

**SRM 2020 Denver: Symposium/Workshops/Ignite Sessions**

**Tuesday PM (1:30 pm to 3:30 pm)**

Session 19	Governors 15	<b>Open(source) Range (Ignite)</b>
Session 20	Silver	<b>Managing invasive species using geospatial technologies (Symposium)</b>
Session 21	Plaza F	<b>Partnerships are the New Conservation Paradigm (Symposium)</b>
Session 22	Governors 14	<b>Kenyan IRC 2020 (Symposium)</b>
Session 23	Windows	<b>The Art &amp; Science of Stockmanship in Rangeland Management: Asking better questions and engaging more people (Symposium)</b>
Session 24	Plaza A-C	<b>Stakeholder Engagement to Improve Federal Rangeland Wildfire Mitigation and Response (Symposium)</b>

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., firebehaviorR 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.

*Tentative list of presenters:*

1. Jason Karl – Livestock GPS collars for \$40 – Development of an open-hardware location tracker
2. Devan McGranahan – thermocouples and fire weather
3. Craig Tweedie – A Raspberry Pi based camera system for phenology monitoring
4. Jeff Herrick – LandPKS – a cloud-based, crowd-sourcing app for rangeland monitoring
5. Matt Dickinson/Bob Kremen – IR fire behavior sensors
6. Justin Ziegler - fire behavior R package
7. Slot to be filled
8. Slot to be filled
9. Jason Karl – Open hardware development and prototyping – from 3D printing to custom circuit boards
10. Devan McGranahan – Data and code sharing = open science!

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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.

Steve Petersen: "The application of geospatial technology to assess pinyon/juniper invasion in western rangelands"

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

Humberto Perotto: "Geospatial perspectives and approaches to monitoring invasive species in South Texas"

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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.

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<b>Presenter</b>	<b>Position</b>	<b>Role in the National Organizing Committee (NOC)</b>
1. Mr. Harry Kimtai	Principal Secretary (PS), State Department of Livestock	Chairman of the NOC
2. Dr. Eliud Kireger	Director General (DG), Kenya Agricultural and Livestock Research Organization (KALRO)	Chairman of the NOC Secretariat
3. Mr. Ernest Mbogo	Deputy Director, State Department of Livestock	Member, NOC
4. Dr. Cecelia Onyango	Lecturer, University of Nairobi	Vice Chair, Local and Arrangements Sub-Committee of NOC
5. Dr. Foustine Peter Wandera	Director Livestock Systems, KALRO	Secretary, Program Sub-committee of NOC
6. Ms. Primrose Nabwire	ICT expert	Manager, Kenya IGC-IRC Secretariat office and managing software running the Congress website

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Since 2015 there have been three Stockmanship Symposia at SRM Annual Meetings (2015, 2016, & 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 & 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 & 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*

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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.

- Katherine Wollstein, University of Idaho: "Context matters: Institutional Conditions for Outcome-Based Approaches to Address Wildfire Risk on Idaho's Rangelands"
- Emily Jane Davis, Oregon State University: "Fire on the Range: 'Co-Managing' Risk Among Agencies and Landowners in the Great Basin"
- Gwendwr Meredith, University of Idaho: "Effects of Wildfire on Collaborative Governance of Rangelands - a case study of the Soda Fire"