LOWER SHEEP LANDSCAPE ESCAPED PRESCRIBED FIRE REVIEW

December 5, 2011

Umatilla National Forest

Walla Walla Ranger District

Walla Walla, Washington

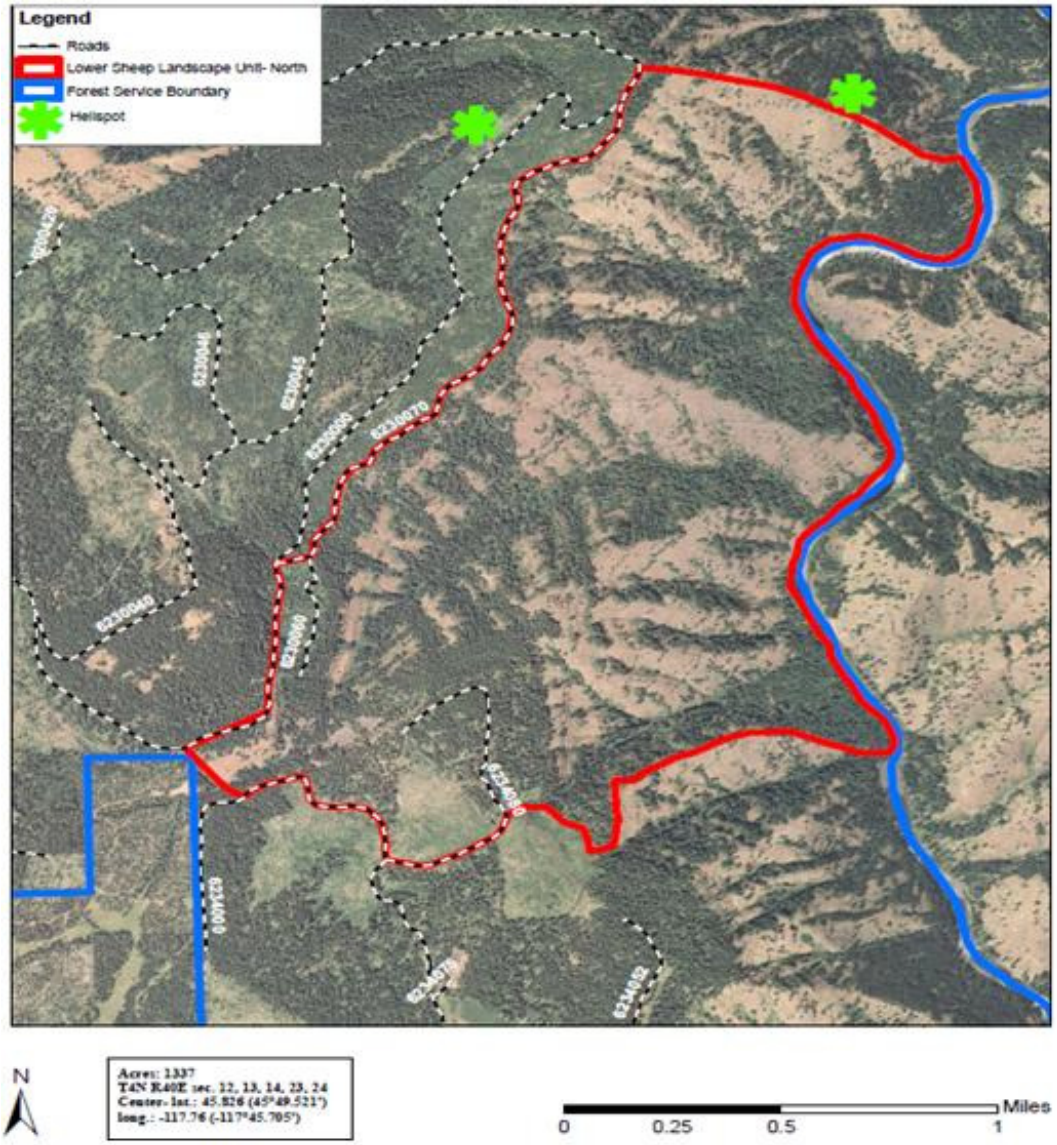
EXECUTIVE SUMMARY

On September 29-30 2011, the Lower Sheep prescribed burn was implemented on the Walla Walla Ranger District (figure 1). Spot fires outside of the northern edge of this burn started in the afternoon of September 30, and while initial efforts to contain these spot fires were successful, subsequent spot fires continued to spread on a steep, forested slope (figure 2). Following policy, a wildfire was declared on the morning of October 3. Eventually, an area of about 100 acres of National Forest land was burned outside of the planned burn block.

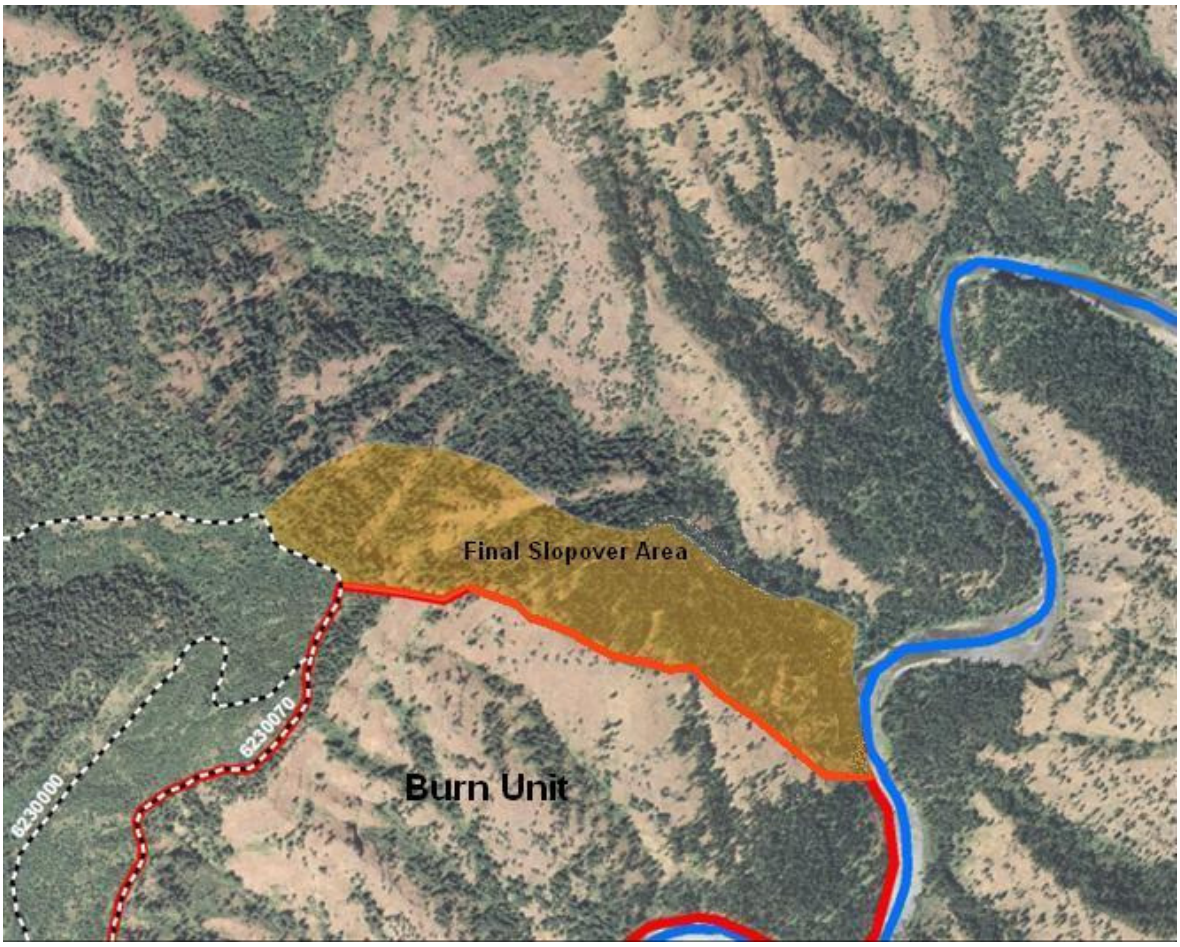
Once the spot fires were discovered, fire suppression efforts were guided by a sound risk assessment process, considering risks to firefighters, natural resource values at risk, proximity of private land, observed and anticipated fire behavior and weather, and likelihood of success. As a result, spot fires detected on October 1 were not contained by the end of the following burn period, requiring the declaration of a wildfire. Rainfall started about 12 hours later, as anticipated, putting an end to the escape.

The northern edge of the planned burn block fell along the northern edge of the NEPA planning area and the area covered by the prescribed burn plan. Therefore, any area burning outside of this block was not cleared for burning, and this area was steep, forested, and not accessible by ground-based equipment (engines or dozers).

The burn plan was developed and implemented following the objectives of the governing environmental assessment. All personnel involved were qualified in the positions they filled.



• **Figure 1** - The Lower Sheep Landscape burn unit.



• **Figure 2** - Close-up of slopover area.

PURPOSE OF REVIEW

The Umatilla National Forest Supervisor convened a team of five people to conduct a review into the key causal factors for this escaped prescribed fire. The Review Team interviewed personnel associated with the implementation of the burn, and reviewed and examined written documentation of events and actions leading up to and immediately following the escape. The purpose of the review is to:

- Determine if the Prescribed Fire Plan was adequate for the project and complied with policy and guidance related to prescribed fire planning and implementation.
- Determine if the prescription, actions, and procedures set forth in the Prescribed Fire Plan were followed.
- Describe and document factual information pertaining to the review.
- Determine if overall policy, guidance, and procedures relating to prescribed fire operations are adequate
- Determine the level of awareness and the understanding of the personnel involved, in regard to procedures and guidance.

BACKGROUND

The Lower Sheep Timber Sale and Fire Reintroduction Project is a vegetation restoration project on the Walla-Walla Ranger District of the Umatilla National Forest, with an analysis documented in an EA and Decision Notice signed in July 2005. The Lower Sheep Landscape Prescribed Fire burn plan was completed by Walla-Walla Ranger District staff, and signed in 2010. This burn plan covered three of the burn units included in the EA, and was rated as a high complexity burn (Level 1) due to the use of aerial ignition, proximity of private land, difficult access, and smoke management concerns.

In the fall of 2010, a portion of Unit 8 was burned in the Grande Ronde River canyon. The burn was successful, generally met objectives, and was conducted without escape or significant injury. However, the burn was the source of a smoke intrusion into the smoke sensitive receptor areas of La Grande and Enterprise, Oregon.

The summer of 2011 was a slow wildfire season across northeastern Oregon, with live fuel moistures remaining unusually high through the season. As mid-September approached, fire managers across the geographic area recognized that the prescribed fire season would soon be upon them. In September 2011, Walla Walla RD staff began preparation for the next phase of the Lower Sheep Rx – completing the northern portion of Unit 8.

Toward the end of September, weather service forecasters were predicting the beginning of a cool and wet pattern near the first of October. The Lower Sheep Rx burn was conducted by aerial and hand lighting on September 28-29, covering about 1400 acres.

During the burn, a number of spot fires were started outside of the burn block to the west and north. The spots to the west were in older plantations, and exhibited minimal fire behavior or threats to values at risk or private lands – therefore, while some spots were contained by hand crews, a number of spots to the west were simply monitored. However as the burn progressed on the second day of ignition, more spot fires began across the northern perimeter of the burn block, onto the north-facing slope above Alder Creek. These spots were of greater concern, due to poor access, steep slopes, heavier fuels, and the potential for a free-burning fire to generate more spot fires across the Grande Ronde River or continue to spread up the Alder Creek drainage to the west.

Ignition was complete after two days, but on subsequent days handcrews continued to find and work the spot fires above Alder Creek Ultimately the crews were unsuccessful in containing these spots due to steep slopes, persistent rollouts, and poor visibility. Following policy, the prescribed fire manager declared the escaped prescribed burn a wildfire on the morning of October 3. Using two helicopters to check fire spread and ground crews for monitoring and for directing bucket drops, fire growth was limited to about 100 acres outside of the burn block by the evening of October 3. Rainfall during the night of October 3-4, and continuing on October 4, effectively put an end to fire spread.

All escaped prescribed fires are to receive a review, focusing on 7 key elements listed in the Interagency Prescribed Fire Planning Guide. The Umatilla National Forest Supervisor is the responsible official for this review, and a 5 person team was assigned this review by the Forest Supervisor in November 2011.

Lower Sheep Landscape Prescribed Fire Timeline

September 29, 2011
0800 - Briefing
1109 - Test Fire
1132 – Begin ignitions
1701 – Stop ignitions, Unit 50% complete. Spots across rim road (to west) are either contained or in plantation and being monitored.
1900 – AAR and Debrief

September 30
0800 – Briefing
1124 – Ignitions resume
1430 – Spots across North flank (lower ¼), contained easily.
1730 – Unit completed

October 1
0900 – Briefing
1130 – Found 2 spots across North flank (lower ¼) above Alder Creek, spots estimated at 1-2 acres
1251 – 4 Hotshots shuttled via helicopter to spots. Then helicopter configures for bucket to work the spots.
1500 – Helicopter and hotshots have marginal success with spot fires, but the spots continue to rollout on steep slopes, lower into drainage towards Alder Creek.
1911 – Operations completed for the day. Spots estimated at 20-40 acres.
1830 – AAR and Debrief

October 2
0900 – Briefing
1130 – Ground resources in place on spot fires. Still estimated at 20-40 acres. Helicopter is not available due to mechanical problems.
1500 – Fire behavior reported to be increasing on the spot fires.
1700 – Ground resources leave spots for the day. Estimated size at 100 acres. Still has not crossed Alder Creek
1800 – AAR and Debrief

October 3
Morning – Time unknown, Lower Sheep declared a wildfire.
0930 – Briefing
1200 – Type 2 Helicopter begins bucket work.
1500 – Spot fire crosses Alder Creek, fire behavior intensifies. Type 1 Helicopter ordered.
1600 – Type 1 Helicopter on scene, released Type 2 Helicopter.
1800 – Operations completed. Spots across Alder Creek secured by Type 1 Helicopter at a small size, fire behavior moderates. Estimated spot size at 100 acres.
2000 – AAR and Debrief

October 4
1000 – Briefing. Consistent rainfall and high Rh. No suppression efforts. No fire growth.

PROCESS

The review team met on November 30 and December 1, 2011 at the Umatilla NF headquarters and reviewed materials relevant to the Lower Sheep Prescribed fire. The Lower Sheep Prescribed Fire Burn Plan, Lower Sheep Timber Sale and Fire Reintroduction Project Environmental Assessment NEPA document, decision logs, and weather records were reviewed to address the seven elements identified under escaped fire reviews in the Interagency Prescribed Fire Planning and Implementation Guide.

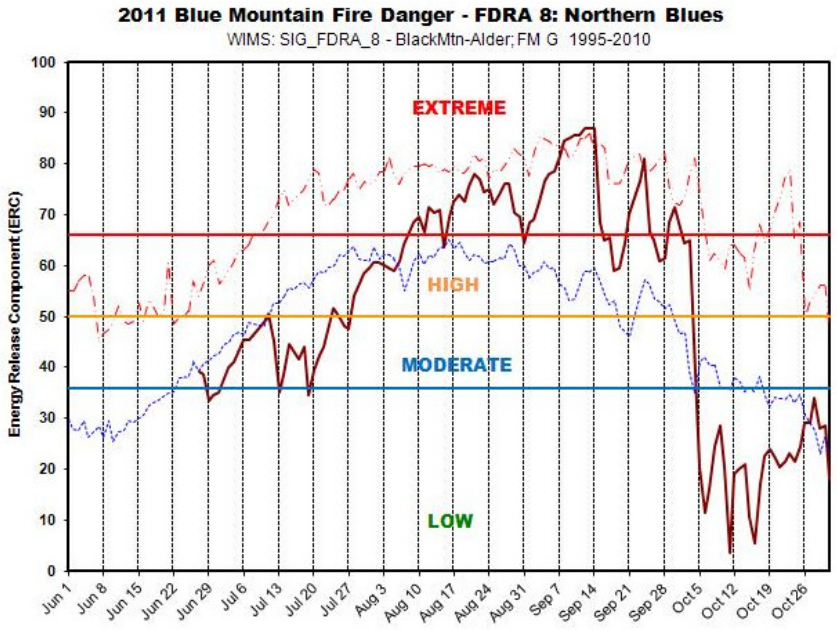
The Burn Boss, Burn Boss Trainee, District Fire Management Officer/Prescribed Fire Manager, and Burn Plan Preparer were interviewed to provide additional clarification. Findings and recommendations were provided to the Umatilla National Forest Supervisor.

Review Team

Chris Johnson	Team Leader	Fuels Program Manager	Umatilla NF
Steve Hawkins	Team Member	Fuels Program Manager	Wallowa-Whitman NF
Roy Walker	Team Member	Fuels Program Manager	Malheur NF
Brian Bishop	Team Member	Fire Management Officer	Prairie City RD, Malheur NF
Bill Aney	Team Member	Regional Fuels Program Manager	State Office/Regional Office

Element 1: Seasonal Severity, Weather, and On-Site Conditions Leading Up to the Wildfire Declaration

Fire season 2011 was a cool to moderate year. The months of June thru mid August remained cool and damp, with high live fuel moistures discouraging wildland fire activity. By mid August conditions began to become more conducive to wildland fire occurrence, with fire danger indices running near to above historical averages. A brief period of drying occurred September 4-12, followed by a cooling trend that resulted in a steep decline in wildland fire activity in the PNW. By September 29 indices were beginning a slight move toward better burning conditions; however, from September 29 through October 3 indices remained below the 90th percentile, considerably declining after October 4. Below is the energy release component graph (figure 3) for the fire danger rating area where the prescribed burn was located. The solid red line is the 2011 ERC, the long-dashed red line is the record ERC and the short-dashed blue line is the average ERC.



• **Figure 3** - Energy Release Component chart for the 2011 fire season in the Northern Blues fire danger rating area.

Element 2: The Actions Taken Leading Up to the Wildfire Declaration, to Determine Consistency with the Prescribed Fire Burn Plan

On October 1, at approximately 1130, two small spots were detected outside the north line in the lower ¼ of the slope backing down into Alder Creek. Four hotshots were shuttled via helicopter to the bottom to take action and coordinate bucket work on the spots. The objective was to check the spread with the buckets and secure the spots as small as possible as an imminent rain event was expected that night.

At 1500, progress was assessed and it was determined that the bucket drops were successful in checking the immediate spread of the spots, however, rollout on the steep slopes continued to establish fire further down toward Alder Creek. At 1700, rollout continued down to within 300 feet of Alder Creek. The spots were then estimated at 20-40 acres. Shading reduced active burning and resources departed at 1800.

On October 2, at 0900 the objectives for the day, as communicated at the briefing, were to keep the north line slopover south of Alder Creek and to check its western spread, continue to assess and monitor without committing people to the bottom of the slope, and utilize buckets to accomplish these objectives. At 1430, the slopover was estimated at 60 acres, but the helicopter was not available due to mechanical issues. During the afternoon, the slopover moved slowly west and actively burned up draws where it was established from rollout. Alder Creek was still holding by 1800 and the slopover was estimated at about 100 acres, as resources departed.

Prior to briefing on October 3, the FMO, Line Officer, Forest Fire Staff and Burn Boss were all involved in discussions regarding the situation with the slopover. By policy, a prescribed fire must be declared a wildfire when the fire has spread outside the project boundary, or it is likely to do so, and cannot be contained by the end of the next burning period. At this point, the slopover had not been contained by the end of the following burn period from its initiation on October 1, and the slopover was outside the project area. Following policy, the decision was quickly made to declare the prescribed fire a wildfire. The burn boss communicated this decision to dispatch and identified himself as the incident commander.

At 0930, resources on the fire were briefed with the objectives to keep the fire on the south side of Alder Creek and to check the western progression of the fire. While ground personnel were used for monitoring, suppression action was taken utilizing helicopters with buckets as visibility allowed. At 1500 a type 2 helicopter detected spots north of Alder Creek. A type 1 helicopter was ordered to assist and the two ships were successful at checking the spots. Around 1700, fire behavior moderated as the canyon shaded in. The two small spots on the north side of Alder Creek were effectively secured for the night and the main fire was still south of Alder Creek. It was determined by the burn boss that the current strategy was viable for 1-2 more shifts, otherwise a contingency plan using another ridge to the north would need to be implemented. Total acreage of the slopover was still about 100 acres.

On October 4 at 1000, fire personnel were on scene and briefed. Consistent rainfall, heavy cloud cover and high humilities had muted fire behavior on all sections of the burn area. No threats were anticipated and no suppression actions were taken. Personnel used the day to map the perimeter, assess burn severity, and address potential future suppression strategies, should they be needed.

In summary, actions taken up to, during and after the declaration of a wildfire were found to be consistent with both policy requirements and the prescribed fire plan.

Element 3: The Prescribed Fire Burn Plan and Consistency with Policy

The following table identifies each element of the prescribed fire burn plan and indicates comments and/or findings as each was evaluated toward consistency with policy and whether this played a role in the escaped fire.

PRESCRIBED FIRE PLAN ELEMENTS:	COMMENTS/FINDINGS	Did this play a role in Escaped Fire?
1. Signature page	Complete.	No
2. GO/NO-GO Checklists	Complete	No
3. Complexity Analysis Summary	Complete.	No
4. Description of the Prescribed Fire Area	Complete.	No
5. Goals and Objectives	Complete	No
6. Funding	Complete	No
7. Prescription	Unit description talks about GR1 and TL3. Prescription talks about GR2 and TL8. Behave runs used GR1, GR2 and TL3.	No
8. Scheduling	Adequate, complete. Check with NEPA on spring vs. fall	No
9. Pre-burn Considerations	Complete.	No
10. Briefing	Complete.	No
11. Organization and Equipment	Unclear on how holding and ignition crew production rates were calculated. Documentation of daily burn organization not found.	No
12. Communication	Complete.	No
13. Public, Personnel Safety and Medical Procedures	Complete.	No
14. Test Fire	Complete.	No
15. Ignition Plan	Complete.	No
16. Holding Plan	Describes areas of concern and mitigation. Complete.	No
17. Contingency Plan	Complete. Not sure how the production rates for the contingency resources are calculated. Found in Holding plan!!! Unknown how calculations of contingency fireline production capability were determined (inputs missing). Unknown if actual contingency resources were based on calculation of hottest/driest case fireline production capability or resources designated in the burn plan section 17. Documentation of daily contingency resources not found any phase of the burn implementation.	No
18. Wildfire Conversion	Complete. Policy is declare “if cannot be mitigated prior to the end of the next burn period”. Should state so in part A.	No
19. Smoke Management and Air Quality	Complete.	No
20. Monitoring	Complete.	No
21. Post-burn Activities	Complete.	No
22. Maps	Found two separate map boundaries for unit.	No
23. Behave Runs	No input values for contain runs, so not sure if based on hottest, driest burn day conditions in #7.	No
24. Dispatch	Burn plan sent to approved BP folder was different than BP file.	

Burn plan consistency with NEPA document

The review team also evaluated the NEPA document that evaluated and disclosed the environmental effects of the prescribed burn, and compared this plan to the prescribed burn plan. The Lower Sheep Landscape Prescribed Fire burn plan is an implementation plan for 3 fuel reduction areas identified in the Lower Sheep Timber Sale and Fire Reintroduction Project Environmental Assessment. The Decision Notice for this project was signed in July 2005 by acting Forest Supervisor Richard Markley.

EA Purpose and Need:

1. Maintain and restore vegetation and forest character reflective of historic fire return intervals and other disturbance processes.

2. Reduce severity of wildland fire near private property and Forest Service administrative sites to allow for more effective protection of those properties.

3. Maintain western larch in stands currently dominated by that species.

4. Reduce stocking levels to make stands more resistant to insect attacks and forest diseases, while maintaining the mixed species composition.

5. Maintain stands that have large tree size classes in a mix of early and late seral species in the overstory.

6. Supply materials and job opportunities to local markets.

7. Amend the Forest Plan specific to this project to apply management direction (objectives, standards and guidelines) related to Canada lynx to guide the conservation of Canada lynx and fulfill our obligations under the Endangered Species Act.

Burn Plan Objectives:

- Reduce the cost, losses, and damage caused by wildland fires by increasing the ease of fire suppression capability around interior private lands including fire fighter and public safety *(tie to EA Purpose and Need statement 2, direct restatement of goal 4 of the selected alternative*)

- Increase stand resilience to low intensity wildfires in infrequent and mixed frequency severity stands *(tie to Purpose and Need statements 1, 5, direct restatement of goal 6 of the selected alternative)*

In summary, the prescribed burn plan had objectives very clearly tied to the goals and the purpose and need statements from the environmental assessment. The project, as implemented, generally met the intent and purposes of the NEPA document (however, see comments about NEPA in the recommendations section of this review document).

Element 4: Prescribed Fire Prescription and Consistency with On-Site Measured Prescription Parameters

The review team found that ignition phases were consistent with the prescribed fire prescription factors for the day of September 29 with forecasted weather and on site weather observations within

prescribed parameters. Spot weather forecasts were requested on a daily basis and on-site weather observations for September 29 and 30 are in the post-burn documentation, though no on-site observations after September 30 were located.

The Lower Sheep Landscape prescribed burn plan identified the following prescription parameters for a fall burn:

Dead Fuel Moisture	5-12%
Live Fuel Moisture	30-150%
Duff Moisture	13
Soil Moisture	Damp
Relative Humidity	15-60%
Temperature	0-80
Mid-Flame Wind Sp.	0-6mph

The spot forecasts and on-site observations were very close on all parameters. The spot weather forecast received on September 29 at 0835 predicted weather for the first two days of the burn. On September 29, weather conditions were predicted to be within prescription. For September 30, the second day of the burn, the predicted maximum temperature was higher than the prescription (forecast high temperatures of 85-90 degrees) The plan was to have ignition complete by 1600 on September 30. Weather forecasted for the following days was within prescribed parameters. Weather observations were taken on a west-facing slope, on a site that would record observations higher than those occurring on the majority of the unit.

On the afternoon of September 30 the dry bulb temperature high was 88. After a review of historical weather data from Eden RAWS the high temperature of September 30 was the highest recorded in the last 25 years of records for that date. The historical mean high for that period is 71.9 degrees. Although other indices/weather observations were close to records, none reached historic highs.

Weather observations taken from 1330 to 1630 on September 30 ranged from 83 to 88 degrees, the hottest and driest day of the project. A minimum RH of 16% and fine fuel moisture of 7% were within prescription parameters and the probability of ignition (PI) on a shaded north slope was 55-60%. This PI is not a level that would normally cause concern from managers of either prescribed fires or wildfires, however it was adequate to support the initiation and growth of spot fires on the steep north facing slope above Alder Creek, outside of the burn block. Once fire was established on this slope a high level of resistance to control would exist, due to rolling material on steep slopes. Ignition was completed at 1730.

Prescription factors are used to predict fire behavior measured in flame length. Observed fire behavior and a follow-up evaluation of fire effects for the burn were within the desired range and as such the prescription parameters were not a direct causal factor of the escape.

Element 5: Approving Line Officer's Qualifications, Experience, and Involvement

The approving line officer has a current delegation by the Forest Supervisor to approve prescribed fire plans with no restrictions. Additionally, the approving line officer has completed the required courses and meets the definition of Working line officer certification (management of low and moderate complexity wildfires; Type 3-5).

Element 6: Qualifications and Experience of Other Key Personnel

All key personnel involved in the preparation, review, management and implementation of this prescribed burning project meet IQCS qualifications pertaining to this project.

Element 7: Key Causal Factors

The primary causal factor was the prescribed burn that generated spot fires in an area that could not be effectively and safely contained with the resources on hand (hand crews and helicopters). Decisions about if and how to work to contain these spot fires were made using a risk assessment process, considering threats that the fire created to values at risk, the risks to firefighters, and likelihood of success. As a result, the fire outside of the planned burn block continued to spread for more than one burn period following escape, requiring (by policy) the declaration of an escape.

The risk and consequences of spot fires across this north line were discussed and well understood by burn personnel prior to and during the project. Risk could have been reduced by burning under cooler burning conditions, but the prescription was written to achieve desired objectives.

Cooler and wetter conditions in spring burning could have reduced the likelihood of spotting on this north-facing slope, and the burn plan did have a spring prescription, however, the overlying NEPA document only addressed fall burning.

CONCLUSIONS

1) The Lower Sheep Prescribed Burn of 2011 was accomplished in a safe and effective manner, meeting objectives established in the NEPA document and burn plan. The project was planned and implemented by trained and qualified personnel, and the project was adequately staffed at all phases. The project shows good oversight by the prescribed fire burn boss, the prescribed fire manager, the line officer, and Forest and District staff.

2) Burn crews and overhead all recognized the risk of spotting onto the north face above Alder Creek, and also recognized the difficulty of containing any spots that became established in this drainage. Fire was not wanted on this slope during this project, primarily because this area was not evaluated in any signed NEPA document or burn plan.

3) Once spot fires became established on this slope above Alder Creek, the strategic and tactical decisions about how to manage these spot fires were based on a sound risk assessment process, considering values at risk, risks to fire fighters, current and anticipated fire behavior and weather, and likelihood of success. As a result, the spot fires were not contained by the end of the following burn period, requiring (by policy) the declaration of an escape.

4) The northern edge of the planned burn block was also the northern edge of any burns planned with a prescribed fire plan and NEPA documentation. This left no room for the fire to spread once it crossed the planned burn boundary. To a certain extent, this was the result of rough terrain and limited access, with no opportunities to “pull back” from the planned unit boundary to create a buffer. However, if the adjacent area to the north had been “cleared” for burning (with a NEPA document and burn plan), the escape declaration would have not been necessary.

RECOMMENDATIONS / OBSERVATIONS / LESSONS LEARNED

This section generally lists items identified during the review process that could improve future plans and may or may not have contributed to the escape fire.
The Burn Plan is developed for both spring and fall burning, but the NEPA document (and fuels specialist reports) only includes fall burning. This project was carried out in the fall, so in this respect the project is consistent with NEPA, but a spring burn would not be.

The Burn Plan has two different maps for Area 8 – one identical to the area identified in the EA, and the other somewhat larger than the EA unit (expanded on the SW by several hundred acres), presumably to make a more logical burn block. Most of this additional area was burned with the 2011 project, but this burning did not contribute to the escape. In NEPA, areas planned for burning should be logical burn blocks. Additionally, prescribed burn plans should follow area boundaries planned in NEPA.

The Description of Alternatives includes a detailed description of aerial ignition – equipment used, number of ignitions points per acre, etc. This level of detail, read literally, constrains the project unnecessarily. NEPA documentation should focus on activities and outcomes, not tactics or tools.

In the burn plan, the prescription window includes a set of environmental parameters that are not needed. Flame lengths are the fire behavior output modeled and monitored by the Burn Boss to adjust operations, and the review team recommends the use of fine fuel moistures and wind speed to prescribe acceptable flame lengths. Temperature and RH are factors of fine fuel moisture but would not be limiting factors in the prescription window.

This review has already highlighted a number of good decisions that were made by burn crews, overhead, district and forest staff and line officers. In addition to these good choices, the review team would like to highlight the following:

1) Staffing - The prescribed fire project and subsequent escaped fire were staffed appropriately at all stages. Additional resources were on scene on the second day of burning (second T1 crew and T2 Helicopter with bucket) and for holding in subsequent shifts, based on anticipated weather and observed fire behavior.

2) Appropriate response - The instinct for prescribed burners is to aggressively contain all spot fires that start outside of the burn block. Early in the project, spot fires started in plantations west of the burn block, and fire managers assessed the spots. Given burning conditions, fire behavior, and upcoming weather, they made a deliberate and informed choice that the appropriate response was to monitor these spots without taking immediate direct action. Similarly, spot fires that started north of the project, above Alder Creek, were more aggressively attacked, as this area posed greater risk of spread and potential risk to other lands.

3) Declaration of escape – fire managers followed policy and the prescribed fire plan when they declared an escape. Follow-up actions were measured and appropriate, given considerations for firefighter safety, forecasted weather, observed fire behavior, and an assessment of the values at risk.

4) Risk Assessment - Once the fire crossed onto the north facing slope on Alder Creek, crews worked to contain spots, and were successful at first. Later, with rollouts and limited visibility, fire managers made the choice to NOT continue to commit ground crews in the bottom of the drainage, but had clear objectives to keep fire south of Alder Creek. Fire managers made deliberate choices about the limited use of helicopters to check fire spread, considering that the use of ground and air resources each had an associated risk.