

SRM 2020 Denver: Symposium/Workshops/Ignite Sessions

Monday PM (1:30 pm to 3:30 pm)

Session 7	Plaza F	Transforming Public Rangeland Management Through Collaborative Multi-Stakeholder Partnerships (Symposium)
Session 8	Plaza A-C	What are animals eating? New methods for estimating diet composition on rangelands (Ignite)
Session 9	Silver	Applications of the State and Transition Model (STMs) to Novel Resource Management Issues (Ignite)
Session 10	Governors 15	Invasive annual grass management: new tools to slow the transformation of Western US Landscapes (Symposium)
Session 11	Governors 14	The future is here: applications of technological advances for precision livestock management in extensive rangelands (Symposium)
Session 12	Windows	Social Science Advancements to Rangeland Management: Perspectives from the Long-Term Agroecosystem Research (LTAR) Network (Ignite)

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.

- Laura Van Riper, BLM: Social Scientist/ROGER facilitator –Transforming Conflict and Fostering Collaborative Action: The Results Oriented Grazing for Ecological Resilience (ROGER) Collaborative
- James Rogers, Winecup-Gamble Ranch: Ranch Manager & Liz Munn, The Nature Conservancy Sagebrush Ecosystem Program Manager – Collaborative development of outcome-based management alternatives: From value-scoping to policy creation
- Taylor Payne, Utah Grazing Improvement Program: Regional Coordinator & Kris Hulvey, Working Lands Conservation: Lead scientist – The Three Creeks Grazing Project: Reimagining partnerships on public-lands from legal structures to adaptive management

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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.

1. Joseph Craine (Ecologist, Jonah Ventures): *Methodological advances in fDNA to correctly distinguish among related plant species*
2. John Walker (Professor and Resident Director of Research, Texas A&M AgriLife Research and Extension Center): *Comparison of techniques to analyze diet composition of livestock*
3. Derek Scasta (Rangeland Extension Specialist, University of Wyoming): *fDNA validation trial using confined cattle*
4. Tamara Jorns (Former graduate student, USDA-ARS): *fDNA and diet quality analyses of cattle grazing mixed grass prairie*

5. Darren James (Range Management Research Statistician, USDA-ARS): *fDNA-based diet selection by Raramuri Criollo and Angus crossbreds in the Chihuahuan Desert*
6. Sarah King (Research Scientist, Colorado State University): *fDNA and microhistology to evaluate feral horse diets*
7. Mitch Stephenson (Range Management Specialist, University of Nebraska - Lincoln): *Using fDNA to evaluate targeted cattle grazing on cheatgrass invaded areas*
8. Laura Goodman (Range Extension Specialist, Oklahoma State University): *The use of fDNA to identify plant families in the diets of cattle, bison, and greater prairie chicken in Oklahoma*

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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.

1. Skye Wills: Agro-ecological applications of STMs
2. Michael Kucera: Developing STMs for multiple land uses in the eastern Great Plains
3. Jamin Johanson: STMs for Dynamic Ecosystem Services: Wildlife Habitat
4. Michael Margo: Applying STMs to Urban Land Management Decision-making
5. Nick Webb: Defining thresholds for wind erosion in desert rangeland STMs
6. Curtis Talbot: Applying STM format to riparian ecosystems
7. Ken Spaeth: Development of STMs on a barrier island ecosystem, the Chincoteague Reserve
8. Phil Barber: Incorporating reindeer grazing interpretations into Alaska rangeland STMs
9. Blaine Spellman: STMs for drying lakes of the Yukon Flats Lowlands
10. Shane Green: Integrating Rapid Assessment Tools into STMS
11. Budbaatar Ulambayar: Ecological Sites and STMs for land management and policy decisions in Mongolia
12. Alexandra Heller: Detecting and describing ecological states on the Taos Plateau

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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© 200 SC herbicide, Bayer CropScience LP) 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.

Included Speakers:

<i>Speaker</i>	<i>Presentation Title</i>
Harry Quicke (Bayer Vegetation Management)	<i>Depleting the Seed Bank: Key to restoring land devastated by annual grass invasion</i>
Jake Courkamp (CSU)	<i>Sagebrush-grassland plant community responses to long-term cheatgrass control in Sublette County, WY</i>
Noe Marymor (NRCS)	<i>Maybe we won't fly the coop: Effects of cheatgrass control using indaziflam herbicide on habitat quality of grassland birds</i>

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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.

Each talk to be 20 min, including questions:

- 1) Melissa Brandao (Founder and CEO of Herddogg): A “fit bit for cows”: applications of accelerometer ear tags for real-time monitoring of cattle.
- 2) Kevin Heaton (Extension Professor, Utah State University): Using remote sensing technology to monitor stock tanks.
- 3) Melissa Johnston (Central Plains Experimental Range Manager, USDA-ARS, Nunn, Colorado). Walk-Over-Weighing scales for real-time monitoring of livestock weight gains: implications of knowing seasonal and individual variation in cattle performance.
- 4) Corey Moffet (Rangeland Management Specialist, USDA-ARS, Woodward, Oklahoma): Enhancing grazing management with animal activity and location measurements.
- 5) Sarah Adams (Rancher and Global Business Development Manager for eShepherd, Gallagher Animal Management). Pushing new boundaries in livestock farming with virtual fencing.

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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.

1. 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.
2. **Can Collaborative Adaptive Rangeland Management (CARM) help conservationists move beyond individual-based conservation? Ted Toombs, Environmental Defense Fund.**
3. Landowner attitudes and management of Kentucky bluegrass in invaded northern Great Plains grasslands. Kiandra Rajala and Mike Sorice, Virginia Tech.
4. Ecosystem service tradeoffs associated with agricultural intensification of grazinglands. Sheri Spiegel, USDA-ARS Jornada Experimental Range, Las Cruces, NM.
5. Multiple stakeholder perceptions of brush control efforts in the Southwest region. Maude Dinan, USDA-ARS Jornada Experimental Range, Las Cruces, NM.
6. Evaluating rangeland management innovations: adoption constraints and capacity for change. Gwendŵr Meredith, University of Idaho and USDA-ARS LTAR.