Colorado Watershed Assembly

Colorado Foundation for Water Education
Your State. Your Water. Your Future.

COLORADO RIPARIAN ASSOCIATION

2016 SUSTAINING COLORADO WATERSHEDS CONFERENCE

A RIVER RUNS OUT OF IT: BUILDING STRONG UPSTREAM COMMUNITIES

OCTOBER 10-13, 2016

With special thanks to our conference benefactor:

The WALTON FAMILY FOUNDATION

Welcome to the 11th annual Sustaining Colorado Watersheds Conference!

We are pleased to be hosting the 2016 Sustaining Colorado Watersheds Conference. "A River Runs Out of It – Building Strong Upstream Communities" brings together engaged citizens, legislators, regulators, ecologists and other scientists to confer on best practices for natural resource management in Colorado. We are especially pleased to celebrate the 100th Anniversary of the National Park System, "The best idea America ever had.", With our keynote speaker James Doyle with the National Park Service and Nicole Jackson with the "Next 100".

The Colorado Watershed Assembly, Colorado Riparian Association and Colorado Foundation for Water Education have been Sustaining Colorado Watersheds Conference partners since 2009. The Colorado Watershed Assembly provides communication and networking opportunities to promote citizen engagement through programs and partnerships. The Colorado Riparian Association was formed in 1989 to promote practices and advance technical knowledge to protect streams and riparian areas. The Colorado Foundation for Water Education promotes better understanding of Colorado's water resources and issues by providing balanced and accurate information and education.

Together, we have worked to create what has become Colorado's premier watershed conference.

Our generous Sponsors provide the support we need to continue to increase attendance by younger participants ensuring learning and participation of multiple generations.

Please thank our presenters. They bring their expertise to share on topics ranging from accounting strategies to use of large woody debris for building resiliency. Practical topics and valuable networking opportunities are the hallmark of the Sustaining Watersheds Conference.

And thank you to all the volunteers, organizers, speakers and guests. We hope you enjoy the Conference.

Casey Davenhill
Colorado Watershed Assembly

Randy H. Mandell
Colorado Riparian Association

Nicole Seltzer
Colorado Foundation for Water Education

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PRE-CONFERENCE WORKSHOPS

ThinkWater Workshop with CFWE's Water Educator Network
Stream Management Planning Workshop with Colorado Water Trust
Restoration Practicioners Workshop with CRA: Introduction to Beaver Dam Analogs for Sediment Trapping

LOOK FOR

Keynote Address & Plenary Sessions
Yoga-at-Dawn in Riverside I on Wednesday

TOPIC TRACKS

Nexus of Water Storage & Watershed Health
Lessons Learned from Flood Recovery
Community Conversations Across Agencies & Interest Groups
Creative & Collaborative Water Solutions
Advancing Technical Tools & Innovations for Restoration
Water Resource Planning
Organizational Development Strategies
Success Stories to Know About
Linking Water Supply with Land Use Planning
Legacy of Mining

AGENDA-AT-A-GLANCE

MONDAY, OCTOBER 10

5:00pm-7:30pm	Early registration and Vendor Tabletop set-up in the Hotel Lobby

TUESDAY, OCTOBER 11

8:00am-1:30pm	Vendor Tabletop set-up in Riverside Foyer Area and Silent Auction in Rapids Room
8:00am-5:00pm	Registration in the Hotel Lobby
8:00am-12:00pm	3 Concurrent Pre-Conference Workshop Options
11:30 - 12:45pm	Conference partner organizational meetings
1:00-2:30pm	Conference opening and Plenary Session 1 in Riverside Ballrooms
2:30-3:00pm	Break. Visit Tabletops (Riverside & Lobby) and Silent Auction in Rapids Room
3:00-4:30pm	Plenary Session 2 in Riverside Ballrooms
5:00-6:30pm	Cocktails in the Library and Lobby Terrace
6:30-7:45pm	Evening Banquet Dinner in the Riverside Ballroom Salon
7:45-8:45pm	Keynote Address

WEDNESDAY, OCTOBER 12

7:00-8:00am	Yoga at Dawn in Riverside I
7:00-8:15am	Breakfast in Maya Restaurant
8:00-8:15am	Day 2 Overview & Logistics Presentation in Maya Restaurant
8:30-10:00am	Concurrent Tracks in the Gondola and Riverside Ballroom Salons
10:00-10:30am	Break. Visit with vendors in Riverside foyer and Silent Auction in Rapids Room
10:30am-12:00pm	Concurrent Tracks in the Gondola and Riverside Ballroom Salons
12:00- 1:30pm	Lunch at the Maya Restaurant
1:30-3:00pm	Concurrent Tracks in the Gondola and Riverside Ballroom Salons
3:00-3:30pm	Break. Visit with vendors in Riverside foyer and Silent Auction in Rapids Room
3:30-5:00pm	Concurrent Tracks in the Gondola and Riverside Ballroom Salons
5:00 PM	Poster session in Riverside Salon I
5:30-8:00pm	Social Event in the Riverside Terrace and Ballroom
7:30pm	Silent Auction Closes
8:00pm	Vendor Tabletops and Posters Close Down
8:30pm	Winners - Pick Up Your Silent Auction Bargains!

THURSDAY, OCTOBER 13

7:00-8:15am	Winners - Pick Up Your Silent Auction Bargains!
7:00-8:15am	Breakfast in Riverside Salons III & IV
8:00-8:15am	Day 3 Overview & Logistics Presentation in Riverside Salons III & IV
8:30am-1:00pm	FIELD WORKSHOP, Meet in Riverside Foyer for Field Workshop

DON'T FORGET TO FILL OUT OUR ON-LINE EVALUATION AT HTTPS://WWW.SURVEYMONKEY.COM/R/2016SCW

PRE-CONFERENCE WORKSHOPS

THINKWATER WORKSHOP WITH CFWE'S WATER EDUCATOR NETWORK

8:00AM-12:45PM

We understand that rivers, lakes, communities, infrastructure, politics and many other things of importance to the quantity and quality of Colorado's water are systems. Our thinking is a system too. Understanding our thinking can improve how we think about Colorado's water and how we communicate with and educate others about Colorado water.

CFWE's Water Educator Network is excited to host a workshop dedicated to this essential and often overlooked topic. We're bringing in ThinkWater's Jeremy Solin from Wisconsin to facilitate the workshop and examine why systems thinking is useful in addressing the everyday and complex water issues we face and introduce the 4 simple rules of systems thinking - making Distinctions, understanding the wholes and parts of Systems, identifying Relationships, and taking Perspectives. We will discuss how systems thinking and the ThinkWater tools and resources can be used to advance and transform the work of water educators and outreach professionals in caring for Colorado's water. We will collaborate and begin to create a strong ThinkWater community across Colorado.

STREAM MANAGEMENT PLANNING WORKSHOP

8:00AM-12:00 NOON

The Colorado Water Plan establishes a goal of having Stream Management Plans (SMP) developed for 80% of priority streams, focused on solution based approaches for integrating environmental and recreational values with traditional agricultural and municipal values. The Conceptual Framework in the CO Water Plan further directs all interests to work to "identify, secure funding for, and implement projects that help recover imperiled species and enhance ecological resiliency." The voluntary projects and processes that SMPs recommend can, as implemented, help a basin build ecological resiliency, which will help Roundtables and other organizations achieve this objective. This workshop will address SMPs, what they are, how to do them, who has done them, and what you need to do to get one up and running in your backyard.

RESTORATION PRACTITIONERS WORSHOP WITH CRA: INTRODUCTION TO BEAVER DAM ANALOGS FOR UPPER WATERSHED SEDIMENT TRAPPING

Dr. Sue Niezgoda of Gonzaga University

9:00AM-11:00AM

This workshop offers an introduction to Beaver Dam Analogs (BDAs) for Upper Watershed Sediment Trapping. Research work is underway in Washington to monitor the effectiveness of Beaver Dam Analog's (BDAs) at trapping sediment in upper reaches of watersheds that are delivering elevated and problematic sediment quantities to downstream reaches and receiving streams. BDAs can be more sustainable than sediment traps, continuing to store sediments after notable adjustments in the structures and even partial failure. BDAs trap sediment to help rebuild main channels, remedy incision, and reconnect floodplains. They incorporate large wood into the fluvial systems and can do so when the alternative to reintroduce beavers is infeasible. Current partnerships include the Lands Council, Partners for Fish and Wildlife, and Gonzaga University and collaboration with other Beaver/BDA projects are being investigated. This new BDA tool will be of interest to Colorado restoration professionals generally, but also specifically to those involved with 2013 flood recovery efforts, which often must address upper watershed instabilities and increased sediment delivery over the next several years as the watersheds continue to adjust.

Colorado Watershed Assembly's mission is to provide support for collaborative efforts among diverse stakeholders to protect and improve the conservation values of land, water, and other natural resources of Colorado's watersheds.

CWA HELPS FACILITATE DISCUSSIONS ON WATER MANAGEMENT ISSUES AND ENCOURAGES LOCALLY DRIVEN COLLABORATIVE SOLUTIONS. SIGN UP TO RECEIVE THE INFLOW NEWSLETTER AND MEMBER PRICING FOR THE SUSTAINING COLORADO WATERSHEDS CONFERENCE AND OTHER WORKSHOPS THROUGHOUT THE YEAR.

NEWS AND NOTES

River Watch is a statewide volunteer water quality-monitoring program operated by the non profit 501(c)3 Colorado Watershed Assembly in cooperation with Colorado Parks and Wildlife (CPW). Since 1989, River Watch has worked with volunteers around the state, coordinating efforts to collect quality water ecosystem data that can be used to monitor and regulate Colorado's rivers and streams. **Donate now and support this valuable service!**

We are delighted to announce that on April 22, 2016 Governor Hickenlooper signed HB 16-1297 reinstating the Healthy Rivers Fund in the Colorado Income Tax Checkoff Program. This program helps support local watershed organizations in their efforts to provide clean water, protect habitat and improve recreation and accessibility.

Contributions made to the Colorado Watershed Assembly for the Colorado Healthy Rivers Fund will be held in reserve and administered jointly with the Colorado Water Conservation Board and the Colorado Water Quality Control Commission. **Go to our website to make your contribution!**

Keeping the Green Line green!

COLORADO RIPARIAN ASSOCIATION

Our mission is to promote the conservation, restoration, and preservation of Colorado's riparian areas and wetlands.

- Foster a practical and scientific understanding of riparian areas.
- Promote sound management through demonstration & education.
- Advance communication for all people interested in riparian areas.

P.O. Box 19636
Boulder, CO 80308

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www.coloradoriparian.org

Colorado Foundation for Water Education

Your State. Your Water. Your Future.

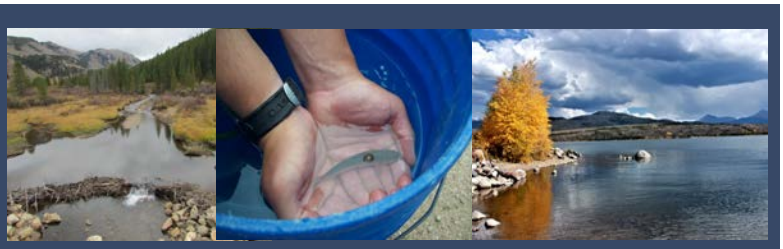
WE WANT COLORADO TO SPEAK FLUENT WATER

The mission of the Colorado Foundation for Water Education is to promote increased understanding of water resource issues so Coloradans can make informed decisions.

How do you care for Colorado's water? Whether you're an experienced professional, a backyard weather watcher or a weekend river warrior, CFWE has a place for you.

Join CFWE in our commitment to education that considers diverse perspectives, come together with uncommon allies, and enjoy a welcoming transparent environment for conversations about water.
Increase your awareness with publications, tours, webinars, leadership programs and more, including**:**

water fluency



A professional development course to help you understand water and lead with confidence

Coming to the West Slope spring of 2017…

Join our first West Slope Water Fluency class. Come away with tools to navigate the culture, complexity and future of water management and policy issues.
Perfect for elected officials, professionals interested in water, and community or business leaders.

Learn more at www.yourwatercolorado.org/waterfluency

Growing the capacity of water educators throughout Colorado

Whether you're engaging communities about water in classrooms, on campus, along rivers, or at the Capitol, the Water Educator Network is customized to your professional development needs.

Members receive regular updates on best practices, proven curriculum, resources and training opportunities, new programs, and a community. Join the network, and attend offerings:

- **November 16: Water Educator Symposium, Visual Storytelling**
  Explore exemplary visual storytelling techniques for water education and outreach
- **Spring 2016: Climate and Colorado's Water Future Workshop**
  Learn about Colorado's climate, what it means for water supplies, and tools to share with your community

Join the network at www.yourwatercolorado.org/water-educator-network

THE COLORADO FOUNDATION FOR WATER EDUCATION

YOURWATERCOLORADO.ORG

DETAILED AGENDA

MONDAY, OCTOBER 10	
5:00-7:30	Early registration and Vendor Tabletop set-up in the Hotel Lobby
TUESDAY, OCTOBER 11	
8:00am-1:30pm	Early registration and Vendor Tabletop set-up in the Hotel Lobby
8:00am-5:00pm	Registration in Hotel Lobby
Times Vary	**Concurrent Pre-Conference Workshop Options:** 8:00am-12:45pm - ThinkWater Workshop with CFWE's Water Educator Network (Lunch Charge) 8:00am-12:00 pm - Stream Management Planning Workshop 9:00am-12:00 pm - Restoration Practitioners Workshop with CRA: Introduction to Beaver Dam Analogs for Sediment Trapping by Dr. Sue Niezgoda of Gonzaga University
11:30am-12:45pm	Conference Partner Organizational Meetings (Gondola Room)
1:00-2:30pm	**Conference Opening: Nicole Seltzer, Colorado Foundation for Water Education** **Plenary Introduction: Julie Ash, Colorado Riparian Association** **Plenary Session 1 in Riverside Ballrooms:** **The Science and Practice of River Restoration** **Dr. Ellen Wohl, Colorado State University**
	Vendor Tabletop set-up in Riverside Foyer Area and Silent Auction in the Rapids Room
2:30-3:00pm	Break. Visit Tabletops (Riverside & Lobby) and Silent Auction (Rapids Room)
3:00-4:30pm	**Plenary Introduction: Mara MacKillop** **Plenary Session 2 in Riverside Ballrooms:** Turning Plan Into Action - Implementation of Colorado's Water Plan Moderator: Anne Castle, CU Getches-Wilkinson Center Panelists: Implementation from plan to action (John Stulp, Governor's Water Policy Advisor); Creative funding schemes (Don Coram, State Representative) ; Integrated land and water planning (Julio Iturreria, Arapahoe County); Alternative transfer methods/Water banks (Peter Nichols, Berg Hill Greenleaf Ruscitti); Philanthropic roles in statewide water projects (Ted Kowalski, Walton Family Foundation)
5:00-6:30pm	Cocktails in the Library and Lobby Terrace
6:30-7:45pm	Evening Banquet Dinner in the Riverside Ballroom Salon followed by Awards Presentation
7:45-8:45pm	**Keynote Address - James P. Doyle, , Chief of Communications and Legislation, Intermountain Region, National Park Service** **Nicole Jackson, advocate for protecting public lands** The National Park Service is celebrating its 100th anniversary. James will share the benefit and social good of publicly available lands, inclusivity and the "next 100 coalition."

WENDESDAY, OCTOBER 12			
7:00-8:15am	Breakfast in Maya Restaurant		
7:30am-5:00pm	Registration in the Hotel Lobby		
8:00-8:15am	Day 2 Overview & Logistics Presentation in Maya Restaurant		
	Concurrent Tracks in the Gondola and Riverside Ballroom Salons		
8:30-10:00am	**GONDOLA B**	**RIVERSIDE SALON III**	**RIVERSIDE SALON IV**
	Nexus of Water Storage and Watershed Health **Moderator: Bill McKee**	**Community Conversations Across Agencies and Interest Groups** **Moderator: Nicole Seltzer**	**Lessons Learned from Flood Recovery** **Moderator: Julie Ash & Jeff Sickles**
	"Meeting Water Quality Standards in a Front Range Reservoir Using an Innovative Watershed-Based Approach that Benefits Multiple Partners" Laurie Rink, Barr-Milton Watershed	"A Watershed Community Collaboration for Source Water Protection in the Upper South Platte: Building Strong Communities for Water Quality Protection and Watershed Health " Sarah Dominick, Denver Water; John Duggan CDPHE	Annual Panel on the Practice of Restoration: The Large Woody Material (LWM) Debate Recent Colorado efforts to work together to understand LWM and balance its benefits with its risks to infrastructure Panelists: Dr. Ellen Wohl, CSU (Poudre River example), Brian Varrella, CDOT & Erika Smull, Ayres (Big Thompson River example), Michael Chard, Boulder OEM & Mac Kobza, BCPOS (Boulder County example) _____ "Building a Design Team to Deliver Resilience" Panel Discussion: Jeff Sickles (RWP Lead), Michael Blazewicz (Restoration/Fluvial Geomorphology), Randy Mandel (Vegetation Ecologist/Revegetation Specialist), Dr. William Miller (Ecological)
	"Wildfire Watershed Risk Assessments: Challenges, opportunities, and the latest science to inform source water protection management strategies " Brett Wolk, Colorado Forest Restoration Institute, Aaron Kimple, Mountain Studies Institute	"The Fountain Creek Watershed Greenway Fund: Turning Our Creeks (Back) Into Assets" Patrick Hannon, Norris Design, Steve Rothstein, Greenway Fund	
	"One River, Many Plans" Kelly Romero-Heaney, Water Resources Manager for the City of Steamboat Springs, Zach Smith, Staff Attorney for the Colorado Water Trust	"The High Water Mark: Policy Lessons Learned from Colorado's 2013 Floods" Deserai Crow, University of Colorado	
10:00-10:30am	Break in Riverside and Gondola and Silent Auction in Rapids Room		
10:30am-12:00pm	**GONDOLA B**	**RIVERSIDE SALON III**	**RIVERSIDE SALON IV**
	Creative and Collaborative Water Solutions **Moderator: Brian Epstein**	**Advancing Technical Tools and Innovations for Restoration** **Moderator: Rachel Williams**	**Water Resource Planning** **Moderator: Stephanie DiBetitto**
	"Learning by Doing with the Colorado River Cooperative Agreement" Mely Whiting, Trout Unlimited, Lurline Curran, Grand County	"Connecting Vegetation Management to the Mapped Flood Risk " David Skuodas, Urban Drainage & Flood Control District	"Developing Watershed Resiliency Metrics: A Case Study from the Cache La Poudre Watershed " Jen Kovecses, Coalition for the Poudre Valley Watershed
	"Are Water Markets a Legal Solution for Scarcity?" Susan Ryan, Ryley Carlock & Applewhite	"Geomorphic analyses in support of channel restoration design - Highlights from three years of flood recovery " Luke Swan, Otak	"Empowering Upstream Communities to Protect Water" Colleen Williams, Colorado Rural Water Association
	"Augmentation for Increased Water Supply Efficiency and Instream Flow Benefits" Ben Moline, MolsonCoors	"New restoration tools and methods from the Dolores River Restoration Partnership" Daniel Oppenheimer, Tamarisk Coalition & Cynthia Dott, Fort Lewis College	"Crystal River Management Plan: Process, Outcomes and Stakeholder Engagement " Seth Mason, Lotic Hydrological, Rick Lofaro, Roaring Fork Conservancy

WENDESDAY, OCTOBER 12			
12:00-1:30pm	Lunch in Maya Restaurant		
	Concurrent Tracks in the Gondola and Riverside Ballroom Salons		
1:30-3:00pm	**GONDOLA B**	**RIVERSIDE SALON III**	**RIVERSIDE SALON IV**
	Organizational Development Strategies Moderator: Casey Davenhill	**Success Stories to Know About! Moderator: Josh Eldridge**	**Linking Water Supply With Land Use Planning Moderator: Jayla Poppleton**
	"Conserving Land and Water: How GOCO, CWT and Watershed Groups Can Collaborate for Success" Amanda Hill , GOCO & Zach Smith, Colorado Water Trust	"CDOT's US34 Rebuild in the Big Thompson Canyon, a case study in Colorado resiliency" Brian Varrella, CDOT Region 4 Hydraulic Engineer, Carolyn Roan, Muller Engineering Company, Will deRossett, Ayres Associates	"Save Water with Land Use Planning: A Manual for How-To" Drew Beckwith, Western Resource Advocates
	"Behind the scenes accounting strategies that lead to winning applications, manageable grant reporting and successful project implementation " Kevin Sear, Paragon Audit and Consulting	"Upper Arkansas River Restoration Project " Greg Brunjack, Upper Arkansas River	"Adventures in Land Use and Water Supply Planning in South Metro Denver: Opportunities, Challenges, and Steps Forward " Logan Burba, South Metro Water Supply Authority, Beorn Courtney, Element Water Consulting
	"Let's WRAP! One Water Solutions Institute at CSU has created WRAP—Watershed Rapid Assessment Program" Tyler Wible, Colorado State University	"A Sandy River Runs Through It: Middle South Platte River Sediment Transport Study" Brian Murphy, CDM Smith	"Land Use Planning to Address Water Quality and Stream Health" Torie Jarvis, Northwest CO Council of Governments
3:00-3:30pm	Break in Riverside and Gondola, Silent Auction in Rapids Room		
3:00pm	Poster session set up in Riverside Salon I		
3:30pm-5:00pm	**GONDOLA B**	**RIVERSIDE SALON III**	**RIVERSIDE SALON IV**
	Lessons Learned from Flood Recovery Moderator: Katie Jagt	**Advancing Technical Tools and Innovations for Restoration Moderator: Chris Sturm**	**Legacy of Mining Panel Discussion Moderator: David Holm**
	"Lessons Learned: Watershed Coalitions Share the Successes and Challenges of the Watershed Resilience Pilot Program" Erin Cooper, Little Thompson Watershed Coalition, Cecily Mui, Saint Vrain Creek Coalition	"Living Streambanks: A Manual of Bioengineering Treatments for Colorado Streams" John Giordanengo, AloTerra/Synergy Bill Spitz, Olsson Associates	Moderator: David Holm, Clear Creek Watershed Foundation; Jean Wyatt, EPA; Robyn Blackburn, U.S. Fish and Wildlife Service; Skip Feeney, Mine Impacted Waters Task Force; Dr. Andrew Todd, U.S. Geological Survey; Jason B. Willis, Trout Unlimited; Carol Ekarius, Coalition for the Upper South Platte; Trez Skillern, US Forest Service; Jeff Graves, Colorado Division of Reclamation, Mining and Safety; Peter Butler, Animas River Stakeholders; Curtis Hartenstine, Southern Ute Indian Tribe
	"The Art of Partnering: Case studies from the Big Thompson and Estes Valley Watershed Coalitions " Shayna Jones, Big Thompson Watershed Coalition, Molly Mills, Estes Valley Watershed Coalition	"Utilizing the CWCB Searchable Revegetation Matrix to Facilitate Proper River Revegetation for the Front Range of Colorado" Randy Mandel, EWP Vegetation Ecologist/ Golder Associates	
	"Restoring Resiliency to St. Vrain Creek Following the Flood of 2013" Douglas Laiho, Boulder County	"Assessment of Geomorphic Impacts of Riparian Vegetation Removal on the Colorado River" Gigi Richard, Colorado Mesa University	
5:00 PM	Poster session opens in Riverside Salon I		
5:30-8:00pm	SOCIAL EVENT IN THE RIVERSIDE TERRACE AND BALLROOM FEATURING "Tori Plays Guitar"		
7:30pm	Silent Auction Closes		
8:00pm	Vendor Tabletops and Posters Close Down		

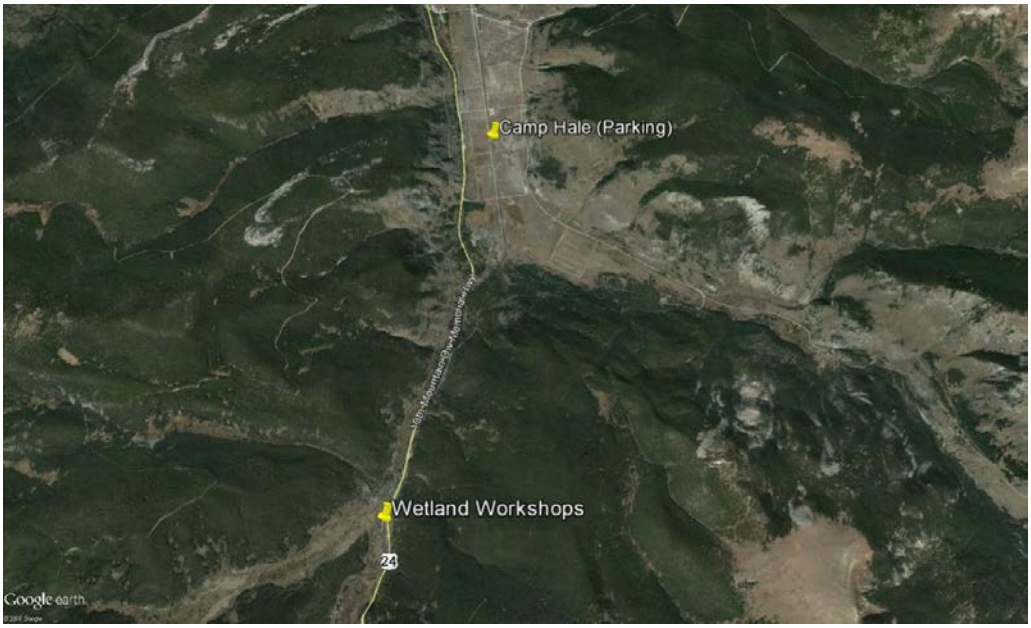
CAMP HALE FIELD WORKSHOP
THURSDAY, OCTOBER 13

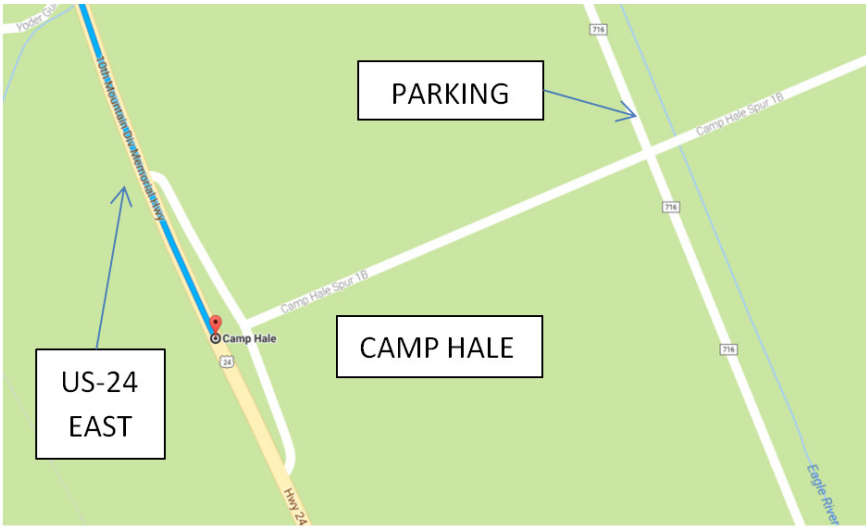
7:00-8:15am Breakfast in Riverside Salons III & IV
9:00 am - 1:30 pm ONSITE AT CAMP HALE
Meet in Riverside Foyer by 8:00 am to carpool/caravan to Camp Hale

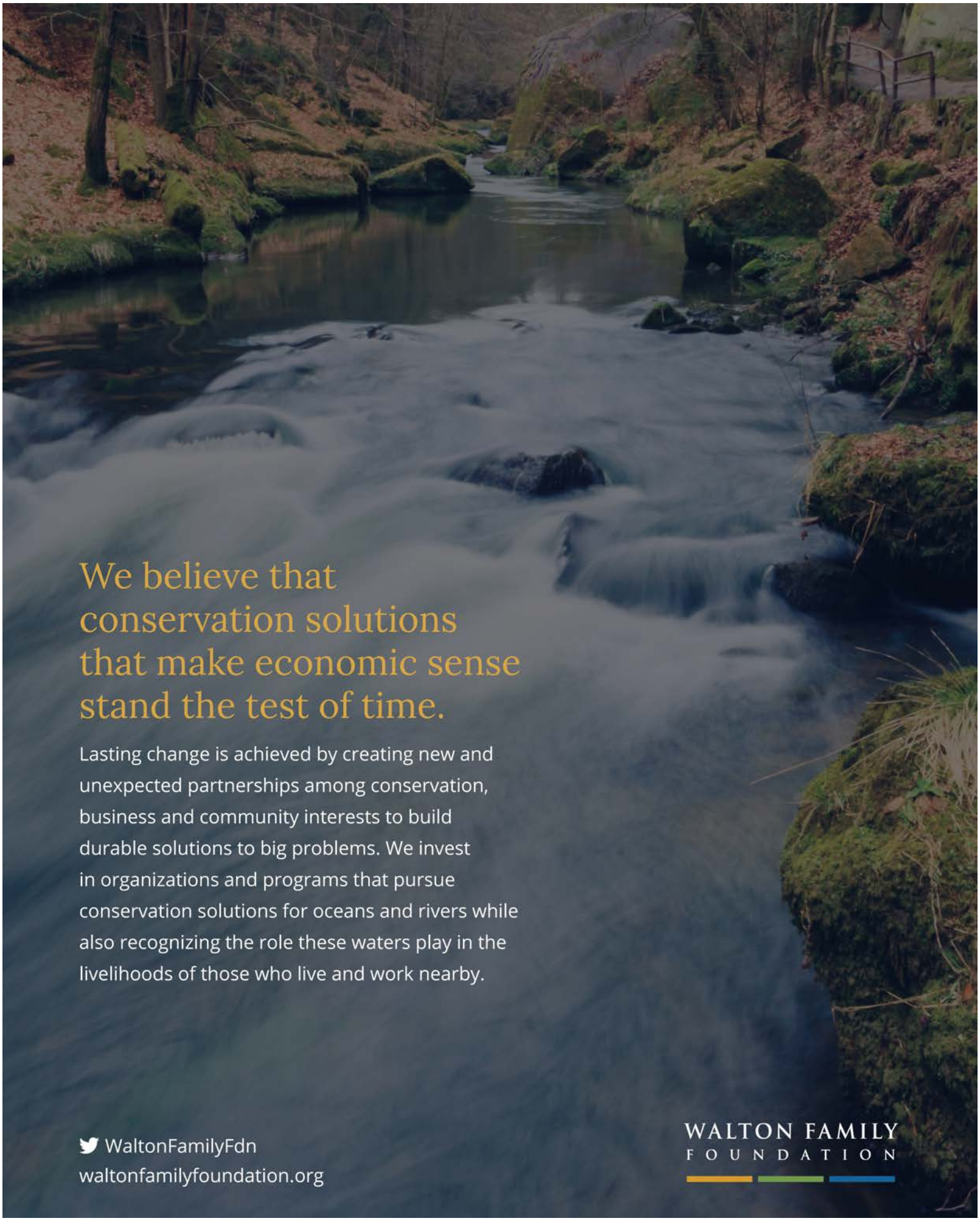
The Colorado Riparian Association will proudly present the 2016 Sustaining Colorado Watersheds Conference Field Workshop to be held at the confluence of Mitchell Creek and Piney Creek, located approximately 4 miles south (upstream) of Camp Hale along Highway 24. Parking will be at the main Camp Hale parking area; see below for directions. **There is very limited parking at the access point to Mitchell Creek, so transportation will be provided from the main Camp Hale parking area to Mitchell Creek. Plan to arrive at the main Camp Hale parking area at 9am.** Workshops will conclude by 1pm. Plan for about a mile of hiking, partially off-trail near a wetland—wear hiking boots, long pants, and appropriate outerwear. Don't forget a water bottle and sunscreen! **Space is limited.** Please go to the registration desk with questions on the field workshop registration.

The 2016 SCW field workshop will explore functional assessment methodology for rivers, streams and wetlands, and how specific methodologies like the Functional Assessment of Colorado Streams (FACStream) can be adapted to local conditions throughout Colorado. Participants will learn the indicators and metrics used in rapid assessments, how data may be incorporated into a functional assessment, and the role that reference areas play in functional site assessment and restoration design. Participants will have the opportunity to conduct their own rapid assessments of both a healthy wetland and in areas where historical channel realignment has altered the hydrology and has disrupted the wetland ecosystem.

Directions to Field Trip Parking (Camp Hale) from the Westin Riverfront Resort in Avon, CO (Approximately 22 miles, 35 minutes): Take I-70 East for 4.1 miles. Take Exit 171 for US-24 East (Follow signs for Minturn/Leadville). Take US-24 E for 16.5 miles. Turn into the main Camp Hale campground/parking area, on the left. Park along the dirt road next to the Eagle River. Additional parking is available in the paved parking lot which is located to your left as you enter Camp Hale (not shown).






We believe that conservation solutions that make economic sense stand the test of time.
Lasting change is achieved by creating new and unexpected partnerships among conservation, business and community interests to build durable solutions to big problems. We invest in organizations and programs that pursue conservation solutions for oceans and rivers while also recognizing the role these waters play in the livelihoods of those who live and work nearby.
WaltonFamilyFdn
waltonfamilyfoundation.org
WALTON FAMILY
FOUNDATION


Support The Colorado Healthy Rivers Fund On Your Next State Income Tax Return!
Your donation helps support:
Cleaner Water
Healthier Wildlife & Restored Habitat
Improved Recreation & Accessibility
To learn more visit www.coloradowater.org
COLORADO HEALTHY RIVERS FUND
WATER IS LIFE. KEEP IT CLEAN!
Photo courtesy of John Fielder

PLENARY SESSION 1 - TUESDAY, OCTOBER 11, 1:00 PM – 2:30 PM

The Science and Practice of River Restoration

Dr. Ellen Wohl, Colorado State University

Abstract: River restoration is informed by scientific understanding of river process and form. In this presentation, I explore how environmental setting, land use history, connectivity, and physical complexity influence river process and form, and I review restoration strategies of reconfiguration versus reconnection in diverse rivers. Sustainable river restoration requires recognition of how (i) the environmental setting and geomorphic context of a particular river or river segment influence natural river characteristics, (ii) present and historical land use constrain river characteristics and restoration options, and (iii) specific management actions are likely to influence river health and the state of the river desired by stakeholders.

Ellen Wohl received her BS in geology from Arizona State University and her PhD in geosciences from the University of Arizona. She has been a faculty member at Colorado State University since 1989. Her research focuses on physical process and form in rivers, but emphasizes physical-ecological and physical-human interactions that influence river ecosystems. She has written numerous scientific journal articles, as well as several popular books on rivers. She has conducted field research on every continent but Antarctica.

PLENARY SESSION 2 – TUESDAY, OCTOBER 11, 3:00 PM – 4:30 PM

Turning Plan Into Action - Implementation of Colorado's Water Plan

Moderator, Anne Castle—Anne Castle is a senior fellow at the Getches-Wilkinson Center for Natural Resources, Energy, and the Environment at the University of Colorado, focusing on western water issues. From 2009 to 2014, she was Assistant Secretary for Water and Science at the U.S. Department of the Interior where she oversaw water and science policy for the Department and had responsibility for the U.S. Bureau of Reclamation and the U.S. Geological Survey. Castle spearheaded the Department of the Interior's WaterSMART program, which although not an entirely original name despite best intentions and multiple trademark searches, provides federal leadership on the path toward sustainable water supplies. She was the driving force behind the 2010 federal MOU addressing sustainable hydropower, the largest, least respected, and most vilified form of renewable energy in the country. Castle also provided hands-on leadership on Colorado River issues and was the Chair of the Glen Canyon Dam Adaptive Management Work Group and a champion of Minute 319 between the US and Mexico. The fact that the Colorado River descended further and further into drought during her tenure is generally believed not to be her fault. Castle is a recovering lawyer, having practiced water law for 28 years with the Rocky Mountain law firm of Holland & Hart. She was the Landreth Visiting Fellow at the Stanford Woods Institute for the Environment for the Spring 2015 quarter, and is now working with the Getches-Wilkinson Center on project relating to implementation of the State of Colorado's Water Plan and Colorado River management policy.

Peter Nichols—The lead attorney for the Lower Arkansas Valley Super Ditch Company and Lower Arkansas Valley Water Conservancy District, who are pioneering new approaches for irrigators to share ag water with municipal and other water users. The Catlin Pilot Project, for example, began providing up to 500 acre-feet of water per year to the City of Fountain, Town of Fowler, and Security Water District. Peter is also the "go to" water attorney for conservation easements involving western water rights, and principal author of "Water Rights Handbook for Colorado Conservation Professionals" (Bradford, 2011).

Nichols is a partner of Berg Hill Greenleaf Ruscitti LLP, Boulder, Colorado, practicing water, environmental, conservation, and related law, and an occasional international mountaineering guide. Nichols is a member of the bars of the U.S. Supreme Court, the First, Second, Ninth, Tenth and Eleventh Circuit Courts of Appeal, the U.S. District Court for Colorado, and Colorado. Peter earned his JD from the University of Colorado School of Law; he also holds an MPA from CU and a BA from Colorado College.

Ted Kowalski—Ted is a Senior Program Officer, leading the Walton Family Foundation's Colorado River Initiative. Prior to joining the foundation, Ted started his career in the Colorado Attorney General's office working on water rights. Ted is recognized for his deep expertise, and has testified before the U.S. Congress and before the Colorado General Assembly. Ted was chief of the interstate, federal and water information section, where he served as a senior negotiator on Federal, interstate and international issues related to the Colorado River. Ted has a law degree from the University of Colorado and an undergraduate degree from Cornell University.

John Stulp - Special Policy Advisor to the Governor for Water & Director of the IBCC. A farmer and rancher from Prowers County Stulp served as Commissioner of Agriculture 2006-2011. A member of the Rocky Mountain Farmers Union since 1975, Stulp has been a leading proponent of building wind farms in rural Colorado as a way to develop new economic opportunities and jobs. Stulp's family farming operation is home to the Lamar Light and Power Wind Farm, and Stulp is a principal in Prairie Wind Energy LLC. Stulp served as a Prowers County commissioner from 1991until 2005. He also served on numerous other boards and commissions, including the State Board of Agriculture, state Wildlife Commission, the Connect Colorado technology committee, the State Land Board, and the Colorado Ag Development Authority & Value Added Board. Stulp graduated from Yuma High School. He earned a bachelor's degree in veterinary science and a doctor of veterinary medicine, both from Colorado State University.

State Rep. Don Coram was born and raised in Montrose County on a family farm/ranch operation. His parents ran stockyards in Montrose and Grand Junction. Rep. Coram's wife, Dianna, is a third generation Delta County resident. Rep. Coram and Dianna have one son, Dee, who also works together with them on business transactions. Rep. Coram is proud to have strong roots and a history throughout the 58th District.

Rep. Coram's business background is representative of the district with experience in ranching, mining, environmental reclamation, and main street small businesses. Strong community participation has always been a very important part of Rep. Coram's life. He brings

small business experience, conservative values, and common sense with him to the state House of Representatives.

Along with small business experience, Rep. Coram has served as Director and Treasurer of School District RE -1J, also Treasurer and President of the Delta-Montrose Vocational Center. He served as a Director of the Western Small Miners Association. Prior to his candidacy in 2010, Rep. Coram served as the 2nd Vice-Chairman of the Montrose County Republican Central Committee and was selected to serve on the Colorado Republican Committee Executive Committee. Rep. Coram is the ranking member of the House Agriculture, Livestock, and Natural Resources Committee; and serves on the House Transportation and Energy Committee as well as the House Services Committee.

Julio G. Iturreria - Over the past three decades, Julio has been involved with urban and rural planning in various positions as a planner, manager and Community Development Director. He currently is the Long Range Program Manager in Arapahoe County. This involves working on comprehensive plans and sub-area plans involving water, water quality, air quality, conservation, open space, regional trails, parks, multiple scaled developments, and regional issues that effect statewide water issues. He was one of the driving individuals in the establishment of the first Open Space Sales Tax Program and establishing the Open Space program for Arapahoe County. Within the last six years, he has also focused attention to the issue of land use and water in an effort toward establishing stronger linkages between local, regional and federal levels. He continues to serve on the Metro and South Platte Water Roundtables and serves on education committee for regional workshops on water issues.

KEYNOTE ADDRESS, TUESDAY, OCTOBER 11, 7:45 PM – 8:45 PM

Celebrating The National Park Service 100th Anniversary

James P. Doyle, Chief of Communications and Legislation, Intermountain Region, National Park Service

James currently serves as the National Park Service Intermountain Region Chief of Communications, Legislation and as the Colorado State Coordinator with oversight of the ten national park units in the state. In his supervisory role as chief of communications and legislation, he works with and advises the regional director and regional management team, the management staff of 86 national park units in eight states, and dozens of programs based in the Intermountain Region Office on a broad range of communications, legislative and policy matters. His supervisory responsibilities include developing and managing communications and legislative support for the regional director, the regional leadership team and all of the parks in our region. This includes managing all aspects of complex and critical communications involving national parks and regional and national agency communication opportunities, from communications planning to execution.

Through 2015 and 2016 he co-managed the planning and execution of hundreds of events across our eight-state region that were designed to celebrate the National Park Service's 100th Centennial celebration in 2016. The goal was to significantly increase the public's awareness of national parks – especially among traditionally underserved audiences – and to increase the relevance of the national parks system and the cultural and natural resources we protect with a new generation of users and consumers.Another major component of his day-to-day responsibilities involves increasing the NPS presence on and use of new and evolving platforms to communicate with consumers. This includes social media platforms and other digital opportunities.

He also manages the eight state regional legislative portfolios for the region. That includes the assessment and development of more than 20 regional legislative opportunities that crop up in parks annually that could benefit from legislative relief, drafting legislative language and all related support materials including Congressional testimony, issue briefing statements, comprehensive legislative data packages and other background materials. He maintains professional relationships with Congressional staff members at the state and Washington, D.C. levels, with staff members of the Congressional Committees with jurisdictional authority of agency activities and appropriations, and with other Washington- and state-based Federal land management agency staff and the with the Governors of the eight states in the region on issues of mutual concern. Understanding the needs of Congressional and state agency staff developed through regular communication has proven to invaluable in building relationships that help advance the needs of the agency while improving our collaborative decision making efforts.

He has worked for the National Park Service for 12 years. Before that he was the Communications Director for U.S. Senator Ben Nighthorse Campbell, working in Washington DC and in Colorado. Prior to working in Washington he was a working journalist at several daily Colorado newspapers. Before that he worked in the Communications Office of U. S. Senator Timothy Wirth. He has also owned and operated a successful small business specializing in renovating commercial office and business spaces.

A Denver Native, **Nicole Jackson** graduated from Montbello High School and is currently pursuing her Bachelors Degree in Biology from the University of Phoenix. She is working for the City and County of Denver in the Parks and Recreation Department at an Irrigation Technician and Horticulturist Assistant. She is proud to be the only woman of color working in this department. Nicole is an alumna of Environmental Learning for Kids (ELK) and says the program helped her secure her current position with the Parks and Recreation Department. Nicole is convinced that if she hadn't joined ELK "I probably would not be where I am today; I would not be as outgoing and active in the community," she says. Nicole is an advocate for protecting public lands and is excited to teach younger students the importance of our public lands heritage.

WEDNESDAY, OCTOBER 12TH, 8:30 AM – 10:00 AM

Gondola B, Nexus of Water Storage and Watershed Health, Moderator: Bill McKee

Title: "Meeting Water Quality Standards in a Front Range Reservoir Using an Innovative Watershed-Based Approach that Benefits Multiple Partners"

Laurie Rink, Barr-Milton Watershed

Abstract: The BMW Association is moving forward to determine how a variety of interests can work together to meet some very tough pollutant reduction requirements in the state's most urban watershed. It is imperative that, while expensive, point source nutrient reductions from municipal facilities occur in tandem with nonpoint source reductions that are much more difficult to quantify and control. Barr Lake is a man-made and operated reservoir that serves irrigation and municipal drinking water uses. Water uses and their applicable water quality standards can only be met through a comprehensive watershed-based approach to pollution control, as demonstrated by the Association's water quality modeling work. The Association has evaluated various options that can control both nonpoint and point sources together, using technologies new to Colorado that require unique partnerships. Barr Lake, while privately owned, is also a state wildlife area. Colorado Parks and Wildlife have been an integral component working along-side local municipal interests, irrigation providers, raw water providers, municipal stormwater and wastewater management agencies, and state and federal regulating entities to improved watershed health in the urban reaches of the South Platte River.

Laurie Rink has practiced as a consulting ecologist in Colorado for thirty years. Her current clients include the Middle Colorado Watershed Council, a nonprofit organization, where she serves in the capacity of Executive Director, and the Farmer's Reservoir and Irrigation Company (FRICO) where she manages its water quality program in the South Platte River basin. Her work for both organizations encompasses two significant watershed areas where collaboration with stakeholders is key to successful project implementation.

She began her career early in life, collecting snails and salamanders from the small kettle wetland outside her bedroom window (northern Illinois). As an older ecologist, she earned a double degree from the University of Colorado at Boulder in 1984 in Environmental, Populational, Organismic Biology and Environmental Conservation. She continued thereafter with graduate degree studies in biology and engineering. Laurie is certified as a professional wetland scientist through the Society of Wetland Scientists program. Laurie co-owned and operated a design/build environmental restoration firm for the first twelve years of her career. She moved on in 1999 to develop and operate one of the state's first wetland mitigation banks, located in Adams County. She lives with her husband, Dan, and dog, Daisy, in Fruita, Colorado, where they enjoy as much of the outdoor life as possible.

Title: Wildfire Watershed Risk Assessments: Challenges, opportunities, and the latest science to inform source water protection management strategies

Brett Wolk, Colorado Forest Restoration Institute, Colorado State University
Aaron Kimple, Mountain Studies Institute

Abstract: Large, severe wildfires have negatively impacted forested watersheds in the interior West and the likelihood of more frequent fire events could jeopardize water supplies in this semi-arid region. This wildfire risk has inspired federal agencies, collaborative groups, municipal water providers, and water users among others to invest millions of dollars in forest wildfire risk reduction activities aimed at increasing source water security. However, financial and practical constraints limit the geographic extent of fuel reduction programs, raising questions about how to optimize placement and extent of management activities to minimize risk of undesirable wildfire. Many watershed risk assessment approaches and analytical tools exist to inform decisions that optimize location, size, and type of management activities that best reduce risk and maximize financial returns on investments. Strengths and limitations of two different risk assessment approaches will be discussed. The San Juan Headwaters Forest Health Partnership in Archuleta County, Colorado, conducted a values risk analysis that has been used by the collaborative group to guide management decisions. The assessment was conducted in a timely manner using local knowledge but could be enhanced using more involved evaluation criteria, expanding the capabilities of the assessment. A new scientifically rigorous watershed wildfire risk reduction investment optimization tool is being developed by the Forested Watershed Research and Decision Support (FORWARD) group led by an interdisciplinary team at Colorado State University. This tool will initially be applied to identify optimal forest fuel treatment locations in the Upper South Platte, Big Thompson and Poudre River Watersheds. Our presentation explores the evolution of payment for watershed services programs towards a more intensive analytical approach to estimating return on investments by linking ecological and economic outcomes. Coauthors: Rob Addington (The Nature Conservancy), Jeffery Cannon, Tony Cheng, Benjamin Gannon, Kelly Jones, Stephanie Kampf, Freddy Saavedra, Yu Wei, Codie Wilson (Colorado State University).

Brett Wolk is the Assistant Director at the Colorado Forest Restoration Institute in the department of Forest and Rangeland Stewardship, Warner College of Natural Resources at Colorado State University. He has experience on diverse restoration research projects throughout the western USA, from mosses to forests to oil pads, from Alaska to Arizona. For much of the past 10+ years, Brett's research interests have focused on understanding ecological responses to forest management in Colorado and the interior West, including plant ecology, tree regeneration and forest development, fuels distribution and fire ecology. In his capacity as Assistant Director of CFRI, Brett works with stakeholders to develop, compile, and apply current knowledge through collaborative, adaptive management approaches to achieve resilient socio-ecological forest communities.

Aaron Kimple is Program Director, Forest Health for Mountain Studies Institute, Durango, Colorado. Program Coordinator for San Juan Headwaters Forest Health Partnership. Mr. Kimple has more than 10 years of experience in project management, 20 years of

experience with landscape ecology and environmental monitoring, and 10 years experience in public facilitation and community outreach. He facilitates partnership development and promotes community involvement. Aaron manages watershed level projects, forest health initiatives, and facilitates community stakeholder groups. Mr. Kimple works with the United States Forest Service, Bureau of Land Management, National Park Service, regional tribal entities, and the local governments of Archuleta, San Juan, La Plata, and San Miguel Counties.

Title: One River, Many Plans

Kelly Romero-Heaney, Water Resources Manager for the City of Steamboat Springs
Zach Smith, Staff Attorney for the Colorado Water Trust

Abstract: This session will present on four years of partnership to use upstream storage to meet a variety of beneficial uses in the upper Yampa basin, including river health needs. They will also discuss current planning efforts and how those plans (Basin Implementation Plan, Yampa Stream Management Plan, Upper Yampa Watershed Plan) may shape the partnership in years to come.

Kelly Romero-Heaney has endeavored to understand, protect, and enhance the health of the Yampa River Watershed throughout her 15-year career in watershed management, environmental compliance, and water supply planning. As the Water Resources Manager for the City of Steamboat Springs Kelly strives to integrate the diverse water demands of a community that relies on the river for its municipal and recreational needs while supporting the unique ecosystem of a free-flowing river. She currently serves on the Yampa-White-Green Basin Roundtable, the Board of Directors for the Colorado Watershed Assembly and the Community Agricultural Alliance, and she founded and now serves on the Technical Committee for the Upper Yampa Watershed Group. Kelly lives a stone's throw from the Yampa with her husband, Geovanny, and their kiddo, Luke.

Zach Smith has been the Colorado Water Trust staff attorney since 2010, where he develops and manages water rights transfers and other projects that benefit Colorado's rivers and streams. A Denver native and a DU Law graduate, he is an alum of the Colorado Foundation for Water Education Water Leaders program and is the current President of the Colorado Watershed Assembly Board of Directors.

Riverside Salon III, Lessons Learned from Flood Recovery, Moderators: Julie Ash & Jeff Sickles

Title: Annual Panel on the Practice of Restoration: The Large Woody Material (LWM) Debate

Dr. Ellen Wohl, CSU (Poudre River example);
Brian Varrella, CDOT &
Erika Smull, Ayres (Big Thompson River example);
Michael Chard, Boulder OEM &
Mac Kobza, BCPOS (Boulder County example)

Since 2010, the Sustaining Colorado Watersheds conference has offered an annual panel discussion on topics of relevance and interest to our local stream restoration industry. Since the 2013 flood, the restoration panel has focused on flood recovery and resiliency. With resiliency's focus on stream health and multiple benefits in addition to hazard reduction, the use of LWM in flood recovery and restoration projects has emerged as a hot topic. This panel brings together local river and floodplain management experts, emergency managers, and flood recovery project proponents to present and discuss several recent efforts in Colorado to improve our understanding of LWM and seek a better balance of its benefits with management of its risks to infrastructure. These recent efforts include both LWM proponents and leaders tasked with protecting life and property because it is only through diverse groups working together that we will effect changes in management practices and improvements to restoration design and construction. This year, we're honored to have Dr. Wohl, Brian Varrella, Erika Sull, Mike Chard, and Mac Kobza as our esteemed panelists.

Ellen Wohl received her BS in geology from Arizona State University and her PhD in geosciences from the University of Arizona. She has been a faculty member at Colorado State University since 1989. Her research focuses on physical process and form in rivers, but emphasizes physical-ecological and physical-human interactions that influence river ecosystems. She has written numerous scientific journal articles, as well as several popular books on rivers. She has conducted field research on every continent but Antarctica.

Brian Varrella is the CDOT Hydraulic Unit Lead for the northeast quarter of Colorado. His 18 year career is equally shared between private consulting and public service, and he current volunteers as a Board member for the Association of State Floodplain Managers (ASFPM) and the Colorado Association of Stormwater and Floodplain Managers (CASFM). Mr. Varrella is a survivor of 3 presidentially-declared flood disasters and spends his free time recreating on Colorado's rivers and streams; these experiences drive his professional passions for public safety, ecological enhancement, and fiscal responsibility. Recently he has collaborated with the Colorado Water Conservation Board (CWCB) to assist in the writing of the Colorado Resiliency Framework, and he is leading an effort at CDOT to implement 2-dimensional hydraulic modeling and GIS into daily practices at the Department of Transportation. Mr. Varrella is fortunate to have worked on projects in 23 states, is a Certified Instructor for the National Highway Institute, and is an national instructor for the Emergency Management Institute's 4-day field-deployed course on Managing Floodplain Development Through the NFIP (E/G273). If you would like to connect with Mr. Varrella, plan to meet in the field and bring your hiking boots, waders, and skis.

Erika Smull, EIT, is a hydraulic engineer in Ayres Associates' River Engineering group in Fort Collins, Colorado. Erika has been working with Ayres for one year, with a focus in one-dimensional and two-dimensional hydraulic modeling of rivers and floodplains, geospatial data work to measure changes in channel form, and river restoration feature design to promote river function. Prior to her start at Ayres, Erika received her M.S. in Civil & Environmental Engineering from Colorado State University. For her thesis, she developed a unique field set-up and modeling framework to understand nitrate transport in a Colorado montane zone stream as it relates to the geomorphology, hydraulics, and hydrology of the system. Erika is passionate about

combining engineering practice with scientific knowledge to best manage rivers in the Mountain West and beyond."

Mike Chard is the Director for the Boulder Office of Emergency Management. The best part of his job as the Director, he says, is working in the county where he lives. Mike has been a Boulder County resident since 1994 and having that connection heightens his commitment to the community. Mike has 28 years of experience in the emergency service field, including 26 years as a firefighter with the Boulder Fire Department, Sheridan Fire Department and Loveland Fire-Rescue, 23 years experience as a paramedic (11 of those serving Boulder County), 17 years in education and training and 10 years of emergency management experience. Mike holds a Masters of Science in Management & Organizational Leadership and a Bachelors of Science in Organizational Development from Regis University, an Associate of Science in Fire Science from Red Rocks Community College, as well as numerous certifications in the Emergency Management field.

Mac Kobza is a staff wildlife biologist for Boulder County Parks and Open Space, Resource Management group in Colorado. Mac has over 20 years of experience as an aquatic biologist working on large scale restoration projects, such as the Kissimmee River Restoration Project and the Comprehensive Everglades Restoration Program. Recently, Mac has led efforts to restore the St. Vrain Creek in Boulder County from the effects of the 2013 Flood event, including flood recovery planning, design, and implementation, as well as in-stream biological monitoring. As part of this recovery, Mac has been a strong advocate for retaining downed large wood habitat within creek corridors. Downed trees in and along stream corridors provides vital habitat and raw materials for regeneration which increases resiliency and naturally restores ecological functions. Mac has found that the persistent negative views of large wood in streams can be influenced through early advocacy and consistent communication with local governments and stakeholders.

Title: Building a Design Team to Deliver Resilience Panel Discussion

Jeffrey Sickles, Enginuity Engineering Solutions
Michael Blazewicz, Principle, Round River Design, Inc.
Randy Mandel, EWP Vegetation Ecologist/Golder Associates
Dr. William Miller, Miller Ecological Consultants, Inc

Abstract: As the Statewide sponsor of the Natural Resource Conservation Service 2013 Phase II Emergency Watershed Protection (EWP) Program, the Colorado Water Conservation Board (CWCB) is tasked with overseeing and implementing over $63 million in stream recovery work. The CWCB's mission is to conserve, develop, protect, and manage Colorado's water for present and future generations. Following the 2013 floods, CWCB continued this mission by developing comprehensive watershed and stream master plans that not only addressed flooding, but also addressed natural and beneficial function, ecology, biology, and overall stream health. The vision is not one of just flood mitigation, but of stream resiliency. The NRCS EWP Program is a critical component in Colorado's flood recovery to accomplish the extensive protection and restoration needed to deliver resiliency for Colorado's communities, economies, and river systems. All eyes are on this effort within the state and our state leaders are watching this program as an example of Colorado's recovery success that can

be shared nationwide to help others facing disasters. This program presents an exciting opportunity to bring long-lasting resilience to the Front Range, but also faces intense and broad-ranging demands.

To deliver on the State's goals of overall stream resiliency, while also meeting the EWP program goals of protecting life and safety, a comprehensive team of experts was brought together. The expertise to support the EWP program was carefully developed to support the Stream Functions Pyramid (Harman et al. 2012) which is a conceptual framework of common stream characteristics and function which starts with hydrology and moves upward to hydraulic processes, geomorphology, physiochemical processes, and ultimately biological function. The EWP technical assistance team represents a specialized group of river restoration design, hydrologic, hydraulic, and geomorphic analysis, native riparian revegetation, fishery health, and riverine construction support. This expertise will and is providing river designs that incorporate multiple benefit features, like floodplain connectivity, nested channels, native revegetation, habitat improvement, and natural materials.

Project implementation that delivers long term stream resiliency and health is achieved by thoughtful, well planned, and intentional interactions, team structure, comprehensive technical resources, and design processes. Strategies including a statewide revegetation matrix, bioengineering manual, mixed teams of professionals, and start to finish collaboration are critical to achieving the State's goals for the EWP Program. These are critical resources that are moving river restoration in Colorado to a higher standard. Ultimately, the entire way of thinking about stream design must be transformed to bring what was once separate communities and areas of expertise together to collaboratively, creatively, and effectively deliver stream design that results in healthy river systems.

Michael Blazewicz, Yale School of Forestry and Environment, Masters Environmental Management, watershed sciences conc. (2010), University of Vermont, B.S., Environmental Studies/ Natural Resources Mgmt., concentration in watershed restoration (1999). Michael has over 15 years' experience working to restore degraded rivers in the Northeast, Northwest, and Colorado. He has contributed to numerous river corridor management plans through field investigations of geomorphology, project prioritization, and

design development. He has been actively involved in working to assess, design, permit, construct and monitor projects following both Hurricane Irene in Vermont and the September 2013 Colorado flood. He recently co-authored a protocol to map fluvial hazard areas for the state of Colorado. When not working he runs, skis, bikes, floats, climbs, skates and even walks sometimes.

Randy Mandel has over 32 years of experience as a restoration ecologist. He has been a key revegetation specialist for multiple restoration, reclamation, and remediation projects, including: 14 national parks and monuments; over 26 wetland, 32 lacustrine, and 29 riverine projects; reservoirs; and various mitigation banking, wetland delineation and remediation, and biofiltration projects. He was the Co-Founder and Vice President of Rocky Mountain Native Plants Company and has authored over two dozen publications, including international journal articles and a stand-alone monograph on the use of wetland plant species for biofiltration. Additionally, Mr. Mandel has overseen the installation of over 5,000 restoration projects, and specializes in site-specific native plant ecology and propagation. He holds a Bachelor of Science in Forest Biology from Colorado State University. He also worked on two Masters-level projects focused on Forest Physiology/Genetics at Colorado State.

Dr. William J. Miller has over 37 years of experience in fisheries, instream flow, and aquatic ecology studies. He is president and senior aquatic ecologist at Miller Ecological Consultants, Inc. in Bozeman, Montana. He has worked extensively throughout Colorado and the western U.S. and is a recognized expert in the areas of instream flow, water temperature modeling and habitat assessments. Dr. Miller's experience includes research and evaluations for several threatened, endangered, and candidate aquatic species in the Colorado River, Rio Grande, Columbia River, and Missouri River basins. He has extensive experience in designing and conducting studies using the Instream Flow Incremental Methodology (IFIM), instream water temperature modeling and developing and implementing ecological models for aquatic systems. Dr. Miller is a former member of the USFWS Instream Flow Group. He is co-author on the Stream Network Temperature Model, Instream Flow Information Paper 16. Dr. Miller has conducted extensive literature reviews on salmonid spawning habitat, which included the effects of sediment, dissolved oxygen and water temperature on hatching and emergence success. Dr. Miller's dissertation work included the development of a salmonid fry emergence model that accounted for effects of water temperature, dissolved oxygen and sediment composition. Dr. Miller presented the model at the First Federal Interagency Hydrologic Modeling Conference in Las Vegas, Nevada. Dr. Miller's experience includes designing and directing basin-wide instream flow and habitat evaluations. He has completed stream flow evaluations for CWCB, US Forest Service, US Fish and Wildlife Service, Bonneville Power Administration, U.S. Army Corps of Engineers, the U.S. Department of Justice and the Bureau of Land Management. Dr. Miller developed a GIS based methodology for determining flow/habitat relationships for aquatic species using 2-D hydraulic modeling and habitat evaluations. Dr. Miller has presented his research at national conferences in the US and international conferences in Japan and New Zealand.

Riverside Salon IV, Community Conversations Across Agencies and Interest Groups, Moderator: Nicole Seltzer

Title: A Watershed Community Collaboration for Source Water Protection in the Upper South Platte: Building Strong Communities for Water Quality Protection and Watershed Health

Sarah Dominick, Denver Water
John Duggan, CDPHE

Abstract: Denver Water's formal Upper South Platte Watershed Source Water Protection Planning process was initiated in 2013 and was completed in November 2015. The plan was developed as part of a collaborative stakeholder process convened by Denver Water, facilitated by the Coalition for the Upper South Platte, and funded by the Colorado Department of Public Health and Environment through the Colorado Source Water Assessment and Protection program. The planning process and final plan are designed to provide municipal water providers, local governments and the public with information about drinking water, as well as providing a way for water providers and community members to get involved in protecting the quality of their drinking water. The program encourages community-based protection and preventive management strategies to ensure public drinking water resources are kept safe from future contamination.

The Source Water Protection Plan was developed through an extensive stakeholder and community driven process including coordination with subject area experts, identification of best management practices, and overall theme of "AIM"ing for source water protection in the Upper South Platte. "AIM" is the Awareness, Information sharing, and Management structure which ensures sustainable implementation of water quality protection within source water areas and surrounding communities.

The planning process recognized that decision makers, multi-jurisdictional agencies (federal, state, and local), public water providers, and emergency response personnel all play key roles in protecting water quality. These entities are the community's front line to protect against spills and emergencies, minimize the impacts from contaminants of concern, mitigate negative impacts of development, and protect against long-term watershed degradation. Additionally, we will cover the implementation of Best Management Practices (BMP's), engagement of counties in Memorandums of Understanding (MOU's) for collaboration on source water protection strategies, and building partnerships to foster long term water quality protection and engaged communities.

Sarah Dominick is a Water Resource Engineer at Denver Water in Denver, Colorado, where she manages the utility's Integrated Resource Plan. She holds two degrees from the Colorado School of Mines: a Bachelors of Science in Engineering and a Masters of Science in Environmental Science and Engineering. She is the Past Chair of the Rocky Mountain Section of the American Water Works Association and has worked with the Denver Sister City of Axum, Ethiopia, on their water system.

John Duggan currently works as the State of Colorado's source water protection work group leader for the Water Quality Control Division. His current position has provided John the unique opportunity to handcraft the source water protection planning phase for Colorado and develop federal and county Memorandums of Understanding, statewide regulations for oil and gas development in source water areas, and a statewide grant funding program. His current responsibilities include program and funding management, land management agency coordination on source water, inter-agency SWAP data sharing, and source water protection outreach and education. He also effectively manages the Drinking Water Revolving Fund Wellhead and Capacity Development Set Aside Funds to support the programmatic and subcontractor activities of the SWAP program. He has a Bachelor of Science degree from Penn State University with a focus in geology and hydrogeology. John has been recognized by Region 8 EPA for excellence in source water protection.

Title: The Fountain Creek Watershed Greenway Fund: Turning Our Creeks (Back) Into Assets

Patrick Hannon, Norris Design
Steve Rothstein, The Greenway Fund

Abstract: Colorado Springs is the Fountain Creek Watershed's "upstream community" and over the past 100 years, we've grown with little regard for the downstream consequences of that growth. The costs of this neglect -- environmental, economic, and political -- run deep. However, today this landscape is changing. Significantly. The Greenway Fund and Norris Design team up to discuss why and how reconnecting people (and the cities we build) to our water environment can play a vital role in this transformation.

Patrick Hannon is a landscape architect and Senior Associate at Norris Design, a leading strategic partner in planning, landscape architecture and project promotion. Patrick brings versatility and comprehension of the design process allowing him to work on a wide variety of project types at a range of scales. His design experience includes conceptual design, master planning and construction documents for projects including waterfront development, parks, gardens, educational and corporate campuses, streetscapes and urban redevelopment. Patrick's interest in the science, cultivation and creative use of plant materials, reinforced by his educational and professional background in horticulture, allows him to weave elements of the natural world into the planning and design process. In addition to his design work, Patrick is also a skilled process facilitator and alternative transportation planner. Patrick graduated from the University of Wisconsin with degrees in landscape architecture and horticulture and has been practicing landscape architecture for over 12 years.

Steve Rothstein is a co-founder and the acting Executive Director of the Fountain Creek Watershed's Greenway Fund. Motivated by the vision of Gary Barber and Carol Baker to establish a non-profit advocate for the region's riparian environment, and driven by a personal desire to create substantive and lasting value in the southern Colorado region, Steve brings his professional experience as an organizational strategist and social entrepreneur to the Greenway Fund table. He enjoyed a 23-year career in the Air Force, serving around the world first as a fighter pilot and later as a military and geo-political strategist. In 2007, Steve, his wife DeeAnn, and their two children settled in Colorado Springs and began "Chapter 2." In the summer of 2011, he found water. He holds a Ph.D. in International Relations and Strategy (the Fletcher School).

Title: The High Water Mark: Policy Lessons Learned from Colorado's 2013 Floods

Deserai Crow, University of Colorado

Abstract: Many communities on Colorado's northern Front Range were hit by the catastrophic 2013 floods. These communities faced immediate challenges in emergency response, but also have wrestled with long-term questions regarding the path to recovery. Floods can serve as opportunities for communities to re-envision themselves. We have followed response to the floods in Colorado in seven communities located in the three hardest-hit counties in the state. Using data from in-depth interviews over three years, as well as surveys with decision-makers and residents, we empirically assess the decisions made within communities and the processes that led to those decisions. We will present reflections on lessons learned regarding policy changes that have taken place and the role of participatory public processes through the recovery process. This study helps to improve our understanding of the factors that contribute to policy learning following a disaster, leading to long-term recovery and community resilience.

Dr. Deserai Anderson Crow is Associate Professor in the School of Public Affairs at the University of Colorado Denver. Dr. Crow researches local and state-level environmental policy, including stakeholder participation and influence, information sources used, and policy outcomes. Her work focuses on natural disaster recovery and risk mitigation in local communities and natural resource agencies. Dr. Crow's natural hazards work includes a study of community flood recovery and policy learning in the aftermath of the 2013 floods in Colorado that is funded by the National Science Foundation. Crow earned her PhD from Duke University's Nicholas School of the Environment in Environmental Policy.

WEDNESDAY, OCTOBER 12TH, 10:30 AM – 12:00 PM

Gondola B, Creative and Collaborative Water Solutions Moderator: Brian Epstein

Title: Learning by Doing with the Colorado River Cooperative Agreement

Mely Whiting, Trout Unlimited
Lurline Underbrink Curran, Grand County

Abstract: Years of negotiation have yielded a series of agreements over water management and development in the headwaters of the Colorado River. Touted as "a new way of doing business" these agreements bring historically opposing interests together for the joint task of, in essence, becoming the stewards of the river. What's the status of those efforts? What are the opportunities

and challenges? Will the experiment work? How well can the Headwaters experience be transferred elsewhere? These are questions to be explored by a panel which should include representatives from Denver Water, Northern, Grand county, River District, Middle Park District, CPW, and Trout Unlimited.

Amelia (Mely) Whiting is legal counsel for Trout Unlimited, where she focuses on projects to protect, reconnect and restore Colorado's cold water fisheries and their habitat. She has practiced water, public lands and environmental law in Colorado for over 25 years. She is currently involved in a number of stakeholder efforts, including Learning by Doing, the Windy Gap Bypass and the Upper Colorado Wild and Scenic Stakeholder Alternative, and the River Projection Workgroup which covers several basins in the Southwest. Mely was born in Montevideo, Uruguay.

Lurline Curran was raised in Grand County and worked for Grand County for 33 years before she retired in September of 2015. She served as in the Planning Department as Director for 17 years and County Manager for 16 years. Lurline has a BA from Regis University in Religious Studies and MA in Psychology. She was Grand County's lead negotiator in the Colorado River Cooperative Agreement and the IGA with the Municipal Subdistrict of the Northern Colorado Water Conservancy District for the Windy Gap Firming Project as well as its permit from Grand County for the project. In addition, Lurline has served on the Colorado River Basin 1177 Roundtable as Grand County's representative since its creation and is Grand County's designated Senate Document 80 Representative for the Colorado Big Thompson Project. Since retirement she has continued to serve Grand County working on Grand Lake Clarity, Windy Gap Bypass, Colorado River Cooperative Agreement Implementation and Learning by Doing Governance Committee as well as numerous other water related issues.

Title: Are Water Markets a Legal Solution for Scarcity?

Susan Ryan, Ryley Carlock & Applewhite

Abstract: Colorado has a long history of buying and selling water rights. While water markets have been relatively successful in the past, there is increased pressure to encourage market-based approaches to address Colorado's projected water supply shortfall. Strict application of the prior appropriation doctrine is often viewed as a constraint on water markets in Colorado. The key question facing Colorado is how to adapt its application of prior appropriation to more efficiently allow for permanent and temporary water transfers while honoring the senior priorities of existing water rights. Another issue facing Colorado is how to mitigate the negative impacts of its existing water markets, such as the permanent dry-up of agricultural lands. This discussion begins with an overview of the existing legal structure for Colorado water markets and a summary of several recent legislative developments related to water markets. Following the overview, the discussion will then focus on how Colorado should redefine water rights in order to encourage an active water market with more efficient transfers and lower transaction costs.

Susan Ryan is a partner at Ryley Carlock & Applewhite in Denver. As a water rights lawyer, Susan represents municipalities, water and sanitation districts, and other water users in acquiring water rights and in water court adjudications. Susan has extensive experience in complex water rights litigation and negotiation. Her experience includes water rights quantification, augmentation plans, substitute water supply plans, recharge projects, conditional water rights, tribal water rights, and exchanges. She has represented clients in federal courts, in Colorado and Oklahoma state courts, and before state agencies including the Colorado State Engineer's Office.

Title: Augmentation for Increased Water Supply Efficiency and Instream Flow Benefits

Ben Moline, MolsonCoors

Abstract: Molson Coors Brewing Company (MCBC), with breweries located globally, has identified water scarcity, use and conservation as key components to achieve World Class Corporate Responsibility. Ben Moline, Manager of Water Resources and Environmental Compliance for MCBC will discuss general trends of Colorado water, the history and purpose of Augmentation Plans, and how Coors utilizes its 3 augmentation plans to maximize the amount and purpose of water within the Clear Creek Basin. A key aspect of this idea is embracing the idea of a Culture of Cooperation, which is an understanding of what is happening locally within the watershed serving a brewery and how best to interact with other shareholders.

Ben Moline is the Manager of Water Resources and Environmental Compliance for Molson Coors Brewing Company (MCBC), located in Golden, Colorado, USA. In this position, he oversees the Water Rights portfolio along Clear Creek for MCBC with regards to legal protection of the water rights portfolio, environmental aspects of water quality, continued water deliveries to the brewery, and corporate responsibility. With regards to corporate responsibility, he helps to develop programs that are used globally to drive efficiency within each brewery and with supply chain members in an effort to reduce the water footprint of MCBC' global network of breweries. Ben also manages and oversees environmental compliance projects, including Clear Creek water quality and reclamation of a coal mine for Coors Energy Company. He works extensively with federal, state and local environmental agencies to ensure compliance to regulations and betterment of the watershed.

Ben is the current President of the Clear Creek Watershed Foundation, and organization focused on the clean-up and remediation of orphaned mines within the Clear Creek watershed. MCBC was a founding member of this Foundation. Ben is also the past-chair of the Upper Clear Creek Watershed Association, an organization comprised of water users along Clear Creek that is focused on nutrient loading, water quality, and monitoring of Clear Creek. He holds Professional Engineer licenses in both Colorado and California. He went to school at the University of Iowa, College of Engineering majoring in Civil Engineering. While at Iowa, he was a teaching assistant for the Principles of Hydraulics class and laboratory at the Iowa Institute of Hydraulic Research Institute. Ben grew up along the banks of the Mississippi River in Fort Madison, Iowa. This is where he started to develop his passion for water and environmental causes.

Riverside Salon III, Advancing Technical Tools and Innovations for Restoration, Moderator: Rachel Williams

Title: Connecting Vegetation Management to the Mapped Flood Risk

David Skuodas, Urban Drainage & Flood Control District

Abstract: There is a disconnect between how we map flood risk and how we manage vegetation along our stream corridors. Rarely do we revisit the original assumptions used to map our floodplains when pondering vegetation management. So how do we bridge this gap?

We map floodplains using a flood event based on specific rainfall intensity, volume, and duration, with static topography and fixed roughness values. In reality, flood discharges don't behave in a nice neat way, geomorphology and erosion lead to topography changes, and vegetation health and density can fluctuate wildly. Vegetation changes happen fairly gradually (i.e. noticeably), can have a significant impact on roughness values, and is something we should be able to manage to reflect the mapped flood risk. Of the factors that impact flood hydraulics, it may be the easiest to manage.

This presentation will discuss ways we can be more strategic in our designs to account for mature vegetation, ideas for documenting roughness values to better inform how we manage vegetation, and will look at case studies of various streams to illustrate how sensitive flood elevations can be to changes in roughness.

Dave Skuodas works at the Urban Drainage and Flood Control District (District), where he manages design and construction projects in Boulder and Adams Counties. He has worked at the District for the past 6 years. Dave was heavily involved in recovering from the 2013 flood in Boulder and surrounding areas, and is currently involved in over 30 projects worth a total of over $100 million in on going design and construction. Prior to working at the District he was an engineering consultant for 9 years in Kansas, Nebraska, and Colorado working for clients such as the District, the U.S. Army Corps of Engineers, the Southeast Metro Stormwater Authority, the Colorado Department of Transportation, and the Colorado Water Conservation Board. Dave received a Bachelor of Science Degree in Civil Engineering from the University of Florida in December of 2000. He is a registered Professional Engineer, a Certified Floodplain Manager, a LEED Accredited Professional, and a Toastmasters "Competent Communicator".

Title: Geomorphic analyses in support of channel restoration design - Highlights from three years of flood recovery

Luke Swan, Otak

Abstract: As part of the recovery to the September 2013 flooding, a renewed emphasis has been placed on the incorporation of fluvial geomorphology into restoration projects along the Front Range of Colorado. Given the drastic impact the flood had on our creeks, the interest of resource managers has been peaked through the use of buzz words like "stable", "dynamic equilibrium", and "increased resiliency". While geomorphology is a critical component of each of these concepts, considerable uncertainty exists around what constitutes an acceptable approach, what are meaningful results, and how those results are incorporated into designs and the design process. The purpose of this talk is to highlight the application of geomorphic assessment techniques (assessment, channel stability, and sediment transport) that inform both resource managers and the channel design process. Project examples from several projects along the Colorado Front Range will be used to demonstrate techniques and illustrate how the results are used to support channel restoration design.

Luke Swan is a Senior Geomorphologist and Project Manager in Otak's Boulder office. He was trained in the Pacific Northwest, having earned his Master of Science degree with a focus on fluvial geomorphology from Central Washington University in 2006. Luke has 10 years of experience in watershed analysis and restoration, having worked for himself and several consulting firms along the way. He employs a science- and process-based approach to restoration and fully enjoys the uncertainty inherent in river work. He has been fully immersed in recovery work since the flood and has been fortunate to work on projects in many of the flood-impacted watersheds with a range of talented colleagues, including government officials and researchers, academics, coalitions, and fellow consultants.

Title: New restoration tools and methods from the Dolores River Restoration Partnership

Daniel Oppenheimer, Tamarisk Coalition
Cynthia Dott, Fort Lewis College

Abstract: The Dolores River Restoration Partnership (DRRP), a public-private collaborative, is working across southwestern Colorado and eastern Utah to restore the riparian plant community along 200 miles of the Dolores River and its tributaries. Having conducted intensive restoration work for seven years now, the DRRP has encountered a variety of on-the-ground challenges, particularly in regards to cottonwood (Populus fremontii) planting in a hydrologically altered system with saline soils, as well the removal of dense stands of tamarisk (Tamarix spp.), a non-native invasive plant, in a manner that effectively facilitates active and passive recruitment of native plant species.

To build on scientific literature and challenges from past planting projects, in 2014 the DRRP conducted the Cottonwood Suitability Assessment project. After sampling soil salinity, depth to groundwater, and groundwater salinity, DRRP planted 116 cottonwood poles, of which 49% survived the first growing season. Fort Lewis College analyzed the data to assess which environmental factors might be linked to survival and mortality. Results found that depth to groundwater was not a key factor driving mortality, while soil and water salinity at the bottom of the planting hole was significantly linked to tree survival, in spite of the fact that no trees were planted in holes with salinities above the 4mmhos/cm (mS/cm) threshold. These results now help guide how the DRRP conducts cottonwood plantings.

DRRP methods for initial removal of dense stands of tamarisk have also evolved. In particular, partners have developed new strategies—

one using two forms of mechanical equipment, the other relying on chainsaw crews conducting a mosaic treatment—that produce suitable site-based conditions for follow-up restoration treatments and recruitment of native plants. This presentation will provide findings that may be contextualized to enhance riparian restoration efforts in other arid and semiarid watersheds. The presenters would like to make a special acknowledgement to Julie Knudson, Staff Scientist, Tamarisk Coalition, and Mike Wight, River Restoration Director, Conservation Legacy's Southwest Conservation Corps, who played invaluable roles in this project.

Daniel Oppenheimer is Restoration Coordinator at the Tamarisk Coalition, a non-profit organization dedicated to advancing the restoration of riparian lands through collaboration, education, and technical assistance. Based in Grand Junction, CO, Daniel leads the Dolores River Restoration Partnership (DRRP), coordinating riparian restoration projects across 200 miles of the Dolores River and its tributaries in Southwestern Colorado and eastern Utah. In addition to his work with the DRRP, Daniel is Tamarisk Coalition's co-lead of the Cross-Watershed Network, a program designed for restoration practitioners working across the Arid West to maximize their effectiveness and impact through information sharing, collective capacity building, and collaboration across watersheds. Before starting with the Tamarisk Coalition in 2011, Daniel worked for Nueces River Authority, implementing restoration projects on the Sabinal and Nueces Rivers in West Texas; the Northern Rockies Conservation Cooperative, assessing collaborative grizzly bear management efforts in Banff National Park; and the Environmental Law Institute in Washington, D.C., conducting policy research and organizing workshops on a variety of natural resource policy and management issues. He has a Bachelor of Arts from Washington University in St. Louis and a Masters in Environmental Management from the Yale University School of Forestry & Environmental Studies.

Dr. Dott has taught a diverse array of biology and ecology courses at Fort Lewis College since 2001, to a range of students including both biology majors, environmental studies majors, and non-science students. She maintains an active research program in riparian ecology, with particular emphasis on riparian plant communities and their response to changing hydrology and disturbance regimes. Regionally, her work is focused on the Colorado Plateau and the San Juan mountains, especially in the watersheds of the Dolores, San Juan and Animas Rivers. Specific research interests include: 1) riparian community dynamics and their interactions with geomorphic processes, and with both surface and groundwater hydrology; 2) interactions between riparian community structure and changes in natural disturbance regimes (e.g. by dam construction, livestock grazing, etc.); 3) the potential impacts of changing climate on existing disturbance regimes (e.g. flood frequency and intensity), geomorphic processes, and vegetation structure; 4) relationships between exotic species invasions and site history in riparian systems. Her recent collaborations include work with Dr. Gary Gianniny of Fort Lewis College (hydrology), Stephen Monroe of the National Park Service (hydrology), members of the Tamarisk Coalition and Dolores River Restoration Partnership – Julie Knudson, Daniel Oppenheimer, Mike Wight – and a host of undergraduate research students from Fort Lewis College.
Recent publications include:
Dott, Gianniny, Clutter & Aanes. 2016. Temporal and spatial variation in riparian vegetation and floodplain aquifers on the regulated Dolores River, southwest Colorado. River Research & Applications, in press.
Gianniny, Hartle & Dott. 2014. The effects of Lake Powell on sediment aggradation in the lower reaches of the San Juan River. In MacLean, Biek & Huntoon, Geology of Utah's Far South: Utah Geological Association Pub. 43:39-56.

Riverside Salon IV, Water Resource Planning
Moderator: Stephanie DiBetitto

Title: Developing Watershed Resiliency Metrics: A Case Study from the Cache La Poudre Watershed

Jen Kovecses, Coalition for the Poudre Valley Watershed

Abstract: Back to back natural disasters in Colorado have created an interest in shifting our policy paradigms towards incorporating the concept of resilience. However, translating resilience from broad policy concepts to scientifically defensible planning and implementation metrics can be challenging at the watershed scale. Using the Coalition for the Poudre River Watershed's efforts to develop a Watershed Resilience Plan for the Upper Poudre Watershed as a case study, we will discuss how CPRW and its stakeholders navigated this question and how we developed quantifiable metrics to define resilient conditions for our watershed, with a focus on protecting/restoring healthy upland habitats from high priority hazards such as high intensity wildfires.

Jennifer Kovecses, Executive Director, CPRW. Jen grew up

playing in lakes and streams in Canada building a life-long interest in aquatic ecosystems and conservation. She pursued this interest in university, completing a Bachelor's of Science in biology and a Master's of Science in aquatic ecology at McGill University. For her Master's thesis, Jen researched the impacts of mining pollution on lakes in northern Quebec. After completing her graduate degree, she continued to pursue her passion for aquatic ecosystems, working on a variety of watershed conservation projects on the shores of Lake Ontario and the coast of British Columbia. While living in California, Jen had the opportunity to work for local non-profits, offering science and policy analysis to help protect water quality and habitat in California's beautiful coastal watersheds. After moving to Colorado in 2011, she began volunteering with Wildlands Restoration Volunteers as a way to get to know some of the amazing places in Colorado. This led to an opportunity to work with Wildlands Restoration Volunteers, managing its post-fire restoration program. Jen is currently the executive director for the Coalition for Poudre River Watershed. When not working, Jen can be found hiking in the mountains or along Colorado's many beautiful rivers.

Title: Empowering Upstream Communities to Protect Water Resources

Colleen Williams, Colorado Rural Water Association

Abstract: Many upstream communities in Colorado are taking proactive steps in protecting water resources that serve as the source of their drinking water. Through the development and implementation of a source water protection plan communities have the opportunity to become involved in land management at the local, county and federal level. This presentation will focus on examples of upstream communities who have integrated land use planning tools into their source water protection efforts. These tools include building partnerships, sharing information, developing memorandums of understanding (MOUs), watershed district ordinances and municipal supply watershed designations on USFS land.

Colleen Williams has worked for the Colorado Rural Water Association as a Source Water Protection Specialist for the past 10 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 throughout Colorado. She also conducts training for water operators and Water Board members on source water protection planning. She has 18 years of experience in watershed coordination and management at the local level. She is an advocate for rural communities in protecting their water resources. Her source water protection efforts have resulted in awards at the regional, state, and local level.

Title: Crystal River Management Plan: Process, Outcomes and Stakeholder Engagement

Seth Mason, Lotic Hydrological
Rick Lofaro, Roaring Fork Conservancy

Abstract: The Crystal River Management Plan aims to identify, prioritize and guide management actions that honor local agricultural production, preserve existing water uses, and enhance the ecological integrity of the river. This planning effort responds to calls in the Colorado Water Plan for decision support tools and planning processes that help stakeholders and resource managers better understand the interplay between hydrology, hydraulics, channel form, alternative water use/management strategies, and measures of ecological function. The assessment framework utilized on the Crystal River quantitatively evaluated the ecological benefits realized by future alternative actions that develop off channel storage, reduce consumptive water use, improve water use efficiency or modify the structure of the stream channel. Discussions with local water users and stakeholders helped characterize the feasibility of specific management approaches. Primary planning recommendations focused on 1) developing and implementing market-based diversion reduction agreements during moderate and severe droughts and, 2) implementing raw water conservation measures and improving the efficiency of conveyance infrastructure in the Town of Carbondale.

Seth Mason is the Principal Hydrologist at Lotic Hydrological, a consulting firm based in Carbondale, CO. He specializes in hydrological modeling; stream characterization; deployment and operation of data collection and management systems; and development and coordination of water quality monitoring and assessment activities. Seth works extensively with city and county governments, federal agencies, and 501(c)3 organizations on a variety of watershed, land use, water quality, and water quantity issues.

Rick Lofaro is the Executive Director of Roaring Fork Conservancy (RFC), located in Basalt, CO. Celebrating its 20th anniversary of

bringing people together to protect the rivers and streams, RFC is the watershed action and education organization for the Roaring Fork valley. Rick joined Roaring Fork Conservancy in 1998 and was promoted to Executive Director in May of 2005. He works with a variety of partners including Cities, Counties, State and Federal agencies and other non-profits, with a focus on protecting water quantity and quality, and riparian health. He also enjoys stepping into the classroom (and the stream) with kids as an instructor with the RFC's National Fishing In Schools Program. Rick is also the past president of the Colorado Watershed Assembly. He has worked as a naturalist and fishing guide in Colorado and as a fishing guide and hunting camp cook in northwestern Montana.

WEDNESDAY, OCTOBER 12TH, 1:30 PM – 3:00 PM

Gondola B, Organizational Development Strategies, Moderator: Casey Davenhill

Title: Conserving Land and Water: How GOCO, CWT and Watershed Groups Can Collaborate for Success

Amanda Hill, GOCO
Zach Smith, Colorado Water Trust

Abstract: Great Outdoors Colorado (GOCO) invests a portion of lottery proceeds to help preserve and enhance the state's parks, trails, wildlife, rivers and open spaces. GOCO has committed more than $825 million in lottery proceeds to more than 4,700 projects in all 64 counties since 1992. The Colorado Water Trust (CWT) engages in voluntary efforts to restore and protect streamflows to sustain healthy aquatic ecosystems. See how GOCO and CWT programs might benefit your watershed and community and discuss the future of their water restoration and flow activities.

Prior to joining GOCO in 2013, **Amanda Hill** worked as the Pikes Peak project specialist at Palmer Land Trust. Her education includes a bachelor's degree in environmental science from Colorado College, a master's degree in environmental studies from the University of Montana and a law degree from the University of Montana School of Law. She joined Colorado's conservation community through the Colorado Conservation Trust Future Leaders Fellowship. In addition to acquisitions due diligence work and supporting GOCO's Open Space grant programs, Amanda manages GOCO's transaction costs grant program. She was nominated to the Colorado Scenic and Historic Byways Commission by Governor Hickenlooper in 2016.

See **Zach Smith**'s bio on page 9.

Title: 'Behind the Scenes' accounting strategies that lead to successful applications, manageable grant reporting and successful project implementation

Kevin Sear, Paragon Audit and Consulting

Abstract: What do you need to do in order to meet the financial reporting requirements that face you every day? This session will provide you with a number of methods to simplify and improve your accounting process to give you the financial data you need. This session is based on real world, hard won experience and will answer the important questions: What controls do you need? How should accounting transactions flow? What should my chart of accounts look like, and why?

Kevin Sear has over 30 years of combined experience as a partner in a CPA firm, internal auditor, IT auditor, performance auditor working with local, State and Federal entities as well as non-for-profit, SEC and other listed entities across a dozen industries. He has been a controller of four different governmental organizations, Treasurer of several not-for profit organizations and has work with or on Boards for the last 25 years. He has an active Certified Public Accountant License, and is an active Certified Information System Auditor, Certified Internal Auditor, Certified Fraud Examiner, and Certified Global Management Accountant. He has done presentations to the Colorado Society of CPS' the Institute of Internal Auditors, Information System Audit and Control Association and a number of national organizations. He has implemented multiply ERP systems and has written the sales and use tax program used by two Colorado Cities.

Title: Let's WRAP! One Water Solutions Institute at CSU has created WRAP - Watershed Rapid Assessment Program.

Tyler Wible, Colorado State University

Abstract: Effective watershed-scale management of Colorado's waterways is critical to the sustainability of the state's vibrant ecology and economy. Watershed

protection programs aim to maintain or restore the physical, chemical, and biological integrity of waterbodies. The development and implementation of these watershed plans require analysis of watershed conditions which are both spatially and temporally variable. Therefore, assessment of current and historic data and information is vital for continuously updating management plans in response to changing land use, climate, and watershed conditions. The Watershed Rapid Assessment Program (WRAP) extracts, organizes, and analyzes data and information at various watershed scales, including HUC 12, HUC 10, and HUC8 levels. This tool summarizes readily available geospatial characteristics from both nationally available datasets and state datasets including land use, land cover, soils, climate, stream discharge, and water quality from various USGA, USDA, NOAA, and EPA data resources. The WRAP tool will calculate a number of watershed health indicators to create an overall summary of the watershed condition. For example, if data is available, the tool can calculate the median summer nitrate concentration which is an indicator of water quality. The overall condition of a particular watershed can then be applied state-wide to prioritize management actions of the state's watersheds.

Tyler Wible is a project manager and research associate at CSU and is the lead eRAMS developer on numerous tool sets including flood risk assessment, nutrient regulation, watershed assessment, fish passage, river cross-section analysis, and gauged and ungauged flow analysis. His major research interests include the assessment of nutrient source at the watershed scale, stream flow analysis tools, and integrated surface water-groundwater modeling. He has managed research projects ranging from regionalized flooding estimation to watershed scale nutrient source research. Mr. Wible received his BS degree from Colorado State University (CSU) in Civil Engineering in 2012 and his MS from CSU in Civil Engineering: Hydrologic Sciences and Engineering in 2014. His master's research focused on the coupling of the SWAT and MODFLOW watershed models and cloud infrastructure for improved access to stream flow analysis tools. He is an active member of the Engineering Honor Society Tau Beta Pi.

on CDOT's large-scale highway rebuild in the Big Thompson Canyon. This project is a strong example of flood recovery in Colorado that finally learns the right lessons and returns truly better-than-before conditions so that it can deliver improved performance and less damage in the next big flood, as well as a healthy stream corridor every day between floods. Project highlights include a new approach as a road-river project (not only a road project), focus on river restoration, and solutions for resiliency and stakeholder engagement on grand scales!

Brian Varrella is the CDOT Hydraulic Unit Lead for the northeast quarter of Colorado. His 18 year career is equally shared between private consulting and public service, and he currently volunteers as a Board member for the Association of State Floodplain Managers (ASFPM) and the Colorado Association of Stormwater and Floodplain Managers (CASFM). Mr. Varrella is a survivor of 3 presidentially-declared flood disasters and spends his free time recreating on Colorado's rivers and streams; these experiences drive his professional passions for public safety, ecological enhancement, and fiscal responsibility. Recently he has collaborated with the Colorado Water Conservation Board (CWCB) to assist in the writing of the Colorado Resiliency Framework, and he is leading an effort at CDOT to implement 2-dimensional hydraulic modeling and GIS into daily practices at CDOT. Mr. Varrella is fortunate to have worked on projects in 23 states, is a Certified Instructor for the National Highway Institute, and is an national instructor for the Emergency Management Institute's 4-day field-deployed course on Managing Floodplain Development Through the NFIP (E/G273). If you would like to connect with Mr. Varrella, plan to meet in the field and bring your hiking boots, waders, and skis.

Carolyn Roan is the group leader for Muller's Transportation Hydraulics section. Carolyn is a registered Professional Engineer in Colorado, California and Nevada, with over 20 years of experience in hydrology, river restoration and engineering, and roadway and bridge hydraulics. With a science background, Carolyn brings a broader perspective to engineering projects, particularly those in rivers. For the US34 project in Big Thompson Canyon, Carolyn is leading the floodplain analysis and manages the river rehabilitation

Riverside Salon III, Success Stories to Know About! Moderator: Josh Eldridge

Title: CDOT's US34 Rebuild in the Big Thompson Canyon, a case study in Colorado resiliency

Brian Varrella, CDOT Region 4 Hydraulic Engineer
Carolyn R. Roan, PE, CFM, Muller Engineering Company
William M. deRosset, PE, Ayres Associates

Abstract: Update from the design team

design with collaboration from multiple stakeholders and partners.

Will deRosset is a licensed Professional Engineer in Colorado with eighteen years of experience in open-channel hydraulics, river engineering, sediment transport analysis, and stream rehabilitation design, with particular emphasis on built-environment and transportation-corridor contexts. He is a certified instructor for Federal Highways Administration's National Highway Institute, and teaches adult education courses in open-channel hydraulics and river engineering, including courses in hydraulic modeling, sediment transport analysis, stream stability and scour, and scour and stream instability countermeasure design. Will has been a contributor to several National Co-operative Highway Research Program studies, including NCHRP 24-39, Environmentally Sensitive Streambank Stabilization, and has been active in post-2013 flood recovery efforts on various streams in the Platte River watershed.

Title: Upper Arkansas River Restoration Project

Greg Brunjack, Upper Arkansas River

Abstract: Leadville was historically a rich mining district; silver, gold, copper, zinc, manganese, and lead deposits were all mined in the area since the mid-1800s. Mining has subsided as the main economic driver for the district, resulting in environmental damages from these activities. The area known as the California Gulch Superfund Site (Site) located in and around Leadville was placed on the U.S. Environmental Protection Agency's (EPA) National Priorities List (NPL) in September 1983. The Site covers approximately eighteen square miles, and contained an 11-mile reach of the Arkansas River downstream of the California Gulch confluence. In 1994 the Lake County Conservation District (LCCD) established a coalition (UARRP) that included federal and state Natural Resource Trustees (US Fish and Wildlife Service, Bureau of Reclamation, Bureau of Land Management, EPA, US Forest Service, Colorado Attorney General, Colorado Department of Public Health and Environment, Colorado Department of Natural Resources), the LCCD, mining companies and private landowners. This coalition, using the Natural Resource Damage Act (NRDA), determined damages to natural resources in the Site. Since 2009, the UARRP has implemented construction protocols to restore 11 miles of the Arkansas River and 5 miles of the Lake Fork of the Arkansas River to fluvial functionality. In addition, fluvial mine tailings were re-mediated throughout the site.

Greg Brunjack is the chairman of the Implementation Team that oversees the $20 million Upper Arkansas River Restoration Project (Project). He represents the Lake County Conservation District on that Team. Greg is project manager for the private lands portion of the Project. He began his natural resource career in 1975 working for the National Marine Fisheries Service. Greg has worked for Colorado Parks and Wildlife and Wyoming Game and Fish as a fisheries biologist. In addition to his work on the Project he was the General Manager for Mt. Massive Lakes, Inc. in Leadville from 1982-2016. He also has operated a fisheries/river restoration consulting firm since 1987.

Title: A Sandy River Runs Through It: Middle South Platte River Sediment Transport Study

Brian Murphy, CDM Smith

Abstract: The primary purpose of this study was to answer the question: how are changes in the middle South Platte River's water and sediment inputs impacting river function and infrastructure integrity within the study area (confluence with St. Vrain Creek to the confluence with Cache la Poudre River)? To answer this question, CDM Smith performed sediment budget and transport modeling under current and future scenarios. The presentation will describe the study approach and results as well as provide suggestions to improve river management creating a more resilient river corridor and ecosystems.

Mr. Murphy currently leads the river engineering team at CDM Smith. He is a licensed professional engineer in Colorado and a Diplomate in Water Resources Engineering. He also serves as the Vice Chair of the Colorado Association of Stormwater and Floodplain Managers. In his spare time he works on his PhD in civil engineering at CSU.

Riverside Salon IV, Linking Water Supply with Land Use Planning, Moderator: Jayla Poppeleton

Title: Save Water with Land Use Planning: A Manual for How-To

Drew Beckwith, Western Resource Advocates

Abstract: There is a tremendous opportunity to decrease the water footprint of new development and promote more sustainable water management by integrating water efficiency policies into a community's land use planning documents. Over the past five years, Western Resource Advocates has produced resources, developed tools, and hosted training workshops for water and land use planners with the goal of increasing integration between these two sectors, thereby reducing future water demand. Our most recent work product is a land use manual describing multiple techniques for how to integrate water efficiency into a community's comprehensive plan, zoning ordinances, subdivision and site plan regulations, plumbing code, and other planning documents. The manual is targeted towards land use planners, provides descriptions of each technique, and includes sample language from communities who have already implemented the technique in their own planning documents. The Sustaining Colorado Watersheds Conference presentation will give a general overview of the manual, discuss terms used by land use planners, and highlight several of the techniques to reduce future water demand. Attendees will come away with information and insight that will allow them to better integrate their water planning activities with that of their land use colleagues back home.

Drew Beckwith is Western Resource Advocates' water policy manager. He works closely with water providers, state officials, and partner organizations around the region to find sustainable ways to meet both human and environmental water needs. He is responsible for the WRA's research, legislative, and policy initiatives that advance water conservation efforts and non-traditional water supplies across the Interior West. His current work includes integrating water efficiency into land use planning, partnering with the performance contracting industry to boost water conservation savings, and enabling rural communities to increase local streamflows through conservation actions.

Title: Adventures in Land Use and Water Supply Planning in South Metro Denver: Opportunities, Challenges, and Steps Forward

Logan Burba, South Metro Water Supply Authority
Beorn Courtney, Element Water Consulting

Abstract: The South Metro Water Supply Authority is a membership organization representing 13 water provider members in the south metro Denver region. As a regional organization, we have recently completed a Master Plan effort focusing on renewable solutions and needs for the future. Over the past year, we have been working with our members to identify opportunities and challenges in linking land use planning with water supply planning and efficiency. We have found that future renewable water supply and efficiency goals tie in directly to some of these opportunities and challenges. We have also uncovered some distinctly different situations and approaches throughout our membership with respect to land use authority as it relates to water efficiency. We will discuss these findings as well as two efforts we are currently advancing, relating directly to land use and water supply planning.

One effort we are well into is the development of a regional model landscape and irrigation ordinance to move towards consistency throughout our area. Additionally, we are investigating the possibility of implementing a regional landscape certification program for developers in the region. These efforts are not unique to our area and we will relate these to parallel efforts occurring along the western slope.

Logan Burba has worked as a Water Resources Engineer since 2007 after graduating with a degree in Civil Engineering from Colorado State University, beginning at Leonard Rice Engineers and currently with the South Metro Water Supply Authority. Over the years, Logan has had the opportunity to work closely with clients and members to help plan for their long-term water supplies and operations, including water conservation activities, water rights management, water quality issues, and water supply planning. While at South Metro, she has led efforts to complete a regional Master Plan, has developed and engaged a regional Water Conservation and Efficiency group, and has worked closely in the management of the WISE project to modify the existing Western Pipeline and develop operational strategies and guidelines to facilitate the regional deliveries.

Beorn Courtney is the president of Element Water Consulting and a licensed professional engineer with experience in a broad range of water resources topics including water supply and demand planning, water rights, and conservation. Last year, Beorn assisted the South Metro Water Supply Authority in an investigation of the water-land use nexus as it relates to water efficiency programs and is now assisting the group in developing a Regional Model Landscape and Irrigation Ordinance. Through a similar effort, she is also working with water providers in the Roaring Fork watershed

on landscaping-related water efficiency programs that are being implemented through individual Municipal Water Efficiency Plans and a Regional Water Efficiency Plan.

Title: Land Use Planning to Address Water Quality and Stream Health

Torie Jarvis, Northwest CO Council of Governments

Abstract: Much discussion is occurring around the state about water supply planning and how it can better integrate with land use planning. Much of the focus is often about water conservation, but local governments also regulate to protect water quality and stream health. This presentation will provide an overview of land use planning regulations and tools that local governments employ to protect stream flows, water quality, and riparian health.

Torie Jarvis is currently the Director and Staff Attorney for the Water Quality/Quantity Committee (QQ) of the Northwest Colorado Council of Governments, where she has worked since graduating from Lewis and Clark Law School in 2013. QQ facilitates and augments efforts of member local governments and special districts in Grand, Summit, Eagle, Pitkin, Gunnison, and Park counties to protect and enhance the region's water quality while encouraging its responsible use for the good of Colorado citizens and the environment.

On behalf of QQ, Torie participates in legislative and administrative proceedings that affect water quality or quantity in the headwaters region, monitors water development activities, and offers related technical assistance to further intergovernmental cooperation in the QQ headwaters region. When she's not working, Torie can usually be found floating down a river or hiking in the nearby mountains and desert. She is a former raft guide who worked on the New and Gauley Rivers in West Virginia before heading to the larger mountains and colder waters of Colorado.

WEDNESDAY, OCTOBER 12TH, 3:30 PM – 5:00 PM

Gondola B, Lessons Learned from Flood Recovery Moderator: Katie Jagt

Title: Lessons Learned: Watershed Coalitions Share the Successes and Challenges of the Watershed Resilience Pilot Program

Erin Cooper, Little Thompson Watershed Coalition
Cecily Mui, Saint Vrain Creek Coalition

Abstract: After back to back natural disasters in 2012 and 2013 affecting multiple watersheds across Colorado, a "Watershed Resilience Pilot Program" was launched by federal and Colorado state government to implement recovery at the watershed scale to address natural disasters such as fires, flood, and landslides. The intent of the program was to 1) address disaster recovery and resiliency from a systems approach and 2) promote an inclusive recovery process that encourages participation and input from all public and private stakeholders at a stream-reach and watershed scale of rehabilitation.

In 2015, the Watershed Resilience Pilot Program resourced eleven watershed coalitions with US Department of Housing and Urban Development (HUD) Community Development Block Grant - Disaster Recovery (CDBG-DR) and Colorado Water Conservation Board (CWCB) funds to enable flood recovery and build long-term organizational capacity. Nearly 18 months after the launch of this program, the coalitions are reflecting on the successes and challenges with a focus on solutions and recommendations for future coalition development.

This presentation addresses common and unique examples of challenges that these coalitions have overcome thus far and looks ahead to ways in which the coalitions are working to ensure the long-term sustainability of watershed stewardship in Colorado's Front Range.

Erin Cooper has spent her academic and professional careers blending science, technology, and education to promote environmental stewardship. Her experience in grassroots nonprofit management and federal grant administration are essential to her current role as Watershed Coordinator with the Little Thompson Watershed Coalition. In this role, she is leading efforts in her watershed to engage stakeholders in building a strong, inclusive organization that works toward the overarching goal of all involved – a resilient watershed – through state and federal disaster

recovery funds awarded by HUD (DOLA), NRCS, and CWCB.

Prior to joining the Little Thompson community, Erin led science education and research programs that used underwater camera technology to bring distant places into classrooms to promote an understanding of our connections to global ecosystems. Before arriving in Colorado, she gained experience in the federal world as a Knauss Marine Policy Fellow with the National Sea Grant Program and NOAA's Office of Education in Washington, DC and earned two degrees – a Masters of Environmental Science from Miami University of Ohio and a B.A. in Biology from Hiram College.
Outside of work with the Little T, Erin spends as much time as she can on mountains, in the ocean, and volunteering as an Advisory Board member with the Colorado Ocean Coalition.

Cecily Mui's current role as Watershed Coordinator with the Saint Vrain Creek Coalition (SVCC) is inspired by the community focused recovery efforts that create opportunities to enhance flood resiliency, ecological functions, and improved quality of life. Her career in land management blends together a combination of technical, outreach, administrative, policy, and collaborations skills to effectively lead the SVCC.

At the University of Wisconsin-Madison, she obtained Bachelor degrees in both Wildlife Ecology and Agricultural Education. There she discovered a passion for restoration while taking classes and volunteering at the Arboretum where conservationist Aldo Leopold led an effort to re-establish native plant communities and introduced the concept of ecological restoration. After completing her Peace Corps-Master's degree in Wildlife Biology at Colorado State University, she went on to environmental consulting, restoration projects, natural areas land management, public outreach, volunteer coordination, and program development.

Fly fishing on the Gunnison River

While working as the Resource Specialist and Land Manager at South Platte Park in Littleton, Colorado, Cecily led a stream restoration project on the South Platte River that educated both the public and elected officials on its degraded condition. Through her collaborative leadership style, funding and support were obtained for a river restoration master plan and a series of demonstration projects. She is working to create another successful program with the SVCC.

Title: The Art of Partnering: Case studies from the Big Thompson and Estes Valley Watershed Coalitions

Shayna Jones, Big Thompson Watershed Coalition
Molly Mills, Estes Valley Watershed Coalition

Abstract: Learn how two new non-profit organizations, the Big Thompson Watershed Coalition (BTWC) and the Estes Valley Watershed Coalition (EVWC), have found success in recent flood recovery projects. This presentation will dive into case studies that explore successful partnerships cultivated by each Coalition and have allowed these new organizations to achieve successful results in a relatively short amount of time. The BTWC recently launched two river restoration projects in the Glen Haven area to restore over 2 miles of creek in partnership with Larimer County, the Natural Resources Conservation Service, the Colorado Water Conservation Board, and over 100 private property owners. The BTWC case study will explore how the Coalition spearheaded collaborative design with private property owners and the design engineers, how the various partners combined forces to streamline federal, local and state permitting, and how Larimer County leveraged contractors working in the area on a separate road and river project in order to expedite the timeline for construction. In the Estes Valley Watershed, the EVWC will illustrate the importance of partnerships at all levels and how the coalitions serve as a liaison between landowners, engineers, and land use planners. Success stories that will be detailed includes a volunteer project spearheaded by the local high school on behalf of the EVWC, where school staff and students provided the volunteer management, food and transport to pull together an impactful community event in just three weeks and a close working relationship with local governments and special districts.

Shayna Jones is currently the Watershed Coordinator of the Big Thompson Watershed Coalition, responsible for laying the groundwork for the organization and the projects currently underway in the Big T – from fundraising to planning to building relationships with project partners. She has spent the last ten years working on conservation issues in Colorado and across the West, including endangered species issues, stream and wetland mitigation, conservation finance, and environmental markets. She has a M.S. in Conservation Leadership and the Human Dimensions of Natural Resources from Colorado State University, and a B.S. in Supply Chain Management from the University of Maryland. When not working on watershed issues, she can be found exploring the various rock climbing spots along the Big Thompson River and across the Front Range, and occasionally dragging her colleagues and others along.

Molly Mills has been working in the Natural Resources field across the Rocky Mountain West. She holds a Fisheries Biology degree from Colorado State University and 15 years of field experience. Those Experiences have included work in river restoration in Montana and Wyoming, Fisheries work in Colorado, Arizona and California, and habitat research and management in Arizona and in California. In addition to the natural resources work, Molly has also worked as a water quality and water quantity professional traveling nationally and internationally to repair equipment and to teach analytical chemistry and techniques for wastewater, drinking water, mining, and environmental applications.

Currently, Molly Mills is a Watershed Coordinator with the newly formed Estes Valley Watershed Coalition and working to implement and manage flood recovery efforts after the 2013 floods. With a newly formed Coalition, Molly is leading the organization's development, scope, mission and community involvement to continue providing watershed health services to the community well beyond flood recovery. In addition to working in the Estes Valley community, she had been working as a partner with local governments, other watershed coordinators and program professionals to make these efforts a success. Restoration efforts are made possible with the direction from Colorado Water Conservation Board and Department of Local Affairs who are administering federal disaster recovery funds provided by HUD, NRCS, and CWCB.

Title: Restoring Resiliency to St. Vrain Creek Following the Flood of 2013

Douglas Laiho, Boulder County

Abstract: During the Flood of 2013, St. Vrain Creek experienced "natural" physical changes and infrastructure damage. These included dam breaches, stream edge breaches, channel avulsions, reservoir sedimentation, and spatially varied flow. Some of the restoration reflects adjustments to a new normal stream , and some a return to pre-flood conditions with hazard mitigation. This presentation describes the lessons learned from this event and the solutions developed to minimize future flood impacts.
Spatially varied flow through an area previously unmapped as within the 100-year floodplain and with the vast majority of flow in the floodplain versus the channel resulted in extensive damage to Boulder County's most popular park and in its closure. The restoration design of Boulder County's Marlatt/Pella Crossing recreational facility serves as a case study demonstrating the impact, challenges, and recovery associated with an extreme flooding event. This design highlights two reservoir embankments that failed, two with partial failures, and how restoration occurred consistent with Office of the State Engineer safety criteria. Restoration construction is underway.

Doug Laiho was completing a dam rehabilitation design as a consultant for Boulder County when the Flood of 2013 occurred. The extent of flood damage was severe, and he was asked to join the County in a key role in flood recovery which has continued from fall 2013 to the present. He lives in south Boulder and had direct experience with the 20" of rain the resulting extreme event flood of September 2013. After initially being involved in emergency flood recovery, he has since focused on water resources ecological and infrastructure permanent repair in the Parks and Open Space Department. He has responsibility designing and managing through consultants (including the Applegate group, which shares responsibility for this presentation) over $20 million of flood recovery construction emphasizing dam rehabilitation, stream restoration, sediment removal, and related projects.

Doug has bachelor and master of science degrees in civil engineering from Michigan Tech University and the University of Colorado. His technical expertise in hydrology, and his primary area of practice has been dams, stream restoration, and fish passage. He has over forty years of experience and is a registered professional engineer. He worked as a water resources engineer for several, private national engineering companies, and his own firm prior to joining the County. He has lived and worked in Colorado since 1979 and has been active in the engineering community, serving as president of the Colorado Section of ASCE.

Riverside Salon III, Advancing Technical Tools and Innovations for Restoration, Moderator: Chris Sturm

Title: Living Streambanks: A Manual of Bioengineering Treatments for Colorado Streams

John Giordanengo, AloTerra/Synergy
Bill Spitz, Olsson Associates

Abstract: To assist the multiple communities and watersheds impacted by the 2013 disaster, the Colorado Department of Natural Resources, Colorado Water Conservation Board, provided funding through Rocky Mountain Flycasters for the creation of a bioengineering manual. Bioengineering practices provide resiliency for streambanks, enhance wildlife habitat, enhance organic matter inputs to streams, improve water quality, increase floodplain roughness, and heighten landscape aesthetics so important to countless residents, visitors, and businesses. This presentation will present the following:

- Design elements that impart site stability and resilience;
- Project recommendations that minimize risk during periods of vulnerability;
- Overview common bioengineering and revegetation techniques for Colorado streams; and
- Background resources on the combined forces of water and gravity as they pertain to bioengineered structures.

From 19 years of applied and academic experience **John Giordanengo** has developed a broad skillset in the field of ecological restoration, plant community monitoring, rare plant surveys, applied research, and project management. Having begun his restoration career planting riparian shrubs and trees along the Green River in Washington, he completed his MS degree (restoration ecology focus) from Colorado State University in 2000. Having planned and implement over 180 restoration-related projects, including riparian, floodplain, and wetland restoration, wetland delineation and ACOE permitting, fish passage, road closure and obliteration, post-fire restoration, and alpine restoration, he has learned that one important precept: you can never know enough. And so every day offers new insights into the field of restoration ecology that help John hone his design skills, values, and construction/implementation methodology. John is the co-author of the Field Guide for Harvesting and Installing Willow and Cottonwood Cuttings, lead author for Living Streambanks: a manual of bioengineering treatments for Colorado Streams, co-author of the OSI Crew Leader Manual in Ecological Restoration, and has authored several professional papers in the field of Ecological Restoration and natural resource research. John's contribution to the practice of riparian restoration earned him the Colorado Riparian Association Excellence in Riparian Management Award in 2010. John has served on the board of directors for the High Altitude Revegetation Organization, Colorado Native Plant Society and dozens of restoration and natural resources committees across the Front Range of Colorado. Responding to some of Northern Colorado's most severe natural disasters, John co-founded the Coalition for the Poudre River Watershed, the Big Thompson River Restoration Coalition, and the Southern Rockies Seed Network.

As a fluvial geomorphologist with 31 years of experience, **Mr. Spitz** has conducted extensive geomorphic analyses on fluvial system with highly variable morphologies and stability problems throughout the United States. In Colorado, he has been extensively involved with recovery efforts related to the September 2013 floods along the Front Range. Immediately following the floods, he served as the team river morphology expert on the flood damage assessment team at the CDOT Incident Command Center where he assisted with assessments of the flood damage, evaluated emergency repairs, and provided recommendations on restoration of the stream channels using natural channel design (NCD) concepts as well as recommendations on permanent repairs and betterments for the stream-highway interface for several of the major mountain highway corridors. As a member of the Big Thompson River Restoration Master Plan development team, he conducted geomorphic assessments and provided concept level NCD recommendations on reestablishing a resilient stream planform and construction of a multi-stage channel for the restoration of reaches along the Big Thompson River from its confluence to Estes Park and the North Fork Big Thompson River from Drake to Glen Haven. Since the floods, he has conducted geomorphic assessments and provided recommendations for stream stabilization and restoration on several projects located on the St. Vrain, Big Thompson, and Poudre Rivers. More recently, he developed a streambank stability management plan for critical and non-critical erosion sites along Muddy Creek downstream of Wolford Mountain Reservoir near Kremmling for the Colorado River Water Conservation District. He was part of the research team on NCHRP Project 24-39 "Evaluation and Assessment of Environmentally Sensitive Stream Bank Protection Measures," is co-author on CWCB's "Draft Fluvial Erosion Hazard Area Regulatory Guidelines Memorandum," and is a co-author of "Living Streambanks: A Manual of Bioengineering Treatments for Colorado Streams" developed for CWCB.

Title: Utilizing the CWCB Searchable Revegetation Matrix to Facilitate Proper River Revegetation for the Front Range of Colorado

Randy Mandel, EWP Vegetation Ecologist/Golder Associates

Abstract: To assist with flood recovery, the Colorado Water Conservation Board provided funding to create a searchable revegetation database to facilitate the use of native plant species for river restoration. The resulting database includes 264 of Colorado's native riverine and wetland plant species into a searchable matrix that incorporates 50-plus parameters including nomenclature, county, hydrology, biophysiography, morphology, seed weight, seed storability, propagules type, germination protocol, and root parameters to allow better integration into bioengineering practices. The included woody, forb, and graminoid species were prioritized through feedback to the Southern Rockies Seed Network from over 200 Federal and State agencies, academia, municipalities, non-profits, and other interested parties. The talk will provide a tutorial for the use of the database to show its application to help create the revegetation plan required for all restoration projects participating in the Emergency Watershed Protection Program (EWP). The searchable database is now available on the CWCB and Resiliency

Watershed Partners EWP websites.

Randy Mandel has over 32 years of experience as a restoration ecologist. He has been a key revegetation specialist for multiple restoration, reclamation, and remediation projects, including: 14 national parks and monuments; over 26 wetland, 32 lacustrine, and 29 riverine projects; reservoirs; and various mitigation banking, wetland delineation and remediation, and biofiltration projects. He was the Co-Founder and Vice President of Rocky Mountain Native Plants Company and has authored over two dozen publications, including international journal articles and a stand-alone monograph on the use of wetland plant species for biofiltration. Additionally, Mr. Mandel has overseen the installation of over 5,000 restoration projects, and specializes in site-specific native plant ecology and propagation. He holds a Bachelor of Science in Forest Biology from Colorado State University. He also worked on two Masters-level projects focused on Forest Physiology/Genetics at Colorado State.

Title: Assessment of Geomorphic Impacts of Riparian Vegetation Removal on the Colorado River

Gigi Richard, Colorado Mesa University

Abstract: The introduction of tamarisk (Tamarix spp.) to the riparian zones adjacent to the Colorado River and many of its tributaries in the southwestern US has contributed to increased stability of the river channels. The increased stabilization and salinization of riparian zones and increased total water consumption of tamarisk stands create a significant impact in the Colorado River drainage basin on the main stem and many tributaries. Tamarisk impacts on the Colorado River and its tributaries have led to removal efforts and the release of the tamarisk leaf beetle (Diorhabda carinulata) as a biological control agent. Bank erosion following high flows in 2011 in areas where vegetation removal had occurred suggested that recent efforts at removal of tamarisk could contribute to increased bank erosion and increased channel mobility. The purpose of this study was to assess changes in channel mobility following tamarisk removal along a 51-km reach of the Colorado River in western Colorado via GIS analysis of repeat aerial photos and field surveying of channel cross sections at vegetation removal sites.

A total of 21 cross sections were surveyed pre- and post-removal at three sites where vegetation removal was conducted in January 2015. Continued future surveys following future high spring peak flow events will be useful in documenting channel change at these sites associated with vegetation removal. Channel changes were measured in GIS from aerial photos taken in 2002, 2007 and 2012. Continuation of this analysis using the 2015 aerial photos will add valuable information, as vegetation removal efforts have increased since 2007 and measuring channel change between 2012 and 2015 may shed more light on how the channel continues to respond to both the earlier and more recent vegetation removal efforts.

Dr. Gigi Richard is a Professor of Geology at Colorado Mesa University (CMU), as well as the Faculty Director of the Water Center at CMU in Grand Junction, CO. She holds an M.S. and Ph.D. from Colorado State University and a B.S. from the Massachusetts Institute of Technology, all in civil engineering. Gigi created the Watershed Science program at CMU and co-founded the Water Center at CMU, which facilitates education, research and dialogue on water issues facing the Upper Colorado River Basin. Gigi teaches water and environmental science classes and her research on human impacts on rivers systems includes the study of downstream impacts of dams, levees and other human activities on rivers in Colorado, New Mexico and New Zealand.

Riverside Salon IV, Legacy of Mining, Moderator: David Holm

Title: Legacy of Mining Panel Discussion

Moderator - David Holm
Peter Butler
Jean Wyatt
Robyn Blackburn
Skip Feeney
Dr. Andrew Todd
Jason B. Wills
Carol Ekarius
Trez Skillern
Jeff Graves
Curtis Hartenstine

Abstract: The legacy of mining discussion will consist of a panel that begins with a presentation by members of the Mixed Ownership Group. The purpose of the Colorado Mixed-Ownership Mine Collaboration Group/Initiative is to provide a forum for Federal and State agencies, and local organizations (when appropriate), to share expertise, combine staffing, and pool resources (financial, services, technology, field support, etc.) in order to effect remediation of lands and waters impacted by historic mining activities. There will be ample opportunity for audience participation in the mining legacy discussion.

Peter Butler, a founding member of the Animas River Stakeholders Group, will then speak about the Gold King Spill and what it reveals about the capacities of local watershed groups to deal with problems of this magnitude. Finally, Curtis Hartenstine, who is the Southern Ute Tribal Water Quality Program Manager, will also speak about the Gold King mine and the Tribe's on-the-ground response to the spill and its broader assessment of the issue. Peter and Curtis will each join the mining legacy panel after their presentations.

Mixed Ownership Group

Jean Wyatt is a North Dakota native with Bachelor of Science Degrees in Geology and Geological Engineering from the University of North Dakota, and a Master's Degree in Accounting from the University of Colorado. She is currently a Project Manager for the US Environmental Protection Agency where she has worked for over 30 years. She has managed various projects under RCRA and CERCLA. Jean currently leads numerous mine site assessment projects and coordinated the Mixed Ownership Team for the last 8 years. This team is made up of a broad cast of stakeholders who have worked together to improve conditions at

multiple abandoned mine sites.

Robyn Blackburn has a Masters of Environmental Health Science and is a U.S. Fish and Wildlife Service Contaminants Biologist. She works primarily on contaminated federal lands as Senior Ecological Risk Assessor and serves as a Liaison to the U.S. EPA. Working with federal and state partners, she provides technical assistance in the evaluation of water quality and habitat on federal lands for the determination of ecological impacts and clean up strategies designed to improve environmental health. Over the past 8 years, working closely with federal, state, and non-government organizations as an integral member of a Mixed Ownership Project Team, she has provided lead technical assistance in site characterization, data collection, and ecological risk evaluations focused on assessing and clean-up of abandoned mines in Colorado.

Skip Feeney holds a Bachelors of Science degree in Environmental Health. He has worked in the water quality industry for 15 years. This includes private sector work in water quality consulting for municipal agencies and public sector work with the Colorado Water Quality Control Division as a water quality assessor. In his role with the Division he championed the development and implementation of a Measurable Results Program to evaluate the water quality impacts derived from pollution control projects funded through the Division. Projects within this program include wastewater treatment plant upgrades and abandoned mine restorations. He is currently taking a leading role with the Mine Impacted Waters Task Force. The task force supports two initiatives: 1) An abandoned mine inventory and 2) a water quality study of 150 draining, abandoned mines.

Dr. Andrew Todd is a Research Biologist at the U.S. Geological Survey based at the Crustal Geophysics and Geochemistry Science Center in Denver, Colorado. He received his B.A. in biology from Williams College, and M.S. and Ph.D. degrees in environmental engineering from the University of Colorado at Boulder. For the last 8 years working for the U.S. Geological Survey, he has conducted research on the impacts of diverse stressors (e.g. acid-rock drainage, climate change, water extraction) to cold-water rivers and streams. For the last 7 years, Dr. Todd has worked under an inter-agency agreement with the U.S. EPA as a subject-matter expert on mining and large water project impacts to resident fisheries. Prior to the USGS, Dr. Todd worked as a contaminants biologist at the Rocky Flats National Wildlife Refuge site, and as the primary project scientist for Trout Unlimited's Colorado Water Project. Dr. Todd served for 9 years on the Colorado Water Quality Control Commission (chair for 2 years) and currently sits on the Board of Trustees of the Colorado Foundation for Water Education. Dr. Todd is the president-elect of the American Fisheries Society's Water Quality Section.

Jason B. Willis has worked as the Mine Restoration Project Manager for Trout Unlimited for the past four years, and is based in Salida, Colorado. He has past experience in various disciplines of engineering such as structural, geotechnical, environmental, and civil engineering and holds an M.S. degree in Civil and Environmental Engineering from the University of Pittsburgh. Currently, Jason manages several mine reclamation clean-up projects across the State of Colorado, which include duties of construction oversight, project design, water quality monitoring and analysis, grant writing, and native revegetation. He can be reached at jwillis@tu.org.

Carol Ekarius has been the Executive Director for the Coalition for the Upper South Platte (CUSP) since 1999. CUSP has a team of 30 employees who work on a wide variety of watershed projects. She brings decades of experience in governmental and nonprofit management. Carol is also a freelance writer and the author of nine books, covering topics in sustainable, small-scale agriculture and farming and environmental solutions. She lives with her husband, Ken Woodard, and their farm menagerie near Cripple Creek.

Trez Skillern began her Forest Service career working summers across her native state of Montana while earning a B.S. in Hydrology from Montana State University. After moving to Colorado, Trez began working for the Arapaho & Roosevelt National Forests (ARNF) Abandoned Mine Lands (AML) program in 2004, and went on to earn an M.S. in Ecological Restoration from Colorado State University. Trez has served as On-Scene Coordinator and Removal/Remediation Project Manager, responsible for planning, coordinating, managing and overseeing CERCLA projects and hazardous substance release sites across National Forest System Lands. She has worked on a variety of abandoned mines on a variety of forests, in partnership with Federal, State, non-profit organizations and local watershed groups. Presently, Trez is Program Manager of the ARNF AML, and a member of the Forest Leadership Team, advising partnership and collaborations for all departments within the USFS.

Jeff Graves is currently the Director of the Inactive Mine Reclamation Program, Colorado Division of Reclamation, Mining and Safety, Colorado Department of Natural Resources. Has been with the State of Colorado for 15 years. Designed and implemented numerous mine reclamation projects for the State of Colorado as a Senior Project Manager. Prior to employment at the State of Colorado, worked as a staff geologist for 2 geotechnical engineering firms in the Denver area. Has a Bachelors of Science in Geology from the University of Colorado and a Masters of Engineering in Geological Engineering, with an emphasis in groundwater engineering, from the Colorado School of Mines. Interests include mining and mining history, American history, mountain biking, hiking, and spending time with family.

Animas River Stakeholders/Gold King Mine responders

Peter Butler has been involved in various Colorado water issues for over thirty years. He has been working with the Animas River Stakeholders Group (ARSG) on legacy mine remediation and water quality since the group's inception twenty-two years ago and is currently one of the group's co-coordinators. Peter has a bachelor's degree in physics, a master's degree in economics, and a Ph.D. in Natural Resource Policy. His Ph.D. program was a combination of economics, water law, hydrology, and water quality management. He served on the Colorado Water Quality Control Commission for nine years, three years as chair. He is presently a member of the Colorado Air Quality Control Commission.

Curtis Hartenstine is the Water Quality Program Manager for Southern Ute Indian Tribe. Curtis moved to Colorado in 2003 after a spending three years in Nepal with the Peace Corps forestry program. He quickly found employment with the Colorado Watershed Network and the River Watch program, where he

coordinated volunteers, supplies and monitoring programs statewide. From 2010 to 2013, Curtis worked for the Department of Public Health and Environment Nonpoint Source Program, administering grant funds and supplying technical assistance for mine reclamation, agriculture, urban runoff and watershed planning projects. During his time at the State, Curtis attended University of Colorado and received a master's degree in Environmental Science with emphasis on Water Quality. In 2014, Curtis became the Manager of the Southern Ute Indian Tribe's Water Quality Program in southwest Colorado. Building on 20 years of Tribal water quality monitoring, Curtis is developing water quality standards for the Tribe, pursuing the authority to implement those standards on the Reservation and manages an active stream restoration program. Curtis and his staff continue to contribute data and information related to the Gold King Mine release monitoring and environmental impact and subsequent Bonita Peak Mining District Superfund project. Curtis enjoys his life in Durango with his wife and two children that provide him the motivation to make the greatest positive impact on watershed health he can.

POSTER SESSION

Poster Title: Bathymetric Mapping of Clear Creek Reservoir

Michael Kohn, US Geological Survey
Jacob Mohrmann, Colorado Mountain College

In a collaborative partnership between the US Geological Survey, Colorado Mountain College, and Pueblo Board of Water Works, during peak stage in June of 2016, Clear Creek reservoir was comprehensively mapped including a detailed bathymetry of the lake as well as shoreline at peak stage and the Clear Creek valley above the reservoir. This poster will exhibit the challenges encountered, equipment utilized, results of the survey as compared to previous historical surveys, and will highlight the benefits of a collaborative partnership approach to project work.

This poster is being co-presented by Michael Kohn, professional engineer with the US Geological Survey and Jacob Mohrmann, professional geologist with the Colorado Mountain College Timberline Field Institute. Michael Kohn has worked with the US Geological Survey since 2010. Mr. Kohn graduated with a Master's of Science in Civil Engineering from Iowa State University. Jacob Mohrmann has worked as a hydrologist for the past 10 years. Mr. Mohrmann graduated with a Master's of Science in Geology from the University of Montana.

Poster Title: Ruby Mountain Springs Fish Hatchery Reclamation, Nathrop, Colorado

Katy Warner, Colorado Mountain College
Dirk Rasmussen, Colorado Mountain College

The Ruby Mountain Springs site is located in Chaffee County on the banks of the Arkansas River near Nathrop, Colorado. Nestlé Waters North America (NWNA) purchased the site in 2009 due to the presence of several perennial springs. The presence of these springs perpetuated the site's history as a private fish hatchery from the early 1960s through the 1990s. As part of NWNA's dedication to environmental protection and natural resource management, NWNA voluntarily committed to reclamation of the fish hatchery to a more natural state thereby enhancing the value of wetland and riparian habitat of the spring's site. In 2011 and 2012, the Colorado Mountain College Timberline Field Institute worked with NWNA to produce and execute a reclamation plan that included removal of the concrete hatchery runs and associated buildings, and creation of a natural stream, pond and riparian system.

This poster is being presented by Katy Warner PhD, director of the Colorado Mountain College Timberline Field Institute and Dirk Rasmussen, assistant project manager of the Colorado Mountain College Timberline Field Institute. Dr. Warner's background is in wildlife biology and habitat management, and she completed her PhD in Ecology from Colorado State University. Prior to joining the Timberline Field Institute, she worked on habitat restoration and improvement projects in California, Oregon, Washington, and Wisconsin. Mr. Dirk Rasmussen received his Masters of Science in Geology from Western Washington University in 2016 where his research focused on Paleocene-Eocene transition and the provenance of sediment deposited in Laramide basins.

Poster Title: The Effects of Acid Mine Drainage on Communities of Denitrifiers

Ben Wise, University of Colorado Denver

An estimated 23,000 abandoned mines are scattered across the State of Colorado. These abandoned mines often leak effluent that is low in pH and high in dissolved metal concentration. This acid mine drainage (AMD) adversely affects ecosystems and is detrimental to local communities who often suffer economic and cultural repercussions with little legal recourse. However, little is known about microbial community structures within these AMD-impacted systems that may otherwise be able to provide valuable ecosystem services. Additionally, far less is known about denitrifying microorganisms in these same systems, despite their critical role in mitigating nitrogen pollution. Denitrifying microorganisms are capable of limiting excess nitrogen deposition that could otherwise lead to problems such as reduced drinking water quality, toxic effects on freshwater biota, and disruption of aquatic nutrient cycling. In this study, denitrifier diversity and community structure are assessed in relation to environmental variables within an ecosystem that has been significantly altered by AMD. This study provides new insight into the biogeochemical activity of ecosystems affected by AMD and has the potential to influence future remediation and watershed management decisions. By gaining an understanding of the ecosystem services provided by denitrifying and other microorganisms and how those services are affected by ecosystem degradation, communities in the future may be able to efficiently utilize their local ecosystems in remediating polluted waterways instead of having to rely on the few, costly, and often ineffective legal tools available.

As a kid Ben was constantly exploring the creeks and lakes near my home in East Texas. In 2009 I moved to Boulder to attend the University of Colorado where I earned a B.A. in Ecology and Evolutionary Biology. It was there that my curiosity and admiration for Colorado's streams, rivers, and lakes exploded. I am currently a graduate student at the University of Colorado Denver where I am

pursuing a M.S. in Environmental Science. My research focuses on the effects that acid mine drainage has on communities of bacteria that provide water quality services for aquatic ecosystem.

Poster Title: Monitoring: Simple, teachable, and non-technical method yields a wealth information

Gwen Kittel, NatureServe

Wildland Restoration Volunteers monitoring committee has 2 years of monitoring data to share from projects that range from 1 to 16+ years old. We designed a straightforward, simple protocol that experienced ecologists and lay persons can follow to accurately assess projects. Monitoring is most successful when pre-project, project design, and project implementation information is available. High quality illustrative photographs play a key role. With a bit of training and mentoring, lay persons can gather excellent information. This protocol works equally well on riparian, wetland, and upland projects. Initial findings include: 1) differences in quality of work done on project day can be discernible after several years, 2) avoid plant installation in areas accessible to high public use, 3) removal of riparian Russian-olive prior to 2013 flood continues to have long-term benefit, 4) creation of micro-habitats at high elevations (>12,000 feet) promoted establishment of both seeded and volunteer species.

Gwen Kittel is a vegetation ecologist, specializing in classification and ecological integrity assessments. Her area of expertise is in riparian and wetland ecology. She has an MS in Botany from the University of Wyoming. Since 1992, Gwen has been conducting field work on riparian and wetland vegetation classification, ecological integrity assessments, and conducting ecoregional plans. She developed a statewide classification of riparian plant associations for Colorado as well as a vegetative key to the state's willow species. She has helped develop national ecological integrity assessment criteria for wetlands. Her vegetation classification work has included development of Ecological Systems, and the development of and descriptions and keys for MacroGroups, Groups, Alliances and Associations of the National Vegetation Classification System. Her experience with vegetation classification analyses and mapping includes many western National Parks, including some of the pacific islands as well as FWS refuges. She has been the lead vegetation ecologist and aquatic vegetation ecologist on many conservation plans throughout the western US and western Canada. This involves setting conservation goals, defined minimum dynamic areas, assisting with the creation of a nation-wide ecological systems map, and establishing criteria for impact on wetland and aquatic ecosystems. In addition, Gwen volunteers for Wildland Restoration Volunteers, www.wlrv.org, as a worker bee and serves on the Monitoring committee.

Poster Title: WaterSMART Cooperative Watershed Management Program

United States Bureau of Reclamation

The Cooperative Watershed Management Program (CWMP) provides funding to watershed groups to encourage diverse stakeholders to form local solutions to address their water management needs. In 2012, Reclamation began providing funding for the establishment or further development of watershed groups, self-sustaining, non-regulatory, consensus-based groups composed of a diverse array of stakeholders (Phase I). As part of Phase I activities, applicants may use funding to develop bylaws, a mission statement, watershed management project concepts, and a watershed restoration plan. For Phase I projects, Reclamation will award up to $50,000 per year for a period of up to two years with no non-Federal cost-share required. Starting in 2017, Reclamation will provide cost-shared financial assistance to watershed groups to implement watershed management projects (Phase II). These on-the-ground projects, collaboratively developed by members of a watershed group, will address ecological resilience, water quality, and critical water supply needs. Reclamation will award up to $100,000 per project over a two-year period. For Phase II projects, applicants must contribute at least 50% of the total project costs.

Poster Title: Water Quality: Impacts to Your Farm's Bottom Line

Rachel Theler

The Arkansas River is the lifeblood of many Coloradans. As one of the largest rivers in the state, its flows provide water for industry, municipalities, and agriculture. However, decades of utilizing this resource have begun to take a toll on this area. Nonpoint source and point source pollution have had culminating effects on the farmers that depend on this resource for their livelihood. The CDPHE Lower Arkansas Water Quality Workgroup is bringing together diverse stakeholders to address these issues in a variety of ways including education, monitoring, and innovative practices.

Poster Title: Water Quality Data for a Broad Audience - Transforming data into engaging and accurate web-tools for outreach and education

Ben Tyler, Leonard Rice Engineers, Inc.

So many resources are invested in the careful collection of data. Whether it is water quality data or steam flow data, data is supposed to tell a story, but can rarely do so on its own. Traditionally, data analysis, visualization, education, and outreach have represented disjointed processes in the work of pulling stories from data and sharing them. Each process requires a unique set of skills and tools necessary to create and communicate the outputs.

Data visualization and analysis have historically lived in the realm of the desktop, with static reports and figures representing the outputs of the analysis that are then distributed as part of outreach efforts. The advent of accessible web-based tools has greatly improved these processes by allowing the streamlined retrieval, analysis, and communication of water resources data. These tools allow for a more meaningful experience where the stories the data have to tell rise to the top.

Importantly, web applications have allowed analytical and educational tools to be packaged together. In place of a static, print report, a decision-maker or concerned citizen can explore the data through interactive maps and graphs while furthering their understanding of what the data means through tools like interactive infographics. With thoughtful development, web-based tools can be easily leveraged to greatly enhance the value and accessibility of water resources data for both decision-makers and the general public. Time that was previously spent generating static reports and analysis can instead be spent exploring the data more deeply, crafting sound policy, and communicating findings.

Growing up on Lake Michigan, **Ben Tyler** has always held an affinity for water. In recent years, he has been able to pursue this passion through web and application development in addition to GIS while working for Leonard Rice Engineers. Ben has worked in water resources in a variety of locales including Colorado, Maine, and Oregon. He is passionate about developing robust websites and applications that allow for the effective management of water resources.

Poster Title: Sediment transport as a key component of restoration design: A case study from the St. Vrain Creek Restoration Project for the Town of Lyons.

Tracy Emmanuel

Sediment transport is a critical component of channel behavior, and sediment transport analyses are increasingly being requested from resource managers to be included in flood recovery and restoration projects. Unfortunately, as a result of the September 2013 flooding, many of the key assumptions required to implement various transport models are not applicable to the post-flood conditions (e.g., inadequate understanding of upstream sediment supply, given the absence of "stable" upstream reaches). This poster will present the methods and results from a study undertaken as part of the St. Vrain Creek Restoration Project, in Lyons. The project encompassed portions of North, South, and mainstem St. Vrain Creek, and included river styles classification in combination with relative stream power, bed mobility, sediment transport capacity and sediment balance calculations. Results were evaluated using reach-to-reach comparisons and longitudinal trajectories, which then allowed for recommendations of future stream restoration efforts.

Tracy Emmanuel is a fluvial geomorphologist and project manager with Otak in Boulder, Colorado. She completed her master's degree in Watershed Science at Colorado State University in 2003. She has broad experience within the environmental consulting field, but most recently has focused on the flood-recovery/stream restoration efforts taking place in Colorado's Front Range. Tracy has experience with geomorphic assessments and sediment transport studies, as well as channel and bank stabilization design. She approaches projects with a process-based vision to produce defensible designs that incorporate prevailing process regimes and onsite natural materials to re-establish river and biological function.

Poster Title: Working together to conserve

Morgan Shimabuku & Kate Larson, Center for ReSource Conservation

"Alone we can do so little, together we can do so much." These words have never been truer than in the water conservation movement, which will require a multitude of organizations and individuals having conversations and working together to meet a common objective: a sustainable water future. For over 15 years, the Center for ReSource Conservation (CRC) has been working with water utilities to implement water conservation programs, beginning with a single relationship between CRC and the City of Boulder, growing to currently encompass a unique partnership with over 30 water utilities. Through this innovative model, the CRC works closely with municipal governments, utilities and water districts to implement and measure water conservation programs on their behalf. By taking advantage of economies of scale, all sizes of water providers can offer a range of high quality programs to their customers at a much lower price, and with much less work, than by each provider implementing their own programs. This model provides a great example of how nonprofit organizations and water providers can team up to offer programs that lead to direct conservation benefits and to measure the results of those programs. The partnership is truly synergistic, with both the water providers and CRC being able to offer services that neither could individually. This presentation will discuss the history of CRC's programs, the growth of the partnership and present results from partner and customer surveys. Also, it will include analysis of both the pros and cons of this partnership model and examples of how the conversations and collaborations of these partnerships have been key to regional success in water conservation programming.

Morgan Shimabuku is Senior Manager of Sustainability Programs at the Center for ReSource Conservation (CRC), a nonprofit based in Boulder, Colorado with a mission to put conservation into action. Since 2013 Morgan has worked to initiate new water conservation programs for Colorado homeowners and businesses for CRC. She has overseen over 1000 high-efficiency toilet installations, identified millions of gallons of water saving opportunities for local businesses and implemented quick and easy fixture swapping services for restaurants to help them save water and energy.

The skills and expertise she gained during her undergraduate studies in geology, graduate work at University of Colorado on a Masters in Geography, and position as a staff scientist at a water resources consulting firm, have allowed her to lead CRC's impact analysis, quantifying their water, energy and waste-reduction efforts that are put into action across the state. Most recently, her work analyzing the impact of CRC's sprinkler inspection program, Slow the Flow, was published in a peer-reviewed journal. When Morgan isn't saving water, she enjoys spending her time enjoying water sports of all kinds in Colorado, but especially in her home state of Oregon.

Poster Title: Design and Implementation of a Large Scale River Restoration Project; Upper Arkansas River Restoration Project, Leadville, CO

B.A. Jordan BA, PhD, PE, HydroGeo Designs LLC.
B.G. Gray, HydroGeo Designs LLC.
G. Brunjak G, Lake County Conservation District
L. Archuleta L, U.S. Fish and Wildlife Service
T. Kittell, PE, Colorado Parks and Wildlife

The riparian areas and stream channels along the headwater reaches of the Arkansas River and Lake Fork Creek have been damaged by historic mining activities in the upstream watershed. Fluvial mine waste has deposited contaminated sediments and metals along the channel floodplain denuding vegetation, leading to excessive bank erosion and damaging aquatic life in the streams. The erosion problems have been exacerbated by flow regime alterations and augmentation in the channel tributaries resulting from trans-basin diversions. A Natural Resources Damages (NRD) settlement project has been implemented by State and Federal Agencies to remedy the damages in these headwater reaches of the Upper Arkansas River. These organizations include Lake County Conservation District, U.S. Fish and Wildlife Service, Colorado Department of Health and Environment, and the EPA to plan, design and implement stream restoration and bank stabilization practices along 4 miles of the Upper Arkansas River and 5 miles of Lake Fork Creek on private lands to remedy these damages. This project has required communication and collaboration with 10 different private land owners with varying objectives and constraints concerning the stream corridors on their property. The project team has been able to bridge these differing objectives to bring consensus in moving forward with the large scale restoration project. The presentation will discuss existing geomorphic, habitat, flow regime and sediment transport conditions in the reaches and illustrate sediment transport design concepts along with habitat considerations for the project design components. Lessons learned from the construction process and implementation phase will also be demonstrated. Including channel and structure design, contaminated floodplain soils remediation and re-vegetation components. This work ties in with public agency restoration on government owned lands ultimately resulting in restoration of 15 continuous miles of stream channel along this headwater stream system.

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