Restoring the West Conference

# Multiple Use and Sustained Yield of Resources on Public Lands: Is It Still Possible?

October 16-17, 2018, Utah State University, Logan, Utah

# 2018 Restoring the West Conference Planning Committee

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# Agenda

| Tuesday, October 16, 2018<br>USU Eccles Conference Center | |
|---|---|
| 8:20 - 8:25 a.m. | Welcome, Chris Luecke, Dean, Quinney College of Natural Resources, Utah State University, Logan, Utah |
| 8:25 – 8:30 a.m. | Conference Overview, Darren McAvoy, Extension Assistant Professor, Utah State University, Logan, Utah |
| 8:30 – 9:10 a.m. | Keynote: Multiple Uses, Multiple Values, Multiple Perturbations: Sustaining Ecosystem Services from Public Lands<br>Mark Brunson, Professor, Environment & Society, Utah State University, Logan, Utah |
| 9:10 – 9:40 a.m. | Restoring Forest Functionality - Breaking the Rules to Save the Pieces<br>Craig Thompson, Landscape Wildlife Ecologist, Conservation Biology Institute, Corvallis, Oregon |
| 9:40 – 10:10 a.m. | Outdoor Recreation and Land Ethics for the 21st Century<br>Ethan Linck, Ph.D. Candidate & High Country News contributor, Seattle, Washington |
| 10:10 – 10:50 a.m. | Extended break, the following speakers will be available at the north end of the refreshment room for further conversation: M. Brunson, C. Thompson, E. Linck, L. Glidden & L. Kuwanwisiwma |
| 10:50 – 11:20 a.m. | Bullseye: Managing Cultural Resource Sites to Reduce the Occurrence of Illegal Collection and Improve Site Conditions<br>Laurel Glidden, Fuels Archaeologist, Bureau of Land Management, Cedar City, Utah |
| 11:20 – 11:50 a.m. | In Defense of A Hopi Sacred Landscape. The Arizona Snow Bowl Controversy<br>Leigh Kuwanwisiwma, Director Emeritus, Hopi Cultural Preservation office. The Hopi Tribe, Hotevilla, Arizona |
| 11:50 a.m. – 1:00 p.m. | Lunch |
| 1:00 – 1:40 p.m. | Keynote: A Primer on the Law and Politics of Multiple Use Management on Federal Public Lands<br>Martin Nie, Director, Bolle Center for People and Forests & Professor, University of Montana, Missoula, Montana |
| 1:40 – 2:10 p.m. | Desert Spring Restoration. Challenges, and Opportunities for Success<br>Don Sada, Research Professor, Division of Hydrologic Sciences, Desert Research Institute, Reno, Nevada |

| Tuesday, October 16, 2018<br>USU Eccles Conference Center | |
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| 2:10 – 2:40 p.m. | Sustaining Multiple Use and Yield on Public Lands in Harney County, Oregon Through Collaboration<br>Ben Cate, Ecological Coordinator, High Desert Partnership, Hines, Oregon |
| 2:40 – 3:20 p.m. | Extended break, the following speakers will be available at the north end of the refreshment room for further conversation: M. Nie, D. Sada, B. Cate, E. Glenn, K. Karnes, & M. Gabriel |
| 3:20 – 3:50 p.m. | Can We, Should We, Keep Up? Changing Demands on Public Lands Recreational Landscapes and Infrastructure<br>Evan Glenn, Trails and Travel Management Program Lead, BLM, Salt Lake City, Utah |
| 3:50 – 4:20 p.m. | Utilizing the Tribal Forest Protection Act (TFPA)<br>Keith Karnes, Leech Lake (MN) Reservation Forester, Leech Lake Indian Reservation, Minnesota |
| 4:20 – 4:50 p.m. | Canary in the Marijuana Field: How Wildlife Engaged Stakeholders and Policy in Addressing Environmental Impacts from Marijuana Cultivation on in the Western United States<br>Mourad Gabriel, Co-Director, Integral Ecology Research Center, Research Associate Faculty, UC Davis, Blue Lake, California. |
| 6:00 – 8:00 p.m. | Reception (light hors d'oeuvres) and Poster Session at Café Sabor.<br>Shuttle will be departing from north side of University Inn @5:45 p.m. with return trips (to and from the venue) as needed. Text Megan if you miss the shuttle and need a ride: 425-213-4452 |

| Wednesday, October 17, 2018<br>USU Eccles Conference Center | |
|---|---|
| 8:50 – 9:20 a.m. | Rural Values and Multiple Use: Insights from a Community Based Organization in Central Idaho<br>Toni Ruth, Executive Director, Salmon Valley Stewardship, Salmon, Idaho |
| 9:20 – 9:50 a.m. | Towards a Better Understanding of the Socio-ecological Complexities of Feral Horses in the U.S. Through a Global Lens<br>Derek Scasta, Rangeland Extension Specialist, Assistant Professor of Rangeland Management, Plant - Herbivore Interactions Ecologist, University of Wyoming, Laramie, Wyoming |
| 9:50 – 10:20 a.m. | Community-engaged Education: A Way Forward for Integrating Multiple Uses on Public Lands?<br>Jacqualine Grant, Associate Professor of Biology, Southern Utah University |

| Wednesday, October 17, 2018<br>USU Eccles Conference Center | |
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| 10:20 – 11:00 a.m. | Extended break, the following speakers will be available at the north end of the refreshment room for further conversation: T. Ruth, D. Scasta, J. Grant, C. Spackman, S. Goeking, N. Brunswick |
| 11:00 – 11:40 a.m.<br><br>Student Presentations (20-min each) | 1) Medusahead: A Potential Livestock Forage on Rangelands?<br>Casey Spackman, PhD Candidate, Utah State University, Logan, Utah State University<br>2) Forests and Water: A Synthesis of Recent Effects of Forest Disturbance on Water Yield in the West<br>Sara Goeking, Biological Scientist, U.S. Forest Service, & PhD Candidate, Utah State University, Logan, Utah |
| 11:40 a.m. – 12:10 p.m. | Saving and Sharing the Pando Aspen Clone – Taking Advantage of Social Media Interest<br>Nancy Brunswick, Regional Landscape Architect, Intermountain Region, United States Forest Service, Ogden, Utah |
| 12:10 – 1:20 p.m. | Lunch |
| 1:20 – 1:50 p.m. | How the U.S. Fish and Wildlife Service Protects and Recovers Federally-listed Species in Multiple-use Landscapes<br>Hilary Whitcomb, Wildlife Biologist, U.S. Fish and Wildlife Service, Salt Lake City, Utah |
| 1:50 – 2:20 p.m. | Co-managing Ecosystem Transition: Making Decisions About Restoration and Multiple Use after Extreme Landscape Change<br>Sasha Stortz, Senior Research Specialist, Landscape Conservation Initiative, Northern Arizona University, Flagstaff, Arizona |
| 2:20 – 2:50 p.m. | A Success Story from West Box Elder County, Utah<br>Diane Tanner, Working Group Leader, Box Elder County, Utah |
| 2:50 – 3:30 p.m. | Extended break, the following speakers will be available at the north end of the refreshment room for further conversation: H. Whitcomb, S. Stortz, D. Tanner, A. Moser, R. McKinney-James |
| 3:30 – 4:00 p.m. | Cooperative Restoration for Sage-grouse and Sagebrush Landscapes in Idaho<br>Ann Moser, Wildlife Staff Biologist, Idaho Department of Fish and Game, Boise, Idaho |
| 4:00 – 4:40 p.m. | Keynote & QCNR Seminar: The Importance of Collaboration in Sustaining the West<br>Rose McKinney-James, Managing Principal Energy Works LLC & McKinney-James & Associates, Las Vegas, Nevada |

Keynote: Multiple Uses, Multiple Values, Multiple Perturbations: Sustaining Ecosystem Services from Public Lands

Mark Brunson, Professor, Environment & Society, Utah State University, Logan, Utah.
mark.brunson@usu.edu

All federal land management agencies, and many of their state equivalents, have statutory requirements to manage for more than resource. Agencies often have struggled to find appropriate balances between often-conflicting values for public lands while providing a sustained yield of tangible resources such as timber, forage, water, and game species. An important reason for this struggle is that politically prescribed concepts of "balance" and "sustained yield" each run counter to ecological and socio-political realities. Under such circumstances, it is remarkable that agency personnel have done as well as they have to address multiple demands for public lands. While law and regulation have lagged behind, the emerging concepts of ecosystem services, resilience thinking, and adaptive co-management offer potential pathways to more robust and responsive land and resource management. It is unlikely in today's political climate that we can achieve a much-needed overhaul of natural resource law and regulation. Instead, a more sustainable future likely lies in innovative "bottom-up" approaches, tailored to meet locally relevant mixes of ecosystem capacity and social values.

Mark Brunson is a professor of Environment and Society in Utah State University's Quinney College of Natural Resources. He is an environmental scientist who combines methods from social and ecological sciences to understand the dynamics of human-environment interactions. His work focuses on the causes and consequences of human behaviors in rangelands and forests, as well as how ecological processes and conditions influence human activities. Current studies investigate cross-boundary collaboration among land management jurisdictions to mitigate effects of landscape-scale ecological processes; effects of institutional and ecological factors on efforts to improve sagebrush ecosystem resistance to wildfire and cheatgrass invasion; and water conservation implications of trends in urban tree species choices. A USU faculty member since 1992, he has a PhD in Forestry and MS in Forest Recreation Resources, both from Oregon State University.

Restoring Forest Functionality – Breaking the Rules to Save the Pieces

Craig Thompson, Wildlife Ecologist, US Forest Service & Conservation Biology Institute, Corvallis, Oregon. craig.thompson@consbio.org

For years, ecological restoration efforts by federal land management agencies have been handicapped by limited scope, public distrust, single-issue regulations, and endless litigation. As a result, land managers are forever trying to repair last year's damage without ever getting to plan ahead for next year, and the problems just keep getting bigger. In 2009, Congress passed the Collaborative Forest Landscape Restoration Act, requiring agencies to think bigger, involve stakeholders in the planning and decision-making process, and target ecological processes as opposed to static conservation targets. In the Northern Rockies, collaboration between the Southwest Crown of the Continent Collaborative and the US Forest Service has led to a large–scale effort to minimize fire risk and restore biodiversity on a quarter million acres of the Flathead National Forest. Here I present some background information on the Blackfoot-Swan Landscape Restoration Project including how we define restoration objectives, the scientific principles we applied to quantify them, and some of the unique challenges faced by large-landscape restoration efforts.

Craig Thompson is a wildlife ecologist with the US Forest Service and the Conservation Biology institute. He received his PhD from Utah State University in 2006, and since then has worked on reconciling

forest carnivore habitat conservation with fire and fuel management in western forests. He has served as a technical advisor for three Congressionally-funded landscape restoration efforts in both the Sierra Nevada and the Northern Rocky Mountains. He currently lives with his family outside Missoula MT, inside the Bitterroot National Forest, giving him the relatively unique perspective of a scientist, land owner, and firefighter.

Outdoor Recreation and Land Ethics for the 21st Century

Ethan Linck, Ph.D. Candidate, University of Washington & freelance journalist. Seattle, Washington. ethanblinck@gmail.com

The idea that participation in outdoor recreation results in increased support for land conservation is often treated as axiomatic, and increasingly relevant as the outdoor recreation industry hefts its political muscle in debates over public land policy. Yet empirical evidence for this assumption is mixed at best, raising the question of whether the goals of conservationists and recreationists can ever meaningfully align to enact ecologically sound conservation policy. In this talk, I critically review the evidence for this assumption, as discussed in my recent article for High Country News ("Your Stoke Won't Save Us", May 2018). I then extend this discussion to examine how recreation-as-conservation relates to Leopold's Land Ethic, whether multiple land ethics can coexist at the national level, and whether the concept retains relevance in the reinvigorated battle for the future of Western public lands.

Ethan Linck is a Ph.D candidate in the Department of Biology at University of Washington, Seattle, where he studies ecology and evolution through the lens of population genetics. He is also a freelance journalist who has written on nature, science, and recreation for High Country News, The Los Angeles Review of Books, and Slate.

Bullseye: Managing Cultural Resource Sites to Reduce the Occurrence of Illegal Collection and Improve Site Conditions

Laurel Glidden, Fuels Archaeologist, Bureau of Land Management, Cedar City, Utah. lglidden@blm.gov

When conducting fire rehabilitation and habitat improvement projects, the traditional practice has been to avoid cultural resource sites to prevent impacts from equipment. However, this practice has resulted in discrete, obvious islands of vegetation which can lead to increased looting, impacts from cattle and wildlife congregating and has done little to counter the effects of erosion plaguing Utah sites. I propose an integrated, active management approach to manage cultural resources.

I have been working as an archaeologist in the Great Basin and Southwest for the past 20 years. My career began with the Dixie National Forest and I've worked for the Utah Department of Transportation and most recently the Bureau of Land Management as a Fire and Fuels Archaeologist. Working collaboratively with the BLM Color Country Fire and Fuels program has given me the opportunity to participate in habitat restoration as well as create opportunities to improve archaeological site conditions within the context of overall landscape management and health.

In Defense of a Hopi Sacred Landscape. The Arizona Snow Bowl Controversy

Leigh Kuwanwisiwma, Director Emeritus, Hopi Cultural Preservation office, The Hopi Tribe, Hotevilla, Arizona. lkuwanwisiwma@gmail.com

Mr. Leigh Kuwanwisiwma, Director Emeritus with the Hopi Cultural Preservation Office, is Tepwungwa (Greasewood Clan) from the village of Paaqavi. Mr. Kuwanwisiwma attained a Bachelors of Science degree in Business from Northern Arizona University. He formerly served as the Hopi Tribal Treasurer

and Assistant Director of the Hopi Health Department. He established the Hopi Cultural Preservation Office and served as director for 30 years until retirement in 2017. Under his leadership, programs were created to maintain the Hopi culture such as the Hopi Lavayi program, establishing a Cultural Resources Advisory Task Team (CRATT), Glen Canyon Environmental Assessment program and the Navajo/Hopi Intergovernmental Compact.

As a longtime advocate for Traditional Cultural Places and sacred site protection, Mr. Kuwanwisiwma represented the Hopi Tribe in major court cases such as the Little Colorado River water rights litigation, United States Forest Service and the City of Flagstaff regarding artificial snow making at the Arizona Snowbowl. Mr. Kuwanwisiwma collaboratively helped shape the Hopi Cultural Preservation Office Archives with Memorandum of Understandings (MOUs) with Northern Arizona University Anthropology departments, NAU Cline Library Special Collections and the Museum of Northern Arizona. He set high standards in addressing the Native American Graves Protection and Repatriation Act (NAGPRA). In 2012 and 2013 he was recognized and awarded the Public Archeology Award by Arizona Governor's Archaeology Advisory Commission (GAAC).

Mr. Kuwanwisiwma's most recent publications are Footprints of Hopi History Hipihiniwtiput Kukveni'at, (2018); co-author for Hisat'sinom- Ancient Peoples in the Land without Water (2012), co-author of Hopi People and Moquis and Kastilam: Hopis, Spaniards and the Trauma of History.

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Keynote: A Primer on the Law and Politics of Multiple Use Management on Federal Public Lands
Martin Nie, Director, Bolle Center for People and Forests & Professor, University of Montana, Missoula, Montana. martin.nie@umontana.edu

Professor Nie will provide an introduction to the law and politics of multiple use management on federal public lands administered by the U.S. Forest Service and Bureau of Land Management. What do our multiple use laws say and how have they been interpreted by these agencies, interest groups and the courts? Is multiple use, as critics claimed years ago, a "vacuous platitude" providing federal land agencies too much discretion? Is it a relic of the past, eclipsed by new ecological understanding and more substantive environmental laws? Is it a recipe for agency capture by special interests? Or, might multiple use be viewed more charitably, providing the principles, flexibility and foresight to solve the complicated conservation issues of today? Nie will introduce these questions, and others, while placing multiple use in its broader political context, focusing on the intense conflicts over the future of public lands in the American West.

Martin Nie is Professor of Natural Resources Policy and Director of the Bolle Center for People and Forests in the W.A. Franke College of Forestry and Conservation at the University of Montana. For twenty years, Nie's research and teaching has focused on public lands and wildlife policy. He is author of The Governance of Western Public Lands: Mapping Its Present and Future (2008) and recent recipient of the University of Montana's Distinguished Teaching Award, a special recognition based on "a history of excellence in classroom teaching" and given to professors who "have demonstrated a quality long-term impact on their students." As appointed by the Secretary of Agriculture, Nie served from 2014-2018 on the U.S. Forest Service's National Advisory Committee for Implementation of the National Forest System Land Management Planning Rule. Nie grew up in Ontario, Canada and received degrees from the University of Nebraska and Northern Arizona University. He loves to ski as much as possible with his son Joe, float wild rivers; hike, hunt and fish the mountains of Montana, and mess around in his garage listening to vintage country and rock and roll. He also enjoys trail running, playing hockey, Irish whiskey, and strong cheese.

Desert Spring Restoration. Challenges, and Opportunities for Success

Don Sada, Research Professor, Division of Hydrologic Sciences, Desert Research Institute, Reno, Nevada. don.sada@dri.edu

North America's desert springs often are small, isolated ecosystems characterized by their productivity, socio-cultural importance, biodiversity, and a wide diversity of endemic crenobiontic species. They are numerous, with more than 50,000 known in the US. Many geomorphically distinctive types of springs are categorized, each potentially including a variety of microhabitats that supports their diverse aquatic life. Aquatic life in springs is also a function of hydrogeology, flow pathways, and landscape associations, which are influenced by the supporting aquifer and natural and human disturbances. Unfortunately, springs also are among the most threatened and degraded habitats. Surveys of more than 2,250 Great Basin and Mojave Desert springs over the past 25 years found evidence of human use (non-native ungulate use, diversion, recreation, etc.) at 83% of springs, and approximately 65% were either moderately or highly disturbed by these activities. Of 256 springs that were visited several times over this period, conditions had not changed at approximately 40%, improved at 16%, and had degraded further at approximately 44%. These disturbances have demonstrable influence on spring ecology. Effects on riparian systems, and their recovery, appears to resemble effects to lotic systems, but effects on aquatic systems are poorly understood. Springs differ from lotic systems by their relatively constant environment and absence of channel forming processes. Therefore, stream/river restoration methods often are inappropriate for springs. Restoring springs is challenged by: 1—the scarcity of reference springs to guide managers toward ecologically based restoration programs, 2—practitioners weakly understand spring ecology consequences of the incremental effects of disturbance and how springs may respond to restoration, and 3—knowledge and experience are limited to set appropriate restoration goals and design monitoring programs to determine success or failure.

Dr. Donald Sada manages an aquatic ecology program that examines relationships between aquatic life and environments influenced by natural factors and human activity. Most of his work is in desert regions and focuses on streams, rivers, and spring-fed systems. He works in systems from the high mountains to below sea level in Death Valley, California, and includes aquatic mollusk biogeography and taxonomy, habitat preference of spring-dwelling benthic macroinvertebrates, spring system inventorying and monitoring, assessing effects of climate change on spring systems, and designing management programs for isolated wetlands species. Dr. Sada is an applied ecologist and often assists government agencies, public utilities, and private organizations develop strategies that minimize environmental influences of land-use practices. His current work includes examining effects of human and natural disturbances on aquatic macroinvertebrate abundance and community structure in arid land springs, spring inventories throughout the arid western US, and developing spring survey protocols for the National Park Service and Bureau of Land Management. In other recent work he has examined the effects of increased discharge on trout communities in Sierra Nevada streams, guided baseline studies to assess the efficacy of restoration programs in the lower Truckee and Walker rivers in northern Nevada. He maintains a database that includes environmental and biological information for more than 2,200 western US springs.

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Sustaining Multiple Use and Yield on Public Lands in Harney County, Oregon Through Collaboration

Benjamin Cate, Ecological Coordinator, High Desert Partnership, Burns, Oregon. ben@highdesertpartnership.org

Harney County encompasses the high elevation, desert sagebrush steppe in southeastern Oregon. The county is 10,000 square miles, the largest county in Oregon and the 10th largest county in the

United States. Of this land base, over 75% is public lands managed by federal agencies. This is home to approximately 7,300 resourceful, independent and resilient residents. Ranching, primarily cow-calf operations, have long been an economic driver of the rural economy. The sister communities of Burns and Hines are the main population center at 3500 residents and is where most all services are located for shopping, healthcare, and schools, with the nearest population base 130 miles away.

The High Desert Partnership is an organization that has pioneered successful collaborative initiatives in Harney County for over 10 years by advocating for a process where solutions are economically, socially, and ecologically sound and are developed by all stakeholders. Addressing the complex issues that impact sustaining multiple use on public lands requires science but must also consider the complexities of management and the people involved in decision-making. In our experiences, we believe engaging in a collaborative, solutions-oriented process with relevant stakeholders is the only viable and lasting means to address contemporary natural resource, social and economic issues facing communities. Collaboration can also serve as a buffer against extremism, foster shared understanding of the issues at hand, support partners during staff turnover, and empower partners to make decisions. In 2016, Harney County experienced a type of extremism where the Malheur National Wildlife Refuge was taken over by a group espousing turning over federal lands to private ownership.

The collaborative efforts, some of which High Desert Partnership continues to support, seemed to have buffered Harney County and there was not widespread embrace of the militia message to turn over federal lands to private ownership. In this presentation, we will explore guiding principles that have emerged across collaborative efforts, including forest, wetlands and sagebrush rangeland initiatives in our region that address multiple-use and sustained yield on publicly managed lands. These efforts are rooted in relationship building and honest listening. As collaboration continues to expand as a process to solve natural resource issues there is interest in understanding the shared qualities that ensure successful solutions to complex issues and community resilience.

Ben grew up in the small southeast Oregon town of Burns that is home to the High Desert Partnership. He attended Oregon State University to obtain a B.S. in Fisheries and Wildlife Science, specializing in wildlife biology and conservation. He has worked in a variety of aspects of natural resource management including wildlife research and habitat improvement projects for Oregon State University and the Oregon Dept. of Fish and Wildlife, and as the manager of several wildlife mitigation properties for the Burns Paiute Tribe. In his current role he serves as coordinator for several ecological collaborative initiatives in Harney County, OR. When not working to influence local public land management in a positive way, he is out enjoying those public lands in all the ways that Oregon has to offer.

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Can We, Should We, Keep Up? Changing Demands on Public Lands Recreational Landscapes and Infrastructure

Evan Glenn, Trails and Travel Management Program Lead, BLM, Salt Lake City, Utah. eglenn@glm.gov

Our public lands recreational landscapes and infrastructure are being enjoyed like never before. Trends in visitation and technology are straining these resources sometimes to the point of failure or at least to the point of loss of appeal. Evan's presentation focuses on the increasing demands on these resources and public land manager's responses towards meeting those demands

Evan is the Trails and Travel Management Program Lead for Bureau of Land Management's Utah State Office. He has 14 years of experience working as an Outdoor Recreation Planner for the BLM and the

U.S. Forest Service in Utah, Alaska, Oregon, and Washington, with focus areas of trails, roads, and river management. Evan's educational background includes a BS in Human Dimensions of Natural Resource Management from USU, Teton Science School Environment Education Residency, and MS degrees from the Environmental Science and Resource Recreation & Tourism programs at the University of Idaho. Evan was raised on a dairy farm in Cache Valley and resides near the trails in Park City, Utah.

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Utilizing the Tribal Forest Protection Act (TFPA)

Keith Karnes, Leech Lake (MN) Reservation Forester, Leech Lake Indian Reservation, Minnesota. forestry@lldrm.org

The Tribal Forest Protection Act (TFPA) was entered into Legislation in 2004. This Act came about from fuels concerns on public lands adjacent to Tribal lands in the western U.S. Another component of TFPA is ecosystem restoration; this is a concern to many Tribes across the country. At Leech Lake, with an abundance of adjacent public land holdings, we have invoked TFPA numerous times to draw attention to concerns. This has led to a much more constructive and collaborative focus on forest management on the Leech Lake Reservation; this collaborative continues to grow.

Keith has worked in Forestry on Indian Lands for 14 years, the last 12 years were at Leech Lake Reservation. He graduated in 2003 from the University of Wisconsin-Stevens Point with a degrees in Forest Management, Forest Administration and Utilization, and a minor in Soil Science. Keith is responsible for all aspects of forest related work at Leech Lake including reforestation, fuels, prescribed understory burns, TSI, timber sales, orchard maintenance, hazard tree removal, etc. In recent years Keith has worked much more closely with Chippewa National Forest to ensure Tribal treaty rights are enforced on their projects, hunting and gathering (with a large emphasis on climate change).

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Canary in the Marijuana Field: How Wildlife Engaged Stakeholders and Policy in Addressing Environmental Impacts from Marijuana Cultivation on in the Western United States

Mourad Gabriel, Co-Director, Integral Ecology Research Center, Research Associate Faculty, UC Davis, Blue Lake, California. mgabriel@iercecology.org

Prior to 2012 the discussion surrounding marijuana cultivation was charged politically, emotionally and sensationally. One point that was missing from debates was the environmental costs stemming from marijuana cultivation. Unfortunately, research, data or any outside knowledge describing the environmental impacts from marijuana cultivation on public lands prior to 2012 was extremely limited. It wasn't until that year, when a foundational paper on exposure to and mortality attributed from pesticides found at marijuana cultivation sites in a rare forest mesocarnivore, the fisher, brought this issue front and center in the main-stream venues. This paper generated national and international media coverage which initiated and, in many instances, forced candid discussions within governmental agencies and communities on the topic of marijuana cultivation and its environmental footprint. However, the fisher data generated by researchers was met with skepticism from both the scientific field and the public. Most of the criticism was based on the notion that researchers were overestimating the importance of these impacts and that it was trivial in comparison to other risks this carnivore was undergoing. Additionally, data gathering on the topic was slow yet meticulous due to the inherent danger and minimal support for continuation of projects. It wasn't until continued data collection efforts and hundreds of presentations demonstrating water, soil, vegetation, ESA listed and game species contamination from pesticides used at these sites, fortified a more cohesive stakeholder discussion on the matter. Stakeholders from

environmental, conservation, hunting and fishing groups, and agencies were then actively discussing and engaging policy makers in developing solutions. Though the topic initially appeared to be polarizing, once additional scientific data demonstrated numerous affected factions, a common thread of engagement was directed towards wildlife conservation efforts.

Dr. Mourad Gabriel is the Co-Director of Integral Ecology Research Center, a non-governmental scientific research organization headquartered in Northwestern California, Research Associate Faculty member at the University of California Davis, School of Veterinary Medicine, One Health Institute and Wildlife Health Center, and Associate Member of Humboldt State University Interdisciplinary Institute of Marijuana Research.

He completed his Bachelor's and Master's degrees at Humboldt State University in Wildlife Ecology and his Ph.D. in Comparative Pathology at the University of California Davis, School of Veterinary Medicine. Dr. Gabriel's leads several national and international projects through his organization which focuses on investigating and understanding threats to wildlife populations of conservation concern from both infectious and non-infectious disease agents. His current research concentrates on the vast environmental impacts that marijuana cultivation has on the unique natural resources of the Western United States.

Dr. Gabriel has authored numerous book chapters and peer-reviewed scientific papers, many of which fashioned the foundational knowledge of harmful impacts to natural resources from marijuana cultivation on public or tribal lands. Dr. Gabriel currently serves as a Steering Committee member and Science Advisor for the California Department of Justice and HIDTA Marijuana Enforcement CAMP Team. He is a scientific advisor and active contributor for the United States Forest Service Marijuana Pesticide Safety Team, United States Forest Service Region 5 Law Enforcement, an instructor at both the Federal Law Enforcement Training Center (FLETC) and California Narcotic Officers (CNOA) Association on how to recognize, avoid, and document environmental hazards associated with marijuana cultivation.

Dr. Gabriel has served as an expert witness for both state and federal prosecutions on environmental degradation associated with marijuana cultivation. His research has contributed towards several state and federal policy reports including the Office of National Drug Control Policy annual reports on the influence of marijuana cultivation on the environment. Dr. Gabriel and collaborators were awarded the 2017 U.S. Forest Service Law Enforcement and Investigations Directors Award, and the 2015 and 2017 Executive Office of the White House ONDCP award for marijuana documentation and enforcement, and his organization was awarded the 2013 Conservationist of the Year award by The Wildlife Society. He currently resides in Northwestern California where he and his family strive to spend as much time as possible outdoors enjoying our public lands.

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## Rural Values and Multiple Use: Insights from a Community Based Organization in Central Idaho

Toni Ruth, Executive Director, Salmon Valley Stewardship, Salmon, Idaho. toniruth@salmonvalley.org

Central Idaho is remote, rugged and public lands rich, containing roughly 5.5 million acres of USFS and BLM lands. The region is the headwaters of the Salmon River and is highly valued as salmon and steelhead habitat. Surrounded by miles of scenic rivers and byways, tributaries to the river have been identified as cold-water fish refugia in a changing climate. Nestled in this beautifully rugged and isolated landscape, our rural communities are frequently at the intersection of navigating community self-reliance and economic development in concert with multiple use interests and sustainable use

of natural resources. People living in these communities rely upon the land for revenue, jobs, and overall well-being. Yet, rural, public lands-dependent communities have typically experienced less economic growth and investment than their metropolitan counterparts. Controversial and complex land management, scaling of multiple use needs, and shrinking federal investments have resulted in sometimes intense social and political conflict, and the loss of traditional business and employment sectors. Overcoming these complex problems requires a combination of enabling civic dialogue, job and policy innovation, and fostering the next generation of community leaders. Over the past several decades, community-based organizations (CBOs) have emerged in many traditionally resource-dependent rural communities, helping rural towns cope with changing policy, economic transitions, and multiple-use ideals. This presentation will highlight successes and challenges to fostering civil dialogue that is inclusive of diverse perspectives. I will provide insights from community based collaboration and restoration endeavors in Central Idaho. No town is an island, even in the rural west.

Toni Ruth is the Executive Director of Salmon Valley Stewardship and lives in Salmon, Idaho. She relishes working with a passionate staff and board to promote a sustainable economy and productive working lands in the stunning Salmon River Region of Central Idaho. She serves on the Leadership Team of the Rural Voices for Conservation Coalition, the Steering Committee for the High Divide Collaborative, is a member of the UI Rangelands Center Partners Advisory Committee, and serves as a council member of the Wild Felid Association. Prior to these roles, Toni studied mountain lions for over 28 years, publishing numerous scientific and popular articles. She is in the final stages of completing a book, Yellowstone Cougars: Ecology Before and During Wolf Restoration, due for publication in 2018. Toni has a PhD in Wildlife Science from the University of Idaho, a MS in Wildlife Science from Texas A&M, and a BS in Forestry and Conservation Biology from the University of Florida.

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Towards a Better Understanding of the Socio-ecological Complexities of Feral Horses in the U.S. Through a Global Lens

Derek Scasta, Rangeland Extension Specialist, Assistant Professor of Rangeland Management, Plant - Herbivore Interactions Ecologist, University of Wyoming, Laramie, Wyoming. jscasta@uwyo.edu

Today, >72,000 feral horses and burros live on western U.S. public rangelands and are protected under the Wild Free-Roaming Horses and Burros Act of 1971. The number of horses and burros exceeds the Bureau of Land Management's maximum Appropriate Management Level (AML) of 26,715 by a factor of approximately 2.7 and has nearly doubled from 2007–2015. The AML was set to balance horse and burro numbers with rangeland health and support other uses such as wildlife habitat and livestock grazing. Thus, public land management agencies must manage horses and burros under the multiple-use context. This becomes more problematic when populations go largely unmanaged and excessive equid grazing negatively impacts rangeland vegetation, native wildlife, and livestock forage. In addition, approximately 46,000 horses and burros exist in off -range holding facilities, further straining federal budgets, and tens of thousands more horses occur on tribal lands. Feral horses also occur in Australia, Canada, and New Zealand where they are as equally controversial. It is necessary to understand that the coevolution of human society and horse domestication was transformative due to the intimate relationship between horse and human and consequently, contemporary management actions are being constrained by: (1) litigation, (2) public emotional concerns that lack reconciliation with the current situation, and (3) increasing complexity in the laws and subsequent amendments shaping horse and burro management policy. Collectively, these factors impede the implementation of concrete solutions to manage for healthy horses and health rangelands upon which they depend. Consequently, stakeholders are increasing polarized over how horses are or should be managed. While the ecological and animal health and welfare implications of unmanaged horse and burros

populations are somewhat understood, publicly acceptable strategies to maintain healthy populations, healthy and functioning rangelands, and multiple uses that sustain wildlife and local communities remain unresolved.

Dr. John Derek Scasta holds a BS degree from Texas A&M University in Rangeland Ecology and Management, a MS degree from Texas Tech University in Crop Science, and a PhD degree from Oklahoma State University in Natural Resource Management. For the past 14 years, he has worked throughout the Great Plains and Front Range region with private, state, and federal partners on a wide variety of natural resource related issues including wildfire, feral horses, livestock-wildlife conflicts, drought, and education. In 2018, Dr. Scasta also traveled to Australia and New Zealand to gain a broader perspective about feral horses.

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Community-engaged Education: A Way Forward for Integrating Multiple Uses on Public Lands?

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For a biologist at a primarily undergraduate institution (PUI), community-engaged education is the practice of developing truly collaborative relationships with community partners to enhance the educational experience of students while simultaneously co-producing actionable science. We developed a community-engaged education program at Southern Utah University by way of cooperative agreements related to (i) native plant materials and (ii) heritage resources such as fossils, archaeological artifacts, and tribal relationships. Other community-engaged partnerships were developed through a university-supported Curriculum Innovation Grant (CIG) that allowed us to convert our genetics laboratory class into an authentic undergraduate research experience driven in part by research needs of federal partners. Cooperative agreements were successful mechanisms to promote multiple uses of public lands through experiential education of our students and development of native plant materials for restoration efforts. However, with some federal partners moving away from cooperative agreements we will need to find new ways to continue to meet the needs of students and the university when partnering to fulfill federal obligations. Our CIG project began as an informal partnership with the Dixie National Forest in which university students used genetic techniques to provide baseline data for diatom communities in streams affected by the 2017 Brian Head Fire. With this approach, not only did students make significant gains on the course learning objectives, but they also provided our community partner with information that can be used to maintain sustained yield on public lands through informed management decisions. The CIG project has since developed into partnerships with multiple agencies to continue the diatom work and assist in the restoration of greater sage-grouse and desert tortoise habitat based on dietary information derived from genetic analysis. When multiple uses includes education, public lands become even more valuable than they were historically envisioned.

Jackie is an associate professor of biology at Southern Utah University where she teaches biology courses and is the curator of the Garth and Jerri Frehner Museum of Natural History. As curator she directs all educational programs, manages all staff, designs and implements all exhibits, and performs educational outreach for the southern Utah community. Jackie became the Provost Faculty Fellow for Parks and Partnerships in July of 2018 - in this capacity she will help build the University of the Parks brand at SUU by implementing pedagogical strategies that take advantage of the university's proximity to parks and public lands. Jackie just finished a three-year term as the Vice President of Education and Outreach for the Society for Conservation Biology. Jackie's main interest in the multiple uses of public lands is education, which gets very little airtime during "multiple use" discussions.

Jackie and her team support restoration on public lands through a cooperative agreement to collect and perform research on native plant materials in compliance with the BLM's Seeds of Success program. She fosters community outreach related to public lands through a second cooperative agreement with the BLM's Heritage Resources program in collaboration with the Paiute Indian Tribe of Utah. Through this agreement she and her team is developing a trio of sister gardens dedicated to culturally significant plants and the role resilient landscapes in the Intermountain West. In addition to recreational and traditional use values, Jackie is convinced that public lands are important because they are the nurseries for native plants needed to restore health, integrity, and beauty to public lands damaged by wildfire and overuse.

Medusahead: A Potential Livestock Forage on Rangelands?

Casey Spackman, PhD Candidate, Utah State University, Logan, Utah.
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Livestock tend to avoid medusahead rye (Taeniatherum caput-medusae (L.) Nevski) due to its high silica content, low digestibility, and inferior nutritional quality. Emerging information on grazing behavior and the application of a glyphosate containing herbicide has been shown to increase preference for this invasive plant species. Several experiments have been conducted to determine why this increased preference occurs and what techniques can be used in order to maximize medusahead control. Initially, the salt contained in the herbicide (Roundup RT 3®) was thought to increase grazing preference; however, application of the salt further reduced medusahead preference by cattle. An additional study was conducted with cattle to determine if the adjuvant within the herbicide was responsible for enhancing medusahead palatability, but this treatment did not increase the consumption of medusahead. Chemical analyses revealed that Roundup RT 3® promoted a decrease in silica content and an increase in water-soluble carbohydrates in medusahead tissues, thus improving the nutritional quality of the plant. An in vitro digestion kinetics study showed that Roundup RT 3® nearly doubled the rate of medusahead digestion. The practical aspect of rate, type of herbicide, and timing of application were explored in ensuing studies. It was observed that 788 g ae ha-1 was the optimal rate of application that enhances medusahead palatability, while there was no difference in preference between the application of a generic glyphosate herbicide and Roundup RT 3®. Another study determined that cattle preferred medusahead that was treated during the late vegetative stage to that of the earlier or later phenological stages. In summary, these studies show that the application of a glyphosate-containing herbicide in combination with targeted grazing can be used to reduce medusahead invasion, provide a forage of improved nutritional value for livestock, and facilitate potential restoration methods.

Casey Spackman is currently a Doctoral student at Utah State University in the Department of Wildland Resources. His work is based off a collaborative grant between the USDA-ARS-Poisonous Plants Research Laboratory and USU-Department of Wildland resources. His focus is on livestock grazing behavior; or in other words, how do you get animals to eat something they usually would not. The grazing specifically deals with invasive annual grasses in the intermountain west.

Forests and water: A Synthesis of Recent Effects of Forest Disturbance on Water Yield in the West

Sara Goeking, Biological Scientist, U.S. Forest Service, & PhD Candidate, Utah State University, Logan, Utah. sgoeking@fs.fed.us

Recent widespread tree mortality across the western US has provided a testbed for hypotheses about the effects of forest disturbance on water yield. Decades of previous research, primarily from before-after/control-impact studies of clearcutting, led to the expectation that forest cover loss

would lead to increased runoff. Our objective was to synthesize studies that quantified the effect of recent tree mortality on streamflow and answer the question: Does water yield increase after forest disturbance? Our synthesis included both standing-replacing disturbances, such as severe wildfire and clearcutting, and non-stand-replacing disturbances such as drought, insects, and low- to mid-severity fire, which have been common and widespread throughout the western US over the past two decades. We also summarized literature that identified the physical processes and components of the hydrologic cycle that drove overall hydrologic response, as measured by streamflow or runoff ratios. Streamflow response to forest disturbance was highly variable and depended on the relative magnitudes of process-level responses, such as decreased interception of snow and decreased canopy evapotranspiration, versus increased loss of snowpack due to increased radiation. Some studies found no increase in streamflow following disturbance, contrary to the expectation that loss of forest cover leads to increased water yield. In some cases, a lack of streamflow response masked process-level responses that affected snowpack retention and soil moisture. Finally, quantitative descriptions of forest cover and disturbance varied widely among papers and between the disciplines of hydrology and forestry, which suggests that cross-disciplinary collaboration could provide more accurate representations of forest structure for water resources planning and research.

Sara is a PhD candidate in USU's Department of Watershed Sciences, and her advisor is Dr. David Tarboton. Her dissertation examines how forest dynamics affect streamflow using forest inventory data in a spatially distributed hydrologic model. Sara is also an analyst for the US Forest Service's Forest Inventory and Analysis Program, where her most recent work quantified the west-wide decline and regeneration status of whitebark pine.

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Saving and Sharing the Pando Aspen Clone – Taking Advantage of Social Media Interest

Nancy Brunswick, Regional Landscape Architect, Intermountain Region, United States Forest Service, Ogden, Utah. nbrunswick@fs.fed.us
Co-author: Dan Child, Public Service Staff Officer, Fishlake National Forest

The Pando aspen clone is located in the Fish Lake Basin, on the Fremont River Ranger District of the Fishlake National Forest, in Sevier County, Utah. Pando is the largest and most massive aspen clone discovered to date. Pando's massive size, weight, and age have caused world-wide fame, fueled by social media interest. As a result of both research that has been published, and social media posts, the Pando is visited and studied by many groups from all backgrounds from all over the world. Currently Pando is suffering from a lack of regeneration and damage caused by insects, disease, and browse by wildlife. In its current state of decline, it is at risk of decreasing in clone size or complete die-off. The Forest Service is working in cooperation with partner organizations to gain an understanding for the decline and how Pando reacts to various treatments. Treatment areas, some fenced, were set up along with research plots to aid with this task. The fenced treatment area creates an amazing opportunity to educate forest visitors about the various ways to encourage aspen growth. Even with the interest in Pando, there currently are no signs, and one locally produced brochure. A comedian from Chicago, IL contacted the Forest to share concerns that there wasn't any information available on site about Pando. This led to a partnership where the comedian, Brad Einstein, and a film crew developed a social media campaign. They are working with local nonprofit organizations, the Fishlake National Forest and Aspen conservation organizations to share information and raise funds to support interpretation and further conservation initiatives. There is a need to provide interpretive exhibits and identity signs at the site to notify visitors of Pando's location and interpret the resource. Phased planning and development of interpretive materials will provide accurate information to the public so they can enjoy their visit with Pando, gain a better understanding of its uniqueness, and understand why ongoing studies of Pando are necessary.

This presentation will demonstrate examples of the benefits of using creative social media outreach and partnerships to share conservation strategies with the visitors to the Fishlake Basin and foster stewardship to help expand monitoring and conservation of the Pando Clone.

Nancy Brunswick is the Regional Landscape Architect for the Intermountain Region of the US Forest Service. Prior to her current position, she was the recreation program manager on the Cibola National Forest in New Mexico, a byway specialist with the America's Byways Resource Center in a partnership position with FHWA and a landscape architect on the Dixie National Forest.

She was a contributing author for "Scenic Byways: A Design Guide for Roadside Improvements", which received an award from the National Association for Interpretation. While working with the Resource Center, she was the project manager and a contributing author for "Conserving Our Treasured Places: Managing Visual Quality on Scenic Byways."

Nancy received a Bachelor of Fine Arts from the University of Utah and a Master of Landscape Architecture degree from Utah State University.

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How the U.S. Fish and Wildlife Service Protects and Recovers Federally-listed Species in Multiple-use Landscapes

Hilary Whitcomb, Wildlife Biologist, U.S. Fish and Wildlife Service, Salt Lake City, Utah.
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The U.S. Fish and Wildlife Service (USFWS) does not have "a multiple use mandate", but the reality is that we work constantly in collaborative multiple use settings. Our office works closely with our partners in multiple use ecosystems to protect and recover federally-listed species to levels where populations and landscapes are self-sustainable. This presentation will describe how the USFWS Utah Ecological Services Field Office facilitates avoidance, minimization, and recovery measures for individual species and how those measures fit into landscape level sustainability.

Hilary Whitcomb graduated from Utah State University with her MS and PhD in Ecology. Her thesis and dissertation work used social-ecological systems frameworks to evaluate rangeland issues in the Great Basin and Mojave Desert. She has been working as a Wildlife Biologist for the U.S. Fish and Wildlife Service, Utah Ecological Services Field Office since 2016. She primarily works with species in the Uintah Basin and Washington County.

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Co-managing Ecosystem Transition: Making Decisions About Restoration and Multiple Use After Extreme Landscape Change

Sasha Stortz, Senior Research Specialist, Landscape Conservation Initiative, Northern Arizona University, Flagstaff, Arizona. sasha.stortz@nau.edu

Extreme fire regime shifts, coupled with climate change, can transform vegetation communities and result in ecosystem transition. For land managers and community members, ecosystem state change can signify a unique challenge: even generations of experience may be insufficient to inform land use and restoration choices when ecosystem conditions are fundamentally changed. This presentation will describe two Southwestern U.S. case studies in which transformative fire-mediated state change has

occurred: the eastern Jemez Mountains of New Mexico, where high severity fires and post-fire flooding have transformed formerly forested areas to grass and shrubland, and the Sonoran Desert of southern Arizona, where invasion of non-native plants has introduced fire to a non-fire-adapted system. Through interviews and surveys, we explored manager and stakeholder perceptions of landscape change, its affects on current land uses and social values, and potential for restoration. We identified barriers and challenges to shifting management strategies in the face of landscape change, and conditions under which landscape change can catalyze collaborative restoration planning in spite of uncertainty about ecological trajectory, timing, and extent of state change. We identified land uses that community members felt were essential to preserve, and turning points at which land management objectives might need to change. In the face of global climate trajectories and Western U.S. fire regime shifts, understanding the factors that facilitate the ability for managers and stakeholders to act in the face of dramatic landscape change will be essential for determining restoration potential and future land use.

Sasha Driscoll Stortz specializes in collaborative planning and designing spatial decision support systems for land management in the Southwest. A Research Associate with Northern Arizona University's Landscape Conservation Initiative, Sasha leads the LCI's Collaborative Planning Program, where recent projects have included supporting managers and scientists in northern New Mexico developing climate adaptation strategies across multiple jurisdictions, developing a strategic agreement for co-management of Canyon de Chelly between the Navajo Nation and federal agencies, and creating a collaborative landscape assessment for the greater Grand Canyon watershed. She is also an instructor for Northern Arizona University's Grand Canyon Semester. Sasha holds a B.A. in Biology from Lewis & Clark College and an M.S. in Environmental Sciences and Policy from Northern Arizona University. Prior to joining Northern Arizona University, Sasha was a Program Associate at the Udall Foundation's US Institute for Environmental Conflict Resolution, conducted research on endangered birds and butterflies with the USGS Alaska Science Center and The Nature Conservancy, and guided students across the globe with National Geographic Student Expeditions. Sasha is trained in conflict management, holding a certificate in mediation from the Center for Community Dialog, and a certificate in conservation conflict resolution from the Smithsonian Institute. She was recently named a Wilburforce Fellow for Conservation Science Leadership. When she's not at work, Sasha makes time for backpacking in the Grand Canyon, playing violin with a local Flagstaff band, and fishing for salmon with her family in Alaska.

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Promoting Sustainable landscapes in the West Box Elder Watershed
Diane Tanner, Working Group Leader, Box Elder County, Utah. tanners@boxcranch.com

We organized a Coordinated Resource Management plan in West Box Elder County, Utah by including Landowners, academics, land managers, and sports enthusiasts to build a framework on 1.5 million acres of land for specific actions and management strategies to maintain and improve natural resources within the watershed.

Diane was the West Box Elder Coordinated Resource Management Plan Coordinator of the last 8 years. Raised in Salt Lake City, married Jay Tanner a rancher in Grouse Creek Utah. They have 4 children and 6 grandchildren. Their ranch was awarded the 2010 Leopold award and in 2011 won the regional NACB Environmental Stewardship award.

Cooperative Restoration for Sage-grouse and Sagebrush Landscapes in Idaho
Ann Moser, Wildlife Staff Biologist, Idaho Department of Fish and Game, Boise, Idaho.
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In 2015 the Idaho legislature first authorized annual appropriations for sage-grouse conservation efforts. In the spirit of "All Hands, All Lands", the State agencies responsible for implementing the Governor's Sage-grouse Plan formed the Idaho Sage-grouse Actions Team, a group of partners dedicated to assuring that the State's funds go to conservation projects that best benefit sage-grouse habitat, as well as working to leverage these funds with federal or other dollars. The Actions Team includes representatives from Idaho Department of Fish and Game, Governor's Office of Species Conservation, Idaho Department of Lands, Idaho Department of Agriculture, Idaho Soil and Water Conservation Commission, Bureau of Land Management, U.S. Forest Service, Natural Resources Conservation Service, U.S. Fish and Wildlife Service, and The Nature Conservancy. The team's four priorities are to fund projects that support 1) Rangeland Fire Protection Associations; 2) strategic fuel breaks; 3) restoration and stewardship; and 4) research and innovation. This presentation highlights the Actions Teams accomplishments, including a project with U.S. Geological Survey that is investigating emerging tools, including weed suppressive bacteria and herbicides, for controlling invasive annual grasses.

Ann Moser is a Wildlife Staff Biologist with the Idaho Department of Fish and Game. She currently coordinates the sage-grouse program and has been working on sage-grouse conservation and biology since 2007. She has an MS in Wildlife Resources from the University of Idaho.

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Keynote & QCNR Seminar Speaker, The Importance of Collaboration in Sustaining the West
Rose McKinney-James, Managing Principal Energy Works LLC & McKinney-James & Associates, Las Vegas, Nevada. rose@mckinneyjamesassociates.com

Nevada has been a leader in advancing renewable energy in the west. Collaboration between industry, advocates, environmental leaders and federal land use officials has played a critical role in this development. There are several examples of how this collaboration proved to be the difference in the ability to complete projects that are beneficial to reducing carbon and addressing the impacts of climate.

Technology, innovation and creative solutions have been a guiding force behind much of the progress made in developing renewable resources on public land. Recent Federal policy shifts may serve to dismantle and interrupt this progress. Support for creating increased public awareness and engagement underscoring the importance of collaboration is key to the success of future efforts.

Rose McKinney-James is a seasoned small business leader, clean energy advocate and independent corporate director with a long history in public service, non-profit volunteerism and private sector corporate social responsibility. The former President and CEO for the Corporation for Solar Technology and Renewable Resources, (CSTRR) and former Commissioner with the Nevada Public Service Commission, also served as Nevada's first Director of the Department of Business and Industry. She is currently the Managing Principal of Energy Works LLC and McKinney-James & Associates. Her firms provide business-consulting services and advocacy in the areas of public affairs, energy policy, and economic and sustainable development. This provides an opportunity to advance her extensive experience as a business, corporate and community leader. Ms. McKinney-James has over two decades of experience in advocacy in legislative and utility regulatory proceedings relative to renewable and clean energy policy and community and stakeholder outreach in Nevada and the U.S. She has helped to shape much of the energy policy framework in place in the state of Nevada. A registered lobbyist with

the Nevada Legislature, Rose currently represents a range of public and private entities with interests in regulatory and energy and public policy. She assists her clients by developing strategic plans and initiatives designed to be executed utilizing solutions that address unique circumstances and demands.

Working with a diverse group of advocates, McKinney-James lead the effort to facilitate the passage of the first Renewable Energy Portfolio Standard (RPS) in Nevada. This was the first of many successful collaborations resulting in significant clean energy policy advancement in the state.

McKinney-James serves on the Boards of the Energy Foundation and Net Impact. She is the Immediate Past Board Chair for the American Association for Blacks in Energy (AABE). In 2013 Rose was selected to serve as an Inaugural Ambassador for the C3E initiative supporting increased participation by women in the clean energy sector. Rose is the past Chair of The Clean Energy Project and Chair Emeritus of Nevada Partners, a nationally recognized workforce development agency.

Ms. McKinney-James has been recognized by the US Small Business Administration as Small Business Advocate of the Year. She received a Lifetime Achievement Award from the Women's Chamber of Commerce as well as the Clark County Public Education Foundation. She has also been honored by the American Solar Energy Society (SOLAR NV) as the Advocate of the Year. McKinney-James is listed in SAVOY Magazine Power 300 among the most influential African American corporate Directors.

A native of Detroit, Michigan, Ms. McKinney-James is a graduate of the Antioch School of Law in Washington D.C., and received her BA from Olivet College in Olivet, Michigan. In 2013, Olivet honored her with the Distinguished Alumna Award. Ms. McKinney-James is married and the mother of two sons.

# Posters

Beaver Dam Analogues: Implementation and Monitoring
Janice Gardner, Conservation Ecologist, Wild Utah Project, Salt Lake City, Utah, janice@wildutahproject.org

Healthy stream and riparian habitats benefit many user groups and resources such as wildlife, agriculture, and recreationists. However, many streams in the west are degraded. Beaver recolonization has been used as a stream restoration tool for decades, but beaver recolonization may not be successful everywhere. Some seriously degraded systems may not be able to initially sustain beaver or reintroduction of beaver may not be feasible. The concept of man-made beaver dams ("beaver dam analogues") began as a means to support the potential colonization of beavers and/or achieve the environmental benefits of beaver dams. The utilization of beaver dam analogues for restoration has become popular because it is affordable and effective.

In light of the popularity of beaver dam analogues, there has been a call for more data and monitoring on their effectiveness. Since 2013, Wild Utah Project and our partners have been using the Rapid Stream-Riparian Assessment (RSRA) method to efficiently assess the condition of a stream before and after beaver dam analogues are installed. RSRA utilizes qualitative and quantitative data collected in a stream to generate a score for water quality, hydrogeomorpohology, fish and aquatic habitat, riparian vegetation, and terrestrial wildlife habitat. RSRA provides a time and cost efficient means for land managers and conservationists to monitor the results of their restoration projects.

Restoring Native American Food Crops
Reagan Wytsalucy, PSC Graduate Researcher, Utah State University, regan.wytsalucy@hotmail.com

Native American populations in the Four Corners area have largely lost their connection to agriculture and face serious health challenges due to poor diet and limited availability of nutritious fruits and vegetables. To help address the lack of fresh nutritional resources in Southwestern Native American Tribes, two traditional food crops, Navajo Spinach (Cleome serrulata) and native peaches, will be assessed for historical importance and use, propagation methods, and to develop outreach methods to warrant local production in the Southwest. Wild collected C. serrulata seed was collected from various locations in the Navajo and Zuni Reservations for germination comparisons to C. serrulata seed from Great Basin Seed Company. Seed germination trials consisted of chilling at 4°C, 7°C, 10°C, or 20°C for four weeks after being pre-treated with or without hydrogen peroxide and Gibberellin ($GA_{4/7}$). Seed presoaked in $GA_{4/7}$ germinated faster and at higher rates at 7°C compared to other treatments for three locations tested. The germination tests will be utilized to matriculate growing requirements for commercial and private uses. Native peach seed has been collected and propagated from Navajo and Hopi Reservations to provide plant material for genome sequencing relative to documented peach varieties and for nutritional value. Dendrochronology samples collected from Navajo, Hopi, and Zuni Reservations will provide detailed information of historic peach orchard lifespan, period of life, and management practices. Historical documents and oral histories of tribal elders have provided insight for traditional growing and management practices of the spinach and peaches focused on preserving traditional knowledge and to utilize for outreach material to successfully manage and market in Southwestern Tribal lands.

Greater Sage-grouse (Centrocercus urophasianus) habitat selection in response to off-highway vehicle recreation in the Sheeprock Mountains, Utah, USA

Melissa Chelak, Ben Muhlestein, Jordan Smith, Terry Messmer, Utah State University

Greater sage-grouse (Centrocercus urophasianus) have exhibited population declines over their range-wide distribution in comparison to pre-settlement estimates; a significant proportion of these population declines have been attributed to habitat fragmentation. Utah contains several populations with little connectivity on largely fragmented landscapes that have followed cyclic population trends similar to those observed across its distribution. For a period of several years, Utah's populations were on a general downward trend, but began increasing overall; however, one of these populations, located in the Sheeprock mountains-- designated as the Sheeprock Sage Grouse Management Area (SGMA)-- continued to show downward trends. Stakeholders monitoring the area applied the use of translocations to address the declining population to prevent extirpation. In addition, they also had concerns about the growing recreation observed in the area and desired more information about these new visitors. In response to that need and also to determine the effects of Off-highway vehicle (OHV) use on habitat fragmentation, we designed a needs assessment survey for recreationists and OHV users in the area. The study was to both satisfy the demand for knowledge about the recreationists and provide insights on how OHV users might be affecting the greater sage-grouse. Data on the spatial patterns of OHV behavior were collected through global positioning system (GPS) units provided to each surveyed group. In addition, we monitored sage-grouse survival and habitat selection through rump-mounted GPS transmitters. This poster presentation outlines the study's data collection and analysis methodologies, presents preliminary descriptive statistics and visuals of OHV and sage-grouse data.

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