Bridge Fire Burned Area Summary

Burned Area Report

Fire Background

The Bridge Fire began September 8, 2024, in the Angeles National Forest on the San Gabriel Mountains National Monument and Front Country Ranger District. The fire occurred in both the Los Angeles and San Bernardino counties. The land burned ranged from 1,800 feet in elevation to 9,680 feet and burned across the San Gabriel range. Vegetation that primarily burned was coastal sage-scrub and mixed chaparral, as well as big cone Douglas-fir stands and mixed hardwood habitats. Overall, 56,660 acres burned.

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 September 24, 2024, for the Bridge Fire. 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.

Watershed in the Bridge Fire burn zone.

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 (7%), Moderate (51%), Low (31%), and Very Low/Unburned (11%) (see map on page 7). 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.

All landscapes within the burn perimeter were mapped to assess soil burn severity. Soil burn severity was assessed in both undeveloped areas by the Forest Service and developed areas by the CA Watershed Emergency Response Team (WERT). The soil burn severity protocol was created for undeveloped/ natural areas and therefore is less accurate for developed areas such as recreational areas or areas with infrastructure or residences.

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 fire occurred on the eastern San Gabriel Mountain assemblage. In this area there are major fault lines including the Vincent Trust Fault, the San Gabriel Fault, and the San Andreas Fault Zone. Because of this, this area experiences uplift at a rate higher than most mountainous areas in the United States.

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 that most drainages in the area show a high likelihood of debris flows under conditions of peak intensity rainfalls (see map on page 8). During a high-water flow event, slopes could become instable and result in possible landslides.

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 impacts to the watershed. Initially, the watershed will be flushed with ash and fine sediment due to erosion from headwater drainages and steep slopes in the burn scar. This will likely lead to increased water quality concerns for municipal and domestic drinking water providers within and downstream of the fire.

Watershed and burned trees.

Forest Service Critical Values

Human Life and Safety

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 fire. There are particular safety concerns in areas downstream/downslope of burned areas especially areas that experienced moderate-high burn severity. Due to hazardous materials contamination, Blue Ridge, lupine, and Inspiration Point area have closures established. Warning signs will be established at the Grassy Hollow Visitor Center, San Dimas Experimental Forest, Big Horn, and Curtis Tungston Mines.

In addition to specific treatments, the BAER team recommends the removal of "danger trees" (fire-killed trees) in areas where crews will be working to implement identified treatments.

Waterway and adjacent road in Bridge Fire burn zone.

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 natural recovery, road closures, road drainage structures, reshaping the crown of the road, preparing ditches for increased runoff, and fill slope armoring. Road treatments are prioritized based on soil burn severity, probability of debris flows or landslides, and proximity to forest resources, homes, or other infrastructure.

Recreation

National Forest System recreation infrastructure includes campgrounds, trails, and day use areas. Most of the recreation assets within the Bridge burned area are considered at heightened risk for flooding, debris flows, and hazard tree risks. Similar to roads, recreation infrastructure could be damaged in post-fire storm events. Areas within steep drainages are more likely to experience significant erosion effects and therefore impacts to trail infrastructure.

The team proposes trail drainage stabilization treatments, which include armoring and/or cleaning existing water control features and adding additional drainage features to provide additional capacity for elevated sediment laden post-fire runoff.

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.

Within the burn area, there were native plant communities that contained 13 Forest Service designated sensitive species. Before the fire, there were 38 invasive plants that were managed within the Angeles National Forest. Current infestations are primarily located along roads, old dozer lines, campgrounds, 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. Due to the high risk of invasion, the team recommends a treatment of Early Detection, Rapid Response (EDRR) to monitor for noxious weed infestation and expansion in areas disturbed due to mechanical suppression activity and burned areas prone to new noxious weed infestations.

Burned vegetation within the Bridge Fire perimeter.

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 Habitat - Wildlife and Fisheries

The Bridge Fire is within the current range of the mountain yellow-legged frog (MYLF). Threats

include additional loss of habitat in the fire area due to blowdown, mass soil movement, flooding, and insects and disease. The BAER team recommends close collaboration with USGS, FWS, California Fish and Wildlife, and non-profits to relocate the MYLF due to high risk and major consequences to the frog's habitat.

Critical habitat for Federally listed the Santa Anna sucker (SAS) occurs in select river drainages. Impacts to aquatic systems are directly related to the anticipated increases to runoff, erosion, and sedimentation in streams.

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.

Partner Agency Contacts

California Geological Survey – WERT Lead, Don Lindsay – don.lindsay@conservation.ca.gov - California Department of Conservation

San Bernardino County OEM – Crisanta Gonzalez - crisanta.gonzalez@oes.sbcounty.gov - Office of Emergency Services

LA County OEM – Bennett Cummings – bcummings@ceooem.lacounty.gov – Emergency Management – Los Angeles County

NRCS – California | Natural Resources Conservation Service

NOAA – Alex Tardy – alexander.tardy@noaa.gov - National Weather Service-San Diego

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 Bridge 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 have been approved and funding has been secured. Because of the emergency nature of BAER, initial requests for funding of proposed BAER treatments are 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 was 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 Bridge Fire. Information can be found on-line at inciweb.wildfire.gov.

The Forest Service continues to work towards long-term recovery and restoration of the burned area in coordination with efforts to rebuild and restore the communities affected. In addition to the BAER team's Bridge Post-Fire Soil Burn Severity map, 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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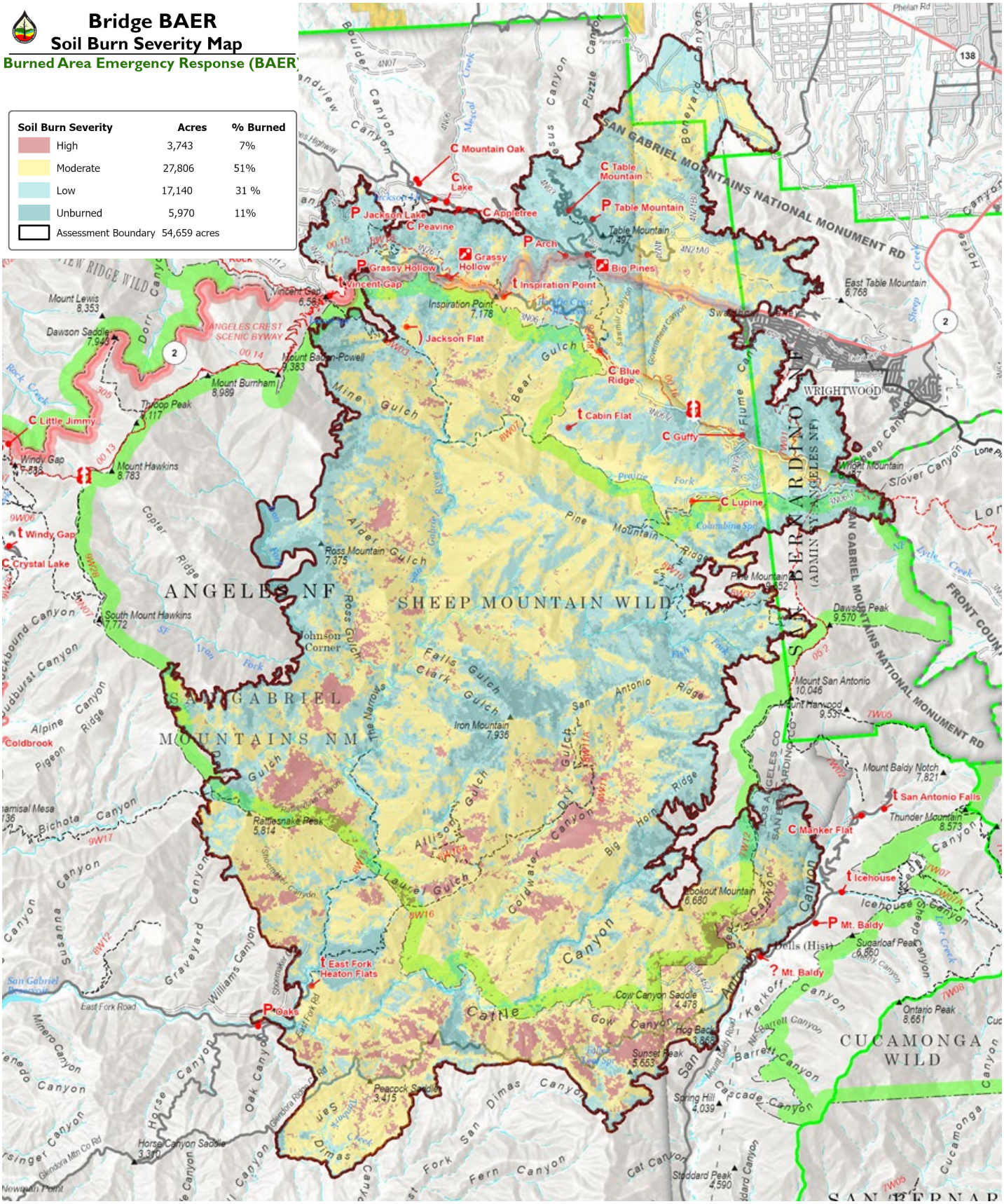
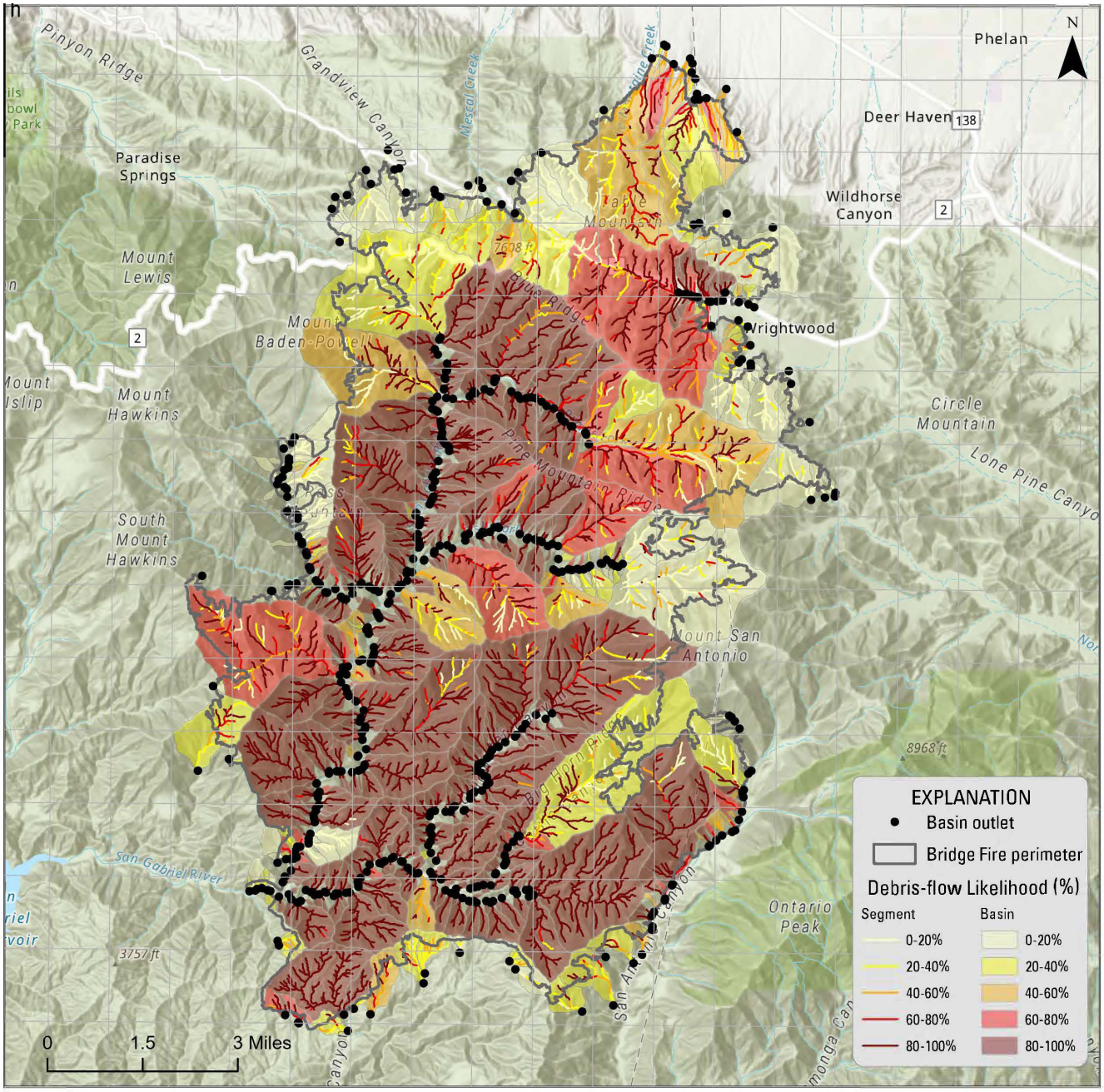
References:

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)

Bridge BAER
Soil Burn Severity Map
Burned Area Emergency Response (BAER)

Soil Burn Severity	Acres	% Burned
High	3,743	7%
Moderate	27,806	51%
Low	17,140	31 %
Unburned	5,970	11%
Assessment Boundary	54,659 acres	




Pinyon Ridge
Grandview Canyon
Mescal Creek
Phelan
N
Deer Haven
138
Paradise Springs
Wildhorse Canyon
2
Mount Lewis
Mount Baden-Powell
Wrightwood
Mount Islip
Mount Hawkins
Circle Mountain
Lone Pine Canyon
Pine Mountain Ridge
South Mount Hawkins
Mount San Antonio
8968 ft
San Gabriel River
Ontario Peak
3757 ft
San Antonio Canyon
0
1.5
3 Miles
EXPLANATION
Basin outlet
Bridge Fire perimeter
Debris-flow Likelihood (%)
Segment
Basin
0-20%
20-40%
40-60%
60-80%
80-100%