
SOCIETY FOR RANGE MANAGEMENT
SRM 2020
A NEW LOOK:
Transformation & Translation
DENVER
FEBRUARY 16-20, 2020
PRESENTED BY: CORTEVA & THE NRCS

DENVER - THE MILE HIGH CITY

Denver has 300 days of sunshine, a walkable downtown, thriving arts and culture, and an award-winning culinary scene. Denver is near the mountains, not in them. There are 200 named peaks visible from Denver, including 32 which exceed 13,000 feet (4,000 meters). the mountain panorama visible from Denver is 140 miles long.

Things To Do in and Around Denver

eTuk Ride Denver- Explore the heart of Denver in a tuk-tuk. eTuks are 100% electric and made in Denver. What's included- awesome local guide, pick-up at your downtown Denver hotel (subject to location) or at Union Station (17th Street and Wynkoop). etukride.com/denver/public-tours/denver-city-tour/

American Museum of Western Art- the Anschutz Collection- Located in the historic Navarre Building, is the permanent home of the Anschutz Collection. Over 300 paintings by more than 180 artists provide guests with a survey of Western art, as well as a better understanding and appreciation of the history and beauty of the American West over time. https://anschutzcollection.org

The Butterfly Pavilion- Just 15 minutes from downtown Denver, the Butterfly Pavilion is the first stand-alone Association of Zoos and Aquariums-accredited non-profit invertebrate zoo in the world and a leader in invertebrate knowledge, inspiration and connection. the Pavilion provides unique hands-on learning experiences, exhibits and educational programs, conducts new research which sets the standard for zoos across the country, and builds innovative solutions for species and habitat conservation around the world. https://butterflies.org

Denver Botanic Gardens- Botanical showcase for native and international plants, events and educational and research programs. Just south of City Park, 24 acres make up the Denver Botanic Gardens. No less than 32,000 diverse and delightful plants from such faraway places as Australia, Africa and the Himalayas are displayed. There are dozens of gardens to enjoy, including a children's garden. https://www.botanicgardens.org/

The Brown Palace- Built in 1892 to accommodate the brave flocking west in search of precious metals, the Brown Palace is pure gold, from its distinctive triangular shape to its soaring eight-story-high atrium, and because almost every president since 1905 has paid a visit (it has three commander-in-chief-sized suites). the six on-site restaurants are made all the sweeter thanks to the honey supplied by the rooftop beehives, and the artesian water comes from the hotel's own well. An afternoon tea is served from 12pm to 4p daily, space is limited, reservations required.

Denver Museum of Nature and Science- IMAX Theater shows require a special ticket but do not require Museum admission. https://www.dmns.org/

Denver Zoo- the Denver Zoo is home to more than 4,000 animals representing 615 species and has championed more than 600 conservation and research projects in 60 countries. Winter is a great time to visit the zoo. Animals are out and about enjoying the sun and cool temperatures. Hours are from 9am to 4pm. Plan your visit: https://www.denverzoo.org/visit/

Downtown Aquarium- the Downtown Aquarium features fascinating sea creatures, sharks and more. There are more than 15,000 fish, mammals and plants, including an exhibit of Sumatran tigers which love to swim.

Lariat Loop and Historic Byway- A 40-mile stretch in the foothills west of Denver, the Lariat Loop connects the communities of Golden, Morrison, Lookout Mountain and Evergreen, featuring some of the area's best historical and cultural attractions, not to mention spectacular mountain views and wildlife viewing opportunities. A handful of the attractions include: Colorado Railroad Museum, Buffalo Bill Grave and Museum, Boettcher Mansion, Dinosaur Ridge, Red Rocks Park and Amphitheatre, and the Morrison Historical District.

Colorado Ski Country- Colorado has some of the best skiing in the country with Echo Mountain, Loveland Ski Area, Winter Park, and Summit County all in a day's trip.

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DIVERSITY AND INCLUSION 2020

The Society for Range Management is a diverse body of members, employees, and representatives that are dedicated to leading the stewardship of rangelands based on sound ecological principles.

These principles have led us to understand that Humankind originated in rangelands, thus resulting in the present-day global diversity of peoples, languages, cultures, and natural resource management and socio-economic systems.

SRM welcomes, encourages, affirms, and values the participation and inclusion of all individuals with an interest in rangelands regardless of race, color, religion, gender, age, sexual orientation, national origin, culture, educational status, disabilities, emerging ideas and perspectives, or socio-economic status. We vigorously strive to eliminate implicit bias and reject discrimination and stereotyping within the society by proactively fostering tolerance, mutual respect, and multicultural awareness and competency by actively promoting inclusion in membership, education & training, competition, leadership, committees, staff, and all other areas of SRM activity.

SRM

Society for Range Management

United States Department of Agriculture

Natural Resources Conservation Service

LOGISTICS

CONFERENCE

Sheraton Denver Downtown
1550 Court Place
(303) 893-3333
Reservations:
https://book.passkey.com/go/SRM2020

RANGE PRACTICUM

Range Practicum Location: National Western Complex
*Enter National Western Complex at East door of Stadium Hall 1 at National Western Complex; the NW Club Room is just off Stadium Hall 1

Lodging: Courtyard Denver Stapleton
https://www.marriott.com/event-reservations/reservation-link.mi?id=1576162864893&key=GRP&app=resvlink

CONTACT

srm2020meeting@gmail.com

WEBSITE

www.srm2020.org
Registration:
srm.allenpress.com/srm/ANNUALMEETINGS.aspx

WIFI

Wifi is available at the hotel at no cost.

TRAVEL

Airport to Sheraton. the Sheraton Hotel does not have a shuttle service to or from DIA.

Airport Rail: Rail service is available between Union Station and DIA and takes about 40 minutes. Purchase tickets at vending machines on rail line platforms, Adults, $10.50, Disabled and/or 65+ $5.25, ages 5-19 $3.20, Under 5 $3. Daily train schedule 6am-8pm, every 15 minutes; 8pm-1am, every 30 minutes; 3am-6am, every 30 minutes. From Union Station take the free 16th Street MallRide bus to the Sheraton Downtown. the MallRide departs every 4-15 minutes. Exit the bus at 16 th Street and Court Place.
Uber or Lyft: $25-40.
Taxi, $25-40.

REGISTRATION

Saturday: 3:00PM - 7:00PM
Sunday: 7:00AM - 7:00PM
Monday: 7:00AM - 5:30PM
Tuesday: 7:00AM - 5:30PM
Wednesday: 7:00AM - 5:30PM
Thursday: 7:00AM - 12:00PM

OTHER INFO.

Kid's Room / Lactating Room will be available. Please see front desk for location.

Tours will depart at the hotel at the exit between Directors Row H and I.

Photo Contest is digital this year, voting will take place on the SRM 2020 App.

LOGISTICS

SILVER

Program

GRAND BALLROOM

Student Activities

WINDOWS

Program

DIRECTOR'S ROW

Committee Meetings

Student Activities

PLAZA BALLROOM & GOVERNOR'S SQUARE

Program

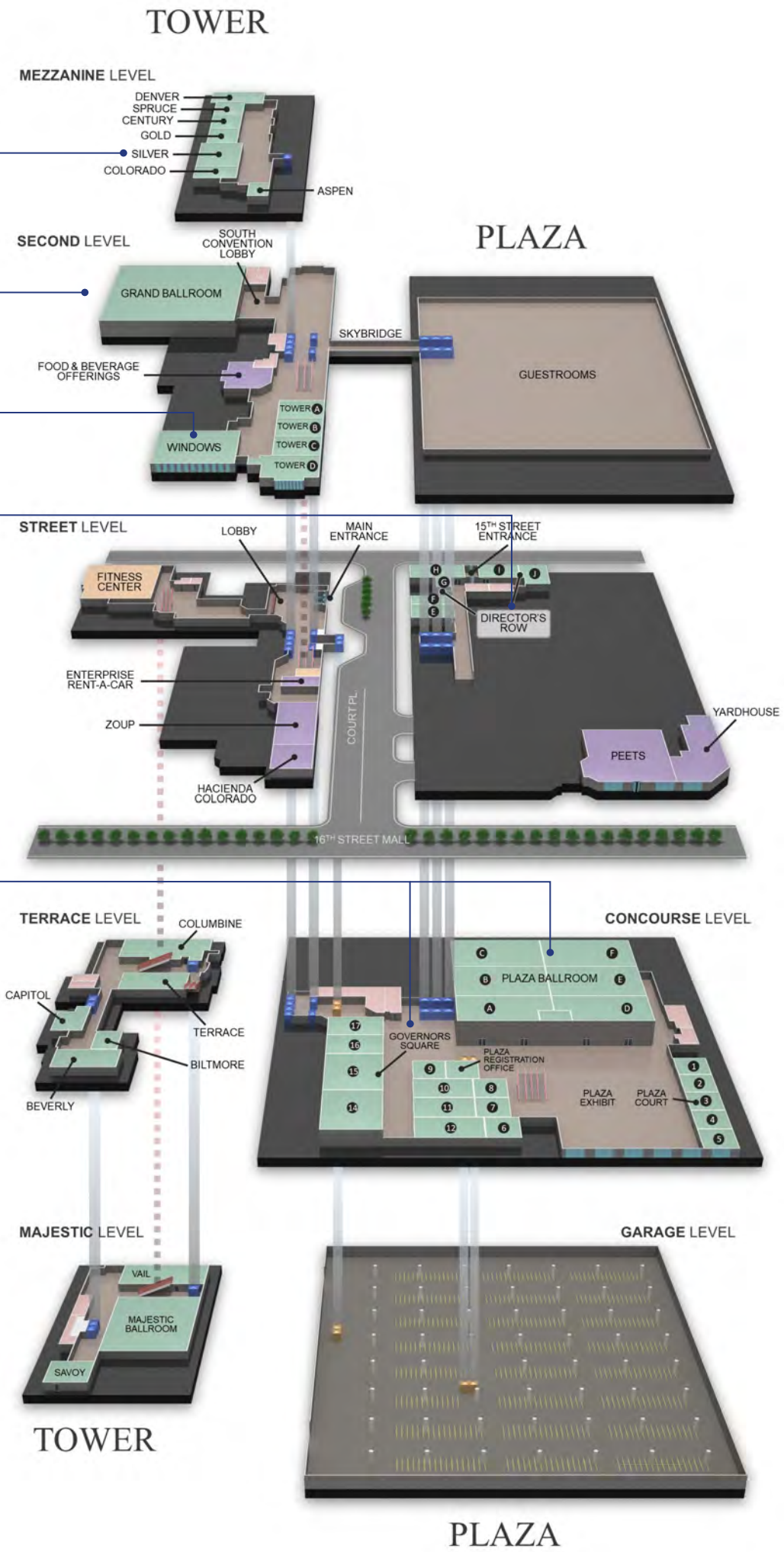
Committee Meetings

Scientific Sessions

Student Activities

Poster Sessions

Excellence in Range Management Poster Contest



AT-A-GLANCE

SATURDAY 2/15

8:00AM - 5:00PM	**Board of Directors**
8:00AM - 5:00PM Director's Row E	**SRM Board of Director's**
1:00PM - 5:00PM Plaza Court 8	**2020 Planning Committee**

SUNDAY 2/16

6:30AM - 7:30AM Plaza Court 8	**Daily Planning Meeting**
6:30AM - 7:30AM Plaza Court 8	**2020 Planning Committee**
7:00AM - 12:00PM Director's Row E	**Membership Team Committee**
8:00AM - 10:00AM Director's Row I	**RAM Committee**
8:00AM - 12:00PM Governor's Square 17	**Range Science Education Council**
8:00AM - 12:00PM Governor's Square 17	**Policy & Public Affairs Committee**
8:00AM - 5:00PM Governor's Square 11	**Avisory Council Committee**

AT-A-GLANCE

8:00AM - 5:00PM Director's Row F	**Nominations Committee**
8:00AM - 10:00PM Governor's Square 12	**Rangeland Invasive Species Committee**
9:00AM - 12:00PM Plaza Court 5	**Finance Committee**
9:00AM - 5:00PM Ballroom E	**Job Fair**
All Day	**Technical Tours**
9:00AM - 4:00PM	Rocky Mountain Arsenal Tour
9:00AM - 3:00PM	Bison Tour
8:00AM - 6:00PM	Grassland / Forest Tour
10:00AM - 12:00PM Director's Row I	**Student Activities Committee Meeting #1**
10:00AM - 12:00PM Governor's Square 16	**GIS/Remote Sensing Committee**
10:00AM - 12:00PM Governor's Square 12	**Targeted Grazing Committee**
10:00AM - 1:00PM Governor's Square 9	**Certified Professional Range Managers Committee (CPRM)**
12:00PM - 1:00PM Director's Row E	**GLC Committee**
12:30PM - 5:30PM Plaza Court 5	**Endowment Fund Development Committee**
All Day	**Companion Tours**
	~~**Ski Trip**~~ **CANCELLED**
12:00PM - 6:00PM	**Coors Brewery Tour**
1:00PM - 2:00PM Governor's Square 16	**Wildlife Habitat Committee**

AT-A-GLANCE

1:00PM - 2:30PM Governor's Square 17	**Certified Range Management Consultants (CRMC) Committee**
1:00PM - 3:00PM Director's Row I	**International Affairs Committee (IAF)**
1:00PM - 4:00PM Governer's Square 9	**Program Accreditation Committee**
1:30PM - 4:30PM Director's Row E	**Awards Committee**
3:00PM - 5:00PM Director's Row I	**Outreach, Communication and Website (OCW)**
3:00PM - 5:00PM Governor's Square 15 Governor's Square 14 Governor's Square 12 Governor's Square 16	**Scientific Sessions** 1. Rangeland Technology and Equipment Countil Workshop: Applying Seed Enhancement Technologies to Improve Rangeland Restoration Success 2. Sustainable Rangelands Roundtable: Past, Present, Future 3. Enhancing Rangeland Inventory and Monitoring w/ Unmanned Aerial System Imagery 4. Solar Grazing: An Emerging Opportunity for Rangeland Sheep Farms
3:00PM - 5:00PM Governor's Square 17	**Student Communication Workshop**
5:00PM - 6:00PM Director's Row E	**Reclamation and Restoration Committee**
5:00PM - 7:00PM Director's Row F	**NRCS West Regional Range Consortium**
5:30PM - 7:30PM Governor's Square 17	**Livestock Foraging Behavior Committee**
5:30PM	**Cash bar for agency meeting attendees**
6:00PM - 9:00PM	**Agency Family meetings, BLM and USFS**

AT-A-GLANCE

6:30PM - 9:00PM Governor's Square Rooms	**Agency family meetings, ARS and NRCS**
6:00PM - 11:00PM Director's Row J	**High School Youth Forum Orientation and Social**

MONDAY 2/17

All Day Director's Row J	**High School Youth Forum**
All Day Colorado	**Student Resume Review, Mentoring and Employment Interviews**
6:30AM - 7:30AM Plaza Court 8	**Daily Planning Meeting**
6:30AM - 7:30AM Grand Ballroom 1	**Undergraduate Range Management Exam (URME)**
6:30AM - 7:30AM Plaza Court 8	**2020 Planning Committee**
8:00AM - 10:00AM Plaza Ballrooms A, B, C	**Plenary 1, moderator Clayton Marlow** Welcome Drum Group and Color Guard SRM Honor Awards Speaker 1- Lauren Porensky "Complex Landscapes and Collaborative Successes" Speaker 2- Leslie Roche "Socio-ecological systems - emphasizing the human dimensions"
9:40AM - 10:00AM	**Break - Sponsored by: Tri-State Generation and Transmission Association, Inc.**

AT-A-GLANCE

10:00AM - 12:00PM	**Concurrent Sessions**
Governor's Square 14 Silver Plaza Ballrooms A, B, C Windows Plaza Ballroom F Governor's Square 15	1. Transforming Ranching through Precision Livestock Management in Extensive Rangelands (Symposium) 2. Creating Success in Rangeland Management, Tapping into our Emotional Intelligence (Workshop) 3. Strategies for Sustainability Transformations in Western Rangelands (Symposium) 4. Social-Ecological Resilience in the Northern Great Plains: Connections and Feedbacks of Dominant Drivers (Ignite) 5. Conservation Economics on Western Working Lands (Ignite) 6. Managing Rangelands for Pollinators: Best Management Practices, Current Research, and Research Needs (Ignite)
12:00PM - 1:30PM	**Lunch (on your own)**
1:00PM - 2:00PM Governor's Square 10	**SRM Past President's, Founding & Charter Member Luncheon, by Invitation Only**
1:30PM - 3:30PM Governor's Square 12	**Session 10 Invasive Annual Grass Management: New Tools to Slow the Transformation of Western US Landscapes (Symposium) launch**
1:30PM - 3:30PM	**Concurrent Sessions**
Plaza Ballroom F Plaza Ballrooms A, B, C Silver Governor's Square 15 Governor's Square 14 Windows	7. Transforming Public Rangeland Management Through Collaborative Multi-Stakeholder Partnerships (Symposium) 8. What are animals eating? New methods for estimating diet composition on rangelands (Ignite) 9. Applications of the State and Transition Model (STM) to Novel Resource Management Issues (Ignite) 10. grass management: new tools to slow the transformation of Western US Landscapes (Symposium) 11 the future is here: applications of technological advances for precision livestock management in extensive rangelands (Symposium) 12 Social Science Advancements to Rangeland Management? Perspectives from the Long-Term Agroecosystem Research (LTAR) Network (Ignite)

AT-A-GLANCE

1:30PM - 3:30PM Denver	**Diversity and Inclusion Workshop** The New IQ- Leveraging Inclusive Intelligence for Engagement, Innovation, and Collaboration
3:30PM - 5:30PM Governor's Square 9	**Watershed/Riparian Committee**
4:00PM - 5:00PM Director's Row F	**Researchers and Industry Collaborators - Nevada's Boulder Valley**
4:00PM - 5:00PM Plaza Ballrooms D&E	**Round 1 - Poster Sessions (Plaza Ballrooms D&E)**
5:00PM - 6:00PM Plaza Ballrooms D&E	**Round 2 - Poster Sessions (Plaza Ballrooms D&E)**
5:30PM - 7:30PM	**4th Annual Range Runners Fun Run 5K**
6:00PM - 8:00PM Plaza Exhibit Foyer	**Trade Show Mixer**

TUESDAY 2/18

6:30AM - 7:30AM Plaza Court 8	**Daily Planning Meeting**
6:30AM - 7:30AM Plaza Court 8	**2020 Planning Committee**
8:00AM - 12:00PM Director's Row E	**Native American Resource Advisory Council Business Meeting**
8:00AM - 12:00PM Director's Row F	**NARAC Business Meeting**

AT-A-GLANCE

8:00AM - 10:00AM Plaza Ballrooms A, B, C	**Plenary 2, moderator Karen Hickman** Welcome 8:20am- SRM Honor Awards 8:40am- Speaker 3- Karen Launchbaugh "Bridging the Gap: What does SRM want/need to be and how to get there?" 9:10am- Speaker 4- YPC leaders "Bridging the Gap: Transitioning Young Professionals to Leaders of SRM"
8:00AM - 11:30AM Spruce	**CPRM Exam Study Session**
8:00AM - 5:00PM Governor's Square 12	**HSYF Paper Presentations**
8:30AM - 11:30AM Governor's Square 17	**BLM AIM Data User's Working Group**
9:00AM - 4:00PM	**Social and Companion Tours** Denver Museum of Science and Nature/IMAX/Planetarium/ Denver Zoo
12:15PM - 1:30PM Governor's Square 17	**LandPKS Working Group**
9:10AM - 9:40AM	**Young Professional's Conclave Plenary**
9:50AM - 11:45AM Denver	**NRCS Ecology Student Project Presentations**
10:00AM Grand Ballroom 1	**Plant ID**
10:00AM - 12:00PM South Convention Foyer	**Campfire Conversations, Session 1**

AT-A-GLANCE

10:00AM - 12:00PM	**Concurrent Sessions**
Governor's Square 14 Plaza Ballrooms A, B, C - Windows Plaza Ballroom F Silver	13. Working together to find solutions for invasive species management: getting mitigation on the ground across ownerships (Symposium) 14. Adaptive management of burned rangelands: challenges and opportunities for its co-production by land-agency staff and scientists (Symposium) 15. SESSION CANCELLED 16. Healthy Ecosystems for Rangeland Development (HERD): sustainable rangeland management strategies and practices (Symposium) 17. Young Professionals Conclave Greenhorn to Trailboss: Cultivating the Next Generation of Stewards (Workshop) 18. Refocusing Rangeland Songbird Research: Connecting Songbirds, Land Management, and Critical Habitat Characteristics (Ignite)
12:00PM - 1:30PM	**Lunch (on your own)**
1:00PM - 5:00PM Spruce	**CPRM Exam**
1:30PM - 3:30PM South Convention Foyer	**Campfire Sessions 2**
1:30PM - 3:30PM	**Concurrent Sessions**
Governor's Square 15 Silver Plaza Ballroom F Governor's Square 14 Windows Plaza Ballrooms A, B, C	19. Open (Source) Range (Ignite) 20. Managing Invasive Species Using Geospatial Technologies (Symposium) 21. Partnerships are the New Conservation Paradigm (Symposium) 22. Kenyan IRC 2020 (Symposium) 23. the Art and Science of Stockmanship in Rangeland Management: Asking Better Questions and Engaging More People (Symposium) 24. Stakeholder Engagement to Improve Federal Rangeland Wildfire Mitigation and Response (Symposium)
1:30PM - 3:30PM Denver	**VGS Workshop**
4:00PM - 5:00PM Plaza Ballrooms D&E	**Round 3- Poster Sessions**

AT-A-GLANCE

4:30PM - 6:30PM Grand Ballroom 1	**Bridging the Gap Mentoring Event**
6:00PM - 8:00PM Tower Court C	**Utah State University Wildland Resource Department**
6:00PM - 8:00PM Tower Court A	**Oregon State University & PNW Section Social**
6:30PM - 7:30PM Tower Court B	**University of Arizona Alumni & Friends**
6:00PM - 8:00PM Plaza Exhibit/Foyer	**All University Mixer**
8:00PM - 12:00AM Grand Ballrooms 1 & 2	**Dance- usic provided by Tris Munsick and the Innocents**

WEDNESDAY 2/19

6:30AM - 7:30AM Plaza Court 8	**Daily Planning Meeting**
6:30AM - 7:30AM Plaza Court 8	**2020 Planning Committee**
7:00AM - 8:00AM Director's Row I	**Student Activities Committee Meeting #2**
7:30AM - 9:00AM Plaza Court 8	**2021, 2022 Planning Committees (others invited)**
8:00AM - 5:00PM Governor's Square 12	**Native American Resource Advisory Council Forum**
9:30AM - 12:30PM Gold	**The Nature Conservancy**
10:00AM - 11:30AM Denver	**Range Program Leads**

AT-A-GLANCE

8:00AM - 10:00AM	**Plenary 3, moderator Maria Fernandez-Gimenez**
Plaza Ballrooms A, B, C	Welcome 8:05am- SRM Honor Awards 8:50am- Speaker 5- Karim-Aly Kassam “Transdisciplinary Research, Indigenous Knowledge and Wicked Problems”
9:40AM - 10:00AM	**Break**
10:00AM - 12:00PM	**Concurrent Sessions**
Plaza Ballrooms A, B, C Windows Plaza Ballroom F Silver Governor’s Square 14 Governor’s Square 15	25. Has Scientific Communication Failed the Art of Range Management? (Symposium) 26. Vulnerability of Beef Cattle Production to Ecological and Socio-Economic Challenges of Future Climates (Symposium) 27. Researchers and Practitioners Integrating Knowledge to Restore and Reclaim Rangelands and Riparian Areas (Symposium) 28. Stakeholder Engagement: Who, When, Why, and How (Workshop) 29. Shared Monitoring, Shared Stewardship (Ignite) 30. Targeted Livestock Grazing to Reduce Fine Fuels in the Great Basin (Symposium)
12:00PM - 1:30PM	**Lunch (on your own)**
1:30PM - 3:30PM	**Concurrent Sessions**
Governor’s Square 15 Plaza Ballroom F Governor’s Square 14 Plaza Ballrooms A, B, C Silver Windows	31. Engaging Rangeland Managers in Grass-Cast to Improve Translation and Transfer (Symposium) 32. Translation of Key Insights from Long-Term Stocking Rate Studies to Range Managers (Symposium) 33. Addressing Flexibility Through Outcome Based Grazing Authorization (Symposium) 34. Science to Action: Communication Needs of the 21St Century Rangeland Manager (Symposium) 35. Ignite Your Rangeland Collaboration: Lessons Learned and Keys To Success (Ignite) 36. Communication and Collaboration (Workshop)
2:00PM - 4:00PM Gold	**Grazingland Information System – Rangeland Thesaurus**

AT-A-GLANCE

4:00PM - 6:30PM
Grand Ballrooms 1 & 2

SRM Business Meeting and Awards Ceremony

6:00PM - 9:00PM
5280 Burger Bar

Wild Women of Range

7:00PM - 8:30PM

Producer Reception- National Western Complex

National Western Complex

James Rogers "Why Management Pays"

THURSDAY 2/20

8:00AM - 4:00PM

Range Practicum

National Western Complex

Low-Stress Livestock Handling Workshop with Whit Hibbard
Producer Forum- Women in Ranching
Horse and Mule Packing Workshop
Wild Horse Training Demonstration
BLM Field Monitoring Methodologies
NRCS Rainfall Simulator and Soils Training- Soil Health and Pasture Productivity Demonstration
Pesticide Sprayer Calibration and Demonstration
Prescribed Fire Demonstration
Winter Livestock Water Workshop
Western States Reclamation and Restoration Equipment On-Site

8:00AM - 4:00PM
Plaza Registration Office

Healthy Grasslands Expo

8:00AM - 12:00PM
Governor's Square 15

SRM Board of Director's Meeting

8:00AM - 1:00PM
Governor's Square 12

Range Social Scientist Meeting

9:00AM - 2:00PM
Off-Site

Rocky Mountain Arsenal Tour

We are excited to **Congratulate Corteva Market Development Specialist, Charlie Hart** as incoming **President of SRM.**

To find out how you can use the Corteva Portfolio to help your operation thrive contact your Range and Pasture Specialist or go to **rangeandpasture.com.**

Follow us on Facebook@CortevaPastures
Follow us on Twitter@CortevaPastures

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Range & Pasture™

TECHNICAL TOURS

Buses depart from Director's Row b/w Rooms H & I on 15th Street for ALL TOURS

SUNDAY 2/16

All-day Tour to Rocky Mountain Arsenal (weather permitting)
9:00am - 4:00pm | Bus leaves hotel at 8:00am, returns by 4:00pm.
Cost $60 (lunch and drink included)

The Arsenal has a fascinating history not only in terms of policy and past human uses, but in ecology and the natural surrounding within which it rests. the tour will focus on ecological, biological, and managerial interaction b/w different types of grazers and multiple uses on the Arsenal. for example, prairie dogs and bison compete for forage and may serve as a rough analogue for competitive uses in other areas such as livestock and prairie dogs. Dietary overlap, competition for resources and implications of introducing an Endangered Species like black-footed ferrets back into a system sets the stage for a series of ecological and administrative questions and how the convergence of policy, biology, and ecology can alter management decisions.

Bison Tour to West Bijou Bison Ranch (weather permitting)
9:00am- 3:00pm | Bus leaves hotel at 9:00am, lunch at noon, bus returns by 3:00pm
Cost $6 (catered lunch by a local Native-owned restaurant included)

Join the Native American Rangeland Advisory Committee for a Holistic Management International bison ranch tour on the Eastern CO plains. Our partner hosts for this tour are SRM, National Bison Association, and the Nature Conservancy. We will discuss multi-species management, long-term sustainable ecosystem health and being a profitable enterprise. Participants will leave with a greater awareness understanding the natural resources used to bring a product from pasture to plate and the cost associated with different business enterprises. We will discuss multiple enterprises which complement existing enterprises like ecotourism. Join US for the tour, lunch and networking opportunities. *Attendance preference will be given to Native producers and managers, though all are welcome. Matt Bain (TNC) will speak from Smokey Valley Ranch in Oakley, KS will speak on multi-species use.

Grassland and Forest; All-dayTour to Kiowa Creek Ranch (weather permitting)
8:00am- 6:00pm | Bus leaves hotel at 8:00am, returns by 6:00pm
Cost $60 (lunch and drink included)

This tour will examine and discuss the science, controversies and objectives of management and restoration projects of dry-forest systems. Looking at forestry through an ecology lens leads projects in a different direction than traditional silvicultural management approaches, including the integration of rangeland ecology and concepts often exclusively applied to rangelands or grasslands. the science and data monitored from these ecosystems is enhancing our ability to understand how these ecosystems function to provide multiple benefits and ecosystem services in a forest that is highly integrated with urban populations. It is also leading some federal agencies, such as the USFS, to adjust the ways in which they approach planning processes and long-term management for timber, range, and wildlife.

SOCIAL TOURS

Buses depart from Director's Row b/w Rooms H & I on 15th Street for ALL TOURS

SUNDAY 2/16

~~Ski Trip- Winter Park Resort~~ CANCELLED
7am- 6pm- Bus leaves hotel at 7am, returns by 6pm.
Cost $170

Fee includes ski train to resort, lift ticket and ski rental- this is almost $60 discount on lift tickets!

20 people are required to gain the discount rate; fees will be refunded if minimum is not met. Can't make the tour on Sunday? Gather 19 friends and organize your own ski package at the discounted rate. Contact Mae Smith for WP Resort group tickets and rental info msmith@sheridan.edu.

Coors Brewery Tour
12pm- 6pm- Bus leaves hotel at 1pm, returns by 6pm
Cost $50

Take a tour of the largest single-site brewery in the world. We will also visit Buffalo Bill's Museum and Grave and take in scenic view at Lookout Mountain. Maximum number for bus- 55. the grave site overlooks the panoramic view of the Rocky Mountains from atop Lookout Mountain. Museum is family friendly with kids' activities- designing a brand, throwing a rope, and has rare artifacts from the Wild West show, including one of Buffalo Bill's Stetson hats.

MONDAY 2/17

4th Annual Range Runners Fun Run
5:30pm- 7:30pm
Regular Member $35; Student/YPC $25

A 5K fun run to help support the Young Professionals Travel Scholarship. a commemorative t-shirt is included with registration before January 10, 2020.

~~Diy Painting for the Kids and Young At Heart~~ CANCELLED
10:00am- 12:00pm
Cost $30

A professional will help guide your child through the process of creating a beautiful painting.

SOCIAL TOURS

Buses depart from Director's Row b/w Rooms H & I on 15th Street for ALL TOURS

TUESDAY 2/18

Denver Museum of Science and Nature/IMAX/Planetarium/Denver Zoo
9am- 4pm- Bus leaves hotel at 9pm, returns by 4pm
Cost $20 per family up to 4

Travel a short distance to four of Denver's popular attractions. Visit what interests you. We'll have a bus transport you in the morning and pick up in afternoon. the $20 registration does not cover admission fees to the museum or zoo. Please check websites for admission fees.

Denver Museum of Science and Nature- www.dmns.org; Denver Zoo- www.denverzoo.org

WEDNESDAY 2/19

~~DIY Painting~~ CANCELLED
1:30pm- 3:30pm
Cost $35

Paint your own masterpiece, no experience necessary. a professional will lead you through the process of creating something you'll want to display on your wall.

THURSDAY 2/20

Rocky Mountain Arsenal Wildlife Refuge
9:00am - 2:00pm
Cost $40

TRADE SHOW

MONDAY 2/17 - WEDNESDAY 2/19

SUNDAY 2/16

7:00PM - 9:00PM	Optional Booth Set-up

MONDAY 2/17

6:00AM - 8:00AM	Optional Booth Set-up
8:00AM - 8:00PM	Exhibit Hall Open
4:00PM - 5:00PM	Poster Session
6:00PM - 8:00PM	Monday Mixer

TUESDAY 2/18

8:00AM - 8:00PM	Exhibit Hall Open
4:00PM - 6:00PM	Poster Session
6:00PM - 8:00PM	Tuesday Mixer

WENESDAY 2/19

8:00AM - 12:00PM	Exhibit Hall Open
12:00PM - 4:00PM	Booth Tear Down

TRADE SHOW

EXHIBITORS

Ag-Renewal Inc
Agrisk Advisors
Aquatic and Weland Nursery, LLC
Arkansas Valley Seed Inc
Berryman Institute
Bird Conservancy of the Rockies
BKS Environmental Associates, Inc
Bureau of Land Management
Colorado Independent Cattlegrowers Association
Colorado State Land Board
Colorado State University Rangeland Ecology Club
Curtis & Curtis Seed
Easy Fence LLC
Fireproof Fencing
Frontier Precision
Gallagher
Giant Rubber Water Tanks
GP Restoration Solutions Inc
Granite Seed Company
Grazingland Animal Nutrition Lab
Great Basin Fire Science Exchange
Great Plains Fire Science Exchange
Jonah Ventures
Juniper Systems
MaiaGrazing
National Grazing Lands Coalition
North Dakota State University
Northern Plains Climate Hub
Pawnee Buttes Seed Inc
PGG Seeds
Quivera Coalition
Rangeland Partnership
Rhonda Bennett Studios
SECO Range Planning
Southwest Climate Hub
Steele Industries
Sustainable Rangelands Roundtable
Triton Environmental
Truax Company, Inc
University of Idaho Range Club
University of Wyoming Student Range Club
USDA ARS Jornada Experimental Range
USDA Forest Service
USDA Poisonous Plant Research Laboratory
Western Colorado University
Corteva
2021 SRM Annual Meeting
International Rangeland Congress
NRCS
FPAC
USFS

PLENARY SESSIONS 1

MONDAY 2/17

DR. LAUREN PORENSKY

—

Embracing Complexity and Humility in Rangeland Science

Dr. Lauren Porensky is an ecologist interested in plant communities, herbivores, and spatial complexity. Her research focuses on balancing livestock production with conservation and restoration in semi-arid rangelands. Porensky got her PhD at UC Davis working on livestock management and wildlife conservation in central Kenya. She currently investigates the interactive effects of grazing, fire, prairie dogs, and variable weather on plants, livestock and humans in the northern Great Plains.

DR. LESLIE ROCHE

—

Socio-ecological Systems - Emphasizing the Human Dimensions

Dr. Leslie Roche is a UC Cooperative Extension Specialist in Rangeland Science and Management with the UC Davis Department of Plant Sciences. She earned a Ph.D. in Ecology from UC Davis, and was a USDA-NIFA Postdoctoral Fellow and Project Scientist before joining the faculty in September 2015. Her research and extension program is at the intersection of agricultural, environmental, and social issues of ranching and livestock production on California's grazinglands. She works across diverse systems and uses interdisciplinary and collaborative approaches to evaluate adaptive decision-making and management strategies to address key challenges and connect solution-oriented research with the needs of local communities, natural resource managers, and policymakers.

PLENARY SESSION 2

TUESDAY 2/18

DR. KAREN LAUNCHBAUGH

—

Bridging the Gap;
What Does SRM Want/Need to be and How to Get There?

Karen Launchbaugh is a professor of rangeland ecology at the University of Idaho who specializes in topics related to grazing behavior, range animal nutrition, and targeted grazing. Dr. Launchbaugh's research and teaching focus on applying principles of grazing management and targeted grazing to manage invasive plants, wildland fuels, and livestock-wildlife interactions. She is currently conducting research on how cattle grazing affect nesting sage-grouse and using targeted grazing to manage cheatgrass.

Karen grew up on a sheep and cattle ranch in western North Dakota where she developed a passion for understanding rangelands and learned about the SRM through Ranch Camp and the High School Youth Forum. She subsequently obtained three college degrees in rangeland science and management including a B.S. from North Dakota State University, M.S. from Texas A&M University, and Ph.D. from Utah State University.

Karen currently serves as director of the Rangeland Center at the University of Idaho. the Center is a unique organization of 35 university scientists and educators who work closely with land managers to bring science to management issues on Idaho's rangelands. Together, the Center's faculty and partners "bring science and solutions to the range."

PLENARY SESSION 3

WEDNESDAY 2/19

DR. KARIM-ALY S. KASSAM

—

Transdisciplinary Research, Indigenous Knowledge and Wicked Problems

Karim-Aly Kassam is International Professor of Environmental and Indigenous Studies in the Department of Natural Resources and the American Indian and Indigenous Studies Program at the College of Agriculture and Life Sciences, Cornell University. in 2019, he was appointed to the Editorial board of the journal Human Ecology, Faculty Fellow of the Cornell Botanic Gardens, and Fellow to Keeton House. in 2018, Dr. Kassam, in collaboration with the Canadian Embassy in Kabul, senior advisors at the Presidential Palace, and the Afghan Ministry of Foreign Affairs, initiated the process that led the President of Afghanistan to create a position devoted specifically to addressing climate change adaptation in all government agencies. in 2017, Dr. Kassam was awarded the University of Bayreuth (Germany) International Senior Fellowship for his contributions to the Faculty of Biology, Chemistry and Earth Sciences. in 2016, he was awarded 1.35 million dollars to lead a project to develop anticipatory capacity for climate change. Dr. Kassam's applied research informs and is integrated into his teaching. As a result, his aim is to seamlessly merge research and teaching in the service of communities. His research focuses on the complex connectivity of human and environmental relations, addressing indigenous ways of knowing, food sovereignty, sustainable livelihoods, stewardship, and climate change. This research is conducted in partnership with indigenous communities such as the Standing Rock Sioux Nation (USA) and the St. Regis Mohawk Tribe (USA), as well as in the Pamir Mountains of Afghanistan and Tajikistan, the Kongur Shan Mountains of China, and the Alai Mountains of Kyrgyzstan. By investigating the relationship between biological and cultural diversity, Dr. Kassam seeks to expand the foundations of the notion of pluralism.

STUDENT ACTIVITIES

HIGH SCHOOL YOUTH FORUM

LAND STEWARDSHIP SERVICES

SUNDAY 2/16

8:00AM - 12:00AM — **Student Plant ID Study Room**
Director's Row H

Evening — **Orientation Session**
Director's Row J

MONDAY 2/17

6:00AM - 12:00AM — **Student Plant ID Study Room**
Director's Row H

8:00AM -10:00AM — **Mini Plenary Session**
Plaza Ballrooms A, B, C

10:30AM - 5:30PM — **Ecological Tour (description/details below)**

5:30PM - 9:00PM — **Professional Interaction Dinner, Downtown Denver**
Hard Rock Café

TUESDAY 2/18

All Day — **Paper Presentation Session**
Governor's Square 12

1:30PM - 4:30PM — **Rangeland Cup**
Plaza Ballrooms D & E

WEDNESDAY 2/19

All Day — **Natural Resources Workshop**
Director's Row J

All Day — **Business Meeting**
Director's Row J

STUDENT ACTIVITIES

HIGH SCHOOL YOUTH FORUM

All Day — **Awards Ceremony**
Grand Ballroom 1 & 2

THURSDAY 2/20

8:00AM - 9:00AM — **HSYF (Concludes and checkout)**
Director's Row J

Ecological Tour- Lowry Ranch and Rocky Mountain Arsenal Nat'l Wildlife Refuge- weather permitting
Monday, Feb. 17- 10:30a- 5:30p- Bus leaves hotel at 10:30am, returns by 5:30pm.
Cost included with HSYF delegate's registration.

Travel from downtown Denver Sheraton to Lowry Ranch 10 miles east of Denver. Travel time is ~1 hour. the ranch is owned by the State of Colorado with oversight by the CO State Land Board. the property was a bombing and gunnery range during WWII and later became a military training site. the ranch is 25,590 acres of shortgrass and mixed grass prairie and riparian areas. Average annual precipitation is 15 inches. the ranch is leased for grazing cow-calf pairs in a program that requires the lessee to manage using holistic principles considering all components of the range ecosystem. the lessee is a young forward-thinking practitioner who is quite successful with the operation.

Lunch will be on or near the Lowry Ranch (~1/1:30 PM) then travel to the Rocky Mountain Arsenal National Wildlife Refuge (RMANWR). Travel time will be ~1 hour. Located just NE of Denver, the RMANWR is 15,000-acres of prairie, wetland and woodland habitat. the land has survived the test of time, transitioned from farmland to war-time manufacturing site to wildlife sanctuary. It may be one of the finest conservation success stories in history and a place where wildlife thrives. the refuge is a sanctuary for more than 330 species of animals, including bison, black-footed ferrets, deer, coyotes, and burrowing owls. the refuge was established, in part, to protect the bald eagle. Currently much of the resource management on the refuge is dedicated to prairie restoration. Following the attack on Pearl Harbor, the U.S. Army transformed the area into a chemical weapons manufacturing facility (arsenal) to support World War II.

As production declined at war's end, a portion of the idle facilities were leased to Shell Chemical to produce agricultural chemicals. the Arsenal was later used for Cold-War weapons production and demilitarization.

Follow the link for highlights of the ranch and the progress made working with holistic management.
https://tomkatranch.org/wp-content/uploads/2019/09/Profiles-in-Land-and-Management-Colorado-State-Land-Board-Lowry-anch.pdfhttps://www.fws.gov/refuge/Rocky_Mountain_Arsenal/

STUDENT ACTIVITIES

UNIVERSITY STUDENTS

Undergraduate Papers have been folded into the regular poster/paper part of the program. There will be no separate event at the meeting in Denver.

Extemporaneous Public Speaking Contest will not be held in Denver as elected by the SRM Sub-committee.

Rangeland Cup competition involves a team approach to problem solving. It promotes critical thinking and cooperative and collaborative work on topics relevant to rangeland science and management. Teams present their solutions during a poster session.

2020 Denver Topic
World population projections indicate that there will be 9.8 billion people on earth by 2050 (UN, 2017). Rangeland ecosystems represent the largest and most diverse land resource, providing multiple ecosystem goods and services to both local communities and the larger public. Traditionally, rangeland science and management have focused on agricultural production (e.g., forage and livestock), which are critical provisioning services that contribute to the nation's food supply. However, society now places growing importance on the delivery of additional ecosystem services, such as water quality regulation, wildlife habitat and cultural/recreational services, and alternative energy development. Balancing multiple conservation and agricultural production goals on rangeland agroecosystems in an economically realistic manner will be a key challenge in an already variable and changing environment.

1. Identify the next transformational issue in rangeland management that will be a key component to obtaining/achieving agricultural production goals to meet the 2050 population projections. Consider multiple types of impacts (ecological, economic, social, etc.) and multiple ecosystems.

2. Discuss one or multiple management practices to implement to address the issue identified above.

3. Provide a specific recommendation to solve the issue you have outlined under prompt one and describe how it relates to agriculture production to meet the needs of the 2050 global population.

Plant ID Contest- Dr. Barry Irving will again coordinate this popular SRM event. Dr. Irving will offer a teaching event along with the competition. Competitive Contest will be Tuesday immediately followed by Teaching Plant ID Contest.

SYNERGY
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URME- Dr. Justin Derner and staff will be in charge. the contest will be held early morning on Monday to be completed prior to the Plenary Session. Undergraduate teams will compete to test their knowledge and understanding of range management and ecology.

Graduate Paper Competition will not be held at the Denver meeting as decided on by the Sub-committee for this SRM University Student Activity.

Graduate Poster Competition will again be organized by Dr. Marc Horney. Graduate students' posters will be imbedded in the technical posters along with professionals and academics. This contest offers graduate students an opportunity to compete in the presentation of their research in technical poster sessions throughout the week. the four categories are M.Sc., Oral; M.Sc., Poster; Ph.D., Oral; and Ph.D., Poster.

STUDENT ACTIVITIES UNIVERSITY STUDENTS

University Website Display Contest will be hosted each year in advance of the Annual Meeting. This contest replaces the University Chapter Display Contest. Each University or College Chapter/Club elects to create a website and develop an online presence that promotes 1) their club, 2) rangeland science, 3) their university and 4) the theme of the 2020 Denver Annual Meeting, "A New Look: Transformation and Translation." the Website Display Contest will now serve as an excellent way to showcase what each School's Chapter/Club is doing to support rangelands throughout the year, and to provide a recruiting tool for each program.

Chapters/Clubs will be judged on the current Annual Meeting's theme, and on four major criteria listed at the bottom of this description. Chapters and Clubs desiring to compete in this contest must email their website link to the subcommittee Chair/Co-Chair between December 10th and December 20th. Any Chapters/Clubs that email their link after that deadline will not be permitted to compete in the contest.

Judging Criteria and points awarded for the displays include the following:

• Information and idea expressed (60 points): Theme; originality of posts

• Web Design (20 points): Pleasing composition; dynamic; eye-catching; neat; easily read; good use of pictures; ease of navigation

• Number of postings (10 points): Number of postings throughout the year

• Club leadership (10 points): Contact names/emails for Chapter/Club advisors and coaches (faculty and graduate); leadership (Chapter/Club officers)

Student Conclave will occur with a Welcome Mixer at 530p-7p, Governor's Square 15.

The SRM Student Conclave functions to improve undergraduate presence and interface among the community of the Society for Range Management. to help accomplish this goal the SRM Student Conclave has developed a blog that will host Student Conclave news, events, and highlights of state and student SRM chapters across the country. the SRM Student Conclave newsletter will now be posted on this site: http://srmstudentconclave.blogspot.com

Student Plant ID Study Room
8am - 12am - Director's Row H

Student Communication Workshop
3pm - 5pm - Governor's Square 17

Plant ID Teaching Session with Dr. Irving
8pm - 9pm - Director's Row I

Job Fair
9am- 5pm- Plaza Ballroom F

STUDENT ACTIVITIES UNIVERSITY STUDENTS

SUNDAY 2/16

The annual **Rangeland Employment Fair** will be held at the Sheraton Denver Downtown Hotel. This is an outstanding opportunity for job seekers to talk with recruiters about available positions. Recruiters from a variety of organizations (federal government, private) and Universities (graduate student recruitment) have attended past employment fairs and recruited for both permanent and seasonal positions.

The mission of the 2020 Rangeland Employment Fair is to match prospective employers from federal agencies, state and provincial governments, academia, conservation organizations, and private industry with the high caliber of educated and enthusiastic prospects from SRM. Attendance at the annual meeting this year is expected to be over 1500 people. Approximately 25% of attendees will be students and young professionals.

The percentage of federal workers eligible to retire by 2025 is projected to be as high as 30%. the demand for students and young professionals with majors in Range Science and other related disciplines remains high. the USFS, BLM and NRCS have successfully filled entry-level positions at past SRM Annual Employment Fairs through On-the-Spot Hiring and the Pathways program. Private entities and universities have also successfully filled positions in the past.

Even though the demand for students and young professionals with majors in range science and management and related disciplines remains high, the supply of graduating students in these fields is decreasing. the SRM is addressing resource management workforce challenges by providing avenues such as the annual Rangeland Employment Fair.

Student preparation is essential for a successful first impression when meeting with a recruiter. the student's employment application packet should include a cover letter, resumé, college transcript, military record (if applicable), and letters of recommendation as minimal documentation prior to arriving at the Employment Fair.

For questions, please contact Dan Fletcher (SRM 2020 Employment Fair Coordinator) at (435) 865-3049 or (435) 590-4834.

We have modified our program based on participant feedback and have new resources available to strengthen networking opportunities between mentees and mentors. Join us for drinks, appetizers, raffle prizes and conversation.

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STUDENT ACTIVITIES UNIVERSITY STUDENTS

TUESDAY 2/18

Bridging the Gap
4:30-6:30pm - Ballroom I

Everyone is invited to participate- registration is FREE- courtesy of the Young Professionals and Student Conclaves! Registration is required for Bridging the Gap. Please register on the 2020 annual meeting registration form to secure your place at the event.

The objective of this mentorship event is to build more connections between the student/young professional membership of SRM and established professionals. Mentees and mentors will participate in a semi-structured activity to facilitate discussion and networking, with the intent of helping mentees navigate career opportunities in rangeland science and management. Students and young professionals looking for a job, internship, grad position or career advice will not want to miss this event!

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SCIENTIFIC SESSIONS

SUNDAY 2/16

1:00PM - 5:00PM
Governor's Square 15

Rangeland Technology and Equipment Council Workshop: Applying Seed Enhancement Technologies to Improve Rangeland Restoration Success

The Rangeland Technology and Equipment Council (RTEC) is an informal organization of land managers, engineers, researchers, academics and private industry representatives interested in developing new rehabilitation equipment and strategies. the focus of the workshop is the potential use of seed enhancement technologies (SETs) for improving post-fire restoration success in western shrublands. Large expanses of western shrublands are being invaded by exotic annual weeds which promote wildfires that not only burn within the invaded area but also spread into native shrublands allowing for the further spread of weeds. the cycle of weed invasion and wildfire can be halted in at-risk areas by successfully seeding desired perennial species after a wildfire. However, our ability to establish a diverse native plant community through seeding is notoriously difficult. SETs have the potential to advance restoration efforts by applying treatments that improve seed delivery and germination, and the tolerance of seedlings to environmental stress. the use of SETs is a standard practice in farming systems where the technology plays a critical role in the production of healthy crops. SETs have had limited use in restoration programs, although an effort is currently underway to develop SETs for rangeland applications. This RTEC session will focus on: SETs that are being developed for rangeland applications; potential market opportunities for treating seed for restoration efforts; and round table discussions between scientists, land managers and industry on the steps that would need to be taken for the broader adoption of SETs in restoration activities.

1:00 Introductions and Program Overview

Mike Pellent- BLM (retired) and
Matthew Madsen- Brigham Young University (BYU)

1:10 Rangeland Rehabilitation R&D; Time for New Partnerships and Approaches

Tamzen Stringham- University of Reno

1:25 Perspectives from the Northern Great Basin on Challenges to Seed Based Restoration and Seed Technology Solutions

Chad Boyd- USDA-ARS and Owen Baughman- TNC, Oregon

1:45 Seeding Technology for Rangelands: Past, Present, Future

Tony Svejcar- Oregon State University

2:00 Seed Pod Technology for Big Sagebrush: Challenges and Opportunities

Maggie Eshleman and Corinna Riginos- TNC, Wyoming

SCIENTIFIC SESSIONS

2:15 Building Climate Resilience into Sagebrush Habitat with an Innovative Seeding Strategy - Jessie Griffen- TNC, Oregon

2:30 Recent Advances in Native Seed Enhancement Technologies in Western Australia - Todd Erickson- Kings Park Science and Univ. of Western Australia

2:45 Use of Flash Flaming Technology to Improve Seed Handling and Delivery of Winterfat Seeds - Mitch Thacker- BYU

3:00 Break

3:05 Improving Rangeland Restoration Using Targeted Fungicide Seed Coatings - Benjamin Hoose and Travis Sowards- BYU

3:20 Seed Conglomeration: An Innovative Approach to Improving Sagebrush Seed Delivery and Establishment - Rhett Anderson and Ben Hoose- BYU

3:35 Making a Breakthrough in Controlling Annual Grass Invaded Landscapes using Novel Seed Coatings Paired with Pre-emergent Herbicides - Chad Camp- BYU

3:50 Roundtable Discussion on Market Opportunities and Steps to Adopt Seed Enhancement Technologies

4:30 Select Topic and Agenda for 2021 RTEC Workshop in Boise

USDA United States Department of Agriculture

Natural Resources Conservation Service

SCIENTIFIC SESSIONS

3:00PM - 5:00PM
Governor's Square 14

Sustainable Rangelands Roundtable: Past, Present, and Future (Ignite)

This session will highlight the past, present, and future of the Sustainable Rangelands Roundtable(SRR). the SRR is an open partnership of ecologists, economists, and sociologists focused on rangeland assessment and reporting. Over the SRR's 20-year history, hundreds of participants originated from more than 75 organizations. Early work focused on identification of criteria and indicators. Participants then explored interactions among social, ecological, and economic aspects of rangeland sustainability, with ecosystem services as the nexus of these components in a conceptual framework. the SRR then began to apply their indicators and framework to emerging issues in rangeland sustainability, including ecosystem services, energy, socio-economic characteristics of ranchers, ranch-level monitoring, usable science, sage grouse conservation, soil health and economics, non-fee costs of federal grazing permits, comprehensive ecological, social and economic rangeland assessment of resource-dependent communities. Speakers will highlight aspects of SRR projects as we overview 20 years of foundational work in all aspects of rangeland sustainability.

1. SRR Origins – Dr. Larry D. Bryant, USDA US Forest Service (retired)
2. SRR Criteria and Indicators – Dr. John E. Mitchell, USDA USFS Rocky Mountain Research Station (emeritus)
3. Integrated Social, Ecological, and Economic Concept (ISEEC) Framework – Dr. William E. Fox, Texas A&M University
4. Usable Science: Involving Ranchers and Land Managers in the Research Process – Lori A. Hidinger, Arizona State University, Consortium for Science, Policy, and Outcomes
5. Sustainable Ranch Management: Ranch Level Indicators: Gene Fults,NRCS
6. Applying the ISEEC model to Energy Alternatives – Urs Kreuter, Texas A&M University
7. Climate Change on the Range: Using Indicators to Guide Adaptation – Jessica Windh, SRR Project Manager and PhD Graduate Student at the University of Nebraska
8. Valuation of Ecosystem Services Associated with Rangelands Used for Beef Production – Dr. Anna Maher, Sustainable Rangelands Roundtable Post-Doc
9. Soil health Influences on Vegetation and Livestock – Timm Gergeni, SRR PhD Graduate Student through the University of Wyoming
10. Economics of Rangeland Soil Health – Savannah Warwick, SRR Master's Graduate Student through the University of Wyoming
11. Managing with Prescribed Fire: Rancher Perspectives, Concerns, and Information Needs – Ryan Wilbur, SRR PhD Graduate Student through the University of Wyoming
12. Non-fee Permit Costs Associated with Grazing on FS and BLM Allotments – Kasey Dollerschell, SRR Master's Graduate Student, University of Wyoming
13. Economics of Sage Grouse Conservation – John A. Tanaka, Sustainable Rangelands Roundtable and University of Wyoming (emeritus)
14. Ecological, Social and Economic Rangeland Assessment – Matt Reeves, USDA USFS, Rocky Mountain Research Station

*To be followed by a one-hour reception with cash bar and hors d'oeuvres

3:00PM - 5:00PM **Enhancing Rangeland Inventory and Monitoring Symposium**
Governor's Square 12 **Unmanned Aerial System Imagery**

Rangeland inventory and monitoring (I & M) data, used to evaluate ecosystem function and successional states, are important for adaptive management of public and private rangelands. Because it is challenging to measure fine-scale vegetation and soil indicators (e.g., species composition, canopy gaps, vegetation heights) over entire landscapes, sampling approaches are commonly used to extrapolate limited data from field plots to estimate conditions in larger landscapes. on landscapes units with heterogeneous or patchy vegetation characteristics, a field sampling approach that observes a relatively small proportion of the inference area may estimate indicator values and their change with low confidence. Additionally, some indicators of interest are not well measured with traditional field methods. This is specifically true of '3D' indicators such as vegetation heights/structure, biomass and forage utilization. Range scientists and managers have long sought a remote sensing solution to extend geographic coverage of indicator observations. Satellite imagery products are often too coarse to observe fine features of interest such as individual plants and the bareground between them. Imagery from manned airplanes can be sufficiently fine-grained but are often cost-prohibitive. the recent availability of small and low-cost sensor carrying unmanned aerial vehicles (UAVs, commonly known as drones) along with the codification of piloting and airspace rules have made drone-collected imagery a potentially valuable tool for range inventory and monitoring. Small drones (< 5 kg) can now be easily brought into the field and deployed to image dozens to hundreds of hectares at spatial resolutions capable of measuring fine-scale vegetation and soil indicators. They hold the promise of observing larger extents and improving measurement of 3D indicators compared with traditional field sampling. These capabilities will enhance our ability to assess the status and trend of rangeland health and ultimately improve land management outcomes.

Our symposium will address the following:

Unmet needs from field based I & M methods (e.g., NRI and AIM) for range monitoring

Latest technical capabilities of drone imagery-based monitoring (RTK UAVs, HPC processing)

Challenges of an imagery approach to range monitoring
Current efforts to develop a suite of drone-based methods that are accurate, repeatable, and cost-effective for supporting management decisions
Compare and complement with remotely sensed continental-scale vegetation products

Goals of symposium

Increase stakeholder (agency staff, researchers, producers) awareness of current technology and capabilities

Develop a shared vision of drone-based imagery data supporting operational land management decisions"

Network with other research or agency groups pursuing similar topics

Speakers

Doug Ramsey - Utah State University

Richard Thurau - US Dept. of Interior Office of Aviation Services

Jeffrey Gillan - University of Arizona

3:00PM - 5:00PM
Governor's Square 16

Solar Grazing: An Emerging opportunity for Rangeland Sheep Farms

Arlo Hark-Cristofaro will present a rapid-fire presentation designed to answer the following:

1. What is solar grazing?
2. Who is doing solar grazing?
3. Why solar sites are great for grazing with sheep?
4. What does it pay farmers, on average?
5. Set up costs, equipment needed?
6. How many sheep per acre?
7. How to get on a solar site with your flock?
8. Why rotational grazing and solar vegetation site management go hand in hand?
9. Pollinators, commercial honey
10. How it works for our farm?
11. A few tips and tricks
12. How much more ground mounted solar is coming to your state?
13. Resources to learn more

We'll have high quality photos from the American Solar Grazing Association's farmer network for an up to date look at this rapidly expanding industry.

Get on board now! www.solargrazing.org and https://www.cannonvalleygraziers.com

United States Department of Agriculture

Natural Resources Conservation Service

PROGRAM

TWO-HOUR SESSION TYPES

Symposium- Innovative and captivating speakers organized around emerging themes in rangeland ecology and management knowledge. Symposia are the core scientific aspect of the SRM program. Each session will synthesize a topic that makes significant contributions to the art and science of rangeland management and ecology through novel collaborations, methods, or interdisciplinary approaches. Three speakers will each have 20 minutes to speak and five minutes for questions, with remaining time for questions and discussion. Topics should have broad appeal and applicability to the SRM audience and offer benefits to rangeland ecosystems and human communities. Symposia are explicitly integrated and provide a synthesis of key conceptual advancements.

Workshops- Contribute to the development of practical, leadership and communication skills within SRM. An interactive, educational experience in which attendees develop new practical skills to apply to their rangeland science and management work. Workshops related to outdoor/livestock/safety skills that require arena space are planned for Thursday at the National Western Stock Show facility.

Ignite-Style Sessions- "Enlighten US but make it quick!"; 5-minute talks organized around a conceptual theme which stimulates an exchange of new ideas in rangeland ecology and management. Each talk will feature 20 slides which advance automatically every 15 seconds (see http://www.ignitetalks.io/). the time remaining after all session speakers will be reserved for panel discussion, and question and answer periods. the short format is intended to inspire a conversational and storytelling experience, and to challenge presenters to succinctly communicate key ideas.

Campfire Conversations- a lively collaborative dialogue around questions for the future of the Society for Range Management and rangelands. These questions may be a single issue, challenge, controversy, or opportunity of immediate relevance to the Society for Range Management. Preference will be given to innovative, provocative, and complex topics with the potential to translate rangeland knowledge and transform the future of SRM.

Submitters of abstracts chosen for Campfire Conversations will work with the Campfire Committee to facilitate conversations following the World Café model (description below). These conversations will take place Tuesday. A product of these Campfire Conversations are summary papers which will be submitted to Rangelands.

World Café is a method for connecting diverse perspectives and sharing collective discoveries on issues that matter. the world cafe will take place in a large conference room with round tables. Each table has a topic and a facilitator.

First, participants select a table for the first round of discussions (20-30 minutes) and the facilitator welcomes them with the directions and ground rules. Then, the facilitator and participants around each table and will dig into a topic question and the facilitator will record key insights on flip chart paper. the facilitator will moderate the discussion and ensure fair opportunities to contribute are available to all participants.

At the end of the first small group round, participants will move to another table. Once seated at a second table, they will hear a summary of the discussion developed by the last group, from the facilitator, and will then build upon this discussion with their own ideas. Rotation continues for 3-4 rounds. Notes from the small group rounds will be synthesized into a summary document for use in writing papers for Rangelands.

PROGRAM

MONDAY

MONDAY 2/17

SESSION 1
Governor's Square 14
10:00AM - 12:00PM

Transforming Ranching Through Precision Livestock Management in Extensive Rangelands (Symposium)

Management of livestock in extensive rangelands has long been a labor-intensive endeavor for ranchers and pastoralists worldwide, often made even more challenging in rangelands characterized by dramatic temporal and spatial variability in forage resources. Recent technological advances have begun to empower livestock managers by providing more rapid, near-real-time monitoring of livestock locations and condition, by providing means to track and predict changes in forage resources across broad landscapes, and by enhancing the means to manipulate livestock distribution remotely. in this session, we bring together speakers to discuss the current state and future direction of precision livestock management in rangelands, and how these technologies can transform the way rangelands are managed.

1. Transformation of Livestock Management in Australia Through Sensor Technologies, and Implications for Grazing Management in Spatially Extensive Rangelands Worldwide. -Dr. Mark Trotter, Cq University, Rockhampton, Queenslanda

2. Development of Real-Time Livestock Management Strategies Using GPS Tracking and Sensor Technologies. -Dr. Derek Bailey, New Mexico State University

3.. Real-Time Monitoring Technologies for Free-Ranging Sheep and Cattle Management. -Dr. Tony Waterhouse, Emeritus Professor, Scotland Rural College and Head of Hill and Mount and Beef Research Centres

AgRisk ADVISORS

PROGRAM

MONDAY

SESSION 2
Silver
10:00AM - 12:00PM

Creating Success in Rangeland Management, Tapping into our Emotional Intelligence (Workshop)

As rangeland managers, we are asked to manage increasingly complex ecological and social situations and account for the needs of a diverse cross-section of people, plants, and animals. It can be overwhelming and applying the science in a way that creates workable solutions can be challenging. However, humans are incredible creatures and are equipped with everything necessary to succeed. Making our work more effective is often not about more science, but the human application, i.e. stronger leadership. Great leadership is grounded in mastering our own inner resources, increasing our emotional intelligence, and communicating effectively. It requires challenging our beliefs and transforming our perspectives in order to engage a broader view and move from polarizing positions to collaboration.

Transformation and translation. Transforming our engagement in the world is a self-lead endeavor. It begins with recognizing that we translate every interaction and conversation by filtering data through our experiences, insights, cultures, and beliefs. to transform we must gain greater personal awareness, identify our motivations, and learn where we get caught in the emotions. People look outside of themselves for the source of their challenges and miss opportunities that are available when we look within first. to shift our interactions, it is critical to examine biases and the ways we unconsciously judge. Equally important are the ways we choose behaviors to increase leadership effectiveness. When we recognize we have the power to choose our response, we increase meaningful conversations and arrive at productive outcomes.

The workshop is broken into three components, with an additional post-conference follow-up offered to participants.

Component One - Self Discovery and Self-Management: Participants learn the foundations of emotional intelligence and are provided exercises for individual reflection and small group discussions. They will examine their inner operating systems, explore their own emotional states, reactions, behaviors, and awareness. Participants will be asked to self-evaluate and identify scenarios in which they recognize the interplay of emotions, biases, and choice. the foundation of this component is based on the Bar-On Psychometric Emotional Intelligence Model developed by Reuven Bar-On.

The outcomes of this component are to:

- Become familiar with emotional intelligence and its applications
- Ignite curiosity about the components of emotional intelligence you rely on frequently and areas that you use less frequently (based on the EQi-2.0 inventory model)
- Build group trust and create an equal playing field for component two
- Learn and engage

Component Two - Bringing Emotional Intelligence into Practice:
In the second portion of the workshop, participants will have a series of topics, rooted in the values and management of rangelands, to explore in groups. They will reflect on their approach and behaviors in challenging conversations and practice key elements of emotional intelligence to brainstorm ideas and solutions. This model is foundational upon mutual respect, equality, and listening, and is designed to engage all views.

The outcomes of this component are to:

- Examine our own behavior, reactions and responses in challenging conversations
- Practice using coaching tools within the conversation model
- Approach difficult rangeland management topics in a new way
- Gain an understanding of how these tools can be applied and developed
- Play and have fun!

Component Three – Choosing a Path Forward:
The final aspect of the workshop will debrief the experience and help participants identify key actions to employ in their life and work. They will receive resources related to the emotional intelligence learning, coaching and conversation tools, and leadership development.

The outcomes of this component are to:

- Identify key actions to apply the learnings
- Identify specific interests in personal and leadership development
- Get curious and creative.

Beyond the Workshop:
The final component of the workshop will include a follow-up group conversation online, post meeting. This will allow participants to reengage and share their experience with the materials since the workshop. This will require participants supply email addresses during the workshop.

PROGRAM

MONDAY

SESSION 3
Plaza Ballroom A-C
10:00AM - 12:00PM

Strategies for sustainability transformations in western rangelands (Symposium)

Ranching and rangelands are undergoing rapid and intertwined changes. Changes include 1) ecological transitions due to climate and invasive species; 2) land use transitions associated with urbanization and shifting priorities for public lands; 3) demographic transitions reflected in the increasing average age and decreasing number of ranchers; 3) market transitions associated with changing consumer attitudes and globalized markets, and 4) technological transitions with advances in wireless and sensor technologies and access to "big data". in this symposium, we ask: how can we direct inevitable change in desirable ways? Through these changes, how can we sustain the flow of rangeland products to consumers and improve environmental conditions in order to maintain or increase the well-being of those who live, work, and recreate on rangelands? the symposium will feature three invited speakers, each of whom will synthesize existing and emerging strategies for enhancing ranching and rangeland resilience, including:

Strategic Connections Between Rural Producers and Urban Consumers: the Future of Marketing for Rangeland Products—Dr. Sara Place, National Cattleman's Beef Association

Precision Technology and Other Adaptation Strategiesin Ranching Systems—Dr. Andres Cibils, New Mexico State University

Collaborative Planning for Diverse Land Uses in Changing Rangelands—Dr. Lynn Huntsinger, University of California, Berkeley

SESSION 4
Windows
10:00AM - 12:00PM

Social-Ecological Resilience in the Northern Great Plains: Connections and Feedbacks of the Dominant Drivers (Ignite)

Complex interactions among climate and disturbance regimes, economic restructuring, and shifting land-use priorities are changing the social-ecological landscape of rangelands of the American West. in addition, many working rangelands are transitioning from traditional agricultural-based systems to multifunctional landscapes with a diverse mix of land uses. This session features participants in an ongoing multidisciplinary and participatory resilience adaptation and transformation assessment (RATA) in Montana. Our goal is to collectively seek a better understanding of the drivers of the area in order to provide a scientific basis that can be used to understand the trajectory of the area and strengthen the social-ecological system. the initial work on the resilience assessment has identified the relationship between changing climate and disturbance regimes, land-management practices and biodiversity, and economic policy and land use as dominant drivers of the system. Currently, climate, land-use, and market forces are changing, and often experiencing increased variability, leading to shifts in the region. Projected intensification of climate trends, coupled with ongoing and legacy effects of altered disturbance regimes (e.g. fire and grazing), are expected to have profound implications for future vegetation dynamics, structure, and function. Furthermore, emphasis and focus on biodiversity conservation has led to a diverse and evolving body of knowledge for individual species and communities. However, the tradeoffs from management across diverse targets is complex, and in conjunction with broader landscape factors, require cross-boundary coordination to implement.

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MONDAY

Finally, diverse and interacting market and policy forces are driving new, and sometimes conflicting, land use outcomes, with direct and indirect feedbacks to vegetation productivity, and biodiversity. This session aims to present highlights of the ongoing research in these three areas to foster discussion on the interaction and feedbacks between drivers acting, and studied, at different geographic and temporal scales. Furthermore, attendees are encouraged to relate strategies for identifying and studying social and ecological drivers in combination, as well as conveying the complex interactions in social-ecological systems.

Session Organization and Intro – David Wood (Moderator)
Rangeland Conservation Science and Practice in the Ngp I: Competing Trajectories, Katie Epstein and Julia Haggerty, Montana State University

The Changing Climate of the Northern Great Plains, Paul Stoy, University of Wisconsin-Madison

Vegetative Change in Northern Great Plains Rangelands: Vegetative Greening and Woody Plant Encroachment, Bryce Currey, Montana State University

The Long View: Paleo-Perspectives on Rangeland Disturbance in the Northern Great Plains, John Wendt, Montana State University

Prescribed Fire and the Biogeochemical Dynamics of Ecosystem Development in the Musselshell-Missouri River Breaks of Central Montana, Justin Gay, Montana State University

Microbes of the Grasslands, Hannah Goemann, Montana State University

Biodiversity Responses to Management in Montana Rangelands, Lance McNew, Montana State University

Grassbanking as a Novel Approach to Engage Ranching and Reach Large-Scale Conservation Outcomes, Brian Martin, the Nature Conservancy

Systems Thinking for Social-Ecological Issues in the Great Plains, Ted Toombs, Colorado State University, Environmental Defense Fund

Rangeland Conservation Science and Practice in the NGP Ii: Towards an Integrative Praxis, Julia Haggerty and Katie Epstein, Montana State University

Discussion Session –David Wood and John Wendt With All Speakers

PROGRAM

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SESSION 5
Plaza Ballroom F
10:00AM - 12:00PM

Conservation Economics: Lessons from Western Rangelands (Ignite)

"In the Sonoran and Chihuahuan bioregions and most of the arid West, ranching is now the only livelihood that is based on human adaptation to wild biotic communities … Much more is at stake here than the future of a few ranch families. Wildlands teach those for whom they are home an outlook and insights to which others are blind."

-Jim Corbett, the Malpai Agenda for Grazing in the Sonoran and Chihuahuan Bioregions

The irony for many such livelihoods is that they are under more pressure than ever from public perception as economic margins continue to narrow. Neither condition is inevitable, but turning the trend requires that public dialogue and policy be better informed by rangeland livelihoods.

Session Organization and Introduction - Cole Mannix (Moderator), WLA

History of Rangeland Science- Dr. Nathan Sayre, Professor of Environmental Geography, University of Cal Berkeley

Blm Rangelands Allotment Monitoring Pilot in Nv - James Rogers, Winecup Gamble Ranch and WLA Board Member

Agricultural Policy - Jen Livsey, Flying Diamond Ranch and WLA BOD

Wildlife and Conservation Policy – Jessica Crowder, WLA Staff

Sustainable Agriculture is the Foundation of Conservation - Nils Christoffersen, Wallowa Resources Executive Director

Moderated Discussion with Speakers

PROGRAM

MONDAY

SESSION 6
Governors 15
10:00AM - 12:00PM

Managing Rangelands for Pollinators: Best Management Practices, Current Research, and Research Needs (Ignite)

Our Ignite-style Session will cover pollinator research and conservation, a subject area of rapidly increasing interest on America's rangelands. One special feature of our session will be broad geographic coverage, with best management practices for both western range and Great Plains range. We will have multiple talks by early career professionals on grazing and fire regimes and how they impact pollinators and the plants they depend on. and our final talk, by someone on the downslope of his career, will include a list of crucial research needs to help guide the research paths of the younger generation.

Following a traditional question and answer session, Dr. Ray Moranz and Dr. Torre Hovick will run an audience participation event in which audience members are randomly selected and asked about range management regimes near their home region. We will then ask other audience members to make predictions about effects of management practices on pollinator habitat (in terms of wildflower diversity and abundance) in that home region, and for our panel of presenters to also discuss their predictions. By doing this, we hope to extend the knowledge of all involved beyond the scope of the information presented during the 5-minute talks (and to further highlight gaps in our understanding).

Best Management Practices for Pollinators on Western Rangelands - Stephanie McKnight, Emma Pelton, Candace Fallon and Ray Moranz (presenter). All authors are from the Xerces Society for Invertebrate Conservation.

Native Bees in Pacific Northwest Rangelands: Challenges in Management and Conservation - Sandra DeBano, Oregon State University

USDA-NRCS Rangeland Resource Inventory: Extent and Distribution of Milkweed Species on Non-Federal Rangelands - Ken Spaeth, NRCS Central National Technology Support Center

Native Bees are an Important but Overlooked Rangeland Resource in the Great Plains - Chyna Pei, Torre Hovick, Ryan Limb, Jason Harmon, Ben Geaumont and Adrienne Antonsen. All authors are from North Dakota State University.

Sheep are Baahhhhddd for Bees - Jasmine Cutter, Torre Hovick, Benjamin Geaumont, Devan McGranahan, Jason Harmon and Ryan Limb. All authors are from North Dakota State University.

Effects of Fire and Grazing on Butterflies in Tame Grasslands - Jasmine Cutter, Torre Hovick, Benjamin Geaumont, Devan McGranahan, Jason Harmon, and Ryan Limb. All authors are from North Dakota State University.

Quantifying Butterfly Responses to Natural Disturbances - Brooke Karasch, Torre Hovick, Jason Harmon, Ryan Limb and Kevin Sedivec. All authors are from North Dakota State University.

Patch-burn Grazing Extends Flowering Plant Phenology - Cameron Duquette, Torre Hovick, Jason Harmon, Devan McGranahan, Ryan Limb, and Benjamin Geaumont. All authors are from North Dakota State University.

The Evolution of Rangelands and Rangeland Management: Implications for Great Plains Pollinators - Shelly Wiggam, Kansas State University

Best Management Practices for Pollinators on Great Plains Rangelands - Ray Moranz, Rae Powers, Sarah Hamilton Buxton, and Jennifer Hopwood. All authors are from the Xerces Society for Invertebrate Conservation.

SESSION 7
Plaza Ballroom F
1:30PM - 3:30PM

Transforming Public Rangeland Management Through Collaborative Multi-Stakeholder Partnerships (Symposium)

In the US, public rangelands support livelihoods and provide local people with a sense of place. At the same time, these landscapes are recognized as homes to wildlife and areas that protect open space. These benefits are valued not only by the people who derive their livelihoods from the land, but also a broader society. Despite the value of rangelands to multiple groups, divisions exist about how rangelands should be managed. Some of this division stems from differences in organizational culture, occupational jargon, and the unique constraints faced by stakeholders as varied as ranchers, agency managers, and research scientists. Additional tension is derived from past management strategies, which at times compromised livelihoods or ecosystem health. Such division blocks development of effective rangeland management by preventing stakeholders from advancing common objectives and implementing innovative management derived from sharing knowledge and resources. in this session we will explore how multi-stakeholder partnerships are creating invested stewardship networks that can overcome division and lead to novel and durable rangeland management.

This symposium brings together members of collaborative partnerships in the Intermountain West who provide insights on the challenges and opportunities of developing multi-stakeholder partnerships. in doing so, they will share how they engaged stakeholders across organizational and cultural silos to lay the foundation of their partnership. They will also highlight management innovations stemming from the hard work of both developing trust among partners and creating a shared vision of management objectives. Symposium topics span current management foci from outcomes-based grazing to time-controlled grazing. We will start the session by introducing principles and practices that are the foundation of multi-stakeholder collaboration, followed by team-presented talks that capture the differing perspectives of partnership members. Speakers represent a diversity of viewpoints from rancher to nonprofit to state and federal agency. Their roles in the partnerships range from manager to facilitator to regulatory agent to scientist. the symposium will conclude with an interactive discussion designed to help attendees navigate the complexities of developing partnerships with a range of constituencies. We expect the discussion to provide the seeds for future collaborations that allow partnership groups to communicate, share information, ask the hard questions, struggle through disagreements, and learn in order to develop solutions to rangeland management problems at hand.

Transforming Conflict and Fostering Collaborative Action: the Results Oriented Grazing for Ecological Resilience (ROGER) Collaborative - Laura Van Riper, BLM: Social Scientist/ROGER facilitator, and Jon Griggs, Maggie Ranch: Owner and Manager

Collaborative Development of Outcome-Based Management Alternatives: from Value-Scoping to Policy Creation - James Rogers, Winecup-Gamble Ranch: Ranch Manager and Liz Munn, the Nature Conservancy Sagebrush Ecosystem Program Manager

The Three Creeks Grazing Project: Reimagining Partnerships on Public-Lands From Legal Structures to Adaptive Management - Taylor Payne, Utah Grazing Improvement Program: Regional Coordinator, and Mellissa Wood, BLM: Sage-Grouse Plan Implementation Coordinator

SESSION 8
Plaza Ballroom A-C
1:30PM - 3:30PM

What are Animals Eating? New Methods for Estimating Diet Composition on Rangelands (Ignite)

Plant selectivity is a driver of how livestock and wildlife utilize and influence rangeland plant communities through space and time. Both research scientists and rangeland managers need accurate and user-friendly tools to quantify diet composition in order to monitor how different grazing animal species select plants in diverse rangeland areas. Researchers have used a number of techniques (i.e., visual observation, microhistology, etc.) in the past to assess diet composition of grazing animals. Newer technologies (i.e., near infrared reflectance spectroscopy [NIRS], fecal DNA barcoding [fDNA]) have received more recent research attention as potential tools to more quickly and accurately assess diet composition and diet quality of grazing animals. the objective of this ignite-style session will be to invite presentations from six to nine researchers who have either evaluated the efficacy of these new technologies and/or utilized these technologies in their research to determine diet composition of grazing animals. the presentations will focus on the science of these emerging technologies, comparisons of new technologies to other diet composition procedures, and current research that has utilized these technologies to address rangeland management questions and challenges. a panel discussion will follow to discuss applications of these technologies for both researchers and managers. the session will provide innovative information on the most appropriate use and interpretation of data derived from these new techniques and stimulate discussion on how both researchers and managers can utilize these techniques to gather valuable information on diet composition. Expected outcomes for participants of this session will be 1) a greater understanding of diet selectivity and composition analysis techniques in different management scenarios, 2) knowledge of how to conduct, and analyze research for diet composition, and 3) understanding of potential challenges associated with analyzing diet composition in grazing animals on rangelands.

Methodological Advances in Fdna to Correctly Distinguish Among Related Plant Species - Joseph Craine, Ecologist, Jonah Ventures

Comparison of Techniques to Analyze Diet Composition of Livestock - John Walker, Professor and Resident Director of Research, Texas A&M AgriLife Research and Extension Center

fDNA Validation Trial Using Confined Cattle - Derek Scasta, Rangeland Extension Specialist, University of Wyoming

fDNA and Diet Quality Analyses of Cattle Grazing Mixed Grass Prairie - Tamara Jorns, Former graduate student, USDA-ARS

fDNA-based diet selection by Raramuri Criollo and Angus crossbreds in the Chihuahuan Desert - Darren James, Range Management Research Statistician, USDA-ARS

fDNA and Microhistology to Evaluate Feral Horse Diets - Sarah King, Research Scientist, Colorado State University

Using fDNA to Evaluate Targeted Cattle Grazing on Cheatgrass Invaded Areas - Mitch Stephenson, Range Management Specialist, University of Nebraska - Lincoln

The use of fDNA to identify plant families in the diets of cattle, bison, and greater prairie chicken in Oklahoma - Laura Goodman, Range Extension Specialist, Oklahoma State University

SESSION 9
Silver
1:30PM - 3:30PM

Applications of the State and Transition Model (STMs) to Novel Resource Management Issues (Ignite)

Ecological Sites and State-and-Transition Models as a basis for management and decision-support have been common practice on rangelands for more than 25 years. This revolutionary approach has improved communication across the management/research boundary and has become widely taught in range management programs. the principles that have been developed have been adopted in a variety of other land use and management situations. for example, cropland, forestland, urban and subaqueous ecological site descriptions are being developed, extending and broadening the concepts. in this session, presenters will demonstrate the use of state-and-transition models to describe ecosystem behavior and help support management decisions.

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Agro-Ecological Applications of STMs - Skye Wills

Developing STMs for Multiple Land Uses in the Eastern Great Plains - Michael Kucera

STMs for Dynamic Ecosystem Services: Wildlife Habitat - Jamin Johanson

Applying STMs to Urban Land Management Decision-Making - Michael Margo

Defining Thresholds for Wind Erosion in Desert Rangeland STMs - Nick Webb

Applying STM Format to Riparian Ecosystems - Curtis Talbot

Development of STMs on a Barrier Island Ecosystem, the Chincoteague Reserve - Ken Spaeth

Incorporating Reindeer Grazing Interpretations Into Alaska Rangeland STMs - Phil Barber

STMs for Drying Lakes of the Yukon Flats Lowlands - Blaine Spellman

Integrating Rapid Assessment Tools Into STMs - Shane Green

Ecological Sites and STMs for Land Management and Policy Decisions in Mongolia - Budbaatar Ulambayar

Detecting and Describing Ecological States on the Taos Plateau - Alexandra Heller

SESSION 10
Governor's Square 15
1:30PM - 3:30PM

Invasive Annual Grass Management: New Tools to Slow the Transformation of Western US Landscapes (Symposium)

Invasive annual grasses are one of the most pressing challenges facing rangelands in the western United States, and each year the size of the infestation and the challenges managers face grow larger. Meaningful control and mitigation of annual grass threats is critical to halting the continuing conversion of native rangelands to annual grass-dominated landscapes and maintaining the provision of ecosystem services that these landscapes provide. in response to this challenge, new tools are emerging to give managers options in the face of the threats posed by these invaders. Indaziflam (Esplanade, Bayer ©) is an emerging herbicide that has demonstrated particular promise as a tool to selectively control annual grasses without harming established perennial plants. Indaziflam has sparked a proliferation of research and the science is moving rapidly. Maximizing the effectiveness of these new tools and proactively avoiding unintended outcomes will require consistent interactive engagement between involved stakeholders (managers, researchers, industry). Our symposium will feature speakers from each of these stakeholder groups to show how collaborative work between researchers, industry representatives, and land managers can translate into meaningful annual grass control. Our target audience will be the diverse array of stakeholders involved in annual grass management (public land managers, private landowners, researchers, industry professionals), and our objectives will be to present results from projects involving annual grass management with indaziflam and demonstrate how these results can be translated into meaningful conservation gains in areas where these infestations have thus far thwarted the efforts of managers.

This to ultimately slow the transformation of natural areas in the western US into impaired landscapes dominated by these invaders. During the discussion portion of the symposium, we will engage the audience and identify key similarities and differences between management objectives and how indaziflam fits into plans to achieve them.

Depleting the Seed Bank: Key to Restoring Land Devastated By Annual Grass Invasion - Harry Quicke, Bayer Vegetation Management

Sagebrush-Grassland Plant Community Responses to Long-Term Cheatgrass Control in Sublette County, Wy - Jake Courkamp, CSU

Maybe We Won't Fly the Coop: Effects of Cheatgrass Control Using Indaziflam Herbicide on Habitat Quality of Grassland Birds - Noe Marymor, NRCS

PROGRAM

MONDAY

SESSION 11
Governor's Square 14
1:30PM - 3:30PM

The Future Is Here: Applications of Technological Advances for Precision Livestock Management in Extensive Rangelands (Symposium)

New technologies are being rapidly developed to monitor livestock and forage resources in rangelands, but can these be implemented in ways that effectively enhance livestock production? in this session, we bring together scientists and managers who are actively engaged in the use of sensor technologies on working ranches, to share their experiences with how they are changing ranching operations.

A "Fit Bit for Cows": Applications of Accelerometer Ear Tags for Real-Time Monitoring of Cattle - Melissa Brandao, Founder and Ceo of Herddogg

Using Remote Sensing Technology to Monitor Stock Tanks - Kevin Heaton, Extension Professor, Utah State University

Walk-Over-Weighing Scales for Real-Time Monitoring of Livestock Weight Gains: Implications of Knowing Seasonal and Individual Variation in Cattle Performance - Melissa Johnston, Central Plains Experimental Range Manager, USDA-ARS, Nunn, Colorado

Enhancing Grazing Management With Animal Activity and Location Measurements - Corey Moffet, Rangeland Management Specialist, USDA-ARS, Woodward, Oklahoma

Pushing New Boundaries in Livestock Farming With Virtual Fencing - Sarah Adams, Rancher and Global Business Development Manager for Eshepherd, Gallagher Animal Management

SESSION 12
Windows
1:30PM - 3:30PM

Social Science Advancements to Rangeland Management: Perspectives from the Long-Term Agroecosystem Research (LTAR) Network (Ignite)

The rangeland community has become increasingly aware of the connectedness of human and ecological systems. It is now widely accepted that we cannot view environmental problems in isolation from the social and economic settings in which they occur, but we still struggle to understand how to integrate science and human decision making to address complex socio-ecological issues facing rangelands.

The Long-Term-Agroecosystem Research network (LTAR) is well poised to address the challenge of integrating science and management of rangelands with human decision making as it takes a network approach to compare agricultural productivity, social, economic and ecological outcomes of predominant agricultural practices to further human well-being.

The LTAR network provides context-specific knowledge related to on-the-ground management issues from scientists and practitioners that inform local decision making and provides scientific knowledge related to human decision making at a broader scale. This local to national scale ultimately leads to actionable science that can be used by various stakeholders, including landowners, scientist and law makers.

The Ignite-style session will feature six invited speakers, who will provide examples of interdisciplinary approaches that include novel science-practitioner collaborations, synthesize information from the natural and social sciences to address complex natural resource issues, and discuss tradeoffs associated with managing for both intensified agricultural production and human well-being.

Social Change Processes and Their Influence on Human Well-Being: Illuminating the Impacts of Community Interactions for Public Lands Management in Southwestern Idaho, Usa - Amanda Bentley Brymer, University of Idaho and USDA-ARS LTAR

Can Collaborative Adaptive Rangeland Management (CARM) Help Conservationists Move Beyond Individual-Based Conservation? - Ted Toombs, Environmental Defense Fund

Landowner Attitudes and Management of Kentucky Bluegrass in Invaded Northern Great Plains Grasslands - Kiandra Rajala and Mike Sorice, Virginia Tech

Ecosystem Service Tradeoffs Associated With Agricultural Intensification of Grazinglands - Sheri Spiegal, USDA-ARS Jornada Experimental Range, Las Cruces, Nm

Multiple Stakeholder Perceptions of Brush Control Efforts in the Southwest Region - Maude Dinan, USDA-ARS Jornada Experimental Range, Las Cruces, NM

Evaluating Rangeland Management Innovations: Adoption Constraints and Capacity for Change - Gwendŵr Meredith, University of Idaho and USDA-ARS LTAR

TUESDAY 2/18

SESSION 13
Governor's Square 14
10:00AM - 12:00PM

Working Together to Find Solutions for Invasive Species Management: Getting Mitigation on the Ground Across Ownerships (Symposium)

What will prompt diverse land managers, landowners, livestock producers, and government decisionmakers to take effective, proactive, and sustained actions to address current and emergent threats from invasive plants? This is a central unanswered question in rangeland management. Across the western US and in many other rangeland systems around the world, invasive exotic grasses are displacing native plants, reducing biodiversity, and fueling wildfires. These invasive grasses can have potentially devastating impacts on the economic and ecological health of rangeland communities – both human and natural. the scientific community has responded to this threat by producing detailed data and decision support tools to mitigate the impacts and aid in the management of invasive species. However, similar scientific study on how to structure and implement effective and efficient governance and management systems to successfully constrain the impacts of invasive species is lacking. This symposium focuses on this gap in knowledge. We begin by reviewing the current state of knowledge on invasive plant governance and identify key questions and gaps. We then propose a shift in thinking about the type of management challenge presented by invasive plants from a place-based program involving individual landowners or public land managers to a common pool resource challenge requiring individual and coordinated actions. a final presentation will then show how these barriers to effective governance and management are evident in efforts to mitigate the impacts of buffelgrass (Cenchrus ciliaris) in southern Arizona and suggest how shifting thinking about invasive species from a place-based problem to a coordination problem can lead to more effective governance. the three presentations provide a foundation for an interactive discussion with meeting participants about their experiences with management and governance of invasive plants on rangelands, barriers they have identified, and solutions to working across interests and jurisdictions to more effectively share scientific knowledge, apply mitigation techniques, and expand available resources.

Speakers/Discussion Facilitators:

Aaron M Lien, Assistant Research Scientist, School of Natural Resources and the Environment, University of Arizona, Tucson, AZ

Elise Gornish, Cooperative Extension Specialist, School of Natural Resources and the Environment, University of Arizona

Mitchel McClaran, Professor, School of Natural Resources and the Environment and Associate Director, Arizona Experiment Station, University of Arizona

SESSION 14
Plaza Ballroom A-C
10:00AM - 12:00PM

Adaptive Management of Burned Rangelands: Challenges and Opportunities for Its Co-Production By Land-Agency Staff and Scientists (Symposium)

Like many other rangelands worldwide, the sagebrush-steppe of the western US has been greatly impacted by wildfire and invasive plants. Efforts to restore desirable native species and ecosystem function are challenging and frequently unsuccessful. Increasingly, land managers recognize the need to practice adaptive management of post-wildfire burned areas at both the project and regional scales. Acting on this recognition will require managers and scientists to develop a shared understanding of their roles, and the challenges and opportunities they experience at each step in the adaptive management process.

Presentations in this symposium will focus on how science for informing adaptive management of public lands is being co-produced by scientists and managers regarding the objectives of reducing exotic annual grasses, increasing desirable perennial plant communities, and stemming the increase of wildfire in sagebrush steppe.

Karen Prentice, Bureau of Land Management's (BLM) National Science Advisor, will describe land agency perspectives on the challenges and opportunities for co-producing science in sagebrush steppe landscapes. Next, Matt Germino, Research Ecologist with the US Geological Survey (USGS) will present lessons learned by a diverse team of public resource managers, land owners, and Federal and University researchers who carefully coordinated post-fire management to maximize opportunities for research and learning on the 2015 Soda Wildfire. With five years of monitoring, 2500 plots distributed across nearly 300,000 acres of varied terrain, ecological condition, and management treatments already provide an unparalleled learning laboratory from which key lessons on adaptive management can be learned. These 2500 plots provide a strong foundation for future monitoring, learning, and adaptive management. Then, USGS Research Ecologist David Pilliod will describe the co-production process of the Land Treatment Exploration Tool and the Land Treatment Digital Library that supplies its data. the Land Treatment Digital Library is a catalog of information about past treatments on public lands administered by the BLM in the western United States, especially burned areas. the Land Treatment Exploration Tool is designed for resource managers to use when planning land treatments. It provides useful summaries of environmental characteristics of planned treatment areas and facilitates adaptive management practices by comparing those characteristics to other similar treatments within a specified distance or area of interest. Paul Steblein, Wildland Fire Science Coordinator for the USGS, will then moderate a discussion session that we anticipate will explore needs, barriers, and opportunities for improving information flow between scientists and managers for rehabilitation and restoration of post-fire rangelands.

Introduction: Paul Steblein (USGS)

A Land Manager's Perspective: Co-Production of Science that Supports Adaptive Management: Scaling Considerations from the Field to the National Level - Karen Prentice, BLM, Sarah Carter, USGS

Project-Specific Case Study: The Seminal Trial of Post-Fire Adaptive Management on the 2015 Soda Fire - Matt Germino, USGS, Rob Bennett, BLM, Alex Webb, USFWS, Amy Stillman, BLM, Cara Applestein, Boise State Univ, Matt Fisk, USGS

National-Scale Learning System: the Land Treatment Digital Library and Exploration Tool: Science Co-Production and Adaptive Management on Public Rangelands - David Pilliod, USGS, Gordon Toevs, BLM, Justin Welty, USGS Discussion moderated by Paul Steblein, USGS

SESSION 15

Unheard: Amplifying Atypical Voices in Rangeland Management (Ignite) SESSION CANCELLED

SESSION 16
Windows
10:00AM - 12:00PM

Healthy Ecosystems for Rangeland Development (HERD): Sustainable Rangeland Management Strategies and Practices (Symposium)

The Healthy Ecosystems for Rangeland Development (HERD) approach aims to improve Rangeland governance at the local level of rangeland users (local communities) and the intermediate level of decentralized rangeland managers and service providers in districts and governorates level, at the national level and at the regional level. the project approach designed to support dialogue-based processes in which all rangeland users and stakeholders are involved in a shared search for negotiated solutions. Rangeland governance is, on this basis, 'improved' or 'good' if the process that leads to it is transparent, democratic, equitable, pro-poor, and gendered, and that these approaches are reflected in the outcomes.

One of the important aspects of Sustainable Rangeland Management (SRM) is the active participation of local communities and collaboration with relevant stakeholders during the different phases of the strategic planning process. the project methodology targeted the three levels in set of activities that in total aims to improve knowledge and information sharing, multi-stakeholders dialogue for better resources management, and build the local and national institutional in the process.

HERD approach brings together many components adapted from well-proven methodologies in the fields of project management, business management, Rangeland Management and Planning and rural development. the approach also builds on existing sets of guidelines such the EU project EMPOWERS Guidelines for Water Governance (2004-2007), the IUCN Increasing Climate Change Resilience Guiding Toolkit (2014) and the Participatory Rangeland Management Planning (PRMP) guideline.

HERD project will adopt the Participatory Rangeland Management and Planning (PRMP) Methodology as the base approach with some customization in the project management cycle to reflect the strategic planning at the three management levels of the project and merge some of other methodologies and tools to enrich the processes. PRMP initially is intended to help practitioners adapt participatory approaches to the unique situation of the rangelands. PRMP is an iterative/cyclic process laid down in the essential steps. the aim of PRMP is to facilitate participatory rangeland management planning in a simplified and practical way.

PROGRAM

TUESDAY

SESSION 17
Plaza Ballroom F
10:00AM - 12:00PM

Greenhorn to Trailboss: Cultivating the Next Generation of Stewards (Workshop)

The younger generation has been further removed from agriculture today with the transition of the cultural norm to urban lifestyles, but we are still having students enroll in natural resource degrees. One of the challenges our younger generations faces is learning how to build those professional relationships through face-to-face conversations with those in the private sector. Forest production, mining, and ranching are the oldest private sector users of forestry and rangelands. It is essential for students' professional development to make personal connections with these credible resource users to open productive conversations about the knowledge and skill base necessary to reach the goals and objectives of private operations. for this to happen, it will take the technology focused generation that is graduating to see how important the ability to communicate effectively across a broad range of resource users is in the early stages of career development.

Our outcome for the training is for young professionals to learn how scientific and educational communication approaches will impact application of their work outcomes and the pitfalls or struggles they might encounter starting out in their career. Since ranches are the resource that most range managers will encounter early in their career, YPC will focus on the livestock production industry.

SESSION 18
Silver
10:00AM - 12:00PM

Refocusing Rangeland Songbird Research: Connecting Songbirds, Land Management, and Critical Habitat Characteristics (Ignite)

Rangeland songbirds are experiencing widespread population declines across the US. from the tallgrass prairie to the sagebrush ecosystem, loss of habitat is considered the primary cause of decline for many species of conservation concern. the majority of research and conservation efforts focus primarily on population metrics, tracking the downward trajectory of bird numbers. However, there is strong evidence that declining songbird populations are linked to the loss, degradation or fragmentation of habitat. As bird populations continue their downward trend, it is imperative to focus on wildlife habitat characteristics and management of remaining tracts of land. in rangeland ecosystems, the need for effective multi-use management strategies that support wildlife and traditional rangeland uses continues to increase. in this symposium, sponsored by the SRM wildlife habitat committee, we will highlight current songbird habitat research conducted by rangeland professionals. This ignite session will emphasize the connection between declining populations and loss or degradation of habitat, by featuring research on land management, songbirds and critical habitat characteristics such as forbs and plant community structure.

Livestock Grazing as a Tool for Managing Songbird Habitat: Evidence from a Broad-Scale Grazing Experiment - Tracey Johnson

Grassland Bird Nesting Success and Community Composition in a Landscape Managed with Patch-Burn Grazing - Cameron Duquette

Increasing Structural Heterogeneity for Bird Habitat and Private Lands Management - Jennifer Lutze

Short Term Effects of Contemporary Grazing Practices on Sagebrush-obligate Songbird Habitat and Reproductive Success - Vanessa Schroeder

What Mountain Plovers and Cattle (May) Agree on: Moderate-Sized Prairie Dog Colonies in the Thunder Basin National Grassland - Courtney Duchardt

Songbird Abundance on Rangelands in Eastern Oregon Prior to Juniper Removal - Sam Wolfe

Conifer Management Tools for Woodland and Sagebrush Obligate Songbirds - Jason Tack

Tradeoffs and Challenges in Applying Adaptive Rangeland Management for a Shortgrass-Obligate Bird - Kristin Davis

Multiple Ecosystem Services in a State-And-Transition Model for Sagebrush Rangelands - Jennifer Timmer

A Unique Look into Landscape-level Threats and Sagebrush-obligate Songbird Dynamics - Alan Harrington

Multi-scale Habitat Associations of the Three Sagebrush-obligate Songbirds: Mechanistic Insights from 18 Years of Study - Anna Chalfoun

SESSION 19
Governor's Square 15
1:30PM - 3:30PM

Open(source) Range Ignite Session

Science has entered a transformative phase catalyzed by burgeoning data streams, powerful and accessible analytical software, and the democratization of prototyping and manufacturing technologies. This is observable in rangelands in many ways including the deployment of connected sensor networks (e.g., the National Wind Erosion Research Network), the rapid adoption of unmanned aerial vehicles (i.e., drones) for rangeland research and monitoring, the proliferation of powerful and free data analysis tools (e.g., firebehavioR or lidR packages for R), and development of cloud-based, crowd-sourced monitoring apps (e.g., LandPKS). Many of these efforts are developed using open-source software, hardware, and data, and many likewise offer the outputs of their work as open-source products. An open-source product is one where the author or creator makes the original source materials (e.g., code, designs, documentation, concepts) freely available for others to use or modify. While generally associated with free software, open source means more than just free: it is a philosophy that embraces a willingness to share ideas to spur collaboration and advancement in science. We propose an Ignite Session at the 2020 SRM Annual Meeting to showcase open-source efforts in rangeland science and management and to explore the opportunities and implications of open-source research and development.

This Ignite session will feature presentations from rangeland researchers who are using or developing open-source hardware, software, or data. the goals of this session are fourfold: 1) highlight exciting open-source projects in rangeland environments, 2) promote an open-source ethos for advancing research and management in rangelands, 3) increase the audience's understanding of the range of possibilities for open-source development; and 4) increase awareness of how to create open-source hardware, software, and data.

Livestock GPS Collars for $40 – Development of An Open-Hardware Location Tracker - Jason Karl

Thermocouples and Fire Weather - Devan McGranahan

Terradactyl: An Example of Modularity and Ontologies to Ensure the Sustainability of Open Source Software - Sarah McCord

A Cloud-Based, Crowd-Sourcing App for Rangeland Monitoring - Jeff Herrick, LandPKS

Ir Fire Behavior Sensors - Matt Dickinson/Bob Kremen

Open-Source Software As a Force Multiplier in Research: Examples Using Fire Modeling - Justin Ziegler

Open Hardware Development and Prototyping – from 3D Printing to Custom Circuit Boards - Jason Karl

Data and Code Sharing - Open Science - Devan McGranahan

SESSION 20
Silver
1:30PM - 3:30PM

Managing Invasive Species Using Geospatial Technologies (Symposium)

Invasive species are continuing to spread throughout native rangelands. Mitigating the degrading effects of these species is contingent upon our ability to monitor their spread. Moreover, many areas that have the greatest risk to invasive species degradation are difficult to access or inaccessible. the use of remote sensing combined with geospatial (GIS) technology provides users a reliable tool for monitoring the degrading effects of invasive plant species, when accessibility or time are limited.

Throughout this seminar, presenters will discuss new tools, the benefits, and the drawbacks of using geospatial technologies for monitoring invasive species across rangelands and identify the best management strategies for these regions.

A key benefit of this proposed symposium is that it applies to many North American rangeland ecosystems in three short presentations; e.g. the southern Great Plains, desert southwest, and the Great Basin. We also aim to engage audience members during a discussion session that will follow the presentations where we will discuss the possibilities of using these technologies across multiple rangeland regions.

The Application of Geospatial Technology to Assess Pinyon/Juniper Invasion in Western Rangelands- Steve Petersen

Unmanned Aerial Vehicle – Based Rangeland Monitoring: Examining a Century of Vegetation Changes-Temuulen Sankey

Geospatial Perspectives and Approaches to Monitoring Invasive Species in South Texas- Humberto Perotto

SESSION 21
Plaza Ballroom F
1:30PM - 3:30PM

Partnerships are the New Conservation Paradigm (Symposium)

Reversing the decline of grassland bird populations in North America requires creative solutions that transcend fence lines, funding sources, and individual agency goals. Conservation practices that stop at lines of jurisdiction or fences fail to address broader goals of landscape connectivity, rangeland health, and biodiversity. We assert collaborative partnerships are the new model of grassland conservation to achieve landscape-scale results across publicly- and privately-owned land. We introduce a new conservation model that spans non-profit conservation organizations, landowners and managers, and federal and academic researchers to deliver creative solutions to challenges of grassland management and conservation. Six strategically paired speakers will deliver 15-minute talks on collaborative approaches to solving conservation challenges, programmatic approaches through federal collaborations, and adaptive management led by unlikely partnerships in local landscapes.

We begin our symposium with a paired talk to address how partnerships are achieving conservation by addressing challenges and solutions through collaboration. Bird Conservancy of the Rockies' Executive Director, Tammy VerCauteren will begin by delivering a "state of the birds" and creative approaches to conserving grassland birds and their habitats through stewardship, research, and education. the Nature Conservancy's Senior Conservation Ecologist, Terri Schulz will share novel approaches to conservation in the grasslands of Colorado across publicly and privately-owned landscapes.

In the next section, we will explore working models of partner positions with Colorado USDA-NRCS State Conservationist, Clint Evans, who leverages partnerships with non-profit organizations to access specialized skillsets and staffing opportunities to deliver USDA Farm Bill conservation practices on private lands.

Next, Bird Conservancy of the Rockies' Biometrician, David Pavlacky will present peer-reviewed research evaluating the efficacy of two Farm Bill programs, Lesser Prairie Chicken Initiative and Conservation Reserve Program, as mechanisms to slow the decline of grassland birds.

In our final section, two innovative collaborative projects will synthesize these concepts through working models of adaptive management in Colorado and Wyoming. Landscape Ecologist David Augustine with the USDA Agricultural Research Service will introduce the Collaborative Adaptive Rangeland Management Experiment in northeast Colorado.

This project engages ranchers, land managers, non-profits, and federal and state employees to collectively and adaptively manage shortgrass prairie for multiple uses, including grassland bird habitat and cattle production. Finally, Thunder Basin Grassland Prairie Ecosystem Association Executive Director, Dave Pellatz, will present a second collaborative effort in eastern Wyoming, the Thunder Basin Research Initiative. Here, a checkerboard of privately-owned land and public land managed by the USDA Forest Service makes landscape-level management especially challenging. Dave will share challenges and accomplishments of the collaborative, multi-stakeholder effort to answer locally identified management questions concerning a suite of bird guilds.

PROGRAM

TUESDAY

1:30 Tammy VerCauteren, Executive Director, Bird Conservancy of the Rockies

State of the (Grassland) Birds, How Bird Conservancy of the Rockies Addresses Threats Through Collaborative Research and Stewardship, and Looking Ahead to the 2020 Grassland Roadmap Summit.

Suggested Transition: Grassland Conservation Requires An "All Hands on Deck" Approach and the Future of Bird Conservation Relies on Collaborative Partnerships

1:45 Sasha Gennet, Director of the North America Sustainable Grazing Lands program, the Nature Conservancy

Novel Approaches to Grassland Conservation – North America Sustainable Grazing Lands Program, How Environmental Sustainability and Profitable Ranching Can Be Complimentary; Case Study (Matador Ranch and Grassbank Program). Emphasis on Working Lands and Ranchers as Part of the Solution.

Suggested Transition: the Conservation Value of Privately-Owned Lands and the Need to Support Private Landowners Through Incentive Programs

2:00 – 2:15 Clint Evans, State Conservationist, Colorado NRCS

Working Models of Partner Positions Between Co NRCS and Non-Profits to Access Specialized Skillsets and Staffing Opportunities to Deliver USDA Farm Bill Conservation Practices on Private Lands; Examples of Programs for Grassland Conservation; Maybe Example(S) of Specific Projects as a Case Study?

Suggested Transition: We Have Funding Programs, Partnerships and Technical Assistance in Place to Achieve Conservation of Grasslands – But are We Accomplishing Our Goals? NRCS Partnered with Bird Conservancy of the Rockies to Evaluate the Effectiveness of our Programs (CRP, LPCI Research Outcomes – see attached PDF).

2:15 – 2:30 David Pavlacky, Biometrician, Bird Conservancy of the Rockies

Present Peer-Reviewed Research Evaluating the Efficacy of Two Farm Bill Programs, Lesser Prairie Chicken Initiative and Conservation Reserve Program, As Mechanisms to Slow the Decline of Grassland Birds.

Suggested transition: Outcomes of our collaborative research verified Farm Bill conservation practices are effective. This research focused on conservation on privately-owned lands and without the direct input of landowners. What does it look like when we marry research and management, and diverse stakeholders including landowners, agencies, researchers, and NGOs?

2:30 – 2:45 David Augustine, Landscape Ecologist, USDA Agricultural Research Service

The Collaborative Adaptive Rangeland Management Experiment In Northeast Colorado. This Project Engages Ranchers, Land Managers, Non-Profits, and Federal and State Employees to Collectively and Adaptively Manage Shortgrass Prairie for Multiple Uses, Including Grassland Bird Habitat and Cattle Production.

Suggested Transition: This Model Includes Input and Adaptive Management From Multiple Stakeholders But Occurs Entirely on Land Managed By USDA-ARS. Can This Model Be Applied to New Grassland Systems and Be Embraced By Local Communities? Can It Succeed In a Landscape With Checkerboard Land Ownership, Where Management Decisions Become Infinitely More Complex?

2:45 – 3:00 Dave Pellatz, Executive Director, Thunder Basin Grassland Prairie Ecosystem Association

- A Second Collaborative Effort In Eastern Wyoming, the Thunder Basin Research Initiative. Here, a Checkerboard of Privately Owned Land and Public Land Managed By the USDA Forest Service Makes Landscape-Level Management Especially Challenging. This Collaborative, Multi-Stakeholder Effort Is Answering Locally-Identified Management Questions Concerning Compatible Grazing and a Suite of Birds. Dave Will Share Challenges, Accomplishments and Lessons Learned.
- Suggested Transition Into Discussion: Biggest Lesson Learned From Tbri Is Conservation Shouldn't Be Prescriptive But Instead Collaborative. Every Person (Landowners, Agency, Non-Profits, Researchers, Tribal Members) Have Something to Contribute to the Conversation.
- 3:00 – 3:30 Panel Discussion

PROGRAM

TUESDAY

SESSION 22
Plaza Ballroom E
1:30PM - 3:30PM

Kenyan IRC 2020 (Symposium)

Harry Kimtai, Principal Secretary (PS), State Department of Livestock - Chairman of the NOC

Dr. Eliud Kireger, Director General (DG), Kenya Agricultural and Livestock Research Organization (KALRO), Chairman of the NOC Secretariat

Ernest Mbogo, Deputy Director, State Department of Livestock, Member, NOC

Dr. Cecelia Onyango, Lecturer, University of Nairobi, Vice Chair, Local and Arrangements Sub-Committee of NOC

Dr. Foustine Peter Wandera, Director Livestock Systems, KALRO, Secretary, Program Sub-committee of NOC

Primrose Nabwire, ICT expert, Manager, Kenya IGC-IRC Secretariat office and managing software running the Congress website

SESSION 23
Windows
1:30PM - 3:30PM

The Art and Science of Stockmanship in Rangeland Management: Asking better questions and engaging more people (Symposium)

Since 2015 there have been three Stockmanship Symposia at SRM Annual Meetings (2015, 2016, and 2018). the value of Stockmanship to range management has been demonstrated in bison and wild horse management, livestock/range management in the presence of predators, utilization of range, managing wilderness grasslands with pack stock, and placing livestock. This proposed symposium for the 2020 SRM AM is not about answers, but what are the new questions for translating Stockmanship into practice to facilitate the transformation of range science. Some questions that we have to start the discussion include: Improving diversity among Stockmanship practitioners; Do new technologies facilitate or antagonize stockmanship?; Do stockmanship skills, experience and techniques impact cattle placement?; Can reductions in livestock stress when applying stockmanship in rangeland conditions be measured?; How do people, livestock and predators interact when stockmanship is applied?; Are we meeting the needs of students, managers, scientists and ranchers in how we inform them about Stockmanship?; and most importantly what are your questions?

Derek W. Bailey, Ph.D. – Professor and Director Chihuahuan Desert Rangeland Research Center, New Mexico State University, Las Cruces, New Mexico

Matt Barnes – Rangeland Scientist, Conservationist, Consultant, and Writer, Shining Horizons Land Management, LLC, Montezuma, Colorado

Retta Bruegger – Western Regional Specialist Range Management, Colorado State University Extension

Jesse Bussard – Storyteller, Community Builder, and Writer; Cowpunch Creative – Bozeman, Montana

Whit Hibbard, Ph.D. – Publisher of Stockmanship Journal (Former National Park Service Law Enforcement and Natural Resources Ranger), Rancher; Sieben Livestock Company – Helena, Montana

Kent Reeves – Range/Wildlife Scientist, and Western Photographer; the Whole Picture and Rancher to Rancher Network – Mariposa, California

David M. Voth – Rangeland Health Coordinator; Nevada Department of Agriculture – Elko, Nevada

Mike Williams – Rancher; Co-owner Diamond W Cattle Company, Ventura, California

Engaging More People to Transform Stockmanship into Practice

SESSION 24
Plaza Ballroom A-C
1:30PM - 3:30PM

Stakeholder Engagement to Improve Federal Rangeland Wildfire Mitigation and Response (Symposium)

Rangeland wildfires have grown in size, frequency, and length of season due to factors that include increasing human use of rangelands, vegetation state change (e.g., cheatgrass invasion), drought, and climate change. for example, the largest wildfires ever recorded in all four Great Basin states have been rangeland fires that have occurred in 2007 or later. in response, land managers and researchers have proposed solutions such as novel grazing systems, pre-emptive restoration, fuel break provision, and more. Because western U.S. rangelands are largely managed by the federal government for multiple uses, and because wildfires frequently cross jurisdictional boundaries, implementing successful strategies to reduce wildfire risk and impact or to improve post-wildfire recovery is likely to require involvement by multiple actors beyond the federal rangeland management agencies.

This symposium presents results of new research exploring options for engagement between land management agencies and multiple stakeholders to improve federal wildfire mitigation and response. First, Katherine Wollstein will present results from three BLM field offices showing how formal and informal arrangements and processes affect learning, interpretation, and subsequent implementation of management designed to reduce wildfire risk in Idaho. Emily Jane Davis will describe her findings in studies of evolving partnerships for rangeland wildfire mitigation and suppression in Oregon and Idaho. Finally, Gwendwr Meredith will present her analysis of how collaborative management efforts in southwestern Idaho and southeastern Oregon shaped, and were shaped by, rehabilitation needs after the 280,000-acre Soda Fire that occurred in 2015.

In their talks, each presenter will not only explain her findings, but also propose ways that local rangeland and fire/fuels managers can use those findings to shape their own external engagement strategies to improve wildfire risk reduction and post-fire response. Subsequent discussion will invite symposium attendees to share their own unique institutional, stakeholder, and fire risk contexts in order to think through together how research findings can be rapidly translated to action.

Context Matters: Institutional Conditions for Outcome-Based Approaches to Address Wildfire Risk on Idaho's Rangelands - Katherine Wollstein, University of Idaho

Fire on the Range: 'Co-Managing' Risk Among Agencies and Landowners in the Great Basin - Emily Jane Davis, Oregon State University

Effects of Wildfire on Collaborative Governance of Rangelands - A case Study of the Soda Fire - Gwendŵr Meredith, University of Idaho

WEDNESDAY 2/19

SESSION 25
Plaza Ballroom A-C
10:00AM - 12:00PM

Has Scientific Communication Failed the Art of Range Management? (Symposium)

"Not everything that counts can be counted, and not everything that can be counted, counts"

-Albert Einstein

When does science become art? We often refer to the "Art and Science of Range Management' but how often do we acknowledge the "art" or the "artist?" in today's world of ever-expanding technology and engineering, many aspects of the "art" of natural resource and land management are being overshadowed by a desire for predictability driven decision processes. the desire to be "right," or better yet, to not be "wrong," weighs heavily on the decision-maker and ultimately can lead to inaction for fear of getting the science wrong. Science and management theory have become a driver for many decision-makers in their efforts to minimize potential negative impacts of decisions made, and in the realm of natural resources, command and control are sought over managed ecosystems. Management decisions must be made every day in the world of land management and are nearly always made with less than perfect and far less than complete knowledge.

Those tasked with the responsibility of stewarding the lands they manage are confronted with challenges that require a decision in the present that may have long-term implications, both to the operation as well as across a broad array of society. Added to the basic operational challenges of land management, the impacts of social, political, ecological and economic drivers confront the land manager with a complexity of scenarios that cannot be addressed through traditional scientific methodologies. in addressing these facts, the Society for Range Management recognized that rangeland management is the "art and science" of deploying management decisions on the landscapes. Whereas, academic endeavors rightfully focus on the "science," the practitioner remains the ultimate decision-maker in the rangeland management system, the "artist" if you will, integrating both "art" and "science" into the decision-making process. in many ways, land management is truly a creative endeavor with the managers creativity producing the art of the management process. Science favors one "right" answer, while the artist may create many scenarios on the landscape, utilizing the science but considering all the other drivers mentioned above.

The Sub-Plenary and accompanying Symposium will focus on inputs from the ranching community as to needs for communicating science to action and will address/challenge the need for new means of communication that brings the science closer to action.

To paraphrase a belief of Dr. John "Chip" Merrill "…as land managers, if the focus is on dealing with problems then we will continue dealing with problems. If the focus is on our desired objectives and we visualize what it takes to achieve that objective, then we can get it done." "Communicating" science into action in the 21st century is a challenge that will require changes in "WHY" we communicate.

Jenny Pluhar and Frank Price, involving a "Conversation with H.L. Bentley, Special Agent in Charge of Grass, Abilene, Texas Field Station, 1898." This session will be "Facebook Live" and interactive.

SESSION 26
Windows
10:00AM - 12:00PM

Vulnerability of Beef Cattle Production to Ecological and Socio-Economic Challenges of Future Climates (Symposium)

Cattle producers have historically had to contend with climate variability, but an increase in the variability of future climates may exceed the existing adaptive capacity. Drought reduces forage availability, increases operating costs, and reduces profits as a result of supplemental feeding, loss of animal condition, and destocking-restocking cycles. Wet years challenge the ability of beef producers to convert high forage production into profits without the purchase of additional livestock. Consequently, increasing climate variability presents a serious challenge to the economic viability of beef cattle production and it defines a major knowledge gap for the region.

This symposium will explore the vulnerability of beef cattle production to future climates in the Northern, Central and Southern Great Plains. We will emphasize (1) the response of beef cattle production to recent droughts (1980s and 2010s), (2) trends in forage production throughout the 21st century, (3) the impact of future climate variability and change on economic viability of beef cattle production, and (4) the ability of beef producers to adapt to future climates to maintain economically viable operations.

The maintenance of economically sustainable beef cattle production may require the collaboration of agricultural research institutions, the beef cattle industry, and local, state, and national governments. Effective contingency planning to sustain beef cattle production has major implications beyond the nation's beef supply by maintaining intact grazing lands and the diverse ecosystem services that are derived from them.

David Briske, Texas A&M University – Retrospective Assessment of Beef Cattle Dynamics to Climate Variability the Past 40 Years

Toni Klemm, Texas A&M University – Future Climate and Forage Projections: Implications for Beef Cattle Numbers and Distribution

John Ritten, University of Wyoming – An Economics Assessment of Beef Cattle Vulnerability to Future Climates

Amber Campbell, Kansas State University – Assessment of the Adaptive Capacity of Beef Cattle Producers to Future Climates

SESSION 27
Plaza Ballroom F
10:00AM - 12:00PM

Researchers and Practitioners Integrating Knowledge to Restore and Reclaim Rangelands and Riparian Areas (Symposium)

Reclamation and restoration efforts on rangelands are often fueled by collaborations between researchers and practitioners, but the integrated knowledge created by these interdisciplinary teams is poorly represented in the scientific literature and in the SRM community. the SRM Reclamation and Restoration (R&R) Committee proposes to build on SRM's capacity by exploring partnerships between science and management in reclamation and restoration on rangelands, including riparian areas.

We propose to continue the stimulating discussion begun at the 2019 Annual Meeting, at the symposium "The Proof is in the Pudding: Showcasing Diverse Perspectives on Success and Failure in Rangeland Reclamation and Restoration." R&R Committee members in attendance in 2019 expressed the need to continue the discussion and learn more about best practices in science-management partnerships in reclamation and restoration. Accordingly, we have secured three pairs of speakers to present on such partnerships, with each pair containing a researcher and a "practitioner" -- with the latter being widely defined. Each pair of speakers will have 25 minutes to illuminate what has worked and what has not in their collaborative project, similarities and differences between research and management perspectives, and the opportunities and challenges experienced in two-way transfers of knowledge between researchers and practitioners. Remaining time will be dedicated to group discussion among speakers and audience participants, including members of the R&R and Watershed/Riparian committees.

Rangeland Restoration for Multiple Audiences, from Local Results to Global Implications - Nancy Shackelford, University of Victoria, British Columbia; *Dr. Katharine Suding, University of Colorado Boulder; Dr. Rebecca Hufft, Denver Botanic Gardens; *Larry Vickerman, Denver Botanic Gardens Chatfield Farms

Lessons from Research and Ranching Applications in Restoring Native Rangelands from Annual Grass Invasion Using Indaziflam Herbicide - Justin Hossfeld, Sunlight Ranch Company; Shannon Clark, Colorado State University

Dalton Meadow Restoration: Intersection of Science, Management and Education - Sam Lossing, Smith Creek Ranch; Tamzen K. Stringham, Ph.D., University of Nevada

SESSION 28 **Stakeholder Engagement: Who, When, Why, and How (Workshop)**

Silver

10:00AM - 12:00PM

This two-hour workshop will introduce SRM 2020 attendees to purposes and processes of stakeholder engagement outside the NEPA process. Engagement with stakeholders can be useful for rangeland managers in a number of contexts, e.g.,

- Identifying opportunities for collaboration
- Prioritizing efforts to address management challenges
- Understanding citizen perceptions of those challenges
- Gauging public perspectives on alternative management strategies that will be the subject of subsequent NEPA efforts

Likewise, for range researchers, stakeholder engagement is a cornerstone of translational science, useful for identification of researchable problems or soliciting assistance with study design, implementation (i.e., citizen science), interpretation of results, and dissemination of findings. Yet principles of stakeholder engagement are not typically taught in university courses. This workshop will help attendees identify when stakeholder engagement can be useful, gain practice at stakeholder identification, and collaboratively identify best practices for effective engagement.

The workshop will combine presentations with hands-on activities and discussion. After an introductory presentation on the potential purposes of stakeholder engagement in rangeland management and situations where it must be most effective ("when" and "why"), attendees will work in small groups to identify which stakeholders and subject matter experts could best inform a real-world situation ("who"). Following report-out from that exercise, the second half of the workshop will focus on the "how," combining discussion with a real-time quiz game to identify effective stakeholder engagement practices that foster efficient use of time as well as beneficial social learning processes and outcomes.

Organizers/Presenters: Amanda Bentley Brymer and Mark Brunson

PROGRAM

WEDNESDAY

SESSION 29
Plaza Ballroom E
10:00AM - 12:00PM

Shared Monitoring, Shared Stewardship (Ignite)

Standardized monitoring information is transforming land stewardship by creating a common language for translating diverse ideas about land conditions and changes. Core monitoring indicators and methodologies adopted by BLM, NRCS, and other groups provide comparable information that can be readily understood by stakeholders. When collection and analysis of this information occurs in partnership, outcomes are often improved for both the lands and communities involved. This session will showcase partnerships that are using core indicator information to achieve shared land management goals. Examples will span the variety of land uses in the Western US, including livestock grazing, land treatment effectiveness, wildlife habitat management, and energy development and reclamation. Together, these examples will demonstrate the hallmarks of successful monitoring partnerships which can be extended into new communities and resource management applications.

Big Data, Local Science: Not an Oxymoron - Brandon Bestelmeyer (ARS), Leticia Lister (BLM), Zoe Davidson (BLM)

Working Together to Get Work Done: Meadow and Riparian Restoration in the Gunnison Basin and Beyond - Tom Grant (Gunnison Conservation District), Renee Rondeau (Colorado Natural Heritage Program)

AIM after Fire: Long-Term Monitoring of Vegetation Treatments within the 2012 Rush Fire - Andrew Johnson (BLM)

Bridging the Gaps: Optimizing Monitoring Data from Oil and Gas Reclamation Reporting - Steven Hale (Utah Gas Corps), Sean diStefano (ARS)

Collaborative Adaptive Rangeland Management (CARM) in Northeast Colorado - Jeff Wahlert (Rancher), David Augustine (ARS)

Addressing Flexibility through Outcome Based Grazing Authorizations - Kathryn Dyer (BLM)

The Use of Targeted Livestock Grazing to Reduce Fine Fuels: Monitoring a Multi-State Demonstration Program - Mike Pellant (ret. BLM), Pat Clark (ARS)

Landowner monitoring and adaptive management using the phone app, LandPKS - Terri Schulz (TNC)

Mule Deer Migration and Habitat Selection in Utah using GPS Collar Data and Terrestrial AIM Monitoring Data - Casey Addy (BLM), Daniel Olsen (Utah DWR)

Development of Ecological Site Group Descriptions and Maps for Adaptive Land Management - Travis Nauman (USGS), Mike Duniway (USGS)

SESSION 30
Governor's Square 15
10:00AM - 12:00PM

Targeted Livestock Grazing to Reduce Fine Fuels in the Great Basin (Symposium)

Wildfires continue to increase in the Great Basin threatening flora, fauna, ecological integrity, economic well-being, and rural heritage. Fuels management projects are an important proactive approach to reduce wildfire threats that impact federal, state, tribal and private lands. There is a renewed interest in using livestock to reduce fine fuels as another tool in the fuels management toolbox. Several approaches are being implemented and evaluated by collaborative partnerships using livestock to reduce fine fuels—composed of cheatgrass, medusahead, and ventenata.

The Bureau of Land Management is supporting three demonstration projects in Nevada, Idaho, and Oregon to strategically reduce fine fuels at a landscape scale using targeted grazing. Livestock permittees are using water and nutrient supplements, herding, and in some cases fencing to meeting fuels reduction objectives (generally two-inch stubble heights) by the beginning of the fire season). An intensive research project has been implemented by the Agricultural Research Service's Northwest Watershed Research Center to evaluate the effects of the grazing on fuel loads, vegetation and soils. Results have been variable in terms of meeting objectives to date given the variability of the spring growth of cheatgrass for the past two years. However, a 2018 wildfire started by lightning burned into an approximately one-mile segment of the T Lazy S targeted grazing fuel break in the Elko District and stopped along the water haul road.

The other approach being investigated is using livestock to remove the invasive annual grasses thatch layer and emerging fall growth when desirable perennial plants are dormant (e.g., dormant season grazing) and less susceptible to disturbance. the goal of this livestock management strategy is to increase residual desirable plants, reduce annual grass germination and carryover fine fuel residue. Dormant season grazing studies are being conducted by the University of Nevada Reno, Oregon State University and the Agricultural Research Services Eastern Oregon Agricultural Research Center in Burns, Oregon. Initial results are promising in terms of reducing residual fine fuels and promoting recovery of desirable perennial vegetation. Both strategies will be addressed in this symposium with an emphasis on collaboration, results, lessons learned, challenges and future directions.

10:00- Introduction and Symposium Objectives - Mike Pellant, BLM (Retired)

10:05- Grazing to Reduce Wildfire Probability and Modify Fire Behavior - Kirk Davies, ARS

10:20- A New Approach Using Livestock to Strategically Create Fuel Breaks in Fine Fuels - Mike Pellant

10:35- Managing Fine Fuels at the Landscape Scale on Public Lands Using Dormant Season Grazing - Sergio Arsipe, OSU Extension

10:50- Multi-Regional Research Projects Evaluating Cattle Grazing for Strategic Fuel Break Creation and Ecological Restoration - Pat Clark, ARS

11:05- Lessons Learned Through Practical Application of Livestock to Create and Maintain Fuel Breaks in Cheatgrass Dominated Areas-Kathryn Dyer BLM

11:20- Accomplishing Targeted Grazing with Good Science and Skilled Livestock Management, Karen Launchbaugh, University of Idaho

11:35- Panel and Audience Interaction

SESSION 31
Governor's Square 15
1:30PM - 3:30PM

Engaging Rangeland Managers in Grass-Cast to Improve Translation and Transfer (Symposium)

The Grassland Productivity Forecast or "Grass-Cast" uses over 30 years of historical data on weather and vegetation growth—combined with satellite NDVI data and seasonal precipitation forecasts—to predict if rangelands in individual ~6 mile x 6 mile areas are likely to produce above-normal, near-normal, or below-normal amounts of vegetation. Grass-Cast can help rangeland managers throughout the Great Plains and Southwest adaptively manage lands to better match animal demand to available forage by providing early warning for drought-induced forage shortages. It was first released to the public in 2018 for the Northern Great Plains, and to the Southern Great Plains in 2019. Work is now underway to develop Grass-Cast for the Southwest region of the United States. This symposium will provide an overview of Grass-Cast, followed by a demonstration of its interactive online maps. Finally, we will use scenarios from 2018 and 2019 to engage participants in small-group discussions centered on how Grass-Cast might fit within existing conservation planning and outreach activities of rangeland specialists with University Extension, private industry, and land management agencies such as NRCS, Forest Service, and BLM.

The symposium will open with a 30-minute introduction to Grass-Cast by a duo of senior and junior team members. Participants will learn how the Grass-Cast maps are made, how to find them online, and how to interpret them. the next 20 minutes will be dedicated to Q&A with the audience to address technical questions. During the second half of the symposium, the USDA Northern Plains Climate Hub will kick off an interactive portion by introducing Grass-Cast maps from the 2018 and 2019 seasons (10 minutes), which exhibited very different characteristics and management implications. Participants will then use the maps in small groups to hone their understanding of Grass-Cast and discuss how they might act upon the early-season information for a location of interest to them (30 minutes). the symposium will conclude with a report-out from all groups to capture their insights about the opportunities and challenges of using Grass-Cast to help inform rangeland management decisions. We are seeking input from rangeland managers to help make Grass-Cast more usable and envision how it might be incorporated into existing conservation planning and outreach programming efforts.

Speakers: Dannele Peck, Justin Derner, Kristin Dickinson, Matt Reeves, Windy Kelley.

SESSION 32
Plaza Ballroom F
1:30PM - 3:30PM

Translation of Key Insights From Long-Term Stocking Rate Studies to Range Managers (Symposium)

Sustainable livestock production is centered on matching animal demand with forage availability, which presents a challenge to managers faced with changing climatic conditions. Long-term stocking rate studies have provided fundamental knowledge to the range management profession. Key insights from these studies have not been translated well to range managers or to agencies (state, federal, tribal) for land management recommendations.

In this symposium, translation of the key insights from several multidecadal stocking rate studies could provide the focus and vision (i.e., 20/20) for reshaping the sustainable management of rangelands in a changing climate. Our goal is to highlight ways that science-based information on livestock production can benefit sustainable ecosystem management. Objectives of resulting discussion with attendees will be: 1) advance questions centered on how long-term data can inform our understanding of climatic drivers and rangeland conditions which mediate livestock production, 2) introduce novel uses of such long-term data for management/practice applications, and 3) engage attendees and speakers in a discussion of livestock production using operation examples from different regions. Expected outcomes for attendees include a better understanding of regional variation in livestock production under different stocking rates, and implications for rangeland ecosystem management and decision-making under changing climatic conditions.

Balancing Ecosystem Goods and Services: Why Do Ranchers Do What They Do? - Alexander “Sandy” Smart, South Dakota State University

’Old’ Stocking Study Still Yields New Information for Current Management -Keith Harmoney, Kansas State University

Testing, Developing and Communicating Guidelines for Sustainable and Profitable Management in the Rangelands of Northern Australia - Peter O’reagain, Queensland Australia Department of Agriculture and Fisheries

Large-Scale and Local Climatic Controls on Large Herbivore Productivity: Implications for Adaptive Rangeland Management - Edward J. Raynor, USDA-ARS, Rangeland Resources and Systems Research Unit

SESSION 33
Governor's Square 14
1:30PM - 3:30PM

Addressing Flexibility through Outcome Based Grazing Authorization (Symposium)

The Bureau of Land Management initiated the Outcome Based Grazing Authorization (OBGA) demonstration project in September 2017. the OBGA project is intended to support enhanced collaboration and partnerships for managing livestock based on conservation performance and ecological outcomes rather than process and prescription. This is expected to result in cooperative improvement, management and/or protection of public lands within the project areas as well as creating or continuing achievement or attainment of positive economic and social outcomes. Flexibility in yearly operational management is key to the OBGA, and clearly stated objectives and an associated monitoring plan is key to implementing legally sound flexibility.

Speakers will be comprised of the OBGA lead and speakers from 2 of the OBGA projects. the symposium will begin with the OBGA lead giving an overview of the effort and the variety of projects involved. the overview will include information regarding the expected outcome of the initiative, which is new national policy and direction on how to renew BLM grazing permits in order to enhance collaboration and maximize flexibility. Two of the 11 National OBGA projects will then present, specifically focusing on innovative monitoring, and successful approaches to collaboration. the projects will also include a discussion of the importance of monitoring to the effort, and how some innovative new techniques are being used to compliment other 'agency' monitoring techniques and support management decision making. Discussions will include information on flexibility that has already been implemented, and how that information is being captured and shared.

Public lands grazing is an important contributor to the agricultural industry in the west, and there is expected to be much conversation initiated through this presentation. There are many opportunities to improve the flexibility afforded a public lands grazing permit, and this project explores those opportunities. Benefits of OBGA are expected to include improved relationships, healthier ecosystems, and enhanced economic viability.

We have from Oregon: Autumn Toelle-Jackson (BLM) and Stacy Davies (or a ranch representative) of Roaring Springs Ranch. From Nevada we have Jeff Morre (BLM) and James Rogers of the Winecup-Gamble Ranch, and from Wyoming we have Cheryl Newberry (BLM) and Niels Hansen of PH Livestock Co. Kathryn Dyer of BLM will also be a presenter/contributor as well as being the facilitator/ moderator.

SESSION 34
Plaza Ballroom A-C
1:30PM - 3:30PM

Science to Action: Communication Needs of the 21st Century Rangeland Manager (Symposium)

When "Rangeland Scientists" question why those who manage ecosystems do not implement the information developed into action, the managers concern is not centrally about the quality of data or information, but rather, the processes of knowledge production and implementation. Knowledge is a consequence of human reflection and experience, and it is most often found within an individual, collective, routine or process that results in an increased capacity for decision-making and action to achieve some purpose. This definition stands in meaningful contrast to data, which refers to unedited descriptions or results of observations about states of past, present or future domains, or information, which refers to patterns that observers find or instill onto the data that has been generated through experimentation.

The adoption and spread of innovation through a society/organization was formally described by Everett M. Rogers in the book Diffusions of Innovations and expanded upon by Geoffrey Moore to not only address the concepts of innovation, but also the spread if ideas. These concepts apply particularly well in natural resource management with a bell-curved continuum from those who readily develop and adopt (Innovators – 2.5%, Early Adopters – 13.5%) through those who are waiting to see (Early Majority – 34%, Late Majority – 34%) and ending with those who lag behind (Laggards – 16%).

David Scarnecchia described rangeland "Management Science" as a distinct scientific entity that provides the basis for synthesizing many of the basic sciences into a discipline focused on the effective management of rangeland/grazing land ecosystems. He pointed out one distinct issue…" to accomplish synthesis, organization is essential, as is communication". What has lacked in most components of the profession is the realization that no matter the complexity of the subject (stocking rate, ecohydrology, landscape dynamics, etc.); to apply rangeland management science is most importantly a science of communication.

Fred Provenza stated that the role of today's rangeland scientist is to provide understanding of the structures, processes and functions that are critical to the "wise" management of rangeland/grazing land ecosystems.

To answer the call for communication and knowledge generation in the 21st century, those who study, assess, create policy, assist and manage natural resource ecosystems must coalesce around a common vision of "Why?" the systems are important, "How?" we can most efficiently and effectively manage them, and "What?" will become the actions and decisions that influence the future of this vital natural resource.

The proposed symposium builds upon the questions of the days sub-plenary session and provides insight from rangeland managers and ideas for communication that traverses science to management.

Moderated by Bill Fox with special guest Special Agent H. L. Bentley.

Speakers will include Neal Wilkins (East Foundation), Meredith Ellis (rancher) and Martin Carcasson (CSU).

SESSION 35
Silver
1:30PM - 3:30PM

Ignite Your Rangeland Collaboration: Lessons Learned and Keys to Success (Ignite)

Collaborations occur in many different contexts from landowner led groups sharing best practices to co-management of a property. Some are formed to share information and others to resolve conflicting priorities. Are there characteristics of collaboration that ensure success or predict failure? Four – six speakers from a diversity of collaboratives will tell the story of their group and why they have been successful. These ignite presentations will focus on lessons learned and themes which are transferable across a variety of collaborations. After the presentations, a discussion with the audience will determine how universal the themes are.

Organizers: Terri Schulz, Mark Brunson, and Michael Duniway

Collaborations in Conservation: What Do They Look Like, How Do They Work, and When Do They Succeed - John Sanderson

Collaborative Adaptive Rangeland Management Project in Colorado - Terri Schulz

Ranchers, Agencies, Scientists, and Consultants Work Together As the California Rangeland Conservation Coalition - Lynn Huntsinger

Well Pad Reclamation Research and Collaboration in the Uinta Basin - Mike Duniway

Co-Creating Knowledge for Action With Women Pastoralists in Spain - Maria Fernandez-Gimenez

Ranch Community Collaboratives and Conservation in Central Montana - Brian Martin

Species of Capital in Collaborative Conservation: the Malpai Borderlands Group - Nathan Sayer

Developing National Livestock and Rangeland Information Systems: Lessons Learned and Adaptations - Jay Angerer

Can Boundary-Spanning Collaborations Help Us Cross the Desire/Outcome Barrier? - Mark Brunson

SESSION 36
Windows
1:30PM - 3:30PM

Improving Communication and Collaboration Among Diverse Experts (Workshop)

Collaboration between experts from different fields and backgrounds is essential in producing actionable science that is applicable as well as accepted and trusted. Diverse expertise, languages, cultures, and priorities can challenge a team's progress, and ineffective collaboration can lead to misunderstanding, inefficiency, and frustration, impacting progress and reducing the acceptance and perceived trustworthiness of results. Improving communication helps to incorporate perspectives of diverse stakeholders, including those who are frequently under-represented or overlooked, and improve public understanding of the benefits of scientific work and its results.

The goal of this workshop is to help bridge the gap between the scientific, managerial, and administrative communities; to improve actionable, collaborative research; and to increase the presence and relevance of research findings in the decision- and policy-making process. Participants will learn and practice ways to transform complex scientific studies into concise descriptions of problems, goals, methods, and relevance using less jargon-heavy and technical language.

The workshop consists of four parts and is built around the Message Box, a widely used concept to communicate complex problems, and guided conversations among three people from different fields (e.g., scientist, management officer, agency employee). Participants first learn the basics of science communication to a broader audience, before being introduced to the Message Box concept, including goals and examples. Then, participants team up in groups of three to apply the concept using their own work and evaluate each other. Finally, all participants will share their experience with each other.

Organizers/hosts:

Toni Klemm, Ph.D., Texas A&M University, College Station, Texas

Cait Rottler, Ph.D., USDA Southern Plains Climate Hub, El Reno, Oklahoma

Toni Klemm and Cait Rottler are postdoctoral researchers. They have extensive experience working in interdisciplinary groups and have been teaching and practicing science communication for several years.

7:00PM - 8:30PM

Producer Reception- National Western Complex

National Western Complex

James Rogers "Why Management Pays"

POSTER SESSIONS

MONDAY

1	Extension Survey of Wyoming Ranchers Reveals Insight for Predator-Livestock Interactions	Barton Stam
2	Wild Horses: Values and Attitudes Towards Management Methods	Elena Dosamantes
3	Evaluating Knowledge, Attitudes, and Perceptions of Ranchers and BLM Managers or Specialists	Calee L. Garn
4	Public Land Grazing and Nepa: A Multimedia Educational Program for Arizona Cooperative Extension and Beyond	Aaron M. Lien
5	Re-Interpretation of Robinson Et Al. 2019: Patterns of Rangeland Productivity and Land Ownership: Implications for Conservation and Management. Ecological Applications, 29(3), E01862.	Robert Washington-Allen
6	Wildish: Mustang of the American West	Anna B. Coburn
7	Range Reseeding and Pastoralists Resilience to Climate Variability	Diana W. Githu
8	Addressing Barriers to Proactive Restoration for At-Risk Sagebrush Communities: A Causal Layered Analysis	Carmen Calzado
9	Improving Drought Preparedness for Utah Range Livestock Systems	D. Layne Coppock
10	The Global Effort to Designate a Un International Year of Rangelands and Pastoralists	Barbara Hutchinson
11	Using First Foods to Guide Ecosystem Management	Bryan A. Endress
12	Drought Adaptation for Rangeland Livestock Producers: Lessons from California's Historic Drought	Grace E. Woodmansee
13	Management of Herbage Allowance Leads to Diverse Result of Stocking Rate, But Improve Animal Productivity	Martin Do Carmo
14	Changing Identities and Livelihoods of Northeastern Colorado Livestock Producers: A Grounded Theory Study	Jasmine E. Bruno
15	Ecological Intensification in Cow-Calf Systems Based on Natural Grasslands in Uruguay: Results of a Co-Innovation Process	Ignacio Paparamborda
16	The Central Role of Grass Cover in Sustainability and Resilience in Social and Natural Systems in the Nebraska Sandhills	Mary Ann Vinton
17	Rangeland Resilience Through Carbon Sequestration: Community Needs Directing Research	Alexia Cooper
18	Outreach on Grazing Lands to Enhance Economic Analyses (Cost Benefits) for Conservation Changes	Kim Stine/ Pat Pfeil

POSTER SESSIONS

MONDAY

19	Passing on the Grit: Women's Stories on the Range	Amanda Botsford
20	Scaling Big Data on Rangelands: Advances in Real-Time Assessment of Livestock Foraging Behavior	Edward J. Raynor
21	A Comparison of Cattle Grazing Diverse, Shortgrass Pastures Using Two Different Grazing Strategies	Larry D. Fritzler
22	Developing a Technique to Estimate Who Grazed What	Brandon K. Mayer
23	Grazing Behavior of Cattle in Upland Sandhills and Sub-Irrigated Meadow Environments	Travis M. Millikan
24	The Effects of Forage Type, Storage Method and Time on Nutrient Composition	Michelle Fitterer
25	The Grazing Behaviors of Heifers on Rangeland Are Not Affected By Feed Efficiency	Nolan Craun
26	Comparison of Diet Selection of Rangefed Raramuri Criollo Cows, Heifers and Steers During Five Seasons	Flavie Audoin
27	Grazing Behavior of Rangefed Raramuri Criollo Bulls During Five Seasons	Flavie Audoin
28	Influence of Rainfall Events on Drinker Visitation Patterns By Beef Cows on Desert Rangeland	Shelemia Nyamuryekunge
29	Late-Fall Landscape Use By Heritage Vs Conventional Beef Cattle on Colorado Plateau Rangelands: A Case Study	Danielle M. Duni
30	The Piosphere, Predicting Cattle Distributions Across a Landscape	Mike T. Anderson
31	Humbled By Nature: A Rancher's Mental-Model of Adaptation in the Great Plains	Jim Sturrock
32	Improving Access to Species Habitat Information on US Grazing Lands Through the Phone App Landpks	Tegan May
33	Changing Grazing Management Through Reciprocal Watershed Agreements in the Rio Grande-Valles Cruceños of Bolivia	Will Munger
34	Finding Needles in Haystacks: A Software Tool to Improve the Accessibility of Range Management Information	Sean F. Di Stefano
35	The Humboldt Ranch Story	Eric D. Sant
36	Mitigating Wolf Livestock Depredation	Donald J. Kaleta

POSTER SESSIONS

MONDAY

37	Developmental Morphology of Six Grasses of North America	Carlos Villalobos
38	Season and Intensity of Defoliation in Biomass Production of Short, Mid and Tall Grasses	Carlos Villalobos
39	Herbivory During the Seedling Phase May Increase Survival in Some Perennial Grasses	Elsie M. Denton
40	Effect of Grazing on Production and Quality of Pasture in the Southeast of Coahuila, Mexico	Eliseo Suarez
41	Grazing and Environment Change Can Affect Purple Prairie Clover Frequency: Evidence from North America Pasture	Tianqi Zhao
42	Above and Below Biomass Allocation in Short, Mid and Tall Grass Species During Different Phenological States	Carlos Villalobos
43	Evaluation of Cutting Frequency on Yield and Nutritional Quality of Herbaceous Forage Species in Enclosure of Borana Rangelands, Southern Ethiopia	Bikila N. Gilo
44	Autumn Bcs and Postpartum Herbage Allowance on Productive and Reproductive Responses of Primiparous Spring Calving Beef Cows Grazing Native Grasslands	Martin Claramunt
45	Sheep Grazing for the Conservation of Biodiversity in Dry Grasslands in the Italian Alps	Alessandra Gorlier
46	Supplementation Strategies to Enhance Intake of Romerillo (*Chiliotrichum diffusum*) By Sheep in Southern Patagonia	Juan J. Villalba
47	Analysis of In-Season Regrowth on California Annual Rangeland Vegetation for Livestock Carrying Capacity	Alan R. Bower
48	Blank	
49	Usfs Vacant Allotment Case Study: Emerson Allotment, Warner Mountain Ranger District California	Laura K. Snell
50	Vegetation and Arthropod Community Response to Long-Term Grazing Exclusion and Deferred Grazing in South Brazil	Bianca O. Andrade
51	Effect of Grazing Strategies on Botanical Composition in the Nebraska Sandhills	Cheryl Dunn
52	Fine Fuels Management to Improve Wyoming Big Sagebrush Plant Communities Using Dormant Season Grazing	William J. Price
53	Quantifying the Benefits of Collaborative Adaptive Management in Rangeland Systems	Justin D. Derner

POSTER SESSIONS

MONDAY

54	Riparian Proper Functioning Condition Assessment to South Fork of the Tamir River, Mongolia	Baldandugar Tsoggerel
55	Targeting the Soil Seedbank of Invasive Broadleaf Weeds Facilitates Long-Term Rangeland Restoration	Shannon L. Clark
56	A Study of the Allelepathic Effects of Two Species of Old World Bluestem	Dean A. Stramel
57	Buffelgrass (*Cenchrus ciliaris L.*) Invasion Pathways Across Texas	Juan G. Garcia-Cancel
58	The Impact of Non-Native Perennial Grasses on Grassland Diversity and Forage Production	Lisa J. Rew
59	Microbiomes of Grass Rhizospheres As Potential Mechanisms of Invasion	Scout M. Harrison
60	Evaluating the Efficacy of Various Herbicides on Bulbous Bluegrass Control	Jordan L. Skovgard
61	Mesquite Control in the Southwest	Kert Young
62	Duracor: Introduction of a New Herbicide for Use in Rangeland, Pastures, and Non-Crop Sites	Byron Sleugh
63	Initial Efficacy of Indazaflam on Cheatgrass Rangelands	Charlie D. Clements
64	Medusahead Silicon, Constraining Factors of Control, and Research Needs	Casey Spackman
65	Timing of Glyphosate Application to Increase Cattle Consumption of Medusahead	Casey Spackman
66	Efficacy of Duracor and Terravue Herbicides on Noxious and Invasive Species in Rangeland and Non-Crop	William Hatler
67	Integrated Cheatgrass (*Bromus tectorum*) Management With Herbicide and Sheep	Erik A. Lehnhoff
68	Targeted Cheatgrass Grazing - Predicting Animal Selectivity in the Western Great Plains	Dana M. Blumenthal
69	Evaluating Native Plant Community Response Using Prescribed Burning and Chemical Control in Areas Invaded By Downy Brome	Rachel Seedorf
70	Prescribed Fire Is Effective for Reducing Annual Bromes in Mixed-Grass Prairie At Lower Invasion Levels	Amy J. Symstad

POSTER SESSIONS

MONDAY

71	Abam: Development and Implementation of An Adaptive Resource Management Framework for National Parks Within the Northern Great Plains	Heather Q. Baldwin
72	Using 30-M, Cloud-Free Remotely Sensed Data to Develop Early Estimates of Annual Invasive Herbaceous Cover in Sagebrush Ecosystems	Stephen P. Boyte
73	Impacts on Herpetofauna in the Presence of Old World Bluestems (*Bothriochloa* Spp.)	Colton Zink
74	Impacts of Simulted Trampling on Total Nonstructural Carbohydrates in Yellow-Flag Iris (*Iris pseudacorus L.*)	Alex L. Stoneburner
75	Wildlife Browse Species Respose to Cheatgrass Control With Indaziflam	Jim Sebastian
76	Pollinator Community and Floral Resource Response to Cheatgrass Control With Esplanade	Jim Sebastian
77	Remote Sensing of Invasive Annual Plants Around Energy Developments	Miguel L. Villarreal
78	Changes in Vegetative Community Composition Following Two-Lined Spittle Bug (*Prosapia bicincta*) Infestations in Hawaii Rangelands	Mark Thorne
79	Capturing Long-Term Change Through Repeat Photography: Historic Photos from Southeastern Utah	Jessica D. Mikenas
80	Long-Term Trajectories Suggest Divergent Responses of Native and Non-Native Perennials and Annuals to Management Treatment	Stella M. Copeland
81	Soil Seed Banks and Fire: Broad Recovery Patterns Across Four North American Desert Systems	Rachel K. Hosna
82	Impact of Large Herbivore Use in Meadows on Lentic Function, Wetland Extent, and Vegetation Hydric Status	Sabrina McCue
83	Ac Saltlander Green Wheatgrass and Smooth Bromegrass Performance Under Waterlogging, Salinity and Combined Conditions	Alan Iwaasa
84	Developing Conservation Measures to Restore and Rehabilitate Rangelands on Degraded Sage-Grouse Habitat in Southeastern Oregon	Noah Poulin
85	Competitive Release of a Dominant Warm Season Grass in Response to Selective Mortality	Sean L. Hoy-Skubik
86	What Is Ecological Drought in Rangelands? A Quantitative Definition from a Burned Sagebrush Steppe	Rory C. OConnor
87	Western Juniper Water Uptake and Soil Moisture Relationships: Paired-Watershed Study in Central Oregon, Usa	Mohamed A. Abdallah

POSTER SESSIONS

MONDAY

88	Perennial Grass Suppression of Cheatgrass: Comparison Among Two Natives One Exotic	Charlie D. Clements
89	Timing to Germination By Functional Plant Groups Across Four Different Deserts	Trenda L. Roper
90	Impact of Defoliation on Axillary Bud Activity in Smooth Brome (*Bromus inermis leyss.*)	Andrew Carrlson
91	Completion and Analysis of a Time-Series of Fractional Component Cover Across Western U.s. Rangelands	Matthew B. Rigge
92	Monitoring Plant Community Change At the Jornada Experimental Range: 100 Years of Quadrat Sampling	Erica Christensen
93	Exploring Utilities of Spectral Diversity for Representing Plant Diversity and Its Spatial Pattern After Prescribed Fires in the Edwards Plateau	Xavier A. Jaime
94	Predicting Woody Plant Encroachment Risk on Sonoran Desert Rangelands	William A. Rutherford
95	Spectrally-Derived Community Leaf Dry Matter Content Links Compositional Shifts to Change in Grassland Production	Wayne Polley
96	Features of Development of the Salsola Arbuscula Pall. in Conditions of the Desert Karnabchu	Khislat K. Khaydarov
97	Post-Fire Ecological Resilience Across Five Southwestern US Deserts	Akasha M. Faist
98	The Purple Plague: Effects of Grazing Post Fire on Purple Threeawn and Prairie Dog Responses	Justin P. Roemer
99	Influence of Grazer-Type on Flower and Pollinator Abundance in Former-Crp Fields Managed With Patch-Burn Grazing	Jasmine A. Cutter
100	Indirect Relationships Between Invasive Grasses and Bee Communities in the Northern Great Plains	Chyna K. Pei
101	Forage for Bees: Exploring How Size, Seed Mix and Surrounding Landscape of Pollinator Plantings Support Bees in Minnesota Tallgrass Prairie	Christina Herron-Sweet
102	Blank	
103	Comparing Gps Position and Fecal Density Counts As Methods for Tracking Livestock Space Use	Megan R. Wanchuk
104	Vegetation Selection of Heritage Vs. Conventional Beef Cows Grazing Chihuauan Desert Rangeland	Shelemia Nyamuryekunge
105	Near Infrared Spectroscopy of Liver Tissue from Goats Differing in Genetic Propensity to Consume Juniper	Douglas R. Tolleson

POSTER SESSIONS

MONDAY

106	Impact of Alternative Grazing Management Practices on Arthropod Community	Alyssa E. Vachino
107	75-Years of No Burning or Grazing in the Southern Plains: Effects on the Vegetation and Soil	Corey A. Moffet
108	Spring Ephemerals: the Ecology of Native Perennial Forbs of the Pacific Northwest Bunchgrass Prairie	Josh P. Averrett
109	Understory Plant Community and Structure in Warm-Dry, Mixed-Conifer Forests	Doug Cram
110	Forage Biomass Reduction By Eastern Red Cedar Trees in Grasslands of Southcentral South Dakota	Alexander J. Smart
111	One Seed Juniper Sapling Control: Effects of Simulated Browsing on Soil-Plant Water Dynamics in Relation to Sapling Size and Density	Yasser M. Almalki
112	Current Condition and Use of Pastures of Foothill Districts of Uzbekistan	Tolibjon K. Mukimov
113	Animal and Plant Factors Which Affect Larkspur Toxicity: Sex, Age, Breed, and Plant Chemotype	Daniel Cook
114	Blank	
115	Do Plant Secondary Metabolite-Containing Forages Influence Soil Dynamics in Pasture Systems?	Andrea Clemensen
116	Landpks Soilid: A Smartphone-Based Soil Identification Tool for Rangeland Management	Jonathan J. Maynard
117	Bison Grazing and Fire Impacts Tallgrass Prairie Soil Microbial Diversity and Distribution As Well Carbon and Nitrogen Cycling Potentials	Jaide H. Allenbrand
118	Soil Responses to Eastern Red Cedar Encroachment and Prescribed Fire in South-Central South Dakota	Robby J. Schaefer
119	Land Resource Units As Soil Systems	Hunter B. Winsor
120	Blank	
121	Cross Comparison of Soil Microbial Community in Three Rangelands Across Continental United States	Brekke Munks
122	Soil Carbon Under Different Grazing Management Across the Northern Great Plains	Clare Kazanski
123	Streamlined Process of Map Unit Component Evaluation and Assessment for Provisional Ecological Site Concept Development	Dave Evans
124	Predicting Soil Carbon Stocks Using Nir Spectroscopy in Saskatchewan Native Mixed Grasslands	Ashly Dyck

POSTER SESSIONS

MONDAY

125	Soil Nutrients and Microbial Communities on Patch-Burn Grazing Pastures in the Northern Great Plains	Jonathan W. Spiess
126	Habitat Differences for Native Ground-Nesting Bees Between Reseeded Old Fields and Native Prairie in the Pacific Northwest Bunchgrass Prairie	Kaylee M. Littlefield
127	Evolution of Conservation Easements in California's Sierra Valley	Tracy Schohr
128	Private Lands Stewardship: A Model for Landscape-Level Conservation in the West	Jennifer Perkins
129	Using Remote Sensing to Predict Sage Grouse Conservation Credits	Timothy M. Bateman
130	Landscape Impacts of Unmaintained Soil and Water Conservation Structures	Mary Nichols
131	Field Establishment of Little Bluestem in a Drought Year	Tim Springer
132	Bullets, Bison and Big Bluestem. Joining Archeology and Range Sciences to Reconstruct a Historic Ecosystem	Kyrsten Wolterstorff
133	Enhancing Irrigated Pasture for Multiple Ecosystem Benefits	Danny J. Eastburn
134	Artificial Floating Islands As a Tool to Improve Water Quality for Livestock	Jennifer M. Muscha
135	Soil Water Content and Water Potential Interaction of Four Representative Plants from a Conservation Wetland	Fevziye Aslan
136	Proper Functioning Condition Assessment of the North Tamir River, Mongolia	Rentsenkhand Munkhbat
137	Bringing Rangeland Taxonomy Into the 21St Century	Austin R. Kelly
138	Geographical and Seasonal Variation in Water Hemlock (*Cicuta maculata*) Toxins	Clint Stonecipher
139	Using Areal Composition of Riparian Vegetation Communities to Identify Thresholds in Prairie Streams	Miranda A. Meehan
140	Comparison of Unmanaged Wild Horse and Managed Cattle Grazing on Two Riparian Springs	Selby L. Boerman
141	Duration and Intensity of Lentic Meadow Use By Feral Horses, Livestock and Wildlife Across Nevada	Sebastian A. Tsocanos
142	Wild Horse and Cattle Use of Nevada Spring Meadows: Hydrologic Gradients Drive Vegetation Response	Jacob M. Burdick

POSTER SESSIONS

MONDAY

143	Grazing of Free-Roaming Horses on Aquatic Macrophytes in the Salt River, Arizona	Thomas M. Krebs
144	Harmful Cyanobacteria Blooms and the Role of Nutrients on Des Lacs National Wildlife Refuge, Nd	Laurie Richardson
145	Valuing U.S. Cattle Ranching Based Ecosystem Services	Anna T. Maher
146	Economic Sustainability of a Perennial Grass System Grazed By Stocker Cattle	Elizabeth K. Widder
147	The Water Footprint of Beef Cattle Raised on New Mexico Rangeland	Andres F. Cibils
148	Development and Changing Policies Transforming the Face of Rangelands in Bhutan	Kuenga Namgay
149	Profitable Grazing Systems for Improved Landscape Condition and Sustainability Reporting	Mick J. Taylor
150	What Is the Future for Mongolia's Rangelands?	Daniel J. Miller
	Excellence in Range Management (ERM) Section	
151	Arizona Section: Philip Bravo, Peach Springs Livestock Association	
152	Colorado Section: Oswald Cattle Company	
153	Nebraska Section: Broken Box Ranch	
154	Oklahoma Section: Open Range Management	
155	Texas Section: Treadwell Cattle Company	
156	Blank	

POSTER SESSIONS

TUESDAY

1	Using Technology to Help Quantify Calf Loss in Rangeland Cattle: An International Effort	Raoul K. Boughton
2	Biomass Estimation Using Unmanned Aerial Vehicles Technology	Alexandria Dimaggio
3	A Test of Lora Wan Real-Time Gps Tracking on Beef Cattle in Desert Pastures	Matthew M. Mcintosh
4	Gps Vs Accelerometers: the Battle Between Technology to Monitor Cattle Behavior and Welfare	Colin T. Tobin
5	Characterizing Cattle Behavior in the Rugged Rangeland of Southeastern Oregon Using Low-Cost Gps Collars	Angela N. Malliaras
6	Correction Algorithm to Reduce Bias in Daily Travel Distance Estimated From Gps Collars	Jameson R. Brennan
7	The Rangelands Partnership: Your Source for Reliable Science-Based Information on Rangeland Ecology and Management	Amber Dalke
8	Optimization of Multi-Model Ensemble Seasonal Forecasts for Rangeland Management Applications in the Western United States	Merilynn Schantz
9	Sagedat: Data and Tools to Support Collaborative Sagebrush Ecosystem Conservation and Management	Steven E. Hanser
10	Results of Studying the Norms of Seeding Sorgo and Orange 160 After Growing Rye (*Secale cereale*)	Eldorbek U. Mirzayev
11	Indicators of Growth, Development and Productivity of Triticale Culture By Watering in the Desert Kyzylkum	Orzu K. Mamedov
12	Blank	
13	Evaluating Mesquite Distribution Using Uavs and Other Geospatial Methodologies	Michael T. Page
14	Morphological Ontogenesis Structure (*Lycium barbarum L.*) in the Conditions of Samarkand Region	Nodira S. Nurullaeva
15	Results of Studying the Development and Efficiency of the Secale Cereale in Kizilkum Desert	Erach F. Mamedov
16	A Rapid Assessment of Drought Induced Forage Reductions to Aid Rehabilitation	Matt C. Reeves
17	Blank	
18	Blank	
19	Effects of Fire Intensity on Resprouting Vigor of Mesquite (*Prosopis glandulosa*)	Heath D. Starns

POSTER SESSIONS

TUESDAY

20	Evaluating Grazing Effects on Ponderosa Pine Habitat Types Following a Large Summer Wildfire	Amanda R. Williams
21	Prescribed Fall Fires Decrease Annual Brome and Sagebrush Abundance in the Thunder Basin Ecoregion in Northeastern Wyoming	Catherine E. Estep
22	Establishing Fuel Breaks to Protect Sage-Grouse Habitat in Nw Utah	William J. Price
23	Silver Sagebrush Fire Response	Marcus A. Comfort
24	Ecological and Economic Impact of Patch-Burn Grazing in Subtropical Humid Grasslands	Elizabeth H. Boughton
25	The Visual Impact of Fire Scars, Effect of Fire Recovery Treatments, and Next Steps	Sabrina Mccue
26	Season of Burn Effects on Forage Production and Composition of Gulf Cordgrass Communities	Silverio Avila
27	Sparks At the Campfire: Participant Aspirations and Motivations Towards Forming the Wyoming Prescribed Fire Council	Ryan Wilbur
28	Effect of Fire and Season of Defoliation on Total Non-Structural Carbohydrates Concentration and Surviving of Purple Threeawn (*Aristida purpurea*)	Carlos Villalobos
29	Forb Community Response to Invasive Species, Grazing, and Prescribed Burns in the Pacific Northwest Bunchgrass Prairie	Brogan L. Watson
30	Blank	
31	Accurately Mapping Residual Dry Matter (RDM) Across 50,000 Acres of Nevada Rangelands	Timothy M. Bateman
32	Plant-Biocrust-Fire Interactions Across Five Southwestern Deserts	Ellie Mccann
33	Effect of Early-Season Burning and Grazing on Sub-Irrigated Meadow Hay Production	Tara M. Harms
34	Examining the Impact of Patch Burning on Livestock Grazing Patterns in Edwards Plateau, Texas	Weiqian Gao
35	Prioritizing Vegetation Management Practices on Private Working Landscapes to Reduce Catastrophic Events	Stephanie R. Larson-Praplan
36	Long Term Responses of Tanglehead to Prescribed Patch Burning and Cattle Grazing	Rider Combs
37	Hydrologic and Biologic Responses of Anthropogenically Altered Springs to Restoration in the Great Basin	Steve Petersen

POSTER SESSIONS

TUESDAY

38	Using the NVC to Develop Functional-Based Seed Mixes for Restoration of Sagebrush Habitat	Scott B. Franklin
39	Understory Vegetation Response to Thinning Pinon-Juniper Woodlands	Yasser M. Almalki
40	Topo-Edaphic Constraints on Woody Plant Cover Change in a Semi-Arid Grassland	Scott A. Jones
41	Sagebrush Field of Dreams: Early Structural Advantage of Transplants for Building Greater Sage-Grouse Habitat	David A. Pyke
42	Longterm Impacts of Pinyon-Juniper Removal on Vegetation and Hydrologic Properties	Cameron S. Burleson
43	Not All Fuel Reduction Treatments Degrade Biocrusts: Herbicides Show Positive Effects on Cover of Biocrusts	Lea A. Condon
44	Effects of Biocrust Development on Establishment of Native Plants in a Salt Desert System	Kari E. Veblen
45	Biotic Causes of Seedling Mortality for Elymus Elymoides (Raf.) Swezey in a Drill-Seeded Rangeland Environment	Jesse R. Morris
46	Comparing Establishment Methods Among Difficult-To-Produce Native Plant Materials	Jaycie N. Arndt
47	Strip-Seeding, Targeted Grazing, and Prescribed Fire: Restoration and Invasive Species Management in California Grasslands	Julea A. Shaw
48	Success of Installing Native Plant Plugs in Cheatgrass (*Bromus tectorum*) Dominated Landscapes	Steven O. Link
49	Controlling Yellow Starthistle to Enhance Water Resources: Response of Multiple Ecosystem Services At the Watershed Scale	Danny J. Eastburn
50	Cattle Removal in Saguaro National Park and the Compositional Changes From Associated Succession	Ryan J. Summers
51	Native and Introduced Seed Mix Performance on Cheatgrass Rangelands	Charlie D. Clements
52	Documenting the Plant Evaluation Process for Commercial Release Purposes in West Texas	Hagen D. Meyer
53	Ecological Restoration of Native Plant Communities in Forests and Woodlands on the Navajo Nation.	Bryan Neztsosie
54	Strategic Placement of Salt Supplements to Restore Shrub-Encroached Pastures: a Case Study From Italian Alps	Ginevra Nota
55	Collaborative Reclamation Experiments on Oil and Gas Well Pads in the Uintah Basin: Approach and Early Results	Rebecca Mann

POSTER SESSIONS

TUESDAY

56	A Review of Oil and Gas Reclamation Practices, Monitoring, and Standards: Improving Reclamation Success on Western Public Lands	Michael C. Duniway
57	Blank	
58	Microtopography Selection for Reseeding Techniques Using Uavs in the Chihuahuan Desert, Brewster County, Texas	Carolina Medina-Nava
59	Restoration of Native Grasses on Abandoned Center Pivots in Sandy Sage Prairie of Southwest Kansas	Alonso Barragan-Martinez
60	Blank	
61	Mezavue Herbicide: the New Standard in Pricklypear Control and So Much More	D Chad Cummings
62	Hotspots for Post-Fire Sagebrush Recovery: Burned and Surviving Individuals Play a Role	Robert S. Arkle
63	Burning, Seeding, and Herbicide Productiveness in Relation to Rangeland Restoration in Southeastern North Dakota	Shawn Dekeyser
64	Establishment of Native Plants in Salt-Impacted Soil	Abigail P. Blanchard
65	Brush Management of a Whitethorn Acacia-Encroached Grassland Enhances Resource-Conserving Shrub Islands	Justin C. Johnson
66	Response of One Introduced and Three Native Sagebrush Steppe Plants to Arbuscular Mycorrhizal Fungi Inoculum	David E. Prado-Tarango
67	Perceptions of Wild Horse and Burro Management on Public Lands of Western Us	Marissa N. Humphreys
68	Examining the Effects of Mammalian Herbivores on Recruitment and Stand Structure of Quaking Aspen	Elizabeth Reikowski
69	Mesic Meadow Habitat Responses to Variation in Grazing Management: Balancing Sage-Grouse Habitat With Livestock Production	Kenneth J. Randall
70	Response of Sagebrush Habitat Characteristics to Feral Horse Grazing	Jacob D. Hennig
71	Determination of Species and Sex in Deer Via Near Infrared Spectroscopy of Liver Tissue	Douglas R. Tolleson
72	Blank	
73	Disruption Or Displacement: How Do Livestock Guardian Dogs Prevent Depredation?	Daniel K. Macon
74	Raramuri Criollo Cattle As Livestock Guardian Against Predators	Kelly J. Koriakin

POSTER SESSIONS

TUESDAY

75	Mesocarnivore Occupancy in a Sagebrush-Juniper Landscape and Associated Effects on Greater Sage-Grouse Nest Failure	Sarah E. Mcintire
76	Small Mammals and Grassland Restoration: Long Term Monitoring of the Sternberg Natural Area	Hunter R. Bohn
77	Blank	
78	Blank	
79	Landcart: Landscape Cover Analysis and Reporting Tools	Bo Zhou
80	Sample Size for Accurate Estimation of Mean Herbage Mass in Campos Grasslands	Martin Do Carmo
81	Determining Appropriate Utilization Measurements for Multiscale Spatial Analysis of Greater Sage-Grouse Habitat in Southern Idaho	Alexander Laurence-Traynor
82	Landpks App for Planning and Monitoring Outcome-Based Grazing: New Features	Jeffrey Herrick
83	Blank	
84	Blank	
85	Using Lidar to Estimate Aboveground Grassland Biomass and the Effect of Grazing on Spatial Heterogeneity	Vincent S. Jansen
86	Improving a Brush Management Assessment Tool Using Drone Technology and Enhanced Landsat Image Processing	Chandra Holifield Collins
87	Gauging Floral Resources for Pollinators Using High Resolution Drone Imagery	Nicholas V. Anderson
88	Spatial Prediction of Ecosystem State Transitions on the Taos Plateau	Alexandra Heller
89	Ubetubes: a New Runoff Monitoring Methodology for Rangelands	Jeremy W. Schallner
90	Nutritional Differences of Pronghorn-Preferred Forage and a Carrying Capacity Estimation Between the Marathon and Marfa Grasslands in Trans-Pecos, Texas	Katherine E. Haile
91	A Synthetic-Control Approach for Assessing Landscape Treatment Effectiveness: Pinyon-Juniper Thinning in Western Drylands	Stephen E. Fick
92	A Web Interface for Creating Random, Spatially Balanced Landscape Monitoring Designs	Nelson G. Stauffer
93	Ndvi Relationship of Depth to Groundwater and Precipitation in a Mesic Pasture Area	Lucas A. Phipps

POSTER SESSIONS

TUESDAY

94	Semi-Automated Tree Segmentation and Quantitative Structure Models of Trees From Terrestrial Laser Scanning Point Clouds in Miombo Woodlands of the Niassa National Reserve, Mozambique	Tracy L. Shane
95	Monitoring Accuracy: Getting the Right Indicators, in the Right Places, At the Right Scale	Kurt O. Reinhart
96	Us National Vegetation Classification (NVC) - Communication Tool for Ecological Site Work	Gene A. Fults
97	Reconciling Sage Grouse Habitat Monitoring Outcomes	Mike T. Anderson
98	Soil Erosion Effects Under Climate Change Scenarios in Northern Mexico	Federico Villarreal Guerrero
99	Electronic and Field Versions of Interpreting Indicators of Rangeland Health (IIRH) Forms (Version 5)	Bob Gillaspy
100	Ecological Site Group Development and Predictive Mapping for the Upper Colorado River Basin	Samuel S. Burch
101	Rangeland Management Policy Effects on Riparian Vegetation	Wayne Smith
102	Uses and Applications of Version 5 of the Interpreting Indicators of Rangeland Health Technical Reference	Mike L. Pellant
103	Uncovering Traits and Recovering Grasslands: a Functional Assessment of Oil and Gas Well Pad Reclamation	Randi C. Lupardus
104	Bioassays: the Role of Seed Bank Monitoring in Range Management	Dan Harmon
105	Impoundment Salinity in Northwest South Dakota	Patrick Kozak
106	Impacts of Commercial Honeybees on Native Butterflies in High-Elevation Meadows in Utah	Jacqueline E. Kunzelman
107	Blank	
108	Blank	

RANGE PRACTICUM HANDS-ON LAND AND LIVESTOCK TRAINING

THURSDAY

Registration will be available on-site at the National Western Complex. You can also register online through the SRM Annual Meeting registration https://srm.allenpress.com/srm/annualmeetings.aspx.

Enter NWC at East door of Stadium Hall 1 at National Western Complex; the NW Club Room is just off Stadium Hall 1.

NatGLC
NATIONAL GRAZING LANDS COALITION

8:00AM - 8:15AM **Welcome**
Stadium Arena

8:15AM - 12:00PM **Low Stress Livestock Handling**
Stadium Arena

Cattle are well-recognized as an excellent range management tool (e.g., improving soil, plant health, range utilization and riparian health). But what if that tool is difficult to manage and ill-behaved (e.g., hard to gather and drive, won't stay in a herd, hang in lowlands and riparian areas)?

What is not well-recognized is that to successfully implement a range management plan we need manageable cattle which we can easily gather, drive and settle anywhere as a herd, that will stay where placed, and that don't hang in lowlands and grub out riparian areas. This requires a high degree of stockmanship skill. Furthermore, if we elevate our stockmanship skill and train more manageable cattle, the easier it is implement some form of intensive grazing management and, consequently, the more likely we are to do it and the more likely it will be successful.

This clinic introduces the fundamentals of low-stress livestock handling- a form of stockmanship developed by Bud Williams- including its origins, principles, techniques, and practical applications relevant to range management. the clinic will include a PowerPoint presentation (with short, instructional videos) followed with hands-on cattle work (e.g., approaching, starting, and driving cattle, corral work, sorting, BudBox). the objective is to give attendees enough understanding of low-stress livestock handling to successfully apply the basic principles and techniques and begin to achieve better results with their grazing management plans.

Whit Hibbard, a fourth generation Montana rancher and protégé of the legendary Bud Williams, will conduct a one-day, intensive workshop on low-stress stockmanship. Hibbard brings an appreciation for scientific rigor, critical thinking, evidence-based rationality, and empirical research skills to the study of working livestock. He's a decades-long student of low-stress stockmanship, horsemanship, ranch roping, and facilities design. "Why would any rancher who's been moving cattle his entire life want to learn more about it? the cattle always get gathered. They always get to market. They always get bred, right? So why take a class and lose a day's work? "The answer is simple: It will save you money and make you money."

THURSDAY

Hibbard's workshop will focus on the foundations, principles, techniques, and applications of low-stress livestock handling, all based on the work of Williams. "Everything I teach is all Bud's work. I've just put his teachings into a more structured format." Hibbard follows a tightly defined framework based on five foundations, "because before anyone can learn how to work animals in a low-stress manner, they have to understand the foundations of the method."

Nick Trainor/Trainor Cattle Company is providing the herd for the low-stress livestock handling workshop. a fifth-generation rancher from SE Colorado, Nick built Trainor Cattle Co. and now manages the 26,000- acre Lowry Ranch, owned by the State of Colorado. the Lowry Ranch is featured in an ecological tour for students on Feb. 17th.

8:30AM - 12:03PM **Producer Forum - Women in Ranching**

NW Club Room

This session highlights leading women in ranching in the United States. the panel is seasoned and diverse, with women from non-traditional backgrounds and those whose families have been in the business for several generations. the objective is to get a breadth of perspective as to what ranching is to them and why women are critical to the mission of sustainable ranches.

The concept grew from the Western Landowner's Alliance's WIR network: to create opportunities for leadership and skills development; build a strong peer network in support of personal growth and care; and promote land management best practice which sustain whole and healthy lands.

The Women in Ranching panel will be moderated by Pat Pfeil

Pat Pfeil has represented the International SRM on the National Grazing Lands Coalition Board of Directors since 2004. Pat and husband Brady are Natural Resource Managers for a 9th generation Florida agricultural family. They have worked as partners in managing the Carlton family holdings in Florida since 1978 and Georgia since 2006. They have developed ranches and managed the Bar a Brangus registered herd, commercial cattle herds, citrus groves, Bahia sod production, timber stands, vegetable, hay and seed production plus maintained a viable wildlife population providing for the Carlton family hunting tradition. Pat oversees the cattle production and grazing management along with all recordkeeping.

Mary Budd Flitner grew up on a ranch in Sublette County, WY, and attended University of WY where she met husband Stan. She moved to his family's ranch in Big Horn County, WY where they still live, operating a cattle ranch in partnership with their son. the base ranch consists of deeded land, trailing their livestock to BLM and USFS rangelands, making use of every kind of soil and grassland in between. Her life's work is that of business partner and ranch mom, raising four children to love and appreciate agriculture for its importance, resilience and value to America. When they had time, she and Stan supported local and state activities. She served as Board member for WY Game and Fish Commission, Ruckelshaus Institute for the Environment and Natural Resources, Buffalo Bill Center of the West, and locally worked with youth in 4H. published a memoir, My Ranch, Too, which describes not just her life, but for many, a "tutorial" of how ranching really works in good times and bad. Mary's talk is "Betting it All."

RANGE PRACTICUM HANDS-ON LAND AND LIVESTOCK TRAINING

THURSDAY

Ashley Wertheimer Hibbard was born and raised in southern California. She holds a BFA in art and design from Cal Poly, San Luis Obispo, and spent a year studying at Accademia di Belle Arti in Florence, Italy, where her love of travel was born. Ashley then met (and subsequently married) the first rancher she'd ever known, leading her down a path she had never previously anticipated. Ashley traveled all over the world pursuing her love of art and culture and interned as an artist resident at Chico Basin Ranch, in Colorado Springs, where exposure to ranching and land stewardship ignited a future goal to meld both worlds. She lives and works on Sieben Livestock Co. where her husband is 5th generation to manage the family ranch outside Cascade, MT, and where she runs A.I.R. Seven, an artist residency program which enables ranchers and artists from urban backgrounds to engage in cross cultural exchange. Ashley's talk is "Letting Go of the Imposter: Embracing My Role as the Outsider."

Nancy Ranney manages the Ranney Ranch in the high mesa country of central New Mexico, owned by her family since 1968 and managed with Melvin Johnson since 1984. the ranch is proud of its Grass-fed/Grass-finished Beef program, its regenerative land management practices and its certification by the American Grassfed Association (AGA), a Greener World/Animal Welfare Approved (AWA) and the Audubon Conservation Ranching Program (Certified Grazed on Bird-Friendly Land). Nancy has a graduate degree in Landscape Architecture and Environmental Planning (MLA/Harvard University Graduate School of Design) and is a board member of the Quivira Coalition, the Southwest Grassfed Livestock Alliance and a member of the New Mexico Cattle Growers and the Society for Range Management. Nancy Ranney's talk is "Regenerative ranching in Mesa country; a personal journey."

Julie Sullivan was born and raised in California. After working as an actor, arts administrator, and starting a private progressive preschool in Seattle, she earned her Master's in Environmental Education and subsequently taught interdisciplinary environmental education at both undergraduate and graduate levels for the Audubon Expedition Institute. She spent those years challenging students to look beyond surface conflicts between environmentalism and agriculture, and to see the common values and goals shared by both points of view. After over a decade living outside teaching for the Expedition, Julie joined George on his certified organic, grass-finished cattle ranch in 2001. Julie works with the Quivira Coalition New Agrarian Program as mentor support and serves as the Quivira representative on the National Agricultural Apprenticeship Learning Network, working to expand opportunities for young agrarians. Julie's talk is "Hippie meets Rancher: Paradox, Partnership, Wholeness."

Mimi Hillenbrand has been running the 777 Ranch for the family for 15 years and has worked on the ranch since she was a kid. It has always been her dream to run a ranch in the West. She has always had a passion for the land and all that lives there. Mimi completed her undergraduate studies at the University of Montana and received a BS in Wildlife Biology and received her Master's in Agricultural Sciences from Colorado State University. She has studied Holistic Management and has been practicing it for over 30 years. Mimi has the best outdoor office, works with amazing people, and loves the bison and land, which teach her something new every day. Mimi's talk is "Using Bison to Regenerate Grasslands."

THURSDAY

8:30AM - 12:00PM **Horse and Mule Packing Training and Demonstration**

Stadium Hall Level 2

SW Corner

The hands-on class is introductory through intermediate packing including advanced packing demonstrations. the class will be flexible and focus on Decker style packing and will include additional sawbuck style packing demonstrations depending on class participant's requests.

Hands-on

- Becoming familiar with stock, equipment and tack
- Familiarize with essential knots
- Weights and making loads-panniers and manty
- Saddling
- Packing basic loads
- Other hitches
- Break-aways and tying animals together

Demonstration

- Packing lumber, posts and timbers
- Packing a riding saddle

Jason Brengle is the Rangeland, Invasives and Stock Program Manager for the Shoshone National Forest (NF) in Cody, WY. He has a M.S. in Rangeland Ecology from Colorado State University and a B.S. from Black Hills State University. He grew up in rural NW South Dakota working on family cattle/sheep ranches. His first exposure to packing stock was when he was 13 years old on a fishing trip into the Cloud Peak Wilderness on the Bighorn NF; from then on, he was hooked. He has worked for the federal government for 19 years and has experience packing both Decker and sawbuck style for the USFS and the National Park Service. He lives with his family on a small acreage outside of Cody and enjoys pack trips and hunting trips into the backcountry of NW Wyoming. He and his wife stay busy hauling their two daughters to rodeos throughout WY and MT. He also enjoys leather work and builds his own tack, riding and pack saddles.

THURSDAY

Jason Pindell is the North Zone Rangeland Management Specialist and Livestock Manager on the Shoshone NF in Cody, WY. He was raised in Wheatland, WY and graduated from the University of Wyoming. Jason has worked for the USFS for 14 years. His first exposure to packing was with the FS on the Medicine Bow NF where he used stock to treat noxious weeds and monitor grazing allotments. Jason worked on the WY Hotshot Crew and in Big Piney on the Bridger-Teton NF as a Rangeland Management Specialist. He has experience with both Decker and sawbuck packing for the USFS, as well as backcountry hunting and pack trips in WY. He and his wife currently live on a small ranch/farm near Powell, WY; they have two young boys which he plans to start taking on backcountry adventures when they're old enough to ride.

Crosby Davidson is the South Zone Recreation Staff Officer for the Shoshone NF in Lander, WY and the Region 2 Blaster Examiner. He has B.S. in Forest Ecology from Colorado State University. Crosby grew up working for backcountry outfitting businesses in Pinedale, WY. His first paying packing job was for an outfitting business at the age of 11 and has been doing it ever since. He spent his college years guiding in Alaska and as a seasonal employee packing for the Bridger-Teton NF. He has worked for the federal government for 18 years and has experience packing both Decker and sawbuck style. Crosby and his wife currently live on a small acreage outside of Kinnear, WY and enjoy spending their time training horses, fly fishing and taking pack trips. He is constantly trying to improve his horsemanship knowledge and skills and frequently works with various clinicians.

Spencer Otto is the South Zone Packer and Livestock Manager on the Shoshone NF in Lander, WY. He has a B.S in Rangeland Ecology from University of Wyoming. He grew up riding horses and learned sawbuck packing while working for an outfitter in Cody Wyoming and learned Decker style packing as a full-time packer for the USFS. He has worked in trails and recreation on the Bighorn and Medicine Bow-Route NF. He served 10 years in the Wyoming Army National Guard working in Field Artillery and deployed to Kuwait and Iraq in 2009. He spent the rest of his time in the guard training crews on HIMARS Rocket artillery. Spencer is an avid fisherman and enjoys spending time fishing in the Wind River Range.

8:30AM - 12:00PM **Terrestrial Core Indicators Monitoring Demo**

Stadium Hall I

The demonstration will provide an overview of BLM terrestrial core monitoring methods- Monitoring Manual for Grassland, Shrubland and Savannah Ecosystems; Herrick et al. 2017. Core indicator data are used to understand status and trend of BLM lands in a diversity of land management scenarios. Interested folks could include students looking for job opportunities or data users who want to see core indicator data collection in action.

Emily Kachergis is an ecologist and technical lead for monitoring land at the BLM National Operations Center in Denver. She works with rangeland managers across the agency to address management concerns through monitoring. Her background is in rangeland ecology at Colorado State University (PhD) and USDA-ARS High Plains Grasslands Research Station (post-doc). She has had the pleasure of working in rangelands and with range people all over the western US, from Canyonlands to Craig to Cheyenne.

RANGE PRACTICUM HANDS-ON LAND AND LIVESTOCK TRAINING

THURSDAY

8:30AM - 12:00PM **Rainfall Simulator and Soil Health**

Stadium Hall I

The Rainfall Simulator provides a "seeing is believing" demonstration of how practices such as no-till farming, cover crops, and prescribed grazing benefit soil health and improve the water cycle on cropland and rangeland. No-till cropland and rangeland managed with prescribed grazing increase infiltration and reduce runoff and sedimentation. This demonstration includes discussion of topics such as infiltration, aggregate stability, soil structure, and the relationship of these properties to runoff, erosion, and water quantity. a "slake" test will also be demonstrated.

Daniel Palic will demonstrate the NRCS Rainfall Simulator. Daniel is the Resource Team Lead District Conservationist with the USDA-Natural Resources Conservation Service in Phillips and Sedgwick Counties in NE Colorado. Daniel also serves as the Soil Health Coordinator for CO NRCS Area 2. Daniel graduated from Colorado State University with a BS in Agronomy-Soil Resources and Conservation and MS in Agronomy-Soil Science. He began his career as a research technician with the USDA-Agricultural Research Service in Fort Collins and after almost 17 years with ARS made the switch to NRCS. He is passionate about soil health and enjoys providing education and outreach of soil health principles because soil health is the cornerstone of NRCS planning.

8:30AM - 12:00PM **Wild Horse Demonstration**

Stadium Hall I

The Carson National Forest team will demonstrate "bait mare" bait trapping and handling and loading wild horses from the trap into a stock trailer for transport. There will also be some wild horses available for adoption. the Mantle Ranch will demonstrate wild horse handling and training and feature trained and untrained wild horses from the Mantle Ranch Adoption and Training Facility in Wheatland, WY.

Dr. Barry L. Perryman is a Professor of Rangeland Ecology and Management in the Department of Agriculture, Veterinary, and Range Sciences at the University of Nevada-Reno. He has appeared on the front page of the Sunday edition of the San Francisco Chronicle, FOX News, National Geographic, and National Television of Turkmenistan and Uzbekistan as a natural resource specialist and has received both gubernatorial and White House appointments including the National Wild Horse and Burro Advisory Board. His teaching and research represents a broad spectrum of interest including sage grouse health and habitat, invasive species mitigation, sagebrush demography, wildfire rehabilitation, mined-land reclamation and plant community dynamics. Dr. Perryman has organized several international meetings and continues to work on research projects in Central Asia and Western China. He is the lead author of a Field Guide to Nevada Grasses and a Field Guide to Nevada Shrubs, the first taxonomic books to use micro-photography as a plant identification resource. Dr. Perryman is an award-winning novelist and columnist and is a well-regarded keynote speaker. Raised on a small Texas ranch, with time spent as an oilfield roughneck, an administrator for a Fortune 100 oilfield service company, and an academician, Dr. Perryman brings a unique and interesting perspective to natural resource management issues of the West.

THURSDAY

Sean Kelly followed a four-year enlistment in the Marine Corps with a four-year stint as a ski bum and elk guide around Durango CO. In 2000 he graduated with a BS degree in Range Ecology from Colorado State University. In 2003 he became a Range Management Specialist on the Carson National Forest Camino Real Ranger District in New Mexico where he spent nine years learning the all-important "Art" of the Art and Science of Range Management. (He feels blessed to get a job close to his hometown of Los Alamos). in addition to annual grazing permit administration, he worked as part of a team to complete seven range allotment Environmental Assessments. He moved to the Jicarilla Ranger District of the Carson NF in 2012 where he is the Wild Horse Coordinator, which consumes all his time, so grazing permits are administered by the competent wildlife biologist. There are two Wild Horse Territories on the Carson NF, but as a relatively small program by national standards, they can experiment with their "full spectrum" program. Learning is constant through range monitoring, fertility control darting, wild horse trapping, transporting to town, training, processing, and adoptions. Hundreds of horses have been caught, most of which have been placed in homes through a small facility in Bloomfield NM. There is high adoption demand in the Four Corners, so long-term holding is not an issue.

Megan Print had always been interested in adopting a wild horse and finally did so in 2008. Through the first year of training him there were ups and downs. She learned a lot relying on a mentor to guide her through the training process. the mentor formed a non-profit in 2009 which focused on fostering mustangs for the BLM. She was part of this successful pilot program which started her career in training mustangs. She fostered/trained mustangs until 2018 which resulted in over 100 horses trained and adopted. in 2018 she came to work for the Carson National Forest as an Animal Caretaker in the Bloomfield, NM wild horse corrals. Her job is very rewarding, and she gets to do what she loves almost every day whether it's catching in the wild, adopting to local families, or training them for their new job.

Wild Horse Training Demonstration Schedule

8:00am Bait Mare Trapping Demonstration, Trailer Loading and Handling Fresh Trapped Horses - USFS team

9:30am Demo That is not Horse Related

10:30am First touch and halter starting the untrained horse; working w/an untouched horse demonstrating first steps in gain in trust while showing development of solid bond and foundation - Mantle team

11:30am Lunch

12:30pm Saddle starting- first ride; begin w/various desensitizing exercises, leading to acceptance of a blanket, saddle pad and saddle; exercises are an example of further development of trust and bonding leading towards final goal of accepting a rider - Mantle team

1:30pm Demo That is not Horse Related

2:30pm Working the green horse under saddle; riding a green horse demonstrates the goal in developing trust, respect and acceptance; this is done through a series of steps involving how to safely saddle, mount, ride and dismount a young, green horse - Mantle team

THURSDAY

8:30AM - 12:00PM **Soils Training**
Stadium Hall I

The NRCS Soils Training will have three stations setup for attendees to visit and get their hands 'dirty'. the first station will have soil cores from the same location as the soil samples for the rainfall simulator. the soil cores will provide an opportunity for attendees to look at the different soil horizons (layers) down to 7 feet below the soil surface. the discussion will focus on water movement below the soil surface, soil structure, and soil texture. the second station will provide attendees an opportunity to test out their own soil texturing skills. Buckets of various soil textures will be available for attendees to try out the soil texture by feel method to determine soil texture. This method provides soil scientists, agronomist, etc. an easy in-the-field way to estimate soil texture without the need to send soil samples to a lab. the third station will demonstrate Web Soil Survey (WSS) and allow attendees to try it for themselves. WSS allows users to obtain soil maps along with information on the soils that includes physical, chemical, and engineering properties, as well as the suitabilities and limitations of those soils. https://websoilsurvey.nrcs.usda.gov

Andy Steinert is the MLRA Soil Survey Leader with NRCS at the Soil Survey Office in Fort Morgan, CO. He is responsible for updating and maintaining soil survey information and providing technical soils assistance for the Central High Plains Northern Part and Central High Plains Southern Part major land resource areas in eastern CO, southwestern panhandle of NE, and southeastern WY. Andy enjoys working with the stewards of the land and getting in the field to collect soil survey data. He enjoys presenting at local schools and teaching the science of land judging to FFA students and brings his equipment to dig holes to provide a true hands-on experience for each kid. Andy received his B.S. from Kansas State University in Agronomy – Soil and Water Science with a secondary degree in Natural Resources and Environmental Sciences. He started in 2001 as a Soil Scientist in Fort Morgan, currently in his 18th year on the job. He is from a farm in central Kansas.

8:30AM - 12:00PM **Great Plains Fire Information Exchange Prescribed Fire Demonstration**
Auction Arena

Carolyn Baldwin will demonstrate

8:30AM - 4:00PM **Western States Reclamation and Restoration Equipment Display**
Outside Stadium Hall

Continuous throughout the day

12:00PM - 1:00PM **Lunch**

COLORADO
Department of Agriculture

RANGE PRACTICUM HANDS-ON LAND AND LIVESTOCK TRAINING

THURSDAY

1:00PM - 4:00PM **Winter Livestock Watering**
NW Club Room

Martin Curry will discuss water quality and quantity needs during winter for various livestock species (cattle, horses, sheep, goats, llamas, alpacas, etc.) methods for providing water to meet livestock needs during the winter, systems to accommodate both large and small livestock operations, solar versus electric, needed storage, methods of storage, etc.

Martin Curry works for the Laramie Rivers Conservation District since graduating from the University of Wyoming in 2007 where he earned a Bachelor of Science in Rangeland Ecology and Watershed Management. Martin served in the United States Navy from 1988 to 1994. Prior to military service Martin worked a family owned ranch in Albany and Carbon County, WY. Happily married for 29 years to Erica they have two adult daughters, Autumn and Montana. Martin resides in Laramie, WY.

1:00PM - 2:30PM **Pesticide Sprayer Calibrations**
Stadium Hall I

Tina Booten will demonstrate

1:00PM - 4:30PM **Low Stress Livestock Handling (continued)**
Stadium Area

Whit Hibbard

1:00PM - 4:30PM **Horse and Mule Packing Training and Demonstration (continued)**
Stadium Hall Level 2
SW Corner

1:00PM - 4:00PM **Rainfall Simulator and Soil Health (continued)**
Stadium Hall I

1:00PM - 4:30PM **Wild Horse Training Demonstration (continued)**
Stadium Hall I

Barry Perryman, Sean Kelly, Steve Leonard, Mantle Ranch Family

1:00PM - 4:30PM **Soils Training (continued)**
Stadium Hall I

1:00PM - 4:30PM **Great Plains Fire Information Exchange Prescribed Fire Demonstration (continued)**
Auction Arena

3:00PM - 4:30PM **Pesticide Sprayer Calibrations (continued)**
Stadium Hall I

RANGE PRACTICUM

LINKS

Low-stress livestock handling
https://stockmanshipjournal.com

Women in Ranching- Western Landowners Alliance
https://westernlandowners.org/women-in-ranching-joins-western-landowners-alliance

Wild Horse Information
https://www.fs.fed.us/wild-horse-burro
https://www.blm.gov/programs/wild-horse-and-burro/herd-management/herd-management-areas/colorado
https://westernhorseman.com/horsemanship/take-a-walk-on-the-wild-side

BLM Field Methods- Assessment, Inventory, and Monitoring (AIM)
https://landscape.blm.gov/geoportal/catalog/AIM/AIM.page

Pesticide sprayer calibration- Weld County Weed Management
https://www.weldgov.com/departments/public_works/weed_management

Prescribed fire- Great Plains Fire Science Exchange
https://www.gpfirescience.org

Rainfall Simulator and Soils- USDA-NRCS Colorado
https://www.nrcs.usda.gov/wps/portal/nrcs/site/co/home

Restoration Equipment- Western States Reclamation, Inc.
http://www.wsreclamation.com/

USDA-NRCS Soil Survey
https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey

Winter Livestock Watering- Laramie Rivers Conservation District
http://www.lrcd.net

RANGE PRACTICUM

THE RANGE PRACTICUM WAS MADE POSSIBLE BY:

SRM Colorado Section
http://www.cssrm.org

SRM Wyoming Section
https://www.wyomingrangelands.org

AgRisk Advisors
https://agriskadvisors.com

Bamert Seed Company
https://bamertseed.com/

Colorado Cattlemen's Association
https://www.coloradocattle.org

Colorado Department of Agriculture
https://www.colorado.gov/agmain

Colorado Sheep and Wool Authority
http://www.coloradosheep.org

National Grazing Lands Coalition
https://www.grazinglands.org

Northern Rockies Conservation Cooperative
http://nrccooperative.org

USDA Natural Resources Conservation Service
https://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home

USDA-US Forest Service Rocky Mountain Region
https://www.fs.usda.gov/main/r2/home

USDI Bureau of Land Management
https://www.blm.gov

Western Landowners Alliance
https://westernlandowners.org

JAX Farm & Ranch
https://www.jaxgoods.com/farm-ranch

Trainor Cattle Company- T&R Ranch LLC
https://www.facebook.com/trainorcattleco

TRAINING EVENTS

THURSDAY

8:00AM - 4:00PM **Healthy Grasslands Expo**
Downtown Denver
Sheraton
Plaza Ballroom A, B, C
Cost $60

Speakers:
Renowned author Dr. Fred Provenza of the book Nourishment; Bobby Gill of the Savory Institute; Jeff Herrick of the USDA-Agriculture Research Service; and Pat Shaver from Oregon State University.

This training is tailored for the layperson and suburban or urban dweller.

Attendees will learn how grasslands have evolved through the behavior of foraging animals and human manipulation; the principals of rangeland health, ecosystem processes and grassland function; and understand how fully functioning grassland ecosystems store carbon.
http://www.srm2020.org/healthy-grasslands-expo.html

9:00AM - 9:10AM **Welcome and Introduction - Rob Alexander and Sharon Bokan**

9:10AM - 10:30AM **Principles and Processes - Jeff Herrick & Pat Shaver**

10:30AM - 10:45AM **Break and Trade Show**

TRAINING EVENTS

THURSDAY

10:45AM - 11:30AM	**Rangeland Health Indicators - Jeff Herrick & Pat Shaver**
11:30AM - 1:00PM	**Lunch (on your own)**
1:00PM - 1:05PM	**Introduction to Afternoon Session - Sylvia Hickenlooper**
1:05PM - 1:50PM	**Global Importance of Rangelands - Bobby Gill Savory**
1:50PM - 2:05PM	**Break and Trade Show**
2:05PM - 3:20PM	**Nourishment - Fred Provenza**
3:20PM - 3:35PM	**Break and Trade Show**
3:35PM - 4:30PM	**Bringing it all together - Why it matters - Closing Dr. Fred Provenza**

TRAINING EVENTS

THURSDAY

9:00AM - 2:00PM **Rocky Mountain Arsenal Wildlife Refuge**
Cost $60 (lunch included)

Learn about the history and wildlife of one of the largest urban refuges in the country. Located NE of Denver, the RMA National Wildlife Refuge is 15,000-acres of prairie, wetland and woodland habitat, with an anomaly of foothill shrubland interspersed with xeric tallgrass prairie. the land transitioned from wildland to farm and ranchland to war-time manufacturing site to a restored prairie where wildlife thrives and may be one of the finest conservation success stories in history.

The refuge is a sanctuary for more than 330 animals species, including bald eagles, bison, black-footed ferrets, burrowing owls, coyote, deer, and migratory and resident birds- more than 280 bird species have been recorded! Currently much of the resource management is dedicated to prairie restoration. www.fws.gov/refuge/rocky_mountain_arsenal/

Be sure to bring binoculars and camera!

OTHER MEETINGS/SESSIONS

SATURDAY 2/15

8:00AM - 5:00PM
Director's Row E
SRM Board of Directors

SUNDAY 2/16

5:00PM - 7:00PM
Director's Row F
NRCS West Regional Range Consortium

6:00PM - 9:00PM
Governor's Square 16
BLM Family Meeting

6:00PM - 9:00PM
Governor's Square 12
USFS Family Meeting

6:00PM - 9:00PM
Governor's Square 11
ARS Family Meeting

6:00PM - 9:00PM
Governor's Square 14
NRCS Family Meeting

MONDAY 2/17

1:30PM - 3:30PM
Governor's Square 12
Yellowstone National Park - Symposium

1:30PM - 3:30PM
Denver
The New IQ - Leveraging Inclusive Intelligence for Engagement, Innovation, and Collaboration

4:00PM - 5:00PM
Director's Row F
Researchers and industry collaborators - Nevada's Boulder Valley

TUESDAY 2/18

8:00AM - 12:00PM
Director's Row F
NARAC Business Meeting

OTHER MEETINGS/SESSIONS

8:30AM - 11:30AM **BLM AIM Data Users Working Group**
Governor's Square 17

9:50AM - 11:45AM **NRCS Rangeland Ecology II Student Project Presentations**
Denver

1:30PM - 3:30PM **CPRM Exam Study Session**
Spruce

1:30PM - 3:30PM **LandPKS Working Group**
Governor's Square 17

1:30PM - 3:30PM **SRM - CPRM Exam**
Spruce

1:30PM - 3:30PM **VGS Workshop**
Denver

WEDNESDAY 2/19

8:00AM - 12:00PM **Forum - NARAC**
Governor's Square 12

9:30AM - 12:30PM **The Nature Conservancy**
Gold

10:00AM - 11:30PM **Range Program Leads**
Denver

2:00PM - 4:00PM **Grazingland Information System – Rangeland Thesaurus**
Gold

6:00PM - 9:00PM **Wild Women of Range**
5280 Burger Bar

OTHER MEETINGS/SESSIONS

THURSDAY 2/20

8:00AM - 1:00PM **Range Social Scientist meeting**
Governor's Square 12

8:00AM - 4:00PM **Healthy Grasslands EXPO**
Plaza Ballroom A, B, C

8:00AM - 12:00PM **SRM Board of Directors Meeting**
Governor's Square 15

Society for Range Management

RANGELANDS

Without Borders ★ SRM 2021

February 7-11, 2021 | Boise, Idaho