Enhancing Rangeland Inventory and Monitoring Symposium
Unmanned Aerial system Imagery

February 16th, 2020, 3:00 – 5:00 PM in Governors Square 12

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, however, are often too coarse to observe fine features of interest such as individual plants and the bare-ground 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