

**Soap Springs Rx Burn
I&E Review Report
5/8/2016**

Background:

The Ashland Post [Stag and Tobin] Fire Environmental Impact Statement ROD was signed in December 2000. The Purpose and Need of the project was to: “move toward Forest Plan desired conditions of maintaining functioning ecosystems by managing woody debris retention and placement, in order to: minimize the potential for public safety hazards along Forest system roads, maintain soil productivity, minimize accelerated soil erosion, minimize structural or erosion damage to heritage sites, minimize spread of noxious weeds, reduce the difficulty in meeting fire control objectives, and reduce the difficulty of fire suppression within the treatment areas.” (ROD, Pg. 5)

A combination of activities, including timber harvest, pile burning, and directional falling were prescribed to meet these objectives. The majority of these activities were not implemented. In 2013, an 18.1 Review was undertaken by the Ashland District to in effort to move forward with management within the project area using prescribed burning as an alternative to timber harvest for achieving desired future condition.

The Soap Springs Prescribed Burn was conducted in Spring 2015 as one of multiple activities scheduled to occur under the Post-Fire EIS 18.1. An Implementation and Effectiveness Review was requested from the Ashland District following burn implementation.

I&E Review Questions/Outline/Objectives:

1. Did burn objectives tier directly to applicable NEPA document(s)?
2. Were design criteria/mitigations from NEPA document(s) carried forward to the Burn Plan?
3. Were burn objectives met?
4. Were detrimental/negative/undesired resource impacts avoided as a result of design criteria/mitigation implementation? If not, what changes need to be made to ensure that such impacts do not occur under future prescribed burn implementation?
5. The Stag Fire 18.1 was written to utilize an alternative to timber harvest for achieving Desired Future Condition (prescribed burning). Did project work move the landscape towards Desired Future Condition or vice versa? How so?
6. As a result of the stand-replacing burn conditions that occurred across the Ash Creek and Taylor Creek fires, approximately 100,000 acres of fuels management will be required in upcoming years. Addressing this issue prompts multiple questions:
 - a. What data is required for each specialist in order to complete effects analysis within these burned areas?
 - b. What monitoring needs to be completed in order for further environmental review and implementation to be completed?

- i. How can recent prescribed burning and wildfire activity across areas with down heavy fuels be used to inform future management?
 - c. How would mitigation of resource effects affect the ability to achieve landscape-wide fuels management objectives?
7. Other lessons learned/AAR

Evaluation Items:

Project Objectives and Mitigation Measures were evaluated in terms of implementation and effectiveness using a modified form of the Forestry Best Management Practice (BMP) review protocol developed by the Montana DNRC. The application and effectiveness rating system consisted of the following scoring system:

Application	4 points. Operation meets requirements of objective or measure
	3 points. Minor departure from objective or measure, requirements mostly met
	2 points. Major departure from objective or measure, requirements marginally/barely met
	1 point. Gross neglect of objective or measure, requirements not met at all

Effectiveness	4 points. <u>Objective:</u> Completely met <u>Mitigation Measure:</u> Adequate Protection of resources, effective
	3 points: <u>Objective:</u> Substantially met <u>Mitigation Measure:</u> Minor & temporary impacts on resources, moderately effective
	2 points: <u>Objective:</u> Partially or minimally met <u>Mitigation Measure:</u> Major & temporary or minor & prolonged impacts on resources, slightly effective
	1 point: <u>Objective:</u> Not met at all <u>Mitigation Measure:</u> Major and prolonged impacts on resources, not effective

Evaluation Item	Source	Applic	Effect	Comments
<u>Burn Plan objectives</u>				
Reduce roughly 1/3 of the coarse woody debris in the units with prescribed fire	Stag Rx Burn Plan, Pg. 7: Resource Objectives	4	4	Likely greater than 1/3 of the coarse woody debris was consumed. Coarse wood transects have yet to be completed; total consumption has yet to be determined.

- Provide for firefighter and public safety - Lower fuel loading while maintaining coarse woody debris - Keep fire within treatment area - Immediately control any fire outside the project boundary - Protect private lands and structures located adjacent to the project area - Manage burning with an emphasis on safety and cost effectiveness	Stag Rx Burn Plan, Pg. 7: Prescribed Fire Objectives			Smoke, heat, and dust effects on firefighters were in excess of what was anticipated. Future burns need to mitigate these effects. This was in part a result of inability to line the burn through an approximately 20 acre area due to heritage concerns that in reality may have only encompassed 1-2 acres of the designated 20 acre protection zone. The fire did escape the designated burn unit perimeter but was promptly controlled within the project area.
<u>Burn plan resource mitigations</u>				
Smoke approval required from MT DEQ prior to ignition	Stag Rx Burn Plan, Pg. 7: Identify Constraints	4	4	
Grazing rotation or scheduling may affect ignition time frames. Grazing deferment will be determined by Range Specialists on a case-by-case basis dependent on plant re-growth and in accordance with the Custer N.F. Management Plan.	Stag Rx Burn Plan, Pg. 7: Identify Constraints	4 for Brian Creek, 2 for Red Rock	TBD	Grazing deferment was planned for the Hagen pasture following burning; cows were to be turned out in the Coal Bank pasture. Following the burn, the district experienced a droughty spring. At the designated turnout date, there was no water within the

				pasture. As such, it was decided that cows would be turned out in the Hagen pasture following the burn.
Existing creeks, trails and roads (both system and decommissioned) will be utilized for control lines when possible.	Stag Rx Burn Plan, Pg. 12: Line Construction Needs	4	4	An existing pipeline was utilized. One of the goals of implementation was to minimize impacts within the Hiking and Riding Area. Lines were disced after implementation to augment recovery.
Decommissioned roads shall be closed after implementation in accordance with the district travel plan	Stag Rx Burn Plan, Pg-12: Line Construction Needs	N/A		
Newly constructed control lines shall be rehabbed after implementation following guidelines described in Element 21.	Stag Rx Burn Plan, Pg-12: Line Construction Needs	4	TBD	Existing line was reused where possible and rehabilitated post-implementation. Past experience has shown this to be effective. One of the lines going down a hill was a preexisting cow path.
Wooden fence posts and improvements may be cleared of flammable materials to reduce damage to infrastructure.	Stag Rx Burn Plan, Pg-12: Line Construction Needs	4	3	Major part of prep work involved going back to the site after the fact to check fences. Some posts were burned, which district personnel wanted to avoid.
A Project Implementation (PIF) will be submitted to the forest archaeology staff for review. Prior to any implementation actions a "Notice to Proceed" shall be received and included in	Stag Rx Burn Plan, Pg. 12: Additional Pre-Burn Notes	4	4	Ted was out on the ground with Mike during evaluation, submitted a PIF. Mitigations were implemented where appropriate. District personnel noted that

the project file. If notified that cultural sites are present within project areas, appropriate mitigation measures shall be implemented to ensure safety of the site.				there was a lot of lag time between PIF submittal and eventual feedback from Heritage. The area of avoidance outlined on the map was 20 acres while only approximately 2 acres of cultural sites were found on the ground. If less than 20 acres had been permitted, more fireline could have been dug. As a result of requiring extra personnel on that part of the fire, a safety hazard from smoke was incurred during implementation.
Prior to ignition fuel loadings will be visually monitored to ensure fine dead loadings are within prescription. Ponderosa pine live and dead fuel moistures may be collected at various times to ensure objectives will be met in fuel consumption	Stag Rx Burn Plan, Pg. 25: Monitoring	4	4	From a fuels standpoint- 4. See soils discussion below.
Following ignition the Burn Boss, Firing Boss, and Holding Specialist will monitor first order fire effects as they relate to the desired objectives and will have discussion regarding the achievement of objectives. This data shall be documented in the burn summary.	Stag Rx Burn Plan, Pg. 25: Monitoring (Overlap with Fuels Monitoring, Element #21)	4	4	First order fire effects include char height, needle scorch, down woody debris, and percent bare soil. From a fuels perspective, effectiveness was a 4. See soils discussion below.

Atmospheric conditions will be analyzed prior to ignition to determine the appropriate smoke management window. During the burn, smoke will be monitored on site and in any sensitive areas (roads, private property, residences, etc.)	Stag Rx Burn Plan, Pg. 25: Monitoring	4	4	Done by state. State has monitor in Birney.
All control lines constructed for the implementation of the Rx burn shall be rehabbed to the following specifications:....	Stag Rx Burn Plan, Pg. 27: Rehab	4	TBD	No time available to evaluate efficacy of control line rehab. SOPs were used for rehabilitation that has been conducted successfully in the past.
Noxious weeds		4	4	Avoided known infestations. Not hand lit, generally discussed during briefing.
<u>Post-fire EIS 18.1 mitigations</u>				
Further, there is a need to re-visit specific sites, and generally the project area, to determine if new sites have been exposed. Therefore, before any soil disturbance management activity continues, surveys or assessments will continue to be completed so the area can be considered under the Region 1 Heritage	Post Fire EIS 18.1, Pg. 9	1	TBD	

Programmatic Agreement. It further will be guided by Mitigation Measures, as shown in Appendix B-1, as shown in the EIS.				
Therefore there is a need to keep noxious weed control, or containment, as a high priority while continuing other management activity. This will still occur with some guidance from the Post-Fire EIS, but will also be guided by more current guidance from current BMPs and The Custer National Forest Field Guide (2007) for noxious weeds. Mitigation may eliminate some management activity in specific areas, or create a larger need for mitigation. It will be addressed at the time of implementation.	Post Fire EIS 18.1, Pg. 11.	3	TBD	Avoided known infestations. While generally discussed, trucks were not washed prior to burning. Specific mitigations were not discussed during briefing.

Discussion of soils effects:

One of the primary concerns following project implementation was extent and magnitude of burn severity. Prior to and following interdisciplinary review of fire effects, soils effects were independently evaluated. During field evaluation in July 2015, north aspects were noted as having greater ground cover in many locations than south facing aspects despite having greater post-fire (as well as assumed greater pre-fire) fuel loading.

Burn severity was evaluated using standard techniques outlined in Parsons et al. (2010). Burn severity was strongly linked with downed fuel length and diameter. On south aspects, wider swaths of high/moderate tending towards high severity burning were noted than on north aspects (Figure 1). This same burn severity was generally observed only directly underneath downed logs on north aspects.



Figure 1. Example of affected soil extent adjacent to down log burned on a south-tending aspect within the burn perimeter.

Since fuel models include only tons per acre for 1, 10, 1,000, and 10,000 hour fuels, number of 1,000 hour logs had to be back-calculated using a variety of assumptions. Those assumptions were:

- 1,000 hour fuel logs were approximately 40' in length
- Tonnages per acre were based on fuel model specs provided in the burn plan
 - Fuel Model TL7, 22.34 tons/ac total, per Soap Springs Rx Burn Plan
 - Assumed to comprise approximately 30% of unit area
- Only consumption of 1,000 hour fuels created high to moderate burn severities
- Log weights were adjusted linearly to 10% moisture content
- Assumed 2000 acres in burn unit (actual area burned was somewhat higher as a result of slopover during implementation)

Log weights were based on Woodweb.com estimates for ponderosa pine (per discussion with D. Grimes, CGNF Beartooth RD Fuels Planner, April 2015). Square footages on north and south aspects were based on observed patterns in the field.

Total acreage burned under moderate to high severity was calculated as percentage of total treated area as well as total area assumed to be within Fuel Model TL7- 30% of project area. As percentage of total treated area, total area burned under moderate to high severity was approximately 4.5%. When calculated as a percentage of total area in Fuel Model TL7, total percent area affected was approximately 15%. cursory sensitivity analyses suggested that these values may vary by approximately +/- 2% if using differing log sizes and lengths for calculations.

Region 1 guidelines state that detrimental soil disturbance should be limited to 15% or less of the activity area, not including system roads. Per FSM 2500-99-1, detrimental soil disturbance (DSD) as it relates to fire is as follows:

Severely-burned Soil. Physical and biological changes to soil resulting from high-intensity burns of long duration are detrimental. This standard is used when evaluating prescribed fire. Guidelines for assessing burn intensity are contained in the Burned-Area Emergency Rehabilitation Handbook (FSH 2509.13).

Area deemed to be in the timbered fuel model is the most appropriate for which to be evaluating detrimental soil disturbance because those burn conditions where detrimental soil disturbance was observed only persisted in areas with down 1,000 hour fuels. Through a combination of field reconnaissance and post-evaluation analysis, these data suggest that the Soap Springs burn was near the threshold for Region 1 soil quality guidelines within that area characterized as Fuel Model TL7.

Review discussion/conclusions:

Table 1. Summary of Application and Effectiveness ratings for the Soap Springs Rx Burn.

	Total possible Applied	Total fully Applied (4 rating)	Total fully Effective (4 rating)	Total TBD Effective	Percent possible applied that were fully effective
Burn Plan Objectives	1	1	1		100
Burn Plan Mitigations	10	9	5	2	50
Stag Fire 18.1 Mitigations	2	0	0	2	0
TOTAL	13	10	6	4	46

While some design criteria were deemed to have been fully applied and effective at achieving desired goals/outcomes, less than 50% of the total that were applied were fully effective. Worth noting is that many of the objectives and goals tiered directly to fuels objectives because multiple resource areas were not included in the NEPA process. It is unknown as to whether some of the unforeseen project outcomes could have been avoided with further analysis/assessment by specialists.

Fuels objectives were not achieved during the Hagen Dam Rx Burn, where fuel moistures were much higher. From observations of the Soap Springs Burn, low fuel moistures resulted in unanticipated resource impacts. The results of this review will help establish optimal fuel moistures for future prescribed burns.

With respect to the evaluation framework questions, summarized answers are as follows:

- 1. Did burn objectives tier directly to applicable NEPA document(s)?**
 - a. The Resource Objectives section of the Stag Rx Burn Plan directly quoted the 18.1 Review. The 18.1 Review was written under the premise that the purpose of and need for the project could be achieved using alternative tools to timber harvest. Prescribed burning was not analyzed within the Stag Fire EIS.
- 2. Were design criteria/mitigations from NEPA document(s) carried forward to the Burn Plan?**
 - a. Yes. As noted above, however, the Post-Fire EIS did not include prescribed burning as a part of the proposed action. Several resource areas which may have required mitigations were not consulted during the drafting of the 18.1 and had no representation within the burn plan.
- 3. Were burn objectives met?**
 - a. Burn objectives were deemed to be met in full from a fuels management standpoint. With no supporting NEPA analyses, there were no further burn objectives to evaluate under this review.
- 4. Were detrimental/negative/undesired resource impacts avoided as a result of design criteria/mitigation implementation? If not, what changes need to be made to ensure that such impacts do not occur under future prescribed burn implementation?**
 - a. It is unknown whether soil and riparian area/water resource impacts would have been avoided through inclusion of resource-specific design criteria. Given the site-specific nature of NEPA analyses, however, impacts encountered during project implementation would likely have been identified. By extension, it is also likely that efforts would have been made to mitigate those effects through recommendation of mitigations and design criteria. Future projects should include a full suite of resource specialists to address the range of applicable resource concerns via analysis at the appropriate scale, scope, and complexity commensurate with the project at hand. Inclusion of applicable design criteria and mitigations into the burn plan would further help achieve the desired result.

5. **The Stag Fire 18.1 was written to utilize an alternative to timber harvest for achieving Desired Future Condition (prescribed burning). Did project work move the landscape towards Desired Future Condition or vice versa? How so?**
- a. Per the 18.1 Review- the Post Fire EIS stated that “management was to work toward Forest Plan desired conditions of **functioning ecosystems by managing woody debris retention and placement** (page 5, ROD) after the fires.” From a fuels management perspective, project work did move the landscape towards DFC. When evaluated holistically from a multi-resource standpoint as was done during the review, the narrow focus on management of woody debris retention and placement does not necessarily equate to functioning ecosystems. This was exemplified by detrimental soil disturbance extent being near the upper end R1 soil quality guideline threshold within the project area.
6. **As a result of the stand-replacing burn conditions that occurred across the Ash Creek and Taylor Creek fires, approximately 100,000 acres of fuels management will be required in upcoming years. Addressing this issue prompts multiple questions:**
- a. **What data is required for each specialist in order to complete effects analysis within these burned areas?**
 - i. This was not covered in detail during the IDT review, but general discussions between disciplines represented at the review did provide some context as to what was needed for broader analysis across the project area. One item of note was the need for better understanding of fuel dynamics in dead stands- more specifically, what range(s) of fuel accumulations is/are expected as time progresses post-burn, what does that translate to from a burn probability and severity perspective, and what are the subsequent resource implications of those events?
 - b. **What monitoring needs to be completed in order for further environmental review and implementation to be completed?**
 - i. **How can recent prescribed burning and wildfire activity across areas with down heavy fuels be used to inform future management?**
 - 1. This evaluation is an example in itself of how recent prescribed burning and wildfire activity can be used to inform future management. Taking an interdisciplinary look at areas with downed heavy fuels in a pre-fire and post-fire setting (ex. Schiller and Kraft Springs/Brewer Fire areas) will help inform future management activities. Some of this work has now been undertaken as a part of the Phoenix Salvage and North Whitetail projects.
 - c. **How would mitigation of resource effects affect the ability to achieve landscape-wide fuels management objectives?**
 - i. During the field tour portion of the review, there was some discussion of design criteria/mitigations that could have been implemented to avoid having the extent of soil and water resource effects that occurred during project implementation. The following design criteria were drafted and vetted with

district personnel for inclusion into future prescribed burn projects. These were intended to help meet fuels management goals while minimizing negative soil and hydrologic impacts associated with implementation:

1. Do not actively light or burn riparian areas within proposed burn units unless analysis/review has been conducted in advance of implementation with pertinent resource specialists. Where fire moves into riparian areas that fall within burn units, take steps to avoid complete consumption of riparian vegetation. Riparian areas, for the purposes of this design criteria, can be defined as those locations where perennial flow can be observed through the majority of the reach length within and adjacent to burn unit boundaries.
2. Emphasize the importance of implementation of MIST tactics for any suppression activities that may be required within riparian areas (such as in instances of spotting or slopover).
3. Where feasible and practicable, in watersheds greater than 130 acres in size, lay out prescribed fire unit boundaries such that less than 30% of watershed area falls in fuel models with substantial amounts of downed 1,000 hour fuels (for example, TL7 or other similar models). This design criteria would not be applicable to watershed locations where rangeland vegetation predominates (ex. grass fuel models)
4. Whenever possible, conduct burn operations while 1,000 hour fuel moistures fall at the upper end of ranges deemed appropriate for achieving desired consumption during burning.