Hayden Pass Fire

BAER SPECIALIST REPORT - Forestry

Resource Specialty: Forestry
Fire Name: Hayden Pass
Month and Year: July 2016
Author(s) Name and Home unit Name:

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**Report**

I. Resource Condition Assessment

A. Resource Setting - The Hayden Pass Fire burn area covers approximately 16,520 acres. The burn area is within management area 2B, 2A, 5B, 7A, 8B as designated in the PSICC Forest Management Plan (Forest Plan, 1984). The 7A Management area is a timber emphasis area, however the area has poor access and the slopes are not conducive to ground based logging, therefore no artificial regeneration activities are proposed. Forest cover types that are present across the burn area are spruce-fir, mixed conifer, aspen, lodgepole pine, pinon juniper and Gambel oak. Tree species represented on the landscape include: Ponderosa Pine (Pinus ponderosa), Douglas-fir (Pseudotsuga menziesii), Limber Pine (Pinus flexilis), Bristlecone pine (Pinus aristata), Lodgepole pine (Pinus contorta), White fir (Abies concolor), Sub-alpine fir (Abies lasiocarpa), Engelmann spruce (Picea engelmanii), Aspen (Populus tremuloides). Shrub species include Pinon pine (Pinus edulis), Juniper (Juniperus scopulorum), and Gambel Oak (Quercus gambelii).

II. Findings of the On-The-Ground Survey

A. Values At Risk – The Hayden Pass Fire did not burn though any stationary targets or infrastructure such as trailheads, campgrounds or structures. The potential values at risk are trails and roads that could be directly damaged or impacted by falling trees. These values at risk are delineated within two categories; the primary category (1-3 yrs post fire) includes hazard trees, snags, trees with weakened root systems, and widow makers. The secondary category (4-7 yrs post fire) include rapid deterioration of the fire killed trees.

B. Condition of Values At Risk – Values at risk in this assessment include the possible loss of life and damage to property. This natural hazard exists in all forest environments, but the Hayden Pass fire has amplified the hazards from the trees that are burned, killed or weakened by fire. These hazards cannot be eliminated from the burn area. Along roadways, trees have been killed and some hazards exist. Many of the obvious hazard trees have been felled or otherwise mitigated during the fire suppression efforts. This risk will continue to pose a problem for many years as trees continue to deteriorate and fall due to high winds and other naturally occurring weather events. (See Appendix A, Photo A3).

The largest risk is to the Rainbow Trail #1336 on the San Isabel N.F. and to a lesser extent the Black Canyon Trail #754 on the Rio Grande N.F. Along the Rainbow Trail, which traverses the fire for 11 miles many thousands of trees have been killed as a result of the fire and may fall and contact the trail. (See Appendix A, Photos A1, A2). The Black Canyon Trail traverses the upper end of the fire for 2 miles, but winds in and out of the fire perimeter at or near treeline. These trees will present hazards to forest users once these trails re-open and continue to pose a significant risk as the burned trees deteriorate.

III. Emergency Determination

The existing condition does not appear to present an emergency in itself. The newly burned trees have increased the risk to forest users. This will continue over time as stated above. However the proposal to complete trail work to protect the trail from increased runoff presents a definite risk to the workers implementing the work.

## IV. Treatments to Mitigate the Emergency

While Burned Area Emergency Response (BAER) funding cannot be used to mitigate all of the risks presented by the thousands of dead trees there are some effective ways to reduce risk to those involved in trail work proposed for BAER treatments. If work is completed on the two trails to prevent additional damage to the trail systems due to effects from the fire, a hazard tree removal system should go hand in hand with the efforts. The additional work proposed on the trails will require workers to be focused on the trail prism and preclude them from continuously observing overhead hazards. On a trip to the Rainbow Trail on July 24, 2016 I observed several trees that had tops blown out by a moderate thunderstorm downdraft adjacent to the Rainbow Trail. The proposal here would be to fell imminent hazard trees adjacent to areas where trail enhancement work or other stabilization work will be completed in areas of burned timber overstory. These hazard trees pose a very high risk to life and safety to the individuals performing this work.

Hazard trees would be trees within 2 tree lengths of the trails that have the potential to impact the trail that are at imminent risk of falling. Trees that were deemed an immediate hazard of failing within the time period where stabilization or trail work will be completed should be felled in advance of the work. The work would be similar to snagging of areas to make them safe for firefighting actions, where not all dead trees are felled, but those in the estimation of the resources working in the area deemed imminent safety hazards are felled and the hazard reduced.

The total length of trail through the burn area is equal to 13 miles. Of this 13 miles, 9 miles passes through moderate and high severity forested burn area and 1 mile passes through low severity forested burn area and the remaining miles are either unburned or were not forested. It is my estimation that along the trails that pass through moderate and high severity forested burn areas that an imminent hazard tree exists every 50 feet on each side of the trail. This would equal 211 trees per mile (5,280 feet/50 feet per tree X 2 sides of trail = 211 trees per mile of trail) in these areas. In low severity forested burn areas an imminent hazard tree exists every 100 feet on each side of the trail (5,280 feet/100 feet per tree X 2 sides of trail = 106 tree/mile of trail) and equals 106 trees per mile. The total number of trees estimated for felling is 1,479. This is equal to 5 miles of trail passing through moderate to high severity (211 tree/mile 5 miles = 1,055 trees) forested burn area and 4 miles of trail passing through low severity forested burn area (106 tree/mile 4 miles = 424 trees).

## V. Cost Estimation

An estimation of costs associated with this treatment is necessary to determine BAER eligibility. Using Department of Labor Statistics (Department of Labor, 2015) for hourly rates and my estimation of trees to be cut and estimated production rates, I have determined the total cost of this tree felling work.

## VI. Discussion/Summary/Recommendations

The Hayden Pass fire, encompasses 16,520 acres, has created an environment of increased risk for forest users. Forest users are now exposed to increased risk and potential injury due to hazard trees falling in trail corridors as well as dispersed camp sites. In addition any work within the fire perimeter entails associated risk from falling burned trees as described above. In order to undertake such work the hazard tree risk should be reduced.

### Recommendations

Prior to initiating BAER funded work within the burn area, hazard tree felling to reduce risk to implementation workers should be completed. In addition, risks associated with the burned trees falling onto the trails will be an ongoing, long term risk. Appropriate signage indicating the potential risk associated with falling trees within the burn area and along the trails needs to be put in place for the forest users to view. Due to the constant deterioration of trees within the burn area, diligent monitoring of tree hazards along road and trail corridors will need to be done. Removal of hazard trees will be required as needed. Fall trees within 1 ½ trees length on either side the trail corridors. Fall trees perpendicular to the slope if possible to facilitate any erosion control efforts. Hazard tree assessment and mitigation will need to be accomplished to facilitate any project work within the burn area. The home unit will need to develop a Job Hazard Analysis (JHA) that addresses any and all work within the burn area specifically detailing the risks associated with hazard trees.

## VII. Forested Area Recovery

Prior to the Hayden Pass Fire, forest cover types present across the burn area were spruce-fir, mixed conifer, aspen, lodgepole pine, pinon-juniper and Gambel oak. These six forest types were burned at low, moderate

and high severity as well as areas that remain unburned. In areas of moderate and high severity burn the majority if not all of the trees have been killed, while the low severity burn may have up to 50% of the trees killed in a mosaic pattern. An assessment of each forest type and recovery is discussed below.

General

Across the landscape of the Hayden Pass Fire many thousands of acres of trees and shrubs have been burned severely enough to kill most of the overstory. Over time as described below the different forest types will recover at different rates. There are no endangered tree or shrub species within the fire area and in some ways the fire has rejuvenated the forested landscape. Post fire, the forest will be a more age class diverse landscape with a wider variety of understory grass and shrub species. The resulting forest will be less susceptible to insects and disease problems for many decade to come. The forested areas may provide improved and additional wildlife habitat and increased forage.

Spruce-Fir Type

The spruce-fir type is composed mainly of Engelmann spruce and sub-alpine fir with scattered aspen and lodgepole pine. Engelmann spruce and sub-alpine fir are characterized by short seeding distances from overstory trees. The effective seeding distance is approximately 200'-300'. Where residual green spruce and fir are within the seeding distance, regeneration of tree species will begin within the next 3-5 years, depending on seed crops that are variable from year to year. There are many areas of moderate and high severity burn that are in the thousands of acres in size in the spruce-fir type, especially in the absence of any lodgepole pine or aspen, regeneration of trees will take decades to hundreds of years to occur due to lack of available seed source. Grasses, forbs and shrubs will regenerate in the next 2-3 years and dominate these sites for many decades.

In areas of spruce-fir forests that had components of lodgepole pine or aspen, tree regeneration will occur much sooner. Aspen and lodgepole pine are pioneer species and re-colonize burned areas quickly. Aspen sprouts and expands in area post fire while lodgepole pine has serotinous cones that open after fire passage and seed easily in the bare mineral soil. In areas of low burn severity where overstory spruce and fir remain, regeneration will take place sooner than the moderate and high severity burns due to the availability of seed sources.

Mixed Conifer Type

The mixed conifer type is composed mainly of Douglas-fir, white fir and ponderosa pine with scattered aspen and lodgepole pine. Douglas-fir, white fir and ponderosa pine are characterized by short seeding distances from overstory trees. The effective seeding distance is approximately 200'-300'. Where residual green Douglas-fir, white fir and ponderosa pine are within the seeding distance, regeneration of trees species will begin within the next 3-5 years, depending on seed crops that are variable from year to year. There are many areas of moderate and high severity burn that are in the thousands of acres in size in the mixed conifer type, especially in the absence of any lodgepole pine or aspen, regeneration of trees will take decades to hundreds of years to occur due to lack of available seed source. Grasses, forbs and shrubs will regenerate in the next 2-3 years and dominate these sites for many decades.

In areas of mixed conifer forests that had components of lodgepole pine or aspen, tree regeneration will occur much sooner. Aspen and lodgepole pine are pioneer species and recolonize burned areas quickly. Aspen sprouts and expands in area post fire while lodgepole pine has serotinous cones that open after fire passage and seed easily in the bare mineral soil. In areas of low burn severity where overstory Douglas-fir, white fir and ponderosa pine remain, regeneration will take place sooner than the moderate and high severity burns due to the availability of seed sources. The fire activity should favor ponderosa pine over the Douglas-fir and white fir in these areas due to the resistance of ponderosa pine to fire.

Lodgepole Pine Type

The lodgepole type is composed mainly of lodgepole pine with scattered aspen Engelmann spruce and sub-alpine fir. Lodgepole pine is characterized by serotinous cones that open after fire and re-establish new lodgepole pine easily after fire. The regeneration of lodgepole pine will begin in the first year after the burn and should be prolific with 500-3,000 seedlings established per acre. In areas where spruce and fir were intermingled with lodgepole pine prior to the fire, lodgepole will dominate the sites for many decades while spruce and fir will regenerate slowly over decades as seed sources become available from adjacent areas.

Where aspen was present before the burn, abundant aspen suckering will occur and compete with lodgepole pine for dominance of the site. Regeneration of grasses, forbs and shrubs will commence shortly and will be abundant compared to pre-fire conditions. As conifer trees grow to dominate the site herbaceous cover will diminish as canopy closure occurs.

Aspen Type

The aspen type is composed mainly of aspen pine with scattered aspen Engelmann spruce and sub-alpine fir and lodgepole pine. Aspen is characterized by root sprouting after fire that re-establishes new aspen stands. The regeneration of aspen will begin in the first year after the burn and should be prolific with 1,000-10,000 sprouts per acre. In areas where spruce and fir were intermingled with aspen prior to the fire, the aspen will dominate the sites for many decades while spruce and fir will regenerate slowly over decades as seed sources become available from adjacent areas. Where lodgepole pine was present before the burn abundant lodgepole pine regeneration will occur and compete with aspen for dominance of the site. Regeneration of grasses, forbs and shrubs will commence shortly and will abundant compared to pre-fire conditions.

Gambel Oak Type

The Gambel oak type is composed mainly of Gambel oak with scattered conifers. Gambel oak is characterized by root sprouting after fire that re-establishes new Gambel oak stands. The regeneration of Gambel oak will begin in the first year after the burn and should be prolific with 1,000-10,000 sprouts per acre. Most live conifers were likely killed in the Gambel oak stands that burned in the Hayden Pass fire. Gambel oak will dominate these sites for decades as conifer encroachment from adjacent live conifers slowly seed in under the oak and grow slowly in the low light conditions. Regeneration of grasses, forbs and shrubs will commence shortly and will be abundant compared to pre fire conditions. As Gambel oak grows to dominate the site herbaceous cover will diminish as canopy closure occurs.

Pinon-Juniper Type

The pinon-juniper type is composed mainly of pinon pine and rocky mountain juniper. These species are characterized by short seeding distances from overstory trees. The effective seeding distance is approximately 100-200'. Where residual green pinon and juniper are within the seeding distance, regeneration of trees species will begin within the next 3-5 years, depending on seed crops that are variable from year to year. There are many areas of moderate and high severity burn that are in the hundreds of acres in size in the pinon-juniper type and regeneration of trees will take decades to hundreds of years to occur due to lack of available seed source. Grasses, forbs and shrubs will regenerate in the next 2-3 years and dominate these sites for many decades.

## VIII. References


1. Pike and San Isabel National Forest, Cimarron and Comanche National Grassland, Forest Plan, 1984.
2. Wage Determination No: 1976-1351, Revision No: 47, 12/29/2015, DEPARTMENT OF LABOR, EMPLOYMENT STANDARDS ADMINISTRATION, WAGE AND HOUR DIVISION, WASHINGTON, D.C. 20210, 12/29/2015.


## IX. Appendices

Appendix A – Photos

Appendix A

Photo A1- High Severity Burn along Rainbow Trail

Photo A2- Moderate Severity Burn along Rainbow Trail

Photo A3- Low Severity Burn along Forest Road 6

Photo A4- High Severity Burn Mixed Conifer Type

Photo A5- Moderate Severity Burn Mixed Conifer Type