

Water and Wisdom

Proceedings of the 25th Annual South Platte Forum
Oct. 22-23, 2014 - Plaza Conference Center - Longmont, Colo.



Sunrise at Lily Lake by Jon R. Ford
Photo Contest Winner (tie)



Heron Pond by Janet Williams
Photo Contest Winner (tie)



Watering Hole by Richard Vidmar
Photo Contest Honorable Mention



Colorado Water Institute Information Series 117

This report was financed in part by the U.S. Department of the Interior, Geological Survey, through the Colorado Water Institute. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

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Water and Wisdom

Proceedings of the 25th Annual South Platte Forum

Oct. 22-23, 2014
Plaza Conference Center
Longmont, Colo.

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Water and Wisdom

25th Annual South Platte Forum - Oct. 22-23, 2014

Wednesday, October 22

- 7:45 Registration and Continental Breakfast
- 8:20 Welcome - Reagan Waskom, Colorado Water Institute
- 8:30 **When it Rains, it Pours (Flood Impacts on Stream Restoration)**
- *Stream Restoration Strategies* - Chris Sturm, Colorado Water Conservation Board
 - *Matching the Hatch gets the Catch* - Matt Kondratieff, Colorado Parks and Wildlife
 - *A Coalition Approach to River Restoration Master Planning* - John Giordanengo, AloTerra Restoration Services, LLC
- 9:35 Break
- 10:05 **Under the Weather (Flood Impacts on Property Owners)**
- *Jamestown: From Flood to Recovery* - Colleen Williams, James Creek Watershed Initiative
 - *Land Owner Repairs* - Jeff Wilson and Buddy Nichols, Weld County Farm Service Agency
 - *Helping People Recover* - Todd Boldt, Natural Resources Conservation Service
- 11:20 **Every Cloud Has a Silver Lining (History of Flood in the Basin)**
- *The History of Floods in the South Platte Basin* - Nolan Doesken, Colorado Climate Center
- 11:50 **Food for Thought (Keynote Luncheon)**
- *Friends of the South Platte Award* - Patricia J. Rettig, Water Resources Archive
 - *Proposed Rule: Definitions of Waters of the U.S.* - Karen Hamilton, U.S. EPA Region 8
- 1:10 **When Life Gives You Gas, Make Energy**
- *Drilling and Completions: An Education* - Alfred William Eustes III, Colorado School of Mines
 - *Colorado Oil and Gas Conservation Commission* - Commissioner Richard Alward, Aridlands Natural Resource Consulting
 - *Public Trust, Local Control, and Environmental Rights* - Doug Kemper, Colorado Water Congress
- 2:30 Break
- 2:45 **Knowledge is Power (Water Education in 2014 and 2034)**
- *Effectiveness of Water Education* - Tom Browning, Colorado Water Conservation Board
 - *Colorado Foundation for Water Education* - Nicole Seltzer, Colorado Foundation for Water Education
 - *The One World One Water Center at MSU Denver* - Tom Cech, One World One Water Center
- 4:00 **Light at the End of the Tunnel (An Overview of Basin Projects)**
- *Front Range Water Supply EISs Overview* - Rena Brand, U.S. Army Corps of Engineers
- 4:20 **Conserve Water, Drink Beer (Project Update Reception)**
- A reception to mingle and learn
- *Halligan Reservoir Enlargement Project* - Donnie Dustin, City of Fort Collins Utilities
 - *Moffat Collection System Project* - Travis Bray, Denver Water
 - *Windy Gap Firming Project* - Jeff Drager, Northern Water
 - *Chatfield Reallocation Project* - Rick McCloud, Centennial Water and Sanitation District
 - *Northern Integrated Supply Project* - Carl Brouwer, Northern Water
 - *HSWMP Milton Seaman Reservoir Expansion* - Eric Reckentine, City of Greeley
 - *Flood Recovery Projects* - Amy Johnson and Jerry Gibbens, Northern Water
 - *The WISE Partnership* - Rick Marsicek, South Metro Water Supply Authority
- 5:30 Day 1 Ends
-

Water and Wisdom

25th Annual South Platte Forum, Oct. 22-23, 2014, Plaza Event Center - Longmont

Thursday, October 23

- 7:45 Registration and Continental Breakfast
- 8:20 Welcome
- 8:30 **Plan Your Work (Opening Keynote)**
- *The Colorado Water Plan* - John Stulp, Special Policy Advisor to the Governor for Water
- 9:00 **Work Your Plan (Basin Implementation Plans)**
- *The South Platte Plan* - Mark Koleber, Metro Roundtable Chair
 - *West Slope Perspective on South Platte Plan* – Jim Pokrandt, Colorado River Basin
- 9:50 Break
- 10:20 **What Goes In Must Come Out (Water Quality)**
- *EPA Perspective on Nutrient Pollution* - Al Basile, U.S. EPA Region 8
 - *CSU National Nutrient Center CLEAN: Finding Optimal Solutions at the System Level* - Mazdak Arabi, Colorado State University
 - *Big Flood! Big Flush! What Was in the Floodwater?* - Suzanne Paschke, U.S. Geological Survey
 - *Nutrients Management in Colorado: Where Are We?* - Dick Parachini, Water Quality Control Division
- 12:00 **Poetry in Water (Keynote Luncheon)**
- *At the Confluence: The Poetry of Colorado Water* - Gregory J. Hobbs, Jr., Justice, Colorado Supreme Court
- 1:10 Forum Ends
- 1:30 **SPWRAP Meeting**

Speaker PowerPoint Presentations are available for viewing at
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Wednesday, Oct. 22, 8:20 a.m.

Welcome

Reagan Waskom, Ph.D.

Director, Colorado Water Institute, Colorado State University, 1033 Campus Delivery, Fort Collins, CO 80523-1033, 970-491-6308, reagan.waskom@colostate.edu

Reagan Waskom currently serves as the director of the Colorado Water Institute and the chair of the Colorado State University Water Center. Dr. Waskom is a member of the Department of Soil and Crop Sciences at CSU, where he has worked on various water related research and outreach programs for the past 28 years, conducting statewide educational and applied research programs on water quality, water quantity, water policy and natural resource issues related to water use. His current teaching responsibility at CSU is for GRAD592 – the Graduate Water Resources Seminar. In addition, Dr. Waskom oversees the CSU Extension Water Outreach program and personnel. Dr. Waskom’s current research emphasis is on the integrated use of surface and groundwater, the impacts of shale gas development on water resources, and agricultural water conservation in the Colorado River basin.

Wednesday, Oct. 22, 8:30 a.m.

When it Rains, it Pours

Moderator: Kevin Houck

Chief, Watershed and Flood Protection, Colorado Water Conservation Board, 1580 Logan St., Ste. 200, Denver, CO 80203, 303-866-3441 x3219, kevin.houck@state.co.us

Kevin Houck has worked as an engineer for the Colorado Water Conservation Board for 11 years, where he is the chief of the watershed and flood protection section. His program works with floodplain regulation, floodplain mapping, watershed restoration, and flood engineering throughout Colorado. Prior to this role he worked as a consulting engineer for seven years in the Denver area. He is a past chair of the Colorado Association of Stormwater and Floodplain Managers and a past treasurer of the Association of State Floodplain Managers. He received his bachelor’s degree in civil engineering from Washington State University and a master’s degree in civil engineering from the University of Colorado at Denver. He is a licensed engineer in Colorado, California, and Louisiana, and he is a certified floodplain manager. He has never been busier in his 20 year career than in the past twelve months.

Stream Restoration Strategies in the Wake of Colorado's 2013 Floods

Chris Sturm

Stream Restoration Coordinator, Colorado Water Conservation Board, 1313 Sherman St., Room 721, Denver, CO 80203, 303-866-3441 ext 3236, chris.sturm@state.co.us, cwcb.state.co.us

The Colorado Water Conservation Board has been leading many stream restoration efforts since the September 2013 floods. The strategy has focused on building local watershed coalitions, enabling watershed scale master planning, and implementing stream restoration projects. The foundation of this approach is based on the CWCB Colorado Watershed Restoration Program. The program exists to provide grant funds and technical assistance for stream restoration projects designed to protect or restore the ecological processes that connect land and water while protecting human life and property. This philosophy is integral to all stream restoration activities in which the CWCB is involved.

The CWCB flood recovery team, the “Stream Team,” formed shortly after the September 2013 floods. The team included many state and federal agencies as well as technical consultants. The focus of the team was to implement emergency channel stabilization projects, develop watershed coalitions, award master planning grants, participate in regular coalition meetings, and provide technical support. A year later, the watershed coalitions are nearing completion of the master plans, and they are prioritizing stream restoration projects. The Stream Team now exists to identify funding opportunities, coordinate multi-objective projects in order to leverage resources, and facilitate the implementation of flood resilient projects.

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Matching the Hatch gets the Catch: Matching Channel Morphology with Hydrology Optimizes Fisheries Benefits

Matt Kondratieff

Aquatic Research Scientist, Colorado Parks and Wildlife, 317 W. Prospect Rd., Fort Collins, CO 80526, 970-472-4316, matt.kondratieff@state.co.us, <http://cpw.state.co.us/learn/Pages/ResearchAquaticStreamInvestigations.aspx>

Matt Kondratieff works as an aquatic research scientist for Colorado Parks and Wildlife in Fort Collins. He completed his undergraduate work at U.C. Davis, received his master's degree from Colorado State University, and worked for three years as a fisheries biologist for Wyoming Game and Fish in Pinedale. He has seven years of experience involving the design, construction, and monitoring of stream restoration projects in Colorado. He also provides technical assistance on aquatic habitat issues with the goal of aiding or preventing upstream fish passage on streams.

A Coalition Approach to River Restoration Master Planning: Case Study on the Big Thompson

John Giordanengo

Chair, Big Thompson River Restoration Coalition; Restoration Ecologist, AloTerra Restoration Services, LLC, PO Box 212, Fort Collins, CO 80522, 970-420-7346, john@aloterraservices.com

John Giordanengo has been deeply involved in the formation and management of two post-disaster coalitions in the past three years - High Park Fire Coalition, and the Big Thompson River Restoration Coalition. There are several benefits of developing a community-based coalition to address post-disaster restoration needs, but such coalitions also have some serious constraints in the face of public-private-philanthropic regulatory and administrative realities. This presentation will explore the development of the BTRRC (unique among the many post-flood coalitions forming), focusing on successes and, most importantly, the challenges we face. Finally, a recommendation for developing similar coalitions in response to the next disaster will be presented.

After 17 years of experience in the field of ecological restoration and natural resources (City of Boulder Open Space and Mountain Parks, Wildlands Restoration Volunteers, Colorado Fourteeners Initiative, Blue Mountain Environmental Consulting), John Giordanengo founded AloTerra Restoration Services, LLC as a means to expand his commitment to the field of ecological restoration. Having begun his restoration career as a volunteer planting shrubs and trees along the Green River in Washington State, he completed his master's degree in restoration ecology from Colorado State University in 2000 and has helped to plan and implement more than 160 restoration-related projects ranging from riparian and wetland restoration to road closure and obliteration, post-fire restoration, and alpine restoration. John serves on the planning committee for the High Altitude Revegetation Organization, the board of the Coalition for the Poudre River Watershed, and has served on several other natural resources committees and boards throughout Colorado, including the Colorado Native Plant Society and Quetzal Foundation. Responding to some of Northern Colorado's most severe natural disasters, John co-founded the High Park Restoration Coalition and the Big Thompson River Restoration Coalition.

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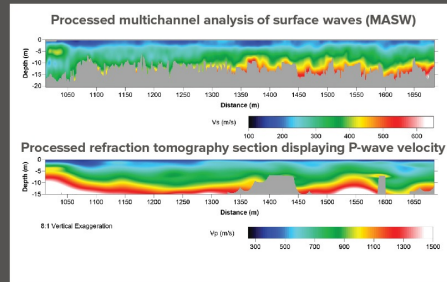
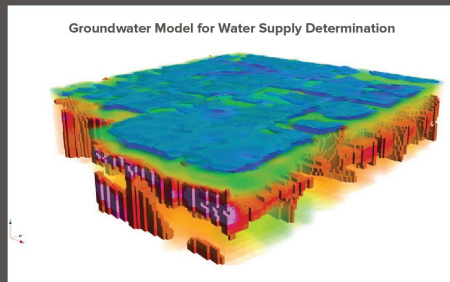
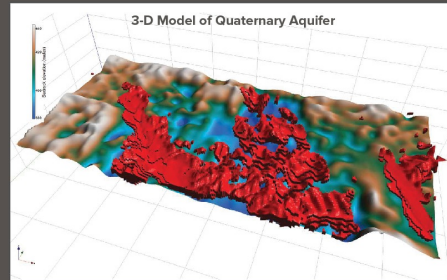
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WATER & WISDOM

OCTOBER 22-23, 2014



Contact us:
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Wednesday, Oct. 22, 10:05 a.m.

Under the Weather

Moderator: Sean Cronin

Executive Director, St. Vrain and Left Hand Water Conservancy District, 9595 Nelson Rd., Ste. 203, Longmont, CO 80501, 303-772-4060, sean.cronin@svlhwcd.org, www.svlhwcd.org

Sean is the executive director for the St. Vrain and Left Hand Water Conservancy District. He has more than 19 years experience in water resource planning and policy. Sean earned his bachelor's degree in environmental science from the University of North Carolina at Charlotte and spent two years as a natural resources agent with the North Carolina Cooperative Extension Service before moving to Colorado. Prior to joining the District, Sean spent 13 years with the city of Greeley, including the last six as their water resources manager. Sean is chairman of the South Platte Basin Roundtable and in 2014 received the Colorado Foundation for Water Education – Emerging Leader Award.

Sean lives in his adopted home of Colorado with his wife and two children. When Sean isn't spending time with family, working, or volunteering, you can find him on a river trying to master the art of making a trout rise.

Jamestown: From Flood to Recovery, it Takes a Village

Colleen Williams

James Creek Watershed Initiative, P.O. Box 110, Jamestown, CO 80455, 303-449-2621, colleen@jimtown.org

One of the most costly and widespread floods in Colorado history devastated the town of Jamestown in September 2013. Sustained heavy rains and post-wildfire conditions led to massive flooding and debris flows. James Creek and Little James Creek both left their banks and formed new channels, undercutting houses and roads. Several homes, bridges, culverts, and roads were washed away, isolating residents and forcing evacuation. Nearly everyone in the community was forced to relocate. By the end of the floods, Jamestown had lost 20% of the homes, 50% of the roads, and multiple bridges. Damage to the town's infrastructure included the water treatment plant, 50% of the water distribution system, and the fire hall. In the aftermath of the flood, the resilient community of Jamestown, along with assistance from multiple agencies, has pulled together to rebuild the town. This session will highlight the path Jamestown has taken over the past year, from emergency response to recovery, ensuring that we learn from the mistakes of the past while rebuilding a sustainable future.

Colleen Williams has 17 years of experience in watershed coordination and management of the James Creek Watershed Initiative, a local nonprofit watershed group that takes direct action to protect and restore the waters of James Creek. Her source water protection efforts have resulted in awards at the regional, state, and local level. She also worked for the Colorado Rural Water Association as a USDA source water protection specialist for the past eight years. Her role at Colorado Rural Water Association is to coordinate and facilitate community stakeholder meetings to develop and implement source water protection plans to protect sources of drinking water for community water systems. She also conducts training for water operators and Water Board members on source water protection planning.



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Limitations and Allowances for Land Owner Repairs

Jeff Wilson

County Executive Director, Weld County Farm Service Agency, 4302 W 9th St. Rd., Greeley, CO 80634, 970-356-8097, jeff.wilson@co.usda.gov, www.fsa.usda.gov

Buddy Nichols

Farm Loan Officer, Weld County Farm Service Agency, 4302 W 9th St. Rd., Greeley, CO 80634, 970-356-8097, richard.nichols@co.usda.gov, www.fsa.usda.gov

Through the emergency conservation program, the Farm Service Agency accepted 70 applications and funded 62 of those applications. They have paid out approximately \$200,000 to return farm land to production and have approximately an additional \$200,000 to disperse. The Farm Service Agency also provides farm ownership loans to cover rebuilding of facilities, farm operating loans to cover annual expenses, intermediate assets loans to cover cattle and equipment, and emergency loans to cover loss of productivity due to the disaster. In addition, the Farm Service Agency provides beginning farmer and non-beginning farmer loans as well as loans for socially-disadvantaged farmers.

Helping People Recover from Flood Damage

Todd Boldt

Irrigation Water Management Specialist, USDA-Natural Resources Conservation Service, Denver State Office, 720-544-2814, Todd.Boldt@co.usda.gov

USDA-Natural Resources Conservation Service is a federal agency with a mission to work with people to solve natural resource conservation issues on private land. Working in conjunction with local conservation districts, the NRCS has a presence in almost every county of the United States.

After the 2013 Colorado flood, NRCS in Colorado mobilized employees to assist local field offices to provide support for the NRCS Colorado flood response. The areas serviced by the Fort Collins and Longmont field offices were especially hard hit by the flood.

The Emergency Watershed Protection program is administered by NRCS and is used in emergency situations as one of the conduits a local sponsor can pursue to alleviate specific problems caused by the natural disaster. EWP can provide technical and financial assistance for the recovery process in a local community through a local sponsor to reduce the immediate threat to life and property from future flooding and erosion. The looming threat was the effects of spring runoff to life and property due to an above-average snowpack that accumulated over the winter of 2013-14 in watersheds affected by the flood.

To assist local field offices responding to the flood event, NRCS Colorado detailed more than 50 employees from Colorado and around the country to provide assistance with initial damage assessment surveys, complete engineering surveys, initiate and finalize project designs, perform construction layout and inspection, and complete final certifications for 120 exigent (immediate) projects. Approximately 15 million dollars of EWP funds was made available to provide technical and financial assistance through local sponsors.

Todd Boldt has been with the NRCS Lakewood office as an irrigation water management specialist since August of 2014. Prior to that, he worked in the Fort Collins field office as a district conservationist. Todd received his bachelor's degree in range ecology from Colorado State University and is from Moline, IL, the world headquarters of John Deere and Whitey's Ice Cream.

Two Things...

1. Be sure to fill out your evaluation to help us choose speakers for 2015.
2. Don't forget to mark your calendar for the 26th Annual South Platte Forum, Oct. 21-22, 2015.

Wednesday, Oct. 22, 11:20 a.m.

Every Cloud Has a Silver Lining

The History of Floods in the South Platte Basin

Nolan Doesken

State Climatologist, Colorado Climate Center, Department of Atmospheric Science, Colorado State University, Fort Collins, CO 80523-1371, 970-491-3690, nolan@atmos.colostate.edu, ccc.atmos.colostate.edu

This year marked the 150th anniversary of one of the first large floods documented in the South Platte Basin although there were surely many before that. In this presentation, we will characterize the types of flooding that occur in the basin - from local flash floods caused by intense thunderstorms, to widespread rainfall floods, to snowmelt floods and even dam-failure floods. We will then step decade-by-decade through the past 150 years, stopping to remember and describe the many floods the basin has experienced. We'll end by considering the September 2013 floods and placing them in historic perspective, asking the question "are the frequency and intensity of Colorado floods changing?"

Nolan Doesken is the state climatologist for Colorado at the Colorado Climate Center at Colorado State University. After obtaining degrees from the University of Michigan and University of Illinois in the 1970s, Nolan began his work as a climatologist at CSU in 1977 and was appointed state climatologist in 2006. He is fascinated with all aspects of weather and climate, but pays particularly close attention to precipitation. After the Fort Collins flash flood of 1997, Nolan established a volunteer rain gauge network to track and map the local variations in northern Colorado precipitation. This project - the Community Collaborative Rain, Hail and Snow network (CoCoRaHS) - has now spread nationwide.

Wednesday, Oct. 22, 11:50 a.m.

Food for Thought

Friends of the South Platte Award

Presented by: Robert Ward

Patricia J. Rettig

Head Archivist, Water Resources Archive, Colorado State University Libraries, Fort Collins, CO 80523-1019, 970-491-1939, patricia.rettig@colostate.edu

Patricia J. Rettig joined the Colorado State University Libraries in March 2000. She began working on the water resources archive in July 2001 and is now its head archivist. Her duties involve all aspects of archival work, including acquiring, organizing, and describing collections, creating exhibits, maintaining websites, running a digitization program, teaching classes, writing articles, and making presentations. In 2010, she received the CSU Libraries Faculty Award for Excellence. Patty earned her Master of Library Science from the University of Maryland in 1998 and worked in that institution's archives and manuscripts department for a year. A native of Ohio, Patty enjoys traveling around Colorado to see its water resources firsthand and meet the people involved.



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Friends of the South Platte Award

This award program was initiated in 2004 to recognize individuals and organizations who, through diligence and dedication, have made exceptional contributions in the South Platte River Basin.

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2008 - Platte River Greenway Foundation

2009 - Nolan Doesken

2010 - Les Williams

2011 - Tom Cech

2012 - Coalition for the Upper South Platte

2013 - Don Kennedy, Reagan Waskom

2014 - Patricia Rettig

You can nominate an individual or organization for the Friends of the South Platte award using your evaluation. You can also visit www.southplatteforum.org or email jennifer@southplatteforum.org to make a nomination. Please make all nominations by the end of this calendar year.



Special thanks for John Fielder for his generous donation of the picture "South Platte Sunset" and his support of the Friends of the South Platte award. "South Platte Sunset" can be found with John's other fine art prints at John Fielder's Colorado, his art gallery in the Cherry Creek mall. You can also view his work, learn about workshops, and order books at www.johnfielder.com.

Proposed Rule: Definitions of Waters of the U.S

Moderator: Marcella Hutchinson

Environmental Science, U.S. EPA Region 8, 1595 Wynkoop St., Denver, CO 80202, 303-312-6753, hutchinson.marcella@epa.gov

Marcella Hutchinson is an environmental scientist with the office of ecosystems protection and remediation at the U.S. EPA Region 8 office in Denver. She is responsible for the Source Water Protection Program for the Region. She holds Bachelor of Arts and Master of Science degrees, both in geology, from the University of Colorado at Boulder. Ms. Hutchinson has worked in EPA water programs since 1996.

Karen Hamilton

Chief, Aquatic Resource and Accountability Unit, U.S. EPA Region 8, 1595 Wynkoop St., Denver, CO 80202, 303-312-6236, Hamilton.Karen@epa.gov, <http://www2.epa.gov/aboutepa/epa-region-8-mountains-and-plains>

Karen will provide a brief description of the current regulation and how it defines Waters of the U.S. for purposes of the Clean Water Act. This description will include current exclusions and exemptions under the CWA. The presentation will describe why changes are being proposed and then what changes are being proposed as well as what is being proposed to remain unchanged. Karen will also describe some of the concerns and suggestions the EPA has heard about this proposal.

Karen Hamilton has worked in Nevada, Oregon, Oklahoma, and Colorado in aquatic ecosystem research and management since 1975. She has been with the Denver EPA office since 1988. About half that time has been in management so, sadly, she no longer has technical expertise. Karen earned her bachelor's degree in zoology and master's degree in fisheries biology, both from Colorado State University. She did graduate work in oceanography at Oregon State University and has a science teaching certification for the secondary level from the University of Northern Colorado.

Wednesday, Oct. 22, 1:10 p.m.

When Life Gives You Gas, Make Energy

Moderator: Patty Limerick

Chair, Board of the Center of the American West, University of Colorado, 282 UCB, Boulder, CO 80309-0282, 303-492-4879

Dr. Patty Limerick is the faculty director and chair of the Board of the Center of the American West at CU, where she is also a professor of history. Limerick has dedicated her career to bridging the gap between academics and the general public and to demonstrating the benefits of applying historical perspective to contemporary dilemmas and conflicts.

Currently she is applying that approach to the complicated issue of hydraulic fracturing and natural gas development. Over the past year and a half she has moderated the Center of the American West FrackingSENSE speaker series. FrackingSENSE has featured a wide variety of speakers with a range of opinions about natural gas development, including former Senator Tim Wirth, Governor John Hickenlooper, and many others. The program was so successful that the Center of the American West hosted three different panel discussions in Greeley sponsored by a broad array of community groups and industry. In addition Patty has spoken on the topic of hydraulic fracturing and natural gas development to variety of community groups including the Democratic Women of Boulder County, the Boulder Rotary Club, the University of Arkansas Hartman Hotz Lecture series, and the South Dakota State Harding Lecture series.

Limerick has received a number of awards and honors recognizing the impact of her scholarship and her commitment to teaching, including the MacArthur Fellowship and the Hazel Barnes Prize, CU's highest award for teaching and research. She has served as president of several professional organizations, advised documentary and film projects, and done two tours as a Pulitzer Nonfiction jurist, as well as serving as chair of the Pulitzer jury in history for 2011. She is currently serving as the president for the

Organization of American Historians. Limerick regularly engages the public on the op-ed pages of local and national newspapers and writes a monthly op-ed piece for the Denver Post. In the summer of 2005 she served as a guest columnist for The New York Times, and she continues to engage the public in many diverse ways.

Drilling and Completions: An Education

Alfred William Eustes III

Associate Professor, Colorado School of Mines Petroleum Engineering Department, 1600 Arapahoe St., Golden, CO 80401, 303-273-3745, aeustes@mines.edu, www.mines.edu

This is a quick technical review of the process for constructing a horizontal wellbore and completing the same. It will cover the technical process of directionally drilling a well, the casing and cementing process for wellbore isolation and pressure integrity, the completion process, and the fracture stimulation treatment needed for today's ultra-tight formations.

Dr. Alfred William Eustes III has been an associate professor at the Colorado School of Mines in the petroleum engineering department since 1996. He researches and teaches a variety of drilling and completion related topics. He has a bachelor's degree in mechanical engineering from Louisiana Tech University (1978), a master's degree in mechanical engineering from the University of Colorado in Boulder (1989), and a doctorate in petroleum engineering from the Colorado School of Mines (1996). He is a registered professional engineer in Colorado and has thirty-six years of drilling, completion, workover, and production engineering and operations experience, nine of those years as a field engineer with ARCO Oil and Gas Company. His work has included working with Louisiana deep-gas wells, casing design on Alaska's North Slope, robotic drills for Mars, and deep ice coring in the Antarctic. He has also worked with National Renewable Energy and Sandia National Laboratories in geothermal drilling operations and the CSM Unconventional Oil and Gas Institute in rig data analysis. He is a member of the SPE, IADC, AADE, and petroleum division of the ASME where he was the chair in 2007. He was selected as an SPE Distinguished Lecturer program for 2013-14.

Colorado Oil and Gas Conservation Commission

Richard Alward

Commissioner, Colorado Oil and Gas Conservation Commission; Principal Ecologist, Aridlands Natural Resource Consulting, 281 28 Rd., Grand Junction, CO 81503, 970-270-1973, ralward@aridlands-nrc.com

The Colorado legislature has charged the Colorado Oil and Gas Conservation Commission with the mission to foster responsible oil and gas development in a manner consistent with protection of public health, safety and welfare, including environment and wildlife resources. Fulfilling this mission has required regular updates to our regulations to protect water resources as the industry adopts new technologies and shifts its attention to different regions around the state. This presentation will provide an update on current COGCC regulations and policies and seek insights about future updates and modifications that might strengthen protections for important water resources.

Richard Alward has been operating Aridlands Natural Resource Consulting in Grand Junction for the past 11 years. He has consulted on development projects on both public and private lands associated with oil, gas, coal, uranium, and reservoir improvements on the Grand Mesa. His work has included leading studies to evaluate the potential for impacts from development on important plant, wildlife, and water resources; developing mitigation approaches to minimize or eliminate impacts to federally listed threatened plant species; and conducting research to test how well soils and vegetation recover following severe disturbance. For nearly thirty years, he has studied vegetation and wildlife communities, and how they respond to grazing, climate change, and physical disturbance in Colorado, Utah, Nebraska, and South Dakota, as well as Swaziland and Antarctica. He earned his bachelor's and master's degrees in biology from the University of Nebraska, and his doctorate in ecology from Colorado State University. He is a member of the Ecological Society of America, the Society for Ecological Restoration, and the Society for Conservation Biology. He was appointed to the COGCC in 2007 by Governor Ritter and re-appointed in 2011 by Governor Hickenlooper to provide expertise in soil conservation and reclamation.

Public Trust, Local Control, and Environmental Rights

Doug Kemper

Executive Director, Colorado Water Congress

Doug Kemper is the executive director of the Colorado Water Congress. He served on the Board of Directors from 1990 through 2003 and was elected CWC president (1994) and treasurer (1996-2003). He holds degrees in water resources engineering from University of Colorado (master's) and Vanderbilt University (bachelor's) and is a registered professional engineer.

Prior to joining the Water Congress, Doug spent 20 years as the water resources manager with Aurora Water. He was responsible for the planning, development, and operation of the city's raw water supply system. His activities included water policy and legislative analysis, acquisition of new water supplies, system modeling, and development of intergovernmental agreements.

Doug began his water resources experience by working for four years as an engineer with Rocky Mountain Consultants. His primary duties were analysis of agricultural water use, water supply modeling, dam safety risk assessments, and water quality remediation studies.

Wednesday, Oct. 22, 2:45 p.m.

Knowledge is Power

Moderator: Rich Vidmar

Senior Water Resources Engineer, Aurora Water, 15151 E. Alameda Pkwy., Aurora, CO 80012, 303-739-7326, rvidmar@ci.aurora.co.us

Richard Vidmar is a water resources engineer for Aurora Water specializing in water rights acquisitions, appropriations, and protection in the South Platte Basin. Rich holds a bachelor's degree in civil engineering from Colorado State University. Prior to earning his degree, Rich worked for the U.S. Bureau of Reclamation for six years at the Mt. Elbert power plant's water operations and maintenance division. Rich has been employed at Aurora Water for more than six years, working on many different projects including the Prairie Waters Project. Rich grew up in Buena Vista where his father, Tom, is the superintendent of the Homestake Water Project. Rich also completed the Colorado Foundation for Water Education Water Leaders program.

Effectiveness of Water Education Survey

Thomas W. Browning

Deputy Director, Integrated Water Resources, State of Colorado, Department of Natural Resources, Colorado Water Conservation Board, 1313 Sherman St., Room 718, Denver, CO 80203, 303-866-3441 x3208, tom.browning@state.co.us, www.cwcb.state.co.us

The Colorado Water Conservation Board commissioned a unique public awareness study that was completed by BBC Research, Inc. following recommendations from an earlier communications roadmap report. An analysis of statewide public opinions, attitudes and awareness regarding water in Colorado was based on a telephone survey of more than two thousand individuals. It included statistically significant survey data from every major river basin in the state. The final report summarized the results of the analysis, which illuminated various notions about water from the public's point of view. Although the report has been publicly available for a while, opportunities to share and discuss its significance have been limited. In his presentation, Tom will highlight some of the key observations and findings, both regionally and statewide, including at least one result that may be quite surprising to the water community.

Tom is a deputy director for the CWCB, and coordinates efforts for the integrated water resources staff. Areas of oversight include the stream and lake protection section, the water supply planning section, and the watershed and flood section. The position also focuses on management functions, agency operations, statewide water policies, strategic planning, and project negotiations. He is a registered professional engineer and received an engineering degree from the University of Colorado, Boulder, with

an emphasis in applied fluid mechanics. Tom additionally studied hazardous materials remediation, also at CU Boulder. He finally embarked on an effort to complete his MBA degree (better late than never) and expects to receive a diploma in 2015. He joined the CWCB in 1995 following seven years in the private sector working for two large consulting firms. Tom is the proud father of two wonderful daughters and enjoys donating his time for a variety of philanthropic activities. His favorite volunteer experiences have been helping to build homes for those in need and serving five years as an unpaid certified firefighter and first responder.

Colorado Foundation for Water Education

Nicole Seltzer

Executive Director, Colorado Foundation for Water Education, 1580 Logan St., Ste. 410, Denver, CO 80203, 303-377-4433, nicole@yourwatercolorado.org, www.yourwatercolorado.org

The importance of water education to the western United States' future is clear and often cited. Numerous local, state, and national reports on the sustainable path forward identify educating the general public and specific interest groups as a critical need. Colorado has made great strides in supporting water education during the past 15 years, yet the investment in water education falls far short of what is needed. What are the roadblocks that keep education in a supporting, rather than starring, role? Lack of measurable outcomes, questionable return on investment, length of time to produce results, and lack of clarity about who we want to reach are frequently mentioned. In her presentation, Nicole will address these roadblocks and make a case for increasing the time and resources dedicated to ensuring that all Coloradans can speak fluent water.

Nicole Seltzer inspires curiosity, advocates for learning, and creates community for the people of Colorado through great water education. She is the executive director of the Colorado Foundation for Water Education, a non-profit organization whose vision is that all Coloradans make more informed water resource decisions through exposure to accurate and balanced water information. Nicole developed a passion for water issues while at the University of Kansas and then expanded her knowledge with a master's degree in water resources from the University of Vermont. She previously performed community and media relations work for the U.S. EPA and Northern Water and volunteered on several non-profit boards including the Colorado Watershed Assembly. She has led the Foundation through a period of growth by doubling staffing levels, diversifying programs, and increasing the budget by more than 60% during her tenure. Nicole's work interests spill over into her personal life: most of her vacation time is spent guiding various inflatable boats down Western rivers.

An OWOW Update: The One World One Water Center at MSU Denver

Tom Cech

Director, One World One Water Center for Urban Water Education and Stewardship, Metropolitan State University of Denver, 1045 9th St., Denver, CO 80217, 303-352-4468, tcech@msudenver.edu, <http://www.msudenver.edu/owow/>

Colorado's water education community gained a new partner recently with the creation of the One World One Water (OWOW) Center for Urban Water Education and Stewardship at Metropolitan State College in Denver. Metro State received a \$1 million donation to develop "urban water stewards" from diverse backgrounds and a wide range of disciplines. Undergraduate students who study hydrology, history, politics, water law, conflict resolution, and negotiation will participate in internships and other volunteer opportunities to help shape new solutions for local and statewide water issues.

Dr. Sandra Haynes, dean of the School of Professional Studies, recently stated, "Part of Metro State's mission as an urban land grant institution is to help the community solve community-related issues. Water is a huge issue in the West, and our new One World One Water Center will help address those needs."

Tom Cech, director of the OWOW Center, along with Nona Shipman and Ale Brown, are working with students in the water studies minor, which has been in place for a year. On- and off-campus collaborations are engaging students, faculty, and staff, as well as creation of the new student water club on campus – Water Association of Student Stewards Urban Program - WASSUP.

Tom Cech was born and raised on a farm near Clarkson, Nebraska, graduated from Kearney State College with a bachelor's degree in math education, and later received a master's degree in community and regional planning from the University of Nebraska – Lincoln. He was executive director of the Central Colorado Water Conservancy District in Greeley, taught undergraduate and graduate level water resources courses at the University of Northern Colorado and Colorado State University, and is now the Director of the One World One Water (OWOW) Center for Urban Water Education and Stewardship at Metropolitan State University of Denver.

Tom wrote “Principles of Water Resources: History, Development, Management and Policy,” published by John Wiley & Sons - currently in its 3rd edition. Tom also recently published “Introduction to Water Resources and Environmental Issues,” (co-author Dr. Karrie Pennington) with Cambridge University Press, and “Colorado Water Law for Non-Lawyers,” (co-author P. Andrew Jones) with the University Press of Colorado. He has also completed histories of the Colorado Water Conservation Board and the Colorado State Engineer’s Office with Bill McDonald and Dick Stenzel, respectively.

Wednesday, Oct. 22, 4:00 p.m.

Light at the End of the Tunnel

Moderator: Diane Hoppe

South Platte Director, Colorado Water Conservation Board, 16602 Antero Circle, Broomfield, CO 80023, 303-886-7378, dianehop@msn.com

U.S. Army Corps of Engineers - Front Range Water Supply EISs - Overview and Status Update

Rena Brand

Clean Water Act 404 Permitting Specialist / EIS Project Manager, U.S. Army Corps of Engineers, Omaha District, Denver Regulatory Office, 9307 S. Wadsworth Blvd, Littleton, CO 80128-6901, 720-922-3841, rena.j.brand@usace.army.mil, <http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/Colorado.aspx>

This presentation will provide an overview and status update of the Corps’ development of water supply Environmental Impact Statements to include:

- Moffat Collection System Project Final EIS (Gross Reservoir expansion proposed by Denver Water)
- Northern Integrated Supply Project (NISP) Supplemental Draft EIS (Glade and Galeton Reservoirs proposed by Northern Colorado Water Conservancy District)
- Halligan-Seaman Draft EIS (Halligan and Seaman Reservoir expansions proposed by Greeley and Fort Collins)

Rena Brand has been serving as a Clean Water Act regulatory specialist for the Omaha District Corps of Engineers, Denver Regulatory Office, for 21 years. She is currently managing the Moffat Project EIS and other environmental reviews. A native of Omaha, Rena earned her geology and GIS degrees from CU Denver while working for the Corps. She enjoys traveling, geocaching, and volunteering as a science fair judge for elementary schools in the Denver area.

Don't Miss the Reception!!

Join us to mix, mingle, relax, and learn about projects that interest you in a one-on-one setting.

Details on the projects represented are on the next page...

Wednesday, Oct. 22, 4:20 p.m.

Conserve Water, Drink Beer

Halligan Reservoir Enlargement Project

Donnie Dustin

Water Resources Manager, City of Fort Collins Utilities, 700 Wood St., PO Box 580, Fort Collins, CO 80522, 970-416-2053, ddustin@fcgov.com, www.fcgov.com

Fort Collins Utilities has been pursuing the enlargement of Halligan Reservoir since the 1980s. The existing reservoir was built in 1909 and has a capacity of about 6,400 acre-feet, which belongs to the North Poudre Irrigation Company. If permitted, Halligan would be enlarged to about 15,000 acre-feet and give Fort Collins Utilities about 8,100 acre-feet of storage to meet future water demands and provide a storage reserve for drought and vulnerability protection. Fort Collins (along with the city of Greeley, as part of their proposed enlargement of Seaman Reservoir) entered the 404 permitting process with the U.S. Army Corps of Engineers in 2006. A draft environment impact statement (DEIS) is scheduled to be released to the public in early 2016.

Donnie Dustin is the water resources manager for Fort Collins Utilities. Donnie was born and raised in central Maryland and moved to Colorado after receiving his bachelor's degree in geology from James Madison University in Virginia. After working in Denver for an engineering consulting firm, he attended Colorado State University where he received a master's degree in civil engineering with a water resources planning and management focus. He is a licensed professional engineer in Colorado and has worked at Fort Collins Utilities since 1998, mostly with the water resources division.

HSWMP Milton Seaman Reservoir Expansion

Eric Reckentine

Deputy Director Water Resources, City of Greeley, 1100 10th St., Greeley, CO 80631, 970-350- 9815, eric.reckentine@greeleygov.com

The city of Greeley's 2003 Water Master Plan evaluated options to obtain water for future growth and provide drought protection. The master plan, which was adopted by the Greeley Water and Sewer Board and City Council, identified a four point program to secure the city's water future: expanding storage, strengthening infrastructure, continuing acquisition of water, and improving conservation. Greeley concluded that expanding Greeley's Milton Seaman Storage Reservoir would be the best expanded storage option and provide new storage at an optimal location. Milton Seaman Reservoir water, along with other direct flow and storage rights from the Poudre and its tributaries, has been treated at Greeley's Bellvue Filter Plant since 1907.

Milton Seaman Reservoir was constructed by the city of Greeley in the 1940s on the North Fork of the Cache la Poudre River, approximately one mile upstream of the confluence with the main stem Cache la Poudre River. The existing capacity of Seaman Reservoir is 5008 acre-feet. The city is proposing to enlarge Milton Seaman Reservoir by 48,000 acre-feet, for a total storage capacity in the reservoir of 53,000 acre-feet.

Greeley, with the city of Fort Collins, as part of their proposed enlargement of Halligan Reservoir, initiated formal consultation with the U.S. Army Corps of Engineers in 2005. The Corps published a Notice of Intent in the federal register in 2006. Currently, the Corps is working on analyses of alternatives, and a draft environment impact statement is scheduled to be released to the public in early 2016.

Eric Reckentine is the deputy director of water resources for the city of Greeley. In his current position, he is responsible for Greeley's raw water management and resource planning, the city's water rights portfolio, federal permitting projects, and high mountain reservoirs and non-potable system. Prior to working for Greeley, Eric was a resource and general manager for an international mining company responsible for the operational management of several business units, development of acquisition and reclamation strategies, and resource permitting. Originally from New York, Eric came to Colorado in 1994

as a geologist to continue work for a geotechnical and environmental engineering firm and worked on environmental assessment, remediation, and regulatory compliance projects throughout North America. He obtained a bachelor's degree in geology from the State University of New York and obtained an MBA from Colorado State University.

Moffat Collection System Project

Travis Bray

Project Manager, Denver Water, 1600 West 12th Ave., Denver, CO 80204, 303-628-6551, travis.bray@denverwater.org, www.denverwater.org

Permitting large projects in Colorado is a multi-year effort and involves a great deal of perseverance. Denver Water started the permitting process for the Moffat Collection System Project in 2003 and had hopes of receiving the necessary permits by 2006. Now, 11 years and three project managers later, Denver Water is still at least one-year away from receiving permits. While many milestones and agreements have been reached, no permits have been issued. Three key permits are needed to go forward with the Moffat Project: 404 Permit (Corps), 401 Certification (CDPHE), and an amendment to the Hydropower license (FERC). Additionally, Denver Water is attempting to work through concerns of Boulder County and residents surrounding Gross Reservoir.

Travis grew up in Craig, Colorado and attended college at the University of Wyoming. He earned his bachelor's degree in fish and wildlife conservation and management and his master's degree in rangeland ecology watershed management/water resources. After graduating in 1996, Travis worked as a research associate for the University of Wyoming. In 1997, Travis and his family moved to Denver where he worked as an aquatic biologist for three years. During this time Travis had the opportunity to travel to several states evaluating aquatic habitats and the effects of different land uses on aquatic ecosystems. As the novelty of traveling and being away from home wore off, Travis decided to seek a job that required less travel. Luckily, Denver Water provided that opportunity. Travis worked for five years in raw water operations before transferring to the environmental planning group in 2005. Currently Travis is Denver Water's project manager for the Moffat Collection System Project.

Windy Gap Firming Project

Jeff Drager

Deputy Manager, Engineering Division, Northern Water, 220 Water Ave., Berthoud, CO 80513, 970-622-2333, jdrager@northernwater.org, www.northernwater.org

The Windy Gap Firming Project is a collaboration between 13 Northeastern Colorado providers to improve the reliability of, or firm, water supplies from the Windy Gap Project, which started delivering water in 1985 and is operated by Northern Water's Municipal Subdistrict. The firming project proposes to build a new East Slope reservoir called Chimney Hollow to provide dedicated storage, which would provide a reliable supply of 30,000 acre-feet of water a year for future generations.

Jeff Drager is the deputy manager of the engineering division at the Northern Water. He has worked at Northern Water since 1995 where he has also served as project manager for the Pleasant Valley Pipeline project and the Windy Gap Firming Project. Prior to that he worked for consulting engineering firms in California and Texas. Jeff is a Colorado native with a bachelor's degree from Colorado State University and master's degree from Stanford University. He is a registered professional engineer in California and Colorado.

Northern Integrated Supply Project

Carl Brouwer

Project Manager, Northern Water, 220 Water Ave., Berthoud, CO 80513, 970-622-2298, cbrouwer@ncwcd.org, northernwater.org

The Northern Integrated Supply Project is a regional water supply project coordinated by Northern Water on behalf of 15 Front Range water providers. NISP would supply participating water providers with approximately 40,000 acre-feet of new, reliable water supply annually. NISP would include two new reservoirs, two water pumping stations, and pipelines:

Glade Reservoir: Glade Reservoir would be located northwest of Fort Collins and north of Horsetooth Reservoir. It would be five miles long, 260 feet deep and have the capacity to store 170,000 acre-feet of water, slightly larger than Horsetooth Reservoir. The water to fill Glade Reservoir would be diverted from the Poudre River using the already existing Poudre Valley Canal. There will be no new structures on the river. U.S. Highway 287 between Fort Collins and the Wyoming border divides the proposed Glade Reservoir site. Therefore, about seven miles of the highway would be relocated.

South Platte Water Conservation Project (Galeton Reservoir): Galeton Reservoir would be located east of Ault and northeast of Greeley. It would hold about 40,000 acre-feet of water at full capacity. The water to fill Galeton would be diverted from the South Platte River downstream from Greeley. Galeton water would be delivered to two agricultural irrigation companies in exchange for Poudre River water they currently use.

More than half of the water that NISP will divert from the Poudre River is water that has already been diverted for decades.

Carl Brouwer is head of the project management department for Northern Water. He has 28 years of experience in the planning, design, and implementation of water projects including pipelines, pump stations, hydro-electric stations, and dams. He has worked for Northern Water for 24 years on numerous water supply projects. Mr. Brouwer graduated with a bachelor's degree in civil engineering from the University of Michigan and a master's degree in civil engineering from Colorado State University. He and his wonderful wife, Jana, have three children. In his spare time he enjoys tending a few cows on his small farm.

Chatfield Reallocation Project: A Success Story

Rick McCloud

Water Resources Manager, Centennial Water and Sanitation District, 62 Plaza Dr., Highlands Ranch, CO 80129, 303-791-0430, rmcloud@highlandsranch.org

The Chatfield Reallocation Project received its Record of Decision on May 29, 2014 from the Corps of Engineers for its Environmental Impact Statement, and approval of its fish, wildlife, and recreation mitigation plan from the Colorado Parks and Wildlife Commission and Colorado Water Conservation Board in January, 2014. This project uses existing on-channel storage on the South Platte River along the Colorado Front Range to develop new surface water supplies without agricultural land dry-up, helping to address the water supply "gap" in the South Platte Basin. Come hear details about the project's innovative mitigation plans, the collaborative processes that developed them, and the next steps for the project.

Rick McCloud is the water resources manager for the Centennial Water and Sanitation District, which serves Highlands Ranch south of Denver, and is one of the nine participants in the Chatfield Reallocation Project. Rick has worked on the Chatfield Reallocation Project since its beginnings in 1994. Rick has more than 30 years of water resource development experience in Colorado and earned his bachelor's and master's degrees in civil engineering from the University of Colorado. Rick previously worked for the EPA in San Francisco and is a native of Denver.

Flood Recovery Projects

Amy Johnson, Jerry Gibbens

Project Manager, Northern Water, 220 Water Ave., Berthoud, CO 80534, 970-292-2524, ajohnson@northernwater.org

Following the devastating flooding of September 2013, Northern Water committed to being the fiscal agent for a Colorado Water Conservation Board grant program. Working together, Northern Water and CWCB developed the Flood Recovery Grant Program: guidelines, criteria, application, review, and reimbursement processes. After two application cycles, 107 subgrants were awarded for a total of \$2.555 million dollars. The funding came from the CWCB water supply reserve account (\$2.255 million), the Denver Basin Round Table account (\$150,000) and the South Platte Basin Round Table account (\$150,000). As the fiscal agent, Northern Water was able to expedite the award and reimbursement of the subgrants. This is a “pass-through grant,” and Northern Water does not keep any of the funding.

The grant program was focused on providing “seed money” to entities affected by the flooding who had decreed water rights for agricultural, domestic, municipal, or industrial uses. Many of these entities were not eligible for other forms of funding or assistance. Subgrants were awarded to entities located as far north as Fort Collins, as far east as Iliiff, as far west as Niwot, and as far south as Northglenn – which shows the success of spreading the funding to all flood affected areas. The maximum subgrant amounts for single entities were \$25,000 for technical services or \$20,000 for construction. The subgrant could not pay more than 75% of the total un-funded project cost (some entities had other grant funding through FEMA for instance).

Northern Water continues to review and issue reimbursement requests for the subgrantees. Although a majority of the projects are completed, the paperwork is still coming in. We will present additional information about the types of projects this grant program helped fund and show many before and after photos of the damage and repairs.

Amy Johnson and Jerry Gibbens are both project managers for Northern Water and have been responsible for the development and administration of the CWCB Flood Recovery Grant Program. Amy Johnson has a bachelor's degree in agricultural engineering from Colorado State University (Go Rams!) and master's degree in agricultural and biological systems engineering from the University of Nebraska – Lincoln. She spent 10 years in consulting and has been at Northern Water for six years. Amy's main responsibilities include project management, engineering support, grant administration, and permit writing. Jerry Gibbens holds both bachelor's and master's degrees in civil engineering from Colorado State University. He spent 19 years in consulting and has been with Northern Water for three years. Jerry's main responsibilities include project management, long-term financial planning and monitoring, watershed and forest health, water resources planning, and environmental permitting.

The WISE Partnership – On to Implementation!

Rick Marsicek

Director of Engineering, South Metro Water Supply Authority, 8400 E. Prentice Ave., Ste. 1500, Greenwood Village, CO 80111, 303-409-7747, rickmarsicek@southmetorwater.org

The Water Infrastructure and Supply Efficiency (WISE) Partnership began in 2008 between Aurora Water, Denver Water, and the South Metro WISE Authority. After years of engineering studies and negotiations, a final water delivery agreement was executed in December of 2013. The project uses Aurora's Prairie Waters Project to deliver Aurora and Denver's reusable water from the South Platte River to Aurora. Infrastructure needed to get water from Aurora to the 10 South Metro WISE Authority members will be completed in the next two years with water deliveries beginning in 2016.

Rick Marsicek is the director of engineering for the South Metro Water Supply Authority (SMWSA) and is responsible for assisting SMWSA with the planning, design, construction, and operation of renewable water projects. Prior to joining SMWSA, Rick was the water resources planning manager for Aurora Water, the third largest water provider in Colorado and one of SMWSA's partners in the WISE Partnership. He was involved in both the Prairie Waters Project and the WISE Partnership while at Aurora.

Thursday, Oct. 23, 8:20 a.m.

Plan Your Work

Colorado Water Plan

John Stulp

Special Policy Advisor to the Governor for Water, 1313 Sherman St., #723, Denver, CO 80203, 303-866-3441 x 3257, john.stulp@state.co.us, www.coloradowaterplan.com

Thursday, Oct. 23, 9:00 a.m.

Work Your Plan

The South Platte Plan

Mark Koleber

Chair, Metro Roundtable; Water Supply Director, City of Thornton, 12450 Washington St., Thornton, CO 80241-2405, 303-255-7790, mark.koleber@cityofthornton.net

The South Platte River Basin is Colorado's most populous river basin and the state's economic engine. It is home to the most-visited state parks and seven of the state's top-ten producing agricultural counties. It sustains high-quality habitats and provides world-class recreation. Water users and suppliers in the basin lead the state in water efficient practices and are committed to pursuing additional efficiencies. The basin is largely over-appropriated and is projected to have the largest future water supply "gap" of any basin in Colorado. Even with completion of the water supply projects that are currently being pursued and increased levels of conservation, additional water will be needed to meet future needs. The South Platte Basin Roundtable and the Metro Roundtable are working together to develop a basin implementation plan for the South Platte River Basin. This plan, along with the basin implementation plans provided by the other Basin Roundtables, will be used to frame Colorado's Water Plan, and will help address the many challenges the South Platte River Basin will face in providing water for environmental, recreational, agricultural, municipal, and industrial uses. The plan has been developed around four key themes:

- "A Good Colorado Plan Needs a Good South Platte Plan"
- Solutions must be pragmatic, balanced, and consistent with Colorado law and property rights
- The South Platte River Basin will continue its leadership role in efficient use and management of water
- A balanced program is needed to investigate, preserve, and develop Colorado River options

Mark Koleber is the water supply director for the city of Thornton, working with a team of professionals to provide water supply, water treatment, and water quality laboratory services to the city's water customers. He has worked with the city of Thornton for more than 27 years and has been in the water resources field for more than 30 years. He received his bachelor's degree in watershed science from Colorado State University. During his career he has participated on the Colorado Water Congress board of directors and the boards of a number of ditch companies, as well as working on a number of state-wide water supply planning efforts. He currently serves as the chair of the Metro Roundtable.

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The West Slope Perspective on the South Platte Plan

Jim Pokrandt

Chair, Colorado Basin Roundtable; PO Box 1120, Glenwood Springs, CO 81602, 970-945-8522 x 236, jpokrandt@crwcd.org, www.crwcd.org

Thursday, Oct. 23, 10:20 a.m.

What Goes In Must Come Out

Moderator: Troy Bauder

Extension Water Quality Specialist, Colorado State University Extension, Department of Soil and Crop Sciences, Fort Collins, CO 80523-1170, 970-491-4923, troy.bauder@colostate.edu

Troy Bauder, extension water quality specialist in the Department of Soil and Crop Sciences at Colorado State University, is responsible for conducting statewide educational and applied research programs on water quality, especially related to protection of groundwater quality from impairment to agricultural chemicals. His research and outreach expertise include nutrient and irrigation management, particularly as related to water quality and conservation. Troy received his Bachelor of Science in agronomy and his Master of Science in soil science from Colorado State University.

EPA Perspective on Nutrient Pollution

Al Basile

Ecosystems Protection Program, U.S. EPA Region 8, 1595 Wynkoop St., Denver, CO 80202-1129, 303-312-6551, basile.alfred@epa.gov

Although nutrients - nitrogen and phosphorus in particular - are essential for aquatic life, too many nutrients can create some very significant problems for our nation's lakes, streams, and coastal waters. Nutrient pollution can degrade habitat for fish and wildlife, render waters unsafe from swimming and other forms of water recreation, create a public health concern for drinking water supplies, decrease property values, and negatively impact local economies. Excessive levels of nutrients often fuel the growth of harmful algal blooms. Blue-green algae, or cyanobacteria, are well known for their ability to produce toxins that can be harmful to both people and animals. In August of this year, drinking water for approximately 400,000 residents of Toledo, Ohio was shut off for two days because of elevated levels of microcystin, a toxin produced by blue-green algae.

Nutrient pollution and its impacts are widespread across our nation with more than 100,000 river and stream miles and greater than three million lake acres identified as either threatened or impaired. And this is an underestimate, as determining impairment is complicated by the fact that most states have not yet adopted numeric water quality criteria for nitrogen and phosphorus. EPA continues to work with states to achieve this important goal. EPA is also encouraging the development of



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statewide nutrient reduction strategies, especially for those states that have not yet adopted criteria. The intent behind the strategies is to outline a path forward to make greater progress in reducing both near-term and long-term loadings from all source sectors. Making greater progress is a high priority for EPA, as nutrient pollution continues to have the potential to be one of the costliest and most challenging environmental problems that we face.

Al Basile is a biologist with EPA Region 8 in Denver, CO. His educational background includes degrees from Cobleskill College, Colorado State University, and the University of Connecticut with a focus in aquatic biology. He has worked for the Colorado Division of Wildlife and Connecticut Department of Environmental Protection, as an environmental consultant, and, for the past 15 years, for the EPA where he has spent much of his time addressing nutrient pollution. Prior to joining Region 8 in July of 2010, he was responsible for overseeing the development of numeric nutrient criteria in EPA Region 1, which encompasses the six New England states.

CSU National Nutrient Center CLEAN: Finding Optimal Solutions at the System Level

Mazdak Arabi

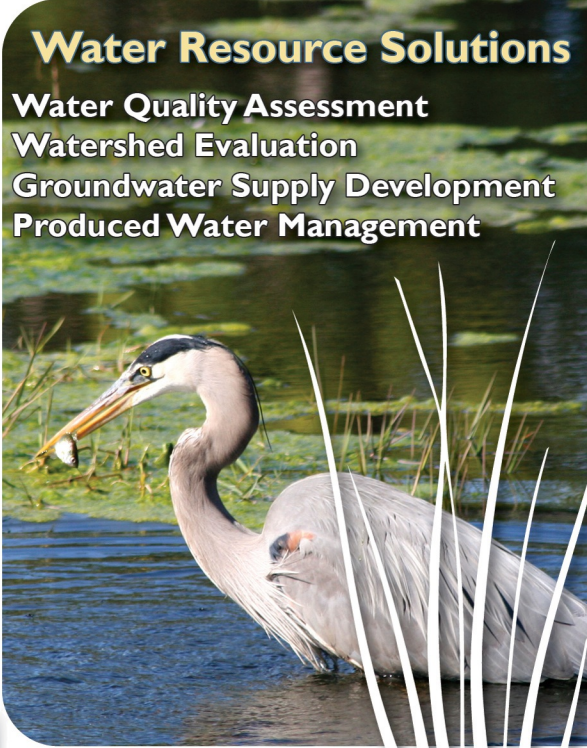
Associate Professor, Colorado State University, 1372 Campus Delivery, Fort Collins, CO 80523, 970-491-4639, mazdak.arabi@colostate.edu, erams.com/marabi

Big Flood! Big Flush! What Was in the Floodwater?

Suzanne Paschke and Larry Barber

Associate Director of Hydrologic Studies, Colorado Water Science Center, U.S. Geological Survey, Denver Federal Center, PO Box 25046, MS 415, Denver, CO 80225, 303-236-6904, spaschke@usgs.gov

Record flooding in the South Platte River Basin during September 2013 inundated the infrastructure of several municipalities along the Front Range urban corridor, as well as areas of agricultural production and oil and gas operations in rural downstream parts of the basin. Flooding began in upstream mountainous parts of the basin on September 11, 2013, and the flood waters moved across northeastern Colorado until approximately September 19, 2013. The U.S. Geological Survey Colorado Water Science Center worked collaboratively with the Colorado Department of Public Health and Environment to collect surface water quality samples of the flood waters from eight tributary and six main-stem sites in the South Platte River Basin between September 16 and September 22, 2013. Samples were analyzed for E. coli, field parameters, major ions, total and dissolved metals, nutrients, volatile organic compounds, wastewater compounds, hormones, and pharmaceutical compounds to provide a comprehensive basin-wide assessment of flood-affected water quality



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in the South Platte River Basin. Simultaneously, a weekly time series sampling of the city of Boulder's tap water, Boulder wastewater treatment plant (WWTP) effluent, and Boulder Creek upstream from the WWTP outfall was conducted by the USGS National Research Program between August 13 and September 30, 2013. Samples were analyzed for a variety of contaminants including endocrine disrupting compounds, halogenated disinfection byproducts, and trace elements. Results from the Boulder Creek samplings form the basis for an assessment of the flood by providing data on pre-flood baseline and post-flood conditions.

Results of the South Platte basin-wide assessment indicate exceedance of reach-specific water quality standards for *E. coli* at several locations with the greatest concentrations occurring downstream from the Boulder WWTP outfall. Indicators of wastewater, such as caffeine and pharmaceutical compounds, were detected in all basin-wide assessment samples, although the difference between flood and pre-flood conditions was not fully characterized because of the lack of pre-flood water-quality data. Volatile organic compounds, such as benzene, toluene, ethylbenzene, and xylene, compounds expected from oil and gas operations or solvents from urban areas, were not detected, likely because of dilution and volatilization. Time-series results from the Boulder Creek Basin captured the progression of the flood from base flow to flood conditions. Comparison of the time-series results for tap water derived from the upper basin, Boulder Creek downstream from the city of Boulder, and Boulder WWTP effluent indicate that the flood event initiated a complex set of hydrogeochemical processes. Runoff of chemicals from the landscape, dilution of instream concentrations by precipitation, and flushing of chemicals stored in the vadose zone by the rising water table affected the water quality of Boulder Creek during the flood event of September 2013.

Suzanne Paschke is the associate director for hydrologic studies at the U.S. Geological Survey Colorado Water Science Center in Lakewood with 25 years of experience in hydrogeologic evaluation and water-quality assessments. Recent projects include publication of the Denver Basin groundwater-flow model and evaluation of groundwater quality in the South Platte River Basin as part of the USGS National Water-Quality Assessment Program. Dr. Paschke holds a bachelor's degree in geology from the University of Wyoming and master's and doctorate degrees in geological engineering from the Colorado School of Mines.

Larry Barber is a research hydrologist at the U.S. Geological Survey National Research Program in Boulder, with more than 30 years of experience investigating the occurrence, fate, and effects of organic and inorganic contaminants in natural waters. Dr. Barber holds a bachelor's degree in geology from the University of Arkansas and master's and doctorate degrees in geology from the University of Colorado.

Nutrients Management in Colorado – Where Are We?

Dick Parachini

Clean Water Program Manager, Colorado Department of Public Health and Environment, Water Quality Control Division, 4300 Cherry Creek Dr. S., Denver, CO 80246, 303-692-3516, dick.parachini@state.co.us, cdphe.state.co.us/wq

The Water Quality Control Commission adopted Regulation #85 – Nutrients Management Control in June 2012, which became effective in September 2012. This new control regulation establishes effluent limitations for many domestic wastewater treatment plants and industrial wastewater dischargers that are likely to discharge significant levels of nutrients. It describes requirements for other point source dischargers and voluntary steps for nonpoint sources to address nutrients. It also establishes monitoring requirements for point source dischargers and a program aimed at monitoring of surface waters for nutrients and related parameters. This effort is geared toward better characterizing nutrient sources and current nutrient conditions to help inform future regulatory decisions regarding nutrients. This presentation will identify the important elements and the status of implementation.

Dick Parachini is the Clean Water Program manager of the Water Quality Control Division in the Colorado Department of Public Health and Environment. This position is responsible for all Clean Water-related work plan, budget, and personnel activities in the watershed, permits, engineering, and field services sections, and compliance and enforcement units totaling approximately 92 professional staff. Prior to

that, he was the Watershed Program manager for the Water Quality Control Division. This program is comprised of the environmental data (monitoring, assessment, and reporting), standards (water quality criteria, standards, and classifications), and restoration and protection (TMDLs, nonpoint source, source water protection, and planning) units. From 2001 to 2007, Dick was the outreach and assistance unit manager for the Water Quality Control Division. This unit was responsible for water quality planning, nonpoint source management, source water protection, and wastewater and drinking water grants and plans. He started with the Water Quality Control Division in 1997 as the South Platte Watershed coordinator where he functioned as a point of contact for the division regarding non-point source pollution programs, wellhead and source water drinking water protection programs, regional water quality planning agency coordination, reservoir control regulations, and local watershed initiatives.

Dick has a Bachelor of Arts in zoology from the University of Northern Colorado and a Master of Science in range ecology from Colorado State University. He is a fourth generation Coloradoan from a farming/ranching family in western Morgan County.

Thursday, Oct. 23, 12:00 p.m.

Poetry in Water

Moderator: Brian Werner

Public Information Officer, Northern Water, 220 Water Ave., Berthoud, CO 80513, 970-622-2229, bwerner@ncwcd.org, www.northernwater.org

Brian is the public information officer for Northern Water and serves as the public affairs coordinator for the Northern Integrated Supply Project, a water storage project currently going through the environmental permitting process. As PIO for Northern Water, Brian oversees public affairs for the district including media relations, youth and public education, facility tours, and informational publications. He has coordinated more than 50 children's water festivals in Colorado and produced a video on the Colorado-Big Thompson Project.

Brian was born in Colorado Springs. He graduated from the University of Northern Colorado with a degree in history and followed with a Master of Arts in history from Colorado State University in Fort Collins. Brian has continued his academic training by researching and giving presentations on the history of water development in Colorado and the American West. He has written extensively about water development and related issues.

Brian was chairman of the Poudre River Trust for five years and helped organize the first ever Riverfest and cleanup in 1994. He helped lead successful efforts to pass county-wide open space taxes in 1995 and 1999. He is on the board of directors of the Four States Irrigation Council, a commissioner for the Poudre Heritage Alliance, and a member of the Public Affairs Committee of the Colorado River Water Users Association.

At the Confluence: The Poetry of Colorado Water

Gregory J. Hobbs, Jr.

Justice, Colorado Supreme Court, 2 E. 14th Ave., Denver, Colorado 80203, 720-625-5440, gregory.hobbs@judicial.state.co.us

We are all water creatures. The music, symmetry, look and feel of Colorado water animates all our community possibilities.

Justice Greg Hobbs practiced environmental, land use, transportation, and water law for 23 years before becoming a member of the Colorado Supreme Court on May 1, 1996. He currently serves as vice-president for the Colorado Foundation for Water Education and a co-convenor of the Water Judges' Educational Project, *Dividing the Waters* (National Judicial College).

He is the author of "In Praise of Fair Colorado, The Practice of Poetry, History and Judging" (Bradford Publishing Co. 2004); "Colorado Mother of Rivers" (Colorado Foundation for Water Education 2005), "The Public's Water Resource, Articles on Water Law, History, and Culture" (Continuing Legal Education in Colorado, Inc. 2007), "Living the Four Corners, Colorado Centennial State at the Headwaters" (Continuing Legal Education in Colorado, Inc. 2010); and "Into the Grand" (Continuing Legal Education in Colorado, Inc. 2012).

His J.D. is from the University of California at Berkeley (1971) and his B.A. in history is from the University of Notre Dame (1966). He was an assistant attorney general for the natural resources section of the Colorado Attorney General's Office from 1975-1979. From 1979-1996, when in private law practice with Davis, Graham & Stubbs followed by Hobbs, Trout & Raley, he served as counsel to Northern Water.

Thank you for coming!

**Please fill out your evaluation and be sure to mark your calendar for the
26th Annual South Platte Forum, Oct. 21-22, 2015**

Poster Abstracts

Reconstructing Peak Discharge in Gordon Gulch During the September 2013 Storm

Amanda Brenner

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A storm with a recurrence interval characterized as "millennial" inundated the Colorado Front Range in September 2013. Boulder's watershed is heavily studied and the effects of this storm on its catchments were severe. Gordon Gulch is a small part of the watershed affected during this event. Unfortunately the discharge measurements from this area are missing due to equipment failure. In order to recover this data and estimate the peak discharge during the storms, two methods were implemented: (1) an estimation of paleodischarge from cross-sections and Manning's Equation and (2) a critical shear stress analysis of flow depth. The purpose of this paper was to look critically at the data collected throughout our research and assessing whether or not our methods support one another. The information gained through these methods allowed us to approximate that discharge was between 2 and 5 m³/s. Cross sectional analysis yielded stream flow heights of 0.7 and 0.8 m. We were also able to infer that the flow depths in Lower Gordon Gulch would have had to be between 0.09 and 0.46 m high in order to move the pebbles measured within the stream at Lower Gordon Gulch. With flow heights of 0.7 and 0.8 m high, we concluded our estimated paleodischarge is well within reason based on the results of our data. Although our methods allowed some room for error, we were able to draw reasonable conclusions that the peak discharge in Lower Gordon Gulch was 10 - 30 times greater than peak discharges during annual spring runoff floods. A shift in discharge this great in such a small stream could have a dramatic impact on the geomorphology of the area.

Water Sources and Quantity for Energy Development in Colorado's Denver-Julesburg Basin

Julie Kallenberger

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Over the past decade, Colorado has experienced a significant rise in oil and gas development with the greatest concentration of activity occurring in the Denver-Julesburg Basin (DJB) in the Northeast corner of the state. According to the Colorado Oil and Gas Association, as of June 2014, there are approximately 52,200 active oil and gas wells statewide, with more than 21,300 located in Weld County, the epicenter of the DJB. In this water-scarce region, much attention is paid to the source and quantity of water being used to produce energy. This information is not readily accessible, but is of great importance to many. In response, our research team is undertaking an evaluation of water quantity impacts and tradeoffs associated with oil and gas development.

Technological advancements in horizontal drilling and hydraulic fracturing require additional sources of water - about 2.8 million gallons of per well (Goodwin et al.). The statewide water use for hydraulic fracturing is estimated to be less than 0.1%; however, on a local scale, when water is transferred from agricultural and municipal uses to industrial use, there are economic, environmental, and social tradeoffs. Unfortunately, the pathway of a particular water transfer and its associated tradeoffs can be difficult to predict and quantify, further complicating the ability of local and state stakeholders to make sound and informative decisions about energy development. Energy companies are implementing new strategies to ensure reliable water supplies for their operations. These include tapping into non-tributary aquifers to help reduce competition for fully appropriated surface and tributary groundwater sources and recycling and reusing wastewater that results from the drilling and extraction practices.

Many conflicting perspectives shape the water-energy discussion in the DJB so non-biased scientific data plays an important role in addressing the questions surrounding water use for energy development. This poster presentation will address the data gathered through the National Science Foundation Sustainability Research Network AirWaterGas Project (<http://airwatergas.org/>) and its contribution to the dynamic conversation about the changing uses of limited water resources in Colorado.

Velocity and Flux of Two Boulder Canyon Debris Flows Initiated by the September 2013 Storms

David Schellhase

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Debris flows carry rocks, trees, and debris and destroy roads, houses, and other structures. Our research showed that the debris flows in Boulder canyon that were initiated by the September 2013 storms were moving at a tremendous speed. A laser range finder and light mapping were used to determine superelevation and topography from paleo high water marks on both sides of the channel. Light imagery was used to find the radius of curvature of each test site, and velocity was determined from the forced vortex equation. The velocity of the flows were shown to be 8.9 m/s at site one and 9.1 m/s at site two. The light mapping was also used to determine the total amount of material contained within the channel before and after the storms. The total volume of material removed by the event was found to be 4450 m³ at site one and 4000 m³ at site two.

FEMA Disaster Environmental and Historic Preservation Branch's Unified Review Team

Jeffrey Fullmer

Environmental Protection Specialist, FEMA Region 8, 303-235-4317, jeffrey.fullmer@fema.dhs.gov

One year after devastating historic flooding, as Coloradans continue to get back on their feet, a unified approach to environmental and historic preservation is expediting long-term recovery in the Centennial State. As part of their ongoing partnership in recovery with the State of Colorado, the Federal Emergency Management Agency's Environmental and Historic Preservation Branch (EHP) initiated a Disaster Unified Review Team (DURT). The team was developed as an interagency think tank tasked to identify streamlining measures for environmental and historic resource preservation regulatory requirements applicable to disaster response and recovery, while at the same time promoting the development of more resilient projects.

DURT is a specialized team representing state, local and federal strategists working together to develop products and more viable processes that will help improve federal and state decision-making and provide more predictable outcomes in planning and implementing disaster recovery projects. The work of the team is intended to promote increased and early coordination among federal agencies and their partners while completing EHP reviews for disaster recovery projects. DURT partners are involved the identification of cross-cutting issues, sharing of environmental data, and providing technical assistance in their areas of expertise. Partners include the: Federal Highway Administration; Colorado Department of Transportation; U.S. Small Business Administration; Department of the Interior; Natural Resource Conservation Service; U.S. Department of Housing and Urban Development; U.S. Environmental Protection Agency, Economic Development Administration; U.S. Fish and Wildlife Service; U.S. Army Corps of Engineers, the Colorado Department of Local Affairs; Colorado Water Conservation Board; Colorado Parks and Wildlife and State Historic Preservation Office.

The team has already made great strides in its top priority to harmonize records for National Environmental Policy Act review. One example is the establishment of an online GeoPlatform called the DURT Viewer. The DURT Viewer is a secure utility for the sharing geospatial data among DURT partners. The viewer is being used to depict project areas and classifications among various partners and agencies. Project locations, descriptions, areas of impact, dollar amounts, etc. are overlaid with environmental and historic resource data to identify areas where multiple funding and regulatory agencies may be involved. Additionally one of the most successful projects of the team has been the creation of documents written by FEMA Region VIII Environmental and Historic Preservation Specialists with input from federal and state partners. The documents were created to provide streamlined National Environmental Policy Act review across similar project types. The creation of these documents promoted transparency and provided a framework for current and future funding. One example is the 'Programmatic Environmental Assessment of Post-Disaster Road, Bridge and Trail Replacement, Relocation and Upgrade in the State of Colorado' developed in cooperation with FHWA. This was written to address damage caused by the 2013 flooding, but can also be applied to future events in Colorado.

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