

Elkhorn Creek Unit #4

Prescribed Fire Review

Executive Summary

March 1, 2020

Compliance & Professional Standards Office



COLORADO
Department of Public Safety
Executive Director's Office

Executive Summary

Background

This is the formal review required by Colorado statute following the escape of the Elkhorn Creek Unit #4 Prescribed Fire. In accordance with the statute, the purpose of the review is “to identify the factors that contributed to the escape, including compliance with policy requirements, in an effort to reduce the occurrence or prevent future escapes.” §24-33.5-1217.7, C.R.S. At the request of the director of the Division of Fire Prevention and Control (DFPC), the review was completed by a team of four subject matter experts led by the Compliance and Professional Standards Office of the Colorado Department of Public Safety.

The Elkhorn Creek Unit #4 Prescribed Fire project took place on October 15 (Day 1) and October 16 (Day 2), 2019 on the Ben Delatour Scout Ranch, private property located in Larimer County, Colorado, as part of a forest restoration effort aimed to reduce the impact of high severity wildfire on Elkhorn Creek, an important tributary of the Poudre River. The Nature Conservancy planned and led the project, dividing the unit into two subunits, 4a which was 385 acres, and 4b, at 120 acres.

The Nature Conservancy staffed the project using a “collaborative burning” organization consisting of personnel from several different partner agencies and organizations. On Day 1, Unit 4a was burned successfully, implementation was executed within the Prescribed Fire Plan’s parameters, and the objectives were met. On Day 2, Unit 4b was ignited within the Prescribed Fire Plan’s parameters. Despite the smaller unit size, operations moved slower in Unit 4b due to the unit’s more complex terrain which required additional coordination between firing and holding teams. On Day 2, the weather was drier, warmer, and windier than the day before, and at approximately 2:00 PM, cloud cover moved off the area, resulting in an increase in fire behavior. At 3:00 PM, a spot fire was identified but quickly contained just over the eastern boundary of the unit. However, only minutes later, two more spot fires were located to the south of the first. Located in dry, dead grass on a steep slope aligned with strong westerly winds, these two spots quickly grew together and began spreading rapidly away from the unit towards the Glacier View community to the east. Leadership personnel, quickly determining that on-site resources would not be able to contain the fire, immediately ordered ground and aerial resources and then declared the wildfire at 3:59 PM. In total, the fire burned 682 acres, with 118 acres outside of the planned boundaries of the project and 82 acres off the Scout Ranch property. One outbuilding was destroyed by the fire.

What We Found

The Review Team found that many interrelated factors together created the conditions leading to the escape and declaration of a wildfire. Though no factors were identified as primary to causation in and of themselves, the following list summarizes the factors that the Review Team identified as most important for lessons learned for the prescribed fire community in order to reduce occurrence of or prevent future escapes.

- Several common cognitive biases and heuristics likely influenced decision-making, leading prescribed fire personnel to undervalue the actual risk of burning in Unit 4b on October 16, 2019.
- The prescribed fire project was implemented in accordance with the prescribed fire plan, however, weaknesses in the plan came into play and compounded on one another, leading to implementation of the project under weather and fuel moisture conditions that exceeded reasonable limits for prescribed fire in the project area. Observations related to the plan include complex challenges related to the fire behavior fuel models utilized, weather parameter values in the prescription too broad to limit implementation windows, use of a single wind parameter that did not match the type of wind measurements taken during implementation of the project, and inconsistencies among specific elements in the plan.
- Inadequate analysis of weather information during implementation of the project prevented fire personnel from accurately understanding current conditions. Observations related to the on-site weather analysis include apparent lack of clarity on the importance of differences between types of wind measurements as well as methods for conversions between them, and inaccurate comparisons of current conditions against parameter values in the prescribed fire plan and in the spot weather forecasts produced for the project.
- Overhead (leadership) fire personnel were qualified and experienced in their positions. However, below the overhead level, several participants interviewed noted a lack of experience amongst participants because the project was a “collaborative burn” (a prescribed fire implemented using personnel from multiple agencies partnering together to leverage resources and enhance learning and training opportunities). Unfamiliarity with one another’s training and experience, as well as many individuals with less experience, added a layer of complexity and some delays in operations during implementation of the project.
- DFPC did not contribute assistance in the planning or implementation of this prescribed fire because it is bound by state statutes that prioritize wildfire suppression and sacrifice proactive measures to reduce wildfire risk to communities. DFPC has no policy enforcement authority regarding prescribed fire conducted on privately-owned land and has no liability protection when engaged in prescribed fire because of a broad statutory waiver of governmental immunity. As a result, DFPC has very limited organizational capacity to assist with planning or implementing prescribed fire. DFPC’s statutory authority and framework only effectively address one of the three goals of the National Cohesive Wildland Fire Management Strategy, “Safe and Effective Wildfire Response.” This leaves the two other goals, “Resilient Landscapes,” and “Fire Adapted Communities” largely unmet by DFPC.

- Finally, several factors present on the Elkhorn Creek Unit 4 Prescribed Fire are not unique to this event, and have been previously documented in surveys of other prescribed fires that escaped and were declared wildfire. These common factors and best practices are presented below as a list of “lessons re-learned” for prescribed fire practitioners:
 - Utilize portable remote automated weather stations to gather site-specific weather data.
 - Blackline depth is not sufficient to contain potential spotting from fuels within the unit.
 - Fuels and weather generated surprising fire behavior, even though it was outlined in the prescribed fire plan.
 - Fuel models selected in prescription development do not accurately represent potential fire behavior.
 - Unexpected winds (strength, duration, direction) occur.
 - Burning adjacent to lands where no agreements exist with the adjacent landowner(s).
 - Notifications to adjacent landowners prior to ignition is viewed as inadequate after the prescribed fire is declared a wildfire.
 - A systematic tendency to underrate overall prescribed fire complexity.
 - 43% of declared wildfires occur in six hours or less from the time of ignition.
 - Lighting at the upper end of the prescription, where prescription parameters are often exceeded during the peak of the day.
 - Prescribed fire plans lack enough depth and detail for the complexity of the project.
 - There is always a desire to make plans broad to increase their utility, but all plan elements must still be cohesive with one another
 - Finding a balance between prescribed fire and containment objectives is often difficult. Ensuring both can be met simultaneously must occur to reduce risk to either objective.

Recommendations and Recommendations

First, based on things that went right during the project and from which other prescribed fire practitioners can learn, the Review Team identified five commendations.

1. Burning adjacent to WUI is inherently more difficult, but significantly more impactful than burning far away from assets that require protection from wildfire. The goals of the Coalition for the Poudre River Watershed, Elkhorn Creek Forest Health Initiative, and Elkhorn Creek #4 Prescribed Fire are in concert with those of the National Cohesive Wildland Fire Management Strategy, which are: 1) Resilient Landscapes, 2) Fire Adapted Communities, and 3) Safe and Effective Wildfire Response.
2. The Nature Conservancy, Colorado, fills a vital gap between private landowners and State and Federal agencies who are not as well equipped to navigate the complexities of implementing broadcast prescribed fire on private lands.
3. The difficulty of suppressing the spot fires that eventually led to the wildfire declaration was rapidly recognized by all involved.
4. The decision to declare a wildfire was made very quickly, and a smooth transition into a suppression organization occurred.

5. The prescribed fire organization rapidly shifted into a suppression organization, with predefined roles and responsibilities, limiting a loss of situational awareness during a very dynamic situation.

Second, based on the interrelated factors summarized in the findings above, the Review Team identified five recommendations, two applicable to all prescribed fire practitioners, two applicable to The Nature Conservancy, and one applicable to DFPC.

Recommendations for All Prescribed Fire Practitioners

1. A strong understanding of fire weather is critical to mitigating risk and responding to changing conditions. Review fire weather concepts presented in the National Wildfire Coordinating Group (NWCG) Intermediate Wildland Fire Weather Behavior (S-290) course and fire weather data acquisition and analysis concepts presented in the NWCG Intermediate National Fire Danger Rating System (S-491) course before each fire season utilizing an Incident Meteorologist (IMET), a Long Term Fire Analyst (LTAN), Fire Behavior Analyst (FBAN), or other knowledgeable individual, and incorporate these concepts into development of prescribed fire plans.
 - o Review and remain diligent regarding the differences between 20-ft sustained 10 minute average winds, gusts, eye level, and midflame wind speeds.
 - o Ensure on-site wind measurements are consistent with the type of wind parameters used in the prescribed fire plan, or ensure that accurate conversion techniques are accurately and consistently applied.
2. Apply “lessons re-learned” from the factors and best practices identified as being common between this prescribed fire and previous prescribed fires that were later declared wildfires.

Recommendations for The Nature Conservancy

3. Evaluate and refine the collaborative burning approach, including considerations for additional cooperative or partnership agreements to increase the experience level below that of overhead or trainee positions on high consequence prescribed fires.
4. Consider the full adoption of the DFPC Colorado Prescribed Fire Planning and Implementation Policy Guide as well as the Prescribed Fire Complexity Rating System Guide (NWCG PMS-424-1).
 - o Adoption of these guides would increase consistency and support cooperation between The Nature Conservancy and DFPC and other Colorado partners.

Recommendations for the Division of Fire Prevention and Control

5. Evaluate all DFPC statutory and policy frameworks and craft solutions to align with all three co-equal goals of the National Cohesive Wildland Fire Management Strategy.
 - o Changes to DFPC’s organizational focus and statutory authority may be necessary to reduce wildfire risk to communities and create resilient landscapes. In the face of an increasingly complex wildland fire environment, the ability to implement proactive measures must be part of a holistic strategy to reduce risk.