

Erskine Fire BAER - Recreation Assessment
Sequoia National Forest
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 By: Hannah Stone, BAER Recreation Specialist
 Eldorado National Forest



I. Potential Values At Risk

Burned-Area Emergency Response (BAER) Assessments are rapid evaluations to determine values at risk due to imminent post-fire threats and to develop appropriate actions to manage unacceptable risks (FSM 2523.1). This report summarizes the assessment of recreation resources on National Forest System (NFS) lands within and adjacent the Erskine fire perimeter. The following critical values were considered during assessment:

CRITICAL VALUES (FSM 2523.1, Exhibit 1)
HUMAN LIFE AND SAFETY
Human life and safety on National Forest System (NFS) lands.
PROPERTY
Buildings, water systems, utility systems, road and trail prisms, dams, wells or other
NATURAL RESOURCES
Water used for municipal, domestic, hydropower, or agricultural supply or waters with special Federal or State designations on NFS lands.
Soil productivity and hydrologic function on NFS lands.
Critical habitat or suitable occupied habitat for federally listed threatened or endangered terrestrial, aquatic animal, or plant species on NFS lands.
Native or naturalized communities on NFS lands where invasive species or noxious weeds are absent or present in only minor amounts.
CULTURAL AND HERITAGE RESOURCES

Cultural resources which are listed on or potentially eligible for the National Register of Historic Places, Traditional Cultural Properties, or Indian Sacred Sites on NFS lands.

No risk determinations were made for non-critical values, such as those on BLM lands, although in some cases these were assessed and recommendations were made.

II. Resource Condition Assessment

A. Resource Setting

The Erskine Fire started on June 23, 2016 and burned a total of 48,019 acres south of Lake Isabella Reservoir in the Piute Mountain area and the Kelso Creek drainage. The fire burned mainly on National Forest land managed by the Kern River Ranger District of the Sequoia National Forest, Bureau of Land Management (BLM) land managed by the Ridgecrest and Bakersfield Field Offices, and Private land (Table 1). The fire had a devastating impact on the communities of Squirrel Valley, South Lake, and settlements in the Kelso Creek Valley. A total of 285 homes were destroyed with two confirmed fatalities. The fire's progression was extreme due to strong winds and light, flashy fuels and moved east from the town of Lake Isabella to South Lake within a few hours of ignition, eventually reaching more than 35,000 acres in less than 24 hours. The fire then moved in a southerly direction, burning in the Piute Mountains parallel to and within the Kelso Creek drainage to approximately 2 miles south of Cortez Canyon (Map 1).

Trails and recreation areas within or downslope of areas burned at moderate to high severity are more likely to have values at risk. These sites were identified using GIS and the Burned Area Reflectance Classification (BARC) data. Four NFS campgrounds, five NFS trail segments totaling 19.76 miles in length, and three BLM trail segments totaling 9.42 miles in length were assessed:

Trails

- *Dry Meadow Trail (34E31): FS*
- *Little Dry Meadow (32E52): FS*
- *Long Canyon Trail: BLM*
- *Steve's Spring (34E32): FS*
- *Willow Gulch (34E41): FS and BLM*
- *Woolstalf Meadow Trail (34E42): FS and BLM*

These trails are all motorcycle trails in the Piute Mountains. The Willow Gulch and Woolstalf Meadow trails cross the Forest boundary and continue as BLM routes through BLM land. Steve's Spring is rated as 'More Difficult,' and the other trails are rated as 'Most Difficult.' There are also many unauthorized routes within the burned area.

Recreation Sites

- *Auxiliary Dam Campground*
- *Old Isabella Campground*
- *Paradise Cove Campground*
- *South Fork Campground*

These are developed campgrounds along the south edge of Lake Isabella.

B. Summary of Analysis

Trails and recreation sites were assessed to determine potential threats to Burned Area Emergency Response (BAER) critical values using Burned Area Reflectance Classification (BARC) data and GIS and through field observations and/or consultation with local and BAER resource specialists. The BARC data uses reflected infrared light to determine post-fire vegetation condition, which is correlated with soil burn severity. The BARC data and soil burn severity field assessments were used to create a final soil burn severity map (Map 2). The final soil burn severity map was one of the resources used to determine the level of risk to the affected sites. None of the trail segments were subject to high burn severity, so the majority of issues will exist within or downslope of areas with moderate burn severity.

Trails

Dry Meadow Trail (34E31): Approximately 67% of the 5.3 miles of trail affected by the fire was subject to moderate burn severity (Appendix B, Table 1). The field assessment was completed on 1.4 miles starting from the south end point near Woolstalf Meadow, and 1.1 miles starting from the north end point at the Kern River District boundary. The north section of this trail was burned in the Bodfish Fire in 1984 and the south end was burned in the Piute Fire in 2008, with some overlap in the middle.

- The trailhead sign posts on the south end of the trail were burned, but are still functional. The trailhead sign and a metal diamond directional sign post on the north endpoint were completely burned. It is recommended that the trailhead sign be replaced to reduce user confusion.
- Off-trail travel is common where the trail has a sinuous design and there are no obstructive barriers. This is a pre-existing issue caused by the trail design in these locations, and possibly more open conditions created by past fires. However, down woody material burned in the Erskine fire may have created off-trail access in some areas which may lead to an increase in unauthorized use. Many of the unauthorized routes are capturing flow and there is some delivery to the existing trail, although there is little potential for damaging accelerated flow due to the small amount of contributing area (Photo 1). It is recommended that barricades be installed or fire-damaged trees be strategically felled, where possible, to prevent off-trail travel and that unauthorized routes be restored more effectively to prevent future travel and flow capture.
- Most of the trail is through chaparral or forest that was burned in the Piute or Bodfish Fire, but the potential for hazard trees exists in forested pockets. There is some potential for rock fall onto the trail from steep slopes and erosion from steep cutbanks. It is recommended that post-fire hazard warning signs be posted at the north and south trailheads.
- Generally, the tread of the south end of the trail was in good condition and did not capture flow. The north end of the trail on the ridge above Long Canyon channels flow for most of its length in between water breaks due to tread incision up to 2.5' in depth. The trail in this section follows the ridgeline closely and it is unlikely that accelerated flow from burned areas would significantly increase the amount of flow and subsequent tread erosion. However, the concentrated flow from the tread is released at water outlets onto adjacent burned land. Some of the water outlets are on steep slopes and have existing rills (Photo 2-3). It is likely that accelerated flow from the fire will create additional erosion leading to gully formation. It is recommended that water outlets be armored to reduce flow velocity and prevent excessive off-site erosion.

- The potential for debris flow exists at drainage crossings. A USGS debris flow model predicted from 0-60% probability of this occurring using a design storm of a peak 15-minute rainfall intensity with a rate of 28 mm/h. It is unlikely that trail users would be present in the location of a debris flow in a storm where one would occur. See the BAER Geology Report for more information about this model.
- The 1.5 mile long burned portion of the trail just north of Dry Meadow Creek has a relatively gentle grade, but may have the potential to capture flow from adjacent burned slopes and stream crossings. The potential for tread damage exists on steeper grades and stream crossings where capture of flow occurs. It is recommended that drainage function be restored in these areas to prevent an increase in erosion from the tread and sediment delivery to streams.

Little Dry Meadow (32E52): Approximately 68% of the 4.2 miles of trail affected by the fire was subject to moderate burn severity (Appendix B, Table 1). The field assessment was completed on 1 mile of trail starting from the north end point at the Forest boundary.

- Regular unauthorized off-highway vehicle (OHV) use occurs on NFS lands, most of which originates from primitive and administratively closed roads on adjacent BLM land to the North (Photo 4). The issue existed prior to the fire, although post-fire conditions may increase the unauthorized use. A post and barbed wire grazing allotment fence runs along the BLM and FS boundary and was damaged in the fire. It is likely that the fence was already in disrepair in some sections, but is now mostly non-functional and opens up many other potential access points for OHVs. Herbaceous vegetation was present before the fire, so loss of this vegetation is unlikely to contribute to creation of OHV access.
- The potential for debris flow exists along this trail. A USGS debris flow model predicted from 0-80% probability of this occurring using a design storm of a peak 15-minute rainfall intensity with a rate of 28 mm/h. This may damage the trail tread at drainage crossings. It is unlikely that trail users would be present in the location of a debris flow in a storm where one would occur. See the BAER Geology Report for more information about this model.
- The potential for hazard trees and rock fall exists where the trail parallels the drainage in the canyon west of Long Canyon. It is recommended that drainage function be maintained at drainage crossings along the length of this trail segment. It is recommended that post-fire hazard warning signs be posted at the north trailhead and at the south end of the trail on the fire perimeter, and that the trail be logged out to open access.

Long Canyon Trail (BLM): Approximately 44% of the 1.1 miles of trail affected by the fire was subject to moderate burn severity (Appendix B, Table 1). The field assessment was completed on the entire length. Primitive roads through BLM land and the Long Canyon trail provide access to the North end of the Dry Meadow Trail (34E31).

- There is a risk to tread from accelerated flow at drainage crossings. In most cases, damage would be localized and minor due to adequate water diversion features. One observed drainage crossing was not graded to allow for easy passage of flow, and it is recommended that a drainage dip be constructed in this location (Photo 5). It is also recommended that dips be maintained at all crossings to ensure effective water removal.
- The potential for debris flow exists along this trail. A USGS debris flow model predicted from 20-60% probability of this occurring using a design storm of a peak 15-minute rainfall intensity with a rate of 28

mm/h. It is unlikely that trail users would be present in the location of a debris flow in a storm where one would occur. See the BAER Geology Report for more information about this model.

- Some sections of the trail with steeper, rocky side slopes may receive rock fall due to soil destabilization from lack of vegetation and increased flow caused by the fire (Photo 6-7). Although, the slopes observed were not very steep and had a relatively small amount of fire-affected contributing area. It is recommended that hazard warning signs be posted at trailheads and junctions.
- A fire-damaged grazing allotment fence was observed on the Forest/BLM boundary near the East endpoint, although has little effect on critical values associated with recreation at this location.

Steve's Spring (34E32): Approximately 21% of the 0.5 miles of trail affected by the fire was subject to moderate burn severity (Appendix B, Table 1). This trail was assessed in the field by Marcos Rios, the BAER Road Engineer.

- The potential for debris flow exists along this trail. A USGS debris flow model predicted from 0-20% probability of this occurring using a design storm of a peak 15-minute rainfall intensity with a rate of 28 mm/h. It is unlikely that trail users would be present in the location of a debris flow in a storm where one would occur. See the BAER Geology Report for more information about this model.
- There is the potential for wash outs of the tread at the existing culverts. This will be addressed in the BAER Road/Engineering Report.
- Hazard trees exist along this trail. It is recommended that a hazard warning sign be posted at the junction with the south fire perimeter. A sign near the south Dry Meadow trailhead should effectively warn trail users traveling from the north end of this trail as well.

Willow Gulch (34E41): Approximately 60% of the 1.3 miles of trail affected by the fire was subject to moderate burn severity (Appendix B, Table 1). This trail was not assessed in the field due to its remote location and the relatively small amount of designated trail that was affected by the fire. The fire-affected portion of this trail is a primitive road that goes through BLM lands, and the BLM has maintenance responsibility for this portion. This trail was burned in the Bodfish Fire in 1984.

- Destabilization of the trail tread may occur at drainage crossings and where the tread channels fire-accelerated flow. Existing wooden water bars may have been burned in the fire. It is recommended that drainage function be maintained/restored along the length of this trail segment to prevent an increase in erosion from the tread and sediment delivery to streams.
- A USGS debris flow model predicted from 0-40% probability of this occurring in an event of a design storm of a peak 15-minute rainfall intensity storm of 28 mm/h rate, although it is unlikely that trail users would be present in the location of a debris flow in a storm where one would occur. See the BAER Geology Report for more information about this model.
- It is likely that trail markers were burned, and it is recommended that carsonite markers be placed at road junctions to prevent user confusion and reduce travel on closed roads and unauthorized routes.
- There is a chance of damage to the tread and risk to human life and safety from debris flow at drainage crossings. A USGS debris flow model predicted from 0-40% probability of this occurring using a design storm of a peak 15-minute rainfall intensity with a rate of 28 mm/h. It is unlikely that trail users would be present in the location of a debris flow in a storm where one would occur. See the BAER Geology Report for more information about this model.
- There is potential for rock fall on the trail from steeper slopes burned by the fire and hazard trees in forested pockets. There is also a risk to trail users who expect to travel long distances in one day by

motorcycle and come across obstacles and hazards caused by the fire, forcing them to ride at night. Hazard warning signs on the Little Dry Meadow and Dry Meadow trails should sufficiently warn of hazards for trail users accessing Willow Gulch from the east. A hazard warning sign should also be located at the main access road to the west end on BLM land near Squirrel Valley.

Woolstalf Meadow Trail (34E42): Approximately 39% of the 17 miles of trail affected by the fire was subject to moderate burn severity (Appendix B, Table 1). The field assessment was completed on 1.9 miles of trail starting from the west end point near Woolstalf Meadow. A portion of this trail goes through the Bright Star Wilderness on BLM lands. Most of the trail was burned in the 2008 Piute Fire.

- The Woolstalf Meadows and Dry Meadow directional sign post on the 28S24 road was slightly burned, but is still functional. The trailhead carsonite markers at the southwest end point were burned, making the trail difficult to find.
- A grazing allotment enclosure fence around Woolstalf Meadow was also damaged by the fire along most of its length. It is not clear how functional the fence was before the fire, but it was apparent that long sections were damaged due to burning trees falling on the barbed wire and bending the metal posts or the burning of wooden fence posts. Another purpose of this fence may have been to restrict unauthorized OHV access to an old road that goes through the meadow. Now that the fence is burned and the designated trail is hard to find, OHV intrusion into the meadow is likely. This can create additional erosion that may alter hydrologic function. It is recommended that the old road be more effectively restored, and the fence be replaced or fire-damaged trees be felled directionally to prevent OHV access into the site.
- A few hazard trees were observed, and there is the potential for others along the length of the trail.
- Lots of down woody material make the trail difficult to find in some areas and impassable to motorcycles in others. It is recommended that the trail be logged out to prevent erosion created by unauthorized off-trail use.
- The potential for increasing unauthorized OHV use through the Bright Star Wilderness is very likely, due to burned natural and constructed barriers. It is recommended that barricades be installed where OHV access into the wilderness has been created and that patrols by law enforcement be increased to dissuade illegal OHV travel.
- Stump holes were observed and may destabilize the sandy tread, causing localized damage and potential for injury to trail users. The potential for tread damage exists on steeper grades where tread captures accelerated flow from upslope burned areas. It is recommended that drainage function be restored in these areas and that stump holes risking safety and infrastructure be filled with nearby material. It is also recommended that hazard warning signs be posted at the east and west trailhead.
- There is a chance of damage to the tread and risk to human life and safety from debris flow at drainage crossings. A USGS debris flow model predicted from 0-40% probability of this occurring using a design storm of a peak 15-minute rainfall intensity with a rate of 28 mm/h. It is unlikely that trail users would be present in the location of a debris flow in a storm where one would occur. See the BAER Geology Report for more information about this model.

Unauthorized Routes: Closed and unauthorized routes exist on BLM lands off the Woolstalf Meadow Trail through the Bright Star Wilderness and south of Squirrel Valley. Multiple routes exist on both BLM and Forest Service lands in the drainage west of Long Canyon. Multiple routes exist on NFS land off the Dry Meadow trail

near Erskine Creek. Other unauthorized routes that may pose a risk to critical values likely exist. No unauthorized OHV routes were assessed in the field due to time constraints.

- It is possible that accelerated flow from burned slopes may create more erosion at these trails and adjacent land. It is also possible that any existing vegetative barriers and constructed barricades were burned in the fire, which may reopen or create new access for OHVs. It is recommended that all unauthorized routes be effectively restored to more natural conditions and access to these routes be blocked.

Recreation Sites

Auxiliary Dam Campground:

- The only fire-related damage identified at this site was a burned 'No Parking' signpost and a slightly burned electrical utility box. The sign is not very legible, but is still standing and functions as a barrier to parking. There are adjacent barrier rocks that also prevent parking of vehicles. It is not likely that the burned sign will result in significant resource issues. The utility box is singed and there are multiple holes that allow rodent access. It is likely that rodents chewed through the box pre-fire, although the fire may have weakened the box material and may cause it to degrade more quickly. It is recommended that the box be replaced and the electrical inside be assessed for damage from rodents and the fire. It is also recommended that any below-ground improvements, such as water lines, be monitored regularly to fix any issues that may have been caused by the fire.
- There is burned land upslope of this site, although Highway 178 acts as a barrier that would reduce the potential of rock fall or debris flow reaching the site. Culverts under Highway 178 were assessed for flow capacity by the BAER Hydrologist and Roads Engineer and were found to be unlikely to impact the site. Any debris flow from upslope lands would plug culverts and have to overtop Highway 178 before reaching the site, which is very unlikely given the relatively low probability of debris flow and flooding in the area.

Old Isabella Campground:

- No fire-related issues were found to exist at this site. There is burned land upslope of this site, although Highway 178 acts as a barrier that would prevent any rock fall or debris flow from reaching the site and no culverts drain directly into the site. The culvert adjacent Old Isabella were assessed for flow capacity by the BAER Hydrologist and Roads Engineer and were found to be unlikely to impact the site.

Paradise Cove Campground:

- No fire-related issues were found to exist at this site. Culverts were assessed for flow capacity by the BAER Hydrologist and Roads Engineer for and were found to be unlikely to impact the site.

South Fork Campground:

- Pre-fire attempts to block unauthorized OHV use have been made at this site south of 26S22. Placement of slash and barrier rocks will no longer be adequate to block unauthorized use due to the burning of vegetative cover. Currently, there has been little attempt to block the routes in the lake bed on the north side of 26S22, since South Fork visitors drive vehicles in order to reach the lake during drought

conditions. This discrepancy in management may make it more difficult to achieve compliance with travel management in the fire-affected lands. It is recommended that additional barrier rock be placed parallel the south edge of the 26S22 road or that temporary signage and barriers be constructed until vegetation grows back. To increase success in the fire-damaged area, more consistent management may be required, which may result in the designation of certain lake bed routes and the restoration of others.

- There is burned land upslope of this site, although Highway 178 acts as a barrier that would reduce the potential of rock fall or debris flow reaching the site. No impacts are expected from the intermittent stream in Yankee Canyon, which drains west of the site. Culverts were assessed for flow capacity by the BAER Hydrologist and Roads Engineer were found to be unlikely to impact the site.

III. Assessment of Values at Risk

The risk to critical values associated with recreation was determined using the BAER Risk Assessment Matrix (FSH 2323.1, Exhibit 2), and emergency conditions were found to exist for the following BAER critical values: human life and safety, property, and natural resources.

Threats to the life and safety exist from hazard trees, debris flow, rock fall, and tread destabilization. The cumulative risk to life and safety is high along the following trails: Steve's Spring (34E32), Willow Gulch (34E41), and Woolstalf Meadow (34E42). The potential for intermediate risk from hazard trees and tread destabilization exists along the Dry Meadow (34E31) and Little Dry Meadow (32E52). There is also risk to life and safety on the BLM Long Canyon trail and the BLM portions of the Woolstalf Meadow and Willow Gulch trails.

Threats to FS property include loss of functionality of fencing and signs due to fire-damage, damage to tread due to debris flow and falling rocks, and erosion of trail infrastructure caused by capture of accelerated flow from upslope areas subject to moderate burn severity. Table 1 in Appendix B outlines the Soil Burn Severity Class for each affected trail. The cumulative risk to property is high at the Little Dry Meadow and Woolstalf Meadow Trail. The risk is intermediate at the Dry Meadow. The risk is low at the Dry Meadow and Woolstalf Meadow. There is also a risk to property on BLM Long Canyon Trail and the BLM portions of the Woolstalf Meadow and Willow Gulch trails.

Threats to natural resources include degradation of soil quality caused by accelerated erosion from trails due to the fire, and disruption of hydrologic function at the Woolstalf Meadow caused by erosion due to unauthorized OHV access off the Woolstalf Meadow trail and 28S24D road. The risk to soil quality is high and the risk to Woolstalf Meadow is intermediate. There is also an intermediate risk to soil quality due to unauthorized routes.

Table 2 in Appendix B summarizes the risk assessment for each trail and recreation site.

IV. Treatments to Mitigate the Emergency on NFS lands

A. Treatment Type

1. Road and Trail Treatments- *Trail Storm Proofing* (Map 5, Table 3)

Storm proofing would occur prior to the first damaging rain event and within the first year following the fire. Treatments would be implemented with hand tools and would include outsloping, berm removal, replacement of burned log waterbars, maintenance and construction of drainage dips and waterbars, and armoring water outlets where necessary to prevent erosion of the trail infrastructure. Treatment would also include filling of stump holes to prevent destabilization of the tread.

2. Protection and Safety Treatments- *Hazard Warning Signs and Closure* (Map 6)

Hazard warning signs would be posted to inform the public of the increased risk to safety in burned areas posed by hazard trees and rock fall. Warning signs would be installed at access points to all authorized trail segments that have been burned and should remain in place for up to 3 years or until potential hazards are mitigated.

Costs may be reduced by coordinating with crews implementing sign installation on roads and BLM lands. The locations recommended for sign installation were chosen as a stand-alone treatment. Some locations, such as those mid-trail at the Forest boundary and at trail junctions near Woolstalf Meadows, may be redundant and unnecessary if BLM posts hazard signs at trail junctions and a hazard sign is installed on the Woolstalf Meadow Road (28S24) south of the Steve's Spring Trail junction on the fire perimeter.

Locations of hazard sign installations would be approved by an Archeologist prior to implementation.

Closure by Forest Order would occur on all trails within the fire perimeter for the duration of one winter to allow immediate hazard trees to fall and treatment implementation to be completed.

All treatments are consistent with the Burned Area Emergency Response Treatments Catalog (Napper, 2006).

B. Treatment Description

1. *Trail Storm Proofing*

Outsloping: Establishing a downward grade from the inside edge (uphill side) of the tread to the outside edge (downhill side) of the tread. Downward sloping of 0.5" to 1" per foot of trailbed width is normally sufficient (FSH 2309.18). Soil may be loosened with a pulaski and removed using a McLeod, and can be used to fill holes in the tread. This treatment would occur as necessary on all trails that require storm proofing.

Berm Removal: Removal of soil build-up on the outside edge of the trailbed that prevents water from exiting the trail. Soil may be removed using a McLeod and used to fill holes in the tread. Berm should be removed where feasible. This treatment would occur as necessary on all trails that require storm proofing.

Maintenance of existing waterbars: Using a shovel to dig material from directly upslope of the waterbar, being sure to maintain the outslope, and filling behind the waterbar with the removed material (0723-2806-MTDC). If drains are eroded they would be armored with rock collected from adjacent the trail. This treatment would occur as necessary on all trails that require storm proofing.

Installation of grade dips: This treatment would occur where tread erosion from accelerated post-fire flows is likely. Tread would be reshaped to create a gradual dip where water can exit the tread followed by a rise at an angle to the outslope to divert water off the trail.

Filling of Stump and Root Holes: This treatment would occur anywhere stump and root holes may destabilize trail tread or pose a risk to safety of trail users. Fill material would be removed from adjacent the trail tread, and would be packed into the stump or root hole then compacted with the back of a McLeod or a tamping bar.

Hazard Tree Removal: Hazard trees posing a risk to life and safety of storm proofing implementation workers along the trails receiving treatment would be identified by qualified Forest Service personnel and felled before work crews pass the location. Hazard trees would be felled away from the trail, if possible, and would be bucked out of the trailway as necessary. Blazed trees and trees identified as a benefit to wildlife would be retained, if possible.

Logging Out: Logs across the trails receiving treatment would be bucked out of the trail corridor, where necessary, to provide for ease of passage and safety of trail workers, and to prevent resource damage that may occur if trail users choose to bypass obstacles through off-trail travel.

2. Hazard Warning Signs and Closure

Hazard Sign Installation: Treated posts would be sized to allow for a 2' burial depth, 5' of length before the bottom of the sign, and 2" of post above the top of the sign which would be slanted at a 45° angle away from the sign face. Pre-drilled post-fire hazard warning signs would be ordered and mounted on the treated wooden posts with vandal-resistant hardware.

Administrative Closure: A Forest Order would be obtained to temporarily close all NFS trails within the Erskine fire perimeter to public use for one winter. The closure order would be posted in the Ranger District offices, the Forest Supervisor's Office, at display boards where trail users may receive information, and on the hazard warning sign posts at trailheads and trail junctions. The order would be terminated when no longer necessary, and closure signs would be removed after termination.

3. Treatment Best Management Practices

All structure installation locations would be identified by an experienced trail technician, who would also supervise construction. Construction would meet Forest Service specifications as outlined in the Forest Service National Trail Drawings and Specifications (EM-7720-103), the Trail Construction and Maintenance Notebook (0723-2806-MTDC), and the Trails Management Handbook (FSH 2308.18) All soil and rock used for structure construction or filling of burned-out stump holes would be gathered from locations adjacent the trail. If existing, the organic material from the surface of borrow pits would be retained and the pits would be rehabilitated by recontouring to a natural grade before replacement of the surface organic material.

All sign installation would occur according to the Forest Service Sign and Poster Guidelines (EM 7100-15).

All implementation work would be consistent with guidelines outlined in the Health and Safety Code Handbook (FSH 6709.11) and relevant job hazard analysis documents.

V. Discussion/Summary/Recommendations

Four Forest Service campgrounds (Auxiliary Dam, Old Isabella, South Fork, Paradise Cove), five NFS trail segments (Little Dry Meadow), and three BLM trail segments with the potential to have values at risk due to the fire.

Forest Service

A high risk to human life and safety on NFS land exists along the Steve's Spring (hazard trees, debris flow), and Woolstalf Meadow Trail (hazard trees, rock fall). Intermediate risk to human life and safety on NFS land exists along the Dry Meadow (hazard trees, rock fall) and Little Dry Meadow (hazard trees, rock fall). It is recommended that all trails posing a risk to life and safety be closed by Forest Order for the duration of one winter to allow immediate hazard trees to fall and treatment implementation to be completed. It is also recommended that post-fire hazard warning signs be installed at the access points of these trails to alert trail users of the risk.

A high risk to Forest Service property exists along the Little Dry Meadow Trail (damaged fencing), Dry Meadow Trail (at-risk tread), and Woolstalf Meadow Trail (damaged fencing and at-risk tread). Storm proofing treatments on the trails and fence replacement or use of natural barricades to block the meadow to OHV traffic is recommended to reduce these risks.

A high risk to natural resources exists at the Dry Meadow Trail (risk to soil quality due to erosion at water outlets) and Woolstalf Meadow (risk to hydrologic function due to OHV trespass).

BLM

A risk to human life and safety exists on the BLM-managed portions of the Woolstalf Meadow Trail (hazard trees) and the Willow Gulch Trail (hazard trees, rock fall). There is a lesser risk to life and safety along the Long Canyon Trail due to rock fall.

A risk to property exists on the Long Canyon Trail, and the BLM-managed portions of the Willow Gulch and Woolstalf Meadow Trail due to at-risk tread.

A risk to natural resources exists on the BLM-managed portion of the Woolstalf Meadow Trail (degradation of soil quality caused by erosion from water outlets), and in the Bright Star Wilderness (degradation of wilderness character and values due to OHV trespass).

It is recommended that BLM implement similar treatments to reduce these risks. Specific recommendations are made in the Summary of Analysis section of this report.

Other Recommendations

It is recommended that the Forest notify the grazing allotment permittee of the burned fencing at the Northern Forest boundary near Long Canyon and at Woolstalf Meadow.

It is recommended that tribal consultation occur before implementation of treatments in areas sensitive for tribal interests.

Consultations

Steve Anderson, Kern River Ranger District Rangeland Management Specialist

Bob Frenes, Kern River Ranger District Assistant Recreation Officer

Curtis Kvamme, BAER Soil Scientist

Marcos Rios, BAER Roads Engineer

Jonathon “Yonni” Schwartz, BAER Geologist

Keith “Andy” Stone, BAER Hydrologist

Alex Neibergs, BLM Ridgecrest Field Office

VI. References

U.S. Department of Agriculture Forest Service. 1999. Health and safety code handbook. **FSH 6709.11**. Washington, DC: U.S. Department of Agriculture Forest Service. (<http://www.fs.fed.us/im/directives/fsh/6709.11/FSH6709.pdf>)

U.S. Department of Agriculture Forest Service. 1991. Trails management handbook. **FSH 2309.18**. Washington, DC: U.S. Department of Agriculture Forest Service. (http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsh?2309.18)

U.S. Department of Agriculture Forest Service. 2014. Burned-area emergency rehabilitation handbook. **FSH 2509.13**. Washington, DC: U.S. Department of Agriculture Forest Service.

U.S. Department of Agriculture Forest Service. 1996. Forest Service National trail drawings and specifications. **EM-7720-103**. Washington, DC: U.S. Department of Agriculture Forest Service. (<http://www.fs.fed.us/.ftproot/pub/acad/dev/trails/trails.htm>)

U.S. Department of Agriculture Forest Service. 2005. Signs and poster guidelines for the Forest Service. **EM-7100-15**. Washington, DC: U.S. Department of Agriculture Forest Service.

Hesselbarth, Woody; Vachowski, Brian; Davies, Mary Ann. 2007. Trail Construction and Maintenance Notebook: 2007 Edition. **0723-2806-MTDC**. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. (www.fs.fed.us/t-d/.../pdf07232806dpi72.pdf)

Napper, Carolyn. 2006. Burned Area Emergency Response Treatments Catalog (BAERCAT). **0625 1801P**. San Dimas, CA: U.S. Department of Agriculture, Forest Service, San Dimas Technology and Development Center. (http://www.fs.fed.us/t-d/pubs/pdf/BAERCAT/lo_res/lo_res.shtml)

VII. Appendices

- A. Referenced Photographs
- B. Referenced Tables

Appendix A: Referenced Photographs



Photo 1: Trail braids on South end of Dry Meadow capture flow and deliver to existing tread.



Photo 2: Rilling at water outlets on North end of Dry Meadow Trail.

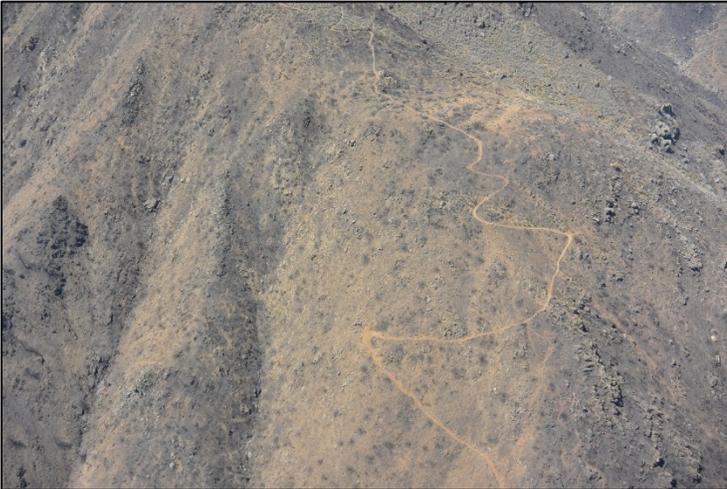


Photo 3: Erosion at water outlets on North end of Dry Meadow.



Photo 4: Unauthorized OHV use is common near North end of Little Dry Meadow.

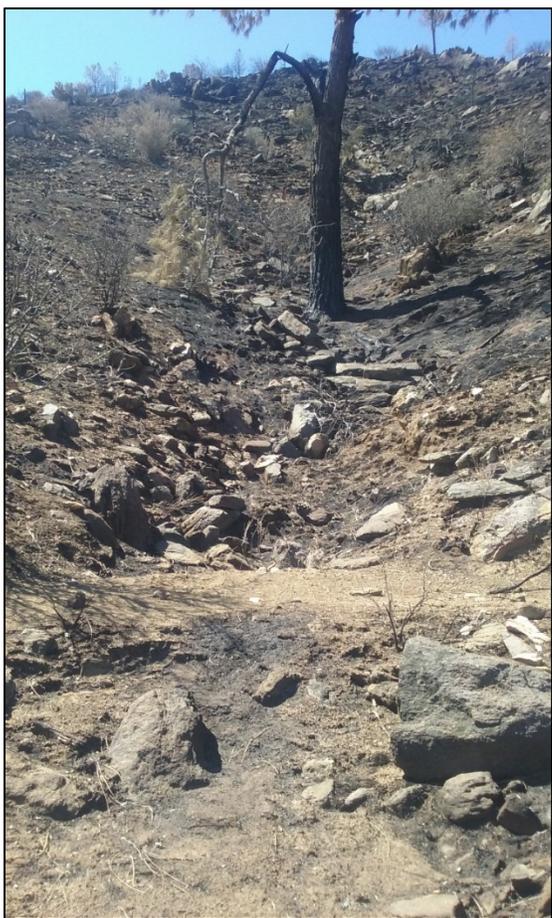


Photo 5: Long Canyon trail needs drainage dip constructed at crossing



Photo 6 and 7: Long Canyon trail at risk from rock fall and wash out of tread at drainage crossing (L), although the slope is not very steep and there is a relatively small amount of contributing area burned by the fire (R).

Appendix B: Referenced Tables

Table 1: Soil Burn Severity Class by Trail.

Soil Burn Severity (SBS) Class by	Length in SBS Class (miles)	Percent in SBS Class
DRY MEADOW TRAIL		
Low	1.37	25.75%
Moderate	3.55	66.97%
Very Low / Unburned	0.39	7.27%
LITTLE DRY MEADOW		
Low	1.23	28.99%
Moderate	2.90	68.41%
Very Low / Unburned	0.11	2.60%
Steve's Spring		
Low	0.33	62.31%
Moderate	0.11	21.22%
Very Low / Unburned	0.09	16.47%
WILLOW GULCH		
Low	0.39	30.06%
Moderate	0.78	60.07%

Very Low / Unburned	0.13	9.87%
WOOLSTALF MEADOW		
Low	10.08	59.36%
Moderate	6.67	39.28%
Very Low / Unburned	0.23	1.36%
Grand Total	28.35	100.00%

Table 2: Risk Assessment of BAER Critical Values

Value Category	Value-at-Risk (VAR)	Description of Threat	Specific Locations	Probability	Magnitude	Risk	Overall Risk to Critical Value on FS lands
Human Life & Safety (HLS)	Public land visitors & agency personnel.	Threats from fire-weakened trees, flooding, debris flows, and falling rocks along trails, within or downslope from burned areas, especially those with moderate to high burn severity.	DRY MEADOW	Unlikely	Major	Intermediate	High
			LITTLE DRY MEADOW	Unlikely	Major	Intermediate	
			LONG CANYON TRAIL (BLM)	BLM will determine risk.			
			STEVE'S SPRING	Possible	Major	High	
			WILLOW GULCH	Possible	Major	High	
			WOOLSTALF MEADOW TRAIL (FS)	Possible	Major	High	
			WOOLSTALF MEADOW TRAIL (BLM)	BLM will determine risk.			
Property (P)	Fencing	Threats to fencing and other barricades caused by the burning of wooden posts and damage from falling trees that were weakened in the fire.	LITTLE DRY MEADOW	Very Likely	Moderate	High	High
			WOOLSTALF MEADOW TRAIL (FS)	Very Likely	Moderate	High	
			WOOLSTALF MEADOW TRAIL (BLM)	BLM will determine risk.			
Property (P)	Signs	Threats to signs and carsonite markers at trails and recreation areas due to burning.	DRY MEADOW	Very Likely	Minor	Low	Low
			WOOLSTALF MEADOW TRAIL (FS)	Very Likely	Minor	Low	
			WOOLSTALF MEADOW TRAIL (FS)	Likely	Minor	Low	
			AUXILIARY DAM CAMPGROUND	Very Likely	Minor	Low	
Property (P)	Trail Infrastructure	Threats to trail infrastructure due to burning of wooden water bars, erosion and destabilization caused by burned-out stump holes, and accelerated overland flow within and downslope from areas burned at moderate severity.	DRY MEADOW	Possible	Major	High	High
			LITTLE DRY MEADOW	Unlikely	Moderate	Low	
			LONG CANYON (BLM)	BLM will determine risk.			
			WILLOW GULCH (BLM)	BLM will determine risk.			
			WOOLSTALF MEADOW TRAIL (FS)	Possible	Major	High	
			WOOLSTALF MEADOW TRAIL (BLM)	BLM will determine risk.			
Natural Resource (NR)	Soil Quality	Threats to soil quality from increased erosion at trail water outlets and on unauthorized OHV	DRY MEADOW	Likely	Moderate	High	High

Value Category	Value-at-Risk (VAR)	Description of Threat	Specific Locations	Probability	Magnitude	Risk	Overall Risk to Critical Value on FS lands
		routes. This may be caused by: burning of natural and constructed barriers to unauthorized OHV use; channeling of accelerated flow from moderate and high burn severity areas and releasing the concentrated flows onto erodible land.	LITTLE DRY MEADOW	Possible	Minor	Low	
			WOOLSTALF MEADOW TRAIL (FS)	Possible	Minor	Low	
			WOOLSTALF MEADOW TRAIL (BLM)	BLM will determine risk.			
			SOUTH FORK CAMPGROUND	Possible	Minor	Low	
			UNAUTHORIZED ROUTES	Possible	Moderate	Inter-mediate	
Natural Resource (NR)	Hydrologic Function	Threats to Woolstalf Meadow from erosion due to increase in illegal off-highway vehicle activity and grazing caused by burned exclosure fence.	WOOLSTALF MEADOW	Likely	Moderate	High	High
Natural Resource (NR)	Bright Star Wilderness	Threats to wilderness values due to unauthorized OHV travel through the wilderness due to burning and loss of functionality of natural and constructed barriers along the Woolstalf Meadow Trail.	UNAUTHORIZED ROUTES	BLM will determine risk.			

Table 3: Storm Proofing Treatment Details

Storm Proofing	
Trail	Treatment Description
Dry Meadow Trail (34E31)	Armor water outlets on north end Restore/maintain drainage function on the south end and entire section north of Dry Meadow Creek Remove down and hazard trees where necessary to protect worker safety
Little Dry Meadow (32E52)	Restore/maintain drainage function at drainage crossings on entire length Remove down and hazard trees where necessary
Long Canyon (BLM)	Restore/maintain drainage function at drainage crossings
Steve's Spring (34E32)	Addressed in BAER Roads Report
Willow Gulch (34E41)	Restore/maintain drainage function at crossings on entire length Remove down and hazard trees where necessary
Woolstalf Meadow Trail (34E42)	Fill burned-out stump holes Maintain drainage structures at drainage crossings on entire length Replace burned OHV barricades in Bright Star Wilderness and install where necessary Remove down and hazard trees where necessary to protect worker safety