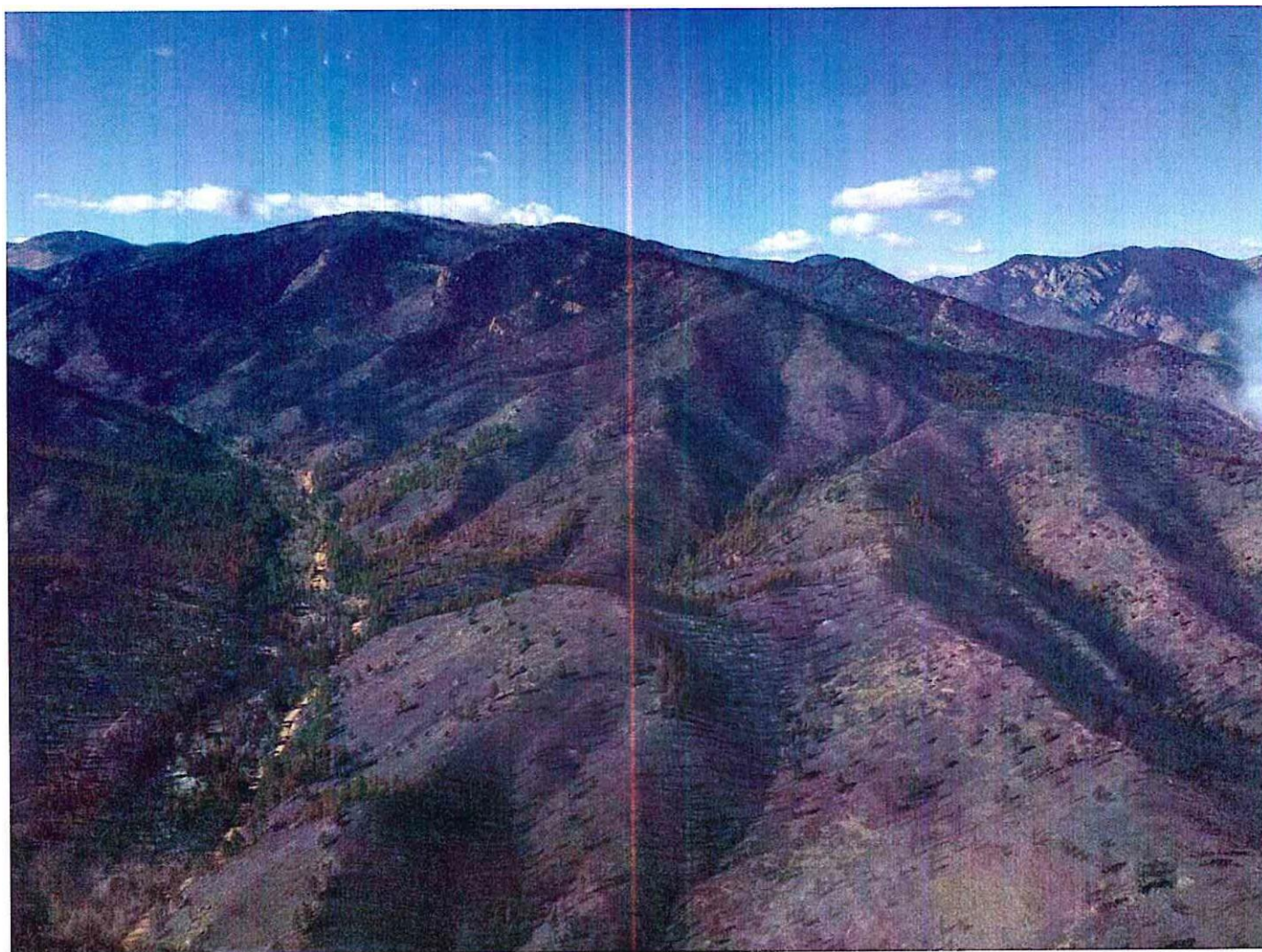


Junkins Fire

October/November 2016



Date of Report: November 3, 2016

BURNED-AREA REPORT
(Reference FSH 2509.13)**PART I - TYPE OF REQUEST****A. Type of Report**

- ☒ 1. Funding request for estimated emergency stabilization funds
☐ 2. Accomplishment Report
☐ 3. No Treatment Recommendation

B. Type of Action

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
☐ 2. Interim Report #_____
 ☐ Updating the initial funding request based on more accurate site data or design analysis
 ☐ Status of accomplishments to date
☐ 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION**A. Fire Name:** Junkins**B. Fire Number:** CO-CUX-002046**C. State:** CO**D. County:** Custer/Pueblo**E. Region:** 02**F. Forest:** PSICC**G. District:** San Carlos**H. Fire Incident Job Code:** PNKR8X17-1502**I. Date Fire Started:** October 17, 2016**J. Date Fire Contained:** N/A**K. Suppression Cost:** Est. \$11.5 million (as of 11/1/2016)**L. Fire Suppression Damages Repaired with Suppression Funds**

1. Fireline waterbarred (miles): 4 (as of 11/2/16)
2. Fireline seeded (miles): 0 (as of 11/2/16, line will be seeded this fall)
3. Other (identify): N/A

M. Watershed Numbers and Percentage Burned:

| 6th field sub-watershed | HUC | Total acres | Acres burned | Percent burned |
|--------------------------|--------------|-------------|--------------|----------------|
| North Hardscrabble Creek | 110200020301 | 35,522 | 3,714 | 11% |
| South Hardscrabble Creek | 110200020302 | 18,687 | 7,759 | 42% |
| North Creek | 110200021101 | 13,247 | 3,294 | 25% |
| Red Creek | 110200020602 | 30,660 | 528 | 2% |

N. Total Acres Burned:

| Land ownership | Acres burned | Percent of burned area |
|----------------------------|--------------|------------------------|
| USDA Forest Service (USFS) | 10242 | 55.7 |
| Private | 7736 | 42.0 |
| BLM | 134. | 0.7 |
| State of Colorado | 291 | 1.6 |

O. Vegetation Types

The dominant forest cover types present across the burn area include mixed conifer, aspen, ponderosa pine and oak. Major tree and shrub species represented on the landscape include: Ponderosa Pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), aspen (*Populus tremuloides*), Gambel Oak (*Quercus gambelii*) and limber Pine (*Pinus flexilis*).

P. Dominant Soils

- 708SB. Hechtman, dry-Guffey families complex, 40 to 60 percent slopes. Loamy-skeletal, mixed superactive Lithic Eutrocrepts
- 709YB. Cathedral family, moist-Rock outcrop complex, 40 to 150 percent slopes. Loamy-skeletal, micaceous, frigid Lithic Haplustolls
- 532M. M Herm family, 5 to 25 percent slopes. Fine, smectitic, frigid Typic Argiustolls
- 707Y. Larkspur family-Rock outcrop complex, 40 to 150 percent slopes. Loamy-skeletal, mixed, superactive, nonacid Lithic Cryorthents
- 13. Granite-Peeler complex, 25 to 50 percent slopes Loamy-skeletal, mixed Typic Cryoboralfs

Q. Geologic Types:

| Geologic Types | Acres |
|---|-------------|
| Xfh - Felsic and hornblendic gneisses, either separate or interleaved | 6810 |
| Yg - Granitic rocks of 1,400-m.v. age group (age 1,350-1,480 m.y.) | 6696 |
| KJde - Southeast Dakota:Dakota,Purgatoire,Morrison,Ralston Creek,Entrada Formations;Central Mountains Dakota:Morrison,Entrada Formations;Gunnison River area Dakota:Burro Canvon,Morrison,Wanakah,Entrada | 2884 |
| PPNf - Fountain Formation | 1011 |
| Keg - Carlile Shale, Greenhorn Limestone, and Graneros Shale | 236 |
| Ts - Santa Fe Formation | 154 |

R. Miles of Stream Channels by Order or Class:

| Stream Class | Length (Miles\ |
|--------------|----------------|
| Perenial | 10.9 |
| Intermittent | 75.1 |
| Ephemeral | 67.5 |
| Total | 153.4 |

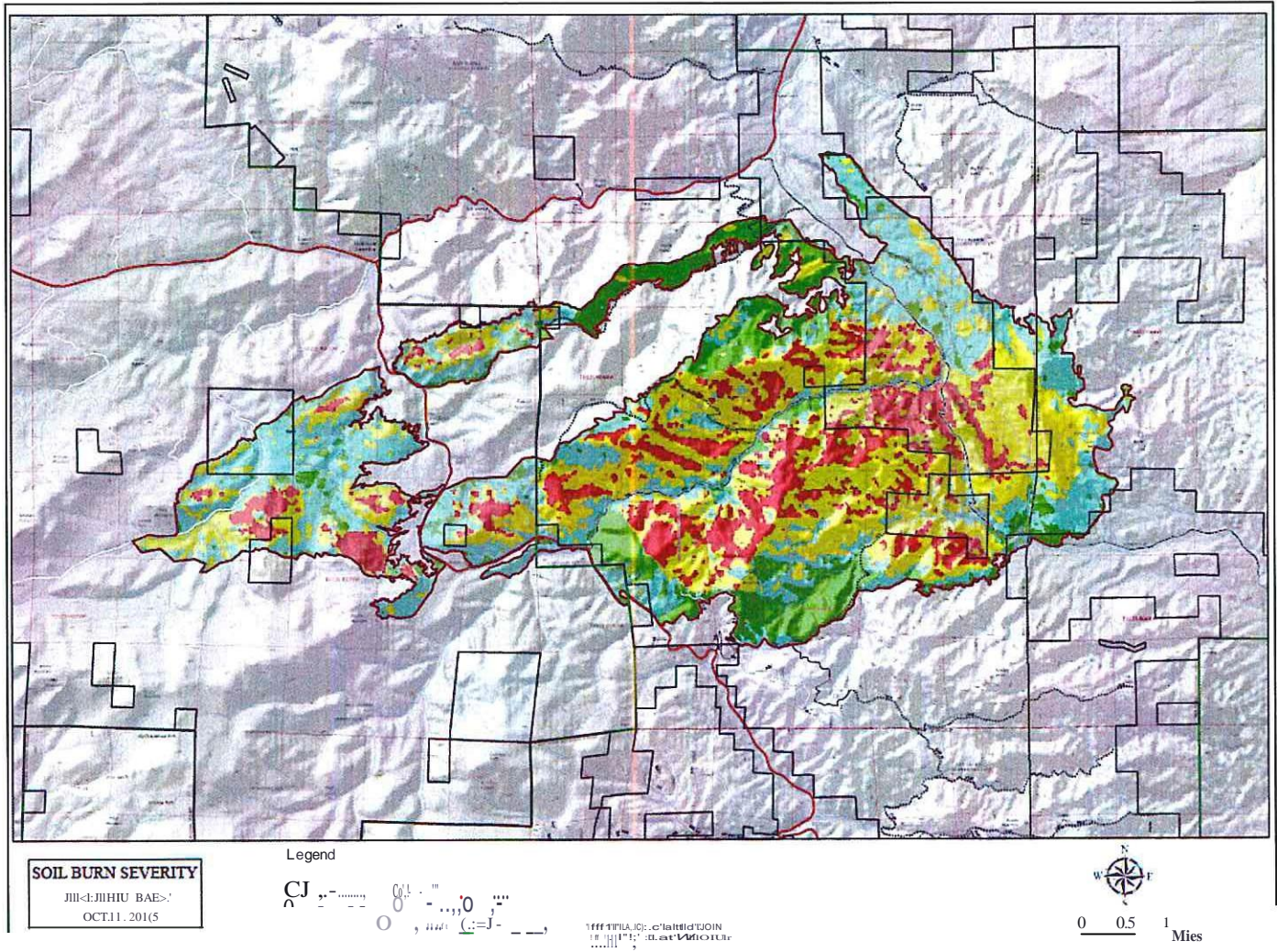
5. Transportation System

Trails: 8.8 miles Roads: 8.3 miles (NFS)

PART III • WATERSHED CONDITION

A. Soil Burn Severity for the Whole Burned Area (acres):

| SBS | Acres | Percent |
|----------------------|--------------|----------------|
| High | 3111 | 17 |
| Moderate | 6769 | 37 |
| Low | 5444 | 30 |
| Unburned or Very Low | 3083 | 16 |
| Total | 18403 | 100 |



Soil Burn Severity Summary

- In grass covered areas, soil burn severity was low. Changes in post wildfire runoff and erosion are expected to be low in these areas.
- In shrub dominated vegetation types, the soil burn severity was influenced by the density of pre fire vegetation and was predominantly low and moderate. The watershed response in moderately burned shrub areas is expected to be high until the native vegetation recovers.
- In forested areas on steep hill-slopes, burn severity was commonly moderate and high. Post fire erosion and runoff is expected to be high in these areas in the first few years following the fire.
- The burn pattern of the fire was such that majority (46%) of the fire area burned at low soil severity or remained unburned. A significant proportion (54%) of the burned area has moderate or high soil burn

severity characteristics. Unburned and low soil burn severity occurs primarily adjacent to the fire perimeter and on grass or sparse shrub areas. The overall burn severity pattern is primarily based on both fire weather conditions (fast moving wind driven fire) and pre-fire vegetation type, condition and density.

Soil Burn Severity by Modeled Drainages in Peak Flow Analysis:

| Modeled drainage | Unburned or Very Low acres(%) | Low acres(%) | Moderate acres(%) | High acres (%) |
|---------------------------|-------------------------------|--------------|-------------------|----------------|
| Middle Hardscrabble Creek | 2,908 (89%) | 196 (6%) | 127 (4%) | 31 (1%) |
| South Hardscrabble Creek | 10,353 (58%) | 1,879 (11%) | 3,390 (19%) | 2,099 (12%) |
| Johnson Gulch | 5 (1%) | 109 (29%) | 186 (50%) | 69 (19%) |
| Bad Canvon | -- | 3 (2%) | 64 (43%) | 84(56%) |
| School Section Draw | 15 (4%) | 69 (18%) | 524 (67%) | 38 (10%) |
| Trib. 1 | -- | 2 (1%) | 97 (49%) | 99 (50%) |
| Trib. 2 | 14 (2%) | 54 (8%) | 331 (47%) | 309 (44%) |
| Trib. 3 | 1 (2%) | 17 (37%) | 28 (60%) | 1 (2%) |
| Trib. 4 | -- | 25 (30%) | 39 (46%) | 20 (24%) |
| Uooer North Creek | 1,678 (42%) | 450 (11%) | 1498 (38%) | 346 (9%) |

B. Water Repellent Soils and Increased Runoff:

The degree and extent of water repellent soils is largely unknown due to limited collection of field data. The extent of water repellent soils is estimated to be 2,470 acres or 25% of the moderate and high burn severity areas. However, observations indicated strong repellency can occur at the surface over several vegetation types and moderate to high burn severities. Areas with coarse textured surface layers, high burn severities, and/or thick ash layers commonly had strong water repellency at a depth of 2-3 inches. Water repellent soils were also observed in unburned areas. The pattern of water repellent soils is likely to be patchy and mosaic.

Increased runoff due to hydrophobic conditions, reflected in the peak flow analysis contained in the Hydrology Report, is one of the factors that drives increases in hill-slope rill and sheet erosion. Hydrophobic layers will usually take six months to two years to break down. Plant root development, soil microbial activity, and freeze-thaw cycling all contribute to the degradation of hydrophobic conditions.

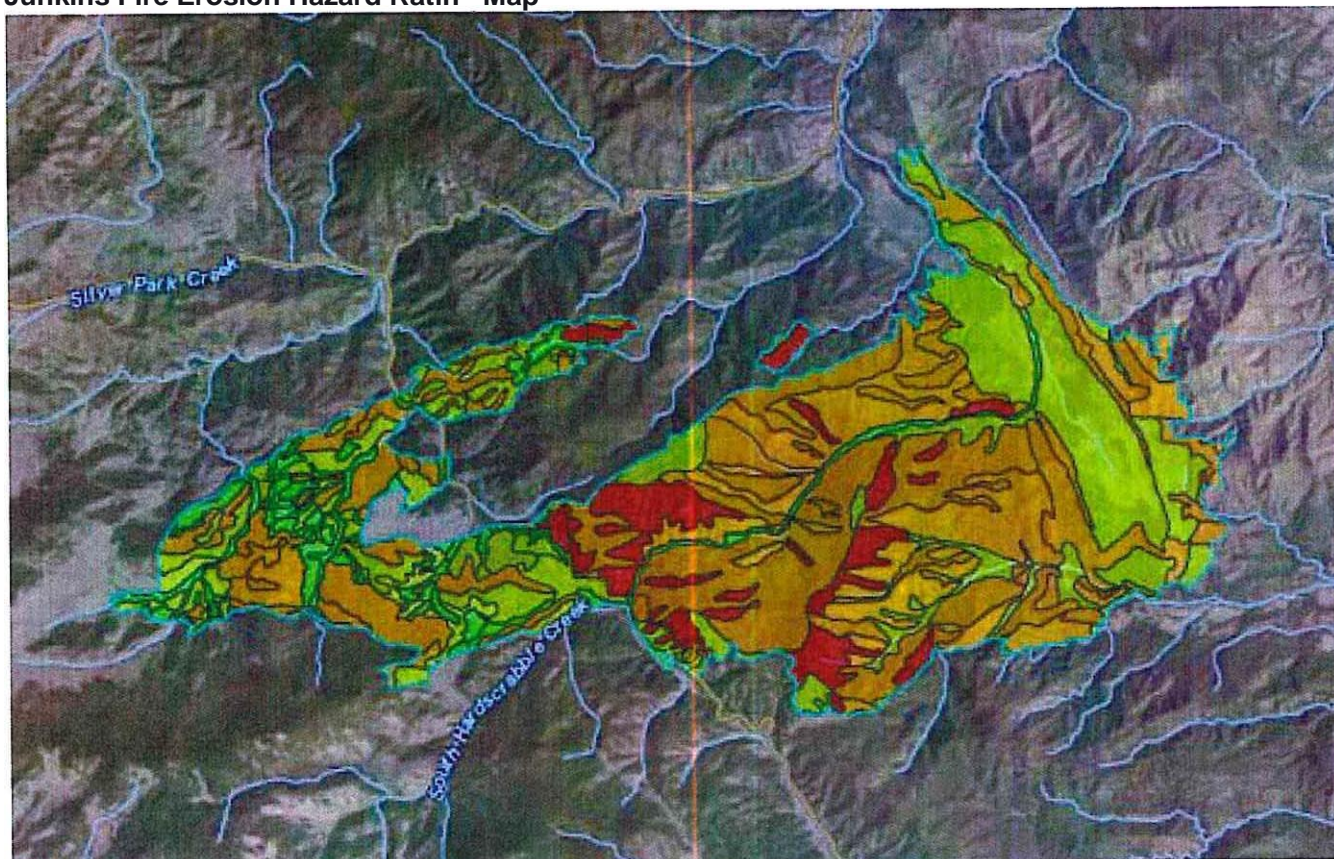
C. Soil Erosion Hazard Rating:

Pre-fire erosion hazard for burned area soils was obtained from existing soil survey erosion hazard rating information. The EHR interpretation is based on soil properties such as soil texture, slope, aggregate stability, infiltration rate, subsoil permeability, depth to restrictive layers, and soil rock content. Actual pre and post fire erosion potential is better reflected by the ERMiT modeling runs for this project.

Erosion Hazard Rating

| EHR | Slight | Moderate | Severe or Very Severe |
|-------|--------|----------|-----------------------|
| Acres | 1371 | 5,221 | 11,213 |

Junkins Fire Erosion Hazard Rating Map



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D. Erosion Potential

The following ERMiT results indicate that rates of erosion are very low **{generally close to zero}** in unburned densely forested areas. Rate of erosion will increase significantly to over **5-10 tons/acre** on steep forested hillslopes that were mapped at moderate or high soil burn severity. Extensive removal of forest floor ground cover occurred in these areas. The results also show that recovery of these areas is likely to occur within 3-5 years following the burn. In shrub dominated areas, the results are similar but slightly higher for the first 2 years following the fire. In high and moderate soil burn severity areas, it is highly likely that increased rates of soil erosion and sediment delivery to stream channels will occur, in the first and second year following the fire, particularly on steep slopes.

E. **Sediment Potential:** 6400 cy/square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. **Estimated Vegetative Recovery Period, {years):**

B. **Design Chance of Success, (percent):**

C. **Equivalent Design Recurrence Interval, {years) :** ..1Q_

D. **Design Storm Duration, {hours):** ..1.

E. Design Storm Magnitude, (inches): 1.56

F. Design Flow, (cubic feet/ second/ square mile): 141

G. Estimated Reduction in Infiltration, (percent):

H. Adjusted Design Flow, (cfs per square mile):

The fire was divided into drainages with "pour points" established at the bottom of burned watersheds, or where values at risk were located. In most cases the pour points are located where tributaries join the mainstem perennial stream. Watershed runoff response is referenced to these points.

Pre and post-fire peak flow predictions from Wildcat Rainfall-Runoff Hydrograph Model

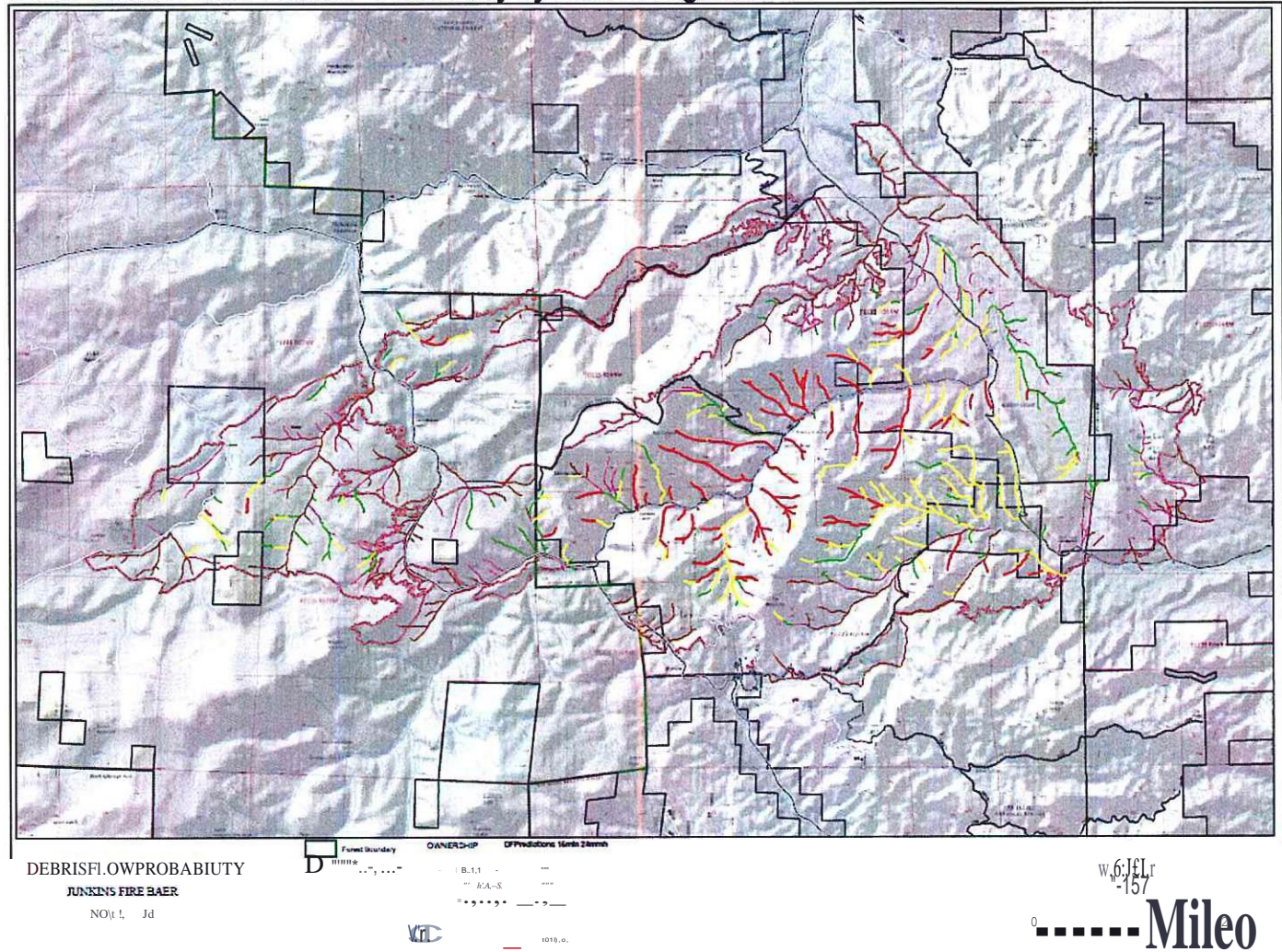
| Sub-Watershed | Percent NFS land | 10-year, 1-hour event | | Percent increase inflow |
|---------------------------|------------------|------------------------------------|-------------------------------------|-------------------------|
| | | Pre-fire estimated discharge (cfs) | Post-fire estimated discharge (cfs) | |
| Middle Hardscrabble Creek | 78% | 587 | 658 | 112% |
| South Hardscrabble Creek | 34% | 1,200 | 2,196 | 183% |
| Johnson Gulch | 100% | 133 | 324 | 244% |
| Bad Canyon | 100% | 54 | 172 | 316% |
| School Section Draw | 100% | 128 | 272 | 212% |
| Trib. 1 | 85% | 67 | 200 | 298% |
| Trib. 2 | 100% | 248 | 652 | 262% |
| Trib. 3 | 100% | 19 | 44 | 229% |
| Trib. 4 | 100% | 31 | 81 | 263% |
| Upper North Creek | 85% | 799 | 1397 | 175% |

Debris Flow Potential

Geologic Response: Debris flows are eminent in the Junkins Fire Area. Debris flows and flooding have occurred in the past under non-fire conditions. Within the burned area, some watersheds show a great deal of past debris slide/debris flow activity and it appears likely these areas could experience future debris flows.

Predictive debris flow model results were provided by the USGS-Geologic Hazards Division. http://landslides.usgs.gov/hazards/postfire_debrisflow/. The following discussion of debris flow risk is based on visual review of the maps generated from the USGS model and field observations. The map illustrates the probability of debris flow occurrence in burned area stream channels in response to a 15 minute rainstorm at a peak intensity of 24 mm/hour.

USGS Debris Flow Potential - Probability by Stream Segment



Summary of USGS Model Results and Field Observations

- Within burned area sub-watersheds and gulches tributary to South Hardscrabble and North Creek, the probability of debris flows is high to very high.
- The model is not designed to predict debris flow probability in larger watersheds so results are not available for the main stems of South Hardscrabble and North Creeks at the fire perimeter. Regardless, debris laden flows are likely to occur in these lower gradient reaches. It is likely suspended, dissolved and or floatable materials will be carried significantly further downstream but it is outside the scope of this assessment to quantify these effects.
- It is likely the increased probability of debris flow activity will subside within 3-5 years following the burn

PART V - SUMMARY OF ANALYSIS

Introduction/Background:

The Junkins Fire began October 17th, 2016 burning approximately 18,403 acres with 10,242 acres on the San Carlos Ranger District of the San Isabel National Forest, 7,736 acres on private property, 291 acres on State of Colorado land, and 134 acres on BLM. As of November 2, 2016 the fire was 95% contained. The fire burned within several sub-watersheds of the Upper Arkansas watershed within the Wet Mountain Range between the towns of Westcliffe and Wetmore, Colorado. The area is characterized by moderately steep to very steep, rocky, mountainous basins.

The soil burn severity (SBS) map shows approximately 54% burned at high and moderate soil burn severity. The rest of the fire was either low soil burn severity or unburned. Large contiguous areas of high and moderate soil burn severity occur throughout the burned area. Increased post fire soil erosion, runoff and debris flows within and downstream from these areas is likely to cause flooding, scouring and/or deposition of materials.

High intensity summer thundershowers are the precipitation events of primary concern. Based on historic precipitation patterns, thunderstorms are likely to occur in the mid-summer months. The risk of flooding and erosional events has increased as a result of the fire, creating hazardous conditions within and downstream of the burned area.

The duration, volume, and location of debris flows and stream channel processes are highly influenced by rainstorm patterns and intensities. The predictive values represented in this report are based on rapid assessment models for specific high intensity/short duration storms. Recovery of pre-fire slope stability and watershed hydrologic response is dependent on many factors and typically occurs within 3-5 years following the fire. Recovery of high burn severity areas is slower because little or no vegetative ground cover remains, the potential for needle cast is low and soils may be impacted by fire effects.

A. Describe Critical Values/Resources and Threats:

Potential impacts on human life and safety, property, natural resources and cultural resources were identified by the BAER team. Values at risk include roads, trails, one trail bridge, critical habitat for T&E species (Mexican Spotted Owl and Canada Lynx), recovery of native vegetation due to increased risk for establishment and/or spread of noxious weeds, historic properties (campgrounds, roads, CCC camp, and cabin), and spring developments.

The BAER team began assessing the area for post-fire emergencies on October 28, 2016. In that time the team has identified the following values at risk and post-fire threats. Interim reports may be submitted as additional assessments are completed and/or the need to repair or maintain BAER treatments emerges.

The risk matrix below, Exhibit 2 of Interim Directive No.: 2520-2010-1 was used to evaluate the Risk Level for each value identified during Assessment. Only values at risk that had a risk of Intermediate or above are discussed in this report but all values at risk inventoried and described by the BAER Team are contained in a value at risk tracking spreadsheet (project file)

| Probability of Damage or Loss | Magnitude of Consequences | | |
|-------------------------------|---------------------------|---------------------|-----------------|
| | Major | Moderate | Minor |
| | RISK | | |
| Very Likely | Very High | Very High | Low |
| Likely | Very High | High | Low |
| Possible | High | Intermediate | Low |
| Unlikely | Intermediate | Low | Very Low |

Human Life and Safety

1) Forest Service Roads, Trails, and Trail Bridges

There is a **Very High** risk to Forest visitors and Government employees using and working in the National Forest along NFSR 386 (South Hardscrabble Rd). This includes but is not limited to roads (FR 386, South Hardscrabble Rd), trails (Rudolph Mtn Trail), and popular dispersed camping areas within the South Hardscrabble Canyon on National Forest lands. Loss of control of water will result in flooding on roads, trails and dispersed camping areas occupied by users. Debris flows, rock fall, tree fall, landslides, road washouts, and entrapment are the major hazards to users.

There is also **Very High** risk to Forest users utilizing the existing trail bridge to access the North Creek Dispersed Sites. Flooding, superstructure failure after comprising events, and entrapment are risks at this site.

There is a **High** risk to Forest users on the Lefthand Fork trail due to flooding, debris flows, erosion, and hazard trees.

There is an **Intermediate** risk to Forest users on the Forest Service portion of NFSR 387, Middle Hardscrabble trail, and within the dispersed sites in the Roundtop Mountain area.

2) Non Forest Service Roads & Properties

There are risks associated with flooding, and in some cases debris flows caused by post-fire conditions to the traveling public and private citizens on County Roads 386, 387, and 389, private drives and bridges crossing North Creek, Rosita Road, Hwy 165, and private homes on and around County Road 389 in Greenwood. Field investigations at each of these sites were conducted by the BAER team but risk assessments were not completed as these are not Forest Service properties or values. The BAER team will communicate the findings of their field investigations to partners (NRCS, County Emergency Managers, COOT, County Road & Bridge Departments, etc.) and private residents as soon as possible.

Property

1) Forest Service Roads

National Forest System Roads impacted by the Junkins Fire are located on the San Carlos District of the San Isabel National Forest. Of the 8.3 miles of affected FS Roads, 3.9 miles are classified as suitable for passenger vehicles (NFSR 386 & 387, Maintenance Level 3) and 4.4 miles are classified as suitable for high clearance vehicles (NFSR 321, 383, 386 A,B,C,D,E,F,G,H,L Maintenance Level 2.)

- On the southern portion of the fire perimeter, NFSR 321 and 383 are accessed by CO-165 and have several spur roads affected by the fire. However, burn severity is low and drainages are short so probability of damage is unlikely.
- On the northeast perimeter, NFSR/County Road 387 passes through low/moderate burn severity and will have sedimentation and drainage impacts but is entirely the jurisdiction of Custer County in areas of concern.
- NFSR/County Road 386 is constructed on a bench in the South Hardscrabble canyon which is mixed moderate/high burn severity with erodible cliffs on one shoulder and a proximal creek on the other shoulder. The road is mostly USFS jurisdiction and will be subjected to large scale erosion, debris, and sedimentation in coming years.
- NFSR spurs (386 A,B,C,D,E,F,G,H,L) are also constructed on a bench in the South Hardscrabble canyon and will be subjected to the same large scale erosion, debris, and sedimentation as NFSR 386. These spurs are used primarily for access to dispersed camp sites.

| Table 11. Roads BAER Risk Ratinas | | | |
|--|--------------|--|--|
| Low | Intermediate | High | Verv Hiah |
| <ul style="list-style-type: none"> • NFSR 321 • NFSR 383 • NFSR 387 | | <ul style="list-style-type: none"> • 386 A,B,C,D,E,F,G, H,L | <ul style="list-style-type: none"> • NFSR 386 |

Roads were assessed by both location (Probability of Damage or Loss) and primary use (Magnitude of Consequences.) Regularly used roads in highly impacted drainages with inadequate ability to handle projected flows rank High or Very High. Less traveled roads in more secure locations with acceptable drainage features rank either Intermediate or Low.

| Table 12. NFS Roads Risk Assessment | |
|-------------------------------------|-------|
| Risk | Miles |
| Very High | 3.8 |
| High | 0.2 |
| Intermediate | 0 |
| Low | 4.3 |
| Total | 8.3 |

Additionally, roughly 1.2 miles of unauthorized 2-track roads access the Forest from system roads and private lands. Poor or inexistent drainage features on these entrenched tracks will channel increased runoff, eroding nearby areas and causing water quality harm and large scale sedimentation in the watershed. Additionally, such tracks that branch off system routes put these established road prisms and drainage features at risk due to flow and sediment concentration. More tracks were exposed by the fire but this mileage was prioritized by impact to system roads and/or riparian areas.

2) Trails, Trail Bridges, and Popular Dispersed Camping Areas

Emergency conditions exist for specific trails and sections of trail within the burned area as well as one trail bridge accessing an abandoned camp ground that is now used for dispersed camping. These emergency conditions are based on threats associated with anticipated post wildfire impacts on trails and trail users. Threats to trails include excessive erosion of the trail tread caused by interception and diversion of runoff from steep burn hill slopes. Trails may also be impacted where they intersect with drainages. Approximately 4 miles of the Rudolph Mountain Trail (NFST 1327) is within high and moderate burn severity and is very likely to sustain damage due to increased flows, erosion, sediment, and debris flows. The trail bridge leading to the Old North Creek Campground is also likely to sustain damage due to increased ash and debris laden flows within North Creek. Life and safety of trail and trail bridge users is also at risk in some areas within the burn. This determination is based on professional judgement and field based identification of segments of trail where implementing treatments would effectively lower the risk of major trail damage.

| Value at Risk | Risk Rating |
|------------------------------------|--------------|
| Middle Hardscrabble (TR 1328) | Low |
| Rudolph Mountain Trail (TR 1327) | Very High |
| Left Hand Fork Trail (TR 1325) | Intermediate |
| North Creek Dispersed Sites Access | High |
| Roundtop Mtn Dispersed Sites | Low |
| Middle Hardscrabble (TR 1328) | Low |

3) Wells and Spring-boxes

A few spring developments exist within the Junkins fire perimeter. Historic North Creek Campground and Historic Florence Campground both have closed wells with active water rights. Also, a springbox with pipe-line to water tank exists at the historic Mingus Cabin. Threats to these pieces of infrastructure were determined to be **Low** due to the unlikelyhood of damage occurring.

4) Land Survey Monuments

Identified monuments within the fire perimeter delineate National Forest lands from private or other agency ownership and are at **High** risk from post-fire flooding in impacted drainages and on highly burned slopes. Erosion and sedimentation potential in these areas are likely to obscure, damage or destroy these markers. If these monuments are lost it will be a costly endeavor to reestablish the boundaries based on controlling land survey monuments in areas unaffected by the fire.

5) Non Forest Service Roads, Properties, and Irrigation Ditches

There are risks to road infrastructure, bridges, drainage features, and private residences associated with flooding, erosion, sedimentation, and debris flows caused by post-fire conditions. Specifically County Roads 386, 387, and 389, private drives and bridges crossing North Creek, Rosita Road, Hwy 165, and private homes on and around County Road 389 in Greenwood may be at risk. Field investigations at each of these sites were conducted by the BAER team but risk assessments were not completed as these are not Forest Service properties or values. The BAER team will communicate the findings of their field investigations to partners (NRCS, County Emergency Managers, COOT, County Road & Bridge Departments, etc.) and private residents as soon as possible.

Private irrigations ditches also exist within the burn perimeter and may be at risk due to sedimentation and flooding. Although a formal risk assessment was not completed for this value, the BAER team will communicate their findings to ditch owners and State Water Commissioners as soon as possible to keep them apprised of potential risk.

Natural Resources

1) Ecosystem Stability and Vegetation Recovery (Invasive Weeds)

There is an emergency situation for the recovery of native vegetation due to significant threats from noxious weed establishment and/or spread affecting natural plant community integrity, wildlife habitats, and watershed values. It is likely that existing weed infestations will increase, particularly in moderate to high soil burn severity areas, due to conditions favorable to accelerated growth and reproduction, and release from competition with native plant communities. In addition, the unknowing introduction and dispersal of invasive weeds into areas disturbed by fire suppression and rehabilitation has the potential to establish persistent weed populations. Thus the risk to native species recovery is **Very High**.

Invasive weed species that exist within and adjacent to the fire area include: Cypress Spurge (*Euphorbia cyparissias*), leafy spurge (*Euphorbia esula*), diffuse knapweed (*Centaurea diffusa*), musk thistle (*Carduus nutans*), Canada thistle (*Cirsium arvense*), Houndstongue (*Cynoglossum officinale*), Common mullein (*Verbascum thapsus*), and Cheatgrass (*Bromus tectorum*).

2) Municipal and Irrigation Water Supply - Water Quality

Water Quality - Municipal Water Supply

Wildfires primarily affect water quality through increased ash laden flows and sedimentation. Primary impacts include color changes and increased sediment, settleable material, suspended material, and turbidity. Post-fire delivery of organic debris to stream channels can potentially decrease dissolved oxygen concentrations in streams. Fire-derived ash inputs can increase pH, alkalinity, conductivity, and nutrient flux (e.g. ammonium, nitrate, phosphate, and potassium). Although these changes are generally short lived, they could impact drinking water providers drawing from the Arkansas River.

The most noticeable effects on water quality will be likely increases in sediment and ash from the burned area into the tributaries within the burned area, the Arkansas River, and other waterbodies downstream of the fire area. Sediment and ash laden flows are expected to occur in response to high intensity summer thunderstorms.

Post-fire water quality is not anticipated to impact municipal or domestic water supply where wells are used as intakes. The closest surface water supplies are approximately 7 miles downstream, near Buelah, CO and 33 miles downstream, near Pueblo, CO.

The loss of riparian shading and the sedimentation of channels by floods and debris flows may increase stream temperature. Floods and debris flows will likely entrain large material. Debris flows are likely to occur within and directly downstream from steep burned watersheds. In response to short duration rainfall events, deposition of most large entrained material is likely to occur on the gently sloping terrain

further downstream from the burned area without making it all the way to the Arkansas River. However, some material could potentially make it to the river during higher intensity/long duration rainfall events.

Water Quality - Irrigation Water Supply

Impacts to irrigation water quality could occur downstream of the burned area. These impacts would occur in direct response to heavy rain events and subside quickly following storm generated peak flows. Irrigation water providers and users may need to test periodically to ensure water quality meets standards for irrigation or livestock watering. Sedimentation and/or other physical damage to water diversion, conveyance or storage infrastructure is described in the "property" section of this report.

Neither surface water supplies nor irrigation water supplies are Forest Service owned thus pertinent BAER/Jeam findings will be communicated to partners and water providers (Pueblo Board of Water Works, town of Buelah, etc.) and **no risk rating** was assigned.

3) Soil Productivity

Although very high rates of post fire soil erosion are expected to occur and the risk was determined to be **High**, an emergency for long-term soil productivity was not caused by the direct effects of fire. Despite high rates of post-fire soil erosion (sediment transport, increased overland flow and wind), soils in the burned area will support recovery of fire adapted vegetation.

4) Critical habitat or suitable occupied habitat for federally listed threatened or endangered terrestrial, aquatic animal or plant species on NFS lands

Mexican Spotted Owl: The Junkins Fire transformed approximately 2,475 acres of suitable MSO Critical Habitat into unsuitable habitat. Post-fire natural processes in these areas could further reduce the quality and quantity of the MSO Critical habitat if significant amounts of habitat were lost due to erosion of uplands and riparian habitat and invasive weeds establish over a large areas. Natural forest and riparian area regeneration will eventually result in those areas transitioning back to suitable MSO habitat. The risk assessment derived a Very High probability of damage to MSO Critical Habitat with potential loss of riparian habitat caused by streambank instability, scouring, and subsequent deposition, which could reduce the quantity of prey availability along these creeks into the future.

Canada lynx: The Junkins Fire transformed approximately 1,641 acres of suitable lynx habitat into unsuitable habitat. Post-fire natural processes in these areas could further reduce the quality and quantity of the lynx habitat if significant amounts of habitat were lost due to erosion of uplands and riparian habitat and invasive weeds establish over a large areas. Natural forest and riparian area regeneration will eventually result in those areas transitioning back to suitable lynx habitat. The risk assessment derived a **Low** risk to Canada lynx, federally listed as *threatened*, located within and/or in proximity to the Junkins Fire burned area.

5) Cultural Resources

Values at risk are defined as "cultural resources which are listed or potentially eligible to the National Register of Historic Places (NRHP), Traditional Cultural Properties, or Indian Sacred sites on National Forest System Lands. Twenty-two cultural resources have been identified within the area of potential effect. Of these, 6 resources are eligible for the national register, and 1 is potentially eligible.

Historic and cultural resources potentially at risk from post wildfire processes include historic roads, drainage features, a CCC camp, two campgrounds, and a historic cabin. Risks to these values due to flooding, erosion, sedimentation, and debris flows are listed below. Field findings at non Forest Service values such as the County jurisdiction portions of 386 and 387 will be communicated to partners (County Road & Bridge) as soon as possible.

| Value at Risk | Risk Rating |
|--|--|
| Hardscrabble CCC Camp | Very High |
| Historic North Creek Campground | High |
| North Creek Road (FR 387) | Verv Low |
| North Creek Road Historic Drainage Features (FR 387- County Jurisdiction) | No Risk Rating (Non Forest Service value) |
| South Hardscrabble Road (FR 386) | High |
| South Hardscrabble Road Historic Drainage Features (FR 386- County Jurisdiction) | No Risk Rating (Non Forest Service value) |
| Historic Hardscrabble Camoaround | Low |
| Mingus Historic Cabin | Verv Low |
| 5CR607.3 (Hwy 165) | Verv Low |

B. Emergency Treatment Objectives:

1. Roads

- Minimize or prevent post fire impacts on selected NFS roads (or sections of road)
- Minimize or prevent impacts on soil and water resources resulting from increased post fire erosion and storm water runoff from roads
- Minimize risk for potential impacts to the life and safety of road users

2. Trails

- Storm proof trails (these treatments are primarily designed to prevent the uncontrolled channeling and resultant damage to trails within the Junkins Fire and to reduce erosion and further watershed degradation by control of run-off within the trail prism)
- Close selected trails to minimize risk for potential impacts to the life and safety forest visitors

3. Ecological integrity - Reduce the potential for impaired vegetative recovery and introduction/spread of invasive weeds by conducting detection surveys and rapid response eradication efforts where feasible.

4. Heritage - Heritage support to other proposed treatments is needed.

5. Interagency Coordination - Continue to work with affected parties and stakeholders.

6. Protection and Safety: Implement closure and warning sign treatments to protect the life and safety of forest visitors and workers.

7. Land Survey Monuments - Preserve the location of land survey monuments on the Forest boundary that are located in areas at risk of flash flooding, erosion, and/or deposition.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:

Land **70**% Channel **80**% Roadsffrails **80**% Protection/Safety **95**%

D. Probability of Treatment Success

| | Years after Treatment | | |
|-------------------|-----------------------|-----|-----|
| | 1 | 3 | 5 |
| Land (weed) | 75 | 95 | 100 |
| Channel | n/a | n/a | n/a |
| Roads/Trails | 75 | 95 | 100 |
| Protection/Safety | 95 | 100 | 100 |

E. Cost of No-Action (Including Loss): \$254,000

F. Cost of Selected Alternative (Including Loss): \$92,626.

The VARTool was used to calculate an overall benefit/ cost ratio of 1:6 for implementing road, trail and land survey monument protection treatments.

G. Skills Represented on Burned Area Survey Team:

| Name | Specialty | Home Unit |
|----------------|--------------------------------|----------------------|
| Eric Schroder | <i>Team Lead/Soils</i> | Arapaho/Roosevelt |
| Cait Woods | <i>Team Lead Trainee</i> | PSICC |
| Aaron Lamp | <i>Roads Engineer</i> | PSICC |
| Jamie Krezelok | <i>Hydrologist</i> | PSICC |
| Ron Torretta | <i>Biologist</i> | PSICC |
| Ben Lara | <i>Recreation</i> | PSICC |
| Alex Rudney | <i>Timber</i> | PSICC |
| Jim Schmidt | <i>GIS</i> | Stanislaus NF - (AD) |
| Steve Sanchez | <i>Partnership Coordinator</i> | PSICC |
| Nick Padilla | <i>Range/Weeds</i> | PSICC |
| Brian Haas | <i>Archeology</i> | GMUG |
| Misty DeSalvo | <i>PIO</i> | PSICC |

Partners and Collaborators

- NRCS
- CoCo
- Private Land Owners
- Municipal Water Providers
- NOAA
- County and State Road and Bridge
- Sheriffs Departments
- BLM
- State Land Board
- Army Corps of Engineers
- DHSEM
- COOT
- Parks and Wildlife
- Area Fire Departments
- County OEMs

- County Commissioners
- State Water Commissioners

H. Treatment Narrative:

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

1) Land Treatments

Noxious Weed Detection and Eradication Treatments

- Treatment Type (spring/summer 2017):
 - o Treat known weed infestations
 - o Conduct weed detection surveys
 - o Treat newly found infestations from detection surveys
- Treatment Objective:
 - o Decreased noxious weed establishment/dispersal
 - o Early detection/rapid response of new infestations or new invading species
 - o Reestablish desirable plants and a healthy plant community.
- Treatment Description:
 - o **Treat known weed infestations.** Treat existing known populations of weeds including the South Hardscrabble Road (NFSR 386), North Creek Road (NFSR 387), other known forest roads and trail infestations, and riparian meadows
 - o **Conduct weed detection surveys.** Determine the need for future treatments,. noxious weed monitoring assessments will be conducted to document if increased noxious weed invasion is occurring within the wildfire perimeter, concentrating in the roadless areas. Individuals conducting the monitoring will be trained to recognize and treat noxious weeds and will treat any infestations encountered. Monitor all roads within the fire area for new infestations, as well as areas of moderate to high soil burn severity, and areas impacted by suppression and rehabilitation activities, such as bulldozer lines, helispots/heliports, drop points, and staging areas. Prioritize areas proximal to known infestations. Monitor in the spring as soon as ground is snow free. Continue monitoring efforts throughout the subsequent growing season.
 - o **Treat newly found infestations from detection surveys.** Focus on priority species: Cypress Spurge (*Euphorbia cyparissias*), leafy spurge (*Euphorbia esula*), myrtle spurge (*Euphorbia myrsinites*) and any new high priority species brought in from suppression activities.

| Item | Unit | Unit Cost | # Units | Total |
|--|----------|-----------|---------|-----------------|
| Treatment (existing): Labor/equipment/supplies(2 person crew) | days | \$377.85 | 20 | \$7,557 |
| Detection: Labor/equipment (1 person crew) | days | \$110.88 | 120 | \$13,306 |
| Treatment (new): equipment/supplies/PPE | lump sum | \$9,500 | 1 | \$9,500 |
| Fleet for Seasonal | month | \$338.00 | 6 | \$2,027 |
| Subtotal Land Treatments | | | | \$32,390 |

Unauthorized Road Decommissioning/OHV Trespass

Approximately 1.2 miles of unauthorized roads access Forest lands and threaten system roads and/or adjoining waterways with magnified erosion and sedimentation. Decommissioning is recommended as an effective treatment to minimize erosion, accelerate natural recovery, effectively prevent trespass in the area, prevent expansion of impacts, lower risk for potential threats to life and safety and lower impacts to riparian

habitats and water quality downstream. Decommissioning will involve de-compacting the traveled path and re-contouring impacted slopes to improve drainage distribution and increase infiltration during storm events.

| Item | Unit | Unit Cost | # Units | Total |
|--|-------|------------|-------------------|----------------|
| Contract | Miles | \$2,460 | 1.2 | \$2,952 |
| Archeological Decommissioning Consultation | Miles | \$1,492.00 | 1.2 | \$1,790 |
| | | | Total Cost | \$4,742 |

Land Survey Monument Protection

Approximately 15 existing survey monuments are at risk due to their location within zones where erosion and deposition are likely to occur on severely burned slopes. Loss of bearing trees in addition to post fire erosional and depositional processes could impact our ability to locate the monuments going forward.

BAER treatments include:

- Protection of official bearing trees by painting the existing tree and attaching a sign to it
- Cutting the burned tree to a stump and attaching a sign to the stump
- Setting a steel fence post along-side the new monument so that it can be easily identified

| Item | Unit | Unit Cost | # Units | Total |
|-----------|----------|-----------|---------|----------------|
| Treatment | Monument | \$150 | 15 | \$2,250 |

2) Roads Treatments

Of the 8.3 miles of NFS Roads impacted by the Junkins Fire, 4.0 miles are expected to be threatened directly by increased storm flows. In addition to impacts to the road & property, erosion of roads contributes greatly to sedimentation in adjacent stream channels. Treatments to protect life and safety, property and natural resources in reference to roads include:

- Maintaining drainage features to accommodate increased post-fire runoff. This covers clearing of ditches, buried culvert outlets and catch basins.
- Improving any such features that are inadequate for the projected flow increases. Drain dips were preferred for large and impacted drainages but culverts were deemed more suitable for smaller drainages that were located on curves or where dips were judged infeasible.
- Armoring road fill slopes that are adjacent to active streams. This covers the placement of large riprap with a geotextile backing on vulnerable slopes with little or no vegetation.
- Temporary road closures accomplished by means of gates, signing and enforcement.
- Road inspection and subsequent resolution of damages after significant storm events. This includes single mobilization trips of machinery to repair damaged fill slopes and drainage features or clear rock and debris slides which compromise drainage in the alignment.

Trail Bridge Temporary Removal

Treatment covers dismantling the trail bridge accessing the historic North Creek Campground on CR 387 to protect human life and safety as well as the historic structure itself. Work will include dismantling the superstructure where necessary, lifting from abutments and storing the bridge outside the affected floodplain.

| Road Treatment Item | Estimated Quantity | Unit | Unit Price | Cost |
|---|--------------------|------|------------|------------|
| Drainage Maintenance - Spot Clean Ditches | 2500 | LF | \$1.68 | \$4,200.00 |
| Drainage Maintenance - Clean Culverts | 204 | LF | \$38.00 | \$7,752.00 |
| Reinforce Existing Drainage - Install 24" x 40' Culvert | 4 | EA | \$2,037.50 | \$8,155.00 |

| | | | | |
|---|-----|------|-------------|-------------|
| Reinforce Existing Drainage - Install Drain Dip | 5 | EA | \$2,028.00 | \$10,140.00 |
| Channel Riprap Armoring and Road Stabilization | 180 | TON | \$97.00 | \$17,492.33 |
| Heavy Gate Closure (24' Double Gate, Signing) | 2 | EA | \$13,156.00 | \$26,312.00 |
| Storm Inspection and Response | 4 | EA | \$2,740.00 | \$10,960.00 |
| Trail Bridge Removal | 1 | JOB | \$3,897.40 | \$3,897.40 |
| Engineering Time/Vehicle and Contract Bonding | 1 | LUMP | \$6,095.69 | \$6,029.36 |
| <i>Costs per PS/CC Roads /O/Q Contract Averages</i> | | | Total Cost | \$94,938 |

3) Trails Treatments

Trail Treatment Description and Costs

Trail Treatments Description: An emergency determination was made that the following BAER treatments are required on segments of Rudolph Trail in the Junkins Fire burned area to protect infrastructure and reduce life/safety hazards:

- Trail stabilization
- Treatment of Hazard Trees
- Temporary trail closure
- Warning Signs
- Storm Inspection and Response

| Table 2: Objective and cost for each type of treatment | |
|---|---|
| Treatment Type (including monitoring if applicable) | Trail Stabilization |
| Objective | Reduce loss of infrastructure and erosion and sediment transport to downstream resources |
| Description | Construct rolling dips, water bars, protection at drainage crossings, outcropping, establishing critical edge |
| Cost | Crew time and supervision \$3000/mile |

| Treatment Type (including monitoring if applicable) | Hazard Tree Treatment |
|---|---|
| Objective | Protect crew implementing trail stabilization |
| Description | Identify and drop hazard trees in work areas, lay across slope and stake to provide sediment flow mitigation see forest BAER report for details * |
| Cost | Crew time and supervision \$29,819.52* |

| Treatment Type (including monitoring if applicable) | Temporary Trail Closure |
|---|--|
| Objective | Public and agency personnel safety, mitigate further degradation of resource |
| Description | Temporary closure of areas of concern by Forest Order until emergency conditions are reduced by revegetation of burned slopes, closure signs at trailheads |
| Cost | Admin. time, sign installation and enforcement. \$3900 |

| Treatment Type (including monitoring if applicable) | Warning Signs |
|---|----------------------|
|---|----------------------|

| | |
|-------------|---|
| Objective | Reduce risk to public and agency personnel with signage reminding them of hazards of burned areas |
| Description | Place warning signs at trailheads and along trails that will stay open in burned areas |
| Cost | Signs and Crew time \$400/each |

| | |
|---|---|
| Treatment Type (including monitoring if applicable) | Storm Inspection/Response |
| Objective | Provide trail and bridge inspection and maintenance throughout the designated storm season to reduce infrastructure and resource damage |
| Description | Keep drainage structures functional by cleaning sediment and debris, check and repair streambank protection where access is required. |
| Cost | \$690/day |

In summary, the prescribed treatments for trails and dispersed sites are designed to help preserve life, safety and infrastructure. Trail treatments are designed to minimize damage caused by increased runoff and sediment transport across steep slopes, hazard trees and erosion from drainage channels in correlation with the severity of burn areas. Installation of the prescribed trail treatment will mitigate potential risk and further trail damage. The risk assessment for the Rudolph Mountain (1327) showed a very likely probability of damage with high consequences resulting in a very high risk. The risk assessment for the Left Hand Fork (1325) showed a possible probability of damage with moderate consequences resulting in an intermediate risk. The risk assessment for dispersed sites (South Hardscrabble, Old North Creek CG & Old Florence CG) showed a very likely probability of damage with major consequences resulting in a very high risk. Round Top Mountain site assessment resulted in a possible probability of damage with moderate consequences resulting in low risk

| Item | Unit | Unit Cost | #of Units | Cost |
|---|-------|-----------|-----------|-----------------|
| Trail Stabilization (total trail miles of high & moderate severity burn, cost includes contractor and USFS oversight) | Mile | \$3000 | 4 | \$12,000 |
| Trail Stabilization vehicle costs | Mile | \$0.25 | 1000 | \$250 |
| *Hazard Tree Removal for Stabilization Efforts | Miles | \$2500 | 2 | \$5,000 |
| Trail Closure Implementation | Each | \$2000 | 1 | \$2000 |
| Warning Signs | Each | \$400 | 4 | \$1600 |
| Storm Inspection and Response | Day | \$690 | 10 | \$6,900 |
| Total Cost | | | | \$27,750 |

*see Forestry BAER report for details of hazard tree cost estimation

Recreation Sites Treatment and Costs

| Item | Unit | Unit Cost | #of Units | Cost |
|-------------------------------------|------|-----------|-----------|---------------|
| Warning Signs (dispersed rec sites) | Each | \$400 | 5 | \$2000 |
| Total Cost | | | | \$2000 |

4) Interagency Coordination

There is a need to continue the interagency coordination initiated during the BAER assessment. This involves communication and coordination with other federal, state and local agencies with jurisdiction over lands where life and property and water quality are at risk from post-fire conditions. Actions include but are not limited to cooperating with other agencies on hazard notification systems, exchanging information and coordinating the BAER implementation plan as needed when subsequent recovery plans are developed by other agencies.

Threats to life, property and water quality requires coordination with many agencies. The Forest Service plans on continuing to collaborate and communicate with partnering agencies, other entities and organizations and the public.

| | | | | | |
|---------------------------|------|----------|----|-------------------|----------------|
| Interagency Coordination | days | \$400.00 | 10 | \$4,000.00 | \$4,000 |
| Heritage and Bot. Support | days | \$800.00 | 5 | \$4,000.00 | \$4,000 |
| Imp Team Leader | days | \$350.00 | 5 | \$1,750.00 | \$1,750 |
| | | | | | |
| <i>Subtotal Support</i> | | | | \$9,750.00 | \$9,750 |

I. **Monitoring Narrative:**

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

Treatment Effectiveness Monitoring: Monitoring of closures is needed to ensure that warning and closure signs are effective. Effectiveness monitoring for road and trail treatments is also recommended to determine if treatments are working and if/when maintenance or repairs are required. Monitoring will be conducted by USFS staff.

| | | | | | |
|----------------------------------|------|----------|----|-------------------|----------------|
| Closure Effectiveness Monitorino | Days | \$260.00 | 15 | \$3,900.00 | \$3,900 |
| Watershed Specialist/Engineer | Days | \$350.00 | 3 | \$1,050.00 | \$1,050 |
| <i>Subtotal Monitoring</i> | | | | \$4,950.00 | \$4,950 |

Junkins Fire BAER - Initial Request and Approval

| | | Unit | # of | Request | Not Approved | Approved |
|---|----------|-------------|-------|---------------------|--------------|------------------|
| Line Items | Units | Cost | Units | BAER\$ | \$ | \$ |
| A. Land Treatments | | | | | | |
| Nox. Weeds Treatment (2 person crew) | days | \$377.85 | 20 | \$7,557.00 | | \$7,557 |
| Nox. Weeds Detection | days | \$110.88 | 120 | \$13,305.60 | | \$13,306 |
| Nox. Weeds Supplies/PPE | lump sum | \$9,500.00 | 1 | \$9,500.00 | | \$9,500 |
| Nox. Weeds Fleet for Seasonal | month | \$338.00 | 6 | \$2,027.00 | | \$2,027 |
| Unauthorized Road Decommissioning | mile | \$2,460.00 | 1.2 | \$2,952.00 | | \$2,952 |
| Arch. Decommissioning Consult. | mile | \$1,492.00 | 1.2 | \$1,790.40 | | \$1,790 |
| Survey Markers | ea | \$150.00 | 15 | \$2,250.00 | | \$2,250 |
| <i>Subtotal Land Treatments</i> | | | | \$39,382.00 | | \$39,382 |
| B. Channel Treatments | | | | | | |
| <i>Subtotal Channel Treat.</i> | | | | \$0.00 | | \$0 |
| C. Road and Trails | | | | | | |
| Trail Stabilization | mile | \$3,000.00 | 4 | \$12,000.00 | | \$12,000 |
| Trail Stabilization vehicle costs | mile | \$0.25 | 1000 | \$250.00 | | \$250 |
| Haz. tree removal for trail crew protection | mile | \$2,500.00 | 2 | \$5,000.00 | | \$5,000 |
| Trail Closure Implementation | ea | \$2,000.00 | 1 | \$2,000.00 | | \$2,000 |
| Trail Warning Signs | ea | \$400.00 | 4 | \$1,600.00 | | \$1,600 |
| Trail Storm Inspection and Response | days | \$690.00 | 10 | \$6,900.00 | | \$6,900 |
| Road drainage - Spot Clean Ditches | LF | \$1.68 | 2,500 | \$4,200.00 | | \$4,200 |
| Road Drainage - Clean Culverts | LF. | \$3 8.00 | 204 | \$7,752.00 | | \$7,752 |
| Road - Install 24" x 40' Culvert | ea | \$2,037.50 | 4 | \$8,155.00 | | \$8,155 |
| Road - Install Drain Dip | ea | \$2,028.00 | 5 | \$10,140.00 | | \$10,140 |
| Riprap Armoring and Road Stabilization | ton | \$97.00 | 180 | \$17,492.33 | | \$17,492 |
| Road - Storm Inspection and Response | ea | \$2,740.00 | 4 | \$10,960.00 | | \$10,960 |
| Trail Bridge Removal | Job | \$3,897.40 | 1 | \$3,897.40 | | \$3,897 |
| Engineering Time/vehicle and Contract Bondina | job | \$6,095.69 | 1 | \$6,029.36 | | \$6,029 |
| <i>Subtotal Road & Trails</i> | | | | \$96,376.09 | | \$96,376 |
| D. Protection/Safety | | | | | | |
| Rec Site Warning Signs (dispersed rec sites) | ea | \$400.00 | 5 | \$2,000.00 | | \$2,000 |
| Heavy Gate Closure (24' Double Gate, Signin | ea | \$13,156.00 | 2 | \$26,312.00 | | \$26,312 |
| <i>Subtotal Protection and Safety</i> | | | | \$28,312.00 | | \$28,312 |
| D. Implementation Support | | | | | | |
| Interagency Coordination | days | \$400.00 | 10 | \$4,000.00 | | \$4,000 |
| Heritage and Bot. Support | days | \$800.00 | 5 | \$4,000.00 | | \$4,000 |
| Imp Team Leader | days | \$350.00 | 5 | \$1,750.00 | | \$1,750 |
| <i>Insert new items above this line!</i> | | | | | | |
| <i>Subtotal Support</i> | | | | \$9,750.00 | | \$9,750 |
| E. BAER Evaluation | | | | | | |
| Assessment | team | \$38,188.00 | 1 | - | | |
| <i>Insert new items above this line!</i> | | | | - | | |
| <i>Subtotal Evaluation</i> | | | | - | | |
| F. Monitoring | | | | | | |
| Closure Effectiveness Monitoring | Days | \$260.00 | 15 | \$3,900.00 | | \$3,900 |
| Watershed Specialist/Engineer | Days | \$350.00 | 3 | \$1,050.00 | | \$1,050 |
| <i>Insert new items above this line!</i> | | | | | | |
| <i>Subtotal Monitoring</i> | | | | \$4,950.00 | | \$4,950 |
| G. Totals | | | | | | |
| | | | | \$178,770.09 | | \$178,770 |

PARTVII • PROVALS

1. Erin Connelly 11/16/16
Forest Supervisor (signature) Date

2. [Signature] 11/16/16
Regional Forester (signature) Date