Apache Fire Burned Area Summary

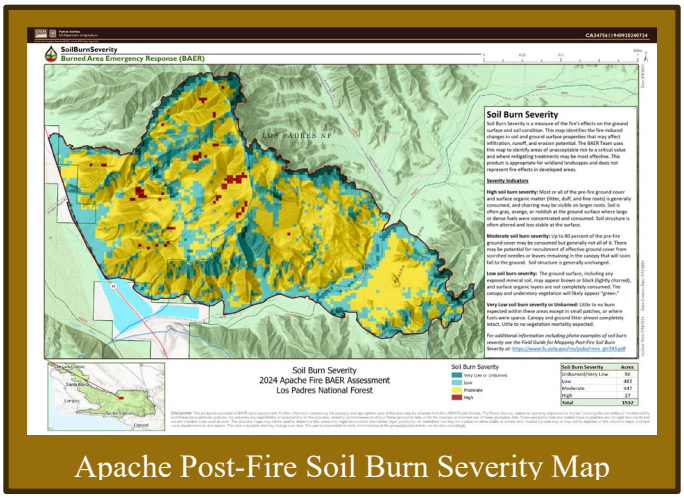
Burned Area Report

Fire Background

The Apache Fire ignited Tuesday evening, July 23, in a remote area of Ventura County in the Los Padres National Forest. The fire, burning in a two-year crop of cured annual grass, spread quickly the following day as winds from nearby thunderstorms impacted the area. On Thursday, July 25, despite weather conditions favorable for fire growth, fire behavior moderated, and fire crews supported by aircraft were able to regain ground lost the day before. As of July 31, the fire was holding at 1,538 acres with 80% containment.

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 on July 31, for the Apache and Lake Fires. 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.



Apache Post-Fire Soil Burn Severity Map

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 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 (1%), Moderate (62%), Low (31%), and Very Low/Unburned (6%) (see map on last page). 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. Erosion after fires can cause tremendous damage to homes and other structures in the years after a fire.

Developed areas (both urban and rural) were not mapped for soil burn severity. This method has been developed for wildland vegetation and landscapes and therefore is not appropriate for describing effects of fire on developed lands and burned structures. As such, these areas were not visited or evaluated by the BAER team.

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 Apache Fire burned at the base of the Sierra Madre Mountain range, along the Cuyama River and Highway 33 spreading up Apache Canyon, in an area colloquially known as the "Cuyama Badlands". These badlands are formed by water "fluvial" erosion through the deformed, soft sedimentary layers in a landscaped fractured by fault activity. This leaves behind deeply incised canyons with characteristic colorfully banded sedimentary stratigraphy (Delong et al. 2005). Elevation within the fire perimeter ranges from a low of approximately 3,200 feet above sea level (asl) to a high of 4,500 feet (asl). The average precipitation accumulation in Apache Canyon is approximately 8.2 inches (Cuyama River, 2023).

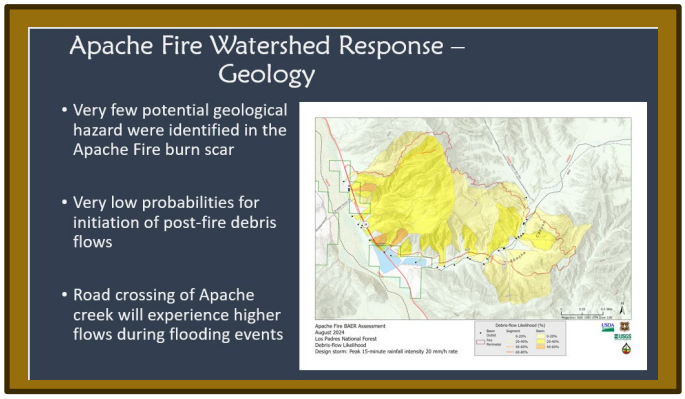
The area is popular with OHV-recreation use and dispersed camping. The road passing through the burn area is the main access to miles of OHV trails. Campers pull to the side of the road and set up dispersed camps. In pre-fire conditions, vegetation prevented expansion of dispersed camping and off-trail OHV use. A sensitive soil only existing in desert environments exists within the burn area. Functioning of the cryptobiotic crust is an essential component for soil productivity in the desert environment. Integrity of the crust influences soil moisture, stimulates growth of other plants, and prevents erosion. When crushed, the crust loses efficacy and soil productivity is significantly reduced. The majority of the fire resulted in moderate soil burn severity and removed the vegetative barrier keeping forest users on road surfaces.

The team provided soil burn severity field data to the US Geological Survey (USGS) Landslide Hazard Program to assist in forecasting the probability, potential volumes, and hazards of debris flows through their developed empirical models.

The primary watershed responses of the Apache Fire are expected to include: 1) an initial flush of ash and debris, 2) rill and gully erosion on steep slopes within the burned area, and 3) potential flash floods and debris flows during short duration high intensity summer monsoonal precipitation events, as well as during long duration winter atmospheric river precipitation events. While the burned topography is variable in steepness, storms will likely create increased surface flow that could trigger floods or debris flows with sediment and floatable debris due to the areas now devoid of vegetation and groundcover after the fire. These

responses are expected to be most pronounced during the first 3-5 years after the fire and will become less evident as vegetation and soil-hydrologic function recover.

The USGS Post-Fire Debris Flow Hazard Model estimates a 2-year return interval peak flow (Q2) can be used as a conservative estimate of a peak flow magnitude that could be potentially damaging



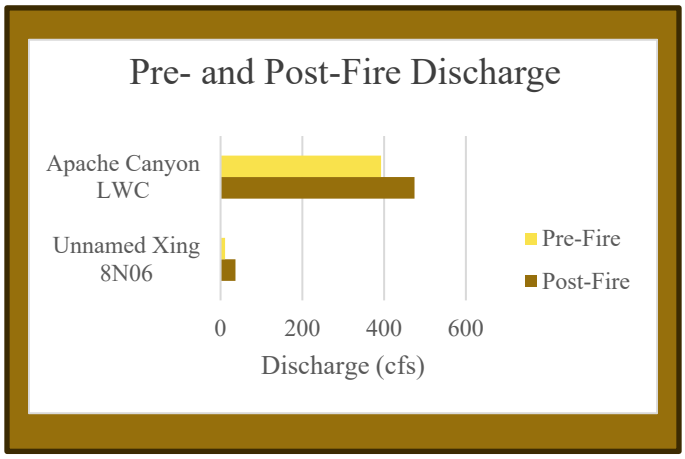
and has a high likelihood of occurrence within the next 1-4 years, when the watersheds are most susceptible to elevated peak flows and erosion. A 2-year peak flow event has a 50% probability of occurrence in any given year and a 94% probability of occurring at least once over the next 4 consecutive years. Modeling pre- and post- fire peak flow involves uncertainty; modeled flows should be considered estimates of the relative expected change in post-fire hydrologic response which are used to help identify areas of concern and prioritize treatment. Design flow estimates for the Apache have been based on the U.S. Geological Survey regression equations developed for the South Coast region (Gotvald, et al., 2012). Adjusted design flow is calculated using the same equations as design flow; however, runoff response is estimated by assuming an increased runoff commensurate with soil burn severity in terms of recurrence interval. It is expected the landscape would respond as if the 2-year storm discharge were associated with a 2-year storm (unburned and low soil burn severity), 10-year event (moderate soil burn severity) and 25-year event (high soil burn severity), respectively.

It must be noted that these results do not account for bulking from sediment and debris that is likely to occur in the watersheds affected by the Apache Fire over the next few years. These elevated post-fire flows and bulking could lead to plugged culverts, damage to road infrastructure, damage to utility infrastructure, damage to buildings, impacts to water quality, decreased soil productivity and hydrologic function, as well as threats to human life and safety.

Apache Canyon is subject to flash floods. The minimal amount of burn in the larger watershed (only 1.5% of the watershed) will not significantly increase the likelihood of flash flooding in the larger wash. The burn will increase runoff, sediment and woody debris inputs from the tributaries and slopes, with effects being localized around the tributary confluence with the wash and base of steep slopes.

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 due to fire-induced hydrophobic soils and loss of stabilizing vegetation, we can anticipate increases in overland flow and flooding potential. Roads will likely be impacted due to burned and steep slopes. Crossings may also be impacted from increased water and debris flows.

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 can establish an early warning alert plan for areas that are 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 Apache Fire.

Roads and Bridges

Typically, roads in and downstream of burned areas are at risk of damage due to post-fire conditions. Generally, the most likely threat from fires to infrastructure within and downstream of burned areas 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 BAER measures that 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 Apache Post-Fire BAER report include Forest Service (FS) System Roads and related drainage features.

Apache Post-Fire BAER treatments recommended for the protection of these roads include three low water crossings along FS Road 8N06, road inspection and response to maintain drainage control and protect egress, and warning signs.

Recreation

National Forest System recreation infrastructure includes campgrounds, trails, and day use areas. Most of the recreation assets within the Apache Fire burned area relate to OHV recreation, trails, and dispersed camping areas.

Similar to roads, motorized trail, Apache Canyon (24W05) could experience erosion from increased overland flows and be damaged in post-fire storm events.

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, intensity, extent, and season of burning.

Current infestations are primarily located along roads, old dozer lines, dispersed camping areas, and trails throughout the burned area, with interior areas being largely un-infested. 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 for noxious weed infestation of all roads widened as line, dozer lines, drop points, and safety zones affected by the Apache Fire on NFS lands. These areas will be surveyed for evidence of introduction or spread of noxious weeds. If any new or outlying populations are found, these will be mapped and documented for treatment and where possible hand and/or chemical treatments will be applied during at the same time the surveys are conducted.

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.

Federally Listed Species - Wildlife and Fisheries

The Apache Fire is within the current range of Blunt-nosed Leopard Lizard, and the Kern Primrose Sphinx Moth – both are threatened and endangered species (TES). Threats include a loss of vegetative cover in the burn area that is likely to make this area more accessible for unauthorized off-road vehicle activity. Dispersed camping and OHV incursion may directly and indirectly negatively impact these species. Direct impacts include increased mortality through crushing the species. Indirect impacts include damage to the cryptobiotic crust which is essential to the native plant community and thus to the TES habitat.

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.

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 Apache 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-changed landscape. It is important for the public to stay informed and prepared for potentially dramatic increased run-off events. Many burned-area watersheds were already hydrologically responsive to rainfall and prone to erosion and sediment transport prior to the fire and will likely be even more responsive due to post-fire conditions. However, vegetation recovery is anticipated to be rapid with ground cover approaching pre-fire conditions within 1-3 years, which will attenuate any 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 Apache Fire. Information can be found on-line at Calpf Lake And Apache Postfire Baer Information | InciWeb (wildfire.gov).

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.

Local Forest Service Leadership

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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)

USDA Forest Service
US Department of Agriculture

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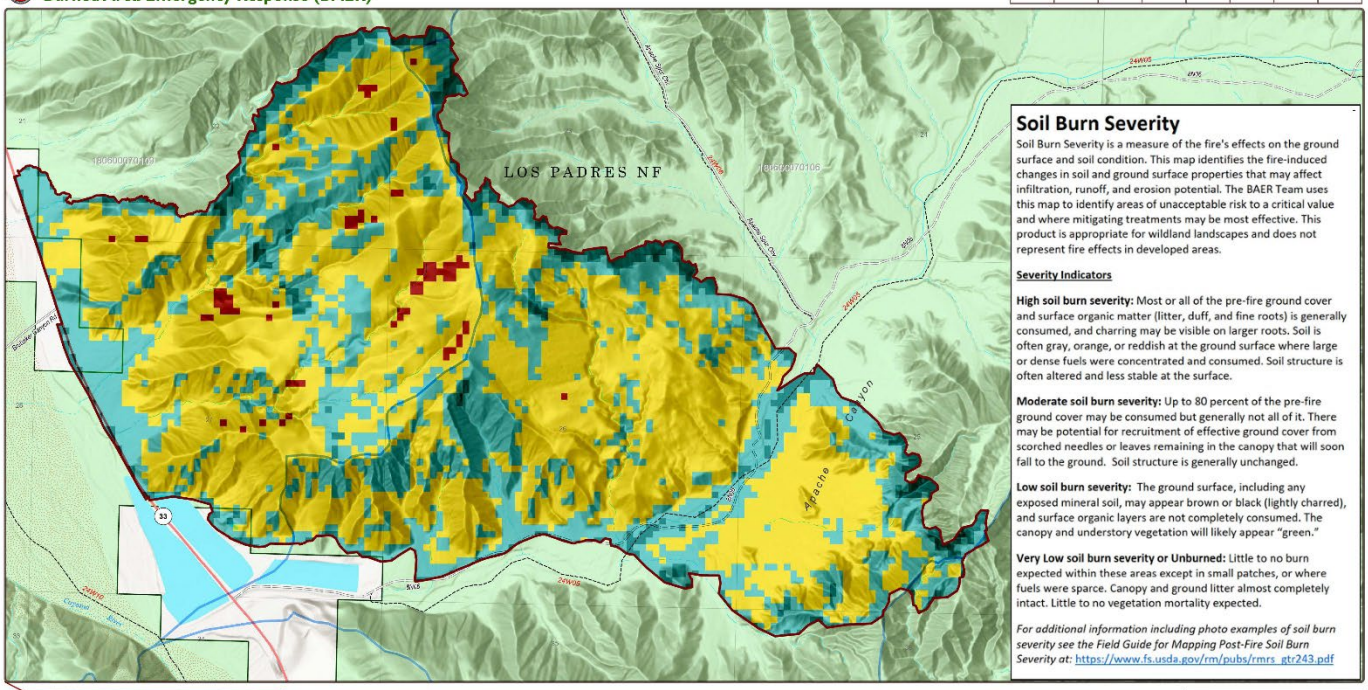
SoilBurnSeverity
Burned Area Emergency Response (BAER)



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 sparce. 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_gtr243.pdf

Data: 7/31/2024
Data Creation Date: 7/31/2024
Incident Date: 7/24/2024

Soil Burn Severity
2024 Apache Fire BAER Assessment
Los Padres National Forest

Soil Burn Severity
- Very Low or Unburned
- Low
- Moderate
- High

Soil Burn Severity	Acres
Unburned/Very Low	86
Low	483
Moderate	947
High	17
Total	**1532**

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.