BOX CREEK PRESCRIBED FIRE ESCAPE

FACILITATED LEARNING ANALYSIS

Fishlake National Forest • June 2012

CONTENTS

"I was looking for a reason to do it, not a reason not to do it. There were plenty of reasons not to do it. But I was not looking at those."

"Never underestimate the power of a level head. People with calm, useful advice were key to helping us through the first burn day."

1. SUMMARY

Prescription Requires Stand-Replacing Crown Fire

The Box Creek Prescribed Fire project was planned to be a 3,300 acre burn in the Monroe Mountain area of the Fishlake National Forest in southern Utah. The objective was to reduce fir encroachment into aspen stands. The prescription required stand-replacing crown fire to achieve desired results.

Test Fire Exceeds Intended Acreage—Still Within Prescribed Fire Boundary

Late in the afternoon of May 15, 2012, a small crew was dispatched to light a test fire, approximately 20 acres in size, to determine if fire behavior would be conducive for aerial ignition the following day. The test fire grew in intensity quickly. It spotted out of the test fire stand. By the time nightfall had stopped the fire's spread, it had covered an area of approximately 194 acres, moving roughly one mile from the test fire site. Over the next few days, the fire was controlled within the planning area without significant growth. It continued to be managed as a prescribed fire.

Ignitions Resume

Fourteen days after that initial test fire was implemented, on May 29, ignitions resumed by anchoring to the 194 acres of recently burned area and extending the burn to the south.

Ignitions were successful in completing an additional 461 acres—in accordance with the prescribed fire plan. Minimal long-range and moderate short-range spotting occurred. The morning of the next day, May 30, holding forces worked to contain all spots and secure the fire's edge. The following day, May 31, crews continued to grid through the downwind green.

For the next three days, the fire remained in patrol status without any further perimeter growth, although pockets of heavy fuels continued to consume in various areas throughout the burn.

Spots Exceed Ability to Contain

On June 4, relative humidity dipped down to 8 percent. Isolated heat sources began to burn more vigorously than had been witnessed on previous days. The patrol witnessed a small group of trees torch near the north edge of the recent burn area which spotted a few hundred yards outside the established black area. These spots were still within the project area. They eventually became established and exceeded the patrols' ability to contain.

Wildfire Declared

By the end of that day, the fire had burned an additional 668 acres and had exceeded the project area. Managers determined that they would not be able to control the fire outside the project area by the end of the next burning period and declared a wildfire at 2200 on June 4.

2. SETTING

Primary Objective: Reduce Wildland Fire Hazard While Restoring Fire-Adaptive Ecosystems

The Box Creek Hazard Fuels Reduction NEPA Environmental Assessment Decision Notice was signed in 2008 by the District Ranger. The Box Creek Prescribed Fire project is located on the Richfield Ranger District of the Fishlake National Forest in Central Utah. The primary objective of this burn was to reduce wildland fire hazard while restoring fire-adaptive ecosystems. Forested stands in this area are in various stages of aspen decline, ranging from a few live aspen trees in mixed-conifer stands with many tons per acre of down logs to small areas of pure aspen.

Fuels in the Box Creek prescribed burn area are sagebrush, aspen, and mixed-conifer stands that range in elevation from 8,800 to 10,300 feet. The project area is characterized by large clumps of mixed-conifer and aspen stands with grass and sagebrush meadows separating these stands. Average tons per acre of fuel loading in sagebrush was 5.5, 6 in aspen, and 26 in mixed-conifer areas. Some private inholdings with improvements (scattered summer homes) border the project boundary. Average slope is 25 percent.

3. NARRATIVE

Burn Plan Amendment Authorizes Test Fire Staffing

On May 1, 2012, a burn plan amendment was signed that authorized a minimum organization of five people to implement a test fire. This burn plan amendment was written to enable a small number of people to conduct a test fire to determine if the environmental parameters are aligned to meet objectives. The burn plan was amended to allow this short organization due to many past failed test fires where fire behavior was too low to meet objectives—resulting in numerous resources to be mobilized and then demobilized.

Test Fire Grows Larger Than Intended

The Box Creek prescribed test fire was ignited at 16:10 on May 15, 2012 with a short “test fire organization” consisting of seven total personnel. If the test fire was successful, the full contingent of burn plan personnel would be called up to begin hand ignition and a helicopter would be mobilized for plastic sphere dispenser (PSD) (“ping pong balls”) operations. Within minutes, the test fire spotted outside of its intended 20-acre patch and ran approximately one mile to the north, encompassing about 194 acres.

The planned holding area of the July/August 2000 Oldroyd Fire burned more readily than expected. This previously burned area provided little help in serving as a solid barrier to fire spread. Therefore, local and out of area forces, including a hotshot crew, were brought in to contain the burn.

Decision Made to Proceed with the Prescribed Fire Plan

After numerous conversations up and down the chain-of-command and a thorough scouting of the burn unit, it was decided to ignite the unit a second time on May 29. There were four reasons indicated for why it made sense to initiate the second ignition: 1.) "Green-up" was occurring, so fire behavior would be moderated as compared to the first ignition; 2.) The 194 acres of black from the first test fire would provide a boundary on the north side of the unit; 3.) Some open aspen areas would help contain the fire on the east side; and 4.) These numerous in-depth conversations and considerable time spent hiking the unit and refining the plan that confirmed an across-the-board confidence to proceed with the project.

Temperature and relative humidity values were similar for the second ignition as those conditions that existed for the previous ignition. Wind speeds were lighter and in a more westerly direction—directing potential spotting toward an aspen grove where spotting was correctly identified to be less of a control problem.

In addition, the grass was visibly greener on the second ignition as compared to the first. However, sampled 1,000-hour and live fuel moistures taken the day of the burn show that fuels had actually become dryer, contrary to the belief that fuels were increasing their live moisture content (see charts in Appendix).

Fuel moisture measures (up to the time of this writing) indicate that the peak live fuel moisture content may have occurred on May 15 this year. Fuel moisture data from a nearby collection site (Signal Peak RAWS) indicates that peak live fuel moistures usually occur during the first two weeks of June for sagebrush, and during July for Douglas fir. Because subalpine fir moistures are not taken at the Signal Peak site, Douglas fir values are used as a surrogate.

Unit Burns Intensely—as Planned

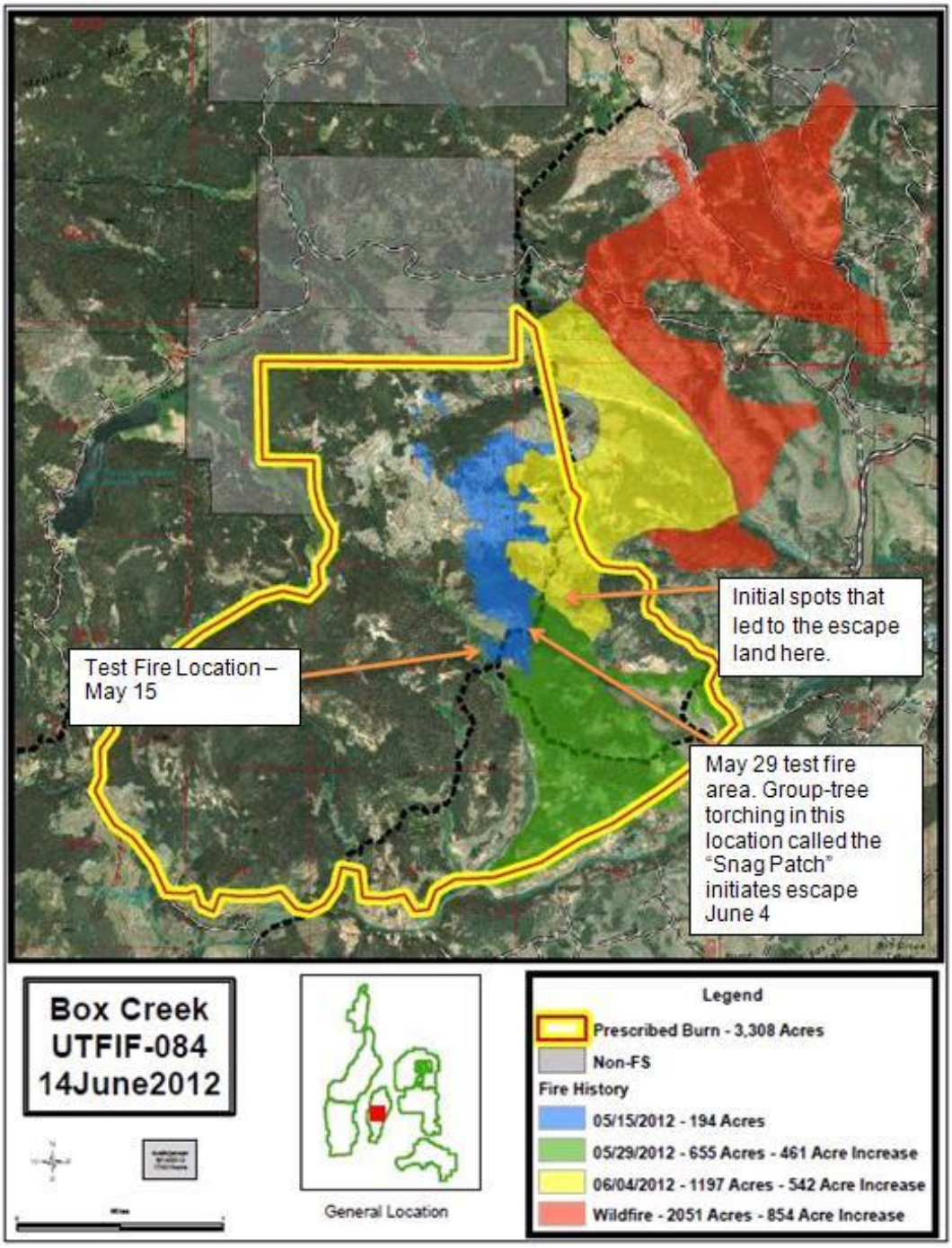
At 16:05 on May 29, ignitions began south of the previous burn with the intent to continue burning to the south. Using a cautious approach, the initial test fire was conducted over the course of an hour and a half. Conditions were determined to be favorable. Ignitions continued until the unit was completed at approximately 2000 hours.

The unit burned intensely, with flame lengths over 100 feet—as was planned. Some spotting occurred, but these spots were contained and extinguished over the next several days. Holding resources were released on May 31. By June 1, the fire was in patrol status with a contingent of three personnel daily.

On June 4, valley Fire Weather Zones throughout the State of Utah had Red Flag Warnings for high winds and low relative humidity below 7,000 feet. The Box Creek project was located in a higher elevation mountain Fire Weather Zone which did not have a Red Flag Warning—because its fuels were not classified as cured.

Wildfire Declared

That afternoon, relative humidity dropped down to 8 percent. Torching occurred in the prescribed fire unit that caused some spotting outside the unit. These spots caused additional spots, leading to large fire growth. At 2200 hours, the burn was declared a wildfire and a Type 3 Incident Management Team was ordered. On June 8, a Type 2 IMT was ordered. The Box Creek wildfire eventually totaled 2,170 acres, with approximately 20 acres of private land burned.



4. CHRONOLOGY OF EVENTS

May 1, 2012	Installed RAWS near unit and started collecting fuel samples.
May 14	Conference call with fire and fuels personnel and Line Officers to prepare for ignitions.
May 15	
1610	First test fire ignited with short “test fire organization” consisting of 7 personnel.
1622	Test fire transitions from ground fire to crown in 8-12 minutes. Spots and runs approximately one mile to the north. Suppression resources ordered to contain northern edge.
May 16	Hotshot crew and other contingency resources arrive to help contain the run. Run is contained at 194 acres—all acres still located within the planning area.
May 17-28	Opportunities to continue burning on the project continued to be evaluated. Several potential ignition days were opted out due to unfavorable wind conditions.
May 29	
1605	Ignitions resume, anchoring to southern edge of previous burn and extending the burn area to the south.
2000	Ignitions stop for the day with 461 acres accomplished.
May 30	Crews begin lining and mopping-up spots from the previous day’s ignition.
May 31	Holding crews released end of shift. Fire is placed in patrol status.
June 1-4	Three-person patrol monitors fire daily.
June 4	
1530	Patrol observes small group torching that causes spotting outside the existing black into adjacent fuels, still within the project boundary. On-scene resources are unable to contain. Torching/spotting/crowning fire behavior observed.
1730	Additional resources arrive, including Burn Boss. Fire has traveled approximately one mile and crossed out of the planning area, eventually halting along the North Fork of Box Creek.
2200	Determination is made that fire cannot be brought back into prescription by end of next burn period. Escaped fire is declared. Type 3 IMT is ordered.

Photo Chronology

May 15, 2012

Test Fire roughly 8 minutes after ignition. Photo @ 1618.

Test Fire @ 1621.

Test Fire @ 1629.

May 15 (Cont.)

Spots to the north of test fire @ 1637.

Spots transition to more continuous fuels. Fire moving north @ 1717.

Fire continues to move north from test fire site @ 1829.

May 29

Second ignition, Box Creek prescribed fire @ 1623.

High intensity fire behavior @ 1852.

Ignition near complete, fire intensity reduced in shaded areas @ 2004.

June 4

Spot fires become established after trees in "the snag patch" torch. Photo @ 1517

Spots grow in intensity and begin moving northeast @ 1547.

Lookout, on road to the north, watches the fire approach the North Fork of Box Creek. @ 1731.

Post Fire

Aerial photo taken of the Box Creek Prescribed Fire escape area shows how the fire burned primarily in a series of patches.

5. DISCUSSION OF CONDITIONS LEADING TO WILDFIRE DECLARATION

SEASONAL SEVERITY AND DROUGHT

The coarse-scale U.S. Drought Monitor indicated that the part of the state in which this project is located was in moderate drought conditions. SNOTEL data indicated that the area was at 60 percent of average for the year. Fuel samples taken on site indicated that peak live fuel moisture levels were a month to a month and a half ahead of the four year average and peaked at much lower percentages than the average. Numerous local fire professionals expressed their opinion that fire season was at least one month ahead of schedule for this area. Prescribed fires that had taken place just previous to Box Creek on other districts of the Fishlake National Forest burned hotter than expected.

The Box Creek Holding Specialist noted that walking on the aspen leaves was like “walking on Corn Flakes” because of how dry and loosely compacted they were—due in large part to the light snow fall the previous winter. While numerous Red Flag warnings had been issued for the valleys surrounding the area during the month of May, there were no Red Flag Warnings issued on either of the ignition days.

The four-year average for live fuel moistures in the sage and mixed-conifer (Douglas fir) in the month of May is 175 and 80, respectively. Both species’ fuel moistures are traditionally still trending up in May, with peak moisture levels typically occurring between June and July. The current-year fuel moistures in May for sage and mixed-conifer (subalpine fir) were 130-145 (sage) and 90 (subalpine fir) and trending down—meaning peak live fuel moistures may have already occurred.

WEATHER

The RXB2 obtained multiple site-specific spot weather forecasts from the National Weather Service for the Box Creek Prescribed Fire. Spots were obtained May 14, 15, 16, 17, 18, 19, 26, 27, 28, 29, 30, 31, and June 4. Part of the reason for the number of spot requests was that the RXB2 wanted to calibrate the spot weather forecast to on-the-ground conditions. The spot weather forecast was requested and referenced against observed weather conditions and feedback was given to the meteorologist. The spots lined up with conditions on the ground very well. This provided the RXB2 with much confidence in the meteorologist’s forecasts.

The afternoon of the escape on June 4, a spot weather forecast showing the predicted weather for the night of the fourth and the day of the fifth was obtained. The eight percent RH recorded on June 4 was the lowest RH recorded in a two-week period (5/26 to 6/8). The daytime forecasts of key dates are summarized in the table (on next page). The weather values in the table for May 15 and 29 are from Spot Forecasts, while those for June 4 were taken from the general fire weather forecast for zone UTX493.

PREDICTED WEATHER

	May 15th	May 29th	June 4th
Haines Index:	6 High	6 High	5
Clearing Index:	1000+	1000+	1000+
Sky/Weather:	Mostly Sunny (10-20% cloud cover) Until noon then partially cloudy (35-45% cloud cover) A slight chance of showers and thunderstorms after 1500.	Mostly Sunny (5-15% cloud cover)	Mostly Sunny (15-25% cloud cover) Areas of blowing dust; Red Flag below 7000 ft.
Max Temp:	63-66	61-64	74-84
Min Humidity:	11-14%	11-14%	6-12%
Winds – 20 Foot:	Southeast winds 4-8 MPH increasing to 10-18 MPH with gusts to 25 MPH after noon.	Southwest winds 7 to 13 MPH with gusts of 17 to 24 MPH. Winds turning westerly through the afternoon/evening.	Slope/valley South 15 MPH increasing to 25. Ridgetop south 10-20 MPH increasing to 15-25 in the afternoon.

OBSERVED WEATHER

	May 15th 1600	May 29th 1630	June 4th 1600
Sky/Weather	5% cloud cover	---	---
Temp	65	64	70
RH	15	13	8
Fine Dead Fuel	3 – Exposed 6 - Shaded	3 – Exposed 6 - Shaded	1 – Exposed 4 - Shaded
Wind Speed	7-10 Gusts to 15	5-7 Gusts to 15	---
PIG	50	80	100

6. KEY FACTORS AND LESSONS LEARNED BY PARTICIPANTS AND FLA TEAM MEMBERS

"It's one thing to write a plan for crown fire in January. It's another thing to actually see 150-foot flame lengths in May and say: 'Is this really what I planned?'."

"When you look within the agency there are not a lot of people experienced with stand replacement burns, it's unchartered territory. So it's going to be a learning experience."

A. FUELS PROGRAM AND PROJECT PLANNING

- Units need a diversity of fuels projects (fuel types/elevations/treatments) to ensure that all their eggs are not in one or two baskets.
- Set yourself up for success during the NEPA process by planning to treat large areas and drawing smart firelines and buffers so fire can be lit and held. Avoid prescribed fire treatment areas that abut with the project area boundary. Utilize arrangement of burn blocks and sequence treatments to improve chance of success. Treat the edges mechanically if necessary. Might need to be less restrictive about the desired results so instead of 60-80 percent black, maybe shoot for 40-80 percent black for flexibility in this fuel type.
- Funding of prescribed fire projects has the potential to influence operational decisions in subtle but troublesome ways. The number of burn personnel and holding personnel retained to patrol after the burn may be influenced by available dollars.
- In this mixed-conifer fuel type, prescribed fire planners will need to recognize that significant holding resources may be required for a substantial time period to ensure that escapes do not occur. This should be factored into project design and the extra holding/patrol cost included in the planned project cost.
- Approach private land owners to see if you can include their land in your project.

B. LIMITED EXPERIENCE WITH PRESCRIBED FIRE IN THIS FUEL TYPE

- In this fuel type, our options to control are to either burn it clean or mop it up. When an area of "dirty burn" cannot be directly mopped-up due to hazard trees, consider formulating a plan to reintroduce fire under favorable conditions to establish "clean black".

- Due to potential spotting, place greater planning emphasis on 20-foot winds rather than eye-level winds in this fuel type. On the first ignition day, the distance of the spotting—not necessarily the number of spots or aggressive spread—presented the greatest challenge to containment. Adjustments were made on May 29 where enough wind was present to commit the column to the desired direction, but was light enough to limit long-range spotting.

C. TEST FIRING PRACTICES

- Consider using a test fire in the vegetation you plan to use for a natural barrier (old fire scar, meadow) to ensure that it will not carry fire prior to initiating the test fire within the target area.

- Select a test fire plot that is representative of the fuels but also one you are able to contain. Don't let test fire build a head of steam in this fuel type. Test fire plan needs to consider control of the test fire as the highest priority, with fire effects secondary. Armed with the experience from May 15, this practice was employed successfully on May 29.

- Anticipate conditions will change from the time your plan is developed to when you implement. A burn plan amendment was written to enable a small number of people to conduct a test fire to determine if the environmental parameters were aligned to meet objectives. Two conditions must be met in order to operate under the amendment: 1) Most aspects are covered in snow; and, 2) the risk of prescribed fire moving toward any areas of concern is unlikely. This amendment was utilized on the day of the first ignition. According to firsthand accounts, there was not a significant amount of snow around the test fire site the day of the first ignition, although more snow was present on north slopes at higher elevations.

D. PATROL AND MOP-UP PRACTICES

- Request weather forecasts as appropriate and adjust staffing and actions accordingly. Plan on committing significant holding resources in this fuel type for many days after the burn.

- Consider a more explicit mop-up and patrol plan in the burn plan that describes specific actions to be taken given forecast conditions—rather than relying on intuition to guide mop-up and patrol actions.

E. INHERENT RISKS OF STAND-REPLACEMENT PRESCRIBED FIRE

- To burn this fuel type, you may need to have a very green or very black area or "catcher's mitt" to lob burning embers into—but creating that first black spot is high risk.

- High number of fire-weakened snags created by crown fire presents an inherent risk to control and mop-up operations.

"Plan for potential, not for current conditions."

"Test your barriers to fire spread and make sure that they are really going to be barriers."

"I banked on nighttime recoveries."

F. DELIBERATE RISK MANAGEMENT DECISIONS

- During mop-up operations, the burn team experienced a close call/minor injury with a snag (debris from falling snag punctured firefighter's cheek). Therefore, for safety concerns, the decision was made to not mop-up in the area known as the "snag patch". While this restriction may have contributed to the flare-up on June 4, it was a deliberate risk/management call—erring on the side of safety. Takeaway lesson is risk management decisions are often a trade-off, reducing risk of one outcome (injury from snags) may result in an increased risk of another outcome (fire escape).

G. MANAGEMENT AND LEADERSHIP CONCERNS

- It is difficult to juggle spring training schedules with extended mop-up/patrol. Everyone wants to come light on ignition day, but the enthusiasm tends to diminish as mop-up and patrol continues on. There is pressure to release crews so they can get their equipment ready and required training done for fire season preparedness. For example, we had to administer pack test at least once to personnel assigned to the burn during time when burn was active.

- Managers should be vigilant in revisiting cooperative agreements with partner agencies in advance of a project or incident. In this instance, a cooperating agency had experienced a change in personnel and the specifics of the existing agreements were not entirely understood between parties. This created confusion and delay when contingency resources were requested. Fire managers need to go beyond hand-shake agreements for cooperating with their counterparts and be deliberate in discussing details of how things such as funding and operational procedures will occur.

- Line Officers really benefit from getting out on site and observing the burn operations to understand the team's challenges and associated risks.

- Line officers can have the ability to calm down ground forces by asking level-headed questions. On the first ignition day when the burn team was surprised by the fire behavior, the Line Officer's reaction was methodical and even-keeled. This allowed personnel to regain focus on the important factors related to management of the fire.

"We're walking on Corn Flakes."

H. HUMAN FACTORS

- Listen to the subtle comments and observations of your prescribed fire team. The intuition and insights your team has can be valuable. During ignitions on the May 15, an ignition crew member referred to walking through aspen litter as: *"We're walking on Corn Flakes."* In hindsight, this was a very insightful comment on how the lack of significant winter snow resulted in a loosely compacted litter layer.

- Be willing to share your experiences and observations with others. Some participants regret that they had seen signals on recent burns on surrounding locations that could have provided some indication of what potential fire behavior could be on May 15. In retrospect, they now wish they would have been more eager to share their experience and insights with the rest of the burn team.

- Collective decision making and information sharing had a stabilizing effect for those anxious about the burn, particularly as the team contemplated the second ignition day. Multiple scenarios were discussed, including worst case. Also, many ignition patterns and problem areas were well thought out in advance. Key players maintained open and active communication to help ensure that nothing would be a surprise and that clear leader's intent was established on ignition and holding days. This level of communication contributed greatly to the confidence and success of the second entry.

- Given the excellent level of communication within the burn team, it was acknowledged that this may make them vulnerable to confirmation bias or "Group Think". To combat this tendency, the group may want to consider making more use of outside observers or internal players who are able to play "devil's advocate" to question the groups reasoning and force decisions to be analyzed with a critical eye.

- Be aware of the influence that pressure to produce, as well as loss aversion, can have on a work unit. Some pressure is self-imposed, some is system imposed, and some is manager/Line Officer imposed. This project had a substantial amount of money ($300k) in fence material and construction awards riding on this burn, as the project required the burn area be fenced off to protect aspen sprouts from ungulate browsing. People outside the burn team and outside the agency were counting on this burn project being completed to enable them to start portions of their projects. There was concern that this money probably would have been lost or squandered if the burn were not completed in the spring, as they would be hard pressed to complete the fence before winter conditions arrived. There is a highly prized cutthroat trout brooding fishery as well as summer-homes in the area that are considered vulnerable to wildfire, especially during what is expected to be an active fire season. This reality/condition added to the sense of urgency to implement this burn—to provide protection to these areas. The District as a whole has high expectations to produce prescribed fire work from the Line Officers down through the entire fire and fuels organization.

- There is a human tendency to base predictions too much off of previous days' observed fire behavior, which, in this case, were mostly uneventful for several days prior to the escape. We should be aware of this tendency and force ourselves to factor in the change we may see when forecasted conditions become more conducive to fire spread.

Summary of Factors that Contributed to the Wildfire Declaration

Some factors contributing to the escape include project design where semi-continuous fuels extend beyond project boundaries, as well as limited experience with stand-replacement prescribed fire locally and throughout the prescribed fire community.

Without extensive experience or knowledge in prescribing stand-replacement fire, there was limited availability of pertinent guidance and critical thresholds useful for anticipating when problematic fire behavior may initiate.

Without identified thresholds, there was little guidance to alter patrol activities in response to changing burning conditions.

The most notable factor contributing to the escape was related to deliberate decisions to limit the risk to firefighters mopping-up in fire-weakened timber. An area that did not burn completely and was not mopped-up due to safety concerns eventually experienced single and group-tree torching on a day in which relative humidity dropped to single digits. In turn, the torching resulted in spotting into adjacent unburned areas that initiated the escape wildfire.

[For more information on conditions that led up to the Box Creek Prescribed Fire escape, see Section 5 and the Appendix in this FLA.]

7. COMMENDATIONS

Positive Outcomes and Traits

While examining the unintended outcome of this escaped prescribed fire, the FLA Team noted a number of positive outcomes and traits, including:

- Prescribed fire operations were conducted in a volatile fuel type with strict adherence to operational safety standards and deliberate choices to limit risk in a high-risk environment.
- Overall, the fire effects appear to have achieved the intent of the burn plan.
- There were also many examples of proactive communication among all levels of the unit—from dispatch to the burn team, on up through fire management personnel and Line Officers.

8. FACILITATED LEARNING ANALYSIS TEAM MEMBERS

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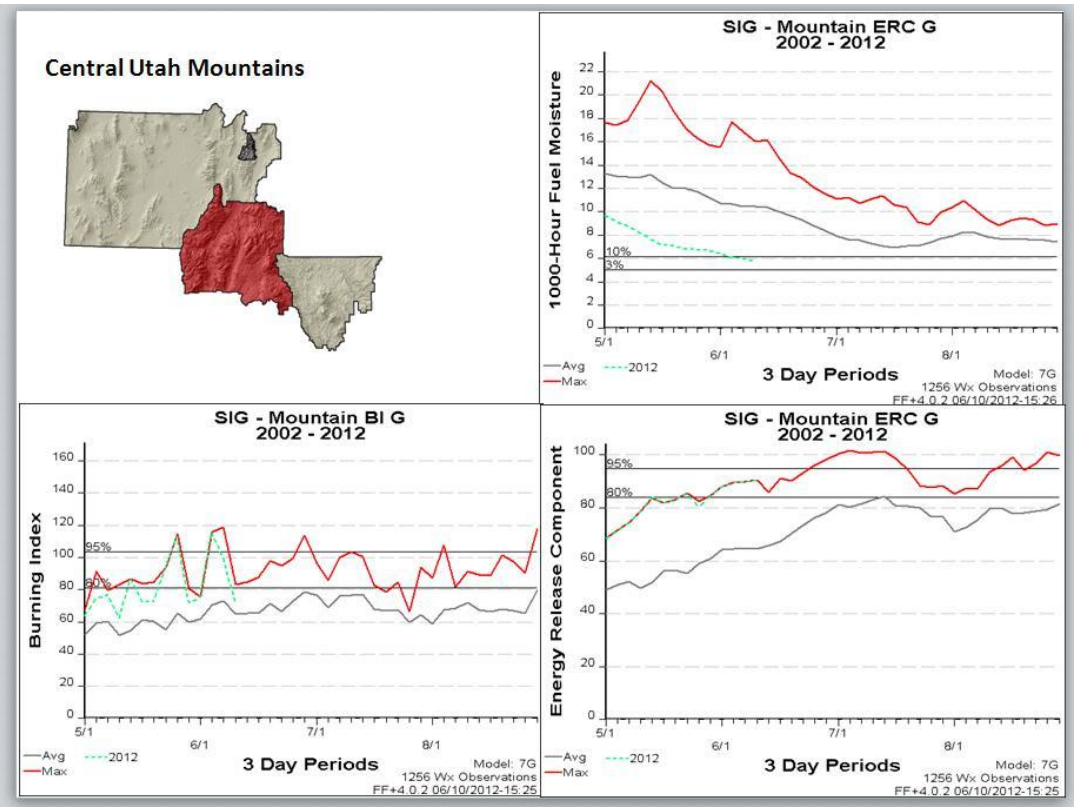
Cedar City Ranger District

Joe Harris
Fuels Assistant Fire Management Officer, Dixie National Forest,
Pine Valley Ranger District

9. APPENDIX

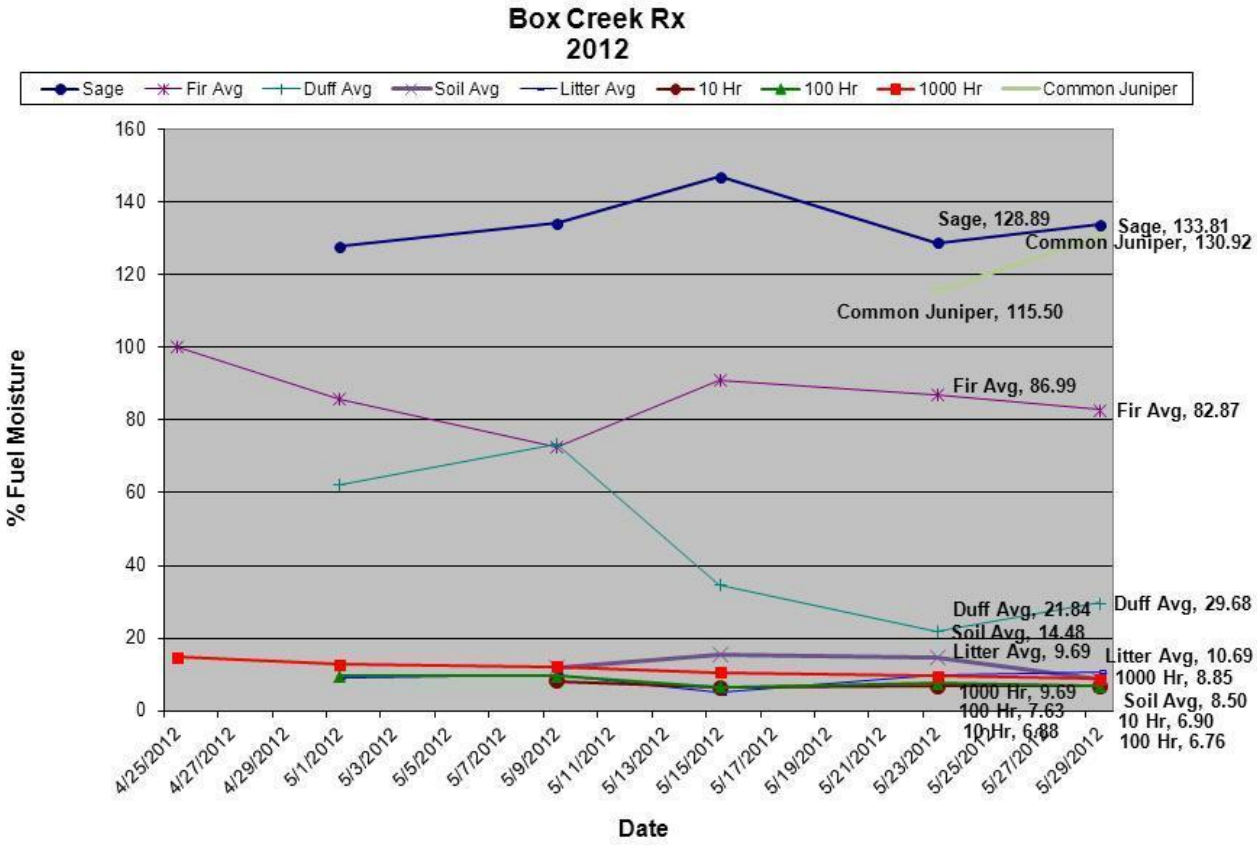
Further Analysis of Seasonal Severity, Weather Events, and On-Site Conditions



The Energy Release Component (ERC) for the Central Utah Mountains Special Interest Group (SIG) was trending toward the 95th percentile in the days preceding the second ignition day. On the day of the escape, the ERC leveled off at around the 93 percentile. Temperature on May 29 at time of ignition (1630) was 64 degrees and climbed to 68 degrees by 1730.

Information from a nearby RAWS (Signal Peak) indicates that the sage brush traditionally reaches its peak moisture in the first couple of weeks in June, and the mixed-conifer (Douglas-Fir) reaches its highest moisture content in the first part of July. The fuel samples collected on the Box Creek project area indicated that peak moisture values for the sage may have occurred mid-May and the mixed-conifer may have hit peak moisture levels in mid-May as well.

The U.S. Drought Monitor showed Moderate Drought for the area. The U.S. Drought Monitor is a broad-scale analysis tool and does not provide site-specific information.


Box Creek Rx
2012
Sage
Fir Avg
Duff Avg
Soil Avg
Litter Avg
10 Hr
100 Hr
1000 Hr
Common Juniper
% Fuel Moisture
Date
Sage, 128.89
Sage, 133.81
Common Juniper, 130.92
Common Juniper, 115.50
Fir Avg, 86.99
Fir Avg, 82.87
Duff Avg, 21.84
Duff Avg, 29.68
Soil Avg, 14.48
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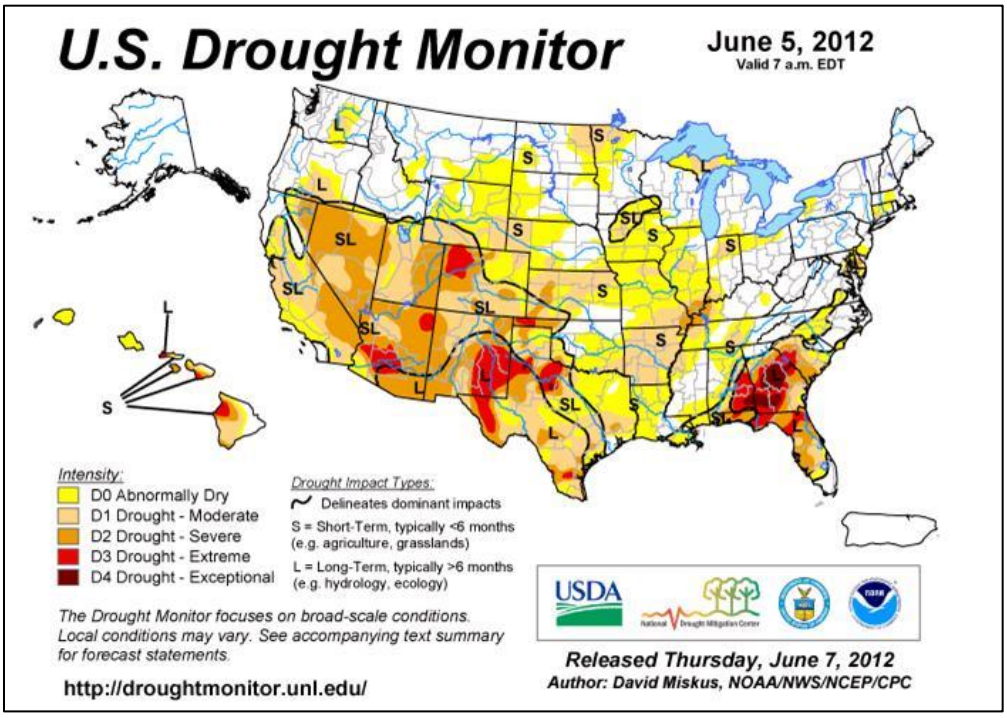
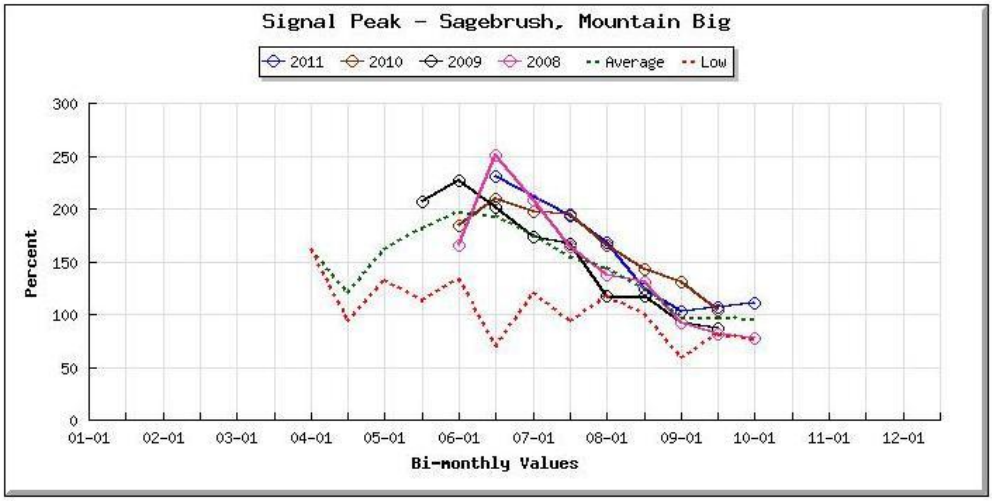
100 Hr, 6.76


U.S. Drought Monitor
June 5, 2012
Valid 7 a.m. EDT
Intensity:
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptional
Drought Impact Types:
Delineates dominant impacts
S = Short-Term, typically <6 months (e.g. agriculture, grasslands)
L = Long-Term, typically >6 months (e.g. hydrology, ecology)
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.
http://droughtmonitor.unl.edu/
USDA
Released Thursday, June 7, 2012
Author: David Miskus, NOAA/NWS/NCEP/CPC

Signal Peak

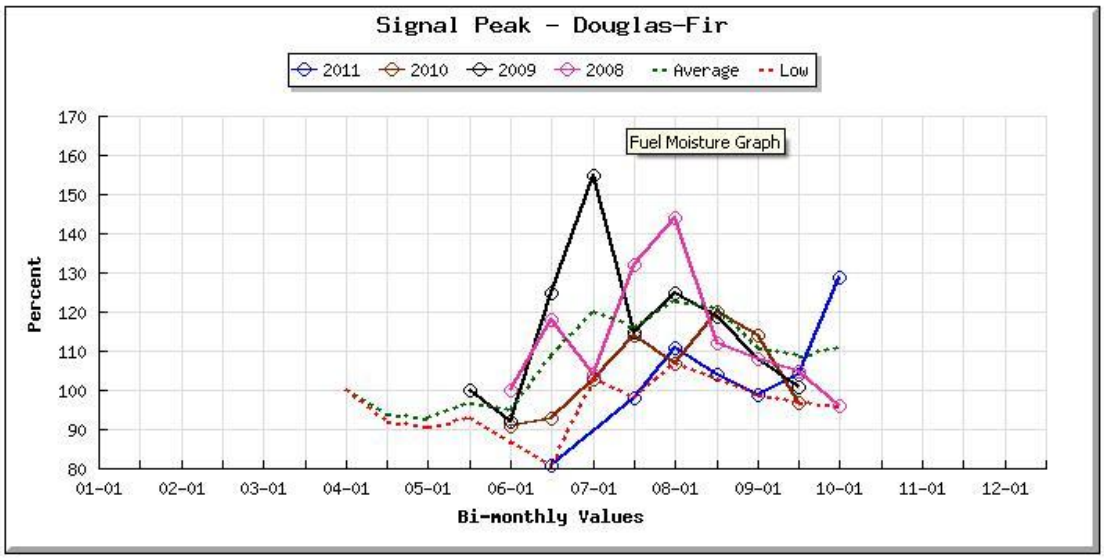
Sagebrush, Mountain Big (Bi-monthly Values)

Site Information | Signal Peak RAWS | Close the Report



Douglas-Fir (Bi-monthly Values)

Site Information | Signal Peak RAWS | Close the Report



TOPOGRAPHY AND ASPECT

The burned area had an elevation range of 8,898 feet to 9,909 feet and burned across all aspects. The aspect with the most burned acres was the east aspect (22 percent of the total burned area). The aspect with the fewest acres burned was the northwest aspect (3 percent of the total burned area).

ADJACENT FUELS

The fuels outside the unit are similar to those found inside the unit. Adjacent fuels consist of sagebrush, aspen, spruce and subalpine fir interspersed with grassy meadows.

ANALYSIS OF ACTIONS TAKEN LEADING UP TO THE WILDFIRE DECLARATION FOR CONSISTENCY WITH THE PRESCRIBED FIRE PLAN.

The burn plan, including the May 1 amendment, was followed to a large degree. The approvals and notifications were in place and utilized. All key personnel were qualified to be in the positions they were assigned. The plan included a sound communications plan and medical emergency plan. The holding plan was implemented as written. The wildfire conversion was done according to plan. And, the smoke management was handled correctly. It was determined that because the forces on scene could not contain the fire before the end of the next burning period, a wildfire was declared. This is consistent with the prescribed burn plan.

Another positive thing to note is the use of trigger points. In the pre-burn briefing, a series of trigger points were put in place. During the escape these trigger points were implemented exactly as identified.

Special mention was made among the District personnel concerning the collaboration and communication that went into planning this prescribed fire. One example: When the Holding Specialist was consulted prior to burning (second ignition) to ensure that all the necessary resources were available to hold this burn, feedback was given and an additional 10-person wildland fire module was ordered as a result of this discussion.

Areas for improvement include placement and timing of the test fire, adherence to monitoring protocols, and adherence to the mitigating factors outlined in the complexity analysis.

Test Fire: The test fire on May 15 was mentioned a few times by implementation personnel in discussions centered on lessons to be learned from this incident. While the events on May 15 did not have any direct effect on the eventual escape on June 4, they are valuable and many of these lessons were applied during test fire operations on May 29. The prescribed fire plan calls for the test fire to be conducted in a representative location and in an area easily controlled. The Firing Boss indicated that more care will be given to finding an area that is easy to control rather than one that is the most representative of the unit. The amendment to the burn plan indicated that a minimum organization

could be utilized to conduct a test fire in an effort to see if the burn was going to meet objectives without the full complement of personnel—provided that most aspects are covered in snow, and that the risk of the prescribed fire moving toward any areas of concern is unlikely.

The test fire, which took less than 20 minutes and less than two torches worth of fuel, resulted in 194 acres being burned—and a serious discussion about declaring a wildfire. Very little snow was said to exist in the test fire area at that time, although north aspects at higher elevations closer to private property still had snow. Conditions changed from the time the amendment was signed on May 1 to the time the first ignition occurred on May 15. Therefore, closer attention should be paid to monitoring when such changes occur that place you outside of planned conditions.

Monitoring Protocols: For the most part, the fuels personnel took great care to collect enough data to ensure they were going to meet objectives with this prescribed fire. The burn plan, however, was very specific in its description of what was expected in terms of monitoring. The burn plan states that fuel samples will be collected 48 hours before scheduled implementation. Fuel samples were actually taken six days before the day of the burn, and once again the day of the burn. A monitoring plan was in effect, specifying that a FEMO would record fire and weather observations on an hourly basis. All observations are to be recorded and included in the documentation. That documentation was in place, but it was incomplete.

Complexity Analysis: The complexity analysis states that the burn will take place late summer or early fall and that residual burning may last for weeks with a low potential for escapes until a season-ending event occurs. The timeframe of the burn should translate to shorter days and a season-ending event occurring soon after the burn is implemented. This timing is listed as a mitigating factor that reduces the risk of potential escape from moderate to low. A failed attempt to implement this burn occurred in the fall of 2011. District personnel then decided to try to hit the spring window in 2012—which would allow for $300,000 worth of fencing supplies and contract money to be utilized during this field season.

ANALYSIS OF PRESCRIBED FIRE PLAN FOR CONSISTENCY WITH POLICY

The burn plan complied with policy and guidance related to prescribed fire planning and implementation.

ANALYSIS OF PRESCRIBED FIRE PRESCRIPTION AND ASSOCIATED ENVIRONMENTAL PARAMETERS

The Box Creek Prescribed Fire area needed to be burned with high intensities. The prescription provided for that (see table below). Most prescription elements fell within the desired conditions while all were within the acceptable prescription range. Sage live fuel moisture is the only exception. It contained a little more moisture than prescribed.

Box Creek prescribed fire burn plan environmental prescriptions and actual conditions during the first and second ignition periods.

	Burn Plan Desired Conditions	First Ignition Observations 5/15/12	Second Ignition Observations 5/29/12
Temperature (°F)	60-85	65	63
Relative Humidity (%)	10-20	15	12
Mid-flame wind speed (mph)	5-10	7-10 Gusts to 15+	5-7 Gusts to 15
Wind direction	Any	SE	W
1-hr fuel moisture (%)	4-8	6	6
10-hr fuel moisture (%)	4-8	6	7
100-hr fuel moisture (%)	6-10	7	7
1,000-hr fuel moisture (%)	8-13	11	9
Live fuel moisture **Sagebrush** **Mixed-conifer**	 70-100 80-100	 147 91	 134 83
Duff moisture	N/A	34	30
Soil moisture	9+	16	9
PIG	62	50	80
Spotting Distance (miles)	0.7	0.6	0.8

APPROVING OFFICER'S QUALIFICATIONS, EXPERIENCE, AND INVOLVEMENT

The two Line Officers involved with the burn:

1) Forest Supervisor – Has an in-depth knowledge of fire management. At one-time in his career, was an RXB1, is certified as "advanced" for wildfire as an Agency Administrator, and has expertise in fire behavior. He was closely involved with the implementation of the burn and approved the burn plan.
2) District Ranger – Has worked primarily in Logistics and Resources in his career, has limited experience with prescribed fire. Has attended PFTC. Is certified at the "working" level for Agency Administrator on wildfires. He was closely involved with the implementation of the burn and was mentored by the Forest Supervisor. He reviewed the burn plan, approved the amendment, and signed the re-validation of the burn plan.

QUALIFICATIONS OF KEY PERSONNEL INVOLVED

Records showed that all key personnel were qualified for the positions they held on the prescribed fire during all phases of implementation.