rd year of his Ph.D. program in Agricultural Economics at Texas A&M University. Andrew has worked as a research assistant for Dr. Ed Rister and Dr. Ron Lacewell at Texas A&M University on several water-related projects. The research he is reporting on in this paper is related to his dissertation.

***Discussion***

**9:35 - 10**

**Session 34    Drought Planning**

**8 am – 10 am**

***Taryn Hutchins-Cabibi – Innovations in Drought Planning: The Colorado State Drought Plan*    8 – 8:15**

Taryn Hutchins-Cabibi works on Drought Planning and Climate Change for the Colorado Water Conservation Board (CWCB). Taryn conducts research and analysis of existing drought planning efforts; and provides technical assistance to water providers on the development, implementation, and monitoring of drought mitigation planning programs, including managing the revision of the Colorado State Drought Mitigation and Response Plan. Taryn also provides technical expertise for the CWCB's participation in regional efforts to analyze the impacts of climate change on water resources; including addressing issues concerning uncertainties and vulnerability in water resource planning & management, focusing primarily on climate change and implementation of water management strategies. Prior to CWCB, Taryn worked in the nonprofit sector on the balance between human water demands and protection of the natural environment. She has authored and co-authored numerous comparative analyses on western water issues. She has also worked with the EPA on climate change.

***Dr. Donna Woudenberg – Drought Ready Communities*    8:20 – 8:35**

Donna Woudenberg is a postdoctoral research associate with the National Drought Mitigation Center (NDMC), which is housed within the University of Nebraska-Lincoln's School of Natural Resources. She received her B.S. (Natural Resources – Environmental Studies), M.S. (Natural Resources – Climate), and Ph.D. (Natural Resources – Human Dimensions) from University of Nebraska-Lincoln. At the NDMC, Donna assists in social, economic, and environmental drought impact-related research and contract work at local, state, national, and international levels. Currently, Donna teaches for both the Environmental Studies Program and the Women's & Gender Studies Program, and is developing and piloting online course modules on climate change education as part of a NASA grant. She is also involved in community education and outreach – particularly in the development of K-12 educational materials and in outreach materials and projects related to drought, Nebraska's water resources, climate variability, and climate change at multiple levels.

***Robert Steger – Denver Water's Drought Response Plan*    8:40 – 8:55**

Bob Steger is the Manager of Raw Water Supply at Denver Water. He is responsible for managing the day-to-day operation of the raw water collection system which is comprised of ten major storage reservoirs, four trans-basin tunnels, and many miles of pipelines and canals. In addition, his department administers numerous raw water leases, helps protect Denver's portfolio of water rights, and participates in long-range water supply planning. Bob has been in the Raw Water Supply section for 22 years, but has only been the manager for two of those years. He has a Bachelor's degree in Civil Engineering from the University of Wisconsin and a Master's

degree in the same discipline from the University of Colorado at Denver. Bob enjoys sports, travel, reading and hanging out with friends and family.

***Dr. Lisa Dilling – Urban Water Management and Adaptation to Climate Change: Preliminary Research on How Responses to Drought Condition Adaptive Capacity*** **9 – 9:15**

Lisa Dilling is Assistant Professor of Environmental Studies, a Fellow of the Cooperative Institute for Research in Environmental Sciences (CIRES) and a member of the Center for Science and Technology Policy Research at the University of Colorado, Boulder. She studies decision making, the use of information and science policies related to climate change, adaptation, and carbon management. Her current projects include studying decision making involving drought in urban water systems and evaluating public lands management in the context of climate change. Her career has spanned both research and practice arenas of the science-policy interface, including program leadership for NOAA and the U.S. Global Change Research Program. She has authored numerous articles and is co-editor of the book, *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change* from Cambridge University Press. She received her Ph.D. in Biological Sciences from the University of California, Santa Barbara.

***Dr. Franco Biondi – Spatial Patterns of Pre-Instrumental Drought in the Central Great Basin (Eastern Nevada, USA)*** **9:20 – 9:35**

Franco Biondi is Associate Professor of Geography and DendroLab Director at the University of Nevada, Reno, where he is also a member of four interdisciplinary graduate programs: Hydrologic Sciences, Environmental Sciences, Atmospheric Sciences, and Ecology, Evolution, and Conservation Biology. He received a Laurea (Italian Doctorate) in forestry from the Università di Firenze, and M.S. and Ph.D. in watershed management and geosciences from the University of Arizona in Tucson. He has authored or co-authored over 50 peer-reviewed articles on climate and forest dynamics, ecohydrological changes, and spatial processes. Dr. Biondi received the 2001 Paper of the Year Award from the Climate Specialty Group of the Association of American Geographers, and in 2006 he was a member of the National Academy of Science Committee that authored the book *Surface Temperature Reconstructions for the Last 2,000 Years*. At UNR he teaches several courses, from introductory undergraduate classes to graduate seminars.

***Discussion*** **9:35 - 10**

***Robert Pietrowsky***

Robert “Bob” Pietrowsky, Director of the U.S. Army Institute for Water Resources (IWR), oversees a broad program of planning, policy & decision-support model development, capacity building, and national interface activities. IWR’s mission niche emphasizes the linkage of economic, social, environmental, hydrologic, and public safety considerations within a contemporary framework for water resources systems, global change, and collaborative problem solving. IWR has five offices: its headquarters in Alexandria, VA, which hosts the U.N.’s International Center for Integrated Water Resources Management; the Hydrologic Engineering Center, Davis, CA; the Waterborne Commerce Statistics Center, New Orleans; and the Risk Management Center in Denver, CO & Pittsburgh, PA.

***Mike O’Neill***

Mike O’Neill is the National Program Leader for Water Resources with the USDA National Institute of Food and Agriculture. He oversees a \$60 million portfolio of research, education, and outreach projects for the USDA that address critical water resource issues in rural, agricultural, and urbanizing watersheds. Prior to joining the USDA in 1998, Dr. O’Neill was on the faculty of the Watershed Science Unit and the Department of Geography & Earth Resources at Utah State University. He also served as the first Watershed Extension Specialist for Utah State University. Dr. O’Neill has an A.B. in Geography from the University of Maryland Baltimore County and an M.A. and Ph.D. in geography from the University at Buffalo. He is an avid golfer, runner, and part-time home brewer.