Airport Fire Burned Area Summary

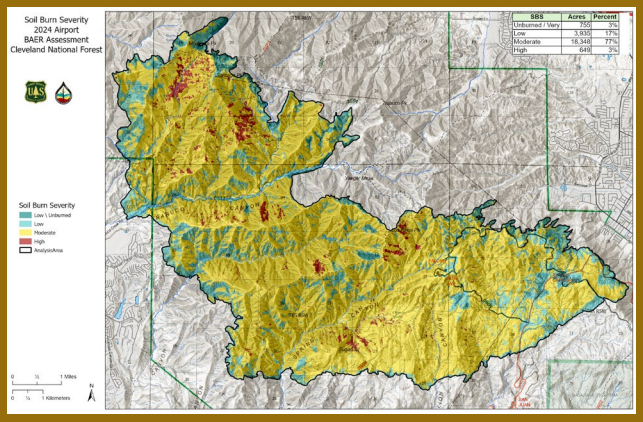
Burned Area Report

Fire Background

The Airport Fire began September 9, 2024, on the Cleveland National Forest's Trabuco Ranger District, and on nearby state, county, and private lands in the Orange and Riverside Counties in California. The fire was started off-forest from a work crew's heavy equipment. On October 5, the fire was contained after burning 23,688 acres. Due to fine grain soils and high annual precipitation, this area is known for productive vegetation including a blend of native and non-native grasses such as mixed chaparral grasslands and oak dominated woodlands. Most of the burn zone exhibited moderate soil burn severity.

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 22, 2024, for the Airport 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,



Soil Burn Severity map for the Airport Fire

physical scientists can estimate 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 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 (3%), Moderate (77%), Low (17%), and Very Low/Unburned (3%) (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.

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 geology of the burned area is the Santa Ana Mountain block bounded by the Elsinore and Christianitos fault zones. The area has highly rugged, variable terrain with elevations ranging from 3,940 to 5,580 feet. The Santiago and Trabuco canyon watersheds flow from the burned zone into Orange County before emptying into the Pacific Ocean.

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 USGS Post-fire Debris Flow Hazard Model estimates a high probability of debris flows in over 60% of the burn area. The model indicates that the largest watersheds (Santiago, Holy Jim and Trabuco, Bell, and Hot Springs Canyon) are 80-100% likely to experience debris flows. Furthermore, the model results corroborate with the flooding and debris flows that occurred in Trabuco Canyon after the 2018 Holy Fire (see map on page 8).

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 initial flush of ash and debris, followed by erosion on slopes within the burned zone. Because of the rugged terrain and frequent storms, flash floods and debris flows are likely to

occur and be most intense within the first five years after fire. This will likely lead to increased water quality concerns for municipal and domestic drinking water providers within and downstream of the fire.

Examining dry ravel in Trabuco canyon.

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 fire. Closures are suggested to occur at all trails within the burn perimeter due to the presence of danger trees, threats to safety, and the high likelihood of falling rocks and debris flows. The team suggests implementing closures at the beginning and end of affected trails within the burn zone to warn the public of potential hazards and closures.

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. Danger trees are of particular concern in recreation trail areas and at Blue Jay and Falcon campgrounds.

Testing soil burn severity (SBS) within the 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 post-fire watershed response threat 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 installing debris fences, culvert removals and modifications, and storm inspection and response to keep drainage structures functioning.

Recreation

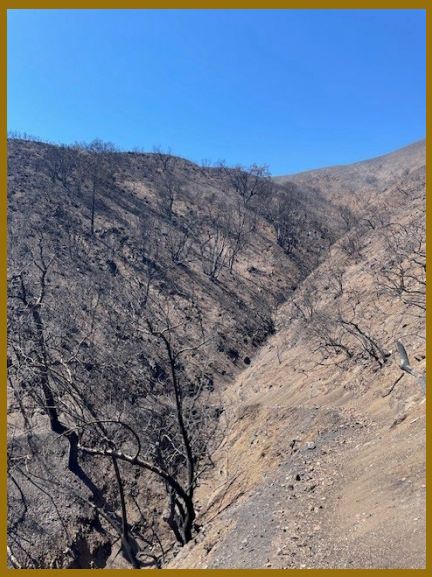
National Forest System recreation infrastructure includes campgrounds, trails, and day use areas. Most of the recreation assets within the Airport Fire burned area relate to 9 non-motorized trails. Threats to human life and safety that could occur in these areas are debris flows, flooding, landslides, and exposure to danger trees. Similar to roads, recreation infrastructure could be damaged in post-fire storm events.

The team proposes trail drainage stabilization treatments, which include armoring and/or cleaning existing water control features and adding 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.

Grasslands in the burn area were dominated by non-native annual grasses, native forbs, upper and lower montane mixed chapparal, oak woodlands, and mixed conifer forests. These communities were comprised of diverse, endemic flora and fauna to the Santa Ana Mountains areas. Pre-fire, non-native weeds were present in the area.



Holy Jim Trail Site 10, drainage crossing. 2

Much of the burned area had vegetation growth that occurred after the Holy Fire. Fieldwork post-incident revealed that non-native weeds were found along highly traveled roads and trails in the suppression and burned zones. 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. The team recommends a treatment of Early Detection, Rapid Response (EDRR) to concurrently monitor and treat noxious weed infestation and expansion in areas disturbed due to mechanical suppression activity and burned areas prone to new noxious weed infestations. The team suggests prioritizing high priority invasive species for EDRR treatments, primarily along dozer lines, some handlines, and roads. The team also found non-native, ornamental giant succulents in a burned cabin tract and are proposing the removal of these plants.

Cultural Resources

The most typical post-fire threats to cultural sites are physical threats such as erosion, flooding, sediment-laden debris flows, or damage from (now dead) falling trees. In some cases, newly exposed artifacts due to lack of vegetative cover are threatened by human damaging activities such as looting or vandalism. Incursion from OHVs is also of concern in meadow areas. 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 Airport Fire is within the current range of Arroyo toad. Threats include additional loss of habitat in the fire area due to blowdown, mass soil movement, flooding, and insects and disease.

There are no Federally listed fish species in the burn zone.

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 (Office of Emergency Management) – Bennett Cummings – bcummings@ceooem.lacounty.gov – Emergency Management – Los Angeles County

NRCS—National Resources Conservation Service – California | Natural Resources Conservation Service

NOAA National Weather Service – Alex Tardy – alexander.tardy@noaa.gov - Los Angeles, CA

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 Airport 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 likely to vary by vegetation type. Grasslands and forblands are expected to recover over 1-5 years. Meadows in the burn zone are likely to recover in 2-8 years. Sagebrush, soft scrub, chaparral, and buckwheat are likely to recover within 5-10 years. Woodlands and mixed conifers are likely to take upwards of 20 and 40 years to recover respectively. The Forest Service will continue to provide information and participate in interagency efforts to address threats to public and private values resulting from the Airport Fire. Information can be found on-line at 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

Scott Tangenberg, Forest Supervisor. Cleveland National Forest. Scott.Tangenberg@usda.gov

Darrell Vance, District Ranger. Cleveland National Forest. Darrell.Vance@usda.gov

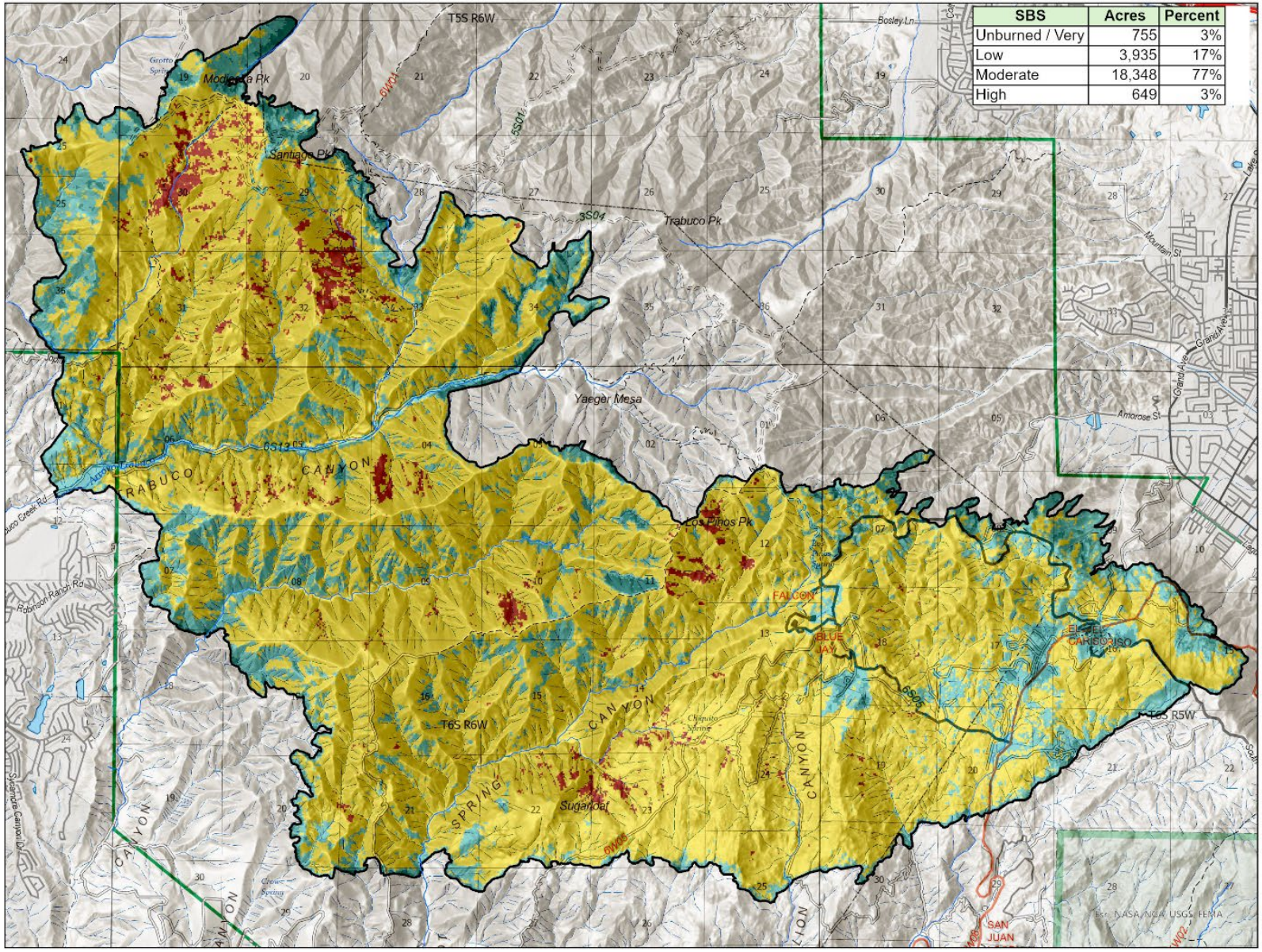
Local Forest Service BAER Coordinator

Emily Fudge, Cleveland National Forest. Emily.Fudge@usda.gov

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
2024 Airport
BAER Assessment
Cleveland National Forest

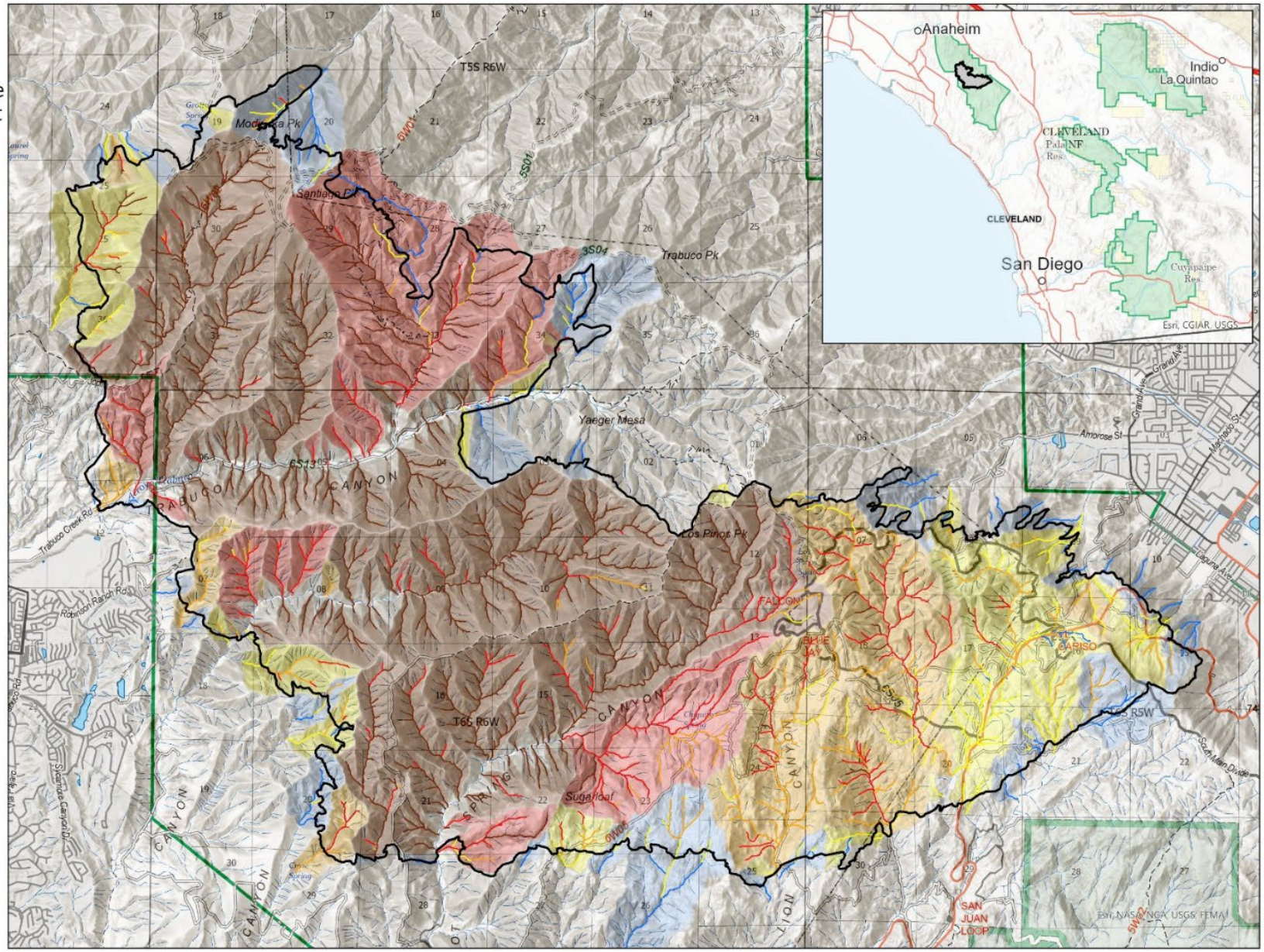


SBS	Acres	Percent
Unburned / Very	755	3%
Low	3,935	17%
Moderate	18,348	77%
High	649	3%

Soil Burn Severity
- Low \ Unburned
- Low
- Moderate
- High
- AnalysisArea

0 ½ 1 Miles
0 ½ 1 Kilometers
N

Airport Fire
Debris Flow Probability
Peak 15 Minute Rainfall
Intensity of 24 mm/h rate
Cleveland National Forest
September 2024



Estimated Likelihood

- 0-20%
- 20-40%
- 40-60%
- 60-80%
- 80-100%
- 0-20%
- 20-40%
- 40-60%
- 60-80%
- 80-100%
- AnalysisArea

0 ½ 1 Miles

0 ½ 1 Kilometers

N

General risks and probabilities of debris flow, flooding and erosion hazards were evaluated by the US Forest Service BAER Team. Site specific risks were not evaluated in this assessment.