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File Code: 5140 Prescribed Fire **Date:** 7/13/06

Subject: Deer Creek Burns– Implementation Monitoring Review

To: Big Timber District Ranger

On June 29, 2006 an Implementation Monitoring Review was held for the Castle Enos (Deer Creek) Prescribed Burn Project. In attendance were Travis Rixford, Sally Orr, Bill Avey, David Callery, Mark Story, Henry Shovic, Jodie Canfield, and Julie Shea. The purpose of the review was to compare burn results with burn objectives with specific emphasis on weed/watershed BMP's, AMP coordination, and air quality mitigation measures. The focus of the review was on the 2000 acre Castle Enos burn (April 10-13, 2006), which is the third of the Deer Creek burns after Bohee (2001) and Dore (2003). The Deer Creek burns were authorized in the Deer Creeks Prescribed Burn Project EA, and Decision Notice and Finding of no Significant Effect (2/2000). In 11/2001 a Section 18 review allowed the prescribed burn activitites to be implemented during the fall and/or winter season as well as spring and also allowed the fall or winter burning to be performed during the first and second "rest from grazing" periods (years 1 and 2). The Castle Enos Prescribed Fire Plan provided specific vegetation treatment objectives. The Deer Creek Burns include prescribed burning of up to 7,000 acres and reducing conifer encroachment by mechanical means on approximately 1,800 acres (DN pg. 5-6). Specific project objectives include:

1) Increase the vigor and productivity of grass and shrub species, and reduce the amount of older, matted, fine fuels.

2) Increase or maintain early succession grass and shrub communities.

3) Re-establish, sustain, and enhance the representation of aspen in the Deer Creeks.

3) Maintain open coniferous forest habitats composed of scattered, large diameter, older aged trees. Protect larger mature trees by removing ladder fuels and reduce the potential for stand-replacing wildfire.

Castle Enos review team on June 29, 2006. The team walked through much of the northern end of the treated area and evaluated 13 review items (objectives and mitigation measures).

For the Castle – Enos burn the Range of Acceptable Results (Burn Plan page 5) includes:

1) Increase the vigor and productivity of burning in a mosaic pattern in the open grass and shrub land.

2) Increase or maintain early succcession: burning in a mosaic pattern with 40% to 60% of the area blackened and maintain 90% of the 10" diameter and greater trees.

3) Re-establish aspen communities: all encroaching conifers cut or burned in aspen stands, 30% to 50% blackened area.

4) Maintain open coniferous habitats: areas composed primarily of dense, pole-sized trees burned in entirety as a stand replacing burn with 30% to 60% of the trees blackened but maintain 95% of trees 10" in diameter or greater.

The 11/2001 Section 18 document changed the prescribed burning schedule to the following:

The new prescribed burning schedule to be considered for each pasture is as follows (*non-range area = areas not currently providing primary range habitat)*:

Year	Winter	Spring	Summer	Fall
1	rest (allow burning in non-range areas)	rest (allow burning in non-range areas)	rest	rest (allow burning in non-range areas)
2	burn all habitat types	burn all habitat types	rest	burn all habitat types
3	rest	rest	rest	graze late

The 4 Prescribed Fire Plan objectives were evaluated as well as nine mitigation measures using the Montana Forestry BMP audit format.

Objective or mitigtion measure and effectiveness definitions include:

Application
5- operation exceeds requirements of objective or measure
4- operation meets requirements of objective or measure
3- minor departure from measure, objective marginally met
2- major departure from measure, objective sporadically met
1- gross neglect of measure, objective not met

Effectiveness
5- improved conditions over pre-project condition
4- adequate protection of resources, effective
3- minor and temporary impacts on resources, moderately effective
2- major and temporary or minor and prolonged impacts on resources or only slightly effective
1- major and prolonged impacts on resources or not effective

Evaluation Items - BMP's	source	Applic	Effect	Comments
Castle Enos Prescribed Fire Objectives				
1. Increase the vigor and productivity: burning in a mosaic pattern in the open grass and shrub land with 50% to 75% of the area blackened.	Rx Fire Plan pg. 5	4	2	project accomplished well considering the constraints
2. Increase or maintain early succession: 40% to 60% of the area blackened and maintain 90% of the 10" diameter and greater trees		4	1	very limited area of Douglas-fir burned
3. Re-establish aspen communities: all encroaching conifers cut or burned in aspen stands, 30% to 50% blackened area.	Rx Fire Plan pg. 5	na	na	very little aspen in project area
4. Maintain open coniferous habitats: areas composed primarily of dense, pole-sized trees burned in entirety as a stand replacing burn with 30% to 60% of the trees blackened but maintain 95% of trees 10" in diameter or greater.	Rx Fire Plan pg. 5	4	1	-very small area of Douglas-fir burned as moisture levels were high -treated S aspects but had to light each tree – slashing not done
Prescribed Fire BMP's				
1. To keep fire intensity low and cool burning will be limited to late winter and spring where weather and fuel conditions are (for spring burning): temperature: 45-75 degrees RH: 18-55% wind: 0-15 mph gust 18 fuel moisture: 0-1/4" = 6-12% ¼ -1" = 8-16% 1"–3" = 12-20% 3"+ = 16+%	Burn plan pg. 9	4	5	-effective job of being conservative in administering burn which resulted in a low and cool burn. Exceeded Burn Plan requirements -constrained by Rx burn parameters of fuel type, season, and slash requirements
2. burn schedule per Section 18 table (grazing allotments)	S18 pg 2	4	4	-permittee did not want to burn the Castle Enos pasture because would need to construct fence -difficult since need to anticipate a year in advance if the burn will occur
3. only fire retardent Fire-Trol GTS-R or LCG-R and not in riparian areas	EA pg II-11, DN pg 9	na	na	no retardent used
4. burn plan Rx's reviewed by archeologist and adjustments made	EA pg 4, DN pg 10	4	4	
5. weed mitigation: -no new roads or ATV trails -undercarriages and wheels of all fire vehicles cleaned prior to entering	EA pg II-11, DN pg 10	4	4	-vehicle undercarriages not cleaned -some leafy spurge in south end of unit

treatment areas -ground disturbing techniques mimimized -mimimal soil disturbance during mop up -known patches of catergory 1-III weeds mapped and avoided -mechanical treatment of encroaching conifers done by hand with chainsaws with vehicles on roads/trails				-soil disturbance from Castle Enos burn very limited and did a good job of weed spread prevention as well as erosion avoidance. No water quality impacts form the project.
6. visuals: -where possible flush cut stumps and limb/lop and scatter slash within sight of trails -avoid intense local deeper burns where slash accumulates	EA pg 4, DN pg II-11,12	4	4	-very limited to no intense local deeper burns
7. Goshawk surveys conducted prior to burning to locate nest sites to be protected	EA pg. II-11	na	na	-goshawk habitat not in unit
Air Quality				
1. Conduct burn with potential to cause smoke problems only when smoke dispersion is good, and early enough in the day to assure good ventilation.	Rx Fire Plan pg. 20	4	4	limited smoke impacts, very good dispersion during burn period 4/13-4/16, 2006
2. Coordinate all Castle Enos burning activities with the Montana/Idaho State Airshed Group. The Airshed Coordinator notified 1 day prior to ignition.	Rx Fire Plan pg. 20	4	4	Coordination and approval done through Montana/Idaho State Airshed Group

Treatment conditions are illustrated in a few photos:

The Castle Enos burn was conducted on an area of highly disected, shallow Livingston-volcanic-derived soils. Vegetation is predominantely open juniper/sage/forb meadows with Douglas-fir in draws and north slopes. Fuels are very light which limits burn spread. The burn was accomplished from April 10-13, 2006 and was complicated by "greening" of the understory as well as residual moist conditions in many of the Douglas-fir stands. The burn crews were very careful to maintain the burn under the Burn Plan prescriptions which resulted in a safe burn but hampered accomplishment of burn objectives.

In the northeastern part of the burn a robust grass/forb response in open grass and shrub land with 50-75% or the area blackened. The burn was very labor intensive, however, as virtually each Douglas fir and juniper had to be individually ignited.

Conclusions

1. The Deer Creek burns (Bohee, Dore, and Castle Enos) have not resulted in as much forage increase as the 1994 Black Butte Burn (which enhanced grass forage production over a large area including part of the Cherry Creek watershed).

2. The Castle Enos prescribedRx fire was accomplished within the 2/06 Burn Plan prescription. However, the burn was very difficult to accomplish due to remote and rugged terrain, large size (2000 acres), sparse and sporadically spaced fuels, residual moisture in Douglas fir stands, and onset of greenup which retarded flame spread. The percent of burned area accomplished was less that the Burn Plan and NEPA as the objectives ratings indicate. Large areas were deferred from burning, however, and the actual accomplished acreages were close to the Burn Plan.

3. The Castle Enos burn NEPA envisioned a landscape level project but the FY2006 budget realities of our fuels targets made it difficult to accomplish the objectives given the limited personnel time and large acreage targets. A higher cost per acre could allow for other methods of RX burning which may result in a more effective bun and a larger window (i.e. aerial ignition).

4. Fuel conditions within the Castle Enos area in April 2006 were quite variable with sparse fuels on south facing sage/grass slopes, accelerating spring green up, and residual winter moisture in Douglas fir stands. The "burn window" was very brief and fuels to carry the fire was sparse especially in the northern part of the unit. After a one or two rotations through the pastures, the amount of fine fuels to carry fire to the larger fuels will increase the success of meeting burn objectvies.

5. The EA and S18 AMP constraints on the Cherry Creek allotment permitees (1 season rest before burn, rest 2nd year and most of 3rd year) have complicated the permittees operations. The results of the Deer Creek burns (Bohee, Dore, and Castle Enos) have not resulted in as much forage increase as the 1994 Black Butte Burn (which enhanced grass forage production over a large area including part of the Cherry Creek watershed). The grazing constraints are complicated to administer since to operate per the S18 table the permitees must rest a pasture a year prior to a burn which may or may not be accomplished due to the generally short burn windows and difficulty of burn plan implementation. Adjusting the grazing schedule for the areas based on primary and secondary range may be an option.

5. Fall burning would allow more fuel consumption and has potential to generally provide better objective accomplishment. However, fall fuel conditions are generally drier than the Burn Plan fall prescription conditions and would be more likely increased risk of an escaped prescribe fire.

7. An excellent time for objective accomplishment in the Deer Creek area could be late January or February when south facing slopes are dormant (no greenup) and north facing slopes are "protected" by snow. The GNF has encouraged the Montana DEQ to allow prescribed burning within the area east of the Gallatin Range Crest in Airsheds 8B and 10 during winter time since this area has robust smoke dispersion and could be efficiently treated during winter conditions. The Castle Enos pasture could not be burned in February 2006 since the FS (ASC) did not make burn permit payment to the State of Montana in time.

Recommendations

1. The burn plan format contains 18 elements which were included in the Castle Enos Burn plan including description, range of acceptable results, prescription, organization, smoke, contingencies, monitoring, etc. Additional information in the burn plan would be helpful to the District; for example, more specific information on logistics, access, and ignition strategy.

2. The Montana/Idaho Smoke Management Unit constraint for no burning before March 1 in Airshed 8B is a major limitation to prescribed burn accomplishment in many areas of the Big Timber and Livingston Districts. The seasonal restriction is based on smoke management concerns, but the areas in question have consistently robust dispersion with a strong down-valley winter wind through Yellowstone valley. The proposed change to unrestricted winter burning as in airshed 8B for areas east of the Gallatin Range Crest is encouraged. A boundary change for the area east of the Gallatin Crest to Airshed 10 (which has un-restricted winter burning) would be more consistent with wind patterns than the current county airshed boundary line. Late January or February would generally allow better objective accomplishment as the area could be burned before greenup.

3. Wildland fire use in late summer or early fall may provide a better opportunity for accomplishment for the Deer Creek objectives than spring burns. A WFU treatment could do a better job of area blackening, re-establishing aspen communitites, controlling Douglas fir encroachment, and burning through grass/shrub areas. As the Gallatin develops a WFU program it would be helpful to evaluate potential for WFU use in the drier parts of the Gallatin NF as an alternative to the labor intensive Castle Enos type of spring treatments. Continued burning of the Deer Creek allotment pastures could be useful to maintain them as a treated area to enhance WFU when it becomes an option. As with any WFU treatment, wildfire escape potential and consequences are key considerations. The continued burning of the Deer Creeks pastures will enhance the Fire Use program, as it could create fuel breaks in the Deer Creeks area. The Deer Creek pastures are located next to private land and continued burning will reduce the risk of a fire use leaving National Forest on to private land. The 1994 Black Butte fire burned 11,500 of the 12,500 total acres on private land (92%) causing loss of grazing and timber resources for the local land owners.

4. The 1994 Black Butte burn accomplished most of the objectives in the Cherry Creek pasture. Additional prescribed burning may not be necessary. The Cherry Creek Pasture will be evaluated after RX burningof Saw Mill as stated in the EA and DN.

5. The Castle Enos prescription parameters worked reasonably well for grass/shrub but were too conservative (high-moisture fuel conditions) to carry fire through the Douglas-fir stands. It would be helpful in future burn plans to allow more flexibility in prescription parameters for different cover types, particularly where the burn objectives include a sizable amount of fuel types 8 and 10.

6. The S18 AMP constraints on the grazing allotment could be reduced by using other methods besides entire-pasture resting to allow fuel buildup the year prior to burning. One method could be to exclude livestock grazing the year prior to a burn from the specific area to be burned instead of from an entire pasture. This could be accomplished with temporary fencing or herding.

7. Based on the sporadic objective accomplisment in the Deer Creek burns Bohee (2001), Dore 2003, and Castle Enos 2006, the review team felt it would be prudent to re-evalute the DN and S18 method of 1 prescribed fire treatment entry per pasture. It would probably require 3-4 entries per pasture to accomplish the objectives and protect the adjacent private land. For future Deer Creeks burns the team felt it would be appropriate to plan to treat each area more than 1 time. Multiple burn entries over several years could facillitate grass or fine fuels growing functioning as carrriers for fire. Mutiple entries will

mimic natural fire on the landscape such as a natural fire regime every 5 to 20 years.

8. The review team recommends that prior to FY 2007 burns a S18 review is prepared and approved which includes the multiple prescription flexibility from recommendation #5 and multiple entry options from recommendation #7. The S18 review should also take a realistic look at the targets and likely personnel available for treatments. The targets for any one year may need to be reduced considerably to accommodate a more geographically limited but more intense and multi-entry prescribed burning approach. A more realistic funding approach may be to allow for other methods of RX burning that would achieve for the large amounts of natural fuels acres. Deer Creek burn unit costs have been $55-60 per acres which is higher than the target based unit cost of $20/acre.

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