

TECHNICAL SPECIALIST'S REPORT – BURNED AREA EMERGENCY RESPONSE

Resource: Recreation & Trails
Fire Name: Hayden Pass **Month/Year:** 7/2016

Author Names: Ben Lara, Recreation Specialist PSICC

I. Potential Values at Risk

Potential values at risk identified and addressed in this report include: Forest Service system trails, campgrounds and dispersed recreation sites. Risks include threat to life and safety of forest visitors, agency staff, BAER team and threat to trail, and facility infrastructure.

Human life and safety

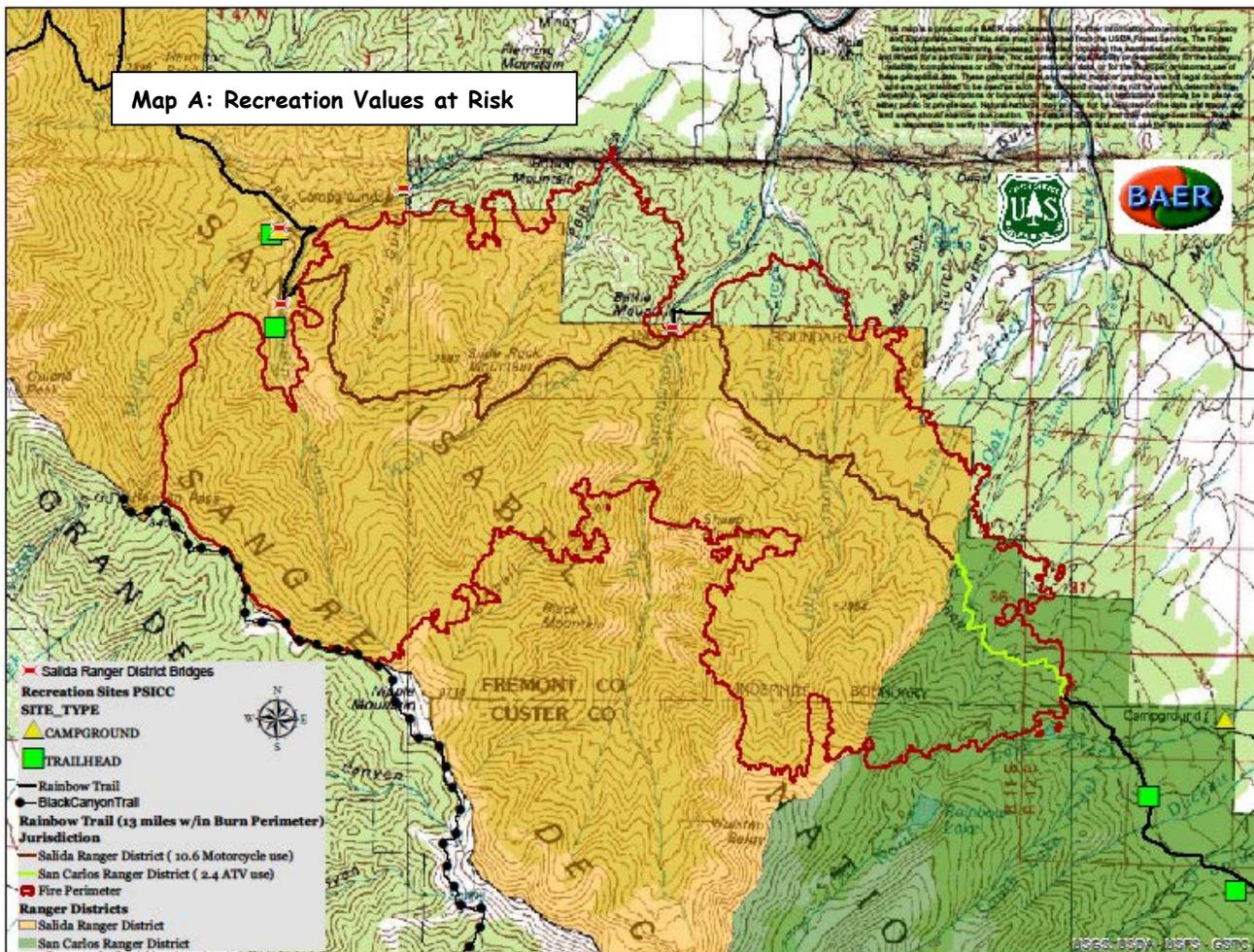
Potential threats to human life and safety within and downstream of the burned area exist for forest visitors and workers on NFS trails and developed recreation sites.

Property

Potential threats to property and infrastructure on NFS lands within and downstream of the burned area exist primarily along the trail network and at some developed recreation sites.

II. Resource Condition Assessment

A. Resource Setting



Wilderness

No emergency determination for the Sangre de Cristo Wilderness was determined. However, potential treatments could result in irretrievable damage to the Wilderness character.

Trails & Trailheads

*Note: Trail site assessment noted that the fire has created numerous hazard trees creating potential threat to life and safety. This risk will be addressed in a separate specialist report (Forestry BAER Report).

- **Rainbow Trail (National Forest System Trail 1336):** The Rainbow Trail is a popular multi-use (open to motorcycle, hiking, equestrian & mountain biking) trail that traverses the northern and eastern boundary of the Sangre de Cristo Wilderness. There are 13 miles of trail within the burned area and approximately 2.4 miles are on the San Carlos Ranger District and 10.6 on the Salida Ranger District. The trail traverses the burned area and there are three access points (see trailheads below) where forest visitors can access the fire. Different segments of this trail within the fire perimeter were observed on the ground and the entire trail was observed from the air.
- **Black Mountain Trail (National Forest System Trail 754):** The Black Mountain trail is a moderately used trail 10 miles in length, starting at the top of Hayden Pass Road (NFSR 6) and runs along the crest of the Sangre de Cristo mountain range. This trail is located on the Saguache Ranger District of the Rio Grande National Forest and the majority of the trail is in the Sangre de Cristo Wilderness.
- **Hayden Creek Trailhead (Rainbow Trail 1336):** Hayden Creek Trailhead provides access to the Rainbow Trail headed south towards Cottonwood Creek. There is a large parking area at the trailhead and another trailer parking area east of the TH.
- **Big Cottonwood Trailhead (Rainbow Trail 1336):** Big Cottonwood Trailhead contains a relatively small parking area where recreationists can go north or south along the Rainbow Trail.

Campgrounds

- **Hayden Creek Campground:** Hayden Creek Campground is directly below the Middle Prong of Hayden Creek and is accessed via NFSR 6
- **Coaldale Campground:** Coaldale Campground is immediately adjacent to Hayden Creek below the confluence of the South, Middle and North Prongs of Hayden Creek.
- **Dispersed campsites along NFSR 6:** Between the Coaldale and Hayden Creek campground there are numerous dispersed campsites that can be accessed thru 9 pullouts along NFSR 6.

B. Findings of the On-The-Ground Survey

1. Resource condition resulting from the fire

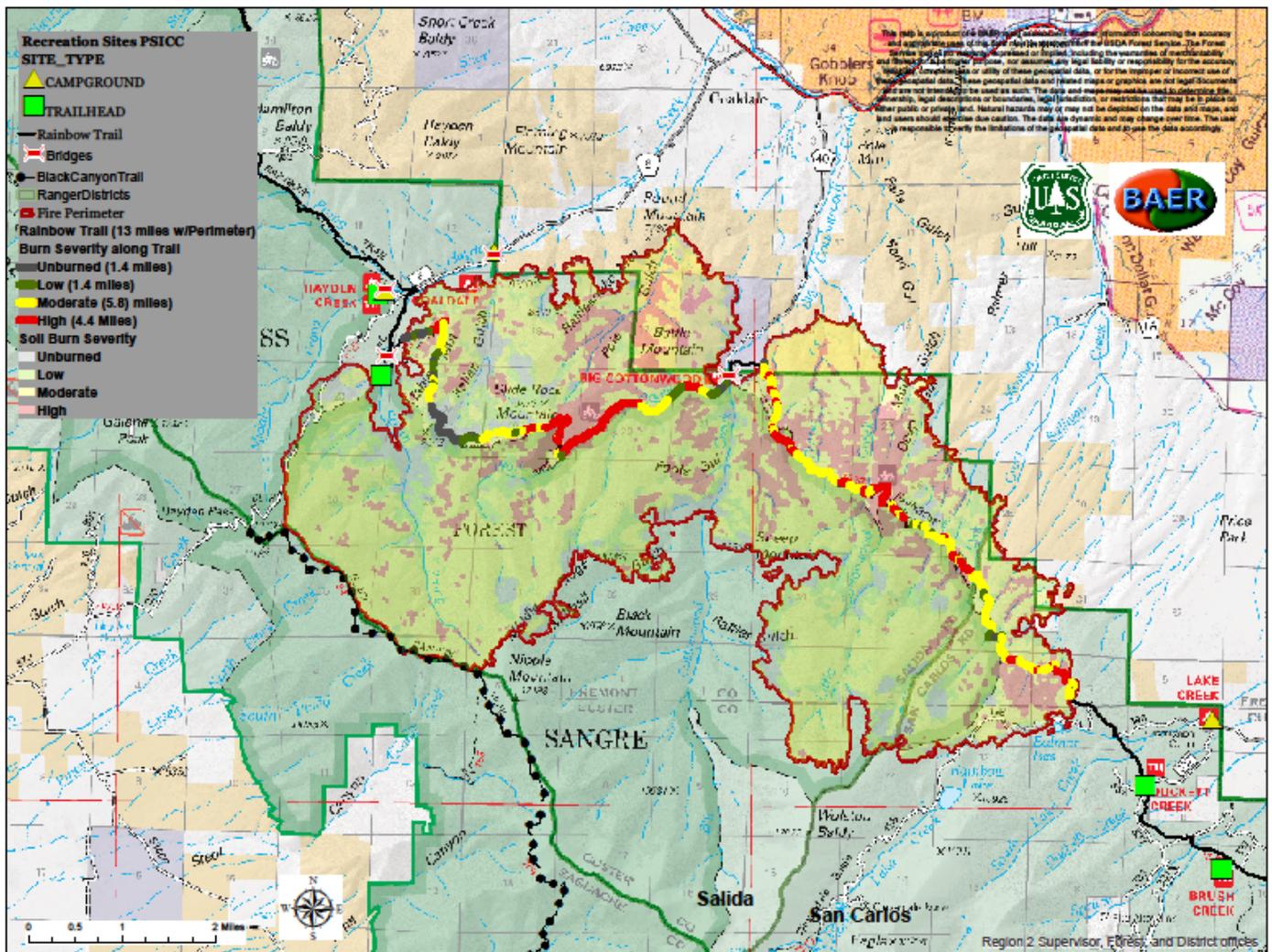
Trails

- **Rainbow Trail 1336:** Of the 13 miles of trail in the burn perimeter, 4.4 miles are located in high severity burn and 5.8 miles in moderate severity—leaving only 1.4 mile in low severity and 1.4 mile unburned. The south portion was observed to be crossing 30-40% burned area slopes with high potential for damage due to sediment laden runoff from burned slopes and drainage crossings, some damage to tread and trail structure was observed. These steep slopes are completely devoid of vegetation and ground cover and when combined with moderate or high burn severity; pose a strong threat to the

integrity of the trail tread. Debris flow, dry ravel, soil erosion, and falling rocks are likely to occur in these areas for 1-3 years following the fire. The mid portion observed from the Big Cottonwood TH had similar observations with additional concerns related to interaction of the trail with the Wolf Creek drainage and potential for trail to capture flows from the creek. In this area the lower portions of the trail are at or below the same elevation as the creek. The northern portions of the trail crosses thru high and moderate burn severity often along slopes exceeding 30%. Hazard trees can be observed along the impacted trail. Three trail bridges were observed at access points, no direct impact was observed, these bridges are potentially at risk from higher runoff, sediment and debris flows from upgradient burned areas. On the ground findings from surveys for these bridges can be found in BAER Engineering report.

Table 1: Total miles of Rainbow Trail by soil burn severity

Soil Burn Severity	Miles
Unburned	1.4
Low	1.4
Moderate	5.8
High	4.4
Total Miles	13



- **Black Mountain Trail 754:** Several small segments of trail from the Hayden Pass Road (NFSR 6) have been impacted by the burned area. During the field assessments, minimal burned area was observed on the trail posing little to no risk.

Trailheads

- **Hayden Creek Trailhead (Rainbow Trail 1336):** Hayden Creek TH is a high use trailhead with a two-panel kiosk containing information & maps. No direct damage, no risk from burned areas observed.
- **Big Cottonwood (Rainbow Trail 1336):** Big Cottonwood TH is a high use trailhead at the end of NFSR 40. No direct damage was witnessed but portions are in close proximity to Big Cottonwood Creek and existing bank erosion is compromising the road at several locations. With the risk of increased flows, there is the possibility of sediment and debris in the creek due to upgradient burned area.

Campgrounds

- **Hayden Creek CG:** The drainage above this campground (Middle Prong) received minimal fire therefore minimizing potential to property damage.
- **Coaldale CG:** No direct impact from the fire was observed but the sites adjacent to the creek are at risk due to potential increases in flows, sediment and debris flows from upgradient burned areas.
- **Dispersed campsites along NFSR 6:** Campgrounds and dispersed sites along Hayden Creek were observed to have no direct damage, sites adjacent to the creek are at risk to increased flows from upgradient burned areas.

2. Consequences of the fire on values at risk

The Values at Risk for trails and campgrounds subject to increased runoff, sediment, and debris are:

- a. Threat to life
- c. Threat to infrastructure from loss of control of water.

The following conditions describe in detail the consequences of the fire on Values at Risk:

- a. The risk to human life may occur at segments of the campground in close proximity to the creek and at major drainage crossings if people are traveling on the road during a significant flood event and road washouts occur. Risk to human life may occur on trails in the burned area due to burned trees falling and sediment and debris flows washing out trails during storm events. Risk to human life may occur at campsites adjacent to creeks during significant storm events.
- b. The risk to water quality may occur where trails interact with natural drainages and capture flows or discharge sediment to drainages. The risk to road and trail infrastructure may occur at stream crossings.

- c. There is an immediate risk of hazard trees adjacent to trails and recreation sites posing life and safety threat to BAER implementation members and other personnel working on or around trails and sites.
- d. Burned slopes above trails pose a risk to trail infrastructure due to potentially high runoff and sediment and ash laden flows. These flows will erode the trail bed and adjacent side slopes.
- e. Burned drainages pose a risk to trail infrastructure due to increased flows and sediment and ash transport. In these drainages flows may pose a risk to life and safety due to potential for flash floods, sediment and ash laden flows, at trail crossings. These flows will likely result in failure of trail infrastructure at the drainage crossings and at trail segments adjacent to the drainage channel

II. Emergency Determinations Addressed in this Report

The BAER team has concluded these risks pose an emergency due to:

- Risk to life and safety
- Risk to infrastructure

III. Treatments to Mitigate the Emergency

Treatment Objectives: Minimize risk to life and risk of damage to trail and recreation site infrastrucure in the burn area through removal of hazards and the placement and maintenance of effective erosion and water control measures (stormproofing). These treatments are primarily designed to prevent the uncontrolled channeling and resultant damage to the Rainbow Trail and to reduce erosion and further watershed degradation by control of run-off within the trail prism.

Trail Treatments Description: An emergency determination was made that the following BAER treatments are required on segments of Rainbow trail in the Hayden 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, outsloping, establishing critical edge

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 forestry BAER report for details)*

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

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

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.

The above treatments were chosen to minimize infrastructure loss due to impact from upgradient burned areas and potential erosion and sediment transport to downgradient resources.

IV. Discussion/Summary/Recommendations

In summary, the prescribed treatments for trails and recreation 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. When compared to the reconstruction of this trail in the current burned condition of the landscape, the treatment developed is the most economical way of protecting these critical values. The risk assessment for the Rainbow Trail (1336) showed a very likely probability of damage with high consequences resulting in a very high risk. The risk assessment for the Black Mountain Trail (756) showed a possible probability of damage with moderate consequences resulting in a low risk. The risk assessment for Hayden Creek Campground showed an unlikely probability of damage with moderate consequences resulting in low risk. For Coaldale Campground the risk assessment showed a likely probability of damage with high consequence resulting in a very high risk.

References:

Burned Area Emergency Response Treatments Catalog

Chapter 2 – Land Treatments

Chapter 3 – Channel Treatments

Chapter 4 – Road and Trail Treatments

Chapter 5 – Protection and Safety Treatments

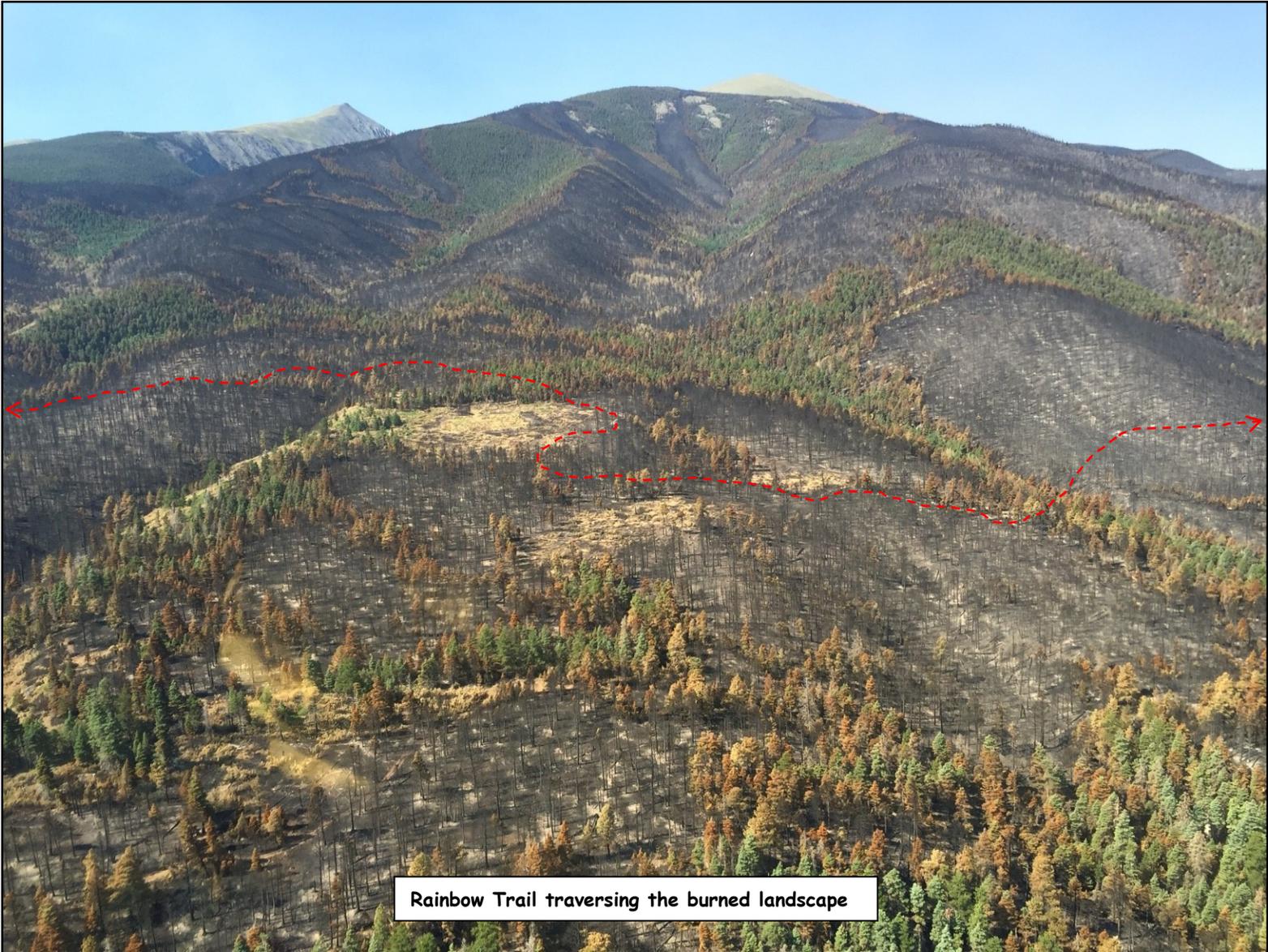
Forest Service Handbook

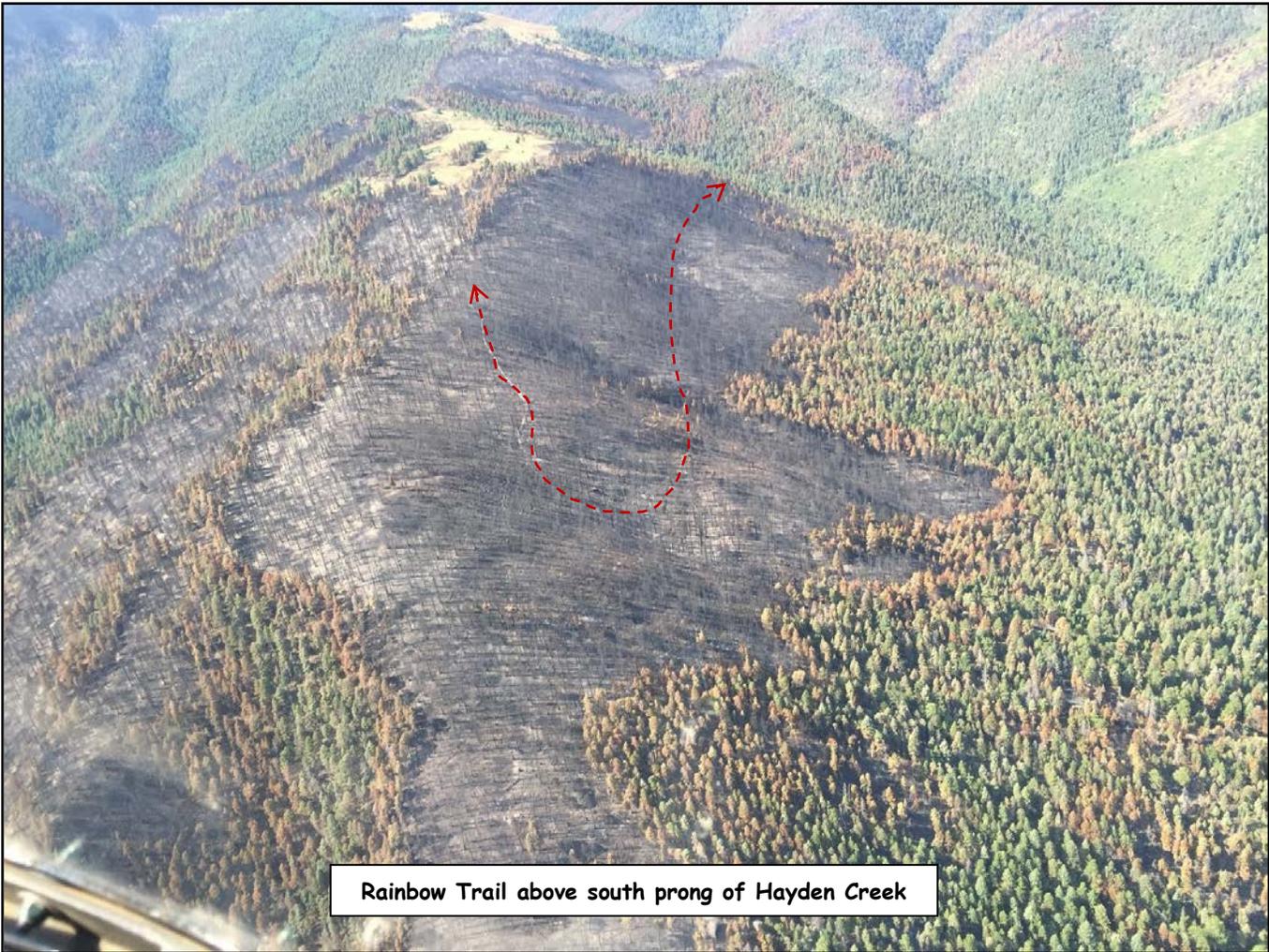
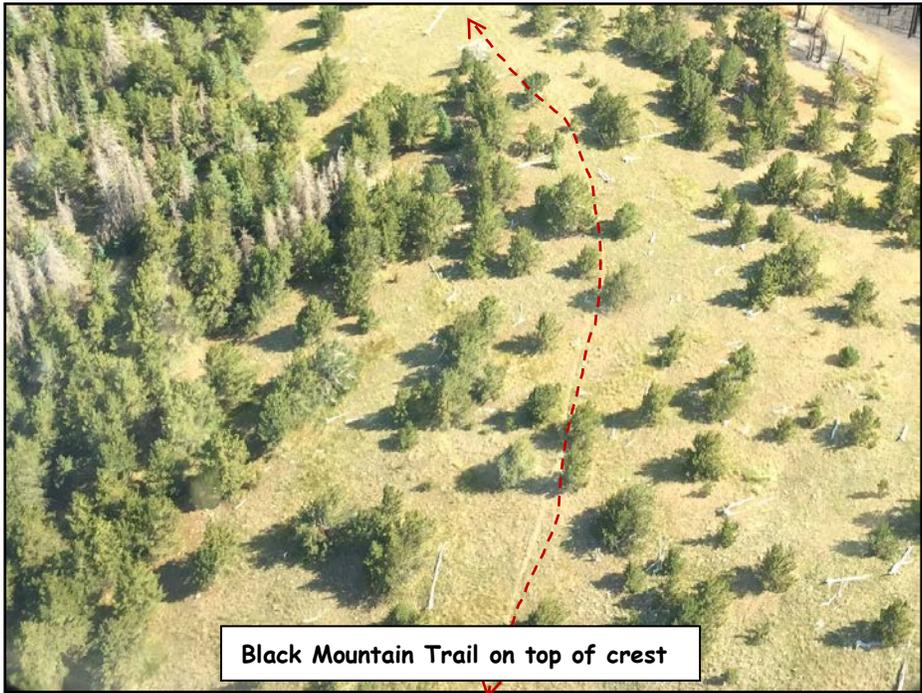
FSH 2309.18 – Trails Management Handbook

FSH 2509.13 – Burned Area Emergency Rehabilitation Handbook

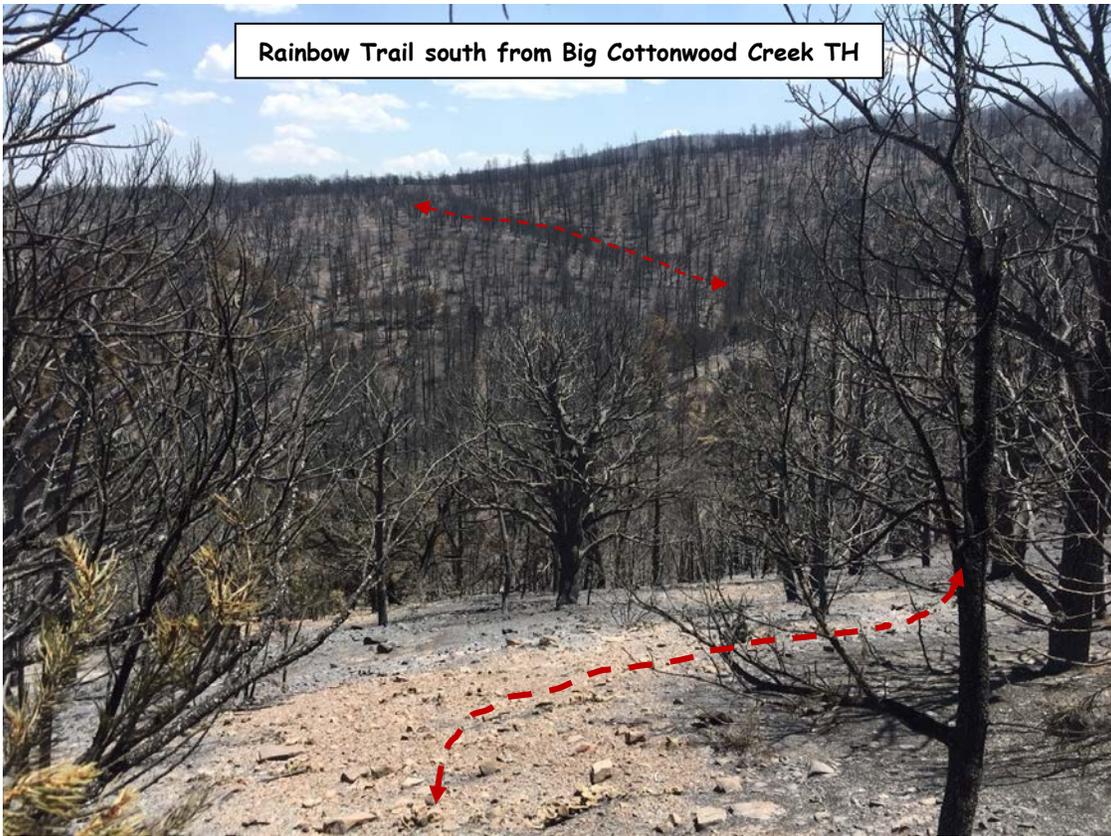
V. Appendices

1. File of referenced pictures





Rainbow Trail south from Big Cottonwood Creek TH



Rainbow Trail south from Big Cottonwood Creek TH



**Examples of Hazard Trees
along Rainbow Trail**



Rainbow Trail north from Cottonwood Creek TH (Wolf Creek Drainage)



Rainbow Trail north from Cottonwood Creek TH (Wolf Creek Drainage)





Hayden Creek Campground



Coaldale Campground Bridge