

Monroe Canyon Fire Burned Area Summary

Burned Area Report

Fire Background

The human caused Monroe Canyon Fire was first detected on July 13th approximately 3.5 miles east of Monroe, Utah on the Richfield Ranger District of the Fishlake National Forest. The fire started near Monroe Canyon Road and spread southwest toward the western edge of Monroe Mountain and northeast across Monroe Mountain and off the east side across BLM to State Highway 24. It stretched approximately 19 miles in a northeast to southwest direction across Monroe Mountain and off the northeast side across Bear Valley.

While many wildfires cause minimal damage to the land and pose few threats to the land or people downstream, some fires result in damage that requires special efforts to reduce impacts afterwards. The Burned Area Emergency Response (BAER) program is designed to identify and manage potential risks to resources on National Forest System lands and reduce these threats through appropriate emergency measures to protect human life and safety, property, and critical natural or cultural resources. BAER is an emergency program for stabilization work that involves time critical activities to be completed before damaging events to meet program objectives.

The Forest Service assembled a BAER team for the Monroe Canyon Fire on August 15th. This team of experts in various resource disciplines began assessing the post-fire effects to critical values on Forest Service lands. Impacts to the soil are the primary indicator of potential post-fire changes in watershed response, as well as watershed recovery. The team developed soil burn severity (SBS) maps to document the degree to which the fires had changed soil properties. Using the SBS map, physical scientists can predict erosion potential,

changes to runoff and flood flows, and increased geologic hazards. Field evaluations and modeling results are used to determine relative increases in post-fire risk to different critical values and inform recommendations to address these increased risks.

Soils

Soil burn severity is not an assessment of vegetation consumption, but rather an integration of vegetation loss, changes in soil structure and infiltration capacity, remaining vegetation, duff, or ash, and soil color, all of which may indicate relative degrees of soil heating.

The final soil burn severity maps were developed with ESRI ArcGIS software using satellite-imagery-derived Burned Area Reflectance

Figure 1: BAER Team member assessing soil burn severity in Monroe Canyon



Classification (BARC) and field survey data. Field work included assessment of ash characteristics,

ground cover, root condition, soil structure, soil water-repellency, and vegetation burn severity as described in the Field Guide for Mapping Post-fire Soil Burn Severity (Parsons et al. 2010). High burn severity is characterized by a complete consumption of organic material with the surface layers of the soil resulting in a change to single-grain structure. Fine roots are commonly charred or consumed 3-5 cm deep. The highest-severity areas often have a loose, dusty appearance, and no longer have any cohesion or soil strength. Generally, there will be less destruction of soil organic matter, roots, and structure in an area mapped as moderate compared to high. In areas mapped as moderate SBS, soil structure, roots, and litter layer may remain intact beneath a thin ash layer. Low soil burn severity results in very little alteration of soil organic matter and little or no change in soil structural stability.

Mapped and validated SBS for the burned area is High (10%), Moderate (38%), Low (31%), and Very Low/Unburned (21%) (see map on page 7). Soil burn severity within the Monroe Canyon burn scar was driven by vegetation types found in the area. The mixed conifer and aspen stands experienced moderate and high intensity due to fuel and weather conditions. Areas within the shrub and grasslands were all dominated by fine fuels that burned quickly resulting in predominately very low and low SBS.

The more severe a fire's effects are on the soil, the more likely those soils will erode in subsequent rainstorms – especially in locations with steep slopes. Hillslope erosion was minimal pre-fire; however, post-fire erosion is anticipated to increase throughout the burned areas. Areas of particular concern were the burned hillslopes within the Monroe and Water Canyon areas. Erosion after fires can cause tremendous damage to homes and other structures in the years after a fire.

Geology

The team identified the geologic conditions and processes that have shaped and altered the watersheds and landscapes and assessed the impacts

from the fire on those conditions and processes that could affect downstream critical values. Using the understanding of rock types and characteristics, geomorphic processes, and distribution of geologic hazards helps predict how the watersheds will respond to and be impacted by upcoming storms. The burned area is located across the Monroe Mountain area, bisecting the range from the southwest to the northeast. Located within the northern portion of the Basin and Range physiographic province, the landforms are characterized by abrupt changes in elevation, alternating between steep narrow faulted mountain chains and flat arid valleys or basins.

The lithology within the burn perimeter is primarily composed of Tertiary volcanics, most notably the widely distributed ash-flows of the Bullion Canyon Volcanics. The soft to resistant tuff layer includes lenses of fluvial conglomerate and other eroded materials, formed by a cluster of stratovolcanoes. Extensive normal faulting resulting from basin and range extension has heavily dissected the terrain, particularly across the steep side slopes climbing up from Sevier Valley where the topography helped drive mass slumping and landslide deposits throughout the Quaternary and presents geologic hazards into the modern day (Giraud, 2004). There are 3 burned watersheds that are expected to be highly responsive to high-intensity rainfall events including Monroe Canyon Creek, Water Canyon Creek, and Dry Canyon Creek.

The team provided soil burn severity field data to the US Geological Survey Landslide Hazard Program to assist in forecasting the probability, potential volumes, and hazards of debris flows through their developed empirical models. The USGS Post-fire Debris Flow Hazard Model estimates a moderate to high debris flow hazard across the burn scar in response to a peak 15-minute rainfall intensity of 24 mm/hour (see map on page 8). This rainfall intensity is equivalent to the accumulation of 0.24” of rain in 15 minutes during a high intensity thunderstorm. This rainfall event



Figure 2: Moderate and high soil burn severity in Monroe Canyon.

has a 1-year recurrence interval in the burned area, meaning it is a very likely event that has a 100% probability of occurring on any given year.

Hydrology

Primary watershed response is expected to include an initial flush of ash and burned materials, erosion in drainages and on steep slopes in the burned area, increased peak flows and sediment transport and deposition, and debris flows. Watershed response is dependent on the occurrence of rainstorms and rain-on-snow events and will likely be greatest with initial storm events. Increased watershed response is most likely in areas with high to moderate soil burn severity. Disturbances will become less evident as vegetation is reestablished, providing ground cover that reduces erosion and increases surface roughness which slows flow accumulation and increases infiltration.

A rapid hydrologic assessment suggests that there will be an extreme hydrologic response to relatively modest high-intensity thunderstorms. A 2-year rainfall event (50% chance of occurrence on any given year) is expected to result in 20-year

flood event. The Monroe Canyon and Water Canyon Creek subwatersheds have modeled post fire flow increases of 219% and 417% respectively. The volume of these runoff events will be further bulked with sediment, rocks, and floatable debris. Based on the modeling of the 1-2-year precipitation event, USGS estimated a likelihood of 80-100% for a debris flow occurring in Dry Canyon, the tributaries to Monroe Canyon, and some basins in Water Canyon. There is a low threshold for rainfall in these areas. These basins also had a high combined hazard rating.

Critical Values

The first critical value BAER teams assess is always human life and safety on National Forest System lands. During and after heavy rainstorms, Forest Service employees and visitors to National Forest System Lands could be threatened by floodwaters and debris flows. In addition, users of roads within and downstream of the burned areas may be affected by road washouts during and after heavy rainstorms. The National Weather Service has established an early warning alert plan for the Monroe Canyon area which is potentially at risk from these events. The BAER team recommends general warning signs and communications to travelers on any National Forest System roads and trails within or directly adjacent to the fire. These will be installed at major motorized and non-motorized entry points into the burned area. In addition to the warning signs, it is recommended to close the Monrovia Park area seasonally with a closure order and gate due to its location at the bottom of Monroe Canyon.

Roads and Bridges

Roads in and downstream of burned areas are at risk of damage due to post-fire conditions. The most likely threat due to the fires is clogging of culverts, bridges, and other in-channel infrastructure from the higher levels of floatable debris (especially burned trees) in burned watersheds. Once blocked by

debris, road drainage structures no longer function and the stream flows over the road, often causing considerable damage and limiting access. Various measures can reduce this risk, including protecting culvert inlets with debris racks, removing large floatable debris from channels upstream of structures before floods, and making heavy equipment available and readily mobilized during storm events to keep structures clear of debris.

Debris flows are less likely than debris-laden flood flows, but they pose a greater threat to roads when they do occur and are difficult to mitigate.

Critical values addressed in the BAER report include Forest Service System Roads and related drainage features. Treatments for the protection of these roads include storm proofing of existing drainage features, culvert basin enlargements, culvert upsizing, and regular storm inspection and response during or immediately after high intensity rainfall.

Recreation

National Forest System recreation infrastructure includes campgrounds, trails, and day use areas. Most of the recreation assets within the Monroe Canyon Fire burned area are motorized and non-motorized trail systems. Similar to roads, recreation infrastructure could be damaged in post-fire storm events.

Within the Monroe Canyon Fire, all of the threatened motorized trails have been designated on existing road alignments. The previously described road treatments will serve to reduce risks to the motorized trail network from post-fire storm damage. There were several miles on nonmotorized trails mapped in the moderate to high SBS portions of the fire and treatments for creating and improving drainage will reduce risks to the trail network from post-fire storm damage.

Botany

Invasive plants adversely affect native plant communities through allelopathy (suppression of growth of a native plant by release of a toxin from a nearby invasive plant) and direct competition for

water and resources. Over time, native plant diversity decreases as invasive plants expand, reducing habitat for native plant species and wildlife. Shifts from diverse native plant communities to non-native invasive plant dominance could alter future fire behavior,



Figure 3: Early warning weather station will be deployed in the Monroe Canyon area by the National Weather Service and Utah Department of Transportation.

intensity, extent, and season of burning. Current infestations are primarily located along roads, dispersed camping areas, and trails throughout the burned area. However, the burned area creates conditions for invasive species to outcompete native plants. The team recommends a treatment of Early Detection, Rapid Response (EDRR) to monitor noxious weed infestation and expansion in areas disturbed during fire suppression activity. During implementation of this treatment, crews will survey the fire control lines, spike camps, helispots, and safety zones for new or expanding populations of invasive plants, document the findings, and apply herbicide.

Cultural Resources

The most typical post-fire threats to cultural

sites are physical threats such as erosion or damage from (now dead) falling trees. In some cases, newly exposed artifacts are threatened by human damaging activities such as looting or vandalism. Cultural resources were evaluated by the team and treatments proposed as necessary to protect these values from post-fire threats.

Anticipated Vegetation Recovery

Post-fire recovery varies greatly based on climate, vegetation types and burn severity. It is typical for recovery to take between 3-5 years for reestablishment of ground cover. The persistence of drought in the years following wildfires also delays the recovery time frame. Even with only a short period of time since fire containment, resprouting of trees and shrubs as well as emergence of forbs have been noted within the burned area.

Non-Forest Service Values

Since fire effects know no administrative boundaries, additional threats exist for assets not owned or managed by the Forest Service. Post-fire emergency response is a shared responsibility. There are several Federal, State, and local agencies that have emergency response responsibilities or authorities in the post-fire environment. The BAER team and local unit BAER Coordinator has engaged with interagency partners to facilitate consideration of off-Forest values covered through other programs with the relevant responsible entities.

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Conclusion

There are multiple phases of post-fire actions after a wildfire covering suppression repair through long-term recovery. BAER is the rapid assessment of burned watersheds by a BAER team to identify imminent post-wildfire threats to human life and safety, property, and critical natural or cultural resources on National Forest System lands and take immediate actions to implement emergency stabilization measures before the first major storms. The BAER team has identified imminent threats to critical values based on a rapid assessment of the area burned by the Monroe Canyon Fire. The assessment was conducted using the best available methods to analyze the potential for damage from post-fire threats, including flooding and debris flows. The findings provide the information needed to prepare and protect National Forest System critical values against post-fire threats. The recommended BAER treatments in this report are not yet approved or funded. Because of the emergency nature of BAER, initial requests for funding of proposed BAER treatments are supposed to be submitted by the Forest Supervisor to the Regional Office within 7 days of total containment of the fire. The Regional Forester's approval authority for individual BAER projects is limited. Approval for BAER projects exceeding this limit is forwarded onto the Washington Office.

BAER treatments cannot prevent all the potential flooding or soil erosion impacts, especially after a wildfire has changed the landscape. It is important for the public to stay informed and prepared for potentially dramatic increased run-off events. The watersheds within the burned area were already hydrologically responsive to rainfall and prone to erosion and sediment transport prior to the fire and will be even more responsive due to post-fire conditions. Among treatments considered was the aerial application of mulch or seed within the burned area, however this treatment was determined to not be an effective treatment to prevent hillslope erosion, increase in peak flows or debris flows. Aerial mulching and seeding is a treatment that can be used as hillslope erosion control, but has a very narrow window of effectiveness that frequently does not align with current post-fire watershed conditions. For example, aerial mulch applied to slopes that are too steep will not persist on the mountain and will dry ravel downslope. Furthermore, when high percentage of watersheds burn, it is not possible to treat enough of the watershed within the effective slope range to reduce the threat. Runoff produced from high intensity thunderstorms will continue to deliver considerable sediment in the untreatable areas, meaning that the treatment would not effectively attenuate sediment delivery and peak flows. Lastly, and most importantly, mulch can be as mobile as the sediment in the high-intensity precipitation events that produce debris flows. Mulching and seeding does not prevent debris flows, and in fact can add debris to debris bulked flows or debris flows.

However, vegetation recovery is anticipated to be rapid with ground cover approaching pre-fire conditions within 3-5 years, which will attenuate most post-fire effects on watershed processes. The Forest Service will continue to provide information and participate in interagency efforts to address threats to public and private values resulting from the Monroe Canyon Fire. Fire information can be found on-line at

<https://inciweb.wildfire.gov/incident->

[information/utfif-monroe-canyon.](https://inciweb.wildfire.gov/incident-information/utfif-monroe-canyon)

The Forest Service will continue to work towards long-term recovery and restoration of the burned area in coordination with efforts to rebuild and restore the communities affected. A vegetation burn severity map, or mortality map, may be produced as a part of the recovery efforts to help other scientists, such as wildlife biologists, botanists, and silviculturists understand what to expect from this changed landscape for wildlife habitat, invasive weeds, timber salvage, and reforestation needs.

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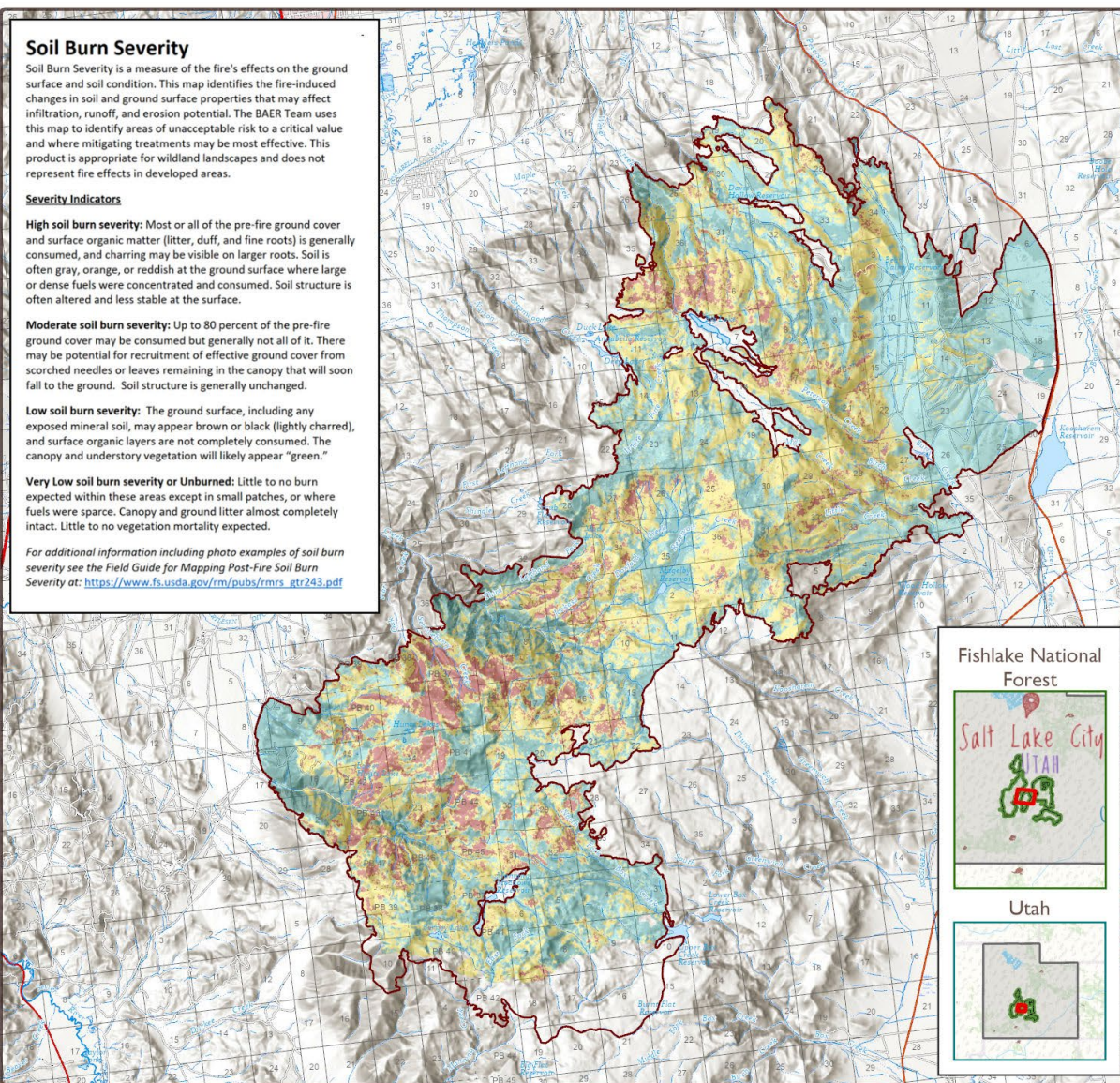
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References:

Parson, Annette; Robichaud, Peter R.; Lewis, Sarah A.; Napper, Carolyn; Clark, Jess T. 2010. Field guide for mapping post-fire soil burn severity. Gen. Tech. Rep. RMRS-GTR-243. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 49 p. (https://www.fs.usda.gov/rm/pubs/rmrs_gtr243.pdf)



Soil Burn Severity Burned Area Emergency Response (BAER)



Soil Burn Severity

Soil Burn Severity is a measure of the fire's effects on the ground surface and soil condition. This map identifies the fire-induced changes in soil and ground surface properties that may affect infiltration, runoff, and erosion potential. The BAER Team uses this map to identify areas of unacceptable risk to a critical value and where mitigating treatments may be most effective. This product is appropriate for wildland landscapes and does not represent fire effects in developed areas.

Severity Indicators

High soil burn severity: Most or all of the pre-fire ground cover and surface organic matter (litter, duff, and fine roots) is generally consumed, and charring may be visible on larger roots. Soil is often gray, orange, or reddish at the ground surface where large or dense fuels were concentrated and consumed. Soil structure is often altered and less stable at the surface.

Moderate soil burn severity: Up to 80 percent of the pre-fire ground cover may be consumed but generally not all of it. There may be potential for recruitment of effective ground cover from scorched needles or leaves remaining in the canopy that will soon fall to the ground. Soil structure is generally unchanged.

Low soil burn severity: The ground surface, including any exposed mineral soil, may appear brown or black (lightly charred), and surface organic layers are not completely consumed. The canopy and understory vegetation will likely appear "green."

Very Low soil burn severity or Unburned: Little to no burn expected within these areas except in small patches, or where fuels were sparse. Canopy and ground litter almost completely intact. Little to no vegetation mortality expected.

For additional information including photo examples of soil burn severity see the Field Guide for Mapping Post-Fire Soil Burn Severity at: https://www.fs.usda.gov/rm/pubs/rmrs_rtr243.pdf



Soil Burn Severity

Soil Burn Severity	Acres	% Burned
High	6,847	10%
Moderate	26,375	38%
Low	21,141	31%
Very Low or Unburned	14,161	21%
Assessment Area	68,524 acres	
Burn Boundary 8/9/2025		

Data Creation Date: 8/9/2025

Disclaimer This product is a product of BAER rapid assessment. Further information concerning the accuracy and appropriate uses of this data may be obtained from the USDA Forest Service. The Forest Service, makes no warranty, expressed or implied, including the warranties of merchantability and fitness for a particular purpose, nor assumes any legal liability or responsibility for the accuracy, reliability, completeness or utility of these geospatial data, or for the improper or incorrect use of these geospatial data. These geospatial data and related maps or graphics are not legal documents and are not intended to be used as such. The data and maps may not be used to determine title, ownership, legal descriptions, boundaries, legal jurisdiction, or restrictions that may be in place on either public or private land. Natural hazards may or may not be depicted on the data and maps, and land users should exercise due caution. The data is dynamic and may change over time. The user is responsible to verify the limitations of the geospatial data and to use the data accordingly.



Monroe Canyon BAER

**USGS Debris Flow Combined Hazard
 Burned Area Emergency Response (BAER)**

**Debris Flow Combined Hazard
 (Likelihood & Volume)
 Peak 15 minute Rainfall Intensity
 Rate of 24 mm/hour**

USGS Debris Flow Hazard 15min 24mmhr

Segments

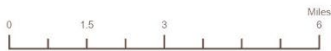
- High
- Moderate
- Low

Basins

- High
- Moderate
- Low
- Basin Outlets
- Assessment Boundary 68,524 acres

A 15-minute rainfall intensity of 24 mm/h is equivalent to the accumulation of 6 mm of rain in 15 minutes.

Fishlake National Forest



Date: 8/20/2025

