

Date of Report: November 12, 2020

Bobcat Fire 2020

*Big Santa Anita Canyon*

PART I - TYPE OF REQUEST

A. Type of Report

- ☒ 1. Funding request for estimated emergency stabilization funds
- ☐ 2. No Treatment Recommendation

B. Type of Action

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
- ☐ 2. Interim Request #____
 - ☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Bobcat**B. Fire Number:** CA-ANF-003687**C. State:** California**D. County:** Los Angeles**E. Region:** 05 Pacific Southwest**F. Forest:** Angeles**G. Districts:** San Gabriel National Monument,
Los Angeles Gateway**H. Fire Incident Job Code:** P5NJ7S20 0501**I. Date Fire Started:** 9/6/2020**J. Date Fire Contained:** 92% of 10/13/20**L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

1. **Fireline repaired (miles):** Approximately 140 miles of dozer line constructed. Approximately 16 miles of repair completed as of 10/11/2020.
2. **Other (identify):**

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
180701050101	Alder Creek	13,092	213	2
180701050103	Upper Big Tujunga Creek	25,366	532	2
180701050302	Santa Anita Wash-Rio Hondo	34,556	11,149	32
180701060201	Devils Canyon	11,021	1,104	10
180701060202	Upper West Fork San Gabriel River	14,097	10,294	73
180701060203	Bear Creek	17,996	14,580	81
180701060204	North Fork San Gabriel River	12,026	384	3
180701060205	Lower West Fork San Gabriel River	11,608	10,824	93
180701060601	Santa Fe Flood Control Basin-San Gabriel River	35,165	4,203	12
180902061001	Pallett Creek	10,110	6,934	69
180902061002	Big Rock Creek	21,995	9,265	42
180902061101	Upper Little Rock Creek	19,964	11,125	56
180902061102	Lower Little Rock Creek	20,826	7,876	38
180902061103	Brainard Canyon-Little Rock Wash	25,677	2,118	8
180902061601	Indian Bill Canyon	15,423	4,472	29
180902061902	Grandview Canyon	27,139	673	2
180902061903	Lovejoy Springs	25,508	3,105	12

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

ownership	acres
nfs	99,222
other federal (BLM)	555
state	0
private	14,800
total	114,577

O. Vegetation Types:

Montane chaparral, bigcone Douglas-fir forest, canyon live oak woodland, scrub oak shrubland, dry mixed conifer and Jeffery pine forest, and riparian mixed hardwood communities.

P. Dominant Soils:

The majority of the fire area is made up of very steep slopes and soils with little development due to high natural erosion rates. Shallow and lithic soils dominate especially in the southern 2/3 of the fire area. Rock outcrops are also common. Gravelly loams (15-35% coarse fragments) are the most commonly found soil texture (40%) with gravelly sandy loam (10%) and loam soil textures (10%) as well. Soils are formed mainly from granitic rocks with some metamorphic rocks. The hillslopes above the Juniper Hills area have a thicker soil mantle (haploxerolls) with gravelly loam soil textures (15-35% coarse fragments) with inclusions of shallow-lithic soils on the steeper slopes. The south eastern portion of the Bobcat Fire is dominated by loamy soil textures on very steep slopes with low coarse fragments weathered from granitics.

Q. Geologic Types:

The geology is characterized by an array of rock units, generally including: Holocene, Quaternary, and Pleistocene alluvium, Tertiary volcanics and non-marine sediments, crystalline basement rocks comprised of various Mesozoic granitics and gneiss, and Precambrian and Proterozoic gneiss.

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

Stream Type	Miles of Stream
Perennial	182
Intermittent	120
Ephemeral	967
OTHER (DEFINE)	

S. Transportation System:

Trails: National Forest (miles): 111

Other (miles):

Roads: National Forest (miles): 100.7

Other (miles): 22.7

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (BLM)	State	Private	Total	% within the Fire Perimeter
Unburned	14,380	23	0	4,587	16,777	15
Low	38,752	430	0	20,939	49,971	44
Moderate	38,394	102	0	2,725	40,117	35
High	7,695	0	0	20	7,711	7
Total	99,222	555	0	28,271	114,577	100

B. Water-Repellent Soil (acres):

33,661 acres (29% of fire)

C. Soil Erosion Hazard Rating:

The Erosion Risk Management Tool (ERMIT) was used in place of the Soil Erosion Hazard rating.

D. Erosion Potential:

Steep slopes, burn severity, and soil properties are drivers of erosion rates in this fire. Unburned erosion rates are less than 1 ton/acre, so the erosion rates modeled in the table below are high. Low to moderate burn severity under conifer forest and some dense oak has potential for needlecast to mitigate erosion response, but moderate burn severity in chaparral will have high erosion potential. Erosion results of select watersheds are shown by pour point table below (see Appendix D of the soil report for erosion rates within all pourpoints).

Table 5: Modeled Erosion Rates

Pour Point	Acres	2-year erosion rate (tons/acre)	5-year erosion rate (tons/acre)
Entire Bobcat Fire Perimeter	115,740	15.9	33.5
WF San Gabriel above Cogswell Dam	25,135	12.1	22.9
East Fork Santa Anita Canyon	1,708	22.8	45.1
SAS West Fork San Gabriel	53,441	16.4	29.3
ARTO Little Rock Creek	38,819	7.0	18.8
Trask Camp	1,740	25.2	52.9

Monrovia Canyon Park	3,294	22.2	46.3
Bear Creek trib to WFSGR	18,001	15.8	27.5
Big Santa Anita Canyon RecT	6,180	18.6	37.6

E. Geologic Response Potential:

Debris Flows: The USFS Geological Survey (USGS) Landslide Hazards Program assisted the assessment of probability and potential volumes of debris flows in the burned area. Their ongoing research has developed empirical models for forecasting the probability and likely volume of such debris flow events. The USGS models integrates geospatial data related to basin morphometry (hill slope, size), burn severity, soil properties, and rainfall characteristics to estimate the probability and volume of debris flows that may occur in response to a local design storm (Staley, 2016). Estimates of probability, volume, and combined hazard are based upon a design storm with a peak 15-minute rainfall intensity of 12 – 40 millimeters per hour (mm/hr) rate (0.47 – 1.57 inches/hr).

An average design storm with a peak 15-minute rainfall intensity of 32 millimeters per hour (mm/h) rate (0.9 inches/hr) was applied to evaluate debris flow potential and volumes for the Bobcat Fire, because this magnitude of storm seems likely to occur in any given year. This intensity storm has about a one-year average reoccurrence interval in the majority of the study area (see Map 2 in Geology Specialist Report for one-year average reoccurrence storm intensities across the burned area) according to the National Oceanic and Atmospheric Administration (NOAA) (Atlas 14, Volume 6, Version 2).

Debris type flows are likely to experience increased susceptibility to debris-flow occurrences in drainages within the areas affected by the Bobcat Fire. Severely burned bedrock areas underlain by granitic and metamorphic rocks have a high potential to produce debris flows (De Graff et al., 2015a and 2015b; Bateman and Krasukopf, 1987). Debris flows require a mixture of water, fine materials (clay, silt, and sand) and at least 50% of the material must be coarse sized particles (gravel, cobbles, boulders); often coarse material predominates. The surficial material within the burned areas (primarily granitics) are comprised of sufficient coarse material to generate debris flows. The southern portion of the burned area (south slope of the San Gabriel Mountains) is particularly susceptible to debris flows for the following reasons:

- (1) the potential 15-min rain-fall intensity (1 year reoccurrence interval) is very high (See Map 2 in Geology Specialist Report),
- (2) the slopes are very steep, and
- (3) the proportion of moderate and high burn severity is high.

Rockfall: Rockfall in the form of individual rocks or small groups of rocks have rolled onto roads from the steep slopes within the Bobcat Fire areas. It is recognized that rockfall activity often takes place during and immediately after a wildfire. Post-fire rockfall activity is often driven by thermal expansion and loss of vegetation. Accumulations of small rocks can damage tires and interfere with safe driving. Rocks in motion or large rocks (1-foot diameter or larger) can damage pavement, cause accidents, damage vehicles, and cause injury or death.

The Bobcat Fire burned area is very steep. Thus, the rockfall query results for slopes greater than or equal to 40% in moderate to high soil burn severity is dominated by the occurrence of moderate to high soil burn severity. See Map 5 in the Geology Specialists Report for rockfall potential maps.

Landslides: There are several mapped landslides within the burned area (Elder and Reichert, 2005). Landslides within burned areas will likely experience renewed movement, or more likely, movement on a part (nested landslides) of the existing feature. The loss of forest vegetation causes a short-term (multi-year) decrease in evapotranspiration which can cause an increase in groundwater levels. This increase in groundwater levels or shallower groundwater can trigger renewed movement on existing, deep-seated landslides.

F. Sediment Potential:

Rowe, Countryman, and Storey (1949) developed estimates of annual erosion rates for watersheds in the burn area based on measurements of sedimentation in reservoirs. On average, across the burn area, annual sediment delivery is estimated to increase 12.85 times greater than normal with an average of 51,502 cubic yards per square mile. These estimates are in line with field observations of dry ravel, existing unstable slopes made worse by fire effects, amount of bedload in washes and tributaries, and evidence of past debris flows.

F. Estimated Vegetative Recovery Period (years): 5-15 years in areas south of Highway 2 that have not burned within the past 50 years. 15-20 years in desert transition vegetation north of Highway 2 that have not burned within the past 100 years. All areas that have burned more recently (since 1990) will take twice as long depending on invasive plant competition.

G. Estimated Hydrologic Response (brief description):

Damaging Storms: The Bobcat Fire took place in a region that experiences mild winters and dry/hot summers. Annual precipitation throughout the burn area ranges from about 14 to 41 inches per year, with most of the precipitation occurring from November through April. Thunderstorms can happen during summer months and these short duration, high intensity storms can trigger debris flows.

In the lower elevations (<4,500 feet), precipitation is rain dominated by frontal storms which account for nearly all moisture, with infrequent thunderstorms occurring in summer and fall. The higher elevations (>4,500 feet) have a mix of rain and snow. The rain-on-snow zone, from about 4,500-6,500 feet in elevation, can produce very high peak flows during long-duration rain storms falling on a shallow snowpack. Historically, major flooding has occurred when a weather system dubbed the "Pineapple Express" taps into subtropical moisture from the latitudes of the Hawaiian Islands. These warm and long duration storm events will cause major deluges and torrential rains leading to catastrophic flooding. Stream channels in the burn area have the potential to flash flood.

Watershed Response: The primary watershed responses of the Bobcat Fire are expected to include: 1) an initial flush of ash, 2) rill and gully erosion in drainages and on steep slopes within the burned area, 3) floods with increased peak flows and sediment deposition, and 4) possible debris flows during precipitation events. Initial erosion of ash and surface soil during the first storm events will reduce slope roughness by filling depressions above rocks, logs, and remaining vegetation. The ability of the burned slopes to detain water and sediment will be reduced accordingly. This will aid in the potential for floods and will increase the distance that eroded materials are transported. The major concern for vegetative recovery and in turn hydrologic recovery is in the high severity burn areas. These responses are expected to be greatest in initial storm events, and will become less evident as vegetation is reestablished, providing ground cover, increasing surface roughness, and stabilizing and improving the infiltration capacity of the soils.

Water Quality: Wildfires primarily affect water quality through increased sedimentation. As a result, the primary water quality constituents or characteristics affected by this fire include color, sediment, settleable material, suspended material, and turbidity. Floods and debris flows can entrain large material, which can physically damage infrastructure associated with the beneficial utilization of water (e.g., water conveyance structures; hydropower structures; transportation networks). The loss of riparian shading and the sedimentation of channels by floods and debris flows may increase stream temperature. Fire-induced increases in mass wasting along with extensive tree mortality can result in increases in floating material – primarily in the form of large woody debris. Post-fire delivery of organic debris to stream channels can potentially decrease dissolved oxygen concentrations in streams. Fire-derived ash inputs can increase pH, alkalinity, conductivity, and nutrient flux (e.g. ammonium, nitrate, phosphate, and potassium), although these changes are generally short lived. Post-fire increases in runoff and sedimentation within the urban interface, and burned structures and equipment within the fire perimeter may also lead to increases in chemical constituents, oil/grease, and pesticides.

Table 6 Modeled Watershed Response to Selected Pour Points

Pour Point Watershed	Watershed Acres	% Watershed Burned	x Increase Flow	x Increase Sediment
Bear Creek Trib to WFSGR	18,048.00	81	5.83	17.98
Big Santa Anita Canyon Rec Tract	6,208.00	93	5.44	18.20
Buckhorn Ski Club	103.72	63	7.42	1.40
Monrovia Canyon Park	3,291.14	99	5.65	25.09
San Gabriel Environmental Center	445.45	99	4.94	31.77
Trask Scout Camp	1,737.86	100	5.28	24.58
East Fork Santa Anita Canyon	1,724.80	96	4.79	16.56
Santa Anita Wash	1,947.24	92	5.07	20.39
ARTO at Little Rock Creek	38,876.03	49	9.77	2.83
ARTO at Santiago Creek	7,259.07	7	2.87	1.02
Santa Ana Sucker at West Fork San Gabriel	53,497.60	68	5.72	14.58
Santa Ana Sucker at North Fork San Gabriel	12,035.97	3	1.15	1.37
MYLF at Little Bear Creek	3,159.04	73	3.82	9.41
MYLF at Little Rock Creek	1,858.00	78	11.79	3.08
MYLF at SF Big Rock Creek	5,043.20	55	11.96	3.45
MYLF at Devils Canyon	1,041.34	48	2.37	3.34
MYLF at Unnamed Trib to Cooper Canyon	1,230.46	68	11.53	2.78
MYLF at Dorr Canyon	1,646.72	9	3.86	1.12
Pasadena Bait Club	763.70	100	5.09	24.05
Chileno Canyon at WFSGR confluence	1,926.84	100	6.24	29.86
Little Mermaids at WFSGR confluence	909.02	99	5.37	27.98
Big Mermaids at WFSGR confluence	1,157.72	100	5.68	29.92
Upper Little Rock Fish Barrier	4,097.01	75	11.49	2.80
SF Big Rock Fish Barrier	5,044.84	55	11.95	3.45
Santa Ana Sucker at West Fork San Gabriel	53,497.60	68	5.72	14.58
WF San Gabriel R above Cogswell	25,149.86	46	3.73	8.85
WF San Gabriel R below Cogswell	28,347.74	87	6.85	19.67
ARTO at Upper Big Tujunga	26,545.33	3	1.16	1.48

WFSGR = West Fork San Gabriel River; ARTO = Arroyo Toad; MYLF = Mountain Yellow-Legged Frog

PART V - SUMMARY OF ANALYSIS**Introduction/Background**

The Bobcat Fire started on September 6, 2020 near Cogswell Reservoir. The fire grew quickly, driven by the low moisture content of the vegetation in the area combined with high temperatures and low relative humidity. Most of the fire burned in areas with no recent (within last 50 years) fire history. Land ownership within the fire

area includes National Forest wilderness and non-wilderness, private, LA County, and Bureau of Land Management lands. The fire is considered to be 92% contained as of October 13, 2020.

A. Describe Critical Values/Resources and Threats (narrative):

A BAER team began assessing the area for post-fire emergencies on October 4, 2020. The full list of critical values analyzed and risk determinations for these values is included in Appendix A. Critical Values described in the sections below were identified by the assessment team as those with risk ratings appropriate for further evaluation and treatment recommendation.

Interim reports may be submitted as additional assessments are completed.

The risk matrix below (Table 7), Exhibit 2 of Directive No.: 2500-2020-1 was used to evaluate the Risk Level for each value identified during Assessment.

Table 7: Critical Value Matrix

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

1.Human Life and Safety (HLS):

General Burned Area Safety

Based on the potential for debris flows, flooding, rock falls, etc., the BAER team identified a serious risk to the public, employees, special use permittees, and cooperators in and downstream of the Bobcat Fire area. Multiple FS critical values are located on rocky, alluvial fans at the base of steep, unstable slopes or in the steep unstable headwaters that are also at risk of post-fire debris flows, rock fall, increased runoff, and hazard trees. These areas have evidence of past debris flows, rock fall, and flooding in the pre-fire environment. Risk of flooding, sediment laden flows, debris flows, and rock fall occurring will be exacerbated by the fire. These post-fire watershed responses may not threaten all infrastructure downstream and downslope of the burn area; however, access roads will **very likely** be impacted. These impacts to access could leave FS employees, permittees, and forest users stranded, possibly exposed to harsh weather conditions and/or areas subject to rockfall, flooding, and debris flows, especially if they try to evacuate or pass through during storms. Impacts from the post-fire environment on human life and safety is considered **very likely** with **major** consequences (*i.e.* death or serious injury). This results in a **very high** risk to human life and safety from post-fire threats, especially for anyone who attempts to access channels and low-lying areas within the burned area prior to or during a storm.

Closure of the burn area and at-risk downstream areas are recommended to prevent long-term exposure to risk and protect life and safety. Installation of burned area warning signs is recommended to warn users passing through the area on main roads of the potential hazard. Because of the **very high** risk of these post-fire threats, it is recommended that the burned area closure applies to the public and all recreation residences tracts within identified hazard zones, as well as FS staff before and during storm events. Risks associated with the burned area should be re-evaluated prior to lifting the closure.

Roads

There is a **very high** risk to human life travelling on Forest Service roads 2N23, 2N24.1 2N24.2 2N25.2, 2N30, 2N40, 2N41.2, 3N02, 4N15, and 5N04.2; L.A. County roads 2N41.1 (Chantry Flat) and 2N25.1 (West Fork); and California State Routes 2 and 39 during rainstorms or periods of moderate/high winds due to the **very likely** probability of hazard tree fall, debris flows, rockfall and flooding that could have **major** consequences associated with road washout, blocked ingress/egress, and lead to serious injury or death of road users. Roads 2N23, 2N24, and 2N30 are all heavily used by Southern California Edison (SCE) as access to multiple transmission lines. 2N25 is used by L.A. County for access to Cogswell Reservoir and by the forest visitors as

a popular bike path. 2N40 is the access for the Big Santa Anita Recreation Residence tract. 2N41.2 leads to the San Olene communication site and 4N15/5N04 provide access to the Little Rock Reservoir.

Trails

There are approximately 111 miles of system trails within the burn perimeter. Urban areas near the fire typically attract large numbers of trail users, and especially seasonal hikers following the PCT. There is a **very high** risk to human life and safety of forest visitors travelling on 17 Forest Service trails during rainstorms or periods of moderate/high winds:

- 9W02, 9W10, 9W20, 10W04, 10W05, 11W06 (Silver Moccasin Nat. Rec. Trail), 11W07, 11W13, 11W14/11W14A (Gabrieleno Nat. Rec. Trail), 11W15, 11W16, 11W23, 12W09, 10W02 (High Desert Nat. Rec. Trail), and the Pacific Crest Trail (2000.5 & 2000.6)

This risk is attributed to the **very likely** probability of hazard tree fall, debris flows, rockfall and flooding that could have **major** consequences associated with trail washout, blocked ingress/egress, and lead to serious injury or death of users. These trails are located on these steep slopes with multiple drainage crossings in areas of high and moderate burn severity.

Campgrounds/Day Use Areas

Risk to human life and safety ranges from **high to very high** in up to 10 campgrounds/day use areas.

- Cooper Canyon Trail Camp: Hazard trees throughout the campground are **likely** with the potential for **major** consequences including death or serious injury creating a **very high** risk to human life and safety.
- Southfork Campground user created trails to creek: It is **possible** that flooding and debris flow may impact these campgrounds with the potential for **major** consequences if this results in death or serious injury creating a **high** risk to human life and safety.
- Glenn Trail Camp: It is **possible** that flooding and debris flow may impact the bathroom structure (in particular the sewage pit) with the potential for **major** consequences if this results in release of sewage into the adjacent West Fork Creek. The overall risk to human safety/water quality is **high**.
- Sycamore Flats Campground and Glenn Camp: It is **possible** that rockfall may occur from slopes behind the sites which could have **major** result death or serious injury to humans creating a **very high** risk to human life and safety.
- Valley Forge Trail Camp and Charlton Flats Day Use Area: Hazard trees throughout the campground are **likely** with the potential for **major** consequences including death or serious injury creating a **very high** risk to human life and safety.
- West Fork Campground: It is **possible** that debris flow may occur and impact picnic area located on past debris flows. Consequences would be **major** if resulting in death or serious injury creating a **high** risk to life and safety.
- Chantry Flats Picnic Area: The hillslopes above Chantry road are steep and burned at moderate to high SBS making rockfall, debris flow, and flooding across the road to the picnic area **likely**. These threats could have **major** consequences if resulting in death or serious injury creating a **very high** risk to human life and safety.
- Crystal Lake Day Use Area: The burned hillslopes above Crystal Lake are steep it is **possible** rockfall, debris flow, and flooding could occur. These threats could have **major** consequences if resulting in death or serious injury creating a **high** risk to human life and safety.

- Hoegee and Spruce Grove Camps and Cascade Picnic Area: **These areas were not assessed due to landslides and downed trees blocking the trails. The team recommends that these be accessed when the trails are cleared as it is highly likely they sustained damage and have high likelihood of experiencing debris flows/flooding, potentially resulting in death or serious injury (very high overall risk).**

Recreation Residences, Trask Camp, Buckhorn Ski Club

Many special use permitted sites are located within the Bobcat burned area, 4 of these general areas are predicted to be at **high to very high** risk of secondary effects to human life and safety.

- Big Rock Creek Recreation Residences: Three residences are at **high** risk of **possible** flooding due to position in channel beneath burned slopes resulting in **major** consequences with potential for death or serious injury or damage to structure.
- Pasadena Bait Club: Club is built on historic debris flow deposition and it is **likely** that a high volume of material could mobilize in this area due to flooding/debris flows. If humans are present during an event, **major** consequences of death or serious injury could occur. Overall risk is **very high**.
- Trask Boy Scout Camp: Camp is located in an area where numerous hazard trees and high potential for debris flow and flooding are all **likely** threats causing **major** potential for death or serious injury. The risk to life and safety and the properties and trails on site is **very high**.
- Buckhorn Ski Club lodge and infrastructure: Situated in a drainage where flooding is **possible** which would cause **major** damage to infrastructure and if humans are present during the event could result in death or serious injury. The overall risk to life, safety is **high**.

Wildlife Guzzlers

- Wildlife Water Developments (Guzzlers): Rincon 3 and Pinyon 6 guzzlers were damaged in the fire and it is **possible** that the degrading fiberglass will become airborne or moved by wildlife, posing a **moderate** health risk to the public and wildlife, creating an **intermediate** risk to human life and safety. Additionally, fiberglass fibers that fall into the tank water could result in ingestion and illness. Contact with fiberglass fibers could also be harmful to some animal species. No BAER treatment was deemed effective to contain the fiberglass.

Hazmat

The September 2020 Bobcat Fire burned: (1) all or a part of 27 permitted recreation residences within proximity to each other in the Big Santa Anita Canyon; (2) pit toilets located at Valley Forge Trail Camp and the Old Ridge Crest Picnic Area bathroom off State Route 2 and (3) hazmat storage areas located at the Mount Waterman Ski Resort and the helipad storage building at Chantry Flats. The purpose of this assessment is the identification and assessment of potential hazardous material contamination created or exposed by the fire. The information obtained via the assessment is used to eliminate or reduce the threat to human health and prevent the unacceptable degradation to the environment. *NOTE: It was not possible to assess all of the recreation residences in Big Santa Anita Canyon due to landslides and downed trees. The residences that were not accessible were centered around Hoegee and Spruce Grove Camps. It is highly likely that there is more hazmat in both burned residences and in unburned residences that are at risk for flooding/debris flows.*

Each recreation residence location in the Big Santa Anita Canyon includes a cabin, shed, and an outhouse. A total of 27 locations burned either fully or partially (i.e. all three burned, or one or two of the three structures survived) during the Bobcat Fire (Table 8).

Table 8: Structures burned in Big Santa Anita Tract

Type of Structure	Total Number Burned
Cabins	15
Storage Sheds	11
Outhouses	23

Four pit toilets (two at Valley Forge Trail Camp and two at the Old Ridge Crest Picnic Area) and two hazmat storages (Mt Wilson and the Helipad Location at Chantry) were also burned.

Hazardous materials contamination created by the fire in the five locations include an assortment of burned hazardous materials (small and large propane tanks, lead acid batteries, asbestos from insulation and piping, lead from lead based paint, aerosol cans, small and large containers of hazardous materials, fifty five gallon drums, gasoline cans, propane bottles etc).

The burned recreational residences are located above the Santa Anita River which flows into the Santa Anita Reservoir, a source of drinking water for downstream urban areas. The proximity of the recreation residences to the river below the burn area highlights the potential for water quality deterioration as a result of the burned structures and hazardous material contamination created by the fire. Runoff (caused by erosion and heavy rainfall) from the burned areas will the river that feeds the downstream drinking water reservoir, ultimately affecting the water quality of the reservoir and the drinking water supplies for hundreds of thousands of urban residents. The burned pit toilets and hazardous materials storage areas are in locations that pose air, soil and water quality risks to Forest Service employees and the public.

It is **very likely** that debris flows, flooding will impact the burned Big Santa Anita Recreation Residence and cause a hazmat release. The magnitude of the consequence is **major** because water quality would be compromised by the abundance of hazmat located in the burned recreation residences. Therefore, a **very high** risk to downstream water quality exists in the burned area.

It is **possible** that a release of asbestos fibers from the burned Valley Forge Trail Camp pit toilets will occur because of the burned and broken asbestos vent pipe on the ground near the burned toilets. The magnitude of the consequence is **major** because of the potential harm (injury or death) to humans caused by the inhalation of airborne asbestos fibers. Therefore, a **high** risk to human health exists in the burned area.

It is **possible** that a release of asbestos fibers and lead from the burned Old Ridge Crest Picnic Area Bathroom Off State Route 2 pit toilets will occur because of the burned and broken asbestos vent pipe and flaked lead paint on the ground near the burned toilets. The magnitude of the consequence is **major** because of the potential harm (injury or death) to humans caused by the inhalation of airborne asbestos fibers and lead paint. Therefore, a **high** risk to human health exists in the burned area.

It is **likely** that a release of hazardous material from the Chantry Helipad hazmat storage area will occur because the hazmat is located in a partially burned building above a steep slope. The magnitude is **major** because if left in place, the hazmat could impact not only human health if disturbed, but also soil and water quality. Therefore, a **very high** risk to human health exists.

2. Property (P):

Roads

The National Forest transportation system consists of approximately 100 miles of National Forest System Roads (NFSR) within the fire perimeter. As mentioned above under Human Life and Safety, these roads are heavily used by a wide variety of agencies, utilities, and the public. The majority of the NFS roads in and downstream of the burned area are at a **very likely** probability of debris flows and flooding during rainstorms as a result of the changed watershed condition. Debris flows and flooding are likely to cause a **moderate to major** magnitude of damage to these roads. The resulting risk of road failures in and downstream of the burned area is **very high**.

Of the NFSR miles in the burned area, approximately 50 miles of road are proposed for treatments due to their overall risk rating of **very high**. Roads in this category include: 2N24.1 2N24.2 2N25.2, 2N30, 2N40, 2N41.2/2N41.3, 3N02, 4N15, and 5N04.2. These roads exhibit an unacceptable risk to property, which constitutes a BAER emergency and treatments are recommended. The purpose of road treatments are to protect roads against loss of water control, soil erosion, flooding, debris flow, loss of road tread and total failure.

Trails

The majority of the trails in and downstream of the burned area are at a **very likely** probability for tree fall, debris flows, rockfall, and flooding during rainstorms and periods of moderate/high winds as a result of the changed watershed condition. Debris flows and flooding are likely to cause a **moderate to major** magnitude of damage to these trails as complete loss of trail sections will occur. The resulting risk of trail failures in and downstream of the burned area is **very high**. Trail sections located within high, moderate, and even low burn severity areas in the steep burn area terrain with little to no ground cover/ vegetation have already sustained extensive dry raveling and tree fall over the trail tread. This has resulted in very difficult access/traversing of the trails and unsafe assessment conditions.

Footbridges at Spring Camp and Rincon Environmental Center

Footbridges at Valley Forge and Chantry Flat were burned completely during the Bobcat Fire. One footbridge at Spring Camp and two at Rincon Environmental Center were not impacted by first order fire effects but are vulnerable to post-fire watershed response.

It is **possible** post-fire flooding or debris flows will impact all three footbridges. Consequences of these events would be **major** for the two bridges at Rincon Environmental Center due potential bridge failure and serious injury to humans creating a **high** risk to life and safety. The consequences of these events to the Spring Camp footbridge would be **moderate** due to potential damage to bridge creating an **intermediate** risk to Forest Service property.

Campgrounds/Day Use Areas

- Charlton Flats Day Use Area: Hazard trees directly over bathroom structures are **very likely** with the potential for **moderate to major** consequences including damage to complete destruction of these structures. Overall risk to property is **high**.
- Hoegee and Spruce Grove Camps and Cascade Picnic Area: **As noted above, these areas were not assessed due to landslides and downed trees blocking the trails. It is highly likely these areas sustained damage and are at high risk of debris flows/flooding, however the magnitude of consequences is unknown, making the overall risk level difficult to categorize.**
- Burkheart Trailhead Bathroom is at the base of a cutslope and beneath a steep burned slope. It is **likely** this SST would be impacted by sedimentation resulting in **moderate** effects to the infrastructure and its function. This poses a **high** risk to property.

Non-FS Property

The following non-USFS properties on USFS land are positioned in significant drainage channels beneath high and moderate burn severity slopes that are expected to experience increased flows and sediment due to post-fire hydrologic response:

- Big Rock Creek Recreation Residences
- Big Santa Anita Recreation Residences
- West Fork Recreation Residences
- Pasadena Bait Club
- Trask Boy Scout Camp
- Buckhorn Ski Club lodge and infrastructure
- LA Department of Public Works Weather Station at Cogswell Dam Residence

3.Natural Resources (NR):

Hydrologic Function:

Fire impacts proper functioning of hydrologic processes with the greatest and longest lasting impacts occurring from high soil burn severity and anthropogenic activities (such as failure of drainage control on roads). Fire impacts within moderate, low, and very low burn areas are recoverable and expected to diminish as vegetation reestablishes. The greatest threats to recovery are threats from mass wasting, OHV incursion, and failure of infrastructure to control drainage (including roads and trails). Slope failure, increased sediment delivery, and mobilization of woody debris increase the risk of channel diversions down roads and ditches. Channel diversion could lead to complete road prism (or infrastructure) loss and irrecoverable damage to hillslopes.

Increased erosion and runoff are **likely** due to loss of vegetative cover and infiltration and potential for OHV incursion. Loss of surface soil would cause **moderate** reduction in soil productivity or delay recovery of pre-fire vegetation types. Overall Risk: **High**.

Soil Productivity:

Soil productivity loss from soil erosion is likely and the magnitude of consequences moderate. The risk level is high. While a threat to soil productivity exists in portions of the Bobcat Fire, hillslope stabilization treatments are not being proposed for soil productivity. Suitable areas are very limited due to land ownership, wilderness designation, and steep slopes. Areas of high and moderate burn severity not limited by the above, are usually interspersed with steep slopes, or located in lower positions within the watershed, below where runoff and rill erosion would initiate. Hillslope treatments would not result in effective slope stabilization because the available areas are so small. See soil specialist report for additional details.

Intense rainfall may be more than a 5-year rainfall event and is **likely** to result in severe surface erosion. Loss of surface soil would cause **moderate** reduction in soil productivity or delay recovery of pre-fire vegetation types. Overall Risk: **High**.

Botany

An emergency exists with respect to vegetative recovery as a result of the threat of post-fire weed introduction and spread and unauthorized OHV use. Much of the Bobcat Fire occurred in Inventory Roadless and Wilderness Areas and did not have many previously documented weed infestations, with the exception of for some scattered populations along the road perimeters. The unknowing introduction and dispersal of invasive weeds into areas disturbed by fire suppression and repair has the potential to establish large and persistent weed populations. In addition, it is highly likely that existent weed infestations along roadsides will increase in the burn area, due to their accelerated growth and reproduction and a release from competition with natives. There is also previous documentation post-fire on the ANF of tamarisk seed becoming airborne and spreading many miles into previously un-infested riparian areas. These weed populations could affect the structure and habitat function of native plant communities within the burn area, especially in highly susceptible riparian areas, which are of significant habitat value to T&E species found in the burn area (i.e. arroyo toad, yellow-legged frog). It is expected that most native vegetation would recover if weed invasions are minimized.

Vegetation Recovery in Burned Area

Probability of damage or loss is **likely** because the burned area is vulnerable to colonization of tamarisk and other invasives. These species are within dispersal distance of species that respond rapidly in the burned environment. The magnitude of damage will be **major** because conversion of high quality native riparian communities or chaparral could type convert to tamarisk or Spanish broom and annual exotic grasslands resulting in loss of native biodiversity, altered fire regimes, and ecosystem structure and function. It is for these reasons that risk to vegetation recovery in the overall burned area is **very high**. Therefore, this is a BAER emergency and treatments are recommended.

Vegetation Recovery on Suppression Features

No equipment washing occurred during fire suppression operations and equipment intersected known invasive plant populations near the forest boundary. It is **very likely** that fire suppression resources spread existing and introduced new weed species to the burned area. Potential for type conversion of high quality native chaparral to Spanish broom or annual exotic grassland and introduction of new fuel types in conifer forests is high. The magnitude weed threats is **major** because chaparral communities outside the burned area are vulnerable to type conversion and associated degradation ecosystem structure and function, biodiversity loss, and altered fire regimes. The risk to vegetative recovery is **very high** where suppression activities occurred and within the greater burned area as a result of suppression operations. Therefore, this is a BAER emergency and treatments are recommended

Wildlife - Arroyo Toad (Federally Endangered)

Approximately 37% of the lower Little Rock Creek watershed is within the burn perimeter with the majority of these acres rated as low burn severity. Approximately 513 acres (83%) of the 612 acres of arroyo toad occupied and critical habitat in Little Rock are within the burn perimeter. Little Rock Creek is anticipated to have a 9.8 times increase in flow and 2.8 times increase in sediment. For Santiago (tributary to Little Rock), there is a predicted 2.9 times increase in flow and 1.0 times increase in sediment.

Direct effects of a fire in riparian habitat include temporary loss of riparian vegetation and could include injury or mortality of recently metamorphosed toads who do not have the body weight needed to burrow deep below the surface. Post-fire effects to the stream and streambank area could include scouring, stream and streambank modification and debris flows which may result in deposits of material ranging from sand to boulders. If these events occur during a time when toads are burrowed in the stream channel or immediate area, individuals could be buried. In some cases, sediment deposition in the stream and streambank area can improve habitat for arroyo toads. Based on the predicted post-fire response for Little Rock Creek, increased flows and debris could potentially impact individuals and their habitat. This impact is expected to be temporary. For Santiago, the potential for loss of individuals or adverse impacts to habitat is considered low and would be temporary.

Little Rock Creek Occupied Critical Habitat: Threat of watershed response is **likely** with potential for **moderate** effects to habitat creating **high** risk to population and habitat.

Santiago Creek Occupied Critical Habitat: Threat of watershed response is **possible** with potential for **moderate** effects to habitat creating **intermediate** risk to population and habitat.

Wildlife - Mountain Yellow-Legged Frog (Federally Endangered)

In the upper reach of Little Rock Creek (including the unnamed tributary to Cooper Canyon release site), 100% of the 615 acres of critical habitat and all 3.7 miles of occupied stream stretch are within the burn perimeter. Little Rock Creek is anticipated to have a 11.8 times increase in flow and 3.1 times increase in sediment.

In South Fork Big Rock Creek, 607 acres (97%) of the 625 acres of critical habitat and 97% of the 3.65 occupied stream miles are within the burn perimeter. South Fork Big Rock Creek is anticipated to have a 12 times increase in flow and 3.4 times increase in sediment.

In Devils Canyon, 121 acres (43%) of the 279 acres of critical habitat and 1.2 miles (60%) of the two occupied stream miles are within the burn perimeter. Devils Canyon is anticipated to have a 2.4 times increase in flow and 3.3 times increase in sediment.

The entire 0.5 mile stretch of the Upper Bear Creek release site and all 116 acres of the Bear Creek Critical Habitat Unit are within the burn perimeter. Upper Bear Creek is anticipated to have a 3.8 times increase in flow and 9.4 times increase in sediment.

This highly aquatic species can avoid some direct fire effects by seeking refuge in the stream and deep pools. However, post-fire effects are expected to be significant and may include debris flows and/or increased peak flows which could fill pools with sediment that are needed for reproduction, tadpoles, hibernation and refugia from predators. Peak flows could deposit frogs into non-habitable areas and scour vegetation needed to hide

from predators. Ash and sediment will impact water quality and decrease visibility and water temperatures will increase in areas where the streamside vegetation is gone. Individuals in the creek during debris flows could be crushed leading to injury or death. With the dramatic decline in mountain yellow-legged frogs across its range, any losses are considered significant. Species experts from USGS have identified extirpation of occurrences as a potential outcome of post-fire conditions.

Critical Habitat in Devils Canyon: Threat of watershed response is **likely** with potential for **major** effects to habitat creating **very high** risk to habitat.

Critical Habitat in Little Bear, Upper Bear, South Fork Big Rock, and Upper Little Rock Creeks: Threat of watershed response is **very likely** with potential for **major** effects to habitat creating **very high** risk to habitat.

Wildlife - Santa Ana Sucker (Federally Threatened)

In West Fork San Gabriel, 100% of the 215 acres of critical habitat and 8.5 miles of occupied stream habitat are within the burn perimeter. West Fork San Gabriel is anticipated to have about a 6.9 times increase in flow and 19.7 times increase in sediment. Only a very small portion of North Fork San Gabriel burned directly, but it is located downslope of the burn area.

Post-fire effects to Santa Ana sucker habitat in West Fork San Gabriel are expected to be significant and may include increased flows, sediment and debris delivery that may scour riparian vegetation and lead to aggradation of pools. Increased deposition in pools and loss of aquatic and emergent vegetation will reduce habitat suitability for Santa Ana sucker. High water flows with increases in floatable debris and fine sediment/ash will impact water quality and may lead to death or injury. Events that occur during the reproductive season have potential to cover or wash away eggs or fry.

Occupied Critical Habitat in Lower Bear Creek: Threat of watershed response is **very likely** with potential for **major** effects to habitat creating **very high** risk to habitat.

Wildlife - Least Bell's Vireo (Federally Endangered)

In Little Rock Creek, the known least Bell's vireo territory is located downstream of the Little Rock Reservoir and Dam. Based on this, there are no anticipated impacts to individuals or their habitat.

4. Cultural and Heritage Resources: The Bobcat Fire BAER cultural resource assessment identified one hundred and twenty-four (124) formerly documented historic or archaeological resources within the fire perimeter, or within areas considered to be at high risk for a significant increase in watershed effects. Of the 124 cultural resources, nine (9) have been formally evaluated and found not eligible for the NRHP, six (6) have been evaluated and determined eligible for the NRHP, one (1) resource has been listed on the National Register, while the remaining one hundred and eight (108) have yet to be evaluated, and are currently managed as potentially eligible for the NRHP. One-hundred and fifteen (115) cultural resources were identified during the initial analysis as potential Heritage Critical Values and were assessed for potential post-fire response due to burn severity and erosion potential. Of the 115 cultural resources reviewed, twenty-four (24) were roads or trails, with all having been either recommended not eligible, or once reviewed, having little to no eligibility potential for listing on the NRHP. Another six (6) cultural resources were identified as permitted infrastructure associated with permitted Utilities. Due to the nature of these resources (i.e. historic transmission line routes, telephone lines, water systems), the risk to these assets can be reduced to an acceptable level by the work that will be done by the infrastructure companies and permitted Utilities to maintain and continue to operate these facilities. Fifty-three (53) of the remaining eighty-five (85) cultural resources were prioritized for their critical values and visited during the field risk assessment due to the site's potential significance, type, or location, with seven (7) resources determined to be very high risk or high risk when run through the risk matrix. The historic status and/or Tribal significance of these resources, along with the soil and hydrologic modeling and analysis, indicates a significant risk to these seven cultural resources from the Bobcat Fire and from the predicted storm induced watershed response.

The sites identified as having at risk values are (FS# 05015100185), (FS# 05015100004), (FS# 05015200007), (FS# 5015200161), (FS# 05015200001), (FS# 5015400018), and (FS# 5015400021).

(FS# 05015100185): The tract has been formally determined eligible for the National Register, any loss or damage of the contributing cabins would post a **major** adverse affect its historical status and integrity. Due to the individual cabins locations within the bottom and slopes of the canyon, it is **very likely** the cabins will be directly impacted by high water, and/or debris or mudflows creating a **very high** risk to this heritage resource.

(FS# 05015100004: Most of the camp facilities, lodge, numerous cabins and outbuildings are built on a significant slope, and thus will **very likely** be impacted by the movement of sediments and rocks downslope, creating a **major** impact to the cabins below and resulting in **very high** risk to the cultural resource.

(FS# 05015200001): The biggest concern for **major** damage is scour by the **very likely** increased sediment-laden flows from higher in the watershed and getting buried by debris and sediment. These types of impacts have occurred in the past from past storm events, and will likely be significantly greater now following the fire and high burn severity in the San Gabriel watershed, putting the resource at **very high** risk to the cultural resource.

(FS# 05015200007): It is **likely** that high increases post-fire sediment and flow in the channel will cause **major** damage to the rock creating **high** risk to this resource is a listed historic property on the NRHP.

(FS# 5015200161): If a flow large enough were to encroach, the boulder seems insecure enough that it would **very likely** become dislodged or otherwise impacted. Due to this potential, and it's potential NRHP status and significance to the tribes, the impacts would be **major** and post a **very high** risk to the site.

(FS# 5015400018), and (FS# 5015400021): One of the Native American sites have a burial component, and has been looted and vandalized in the past, and is **very likely** to occur again with major consequences as the burned environment makes it easily assessible to damage from illegal OHV activity. This site is at **very high** risk from OHV incursion and looting.

B. Emergency Treatment Objectives:

- Provide for public safety
- Limit damage to property
- Limit loss of soil productivity and provide for natural vegetative recovery
- Early detection and rapid response of nonnative invasive plants
- Road and trail treatments to protect investment in infrastructure and limit post-fire watershed response
- Conserve threatened and endangered species habitat
- Protect and stabilize Forest Service infrastructure at risk of damage as a result of increased sedimentation, stream diversion, erosion, and hazard trees from the fire.
- Reduce risk to water quality and other natural resources by reducing risk of infrastructure contamination, damage, and failure and hazardous materials.
- Mitigate public safety hazards along NFS roads.
- Reduce risk to downstream infrastructure where possible.
- Protect road crews from the threat of falling trees.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:

Land: EDRR-N/A to storm event, but 95% probability of surveying all priority treatment areas if fully funded

Channel: none

Roads/Trails: 80%

Protection/Safety: 90%

D. Probability of Treatment Success

Table 9: Probability of Treatment Success

	1 year after treatment	3 years after treatment	5 years after treatment
Land	85	95	100
Channel	NA	NA	NA
Roads/Trails	85	95	100

	1 year after treatment	3 years after treatment	5 years after treatment
Protection/Safety	90	100	100

E. Cost of No-Action (Including Loss): Potential lost market value plus assessment costs (derived from Cost-Risk Assessments in the BAER assessment record or the value, cost risk assessment tool summary). This does not include a monetary value on loss or harm to human life.

F. Cost of Selected Alternative (Including Loss): Potential lost market value plus assessment costs plus treatment costs (derived from Cost-Risk Assessments in the BAER assessment record or the value, cost risk assessment tool summary). This does not include a monetary value on loss or harm to human life

Skills Represented on Burned-Area Survey Team:

- ☒ Soils ☒ Hydrology ☒ Engineering ☒ GIS ☒ Archaeology
☒ Weeds ☒ Recreation ☐ Fisheries ☒ Wildlife
☒ Other: Geology, Hazmat

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Team Members: *Table 10: BAER Team Members by Skill*

Skill	Team Member Name
Team Lead(s)	Katie VinZant, Chris Stewart
Soils	Terry Hardy, Eric Nicita, Tricia Prentice
Hydrology	Kristin Richardson, Hilda Kwan
Engineering	Greg Cox
GIS	Celia Yamagawa, Elaine Elliot
Archaeology	David Peebles, Joanna Huckabee
Botany/Weeds	Janet Nickerman
Wildlife	Leslie Welsh, Ann Berkeley
Recreation	Ray Kidd, Mike Hansen
Hazmat	Belinda Walker
Geology	David Annis, Eric Nicita
Other	Carly Gibson, Emma Williams

G. Treatment Narrative:

Land Treatments

Early Detection and Response – Invasive and Noxious Weeds

Invasive plant surveys will begin in 2021 during the flowering periods of weed species. Because of differences in flowering times for all potential species, two visits during the growing season are normally required, although the funding requested will not support this. Completion of surveys in dozerlines (140 miles), riparian areas (302 miles), and along high priority roads (80 miles) used as dozerlines will be the first priority. The second survey priorities will be other suppression areas such as staging areas and drop points. All locations of weed species will be mapped, using the Angeles NF, "Invasive Weeds" list.

Surveying will include walking the priority areas, documenting and hand pulling/herbicide new weed occurrences at the time of inspection. Herbicide will be used in compliance with the Forest Wide NEPA project. New weed occurrences will be pulled to root depth, placed in sealed plastic bags, and properly disposed or sprayed with the appropriate and approved herbicide.

Weed detection surveys to determine whether ground disturbing activities related to the Bobcat Fire have resulted in the expansion of noxious weeds is requested for the first year. EDRR funding is requested for areas throughout high, moderate, and low burn severities as low soil burn severity does not always correlate to significant amounts of remaining vegetation. For example, on the northern portion of the fire a significant amount of low burn severity is recorded. The vegetation in this area is characterized as desert transition, dominated by bunch grasses, cacti, and some desert shrubs. The fire burned off the majority of this vegetation, even in areas characterized as low burn severity, leaving this area extremely vulnerable to invasion by weeds, which is well known to be even more catastrophic in desert environments (see picture below).



There are several reasons this funding request is substantial, yet essential and feasible:

- large amount of perennial and intermittent streams in the burn area;
- previous experience in Station Fire where tamarisk (currently unknown from the burn area) blew into 99% of riparian areas and eradication using EDRR was very successful;
- high percentage of Wilderness and subsequent access difficulties;
- high number of dozerline miles;
- no weed wash station was ordered and known invasive populations were driven through;
- previous experience on ANF of finding new invasive species unknown to the area more than 5 miles down dozerlines;
- ANF's 11-year record of great success in controlling invasives after fires with partners and contractors. The ANF ecosystem would be completely different if not for EDRR BAER funding.

Cultural Site Protection

Three cultural sites with a potential for post-fire watershed impacts were identified for treatment within the burn area.

Hydrologic modeling for these locations shows a high potential for increased sediment-laden flows from higher in the sites watersheds, which is likely to result in the pictograph rocks getting buried by debris and sediment. These types of impacts have occurred in the past from past storm events and will likely be significantly greater now following the fire and high burn severity in the San Gabriel watershed. No viable landscape treatments have been identified that could protect these significant resources from direct impacts. Thus, the treatment proposed would be to assess impacts to the condition of the rocks following significant storm events, to remove built-up debris, to document any change in condition that could affect the values that contribute to NRHP eligibility or NHRP status and to inform the local tribal community as to any change in status or condition.

Channel Treatments

No channel treatments are proposed for the Bobcat Fire.

Roads and Trail Treatments

Roads: Road drainage features are at risk from adjacent burned watersheds. Increased runoff and sediment from the burned areas can negatively affect the road prism, damaging the road, eroding land downslope of the road and routing flow and sediment directly to stream channels. Road failure can also contribute to failure of infrastructure downstream. Culverts associated with these roads are at risk of plugging from debris carried down channels from burned watersheds. Proposed road treatments include: drainage structure cleaning, reestablishing rolling dips and leadoff ditches, installation of overside drains, culvert removal and upsizing, reshaping low water crossings, installation of riprap armoring and spillways, culvert inlet basin cleaning, berm removal, outsloping, and riprap armoring at strategic locations. Two roads in the northern portion of the fire (Little Rock (5N04) and Alimony (4N15)) primarily burned at a low to moderate soil burn severity and have stormproofing and drainage improvement treatments prescribed. These treatments are recommended as regardless of soil burn severity, the vegetation in these watersheds has been almost entirely removed, leading to expected watershed responses more similar to moderate soil burn severities.

Treatment Objectives: The primary objectives of the road and infrastructure treatments are to:

- a. Protect and stabilize Forest Service infrastructure at risk of damage as a result of increased sedimentation, stream diversion, and erosion from the fire.
- b. Reduce risk to water quality and other natural resources by reducing risk of infrastructure contamination, damage, and failure.
- c. Mitigate public safety hazards along NFS roads.
- d. Reduce risk to downstream infrastructure where possible.
- e. Protect road crews from the threat of falling trees.

1. Road Storm-Proofing

Road stormproofing involves cleaning or armoring of existing drainage structures to help ensure road drainage performs optimally. This work will involve restoration of drainage function of existing road drainage structures, culverts, lead off ditches and rolling dips. This work will be accomplished through contractor equipment and labor.

Locations: 2N25.2- Cogswell Rd., 2N24.3- Redbox Rincon (East), 2N24.1- Redbox Rincon (west) 2N30.1, 2N30.2, & 2N30.3 Sawpit Road, 2N40- Big Santa Anita, 2N41.2 & 2N41.3 Chantry Rd. 3N02 Cooper Canyon Rd., CO, 4N15 Alimony, 5N04 Little Rock Cyn Road

Note: 10% Mobilization costs cover the following: labor/equipment to move the following: heavy equipment, crew & crew vehicles, road materials, jobsite items (e.g. portable toilet), fencing to set up staging area; bonding; and permitting.

15% Overhead costs cover the following: Job Office Overhead-portable toilet rental, utilities, communications, staging area fencing, water, safety gear, hotel, per diem and Home Office Overhead-contract/billing processing, admin staff labor, and office rent/utilities.

10% Profit costs cover the following: performance risk, contract type risk, facilities capital employed, and cost efficiency.

2. Road Drainage Structure Replacements/Improvements

Road drainage structure improvements involves replacing existing deficient structures and installation of additional drainage structures to help ensure road drainage performs optimally. This work will be accomplished with contractor equipment and labor.

Locations: 2N25.2, 2N24.3, 2N24.1, 2N30.1, 2N30.2, & 2N30.3, 2N40, 2N41.2 & 2N41.3, 3N02, 4N15, 5N04.

3. Storm Inspection/Response

Storm inspection/response will keep culvert and drainage features functional by cleaning sediment and debris from in and around features between or during storms. This work will be accomplished through contractor equipment and labor.

Locations: 2N25.2, 2N24.3, 2N24.1, 2N30.1, 2N30.2, & 2N30.3, 2N40, 2N41.2 & 2N41.3, 3N02, 4N15, 5N04.

4. Road Contract Preparation/Administration

Forest Service preparation, administration and oversight of road work contracts.

5. Road Treatment Cultural Monitor (Archaeologist)

Oversees and ensures cultural resources are protected or mitigated during road treatment implementation and completes required documentation.

Trails

Trail (non-motorized trails) treatment work will include the installation of drainage features (out sloping, rolling grade dips, water bars) and snagging trees as appropriate for worker safety. This work is necessary to protect the trail asset by diverting anticipated increases in surface runoff off the trail. This request also includes felling of hazard trees along the portion of trail to be worked on in order to mitigate safety concerns as necessary. The trail work will be conducted by partnership agreement crews (PCTA, CCC, or CC's) and administered and supervised by Forest Service personnel.

It was determined sections of the Pacific Crest Trail (PCT) (Sections 2000.5 & 2000.6), High Desert (10W09/10W07/10W02), Gabrieleno (11W14), and Silver Moccasin (11W06) National Recreation Trails within the fire area need trail storm proofing and stabilization treatments. Treatment sections within areas of high and moderate burn severity with slopes where watershed response is expected to be high and trail impacts likely were selected (17 miles selected out of 111 miles total in fire perimeter).

Urban areas near the fire area typically attract numbers of trail users, and especially seasonal hike-through groups following the PCT. The trail sections selected are located within high and moderate burn severity areas in steep terrain with little to no ground cover or vegetation remaining after the fire. Trails currently have sections that are incised and conducive to channelization of runoff, furthering erosion and need additional drainage features installed. Trail storm proofing and grade stabilization of 17 miles of the trail has been identified to prevent loss of trail tread, trail structure and to reduce soil erosion on slopes. Prior to implementation of treatments, trail specialists will perform specific trail surveys on identified trails. The result of the survey will dictate subsequent detailed storm proofing treatment recommendations and identification of hazard trees in need of removal for crew safety. The trails will be monitored post-implementation after winter rain season to determine effectiveness and maintenance needs, and if additional treatments are necessary.

1) Trail Storm-Proofing

Trail stormproofing involves cleaning or armoring of existing drainage structures to help ensure trail drainage performs optimally. This work will be accomplished through partner equipment and labor. In addition, this treatment includes Forest Service fire crew felling of hazard trees in forested areas that pose a threat to crews.

2) Trails Storm Inspection and Response

Storm inspection/response of treated trails will keep drainage features on trails functional by cleaning sediment and debris from in and around features between or during storms. This work will be accomplished through partner equipment and labor. The unit cost per mile is expected to be roughly half of the cost of the initial stormproofing cost, as it is expected that only touch-up work will be necessary in most of the drainage feature areas.

Protection/Safety Treatments

1) Human Life and Safety (and Resource) Protection – Closure and Hazard Warning Signage

To ensure safety for Forest visitors and protection to Forest resources during the natural recovery period, area closure and hazard warning signs will be placed at road, trailhead, campground, and day use area locations adjacent to and within the fire perimeter to warn visitors of potential hazards. Given the typical amount of vandalism on the ANF, it is likely signs will need to be checked and replaced periodically within the first year; the cost estimate includes extra signs and personnel time for sign replacement. There are a number of portals or access points to these roads, recreation areas, and trails. Forest staff will provide oversight for sign installations and implementation.

2) Unauthorized OHV Barriers and Closure Patrols

Unauthorized OHV access is a threat to the burned watershed due to the numerous miles of dozerlines (140) and open terrain created due to the fire. This is especially true in the northern portion of the fire (from Highway 2 line north to Little Rock/Juniper Hills/Big Rock) in the desert transition vegetation types that are naturally more open and have less steep slopes. The ANF is one of the most urban Forest in the nation with one of the highest recreation use levels. The challenge for the ANF is managing the high number of users who gain unauthorized access to the Forest by driving/riding/entering through or around a locked gates and/or closure signs. This type of unmanaged OHV use can cause damage to natural and cultural resources, establish routes that may take years to rehabilitate. A hard closure to vehicle users of the burn and adjacent areas is required for native vegetation to return within the burn area and on dozer lines as most of the ground cover will return without vehicle use to compact soils and introduce non-native weeds. OHV barriers are also needed on either side of the entrance station to Little Rock Reservoir to prevent access into Critical Habitat for two T&E species and a multitude of cultural sites. These barriers would be in the form of pipe rail fencing and large (3-4ft. wide/tall) boulders. Exact locations of the fencing and boulders will need to be determined with ANF recreation staff in the field. It may be beneficial/cost effective to consider including the implementation of these barriers in the road contract.

Through past BAER experience, the ANF has determined that signage, barriers and other hard closures that are installed to discourage soil disturbance and assist in allowing natural vegetative recovery are not effective by themselves. Patrolling within and adjacent to the burn area is needed to enforce the closure to safeguard human life/inform the public and deter unauthorized access, vandalism, and damage to National Forest System lands. Prevention patrols are recommended in lieu of adding additional miles of barrier that may not be effective alone. Prevention patrols are considered a lower cost treatment compared to miles of barrier installation. Should patrols be found to be insufficient, the Forest may reassess and submit an interim request to install barriers at specific locations where unauthorized activity is observed.

Note: This cost assumes enforcement patrols will occur primarily on weekends for four months, concentrating on visitor peak usage and storm event times. In addition, only areas with high/moderate usage will be targeted. Due to the lack of available ANF personnel, it was assumed that half of this time would be covered by off-forest assignments, hence the inclusion of lodging/per diem.

3) Alimony Truck Trail Gate and Little Rock/Sulphur Springs Gate Repair

In an effort to prevent unauthorized OHV entry from trails intersecting Alimony Truck Trail (4N15) into the Little Rock Creek area (a T&E and culturally sensitive area) the installation of an "Angeles" style pipe gate is recommended. The exact location of the gate will need to be determined in the field by ANF recreation staff, but is anticipated in the area of 34 26'16" N, 117 58'26" W.

There is also a need to repair the gate at the Sulphur Springs end of 5N04, which is no longer closeable and the locking pin on one of the gates at the entrance to Little Rock Reservoir on the northern end of 5N04 to prevent vehicle access into the Little Rock Creek area.

This work will be accomplished through contractor equipment and labor and the prices mobilization, overhead, profit, and ANF contract administration. It is recommended the gate installation/repair be combined with the road work treatments.

4) West Fork Day Use Area Gates

In order to prevent access to West Fork River recreation area attractions (e.g. hiking/biking trails, fishing, picnicking) the installation of five “Angeles” style pipe gates is recommended at the three parking areas (largest lot requires 3 gates) that service the West Fork Day Use Area. This work will be accomplished through contractor equipment and labor and the prices mobilization, overhead, profit, and ANF contract administration. It is recommended the gate installation be combined with the road work treatments.

5) Burkhart Trailhead SST Protection

The purpose of this treatment is to remove built up dry ravel from the Bobcat Fire that has accumulated between the hillside and the concrete wall behind a Sweet Smelling Toilet (SST) at Burkhart Trailhead. This would allow any runoff from the burned hillside behind the SST to channel around the SST. The cost allows for three clean-out operations using hand tools.

6) Hazard Tree Mitigation Around SST's and BAER Treatment Areas

This treatment includes the felling of hazard trees that pose a risk to personnel performing BAER treatments (e.g. road infrastructure repair, OHV barriers, and sign installation). In addition, this treatment will cover the felling of hazard trees identified during the assessment to pose a risk to bathrooms in the Charlton Day Use Area.

7) Hazardous Waste Removal

This treatment involves the removal and disposal of hazardous materials contamination associated with four (4) pit toilets located at Valley Forge Trail Camp (2) and Old Ridge Crest Picnic Area Bathrooms (2) off State Route 2. Removal and disposal of the hazardous materials contamination will eliminate continued employee/public exposure to potentially lead based paint in the soil and asbestos particles associated with the toilet's asbestos vent pipes. The lead and asbestos are likely to become airborne if disturbed by untrained personnel or members of the public.

The pit toilets located at Valley Forge Trail Camp and Old Ridge Crest Picnic Area may also meet the Environmental Protection Agency's definition of a Large Capacity Cesspool, which requires closure in accordance with federal regulations. This treatment includes the evaluation of the pit toilets to determine if they are classified as Large Capacity Cesspools. If they meet the definition, the pit toilets must be closed in accordance with federal regulations as soon as possible. Failure to do so will allow wastewater systems to exist that may contaminate drinking water sources and impact the health of employees/public.

Removal and disposal of burned exposed hazardous waste at the Chantry Helipad Cinderblock Outbuilding to eliminate continued threats to soil and water quality is also included in this treatment. All hazmat removal work described above will be performed via contract.

8) Interagency/Partner/Permittee Coordination

Many non-Forest Service entities, partners and permittees (e.g., Southern California Edison, LA County Department of Public Works, NOAA NWS, NRCS, US Army Corp of Engineers private landowners, etc.) that have infrastructure in the fire area are actively repairing damaged infrastructure and/or implementing mitigations to reduce post-fire damage. The BAER team's findings will be shared with those entities so that they can plan measures to protect/prepare infrastructure from post-fire watershed response events. This cost is to get the Forest started with coordination and facilitation of emergency treatments from partners and permittees.

Above and beyond facilitating protection measures for non-Forest Service entities threats to life, property and water quality requires continued coordination with many agencies. The Forest Service

plans on continuing to collaborate and communicate with partnering agencies, other entities and organizations and the public.

A Special Uses Coordinator with in-depth knowledge of administration of recreational residences is needed for coordination with permittees in the four recreation residences tracts impacted by the fire, most notably the Big Santa Anita tract. This coordinator would work with the Regional Assistant Environmental Engineer and an ANF Special Uses specialist to ensure adequate attention is given to the removal of hazardous waste by permittees from both burned and unburned rec residences at risk for debris flow/flooding.

9) Treatment Implementation Leader

The ANF does not currently have the staff to dedicate to properly guiding the implementation of the suite of treatments recommended by the Bobcat BAER. It is anticipated that this person would also assist with the Ranch 2 BAER implementation and Lake BAER implementation. The Team proposes detailing in or borrowing staff from another forest to take the lead for an implementation effort.

H. Monitoring Narrative: none

Appendix A: Bobcat BAER - FS Critical Value Table				Click "Enable Content" in the upper left where it says, "SECURITY WARNING Macros have been disabled" or this spreadsheet will not work correctly.						
				Instructions: Make sure to include enough information to be able to track logic and rationale for determinations of probability and magnitude in the risk assessment process. If needed, see the risk assessment matrix tab. Additional columns can be added at the end but do not delete columns.						
Value	Life/ Property/ Resource s	Life/ Property/ Resources2	Critical Value	Threat to Value	Probabilit y of Damage or Loss	Rationale for Probability	Magnitude of Consequence	Rationale for Magnitude	Risk	Recommended Treatment
BAER critica l value	Cultural Resources			Debris flow, flooding	Very Likely	Site is located within channel downstream of watersheds with steep slopes and moderate to high burn severities.	Major	Listed on National Register of Historic Places.	Very High	monitor watershed response impacts, stabilize and remove debris, coordination with tribes
BAER critica l value	Cultural Resources			Debris flow, flooding	Likely	Site is located within channel downstream of watersheds with steep slopes and moderate to high burn severities.	Major	Assumed eligible for National Register of Historic Places	Very High	monitor watershed response impacts, stabilize and remove debris
BAER critica l value	Cultural Resources	Property - Other		debris and soil movement from burned upslope canyon directly above camp buildings	Very Likely	Camp buildings are located on a significant hillside with burned slopes above, with the lodge and ranger cabin below and above creek, impacts from slope wash and rock fall is very likely	Major	Damage from force of rockfall to site assumed eligible for National Register of Historic Places	Very High	coordinate with permittee
BAER critica l value	Life and Safety	Property - Other	Big Rock Creek Rec Residences (3)	Flooding	Possible	Building are located in canyon with potential for increased post-fire flows.	Major	Death or serious injury to humans is possible. Damage from flooding could cause major damage to structures.	High	closure
BAER critica l value	Life and Safety	Property - Other	Big Santa Anita Recreation Residences	Hazmat, hazard trees, debris flow, flooding, rockfall	Very Likely	SBS for the watershed above the rec tracts is predominately moderate and high with a high potential for debris flow and flooding.	Major	Death or serious injury to humans is possible. Water quality would be compromised by abundance of hazmat. Cabins determined eligible for National Register of Historic Places.	Very High	closure, signs, hazmat removal
BAER critica l value	Life and Safety	Property - Other	Buckhorn Ski Club	flooding	Possible	Burn severity is not high and top of watershed	Major	Death or serious injury to humans is possible. Damage from flooding could cause major damage to structures.	High	signage, communication with ski club
BAER critica l value	Life and Safety	Property - Roads	Burkhart Trailhead Access Road	road culvert	Possible	Steep slope burned above.	Moderate	Culvert could plug and flood road.	Intermediate	storm patrol
BAER critica l value	Life and Safety		Chantry Flats FS Residences/Station	Closed ingress/egress (2N41.1) due to debris flows/flooding/rockfall across Chantry Road	Likely	Hillslopes above Chantry road are steep and burned at moderate/high SBS	Major	Death or serious injury to humans is possible.	Very High	ANF discussion
BAER critica l value	Life and Safety	Property - Other	Chantry Flats Picnic Area	Closed ingress/egress due to debris flows/flooding/rockfall across Chantry Road	Likely	Hillslopes above Chantry road are steep and burned at moderate/high SBS	Major	Death or serious injury to humans is possible.	Very High	ANF discussion

BAER critical value	Life and Safety	Natural Resources - Soil and Water	Chantry Helipad Outbuilding	Hazmat	Unlikely	Hazmat is located on flat slope with little chance of mobilization	Moderate	Local impact to soil and water quality.	Low	Hazmat removal
BAER critical value	Life and Safety		Charlton Flats Campground	Hazard trees, stump holes, invasives, OHV	Possible	Burned trees throughout campground.	Major	Death or serious injury to humans is possible.	High	closure, signs
BAER critical value	Life and Safety	Property - Other	Cogswell Dam Keeper and Other Residence	Lack of ingress/egress (2N25.1) due to debris flows	Very Likely	Both roads (2N25.1 & 2N25.2) into the residence areas are highly susceptible to closure from rockfall, debris flows, flooding, hazard trees.	Moderate	Helipad at residences could allow for emergency exit	Very High	coordination with LA County DPW
BAER critical value	Life and Safety	Property - Other	Cooper Canyon Trail Camp	hazard trees	Likely	Burned trees throughout campground.	Major	Death or serious injury to humans is possible.	Very High	closure
BAER critical value	Life and Safety	Property - Other	Crystal Lake Day Use Area and Lake	Rockfall, debris flow, flooding	Possible	Burned sloped above day use area with potential debris flow path burned at sourcewaters.	Major	Death or serious injury to humans is possible.	High	closures, signs, monitor for response and period of closure
BAER critical value	Life and Safety	Property - Other	Glenn Trail Camp	Rockfall, flooding, debris flow	Possible	Moderate increase in runoff, rockfall off slopes behind campground	Major	Death or serious injury to humans is possible.	High	closure, signs, pit toilet pump
BAER critical value	Life and Safety	Property - Roads	Little Jimmy Campground Access Road	hazard trees/rockfall along access road, but not campground	Possible	Scattered hazard trees and some rockfall are present along the road	Major	Death or serious injury to humans is possible.	High	
BAER critical value	Life and Safety		NFS Roads 2N24, 2N25, 2N30, 2N40, 2N41, 3N02, 4N15, 5N04	Hazard trees, debris flow, flooding, rockfall, loss of road tread.	Very Likely	Areas burned at high and moderate SBS. Burned trees and steep slopes have led to hazard trees and significant rockfall, dry ravel. Drainage is compromised.	Major	Death or serious injury to humans is possible.	Very High	closure, signs, hazard tree mitigation
BAER critical value	Property - Roads		NFS Roads 2N24, 2N25, 2N30, 2N40, 2N41, 3N02, 4N15, 5N04	debris flow, flooding, rockfall, loss of road tread.	Very Likely	Areas burned at high and moderate SBS. Burned trees and steep slopes have led to hazard trees and significant rockfall, dry ravel. Drainage is compromised.	Moderate/ Major	Loss of road infrastructure and erosion from road failure can create soil, water quality, vegetation damage.	Very High	restore road drainage function (culverts, overside drains, rolling dip, stabilize, etc.), road stormproofing
BAER critical value	Life and Safety		NFS Trails 9W02, 9W10, 9W20, 10W04, 10W05, 11W06, 11W07, 11W13, 11W14, 11W14A, 11W15, 11W16, 11W23, 12W09, 10W02 (High Desert Nat. Rec. Trail), Pacific Crest Trail (2000.5 & 2000.6)	Hazard trees, debris flow, flooding, rockfall.	Very Likely	Areas burned at high and moderate SBS. Burned trees and steep slopes have led to hazard trees and significant rockfall, dry ravel.	Major	Death or serious injury to humans is possible. Complete loss of the trail may occur to sections of this trail. Channel crossings and sections of the trail in moderate/high soil burn severity are particularly vulnerable. Trail reconstruction would be hazardous and expensive.	Very High	closure, signs
BAER critical value	Property - Trails		NFS Trails, 11W06 (Gabrieleno Nat. Rec. Trail) 11W14 (Silver Moccasin Nat. Rec. Trail), 10W02 (High Desert Nat. Rec. Trail), Pacific Crest Trail (2000.5 & 2000.6)	Debris flow, flooding, rockfall.	Very Likely	Areas burned at high and moderate SBS. Burned trees and steep slopes have led to hazard trees and significant rockfall, dry ravel.	Moderate	Channel crossings and sections of the trail in moderate/high soil burn severity are particularly vulnerable. Trail reconstruction would be hazardous and expensive.	Very High	Trail stormproofing and inspection
BAER critical value	Property - Trails		NFS Trails 9W02, 9W10, 9W20, 10W04, 10W05, 11W07, 11W13, 11W15, 11W16, 11W23, 12W09	Debris flow, flooding, rockfall.	Possible	Areas burned at moderate and low SBS. Burned trees and steep slopes have led to hazard trees and significant rockfall, dry ravel.	Minor/ Moderate	Channel crossings and sections of the trail in moderate soil burn severity are vulnerable, however trails are not most popular/used.	Intermediate/ Low	None

BAER critical value	Life and Safety	Property - Other	Pasadena Bait Club	Lack of ingress/egress (2N25.1), Debris flow, flooding, hazard trees	Likely	Built on historic debris flow deposition, and possibly high volume of material movement in this area.	Major	Debris flow or hazard trees impacting structures at this location would require expensive complete structural replacement.	Very High	Closure of road (2N25.1) to the cabin to prevent entrapment. Coordination with permittee.
BAER critical value	Life and Safety		Permittees, USFS staff, Forest Visitors (ingress/egress during evacuation or travel during storms)	Debris flow, flooding	Very Likely	There is a very high probability of significant damage to several sections of Highway 2. These post-fire events are expected to deliver sediment, rock and large boulders across the highway.	Major	It is very likely forest permittees, staff, and visitors may be trapped between impassable highway washouts, exposed to rockfall/debris flows while entrapped, and/or unable to travel by car.	Very High	Forest closure, early warning systems, interagency coordination, media/public awareness outreach
BAER critical value	Life and Safety	Property - Other	Rincon Environmental Center-2 footbridge crossings	flooding/debris flows	Possible	Notched and constricted under bridge.	Major	Bridge failure potential for serious injury.	High	signage, communication with center
BAER critical value	Life and Safety		Southfork Campground User Created Trails	Debris flow, flooding	Possible	user created trails coming out of campground traverse down into drainage with debris flow/flooding potential	Major	Death or serious injury to humans is possible.	High	hazard signs
BAER critical value	Life and Safety	Property - Other	Sycamore Flats Campground	Rockfall	Possible	Rockfall off slopes behind campground	Major	Death or serious injury to humans is possible.	High	closure, signs
BAER critical value	Life and Safety	Property - Other	Trask Boy Scout Camp and Permitted Trails	Loss of trail tread due to rockfall, overland flow. Hazard trees. Debris flow/flooding into camp.	Likely	Steep slopes and moderate to high soil burn severity pose increased threat of rockfall, debris flow, and flooding. Area also surrounded by burned trees.	Major	Death or serious injury to humans is possible.	Very High	Coordination with camp about hazards of trails and flooding/debris flow for camp. Special use administration to alter permit
BAER critical value	Life and Safety	Natural Resources - Soil and Water	Valley Forge Trail Camp	Hazard trees, Hazmat	Possible	Scattered hazard trees and two burned bathrooms. Asbestos airborne mobilization.	Major	Death or serious injury to humans is possible.	High	closure, hazmat removal
BAER critical value	Life and Safety	Property - Roads	Valley Forge Trail Camp Access Route	Erosion, hazard trees	Very Likely	Continued erosion of road bed.	Moderate	Damage to road creates risk of causing a vehicle accident resulting in injury.	Very High	closure, road treatments
BAER critical value	Life and Safety	Property - Other	West Fork Campground	Debris flow	Possible	Picnic tables on past debris flows.	Major	Death or serious injury to humans is possible.	High	closure, signs
BAER critical value	Natural Resources - Other		Southwestern Pond Turtle (pre-listing status) - West Fork Tributary (Chileno Canyon)	Debris flow, sedimentation, flooding	Very Likely	SBS above the West Fork and Bear Creek drainages is predominately moderate with a high potential for debris flow and flooding.	Major	Debris flow could bury borrows and eggs at toe of slopes causing reproductive failure and mortality.	Very High	None
BAER critical value	Natural Resources - Other	Life and Safety	Wildlife Guzzlers	fiberglass migration	Possible	Potential wind mobilization, overland debris flows could transport material. Still holding water with potential to harm wildlife drinking from guzzler.	Moderate	If left, fiberglass would result in harm to local wildlife.	Intermediate	containment of threat
BAER critical value	Natural Resources - Soil and Water		Hydrologic Function	Loss of cover, reduced infiltration, increased erosion & runoff	Likely	Soil burn severity, steep slopes, increased runoff & erosion, loss of above ground cover will compromise infiltration and surface water dissipation.	Moderate	High/moderate soil burn severity will have long-term effects that are reversible/will recover in time if OHV incursion is controlled.	High	Natural recovery, EDRR
BAER critical value	Natural Resources - Soil and Water		Mt. Waterman Ski Resort	hazmat	Unlikely	Hazmat is located on flat slope with little chance of mobilization	Moderate	If left, hazmat would impact water quality and soil productivity	Low	special uses to work with permittee to remove hazmat

BAER critical value	Natural Resources - Soil and Water		Old Ridge Crest Picnic Area Bathrooms off SR2	hazmat (asbestos, lead paint, large capacity cesspool)	Possible	On gentle grade with small contributing upslope area.	Major	Death or serious injury to humans from inhalation of airborne asbestos fibers and lead paint is possible.	High	
BAER critical value	Natural Resources - Soil and Water		Soil Productivity	Runoff, erosion, sedimentation	Likely	Steep slopes, lack of ground cover and high modeled erosion rate in 5-year storm.	Moderate	Erosion rates are unlikely to cause irreversible damage.	High	Natural recovery
BAER critical value	Natural Resources - Soil and Water	Cultural Resources	Soil Productivity/Veg recover	Unauthorized OHV, looting	Very Likely	Areas denuded of vegetation are now more easily accessible to OHV use	Major	Unrestrained OHV use will lead to destruction of recovering veg, influx of invasives, impacts to T&E wildlife & habitat, & damage to & looting of cultural sites assumed eligible for National Register of Historic Places.	Very High	OHV barriers and OHV monitoring, suspension of OHV permit
BAER critical value	Natural Resources - T&E habitat		Arroyo toad Occupied and Critical Habitat-Little Rock Creek	Debris flows/flooding resulting in habitat alteration.	Likely	Debris flows, erosion and increased runoff is predicted to occur.	Moderate	Viability of the Little Rock Creek arroyo toad population has been a concern for several years. Based on the predicted post-fire response, increased flows and debris could potentially impact individuals and their habitat. This impact is expected to be temporary.	High	NA
BAER critical value	Natural Resources - T&E habitat		Arroyo toad Occupied and Critical Habitat-Santiago Creek	Debris flows/flooding resulting in habitat alteration.	Possible	Debris flows, erosion and increased runoff is predicted to occur at low levels.	Moderate	Viability of the arroyo toad occurrence in Santiago Creek has been a concern for several years. Based on the predicted post-fire response, the potential for loss of individuals or adverse impacts to habitat is considered low.	Intermediate	NA
BAER critical value	Natural Resources - T&E habitat		Arroyo toad Occupied and Critical Habitat-Upper Big Tujunga	Debris flows/flooding resulting in habitat alteration.	Unlikely	Debris flows, erosion and increased runoff is predicted to be low and will not have a measurable impact on the species.	Moderate	Based on the predicted post-fire response, measurable impacts to arroyo toads and their habitat are not expected.	Low	NA
BAER critical value	Natural Resources - T&E habitat		Least Bell's Vireo-Little Rock Creek	Debris flows/flooding resulting in habitat alteration.	Unlikely	The least Bell's vireo territory is located below the Little Rock dam and reservoir and is not expected to be impacted by debris flows, erosion and increased runoff.	Moderate	Loss of pair would represent a high proportion of local population.	Low	NA
BAER critical value	Natural Resources - T&E habitat		Mountain yellow-legged frog Critical Habitat-Unnamed Tributary of Cooper Canyon (recovery action site)	Debris flows/flooding resulting in habitat alteration and loss of deep pools essential for reproduction, cover and foraging.	Very Likely	Debris flows, erosion and increased runoff is predicted to occur.	Major	The unnamed tributary of Cooper Canyon is a translocation release site. If aggradation occurs, this area may not be suitable as a release site until the stream is reset and the naturally occurring pools are restored. Potential for sedimentation of deep pools would disrupt 2 year tadpole metamorphosis period leading to loss of recruitment.	Very High	closure and signs
BAER critical value	Natural Resources		Mountain yellow-legged frog -Critical Habitat Upper Bear Creek (recovery site)	Debris flows/flooding resulting in habitat alteration and loss of	Very Likely	Debris flows, erosion and increased runoff is predicted to occur.	Major	The upper reach of Bear Creek is a translocation release site. If aggradation occurs, this area may	Very High	NA

	- T&E habitat			deep pools essential for reproduction, cover and foraging.				not be suitable as a release site until the stream is reset and the naturally occurring pools are restored. Potential for sedimentation of deep pools would disrupt 2 year tadpole metamorphosis period leading to loss of recruitment.		
BAER critical value	Natural Resources - T&E habitat		Mountain yellow-legged frog Critical Habitat-Bear Creek (Little Bear Cr.)	Debris flows/flooding resulting in habitat alteration and loss of deep pools essential for reproduction, cover and foraging.	Very Likely	Debris flows, erosion and increased runoff are predicted to occur.	Major	Little Bear Creek is identified as a potential translocation release site. If aggradation occurs, this area may not be suitable as a release site until the stream is reset and the naturally occurring pools are restored.	Very High	NA
BAER critical value	Natural Resources - T&E habitat		Mountain yellow-legged frog Occupied and Critical Habitat in Devils Canyon	Debris flows/flooding resulting in habitat alteration and loss of deep pools essential for reproduction, cover and foraging.	Likely	Debris flows, erosion and increased runoff is predicted to occur.	Major	Following Station Fire, the species was extirpated from this drainage due to post-fire sedimentation and stream aggradation. With the dramatic decline in mountain yellow-legged frogs across its range, any losses are considered significant.	Very High	NA
BAER critical value	Natural Resources - T&E habitat		Mountain yellow-legged frog Occupied and Critical Habitat-South Fork Big Rock Creek	Debris flows/flooding resulting in habitat alteration and loss of deep pools essential for reproduction, cover and foraging.	Very Likely	Debris flows, erosion and increased runoff are predicted to occur.	Major	With the dramatic decline in mountain yellow-legged frogs across its range, any losses are considered significant. Pools in the stream may fill with sediment and debris, eliminating essential habitat for adults and tadpoles.	Very High	NA
BAER critical value	Natural Resources - T&E habitat		Mountain yellow-legged frog Occupied and Critical Habitat-Upper Little Rock Creek	Debris flows/flooding resulting in habitat alteration and loss of deep pools essential for reproduction, cover and foraging.	Very Likely	Debris flows, erosion and increased runoff is predicted to occur.	Major	With the dramatic decline in mountain yellow-legged frogs across its range, any losses are considered significant. Pools in the stream may fill with sediment and debris, eliminating essential habitat for adults and tadpoles.	Very High	closure, gates, signs, patrol for closure violations
BAER critical value	Natural Resources - T&E habitat		Santa Ana sucker Occupied and Critical Habitat -North Fork San Gabriel River	Increased turbidity and debris flows resulting in decreased water quality and habitat suitability.	Unlikely	Flow and sediment increases are predicted to be low.	Moderate	With the exception of one small area, North Fork San Gabriel is outside the burn perimeter and is not expected to experience impacts to water quality that would be detrimental to the species.	Low	closure
BAER critical value	Natural Resources - T&E habitat		Santa Ana sucker Occupied and Critical Habitat -West Fork, Lower Bear Creek (tributary to West Fork)	Increased turbidity and debris flows resulting in decreased water quality and habitat suitability.	Very Likely	SBS above the West Fork and Bear Creek drainages is predominately moderate with a high potential for debris flow and flooding.	Major	The Santa Ana sucker population in San Gabriel Canyon has experienced a downward trend and additional losses could affect species recovery	Very High	closure
BAER critical value	Natural Resources - T&E habitat		Santa Ana sucker Occupied and Critical Habitat -West Fork, Lower Bear Creek (tributary to West Fork)	Increased turbidity and debris flows resulting in decreased water quality and habitat suitability.	Very Likely	SBS above the West Fork and Bear Creek drainages is predominately moderate with a high potential for debris flow and flooding.	Major	The Santa Ana sucker population in San Gabriel Canyon has experienced a downward trend and additional losses could affect species recovery	Very High	closure

BAER critical value	Natural Resources - Native Plants		Native and Naturalized Vegetation Communities (Burned Area)	Non-native invasive plants in the burn area.	Very Likely	Noxious weeds present adjacent/in close proximity to the burned area are likely to invade the burned area. Forest visitors may unintentionally spread existing and new species in the burned area.	Major	Ecosystem structure and function may be compromised by noxious weed invasion due to loss of native plant biodiversity & presence (type conversion) and altered fire regime characteristics (increased fire frequency & extent).	Very High	EDRR
BAER critical value	Natural Resources - Native Plants		Native and Naturalized Vegetation Communities (Suppression)	Non-native invasive plants in control lines, DPs, SZs, etc.	Very Likely	Noxious weeds present adjacent/in close proximity to the burned area are likely to invade the burned area. No weed wash or mitigation actions were taken during suppression actions. Fire suppression resources likely unintentionally spread existing (e.g., dozer line through known populations) and new species in suppression features.	Major	Ecosystem structure and function may be compromised by noxious weed invasion due to loss of native plant biodiversity & presence (type conversion) and altered fire regime characteristics (increased fire frequency & extent).	Very High	EDRR
BAER critical value	Property - Other		Water systems	none					-	NA
BAER critical value	Property - Other		Burkheart Trailhead Bathroom	Rockfall, sediment	Likely	Area behind the CTX is already receiving sediment	Moderate	Sedimentation from cutbank could affect CTX	High	sediment clean out
BAER critical value	Cultural Resources			None					-	
BAER critical value	Life and Safety		Glenwood Dad's Club	None					-	
BAER critical value	Life and Safety	Property - Other	Valyermo Fire Station	none					-	
BAER critical value	Life and Safety	Property - Other	Rincon Fire Station	none					-	
BAER critical value	Life and Safety	Property - Other	Singing Pines, Hidden Valley, Christian, Valcrest Org Camps	none					-	
BAER critical value	Life and Safety		Little Jimmy Campground	none						
BAER critical value	Life and Safety	Property - Other	Snowcrest Ski Area	none					-	
BAER critical value	Life and Safety	Property - Other	Southfork Campground	none					-	Trail signage at campground entrance
BAER critical value	Life and Safety	Property - Other	Buckhorn Campground	none					-	
BAER critical value	Life and Safety	Property - Other	West Fork Rec Residences	None					-	2 cabins were found, did not burn and at no post- fire risk

BAER critical value	Life and Safety		Williamson Rock Climbing Area	none as climbing area has been closed & will continue to be due to public safety and resource concerns					-	
BAER critical value	Natural Resources - Soil and Water		Camp Hi-Hill	None						
BAER critical value	Property - Other		Chantry Flats FS Residences/Station	none					-	
BAER critical value	Property - Other		Forest Water Systems	None					-	
BAER critical value	Property - Other		Fishing Platforms, Barrett Wetherbee Permittee (West Fork San Gabriel)	Debris, flooding	Very Likely		Moderate		Very High	none
BAER critical value	Life and Safety		Devore Trail Campground	unable to assess					-	ANF to address when safe
BAER critical value	Life and Safety		Hoegge Trail Campground	unable to assess					-	ANF to address when safe
BAER critical value	Life and Safety		Spruce Grove Campground	unable to assess					-	ANF to address when safe
BAER critical value	Life and Safety		Cascade Picnic Area	unable to assess					-	ANF to address when safe
BAER critical value	Life and Safety	Property - Other	West Fork Rec Residences	unable to assess					-	2 cabins out of 4 were not found
BAER critical value	Property - Other		Spring Camp Footbridge	flooding	Possible	Drainage under bridge is ephemeral and at top of watershed	Moderate	Replacement or repair of footbridge would be costly	Intermediate	none
BAER critical value	Property - Roads		1N29, 1N36, 2N13, 2N20, 2N46, 3N03, 3N04, 3N09, 3N11, 3N16, 3N62, 3N63, 3N65, 4N11A, 4N56, 4N59	Loss of water control, soil erosion, loss of road tread.	Unlikely	Only portions of the road are in the burn perimeter and terrain is not overly steep.	Minor	Erosion from road failure can create soil, water quality, vegetation damage.	Very Low	none