2016 Custer Gallatin National Forest East Zone Fuels Management Implementation and Effectiveness Review

Background:

Fuels management is an ongoing concern in the (commonly) high frequency, low severity fire regimes found in the high plains ponderosa pine stands of southeast Montana and northwest South Dakota. A variety of tools have been used in recent years to address excess fuel loads, including prescribed burning, timber and salvage harvest, and mastication. In effort to evaluate the success of these varying methods across the two East Zone districts, a consolidated I&E review was conducted between the Ashland and Sioux Districts in October 2016. The intent was to create an opportunity to share successes and failures for both districts to learn from and apply in future planning and implementation of fuels management activities.

Two project areas were reviewed: the Lost Farm mastication, prescribed burning, and roadside salvage in the Long Pines unit of the Sioux District, and the Phoenix Salvage timber sale in the Whitetail Cabin vicinity on the Ashland District. Reviews were conducted on October 13th and 14th of 2016.

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

Individual ratings of project objectives, design criteria, and mitigations were used to in turn to inform the master review questions/objectives.

Lost Farm Rx Burn/Mastication/Roadside Salvage

The Lost Farm area falls in the southcentral part of the Long Pines. The I&E review evaluated multiple fuels management activities: mastication work conducted as a part of the Lost Farm Hazardous Fuels Reduction Project, prescribed burning activities conducted as a part of the Lost Farm Hazardous Fuels Reduction Project, and roadside clearing activities in the Lost Farm vicinity conducted as a part of the Sioux Ranger District Road Clearing Project. Both projects utilized Categorical Exclusion (CE) categories for NEPA compliance; the Decision Memo (DM) for the Lost Farm Hazardous Fuels CE was signed in June of 2005 and the DM for the Sioux RD Road Clearing CE was signed in 2011. Total acreage proposed for treatment under the Lost Farm Hazardous Fuels CE was approximately 580 acres. The Sioux RD Road Clearing CE is applicable to all roads across the district.

Per the Proposed Action Enclosure for the Lost Farm Hazardous Fuels Reduction CE:

> Within the Lost Farm Project Area, the purpose and need of the proposed action is to:
>
> - improve the ability to control future wildfires in order to protect existing forest stands (wildlife habitat), forest investments (plantations) and heritage resources from stand replacing fires.
> - reduce the amount of large time lag fuels (100-hour and above)
> - reduce and prevent the ladder fuels within the mature ponderosa pine stands;
> - reduce stem densities in both the natural and artificial plantations;

Per Appendix A of the Roadside Clearing project:

> The purpose and need for action is to clean up hazardous fuels resulting from tree mortality from multiple years of spring and fall storms and to reduce ladder fuels less than 8 inches dbh. This will create forested conditions along roads and motorized trails so that they can be used for control lines during wildland fire. This will enhance the safety for egress and ingress for fire crews.

Review questions/objectives were as follows:

1. Were designated project objectives achieved as outlined within the Decision Memo?
2. Were design criteria sufficient to address resource concerns associated with project implementation? Which criteria were effective at addressing potential resource impacts, which were not, and what should be changed in the future? Did burn prescriptions and the burn plan take into account design criteria outlined within specialist reports and the Decision Memo?
3. Acknowledging the long-term fuel management concerns across the Sioux Ranger District, what elements of the Lost Farm Project can/should be incorporated into broader scale management analyses and implementation?

As a district, the goal in implementing these activities has been to maintain forested stands as a part of the landscape. While it is acknowledged that these districts have always had a shifting mosaic of rangelands and ponderosa pine in the uplands, those areas with persisting forest serve a variety of desired uses. With shifts towards more extensive and intense fire activity, efforts to maintain those existing stands are a central part of the district's program of work.

Review Context and Discussion:

The field review was conducted on October 13th, 2016. Personnel/resource areas in attendance included:

- Kurt Hansen, District Ranger, Sioux Ranger District
- Ron Hecker, District Ranger, Ashland Ranger District
- Bobby Cordell, Fuels Management Specialist, Sioux Ranger District
- Brent Elmore, Fuels Technician, Sioux Ranger District
- Scott Studiner, Fuels Management Specialist/District FMO, Ashland Ranger District
- Mike Gagen, CGNF Fire Staff Officer
- Andy Efta, CGNF East Side Hydrologist/Soil Scientist

Following the review, Halcyon LaPoint (CGNF Heritage Program Manager/Forest Archaeologist) and Mike Bergstrom (CGNF Zone Archaeologist) were also consulted regarding compliance with cultural resource-related design criteria.

Prescribed Fire:

The prescribed fire was conducted on March 9th, 2016 over mostly frozen ground. Rutting was observed, however, along one of the fire lines walked during the review (Photo 1), indicating some frost patchiness. At the time of review, microsite changes in understory species diversity were observed as a result of implementing the burn.

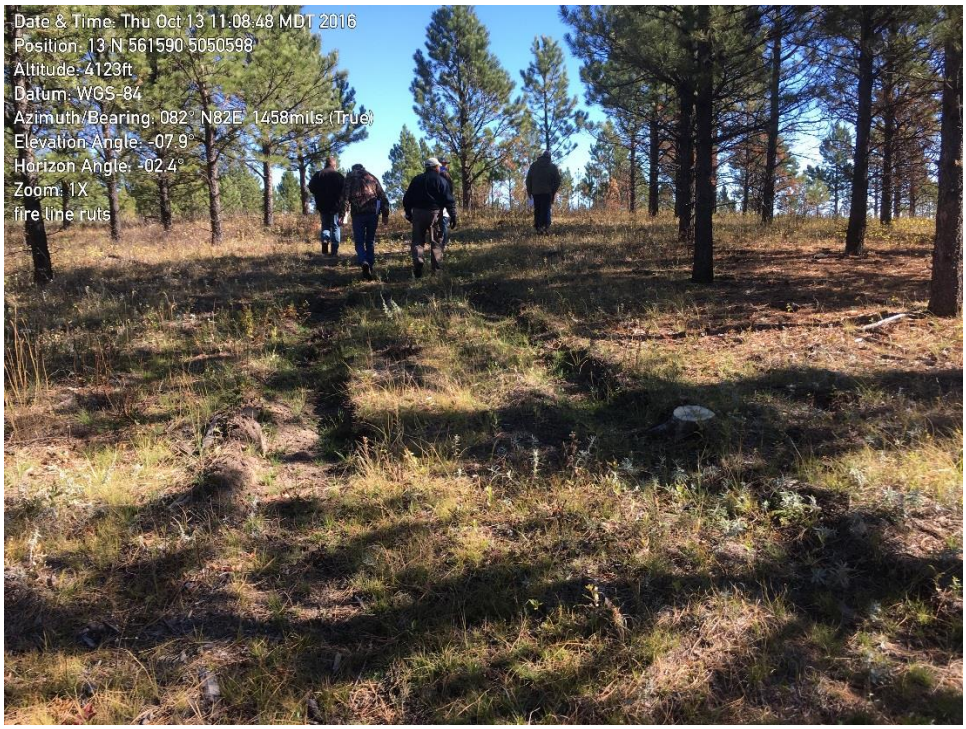

Photo 1. Rutting in fireline used during 2016 Lost Farm prescribed burn.

Small tree mortality was observed within the burn perimeter and no overstory mortality was observed, despite some red needles on the lower part of the trees (Photo 2).

Photo 2. Picture within 2016 Lost Farm prescribed burn perimeter. Note seedlings lacking remaining needles and lack of overstory mortality.

Tree densities were low within the burn area; rangeland vegetation was the dominant vegetative life form within the burn perimeter and benefitted from the burn. During the review, there was some discussion as to what resource area should be a primary proponent for this type of prescribed burn. Given the benefits to species diversity and observed vegetative vigor, the districts may want to further integrate their respective range programs into the planning and implementation process.

Mastication:

The portion of the project area that had been masticated was logged in 1988. Mastication was first conducted during winter of 2011 and 2012 as the first test of the district's mastication equipment and, given the perceived success of that work, was conducted again during 2016.

Within portions of the project area, thickets of ponderosa pine regeneration were readily observed adjacent to those areas that had been masticated (Photos 3 and 4). With respect to mastication, during the review it was noted that R1 soil quality standard compliance was not included as a design criteria. Extent of pre- or post-implementation DSD is unknown without soil disturbance monitoring. Some compaction was observed during field review, but appeared to be relatively minor in extent.

Photo 3. 2011/2012 Lost Farm mastication unit.

Photo 4. Example of unmasticated area adjacent to masticated unit.

The 2016 mastication unit displayed little evidence of mechanical operations, but of note was the fact that stand density was already relatively low (Photo 5).

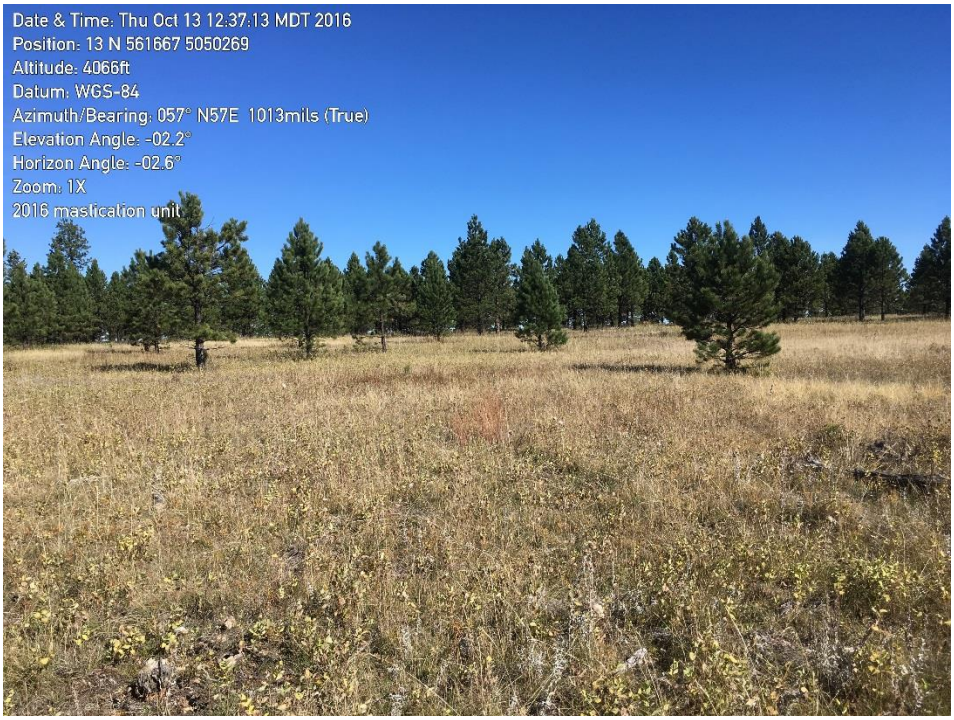

Photo 5. 2016 Lost Farm mastication unit.

Roadside Clearing:

Review of the roadside clearing portion of the Lost Farm project was somewhat abbreviated because the project has yet to be completed; multiple project objectives/design criteria/mitigations could not be evaluated. Brush piles had been placed in ditches (Photo 6), though had as of yet not created road drainage issues. Brush cleanup via pile burning occurred during winter 2017 and is anticipated to continue during the 2017 field season.

Because the work was still in progress, a complete review of roadside clearing activities was not possible. Of note here is the fact that the decision memo for these project activities included a design criteria stating, “Ensure excess slash is pulled from drainage bottoms above/below culverts and from road ditches.” This element was given a “3” application rating instead of a “4” (since most piles were indeed outside of ditches), but a “4” effectiveness rating since at the time of review no damage was observed on the roads that could be attributed to piles being in the roadside ditch.

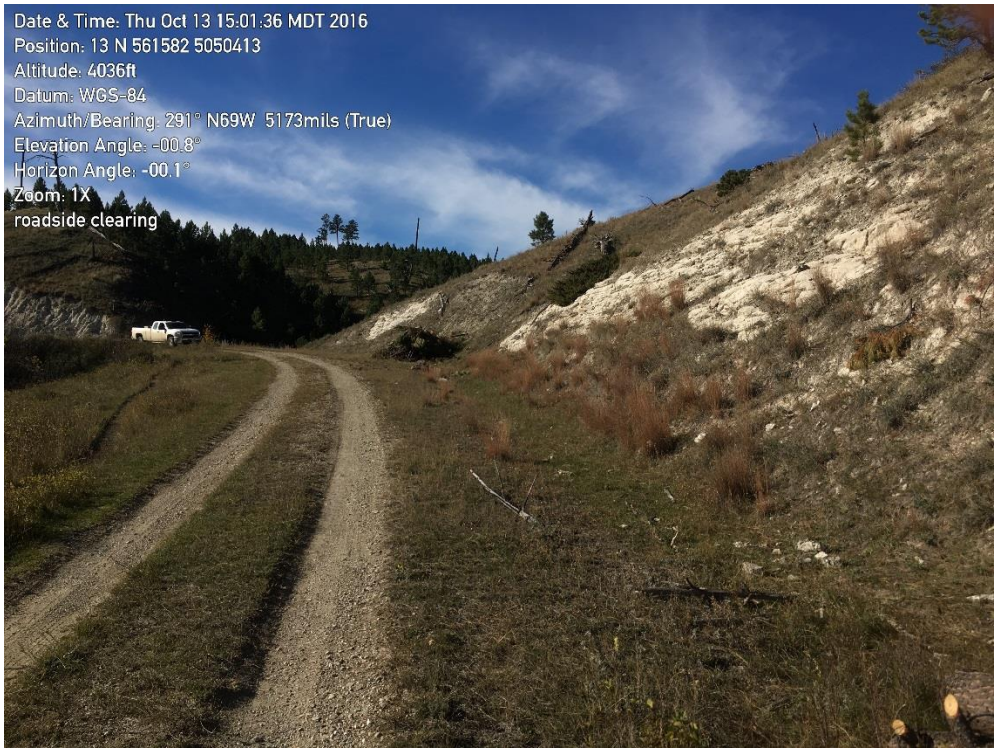

Photo 6. Brush pile in ditch along road within Lost Farm roadside clearing project area.

Results:

Thirty-four objectives, mitigations, and design criteria were included within Lost Farm NEPA documentation and prescribed burn plan (Table 1). Of these, six (18% of total) were deemed not applicable and seven (21%) had yet to be determined as a result of portions of the project having yet to be completed. Of note is that the majority of the TBD objectives/mitigations/design criteria were within the roadside clearing portion of the project. See Appendix A for a complete listing of review items and associated ratings.

Approximately 92% of the evaluated objectives, mitigations, and design criteria that were fully applied were fully effective. As noted above, further efforts need to be taken to reduce the number of non-applicable mitigations and design criteria. This rating does not account for those design criteria that should have been included, such as the stipulation that R1 soil quality standards be met.

Table 1. Summary of Application and Effectiveness ratings for the Lost Farm Hazardous Fuels and Roadside Clearing projects.

	Total possible Applied	Total fully Applied (4 rating)	Total fully Effective (4 rating)	Total TBD Effective	Total N/A	Percent possible applied that were fully effective
Lost Farm Hazardous Fuels Reduction Project Objectives	**7**	**4**	**4**	**1**	**2**	**57**
Mastication/Rx Burn Design Criteria	**10**	**8**	**8**	**2**	**0**	**80**
Roadside Clearing Design Criteria	**17**	**11**	**9**	**4**	**4**	**53**
TOTAL	**34**	**23**	**21**	**7**	**6**	**62**

With respect to review objectives:

1. **Were designated project objectives achieved as outlined within the Decision Memo?**
    a. Project objectives were deemed to have generally been achieved for the mastication and prescribed burning activities. Of note, however, was the fact that 100- and 1000-hour fuels were already generally in low densities within the project area for the mastication and prescribed burning. Stem densities in some locations were indeed too dense, and were addressed with mastication.
    b. Roadside hazard tree reduction is still in process, so project activities could not be fully evaluated for success.
2. **Were design criteria sufficient to address resource concerns associated with project implementation? Which criteria were effective at addressing potential resource impacts, which were not, and what should be changed in the future? Did burn prescriptions and the burn plan take into account design criteria outlined within specialist reports and the Decision Memo?**
    a. Design criteria were not totally sufficient. Some were lacking and some were ambiguous. It was generally agreed that there was a need to improve vetting of design criteria during project planning/NEPA analysis. While adverse resource impacts were generally averted during implementation, this was likely coincidental.
    b. See rating table for specific DCs that were effective at addressing resource impacts and which should be changed in the future.

c. The burn plan did tier to the project objectives contained in the NEPA decision. Resource specific design criteria were not included in the burn plan. Adverse effects were not observed during the review, but future burn plans may want to highlight resource specific concerns in some capacity.

3. **Acknowledging the long-term fuel management concerns across the Sioux Ranger District, what elements of the Lost Farm Project can/should be incorporated into broader scale management analyses and implementation?**
    a. Mastication was generally considered a viable and efficient way for district resources to accomplish fuels management objectives. While district equipment may be limiting in some cases, it is viable if not ideal for many situations on the district.
    b. There was some discussion of NEPA approach, given limited district capacity and reliance on some SO resource specialists. "Right sizing" NEPA was a big topic- how big can we go? Alternatively, would it make more sense to complete multiple CE's a year? The group did not arrive at a final answer.

Phoenix Salvage Harvest

The Phoenix Salvage project was completed under the 250-acre salvage harvest CE category. The purpose of the Phoenix Project was to salvage up to 250 acres of ponderosa pine that were killed by the Ash Creek Fire to reduce long term downed fuel accumulations, re-establish forest cover, and provide timber products to help support local communities (Phoenix Salvage DM, pg. 1). The Decision Memo for the project was signed in August 2015. Harvest activities conducted through Winter 2015 and Spring/early Summer 2016. I&E review questions/objectives were as follows:

1. Was the Purpose and Need for the project met? Tiering directly to the Purpose and Need:
    a. Were long term downed fuel accumulations reduced? If so, to what extent?
    b. If downed fuel accumulations were indeed reduced, where those reductions sufficient to alter future wildfire behavior?
    c. Has forest cover begun to re-establish post-implementation; were project activities effective at minimizing or avoiding delayed natural regeneration?
2. Acknowledging the long-term fuel management concerns resulting from the 2012 Ash Creek Fire, what elements of the Phoenix Salvage Project can/should be incorporated into broader scale management analyses and implementation?

Mitigations/evaluation items were collated by comparing design criteria with the Phoenix Salvage Sale Mitigation Measures Crosswalk. Where Design Criteria were designated as "Standard Practice", "Not Applicable", or otherwise covered through other means, they were excluded as evaluation items for this I&E Review. Note that one of these standard timber sale items is compliance with R1 soil quality standards.

Review Discussion:

The field review was conducted on October 14th, 2016. Personnel/resource areas in attendance included:

- Ron Hecker, District Ranger, Ashland Ranger District
- Scott Studiner, Fuels Management Specialist/District FMO, Ashland Ranger District
- Brad Bergman, Fuels Technician, Ashland Ranger District
- Ryan Melin, Rangeland Management Specialist, Ashland Ranger District
- Lynne Buckles, Rangeland Management Specialist, Ashland Ranger District
- Kurt Hansen, District Ranger, Sioux Ranger District
- Bobby Cordell, Fuels Management Specialist, Sioux Ranger District
- Mark Slacks, CGNF Forest Planner
- Scott Schuster, CGNF Deputy Fire Staff Officer/Forest FMO
- Mike Gagen, CGNF Fire Staff Officer
- Andy Efta, CGNF East Side Hydrologist/Soil Scientist

Following the review, Halcyon LaPoint (CGNF Heritage Program Manager/Forest Archaeologist) and Mike Bergstrom (CGNF Zone Archaeologist) were also consulted regarding compliance with cultural resource-related design criteria.

The review team first visited Unit 14 (Photo 7). At this unit, the review team discussed the down heavy (1,000 hour) fuel loading, which within a week of the review had been calculated as approximately 25 tons/acre. The observed downed fuel concentration was deemed to be in excess of fuel loading prior to mechanical operations proceeding. While no fuels reduction goal was set during the planning process, one of the stated project objectives was to reduce heavy fuel loading in the understory for the purposes of improving firefighting efficacy and firefighter safety. The desired range from a silvicultural and soils perspective is 5-13 tons/acre.

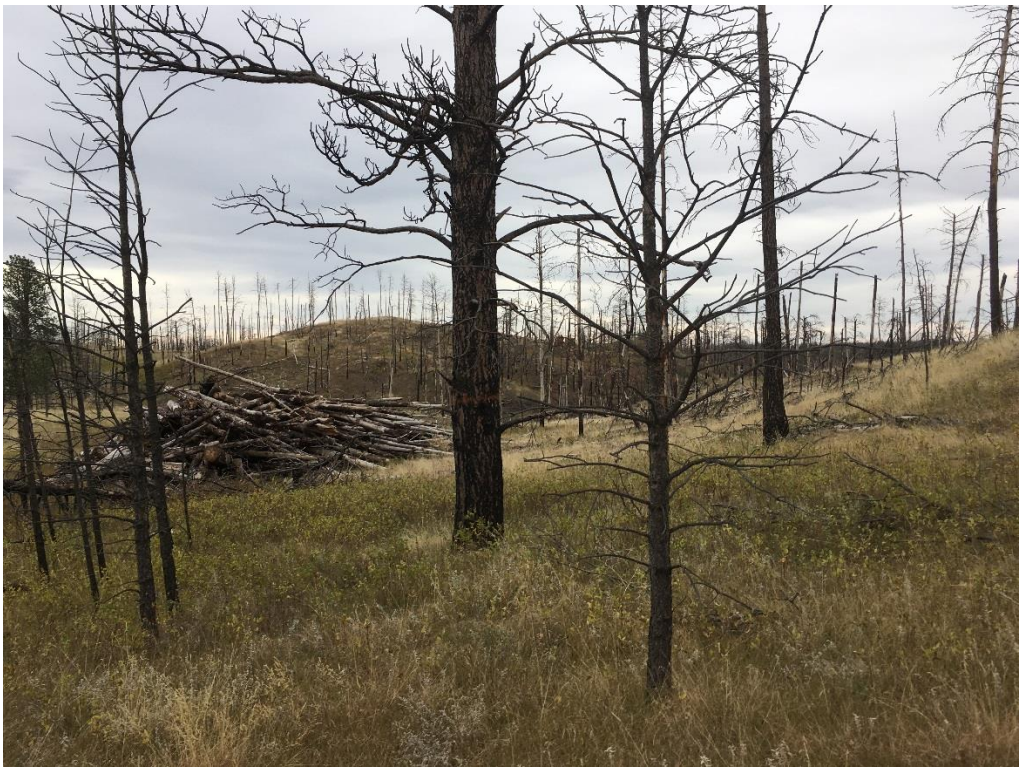

Photo 7. Phoenix Salvage Unit 14. Tall understory vegetation obscures downed fuel concentrations.

The review team next traveled to the southeast of Whitetail cabin and stopped at Unit 34, observing units on both sides of the road while en route. Here, the team discussed soil disturbance associated with the sale. A combination of formal soil disturbance monitoring and general field reconnaissance had been conducted during the previous field season. While formal soil disturbance monitoring has yet to be fully analyzed and correlated with qualitative evaluation, in general soil disturbance was observed to be lower in sites that were harvested during the winter. A cursory review of soil disturbance monitoring data suggested that project activities were generally in compliance with regional soil quality guidelines, but more detailed analysis is required to confirm this.

Pile sizes were not restricted within NEPA. Some concerns were expressed by review team members about the sizes of piles and the potential extent, intensity, and duration of effects following burning. In the future, pile sizes should be directly addressed in NEPA and coordinated with the TSA.

Within the NEPA analysis, a hardened ford was prescribed for an ephemeral draw accessing Units 1 and 4 on the north end of the sale. During operations, the acting district ranger contacted the east side hydrologist regarding the prospect of waiving construction of the hardened crossing. Given the site conditions, the longevity of operations (no more than a week or two), and ongoing cold weather pattern (logging was during the winter), it was deemed appropriate to waive the requirement for the crossing, provided that the purchaser would be liable for repairs should resource damage be incurred. This should have been coordinated with the TSA, but was not.

A 124 permit should have been acquired prior to initiation of project activities for this crossing, but poor coordination between the TSA/pre-sale forester completing contract prep, district ranger, and east side hydrologist resulted in us not acquiring the permit. With no activity implemented, however, no 124 permit acquisition was warranted in the end. Nonetheless, better future coordination during contract preparation is required.

This crossing, evaluated independently following conclusion of the review, was found to be intact despite being used as a haul route (Photo 8 was taken at the time of the independent review).

Much of the remaining conversation revolved around mechanisms for addressing fuels management with the continued accumulation of down heavy fuels resulting from widespread overstory mortality following the 2012 Ash Creek fire. No single answer was arrived at, but the group discussed the various pros and cons of using large scale NEPA analyses as opposed to smaller CEs.

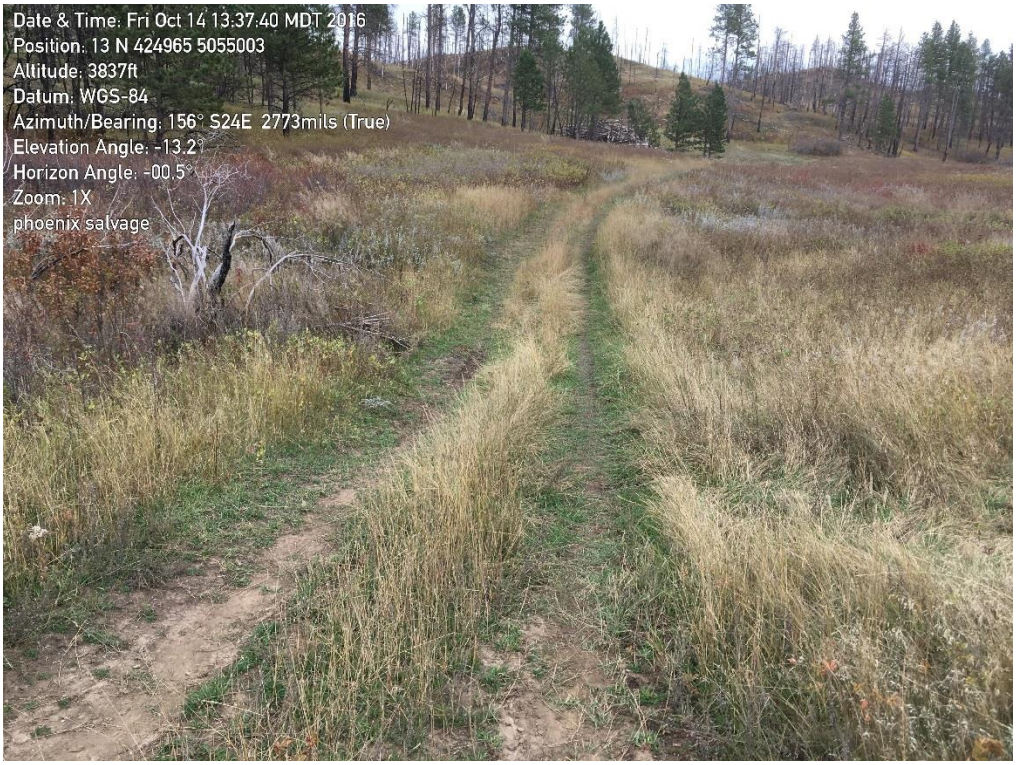

Photo 8. Ephemeral draw/proposed hardened crossing site accessing Phoenix Salvage Units 1 and 4.

Results:

Of the 15 Phoenix Salvage review elements, approximately 82% of those that were fully applied were in turn deemed fully effective at mitigating resource impacts (Table 2). Three items (20%) have yet to be evaluated due to lack of available information and 2 (approximately 13%) were deemed not applicable. See Appendix B for a complete listing of review items and associated ratings. Ratings may further improve after items that have yet to be determined effective have been evaluated. The lack of interaction between soils/hydro staff and the TSA during the sale was noted as less than optimal,

thereby comprising one of the evaluation items deemed to be not fully implemented. While a synoptic review of soils condition has yet to be fully completed on site, despite the likely compliance with R1 soil disturbance standards further soil disturbance may have been avoided if closer interaction with between soils/hydro staff and the TSA may have occurred.

Table 1. Summary of Application and Effectiveness ratings for the Lost Farm Hazardous Fuels and Roadside Clearing projects.

	Total possible Applied	Total fully Applied (4 rating)	Total fully Effective (4 rating)	Total TBD Effective	Total N/A	Percent possible applied that were fully effective
Phoenix Salvage Design Criteria (per DM/Timber Sale mitigation crosswalk)	**15**	**11**	**9**	**3**	**2**	**60**

With respect to review objectives:

1. **Was the Purpose and Need for the project met?**
    a. **Were long term downed fuel accumulations reduced? If so, to what extent?**
        i. Long term downed fuel accumulations may have been marginally reduced by operations, but downed fuel accumulations are still well in excess of what can be considered optimal from a fuels management perspective. In some cases, down fuel accumulations were increased as a result of salvage harvest.
    b. **If downed fuel accumulations were indeed reduced, where those reductions sufficient to alter future wildfire behavior?**
        i. It is unlikely that fire behavior would be significantly altered within much of the project area.
    c. **Has forest cover begun to re-establish post-implementation; were project activities effective at minimizing or avoiding delayed natural regeneration?**
        i. Per discussion with D. Sandbak (CGNF silviculturist), Both the North Whitetail and Phoenix Salvage areas are going to be planted in 2018. Assuming successful regeneration, it is assumed that planting, coupled with the microsite protections afforded by coarse wood retention within the project area, would be successful at minimizing delayed natural regeneration.
2. **Acknowledging the long-term fuel management concerns resulting from the 2012 Ash Creek Fire, what elements of the Phoenix Salvage Project can/should be incorporated into broader scale management analyses and implementation?**

a. Future projects need to be more explicit about fuels reduction goals to ensure that those goals are reached. Salvage logging by itself may not be sufficient to meet fuels management objectives; prescribed fire and/or mastication may be viable tools for reducing down fuel loading in tandem with salvage logging. Of note is the fact that timber burned during the Ash Creek Fire has lost its integrity; after the 2017 operating season, salvage logging is no longer economically viable.
b. Discussion of "right sizing" NEPA continued during the second day of the review, with similar threads of discussion from the first day.

Common Themes between Reviews

There were some common across both review areas. These are listed below, in no particular order:

- *Make sure all design criteria and mitigations are clear, relevant, and cater directly to the project*
    - There were some cases where design criteria and mitigations could not be evaluated because the review team was not sure why they had been included. Further, the frequency with which "Not Applicable" design criteria was relatively high. Specialists need to make sure that design criteria and mitigations are included specifically with the intent of addressing a concern within a project area.
- *Need to set clear, measurable project objectives*
    - In several cases, objectives were not met simply because they were not well laid-out during the planning process. An example of this is with Phoenix Salvage, where fuel loading is not meeting fuels objectives in part because desired reductions were not explicitly laid out in advance.
- *Need improved communication between implementation teams and resource specialists*
    - The lack of inclusion of a design criteria speaking to soil disturbance standards on the Lost Farm projects as well as the issue with 124 crossing permitting are both a byproduct of poor communication between specialists and implementation personnel. There may have been more widespread issues, but with only one affected resource specialist outside of fuels in attendance at both meetings, other similar concerns may not have been accounted for.
- Need to think in terms of multiple treatments at a given location; objectives may not be met by a single entry/project activity
    - A common theme across both review days was the need to be thinking in terms of multiple entries to achieve a given objective. All treatments that were evaluated during the review were examples of this situation. There are logistical challenges to achieving this end with limited personnel and funding, annual budget cycles, and relatively short life spans on NEPA documents. This of course comes back to the discussion of right-sizing NEPA; how do we toe the line with respect to thinking ahead for multiple project entries while keeping NEPA manageable in scope?
- "Right sizing" NEPA

- This was a dominant discussion point across both review days, and is directly related to the previous point. Review team members discussed the value of large-scale (100,000 acres plus), complex, multi-year NEPA analyses versus use of numerous smaller scale CEs to complete project objectives. While CEs may be faster and are generally cheaper, they may in turn require more NEPA analysis to permit re-entry/re-treatment and also create headaches from a cumulative effects analysis perspective. No conclusions were reached during discussions.

Appendix A. Lost Farm Mastication/Rx Burn/Roadside Clearing Review Items.

Evaluation Item	Source	Applic	Effect	Comments
Lost Farm Hazardous Fuel Reduction (Mastication/Rx Burn) Project Objectives				
Convert the 1000 and 100 hour time lag fuels so most fuels after treatment are categorized as 1-hour and 10-hour.	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 4	4	4	Fuels were in low densities to start with
Where available, leave five to seven of the largest logs per acre to provide for long term soil productivity	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 4			Most logs were already gone with first entry. N/A: didn't work in here.
Maintain and protect existing, forested habitat.	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 4	4	4	Didn't touch aspen. Can drive up close to trees and not damage.
Reduce stem densities in plantations to 125-260 desirable trees per acre	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 4			Haven't done a plot; probably close, but not sure. 15 x 15 spacing = 150 trees/ac, so probably on low end of desired tree densities.
Reduce the amount of trees within the 0-3 inch diameter class below existing, mature forested stands in order to prevent the development of ladder fuels within these stands	Lost Farm Hazardous Fuels Reduction Project Action	4	4	Fire removed seedlings.

	Enclosure pg. 5			
Reduce fuel loadings on heritage sites such that any fires that occur over these sites will be fast moving and low intensity to reduce or eliminate damage to these resources.	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5			N/A to evaluated area. No sites in area walked through during review.
Improve ability to contain large, high-intensity and severe wildfires along Forest Road 3819.	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5	4	4	Did "improve", but may be too general Followed advising to public of 200' buffer
<u>Mastication/Rx Burn Design Criteria</u> Note: Separate NEPA was completed for piling and decking.				
Silviculture: When doing pre-commercial thinning and mechanical pretreatment; use silviculture prescription for selecting genetic traits for both growth and vigor.	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5	4	4	Work was done via contract. Was this necessary as a design criteria?
Silviculture: Generally, when pre-commercial thinning within the natural or artificial plantations, do not create slash greater than 3 inches in diameter and longer than 3 feet in length between January 1st and July 31st to prevent ips species beetle outbreak.	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5	4	4	All done in that timeframe.

Fire/Fuels: Fuel depths after treatment should not exceed 18 inches in depth	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5	4	4	
Silviculture/Heritage: When hand-piling, piles should be compact, and not be placed closer than 10 feet from leave trees or on known heritage sites.	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5			N/A: no hand piling
Soil/Water: Compliance with Best Management Practices identified in Forest Service Handbooks	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5	4	4	Marked equpment out, had buffers. Doesn't translate well to implementation.
Heritage: Compliance with the Montana State Historic Preservation Office Programmatic Agreement	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5	4	4	Pre-approved, turned in map
Wildlife: Prepare Biological Evaluation	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5	4	4	Would recommend not including as DC in future.
Silviculture: Prepare Silvicultural Prescription	Lost Farm Hazardous Fuels Reduction Project Action	4	4	After the fact comment- include in the future?

	Enclosure pg. 5			
Soil/Water: Compliance with Montana Streamside Management Zone Law	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5			N/A: no water in project area
Fire/Fuels: Prepare burn prescription and Burn Plans.	Lost Farm Hazardous Fuels Reduction Project Action Enclosure pg. 5	4	4	
<u>Roadside Clearing Design Criteria</u>				
Wildlife: All projects will be reviewed by the district wildlife biologist to implementation.	Sioux RD Road Clearing Project DM Appendix B, Pg. 9	4	4	NEPA covered every road on district map.
Soil/Water: Minimize equipment operation within 50' from perennial streams and wetlands. Minimize soil displacement and disruption of flow paths in road ditches from equipment.	Sioux RD Road Clearing Project DM Appendix B, Pg. 9			Should be two separate DCs. First line: not applicable. Second line: project not finalized
Soil/Water: Ensure excess slash is pulled from drainage bottoms above/below culverts and from road ditches.	Sioux RD Road Clearing Project DM Appendix B, Pg. 9	3	4	Slash observed in drainage bottoms/ditches, no damage being incurred on road

Soil/Water: Locate burn piles outside of drainage bottoms at least 50' from perennial streams.	Sioux RD Road Clearing Project DM Appendix B, Pg. 9	4	4	
Soil/Water: Minimize soil displacement, especially in areas of know weed infestations. Consider seeding areas of excessive soil displacement with native grass.	Sioux RD Road Clearing Project DM Appendix B, Pg. 9	4	?	Hand piled through strectch with knapweed. Haven't burned piles yet, so no way to know effectiveness.
Range/Weeds: Use required noxious weed best management practices outlined in the Custer National Forest Weed Management FEIS and Record of Decision (11/1/2006), as well as FSM 2080, Supplement No.: R1 2000-2001-1.	Sioux RD Road Clearing Project DM Appendix B, Pg. 9	4	?	See discussion of hand piling above.
Range/Weeds: Avoid staging equipment/ personnel in areas of known weed infestations and known sensitive plant populations.	Sioux RD Road Clearing Project DM Appendix B, Pg. 9	4	4	Kept equipment out of known investations; didn't park in them.
Range/Weeds: Avoid ground disturbing activities during wet periods.	Sioux RD Road Clearing Project DM Appendix B, Pg. 9	4	?	Not sure why this was included. In future, state why this was needed.
Range/Weeds: If post burn conditions warrant seeding, use native certified weed-free seed when reseeding after treatment.	Sioux RD Road Clearing Project DM Appendix B, Pg. 9			Not rated- yet to be completed. Some burning done, but but haven't had to reseed yet. May be a redundant DC. Recommendation from Ashland fuels to not reseed because it has limited effectiveness.

Safety: Post Forest Service Roads when pile burning is taking place.	Sioux RD Road Clearing Project DM Appendix B, Pg. 10	4	4	
Safety: Post Forest Service Roads during thinning and maintenance activities	Sioux RD Road Clearing Project DM Appendix B, Pg. 10	4	4	
Safety: During thinning activities, inform public via newspaper notices and/or through county commissioner meetings.	Sioux RD Road Clearing Project DM Appendix B, Pg. 10	4	4	No complaints
Heritage: Remove trees and fuels within site boundaries where feasible.	Sioux RD Road Clearing Project DM Appendix B, Pg. 10			N/A: No sites occurred within project boundaries.
Heritage: All sites should be avoided by all ground disturbing project activities.	Sioux RD Road Clearing Project DM Appendix B, Pg. 10			N/A: No sites occurred within the project boundaries.
Heritage: An archaeological assessment will be required prior to implementation. The assessment may find that additional cultural resource surveys will be needed.	Sioux RD Road Clearing Project DM Appendix B, Pg. 10	4	4	No additional surveys were deemed necessary.

Heritage: All personnel associated with operations under this decision memo must be informed that any historic or prehistoric sites are not to be damaged, destroyed, removed, moved or disturbed. If in connection with operations under this decision any historic or prehistoric resources are encountered, activities must cease in the vicinity of the find and the District Ranger notified. The discovery must be protected until notified in writing to proceed by the authorized officer (36CFR 800.110, .112; 43 CFR 10.4)	Sioux RD Road Clearing Project DM Appendix B, Pg. 10	4	4	No archaeological sites occurred within the project area.

Appendix B. Phoenix Salvage Review Items.

Evaluation Item	Source	Applic	Effect	Comments
Design Criteria (per DM)				
Leave Tree Protection: During implementation, contractor will take all reasonable care to avoid damage to the roots, bole, and crown of live trees that will be reserved from cutting. When any live tree is damaged beyond recovery (expected to die within 1 year) that was intended to be retained, it can be removed or otherwise treated by the contractor as instructed by the Forest Service. Applies to all units with identified green trees including: Units 01, 04, 20, 22, 24, 26, and 27.	Phoenix Salvage Decision Memo, pg. 3	4	4	Per discussion with C. Lund- 5/15/2017
Coarse Woody Debris: Long term objective is to average 5 to 13 tons per acre where available.	Phoenix Salvage Decision Memo, pg. 3,4	4	?	Exceeding 5-13; approx 25 tons/ac, plus stuff still standing. Next time, desired condition would be 0-10 for fuels.
Landing Piles: Where possible landing piles should not occur near live green trees or where natural regeneration has established. Applies to all units with identified green trees including: Units 01, 04, 20a, 22, 24, 26, and 27.	Phoenix Salvage Decision Memo, pg. 4	4	?	Haven't been burned yet
Green Tree Retention: Leave all green trees except those that have had successful beetle attack and are likely to result in mortality. The focus is to maximize to the extent possible all potential cone producing trees. Due to safety concerns in recreation sites and along National Forest System roads guides for determining additional mortality will be used to assess hazard trees for removal.	Phoenix Salvage Decision Memo, pg. 4	4	4	Per discussion with C. Lund- 5/15/2017

Green Tree Retention along Road Corridors: Wherever National Forest System roads are adjacent to treatment units, assessments for hazard trees will occur within 75 feet of road. Trees will be assessed as hazard trees whenever the condition of a tree could result in the tree falling or portions of the tree falling and will be felled and removed or left on site. Future hazard trees will be assessed according to the general rules for determining post fire mortality (see Forest Vegetation report). Where these general rules are met these trees will be felled and removed or left on site.	Phoenix Salvage Decision Memo, pg. 4			N/A
Soil/Water: A rock-lined ford will be utilized where the haul route crosses the West Fork of Little Pumpkin Creek on an existing Maintenance Level 1 Route on National Forest System road 44237. This ford would be constructed per standard design used for other fords across the East Zone of the Custer Gallatin National Forest.	Phoenix Salvage Decision Memo, pg. 4	1	4	Ford not implemented
Soil/Water: Standard timber sale protection provisions would be applied to the commercial harvest activities to protect against soil erosion and sedimentation. Timber harvest activities will be conducted in compliance with Water Quality BMPs for Montana Forests (Logan 2001).	Phoenix Salvage Decision Memo, pg. 4	4	4	Cut units, minimized temp road length, avoided water/wetlands with design

Soil/Water: All required water quality permits, including but not limited to 124 (Stream Protection Act), 318 (Short Term Water Quality Standard for Turbidity), and Nationwide 404 (Federal Clean Water Act) permits would be acquired by the Custer Gallatin National Forest prior to any ground disturbance.	Phoenix Salvage Decision Memo, pg. 4	1	N/A	No work was done, ie 124 permit not required. Permit should have been acquired prior to project initiation.
Soil/Water: Hand and mechanical operations must be in compliance with USFS R1 soil quality guidelines (R1 Supplement No. 2500-99-1). This guideline requires that management activities should not create detrimental soil conditions on greater than 15 percent of the activity area. Any detrimental disturbance exceeding 15 percent in the activity area should be remediated after treatment. Detrimental soil disturbance includes any or all of the following (from FSM 2500 R1 Supplement 2500-99-1 2554.10): • Compaction resulting in a 15 percent increase in bulk density • Rutting in excess of 2 inches • Displacement of soil of one or more inches depth from a surface soil horizon from a continuous area greater than 100 square feet • Physical and biological changes to soil resulting from high severity burning • Severe surface erosion, evidenced by rills, gullying, and soil deposition	Phoenix Salvage Decision Memo, pg. 4	4	?	Data needs to be more fully analyzed. Initial analysis suggests that project activities were in compliance with R1 soil disturbance standards.
Soil/Water: Mechanical operations in units would be conducted when soils can support the weight of machinery while meeting R1 soil quality guidelines. These conditions include, but are not limited to, dry summer months when soil moisture is minimal or during winter months when sufficient frost is found in the soil profile to support machinery. Custer Gallatin National Forest soils personnel would work with harvest administrators and fuels specialists before and during implementation to ensure that soil conditions are conducive to	Phoenix Salvage Decision Memo, pg. 5	3	2-3	Rating was two-tiered. Part 1: "Mechanical… machinery". Part 2: "Custer Gallatin… mechanical operations." Part 1: 4-4, sites generally looked good. Part 2: limited to no interactivity with TSA during

mechanical operations.				operations. Sale occurred during transition period between TSA's.
Wildlife: All Bats: If a bat or bats (any species) are seen clinging to, crawling on, or flying from, a tree identified for harvest, the tree will be left standing until either a) no bats are seen on or near the tree, or b) after the pup season (after July 31). *This measure should be effective because: 1) any bat species would be protected; i.e. loggers would not be required to identify bat species, 2) northern long-eared bats switch tree roosts often – typically every 2 to 3 days (USDI 2015b) and 3) young bats should have sufficient flight skills developed by the end of pup season to escape harm.*	Phoenix Salvage Decision Memo, pg. 5	4	4	
Range/Weeds: All applicable measures outlined in FS Manual 2080 will be implemented to minimize the spread of noxious weeds. These measures are summarized in the fuels, range, and weeds specialist report.	Phoenix Salvage Decision Memo, pg. 6	4	4	Inspected equipment; not a high priority weeds area.
Range/Weeds: Accurate and detailed maps of range management structures will be provided to the Sale Administrator and/or contractor showing the location of the structures. Any damage to structures would be assigned to the harvest contractor.	Phoenix Salvage Decision Memo, pg. 6	4	4	Structures completed post implementation, maps were supplied to contractors.
Heritage: All personnel associated with the proposed Phoenix Project would be informed that no historic or prehistoric site would be disturbed, damaged, destroyed, moved, or removed. If, in connection with operations under the Phoenix Project, any historic or prehistoric resources are encountered activities must cease in the vicinity of the find and the District Ranger and Forest Archaeologist notified. Plans designed to avoid, reduce further disturbance, or mitigate existing disturbance would be formulated in consultation with the MTSHPO, the Northern Cheyenne Tribe and the Forest Service. The discovery must be protected until notified in	Phoenix Salvage Decision Memo, pg. 6	4	4	Per discussion with H. LaPoint and M. Bergstrom: no issues arose as a result of project implementation; no sites affected during operations. Heritage sites were avoided during project planning.

writing to proceed by the authorized officer (see 36 CFR 800.100, 112: 43 CFR 10.4).				
Heritage: **Existing Sites:** Tables 2 and 3 (DM, pgs. 5 and 6) summarize design criteria that will be implemented to remove, reduce, or mitigate disturbances to recorded cultural resource sites located within the Area of Potential Effects (APE) and along roads proposed for use during operations.	Phoenix Salvage Decision Memo, pg. 6	4	4	Per discussion with H. LaPoint and M. Bergstrom: no sites had to be mitigated; areas of concern were avoided during project design and implementation.