Field Trip Summary 15 | May 2018

Twenty-one participants were integrated into the operational command structure of a 10-acre prescribed burn on the Lubrecht Experimental Forest in Montana. This was the first Western Rx Fire Science research burn conducted as an extension of the RxCADRE (https://www.firelab.org/project/rxcadre-project) and national Prescribed Fire Science Consortium (RxScience) experiments, which have been conducted in the Southeast for the past decade. Sharon Hood, Research Ecologist for the USDA Forest Service's Rocky Mountain Research Station (RMRS) facilitated the field trip, and the research burn was a collaborative effort between the Tall Timbers Research Station, University of Montana, Los Alamos National Lab, and the USDA Forest Service.

OVERVIEW

Often a prescribed burn requires time sensitive, logistical, and safety precautions that would make it challenging for a non-fire qualified person to observe and ask questions while it is taking place. The Lubrecht field trip, though requiring the same precautions listed above, was unique in that it was set up for the purpose of shared learning and offered an opportunity for people from a variety of fire experience backgrounds to observe a prescribed burn up close from an established safety zone. The burn also offered a chance for participants to learn about the many facets of the fire continuum that can play into a prescribed burn. Some topics discussed during the day by managers, academics, and researchers were operations, fire effects, fire behavior, and fuel characterization methods, which were also demonstrated in the field during the prescribed burn.

THE LUBRECHT EXPERIMENTAL FOREST

The Lubrecht Experimental Forest is a 28,000-acre forest that is owned and managed by the W.A. Franke College of Forestry and Conservation through the Montana Forest and Conservation Experiment Station. Chris Keyes, Research Professor of Silviculture in the Department of Forest Management, oversees management and

research for the property. The forest encompasses a broad range of elevations and species composition, with low-elevation forests dominated by ponderosa pine, Douglas-fir, and western larch. The National Center for Landscape Fire Analysis and the University of Montana Student Chapter of the Association for Fire Ecology have a decade-long commitment to returning fire to this ecosystem, having conducted four previous prescribed burns on the property.

19,058 acres of the Lubrecht Experimental Forest was previously owned and logged by the Anaconda Copper Mining Company in the late 1800s, 1916, 1925, 1926. It was donated to the University of Montana in 1937. In 1939, another 1,200 acres owned by the Northern Pacific Railroad were donated to the University of Montana (www.cfc.umt.edu/lubrecht/about/history.php).

The Lubrecht Experimental forest serves a middle ground between fire and forest management and academia and offers a unique opportunity to move forward with experimental projects and treatments, such as this prescribed burn, more quickly than could be achieved on lands managed by a state or federal agency.

Figure 1. Valentijn Hoff gives the group a morning briefing prior to the prescribed burn.

BLENDING OPERATIONS AND SCIENCE

Often, the operational and scientific aspects of fuels management are managed separately. In this case, the entire group, managers, researchers, and observers were

all incorporated into the command structure of the prescribed burn. They took part in the morning briefing (Figure 1), where they were able to learn about the logistical aspects that go into a prescribed burn, such as safety, weather, and goals of the burn.

The prescribed fire had two incident command structures: the operational command structure led by Valentijn Hoff and the research command structure led by Eric Rowell. The operational command structure was in place to oversee the burn plan, incident action plan, and operational aspects of the fire. The research command structure was in place to facilitate research objectives, maintain orderly and safe observation of the fire, and provide logistical support to the incident. During the briefing, the two objectives of the burn were: 1) reduce fuels, and 2) provide a demonstration for the field trip participants that was safe for both the participants and the operations team.

The day was ended with an After Action Review (AAR), in which the group was able to share what they learned and how the prescribed burn could be improved for future field trips.

Figure 2. Introduction to some research equipment used on wildfires and prescribed burns. Top left: Discussion of comparisons between In-situ measurements of fire energy and remote sensed thermography using unmanned aerial systems (UAS) to provide real-time co-located thermographic data. Top right and bottom left: tools used on the ground to collect on-the-ground fuels measurements and thermographic data. Bottom right: Matthew Cunningham showing the group the DGI Matrice 100 UAS prior to it being flown over the prescribed burn.

THE SCIENCE OF PRESCRIBED FIRE

After taking part in the morning briefing, the group was able to see the research equipment that would be used during the burn (Figure 2) and then they moved to the safety zone of the experimental burn and waited for the test fire on the East side of the 10 acre unit (Figure 3).

Figure 3. Colin Hardy, Fire Fuel and Smoke Program Manager, Rocky Mountain Research Station, lighting the test fire on the east side of the 10 acre burn unit.

The group learned about the fire ecology of ponderosa pine (*Pinus ponderosa*) systems of the Rocky Mountains as well as the goal of the past burns within the Lubrecht Experimental Forest (Figure 4), which was to kill the Douglas-fir (*Pseudotsuga menziesii*) to promote shade intolerant species and reduce the risk of Ponderosa pine being killed by a crown fire.

Speakers also explained to the group that western larch (*Larix occidentalis*) is more adapted to fires than is ponderosa pine, since larch is deciduous and has very thick bark. The burn unit was dominated by second growth ponderosa pine with higher canopy density on the western side of the unit. Primary fuels were ponderosa pine litter, kinnikinnick (*Arctostaphylos uva-ursi*), Oregon grape (*Mahonia aquifolium*), bear grass (*Xerophyllum tenax*), and sparse grasses. The site gently sloped upward from south to north (10% slope).

The prescribed fire burned enough of the unit for the researchers on the burn to set up their equipment and demonstrate how they collected and applied data to their models in the lab. During the burn, there was discussion of the power of leveraging models with on-the-ground and same-time data and the importance of looking at multiple scales of fire behavior and effects.

Field demonstrations during the burn included:

- thermocouples measuring internal temperatures of individual trees before, during, and after the fire,

- a thermal infrared camera that was used to view the burn from the safety zone, and

- demonstrations of different methods and equipment for measuring fire behavior and post-fire effects.

- 1 m^2 plot box used to validate models

Figure 4. While the burn crew prepares for the test fire, Ron Wakimoto, University of Montana, and Eric Rowell, University of Montana, describe to the group the goals of past burns on the Lubrecht Experimental Forest and fire ecology of the area and how that drives the goals of the field trip prescribed burn.

SUMMARY

Though the wet conditions weren't optimal for burning the entire 10-acre unit, the field trip was a success and provided an excellent example of shared learning between the managers, researchers, and scientists involved. The atmosphere was energetic and positive, and the group left excited for the future of collaborative burn experiments in the western United States.

ADDITIONAL INFORMATION

Field trip presenters-

Sharon Hood, Colin Hardy, Dan Jimenez, Andy Hudak, USDA Forest Service, Rocky Mountain Research Station; Christopher Keyes, Eric Rowell, Valentijn Hoff, Lloyd Queen, Ron Wakimoto (retired), University of Montana; Kevin Hiers, Dave Grimm, Tall Timbers; Morgan Varner, Roger Ottmar, USDA Forest Service, Pacific Northwest Research Station; Susan Prichard, University of

Washington; Nick Skowronski, USDA Forest Service, Northern Research Station; Marjie Brown, Science Fire Solutions Inc.; Linda Chappell, USDA Forest Service, Intermountain Region; Leda Kobziar, University of Idaho

Planning Committee-

Eric Rowell, Lloyd Queen, National Center for Landscape Fire Analysis, University of Montana; Kevin Hiers, Tall Timbers; Morgan Varner, USDA Forest Service, Pacific Northwest Research Station; Sharon Hood, USDA Forest Service, Rocky Mountain Research Station

Rx Burn Planning-

Valentijn Hoff, Chris Moran, National Center for Landscape Fire Analysis, University of Montana

Summary author–

Monique Wynecoop, Fire Ecologist, USFS Colville National Forest

The Northern Rockies Fire Science Network (NRFSN) serves as a go-to resource for managers and scientists involved in fire and fuels management in the Northern Rockies. The NRFSN facilitates knowledge exchange by bringing people together to strengthen collaborations, synthesize science, and enhance science application around critical management issues.