

Black Ridge Prescribed Fire Review

Escaped Prescribed Fire on the

Burns District BLM

Conducted
September 20, 2005

By
Burns Interagency Fire Zone
Oregon State Office BLM

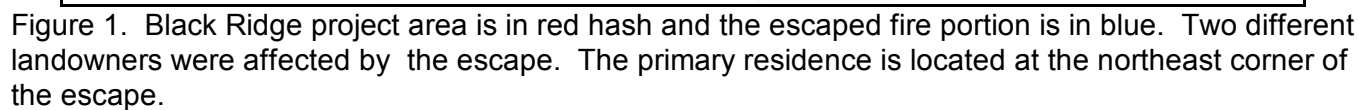
Review Team:

Team Leader: Mike Morcom, Fire Management Officer, BIFZ
Team Member: Louisa Evers, Fire Ecology, SORO

Introduction and Background

The Black Ridge prescribed fire escaped on September 15, 2005, although it was never declared a wildfire (fig.1). Burns Interagency Fire Zone assigned a review team to determine how the burn escaped and how this could be avoided in the future. Since the fire burned onto private lands, the State Office was requested to participate in the review. The review team was briefed on September 20 at the Burns Interagency Communications Center. Review objectives were:

- To prevent future escapes from occurring.
- To establish accountability.
- To determine if the Prescribed Fire Plan was adequate for the project.
- To determine if the prescription, actions and procedures set forth in the Prescribed Fire Plan were followed.
- To determine the level of awareness and understanding of the personnel involved, with regard to procedures and guidance.
- To determine the extent of prescribed fire training and experience levels of personnel involved.
- To determine if overall policy, guidance and procedures relating to prescribed fire operations are adequate.



Summary of events

The Black Ridge prescribed fire was initiated as a single-day project 363 acres in size on federal lands managed by Burns District of the BLM. The purpose of the burn was to reduce annual grasses and forbs and their seeds in preparation for reseeding with perennial grasses and forbs.

All resources arrived at the project site by 1000 and were briefed on the project objectives and individual tasks. The GO-NO GO checklist was completed prior to the test fire at approximately 1045. At approximately 1050 a test fire was initiated in the northeast corner of the burn. Results were favorable, so the Burn Boss decided to proceed with the project. The east line was burned out first to 100-150 feet, completed at about 1145. The east line was extinguished and burnout began on the north line with the northeast corner feathered in about 100-200 feet. As the north line burnout reached the intersection of Beckley Road and Wild Willy Well at approximately 1300, a dust devil traveled across the north line, carrying embers across a disc line approximately 25 feet wide, starting several spot fires at the toe of the slope to the immediate north. Helicopter 3DH with bucket was ordered immediately.

Ignition ceased once the spot fires were detected, with two engines left to secure the prescribed fire. All other resources were committed to attacking the spot fires. By 1315 the slopover reached the top of the ridge with several crew personnel on top attempting to keep the fire from establishing on the ridgetop. The fire kept moving to the east and upslope faster than the crew personnel could keep up. Between 1410 and 1420, the remaining contingency resources were ordered along with Air Attack and a heavy Air Tanker. At about 1420, the fire reached a saddle and established on the ridge. The Burn Boss pulled his resources back to re-anchor the line and begin flanking the fire. The air tanker made a single drop near a house to the east of the escape and was released. By 1530, fire activity began dying down and by 1600 the fire was contained.

Weather and Seasonality

The wet spring resulted in higher than average grass fuel loadings across southeastern Oregon; this higher than average loading was included in the burn plan. The fire season had been about average with Burning Index for grass models tracking within seasonal averages. Energy Release Component for G model tracked below average to average until early August, when it began tracking above seasonal averages. Values remained below the maximum levels and had begun moving closer to seasonal norms at the time of the escape.

The spot weather forecast for September 15th called for a maximum temperature of 77 degrees, minimum relative humidity of 19%, and westerly winds of 3-7 mph at eye level. Normally the peak burning period occurs 1300-1600 at this time of year. On-site observations recorded a maximum temperature of 80 degrees, minimum relative humidity of 20% and west winds 4-8 mph at eye level.

The Burn Boss reported that winds became gusty around 1300. Wind records at Sage Hen, Riddle Mountain, and Bald Mountains RAWS recorded 10-minute average wind speeds within the range forecast but gusts ranging from 15-30 mph, depending on the station. Burns Airport recorded 10-minute average wind speeds in the low teens. At about 1430, the National Weather Service Office in Boise, the office responsible for fire weather forecasting in this part of the zone, called to inform the FMO that gusty winds had not been included in the forecast, but strong gusty winds had been noted on the RAWS in the area.

Actions Taken

Actions taken included immediate cessation of burning once the spots were discovered and all personnel except two engines diverted into suppression actions. The two engines under the direction of a Holding Specialist proceeded to secure the burn area by burning out along the Beckley Road ahead of the main fire, which continued to back and flank through the eastern part of the project area.

The bulk of the personnel on-site worked on hot-spotting in an attempt to contain the fire. The Tatra, which had been designated as the water tender, was able to climb up the ridge to the top to aid in containment efforts there. No other engines could reach the ridge top. When a re-grouping was necessary, the Tatra with a crew of three plus a 5-person squad remained on the ridgetop to contain the fire to the north under the direction of a second Holding Specialist. The Ignition Specialist went to the east to protect a primary residence, outbuilding, and other ranch features such as hay stacks, fences, and power poles using two type 4 engines, three type 6 engines, a tractor with disc, and D5 bulldozer. Air Attack and the air tanker were ordered to help protect the private lands. The three contingency engines did not arrive until after fire activity died down.

The Resource Advisor was on-scene and working with the private landowner at the ranch house for one owner and the ranch manager for the other private parcel affected. The landowner was evacuated for approximately one hour as the fire moved towards the primary residence.

It appears that all actions taken were appropriate. No other actions were identified that would have resulted in a different outcome or smaller fire. Both landowners were appreciative of the efforts taken to suppress the escape and thus far have not questioned the actions taken.

Prescribed Fire Plan Consistency with Policy

The prescribed fire plan was within the requirements set forth in Handbook 9214-1 with four minor exceptions. However, none of these exceptions were causal factors in the escape.

Prescription and Environmental Parameters

The burning prescription and environmental parameters appear to be reasonable for this fuel type. Because the Burn Boss and FMO felt the fuel model used (model 1) did not adequately represent potential spread rates under current grass loadings, the resources assigned to the project were taken from the high end of the prescriptive criteria for fire behavior and weather. The prescription was focused on the herbaceous vegetation as the target and the main carrier of the fire. Shrubs were present, but widely scattered. Fire behavior from the shrubs did not contribute to the escape. Average flame lengths observed were within the desired range. Maximum flame lengths were up to 5 feet, in keeping with the burn plan fire behavior description which noted that flame lengths in excess of 4 feet were possible off shrubs. Observed one-hour fuel moistures were between the low end (8-9%) and desired (3-5%). Probability of ignition and rate-of-spread were not tracked during the burn, although fire within the unit was primarily a backing fire.

At the time of the escape, temperature was in the mid-70s, relative humidity approximately 30%, and eye-level winds were west at 4-7 mph. These burning conditions were between the low and desired end of the environmental parameters. About the time the fire was contained, temperature was 80 degrees, relative humidity 20%, and winds west at 4-8 mph. These burning conditions were between the desired and the high end of the environmental parameters.

Based on the fire behavior during the escape, BEHAVE probably did under-predict the rate-of-spread at the low and desired end of the prescription. Since the high end of the prescription was not reached, it is not possible to determine whether BEHAVE under-predicted that rate-of-spread. Based on the actual versus predicted fire behavior at the low and moderate end, it probably would have under-predicted at the high end.

Agency Administrator

The Burns District Manager is engaged in the prescribed fire program. He requires a briefing prior to approving any burn plans and keeps abreast of factors affecting the fire management program. During this incident, he remained engaged, receiving briefings on his responsibilities during an escape, informing the State Director of the escape, and obtaining post-incident briefings from the Burn Boss, Ignition Specialist, and Resource Advisor. The District Manager is qualified in several dispatching duties, as an agency representative, and as a trainee in MAC group coordination.

Key Personnel

All key personnel were well qualified and appeared to have the necessary experience to successfully complete the tasks assigned. Current qualifications and experience levels in IQCS include:

- Burn Boss – DIVS, ICT3, RXB2, RXI1 with 12 RXB2 assignments and 5 ICT3 assignments
- Ignition Specialist – DIVS, ICT3, OSC2, RXB1, RXI2 with 5 RXI2 assignments and 8 RXB2 assignments
- Ignition Specialist Trainee – ICT4, RXI2-trainee with two training assignments as RXI2 prior to this assignment
- Holding Specialist 1 – DIVS, ICT3, RXB1, RXI2, TFLD with 22 assignments as ICT3 and 2 assignments as TFLD
- Holding Specialist 2 – ICT3, RXI2, TFLD. STEN with 6 TFLD assignments, 5 STEN assignments, and 2 ICT3 assignments

Causal Agents

The primary causal agents were identified as strong gusty winds that contributed to the formation of a dust devil within the project area, but probably in the unburned portion (fig 2). Continuous fuel pathways, not present in recent years, provided a route for fire to reach the ridgetop. Winds at the ridgetop were somewhat higher than forecast. High cheatgrass production outside the unit allowed the fire to move quickly. It would appear that the prescription, environmental parameters, and actions taken by the project personnel did not contribute to the escape. Fire behavior at the time of the escape was rather benign and well within that prescribed as documented in the observations and photos taken shortly before the escape. The Boise Fire Weather Office recognized deficiencies in the spot forecast by monitoring nearby RAWS and calling BICC. The burn plan attempted to deal with the unusually high loadings, but recognized that problems with the fire behavior predictions were still possible. In part, this potential was recognized by staffing the project at the high end of the equipment and personnel for conditions anticipated to be within the desired range.



Figure 2. Dust devil believed to have caused the escape. Photo taken from southeast corner of the project area. Note generally low-level of fire activity away from the dust devil.

Present prescribed fire procedures and tools do not deal well with gusty winds, fire whirls, and dust devils other than recognizing they can occur. Given their highly unpredictable nature, designing features to better deal with these weather elements is very difficult and a national-scale issue.

Conclusions

This escape was primarily due to bad luck. With four minor exceptions, the burn plan meets agency standards and was followed, the key personnel were well qualified for the positions held, and the agency administrator was engaged in the prescribed fire program and this project. Actual burning conditions were within those prescribed, except for the gusty winds; these winds were not included in the spot forecast. Actions taken prior to and during the escape were appropriate.

Room for Improvement

All reviews tend to surface areas that could use some improvement but are not related to the issue at hand. This review was no exception. The four minor deficiencies include:

1. Failure to specifically include a monitoring plan, although monitoring was provided for,
2. Failure to specifically discuss the mitigation measures for protecting fences and power poles in the management summary,

3. Failure to specifically note the procedures for protecting fences and power poles in the holding plan, and
4. The equipment and organization stated that a crew boss was the minimum qualification needed for the Holding Specialist when the resource mix was more than a crew boss should handle.

These deficiencies were discussed with the burn plan preparer and appear to have arisen from “over-familiarity” with standard procedures that were not detailed in the plan, although these procedures were followed. The burning crew included actions to protect fences and power poles during burning operations. The Holding Specialists used were qualified at the Task Force Leader level or higher. Burn plans should be prepared under the assumption that a total stranger to the local area will be implementing the plan.

In addition, although sufficient according to stated procedures, the spot forecast request included only one observation from the site. A better spot forecast may result if either more than one observation from the site is used or if the forecaster is informed on which RAWS best represents the project area. More observations provide the forecaster with a better basis on which to build the spot forecast.

Commendations

The plan recognized that Fuel Model 1 might under-predict rates-of-spread for the current year loadings and the holding resources needed were based on those predictions. Both the Burn Boss and FMO recognized this potential and increased the number of holding resources relative to the expected burning conditions. For future burn planning, the District should begin evaluating and using the 40 new fuel models issued spring 2005 in RMRS-GTR-153. Use of these models may trigger a different resource mix for holding under the low, desired, and high end prescriptions.

The burn plan incorporated the fuel moisture reference charts and correction factors for the time of year the burn was planned. Including these charts facilitates tracking 1-hour fuel moistures.

Once the burn escaped, the Burn Boss, Holding Specialists, and Ignition Specialists were quick to reorganize to attack the slop-over and then re-group when the initial tactics were not effective. Prompt action was taken once the key personnel recognized the fire’s potential to impact the ranch structures and facilities east of the affected ridge. The Burn Boss did not hesitate in ordering needed contingency resources and air resources in order to stop the fire and protect the structures.

Appendix I. List of people interviewed:

Burn Plan Preparer
Burn Boss
Ignition Specialist
Resource Advisor
Holding Specialist
BICC Center Manager
Fire Ecologist

Appendix II. Items in Review File

Copy of Prescribed Fire Plan
Dispatch Logs
Resource List
Spot Weather Forecast for 9/15 and 9/16
RAWS printouts for 9/15 – Sage Hen, Riddle Mountain, Bald Mountain
Burns Airport Observations
Burn Boss Chronology
Test Fire Results
Mop-Up Shift Plan for 9/16
Completed GO-NO GO checklist
Weather/Fuels/Fire Behavior Observations
Maps and Photographs (on CD)