BLUE CUT FIRE FISH and WILDLIFE BAER REPORT

Resource Specialty	Fish and Wildlife
Fire Name	Blue Cut Fire
Month and Year	August 2016
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I. INTRODUCTION

Objectives

This Resource Assessment has two primary purposes:

- Assess the post-fire effects of the Blue Cut Fire on federally-listed wildlife species and their habitats.
- Develop treatments for species at risk to prevent permanent impairment of ecosystem structure and function or loss of population viability.

In some instances, direct effects of the fire on wildlife are documented, but they do not necessarily meet the purpose of BAER and so a detailed analysis is not provided. This report also includes an assessment of post-fire watershed response effects to several additional locally-important wildlife species as well as wildlife water sources (spring developments and guzzlers).

Resource Setting/ Fire Summary

The Blue Cut fire burned 36,240 acres, the majority of the fire within the lower and upper Cajon Wash watersheds on the San Bernardino National Forest (SBNF). The Blue Cut Fire started on August 16, 2016 at 10:36 AM in the Cajon Pass along Old Cajon Blvd. north of Kenwood Avenue west of Interstate 15. The fire quickly spotted across Cajon Creek and grew into a large wildland fire. During the course of the fire fight, railroad lines, local roads, highway 138 and Interstate 15 were closed along with a large evacuation area that included Lytle Creek, Wrightwood, Summit Valley, Baldy Mesa, Phelan and Oak Hills. The fire was declared contained on August 23rd at 6:00 am.

The fire burned in surrounding watersheds such as North Fork Lytle Creek along the southern perimeter and Manzanita Creek along the northern perimeter, and burned into the high desert regions to the north. The fire burned between 2400 feet elevation at Cajon Wash to 6955 feet elevation on Lytle Creek Ridge in the San Gabriel Mountains. The Cajon Wash and tributaries dominate the watershed setting of the fire, and the San Gabriel Mountain Range to the west have elevations reaching 10,000 feet at the head of North Fork Lytle Creek. The drainage headwaters are steep and confined, flowing into extended and anastomosed low gradient channels and washes (alluvial fans and plains) with wide valleys such as Cajon Canyon, Lone Pine Canyon and Lower Cajon Wash. Lytle Creek and Cajon Wash merge below the mountains and flow into the Santa Ana River near San Bernardino.

Most of the streams have seasonal flow, usually from large storm events or during wet winter rain seasons and typically turn dry during the summer. Cajon Wash and Lytle Creek have sections of perennial stream flow. Primary streams can flow for extended periods during wet winters further down reaches and reach the Santa Ana River to the Pacific Ocean, the northern streams beyond the Cajon watershed flow into the Mojave River system to sinks. Streams can flood during storms and flow at high rates during the winter. In 1938 and 1969 when significant storms occurred, Lytle Creek near the mouth of the canyon had peak flows estimated to be 26,000 and 35,900 cubic feet per second, respectively.

The majority of precipitation in the area occurs from October through April, with the bulk coming from December through March. Summers are warm and Occasional summer convective storms, or monsoon storms can produce sudden and heavy rainfall that can cause flooding.

Snowfall occurs in elevations above 5000 feet in winter and high elevation snowpack can develop. Annual precipitation is greatest within the upper Lytle Creek watershed along the south facing front of the San Gabriel range. The upper reaches of the Cajon watershed tend to have lower annual precipitation due to rain shadowing as storms release the bulk of precipitation on the San Gabriel Range before reaching the upper Cajon watershed.

The San Gabriel range rises abruptly from coastal valleys in an east to west orientation, where moisture from Pacific frontal systems is directed from the south to southwest. Storms tend to build along the range causing an orographic lift effect that can lead to significant amounts of precipitation if storm dynamics are in place. Average annual precipitation in Upper Lytle watershed is near 40 inches, 20 inches in the lower Cajon Wash, and 15 inches in the northern area of the fire near Baldy Mesa and Manzanita Creek. Powerful winter storms that tap into deep sub-tropical moisture can create high, intense rainfall rates on mountain slopes and are the storms that can cause significant flooding and debris flows in the major drainages. Although not common, these storms tend to be warmer with high snow levels, and warm heavy rain on existing snowpack can cause even larger floods that have historically caused damage to roads and infrastructure along the major streams and alluvial fans.

Potential Wildlife Values at Risk (Identified Prior to on-the-Ground Surveys)

Critical Values: Threatened and Endangered Species

There are five federally-listed endangered species are known from within and downstream of the fire area: southwestern willow flycatcher, least Bell's vireo, arroyo toad, San Bernardino kangaroo rat, and desert tortoise. Critical Habitat occurs for San Bernardino kangaroo rat and arroyo toad within and downstream of the fire area.

One other endangered species, California red-legged frog, has historic habitat within and downstream/downslope from the fire but are considered extirpated from this portion of the San Gabriel and San Bernardino Mountains. This species will not be further addressed in this document.

The areas within the Blue Cut fire that are known to support T/E species are displayed in **Table 1**.

Table 1. Areas of Concern for Threatened/Endangered Species within the Blue Cut Fire area

Location	Species					
	ARTO		SBKR		SWWF	LBVI
	Occupied	Critical Habitat	Occupied	Critical Habitat	Occupied Habitat	Occupied Habitat
Cajon Creek/Wash	X	X	X	X	X	X
Sheep Creek					X	
Lost Lake					X	X
Lytle Creek			X		X	
Little Horsethief Canyon	X					
Lone Pine Canyon					X*	
Crowder Canyon					X	

ARTO=Arroyo Toad; SBKR=San Bernardino Kangaroo Rat; SWWF=Southwestern Willow Flycatcher; LBVI=Least Bell's Vireo

** Has not had suitable riparian habitat since the early 1990s.*

Post-Fire Soil Survey Results

The BAER soils scientists field-verified the Burn Area Reflectance Classification (BARC) map, which is used to estimate soil burn severity (SBS). Description of methods (both development of the BARC and field verification methods) to determine SBS are described in detail in the Blue Cut Fire Soils Report. Soil burn severity ratings includes careful consideration of factors such as, amount and condition of residual ground cover, viability of native seed banks, condition of residual fine roots, degree of fire-induced water-repellency, soil physical factors (texture, structural stability, porosity, restricted drainage), soil chemical factors (oxidation, altered nutrient status), and topography (slope gradient, length, and profile), and the length of time heat from the fire has been in contact with the soil (residence time). Hydrologic function, runoff, and erosion potential are influenced by pre-fire, fire, and post-fire environments. Final ratings for SBS of the Blue Cut Fire are listed in **Table 2**. The map packet included at the end of this report displays the soil burn severity within key areas in the Blue Cut Fire.

Table 2. Blue Cut BAER Soil Burn Severity (2/Sept/2016)

Soil Burn Severity	Acres	% Fire Area
Unburned/Very Low	6,205	17%
Low	12,505	35%
Moderate	15,678	43%
High	1,852	5%
Total	**36,240**	

Predicted Post-Fire Watershed Response

Blue Cut BAER team hydrologists and soil scientists evaluated and modeled the predicted post-fire watershed response. The Blue Cut BAER Hydrology Report summarized the predictions as shown in **Table 3, Table 4, Figure 1, Figure 2, Figure 3,** and **Figure 4.** The yellow highlighted rows correspond to sites with rare species that are discussed in this analysis.

The analysis for pre- and post- fire hydrologic response and probability of flows is based on the probability of a 2-year storm occurring in the fire area. The 2-year design storm has a 50% chance of occurring in any given year, and a 97% chance of occurring in the next five years. Conversely, there is a 3% chance that the 2 year storm event will not occur in the next 5 years (during the recovery period). A damaging storm expected to occur within the fire burned area is a short duration, high intensity storm, such as the 2 year recurrence interval, 30 minute duration storm with approximately 0.54 inches of precipitation.

It is important to note that any “Value At Risk” found to be at risk during the 2 year event will still be at risk during greater events. Several locations within the analyzed area have an inherent risk of flooding and debris flows in greater recurrence interval storms. Information for recurrence interval storms for both ~5 year and ~10 year peak flows and erosion rates are also included in the analysis.

Table 3. Comparison of Pre and Post-Fire Discharge at Selected Sites (pour points) intended to provide general trends of flooding risk. Percent increase in discharge represents the percent above normal. All pour points exhibit increases in flows compared to pre-fire discharge. Source: Blue Cut BAER Hydrology Report

Pour Point	Pre-Fire Discharge			Post-Fire Discharge			Post-Fire Discharge Compared to Pre-Fire Discharge			% Increase in Discharge*
	~Q2	Q5-6	Q10-12	~Q2	Q5-6	Q10-12	~Q2	Q5-6	~Q10-12	Q2
Cajon Junction (near McDonalds)	6	9	13	10	16	22	~Q10	~Q25	~Q80	67%
Cajon Wash 1 (Below fire area)	3,130	5,376	7,819	4,354	7,096	10,045	~Q4	~Q11	~Q26	39%
Cajon Wash 2 (above community)	9	16	22	18	27	37	~Q8	~Q25	~Q80	100%
Hwy 138 Xing 1 (above wildlife habitat)–Crowder Canyon	46	77	110	68	109	149	~Q4	~Q12	~Q28	48%
Hwy 2 (basin near HWY)	7	13	19	11	18	24	~Q4	~Q9	~Q20	57%
Lone Pine Canyon (hillside wash)	3	6	10	8	14	21	~Q10	~Q25	~Q75	167%
Lone Pine Canyon at LADWP Rd Xing	407	772	1270	625	1092	1729	~Q4	~Q10	~Q25	54%
Lost Lake	2	4	7	3	6	9	~Q3	~Q8	~Q25	50%
Lytle Creek above community	875	1754	2823	900	1795	2880	~Q2	~Q5	~Q10	3%
Lytle Resort 1 (swale)	1	2	3	2	3	4	~Q5	~Q12	~Q40	100%
Lytle Resort 2 (swale)	0	1	1	1	1	2	~Q5	~Q12	~Q40	150%
Manzanita Wash	10	57	143	12	68	171	~Q3	~Q6	~Q12	20%
Middle Fork Lytle Cr Bridge	981	1966	3163	1033	2050	3282	~Q3	~Q6	~Q13	5%
PCT at RR Culvert Xing	70	119	169	117	184	251	~Q5	~Q20	~Q40	67%
Pioneer & Hwy 138 Xing	126	214	304	201	317	435	~Q4	~Q13	~Q30	60%
Railroad1	19	36	59	43	72	111	~Q8	~Q20	~Q50	126%
Railroad2	13	25	41	34	55	84	~Q10	~Q24	~Q80	162%
Railroad3	6	11	18	15	24	37	~Q10	~Q25	~Q80	150%
Railroad4	38	68	98	109	167	218	~Q13	~Q90	>Q100	187%
Railroad5	8	14	21	23	35	46	~Q15	~Q100	>Q100	188%
Railroad6	3	6	8	9	14	18	~Q25	~Q100	>Q100	200%
Railroad7	15	25	35	25	39	53	~Q5	~Q20	~Q50	67%
Sheep Creek and Lytle Cr Rd Xing	23	46	73	39	71	110	~Q4	~Q12	~Q30	70%
Sheep Creek Wildlife Habitat	9	17	29	16	27	43	~Q5	~Q12	~Q26	78%
West Cajon Valley wash	37	63	89	60	94	129	~Q5	~Q15	~Q40	62%

**All percentages are increases above normal.*

Table 4. Comparison of Pre and Post-Fire Erosion at Selected Sites (pour points) intended to provide general trends of post-fire erosion potential. Source: Blue Cut BAER Hydrology Report

Pour Point	Erosion in Cubic Yards Per Year (RCS model)			Erosion Hazard Rating
	Pre-Fire	Post-Fire	% Increase	
Cajon Junction (near McDonalds)	185	3,859	1986%	Very High
Cajon Wash 1 (Below fire area)	108,749	1,050,385	866%	--
Cajon Wash 2 (above community)	307	6,585	2045%	Very High
Hwy 138 Xing 1 (above wildlife habitat) – Crowder Canyon	2,323	36,212	1459%	High
Hwy 2 (basin near HWY)	138	1,364	888%	Very High
Lone Pine Canyon (hillside wash)	144	4,301	2887%	Very High
Lone Pine Canyon at LADWP Rd Xing	18,488	196,457	963%	Very High*
Lost Lake	129	2,080	1512%	Low
Lytle Creek above community	49,396	76,632	55%	Very High*
Lytle Resort 1 (swale)	53	745	1306%	Very High
Lytle Resort 2 (swale)	14	194	1286%	Very High
Manzanita Wash	--	--	--	Moderate
Middle Fork Lytle Cr Bridge	55,359	111,609	102%	Very High*
PCT at RR Culvert Xing	2,342	37,634	1507%	Very High
Pioneer & Hwy 138 Xing	4,206	60,758	1345%	High
Railroad1	850	20,720	2338%	Very High
Railroad2	584	17,437	2886%	Very High
Railroad3	258	7,686	2879%	Very High
Railroad4	1,333	29,072	2081%	Very High
Railroad5	281	6,119	2078%	Very High
Railroad6	72	1,569	2079%	Very High
Railroad7	486	8,181	1583%	High
Sheep Creek and Lytle Cr Rd Xing	1,282	18,590	1350%	Very High
Sheep Creek Wildlife Habitat	408	5,998	1370%	Very High
West Cajon Valley Wash	1,237	18,225	1373%	Very High

** Estimated for within the burned area only.*

Figure 1. Smaller sized basins

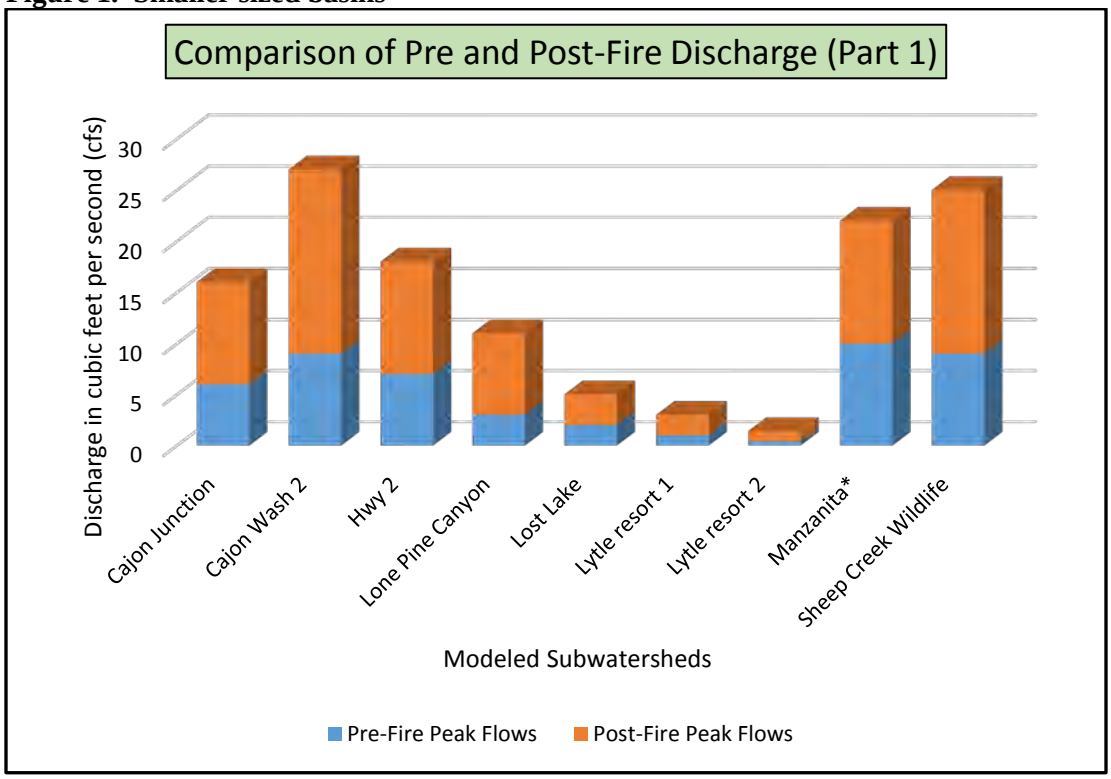


Figure 2. Moderately sized basins

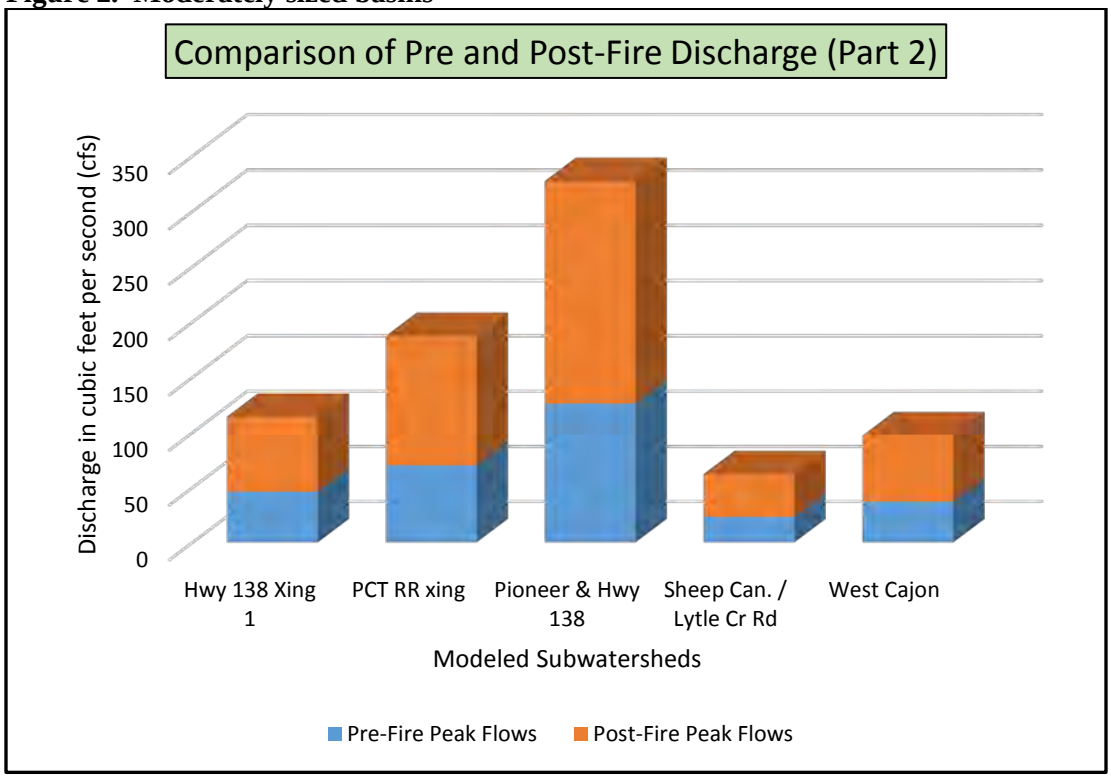


Figure 3. Area of Special Interest

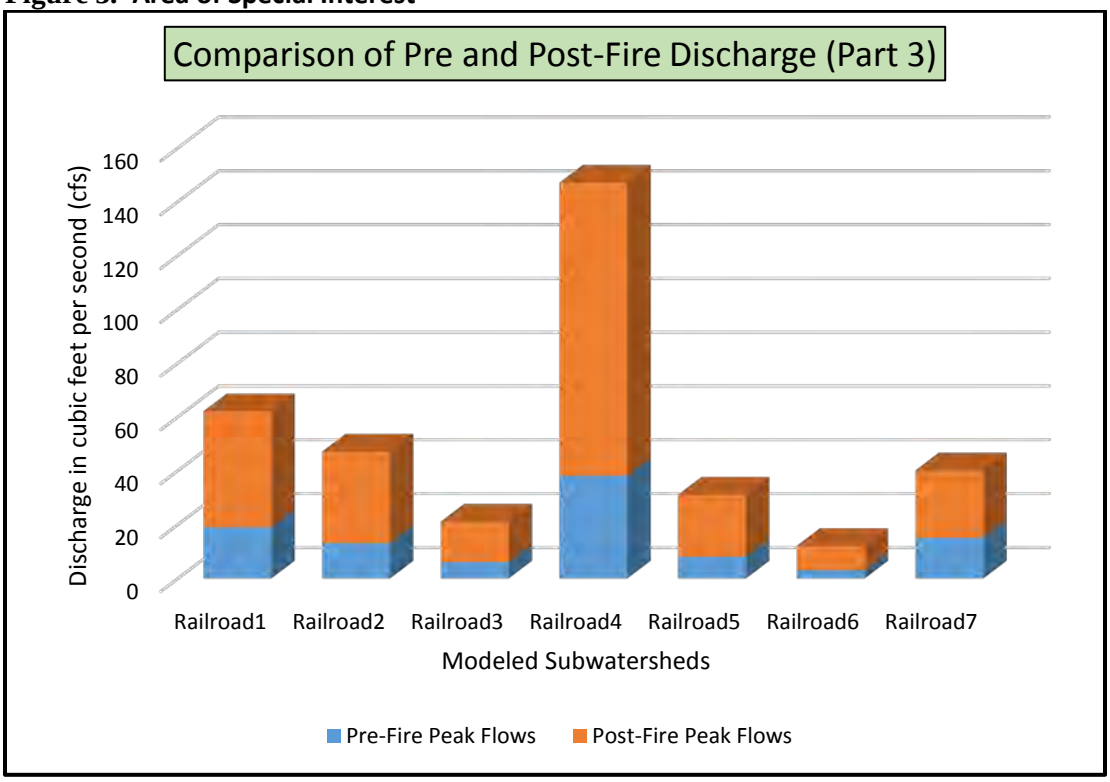
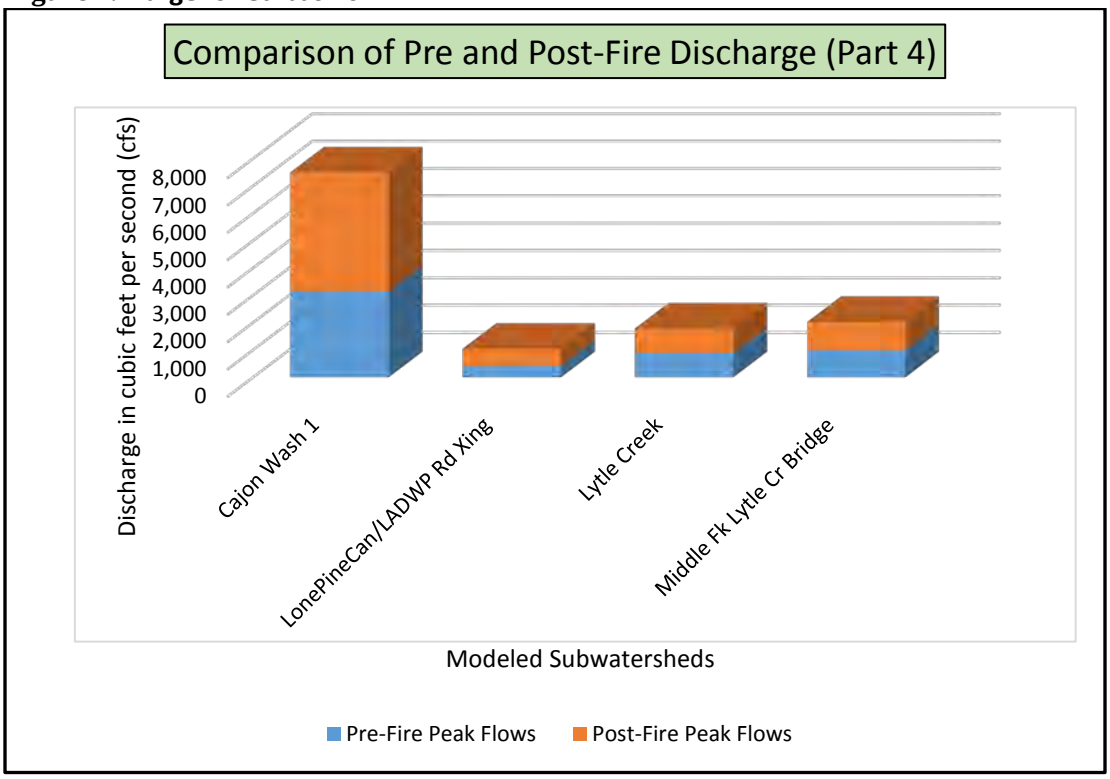


Figure 4. Larger sized basins



Threats to Water Quality and Beneficial Uses of Water

The Blue Cut BAER Hydrology Report summarized the threats as follows. Peak flow increases from the fire will also be bulked by ash, debris and other floatable and transportable material within stream channel areas of the fire. Temporary episodes of water quality degradation and fine siltation is likely during the first year after the fire to Cajon Canyon Creek and major tributaries. Less severe and localized water quality impacts to North Fork Lytle Creek below burned tributaries upstream and adjacent to the Lytle Creek residential area and downstream could occur. Beyond the first year, post-fire water quality impacts will be lessened as the burned watersheds recover. Beneficial uses, including wildlife/TE species habitat in Cajon Creek Canyon and Lytle Creek could experience temporary impacts post-fire.

Erosion Threats

All the modeled subwatersheds will experience increases in erosion with the greatest increases occurring in subwatersheds with the most burned acres and the steepest slopes. Subwatersheds with a large percentage of unburned acres or flatter terrain exhibit less increases; however, areas within these subwatersheds that are in close proximity to the burn may still have increased sediment beyond that which resulted in modeling. The Blue Cut BAER Hydrology Report summarizes the predicted changes in the Erosion Hazard Ratings (EHRs) for different areas in the fire, including in T/E habitat.

Debris Flows

The Blue Cut Fire occurred in a landscape characterized by debris flow and landslide processes, as indicated by alluvial fan deposits below steep slopes with visible relic and active headscarps. Debris flows can occur in any rock type, but are most common in metamorphic and sedimentary rocks. Debris flows can be initiated on slopes of 20° (36%) and greater and deliver quantities ranging between 100 – 1,000,000 cubic yards of rock, sediment and large woody material, depending on rainfall amounts, slope, and amount of unconsolidated soil, rock and sediment material available. Debris flows most commonly occur in burned areas within the 2-year span of time after the fire, in areas of moderate and high soil burn severity. The Blue Cut BAER Hydrology Report describes debris flow likelihood for different areas in the fire.

II. THREATENED/ENDANGERED SPECIES EVALUATIONS

1. Arroyo Toad (*Anaxyrus californicus*)

A. Resource Condition Assessment – Arroyo Toad

a) Resource Setting – Arroyo Toad

The arroyo toad was federally-listed as Endangered in 1994 (59 Federal Register 64859). Final Critical Habitat was designated on February 9, 2011 (76 FR 7245 7467). The arroyo toad recovery plan was issued in 1999. It is listed as a Species of Special Concern by the State of California.

The arroyo toad is endemic to the coastal plains, mountains, and desert slopes of central and southern California and northwestern Baja California from near sea level to about 8,000 feet. Within these areas, arroyo toads are found in both perennial and intermittent rivers and streams with shallow, sandy to gravelly pools adjacent to sand or fine gravel terraces. Arroyo toads have

evolved in a system that is inherently dynamic, with marked seasonal and annual fluctuations in rainfall and flooding. Breeding habitat requirements are highly specialized. Specifically, arroyo toads require shallow slow-moving stream and riparian habitats that are naturally disturbed on a regular basis, primarily by flooding.

The breeding period occurs from late January or February to early July, although it can be extended in some years depending on weather conditions. Breeding in mountainous habitats may commence later (May–June) and last longer (to August) than in the coastal portion of the range. When water temperatures reach 57° F, adult males advertise with a soft, high whistled trill. Receptive females seek out calling males based on the size of the male and the sound of his call.

Although males may breed with several females in a season, females release their entire clutch of eggs in a single breeding effort and probably do not produce a second clutch during the season. Eggs are deposited and larvae develop in shallow pools with minimal current, little or no emergent vegetation, and sand or pea gravel substrate. Embryos usually hatch in 4–6 days; the larval period lasts approximately 65–85 days.

After metamorphosis from June to August, the juveniles remain on the bordering gravel bars until the pool no longer persists. Sexual maturity is reached in 1-2 years. Little is known about movements or other behavior in the non-breeding season.

Juvenile arroyo toads spend more time exposed on terraces during the daytime than do adults, and are thus vulnerable to diurnal predators. Once juveniles are of sufficient size to dig burrows and bury themselves in sand, they become nocturnal. All age classes of post-metamorphic individuals tend to be active on rainy nights with moderate temperatures (above 45° F). Adults excavate shallow burrows for shelter during the day when the surface is damp or for longer intervals in the dry season.

Larvae feed by inserting their heads into the substrate and ingesting loose organic material such as detritus, interstitial algae, bacteria, and diatoms. Juveniles and adults forage for insects, especially ants and small beetles, on sandy stream terraces or around the drip line of oak trees.

The species has been extirpated from approximately 75 percent of its former range in the United States. Although the arroyo toad occurs mostly along coastal drainages, it has also been recorded at several locations on the desert slopes of the Transverse Ranges. On the SBNF, arroyo toad populations exist on tributaries of the Mojave River including lower Deep Creek, Kinley Creek, West Fork of the Mojave River, Cajon Wash, and Little Horsethief Creek.

On NFS lands, arroyo toad populations are localized and face a variety of threats including loss/degradation of riparian habitats, predatory non-native species, invasive non-native plants, non-native species outcompeting natural prey species, OHV impacts, dispersed and developed recreation impacts, water extractions and diversions, mining, and livestock grazing.

Arroyo toads and Critical Habitat are known to occur in and downstream/downslope of the fire, as listed below and displayed in the map packet.

- Cajon Wash (in and downstream of fire) – occupied and Critical Habitat
- Little Horsethief Canyon (downstream of fire) – occupied and Critical Habitat

b) Fire Effects – Arroyo Toad (ARTO)

No focused surveys for arroyo toad were conducted as part of the BAER assessment. Fire activity was highest during the daytime. During this time of year, toads would be burrowed in the sandy terraces during the daytime. Although fire was less active at night when toads are active above ground, it is possible that toads were killed by the fire. Young metamorphs not able to dig down very deep would have been at the greatest risk of direct loss. Toads burrowed under leaf litter would also have been at risk during the fire since their cover would have been flammable.

Table 4 and the map packet display the amount of breeding and Critical Habitat in the fire by burn severity. The majority of the arroyo toad habitat burned was mapped as unburned or low severity. Direct effects from the fire were probably very minimal or none.

Table 4. Arroyo Toad Habitat (in acres) by Soil Burn Severity

Habitat Type	Land Ownership	Unburned/ Very Low	Low	Moderate	High	Grand Total
Occupied Breeding Habitat	**NFS**	58	61	33	10	162
	Non-NFS	75	74	48	5	203
Upland Habitat	**NFS**	94	194	142	3	433
	Non-NFS	104	139	113	2	359
Critical Habitat	**NFS**	115	157	113	16	401
	Non-NFS	190	184	121	8	503

c) Post-Fire Watershed Response Effects – Arroyo Toad

The BAER hydrologists modeled 2-year storm events for this analysis, using parameters that simulate summer thunderstorms. **Table 3** and **Table 4** display the expected increases in peak flows and sediment contribution within arroyo toad habitat. Site-specific discussions follow.

Cajon Creek/Wash: Cajon Wash is occupied and Critical Habitat for arroyo toads. Toad breeding areas in Cajon Wash seem to vary with habitat disturbance and annual fluctuations in precipitation and stream morphology. Most of the Cajon Wash habitat area did not burn or experienced a patchy low severity burn.

The Blue Cut BAER Hydrology Report modeled flows for a number of different sites in the Cajon Creek/Wash habitat (**Table 3** and **Table 4 –** Cajon Junction, Cajon Wash 1, and the Railroad Sites). The models indicate that there would be between 48 – 200% increase (depending on specific location) in flow in the arroyo toad occupied and Critical Habitat in Cajon Wash during a 2-year storm event.

Overall, Cajon Wash riparian areas will experience increased flows (a two-year storm will act like a 4-year storm; a 5-year storm will act like an 11-year storm) and localized effects from increased sediment and debris delivery. Under a two-year storm, the post-fire watershed

response is not expected to scour the riparian vegetation. Deposition of sediment will be localized where side drainages come in to Cajon Wash/Creek. Erosion Hazard Ratings (EHRs) for sites in/leading to Cajon Wash are Very High.

Little Horsethief Canyon: The lower part of Little Horsethief Canyon has had the densest population of arroyo toad on the SBNF in the past; however recent surveys are lacking. The upper portion of the mapped habitat (the part within the Blue Cut Fire) is not suitable for breeding but is considered suitable as upland habitat. The fire just barely reached the mapped upland habitat in Little Horsethief. Burn severity was low in that area. Expected post-fire watershed response is expected to be minimal in the arroyo toad habitat.

Post-Fire Watershed Response Effects in Arroyo Toad Habitat: The greatest impacts to aquatic ecosystems within the fire area and immediately downstream will be higher water flows and higher levels of sediment delivery to stream channels resulting in greater scouring and deposition. There is also a much higher likelihood of debris flows that could result in rocks, boulders, soil, and vegetation flowing into and through the habitat in a fast-moving slurry.

Water quality is often affected for a short duration during the first post-fire heavy storm events occur as introduced ash and fine sediment are carried into aquatic systems. This can increase turbidity, change the pH and temperatures, and affect stream substrates. In some cases, water quality can be affected enough to affect toad health, especially when water quality if affected during the breeding season.

The level of effects to arroyo toads would depend on the size of the storm event. Adult arroyo toads would not be expected to be negatively affected by small or moderate levels of increased flows and sediments. In less severe storms, individual toads would likely survive and not be displaced; habitat may be enhanced due to sediment deposition and vegetation removal. A larger storm event would have higher levels of effects. A large storm that results in debris flows carrying boulders, rocks, and large woody debris would be expected to have more severe effects to individual toads. If storm events result in high sediment loading or debris flows, egg masses, tadpoles, and toads could be washed downstream, crushed by rocks and boulders moving through the system, or buried under debris/sediment.

The severity of effects would also vary with timing. Flooding or debris flows occurring when toads are closely associated to the water during the breeding season would be more likely to result in eggs, tadpoles, and young toads being flushed downstream, suffocated by debris, or killed in churning flows. Events during other times of year when toads are farther upland would generally have fewer effects unless debris flows and sediment occurred over burrowing sites smothering/burying individuals.

Since arroyo toads favor wide alluvial terraces, the results of debris flows, sediment delivery, and scouring of some vegetation may result in improved habitat over time. Or it may simply re-organize the habitat on the landscape as a result of channels and terraces moving.

The greatest post-fire risk to arroyo toads is lack of cover and forage where vegetation burned. Lack of cover increases predation and collection by people. Additionally, lack of vegetation

increases the off-road cross-county vehicle traffic that puts arroyo toads at more risk and results in continued/additional habitat degradation. Non-native plants may also become established (without treatment) within burned areas, further degrading the habitat. Off-highway vehicle (OHV) use also promotes spread of non-native plants that degrade habitat quality.

B. Emergency Determination – Arroyo Toad

The risk assessment matrix in **Table 5** (from Chapter 2520 - Watershed Protection and Management) was used to determine the probability of damage/loss for arroyo toad.

Table 5. Risk Assessment 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

Probability of Damage or Loss

The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within one to three years (depending on the resource):

Very likely=nearly certain occurrence (>90%)
Likely=likely occurrence (>50% to < 90%)
Possible=possible occurrence (>10% to <50%)
Unlikely=unlikely occurrence (<10%)

Magnitude of Consequences

Major=Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.
Moderate=Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects.
Minor=Property damage is limited in economic value and/or to few investments; damage to natural or cultural resources resulting in minimal, recoverable or localized effects.

Based on the likelihood of habitat damage due to increased OHV access/disturbance, increased non-native invasive plants, and debris flows during breeding season, the risk determinations for arroyo toad are:

- Cajon Wash (within the fire) – VERY HIGH (Very likely probability with Major consequences)
- Little Horsethief Canyon: VERY LOW (Unlikely probability with Minor consequences)

The BAER assessment team has determined that an emergency condition exists for the critical natural value of the federally endangered arroyo toad.

C. Treatments to Mitigate the Emergency – Arroyo Toad

One of the threats to arroyo toad following the fire is debris flows during the breeding season that could kill individual toads or egg masses. However, no treatments are feasible to stabilize slopes and effectively reduce that risk. Other post-fire threats are the potential for increased

OHV use and non-native invasive plants within occupied, suitable, and Critical Habitat for arroyo toads.

The BAER assessment team has proposed Forest Closure Treatments that includes installation of barriers, gates, fencing, and vegetation barriers to limit the amount of illegal cross-country vehicle use that is expected due to the loss of vegetation. The Forest Closure Treatments will help reduce the risk of death/injury to arroyo toads from vehicles driving off road. It will also help speed the rate of habitat recovery by reducing the risk of spreading and establishing non-native invasive plants.

In addition, the BAER assessment team has proposed a Weed Detection and Rapid Response treatment will reduce the risk of arroyo toad habitat degradation from non-native invasive plants.

2. San Bernardino Kangaroo Rat (*Dipodomys merriami parvus*)

A. Resource Condition Assessment – San Bernardino Kangaroo Rat

The San Bernardino kangaroo rat was listed as Endangered by USFWS in January 1998 (FR 63 (185): 51005 - 51017). Critical habitat designated April 23, 2002 (67 Federal Register 19812). No recovery plan has been written for this species.

San Bernardino kangaroo rat is one of 19 subspecies of Merriam's kangaroo rat (*Dipodomys merriami*). San Bernardino kangaroo rat is distinguished from the other southern California subspecies by its darker body fur, smaller size and occurrence of four toes on its hind feet. This subspecies is one of the most highly differentiated of Merriam's kangaroo rats, possibly because of its complete geographic isolation from the other subspecies.

San Bernardino kangaroo rats are found primarily on sandy loam substrates, characteristic of alluvial fans and floodplains, where they are able to dig shallow burrows. They are always associated with alluvial fans. San Bernardino kangaroo rats can be found in all phases of alluvial fan sage scrub, as well as coastal sage scrub and even chaparral habitats within the species historical range. Soil texture plays an important role in habitat preference. Like other kangaroo rats, the San Bernardino kangaroo rat avoids rocky soils. The SBKR reaches its highest densities in early and intermediate seral stages. Early successional habitat provides the relatively open vegetation structure preferred by this subspecies.

The breeding season of Merriam's kangaroo rat lasts from mid-winter until spring depending on environmental conditions. In years with heavy winter rains and abundant herbaceous annuals, breeding activities may increase. Gestation is 33 days, and litter size averages 2.4 young. Weaning occurs 24–33 days after birth. In favorable years, females are capable of breeding shortly after weaning. They may breed twice in one year if conditions allow. Herbaceous material or free water is believed to be necessary for successful reproduction. Adult survivorship in San Bernardino kangaroo rat is high, and there is no difference in survivorship between the sexes. Individuals live approximately 5 years in the wild and 7 years in captivity.

Like other kangaroo rats, San Bernardino kangaroo rat is primarily nocturnal. It exhibits crepuscular activity, emerging from burrows at dusk to forage and returning to the day burrow

before dawn. Individuals reduce surface activity in areas with less vegetation cover and on nights with high levels of moonlight.

San Bernardino kangaroo rat diet primarily consists of seeds, herbaceous material and insects, when available. *D. merriami* collects seeds in cheek pouches and stores them in scattered surface caches in the vicinity of home burrows. Green vegetation and insects are also important seasonal food sources. Insects, when available, have been documented to constitute as much as 50 percent of a kangaroo rat's diet. San Bernardino kangaroo rats are known for their ability to live indefinitely without water on a diet consisting entirely of dry seeds.

In the winters of 2004 and 2005, there was substantial flooding in Lytle Creek, Cajon Wash, and Bautista Canyon. San Bernardino kangaroo rats are adapted to periodic flooding, but the habitat has been severely altered by flood control measures primarily downstream of the SBNF. In addition, a large amount of emergency flood control work is conducted during and immediately after storm events. It is not clear what effect these emergency measures have had on the populations on and off NFS lands.

a) Resource Setting – San Bernardino Kangaroo Rat

San Bernardino kangaroo rats and Critical Habitat are known to occur in and downstream/downslope of the fire, as listed below and displayed in the map packet.

- Cajon Wash (in and downstream of fire) – occupied and Critical Habitat
- Lytle Creek (downstream of fire) - occupied and Critical Habitat

b) Fire Effects – San Bernardino kangaroo rat

No focused surveys for San Bernardino kangaroo rat were conducted as part of the BAER assessment. Fire activity was highest during the daytime when they would have been in their burrows. Although fire was less active at night when kangaroo rats are active above ground, it is possible that some kangaroo rats were killed by the fire. Since fire severity in the suitable/occupied habitat was mostly unburned/very low/low, the loss of individuals was probably very low.

Table 6 and the map packet display the amount of occupied and Critical Habitat by burn severity. The vast majority of the San Bernardino kangaroo rat habitat burned was mapped as unburned or low severity. Direct effects from the fire were probably very minimal.

Table 6. San Bernardino Kangaroo Rat Habitat (in acres) By Soil Burn Severity

Habitat Type	Land Ownership	Unburned/ Very Low	Low	Moderate	High	Grand Total
Occupied Habitat	**NFS**	18	28	7	0	53
	Non-NFS	64	39	5	0	108
Critical Habitat	**NFS**	18	28	7	0	53
	Non-NFS	64	39	5	0	108

c) Post-Fire Watershed Response Effects – San Bernardino Kangaroo Rat

The BAER hydrologists and soil scientists modeled 5-year storm events for this analysis, using parameters that simulate summer thunderstorms. **Table 3** and **Table 4** display the expected

increases in peak flows and sediment contribution within San Bernardino kangaroo rat habitat. Site-specific discussions follow.

Cajon Wash: Cajon Wash is occupied and Critical Habitat for San Bernardino kangaroo rat. The population in Cajon Wash is known to extend south of the National Forest boundary. The occupied habitat is described as a pioneer alluvial fan sage scrub community with a sandy substrate. Much of the Cajon Wash habitat area did not burn; the rest was a patchy low burn. The post-fire watershed response discussion above for arroyo toad habitat in Cajon Wash applies to San Bernardino kangaroo rat habitat in Cajon Wash.

Lytle Creek: Lytle Creek is considered occupied and is mapped Critical Habitat for San Bernardino kangaroo rat. Lytle Creek is an alluvial stream course. The stream channel is constantly changing due to flooding events. The creek bed is comprised of primarily sand, gravel, and boulders. Suitable San Bernardino kangaroo rat habitat in the reach of Lytle Creek has been highly modified by flood control activities. Nevertheless, small areas of undisturbed San Bernardino kangaroo rat habitat are scattered along the margins of the creek throughout the reach. The suitable habitat in Lytle Creek is about 2.5 miles downstream from the fire and was not directly affected by fire.

The BAER hydrology and soil models for Lytle Creek (**Table 3** and **Table 4**) indicate that there would be a 5% increase in flow at the Middle Fork Bridge above the San Bernardino kangaroo rat occupied and Critical Habitat in Lytle Creek during a 2-year storm event. The EHR for that area within the fire perimeter is Very High.

Overall, Lytle Creek is expected to experience localized effects where side drainages come in to Lytle Creek. During the first storms, water quality will affected as ash and sediment delivery will be higher than normal and could be substantial in areas. Due to the large portion of the watershed that is outside the fire area, those sediment deliveries will be carried downstream during flood events. Effects will be mitigated by the large amount of the watershed that is outside the fire area.

Post-Fire Watershed Response Effects in San Bernardino Kangaroo Rat: The post-fire watershed response effects for San Bernardino kangaroo rat would be similar to those described above for arroyo toads in Cajon Wash. This species is adapted to and has evolved with periodic flood events and debris flows. For kangaroo rats, increase sediment delivery will enhance habitat. It is unlikely that severe scouring of riparian habitat will occur in Lytle Creek and Cajon Wash under a typical 2-5 year storm event post-fire. Larger storms, obviously, could result in more effects to habitat. Flooding, depending on how fast and how severe, could result in losses of kangaroo rats if they are unable to escape rising waters.

B. Emergency Determination – San Bernardino Kangaroo Rat

The risk assessment matrix in **Table 5** was used to determine the probability of damage/loss for San Bernardino kangaroo rat. Based on the likelihood of habitat damage due to increased OHV access/disturbance, increased non-native invasive plants, and debris flows, the risk determinations for San Bernardino kangaroo rat are:

- Cajon Wash (within and below the fire): VERY HIGH (Very Likely probability and Major magnitude of consequences)
- Lytle Creek (below the fire): LOW (Unlikely probability and Moderate magnitude of consequences)

The BAER assessment team has determined that an emergency condition exists for the critical natural value of the federally endangered San Bernardino kangaroo rat.

C. Treatments to Mitigate the Emergency – San Bernardino Kangaroo Rat

One of the threats to San Bernardino kangaroo rat following the fire is debris flows during the breeding season that could kill individuals. However, no treatments are feasible to stabilize slopes and effectively reduce that risk. Other post-fire threats are the potential for increased OHV use and non-native invasive plants within occupied, suitable, and Critical Habitat for San Bernardino kangaroo rat.

The BAER assessment team has proposed Forest Closure Treatments that includes installation of barriers, gates, fencing, and vegetation barriers to limit the amount of illegal cross-country vehicle use that is expected due to the loss of vegetation. The Forest Closure Treatments will help reduce the risk of death/injury to San Bernardino kangaroo rats from vehicles driving off road. It will also help speed the rate of habitat recovery by reducing the risk of spreading and establishing non-native invasive plants.

In addition, the BAER assessment team has proposed a Weed Detection and Rapid Response treatment will reduce the risk of San Bernardino kangaroo rat habitat degradation from non-native invasive plants.

3. Southwestern Willow *Flycatcher (Empidonax traillii extimus)*

A. Resource Condition Assessment – Southwestern Willow Flycatcher

a) Resource Setting – Southwestern Willow Flycatcher

The southwestern willow flycatcher is federally- and state-listed as endangered and has a federal Recovery Plan. Critical Habitat was designated in 2005 and revised in 2013. Currently in California, southwestern willow flycatchers exist only in small disjunct groups and have been extirpated from the lower Colorado River.

Riparian communities provide both nesting and foraging habitat for the southwestern willow flycatcher. They feed primarily on insects and occasionally on seeds and berries. An important habitat component is the dense growth of the lower branches within willow thickets or a dense shrub understory. The nest site plant community is typically even-aged, structurally homogeneous, dense, and near surface water or saturated soil. Other characteristics such as dominant plant species, size and shape of habitat patch, canopy structure, and vegetation height vary widely among sites.

Most returning flycatchers show site fidelity to breeding territories; however, a significant number move within and among sites. Therefore, if a site is surveyed in one year and determined to be unoccupied, that does not mean it will not be occupied in successive years.

About 25 nesting territories have been identified in the San Bernardino Mountains. Due to varying survey efforts, it is not known what percentage nest consistently. This paragraph from the San Bernardino County Museum summarizes the current understanding of southwestern willow flycatcher population status in the San Bernardino Mountains:

> There is an emerging pattern at the larger scale of overall southwestern willow flycatcher occurrences in the San Bernardino Mountains. Since southwestern willow flycatcher surveys by SBCM began in 1999, the percentage of surveyed sites that had territories gradually increased from 39% in 1999, to 68% in 2000, and to an overall high of 76% in 2001. The following three years saw a steady reduction in the percentage of surveyed sites with territories until in 2004 there were no surveyed sites with territories. The most recent three years have yielded a small but steady increase in the percentage of surveyed sites with territories from 3% in 2005, to 6% in 2006, and 36% in 2007. The reason(s) for these apparent trends are not clear, but there does appear to be a cyclic nature to the occurrence of southwestern willow flycatcher in the San Bernardino Mountains. Ultimate factors driving the cyclic occupancy pattern are unknown at this time, but surveys in subsequent years may help to resolve this question.

The primary cause for the decline of the southwestern willow flycatcher is widespread fragmentation and extensive loss of both structural components and habitat resulting from hydrological changes in low elevation cottonwood-willow riparian habitat across the species' range. Other factors contributing to habitat losses include urban development, road development and maintenance, livestock grazing, high intensity and frequent wildfire, and human recreational activities.

Additional threats include brood parasitism by brown-headed cowbirds, replacement of native riparian vegetation by invasive nonnative species, pesticide contamination, predation, water management, and probable loss of winter habitat due to tropical deforestation. Throughout southern California, another ongoing effect to this species is from encroachment into the riparian zones by recreationists using the area for off-road vehicle use, enjoying nature, cooling off in the water, mountain biking, dog walking, etc. This type of encroachment can be expected to disturb nesting birds, possibly causing displacement, nest abandonment, lowered breeding success, degraded habitat, and individual mortality.

The known nesting territories for southwestern willow flycatcher within/near the Blue Cut fire are:

1. Keenbrook (downstream and downslope of the fire) – in Cajon Wash
2. Cajon Creek 1 (within the fire)
3. Cajon Creek 2 (within the fire)
4. Cajon Creek 3 (within the fire)
5. Cajon Creek 4 (within the fire)
6. Lost Lake (within the fire)
7. Lone Pine (within the fire)
8. Lytle Creek (outside the fire)
9. Sheep Creek (within the fire)

Migrant willow flycatchers have been observed in Crowder Canyon (within the fire), indicating the habitat is suitable for breeding there even though nesting has not been recorded. Additional areas of unmapped suitable habitat were likely within the fire.

b) Fire Effects – Southwestern Willow Flycatcher

No focused surveys for willow flycatcher were conducted for this BAER effort. It is assumed that southwestern willow flycatchers could be breeding in wherever suitable habitat is present within or downstream from the Blue Cut Fire. **Table 7** and the map packet display the amount of occupied by burn severity.

The Blue Cut Fire burned after the peak of breeding season when most or all of this year's young would be expected to have fledged; impacts to this year's breeding productivity is anticipated to be little or none. Losses of individuals due to the fire may have occurred where the flame front moved too fast for birds to escape.

Table 7. Southwestern Willow Flycatcher Habitat (in acres) by Soil Burn Severity

Habitat Type	Land Ownership	Unburned/ Very Low	Low	Moderate	High	Grand Total
Occupied Habitat	**NFS**	13	20	30	12	76
	Non-NFS	2	12	16	4	34
TOTALS		15	32	46	16	110

c) Post-Fire Watershed Response Effects – Southwestern Willow Flycatcher

The BAER hydrologists and soil scientists modeled 5-year storm events for this analysis, using parameters that simulate summer thunderstorms. **Table 3** and **Table 4** display the expected increases in peak flows and sediment contribution within southwestern willow flycatcher habitat. Site-specific discussions follow.

Cajon Wash Territories (Cajon Creek 1-4 and Keenbrook): Cajon Wash is occupied habitat for southwestern willow flycatchers. The area contains white alder, with some California sycamore, ash, and arroyo willow. The riparian area includes seepage on the upper benches of the stream course contributing to a dense nettle, wild grape, and poison oak understory. Non-native arundo and tamarisk is also present at places in Cajon Wash.

While the SBNF has mapped five separate territories based on past protocol-level surveys, the habitat in Cajon Wash should be considered an almost dynamic stringer of suitable habitat with nesting occurring at a number of sites within the suitable habitat. Due to the dynamic nature of riparian vegetation, the number and location of nesting territories and suitable habitat varies in any given year. Much of the Cajon Wash habitat area did not burn; the rest was a patchy low burn.

The post-fire watershed response discussion above for arroyo toad habitat in Cajon Wash applies to southwestern willow flycatcher habitat in Cajon Wash.

Lost Lake: Lost Lake is a linear sag pond associated with the San Andreas Fault in Lone Pine Canyon. The lake is approximately 50 feet wide by 250 feet long at full capacity; however, at

the time of the Blue Cut fire it was almost completely dry. A perennial creek feeds Lost Lake, which contains a 250 meter long stretch of willows and cattail habitat. Habitat at the site consisted of willows no more than 5 meters tall, less in some areas, and no more than five meters wide. The continuous stand was 80% arroyo willow which was approximately 7 meters in height and 15% sandbar willow which forms a dense canopy to 5 meters. The willow habitat was confined to the eastern and about half of the northern shoreline. The surrounding uplands are covered by dense montane chaparral.

Lost Lake is a developed recreation site with a parking area. It is open to day use only but the use is very concentrated. Water-related dispersed recreation use is high at Lost Lake. The amount of use is believed to be high enough at several locations that it could affect the selection of nest sites for southwestern willow flycatcher. Unauthorized vehicle use sometimes takes place and damages riparian habitat. The drying of Lost Lake in summer 2016 has resulted in substantially reduced recreation use.

When water is present, Lost Lake is commonly used as a source of water for helicopters carrying buckets and using suction devices during wild fires. Tamarisk also occurs around Lost Lake. About ¾ of an acre of the suitable habitat for nesting at Lost Lake burned and became unsuitable during the 2014 Lost Fire. The remaining nesting habitat at Lost Lake was became completely unsuitable during the Blue Cut Fire.

The Blue Cut BAER Hydrology Report summarized the predicted post-fire watershed response for Lost Lake in **Table 3** and **Table 4**, and as follows. Lost Lake is located in flat terrain, with soils that have high infiltration rates, and a small catchment area. Based on site specific field observations, the RCS erosion modeling for this site over-estimates the increase in sediment delivery to Lost Lake. Erosion and sedimentation of the Lost Lake pour point modeled area will experience increases in sediment but not at the level RCS modeled. The EHR model rated this area as Low Erosion Hazard Rating, which is more applicable based on field observations. Because this site is a recreational area, there is potential for increased erosion due to trampling and soil disturbance (OHV and hikers) before vegetation can re-establish. The BAER hydrology models for Lost Lake indicate that there would be a 50% increase in flow and in the southwestern willow flycatcher habitat in Lost Lake during a 2-year storm event.

Overall, Lost Lake is expected to experience an increase in flows and sediment but it is not expected to result in changes to that habitat conditions at the site.

Lone Pine Canyon: There is a record of breeding southwestern willow flycatchers in Lone Pine Canyon from 1993. The Lone Pine nesting territory site has not supported riparian habitat since the early 1990s. This site is no longer considered suitable for this species.

Sheep Creek: Sheep Creek is known to have had two successful nesting pairs of southwestern willow flycatcher in 2007. The suitable habitat was about 0.75 miles long paralleling Forest Road 2N56. Most of the suitable Sheep Creek habitat burned in the 2009 Sheep Fire. The upper portion of the mapped territory did not reburn in the Blue Cut fire and there is still some suitable habitat there. The lower estimated ¾ of the territory did reburn and is no longer suitable for nesting.

The BAER hydrology and soil models for the Sheep Creek territory (**Table 3** and **Table 4**) indicate that there would be a 78% increase in the southwestern willow flycatcher habitat in Sheep Creek during a 2-year storm event. Expected post-fire erosion potential in Sheep Creek Wildlife Habitat pour point is an increase of 1370% and was rated as a Very High EHR. This site is located in a steeper, transport section of the stream channel and will most likely experience incision and down-cutting; however, most of the riparian area did not burn (including a large stretch of Sheep Creek above the willow flycatcher habitat) and will help minimize erosion potential and effects from increased flows. Scouring of the southwestern willow flycatcher habitat in Sheep Creek is not expected.

Lytle Creek: The occupied/suitable habitat in Lytle Creek is about 2 miles downstream from the fire and was not affected by the fire. While the known nesting willow flycatcher site is about two miles downstream of the fire perimeter, there is suitable nesting habitat in Lytle Creek between that territory and the fire perimeter as well as farther downstream of the nesting territory.

The post-fire watershed response discussion above for San Bernardino kangaroo rat habitat is Lytle Creek applies to southwestern willow flycatcher habitat in Lytle Creek.

Crowder Canyon: Migrant willow flycatchers of unknown subspecies have been detected in the Crowder Canyon riparian habitat, indicating suitability for southwestern willow flycatcher nesting. Nesting is not known from the site but surveys have been limited and nesting may occur in that drainage.

The Blue Cut BAER Hydrology Report modeled potential post-fire watershed response for the Crowder Canyon willow flycatcher site (**Table 3** and **Table 4**) ("Hwy 138 Xing 1 above wildlife habitat" in the models). The model indicates that there would be a 48% increase in flow in the southwestern willow flycatcher habitat in Crowder Canyon during a 2-year storm event. This southwestern willow flycatcher territory will experience increases in sediment delivery (approximately 1500% increase and rated as High EHR). This section of the channel is wider, braided, and more of a depositional area. The stream channel may experience some post-fire effects that are related to increased flows and sediment delivery such as channel migration, filling in of pools, and erosion; however, riparian vegetation is expected to respond/re-establish quickly, which will help stabilize the area. Additionally, leading to the habitat in this area are three tributaries, one of which (modeled) has a large depositional area upstream of the Highway 138 crossing. This depositional area will help minimize post-fire hydrologic and sedimentation effects.

Summary of Post-Fire Effects to Southwestern Willow Flycatcher: The expected post-fire watershed response impact to aquatic and riparian ecosystems within the fire area will be higher water flows and higher levels of sediment delivery to stream channels resulting in greater scour and deposition in some locations. Low debris flows will likely not impact riparian vegetation, but intensive debris flows could completely uproot and destroy riparian vegetation within the flood channel.

Scouring of riparian habitat in the known territories may occur post-fire depending on the degree of flooding and debris flows. Complete scouring of nesting habitat is not expected under a 2 or 5 year storm event. If scouring occurs, fragmentation of willow habitat may occur as well as loss of important vegetative structure and cover. While this habitat would recover in several years (or longer if scoured to bedrock), there could be a period during which suitable nesting habitat is not available in the affected drainages. Whether the birds would return to the same area after an absence of several years is unknown.

Since many of the prey species for southwestern willow flycatchers are insects that have aquatic life stages, changes in water quality or introduction of environmental toxins could reduce prey availability (and thus, lower reproductive success or lead to reduced health).

If riparian vegetation is removed as a result of debris flows or flooding, there is an increased risk of non-native plants spreading or becoming established in the area. The establishment of non-native plants would hinder the recovery of the native riparian vegetation and the recovery of suitable southwestern willow flycatcher habitat.

Another significant post-fire risk to southwestern willow flycatchers is lack of cover and forage where vegetation burned off. Lack of vegetation increases the off-road cross-county vehicle traffic that will slow the recovery of habitat for this species by killing plants and spreading non-native plants.

If southwestern willow flycatchers that normally nest within the fire area are not able to relocate for the duration of time it takes for habitat recovery, they may experience increased rates of mortality and decreased reproductive success. If displaced birds relocate to new habitats, it is not known how long it would take for them to return to their previous territories.

B. Emergency Determination – Southwestern Willow Flycatcher

The risk assessment matrix in **Table 5** was used to determine the probability of damage/loss for southwestern willow flycatcher. Based on the likelihood of habitat damage due to increased OHV access/disturbance, increased non-native invasive plants, and debris flows, the risk determinations for southwestern willow flycatcher are:

- Keenbrook and Cajon Creek 1-4 (downslope and in the fire): VERY HIGH (Very Likely probability and Major magnitude of consequences)
- Lost Lake (in the fire): HIGH (Likely probability and Major magnitude of consequences)
- Lone Pine (in the fire): LOW (Unlikely probability and Moderate magnitude of consequences)
- Lytle Creek (outside the fire): LOW (Unlikely probability and Moderate magnitude of consequences)
- Crowder Canyon (in the fire): LOW (Unlikely probability and Moderate magnitude of consequences)
- Sheep Creek (in the fire): LOW (Unlikely probability and Moderate magnitude of consequences)

The BAER assessment team has determined that an emergency condition does exist for the critical natural value of the federally endangered southwestern willow flycatcher due to the increased access to habitat for OHVs.

C. Treatments to Mitigate the Emergency – Southwestern Willow Flycatcher

No specific treatment is proposed to treat threats to southwestern willow flycatcher habitat from flooding and debris flows due to the infeasibility and ineffectiveness of treatments to stabilize the amount of watershed affected in the Blue Cut fire. This type of habitat is resilient and expected to recover in a few years. Treatments to effectively reduce the risk of debris flows and flooding are not feasible.

The BAER assessment team has proposed Forest Closure Treatments that includes installation of barriers, gates, fencing, and vegetation barriers to try to limit the amount of illegal cross-country vehicle use that is expected due to the lack of vegetation. The Forest Closure Treatments will help reduce the risk of death/injury to southwestern willow flycatcher from vehicles driving off road. It will also help speed the rate of habitat recovery by reducing the risk of spreading and establishing non-native plants.

In addition, the BAER assessment team has proposed a Weed Detection and Rapid Response treatment will reduce the risk of San Bernardino kangaroo rat habitat degradation from non-native invasive plants.

4. Least Bell's Vireo (*Vireo bellii pusillus*)

A. Resource Condition Assessment – Least Bell's Vireo

a) Resource Setting – Least Bell's Vireo

The least Bell's vireo was listed as endangered on May 2, 1986 (FR 51(85): 16474-16481). Critical habitat was designated on February 2, 1994 (FR 59(22): 4845-4867) but there are no critical habitat units on the SBNF. A draft recovery plan was distributed to the public in 1998 but was not finalized.

The least Bell's vireo is a small, olive-gray, migratory songbird that nests and forages almost exclusively in riparian woodland habitats. All subspecies of Bell's vireo (*Vireo bellii*), including the least Bell's vireo, are almost exclusively insectivorous and highly territorial.

Least Bell's vireos generally begin to establish breeding territories by mid-March to late March. Most breeding least Bell's vireos depart their breeding grounds by the third week of September, and only very few are found wintering in the United States. In some areas, they will also use adjacent upland habitats for foraging.

Least Bell's vireos are apparently more restricted in choice of nesting habitat than other subspecies of Bell's vireo. Least Bell's vireo nesting habitat typically consists of well-developed overstories, understories, and low densities of aquatic and herbaceous cover. The understory frequently contains dense subshrub or shrub thickets. These thickets are often dominated by of sandbar willow (*Salix hindsiana*), mulefat (*Baccharis salicifolia*), young individuals of other willow species such as arroyo willow (*S. lasiolepis*) or black willow (*S. goodingii*), and one or more herbaceous species. Significant overstory species include mature arroyo willows and black

willows. Occasional cottonwoods (*Populus* sp.) and western sycamore (*Platanus racemosa*) occur in some least Bell's vireo habitats. Coast live oak (*Quercus agrifolia*) may also make locally important contributions to the overstory.

As much as 90 percent of the original extent of riparian woodland in California has been eliminated, and most of the remaining 10 percent is in a degraded condition. It appears that least Bell's vireos nesting in areas containing a high proportion of degraded habitat have lower productivity (*e.g.*, hatching success) than those in areas of high quality riparian woodland. Additionally, widespread habitat losses have fragmented most remaining populations into small, disjunct, widely dispersed subpopulations. Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds, in part by increasing incidence of nest predation and parasitism.

Least Bell's vireos are sensitive to many forms of human disturbance including noise, night lighting, and consistent human presence in an area. Noise (*e.g.*, bulldozers, OHVs, and hiker travel) can cause vireos to abandon an area. Much of the least Bell's vireo decline is attributable in part to the combined, perhaps synergistic, effects of the widespread destruction of riparian habitats and brood-parasitism by the brown-headed cowbird (*Molothrus ater*).

There are ## known nesting territories for least Bell's vireo within/near the Blue Cut fire:

- Cajon Creek 1 (within the fire)
- Cajon Creek 2 (below the fire)
- Cajon Creek 3 (within the fire)
- Cajon Creek 4 (within the fire)
- Lost Lake (within the fire)

b) Fire Effects – Least Bell's Vireo

No focused surveys for least Bell's vireo were conducted for this BAER effort. It is assumed that least Bell's vireo could be breeding in wherever suitable habitat is present in or downstream from the Blue Cut Fire. Table 8 and the map packet display the amount of occupied by burn severity.

The Blue Cut Fire burned after the peak of breeding season when most or all of this year's young would be expected to have fledged; impacts to this year's breeding productivity is believed to be little or none. Losses of individuals due to the fire may have occurred where the flame front moved too fast for birds to escape.

Table 8. Least Bell's Vireo Habitat (in acres) By Soil Burn Severity

Habitat Type	Land Ownership	Unburned/ Very Low	Low	Moderate	High	Grand Total
Occupied Habitat	**NFS**	0	4	10	6	20
	Non-NFS	0	1	3	1	5
TOTALS		0	5	15	7	25

c) Post-Fire Watershed Response Effects – Least Bell's Vireo

Cajon Wash Territories (Cajon Creek 1-4): Cajon Wash is occupied habitat for least Bell's vireo. While the SBNF has mapped four separate territories based on past protocol-level surveys, the habitat in Cajon Wash should be considered a dynamic stringer of suitable habitat with nesting occurring at a number of sites within the suitable habitat. Due to the dynamic nature of riparian vegetation, the number and location of nesting territories and suitable habitat varies in any given year. Much of the Cajon Wash habitat area did not burn; the rest was a patchy low burn.

The post-fire watershed response discussion above for arroyo toad habitat in Cajon Wash applies to least Bell's vireo habitat in Cajon Wash.

Lost Lake: See the description for Lost Lake under southwestern willow flycatcher. About ¾ of an acre of the suitable habitat for nesting at Lost Lake burned and became unsuitable during the 2014 Lost Fire. The remaining nesting habitat at Lost Lake was became completely unsuitable during the Blue Cut Fire.

The post-fire watershed response discussion above for southwestern willow flycatcher habitat in Lost Lake applies to least Bell's vireo habitat in Lost Lake.

B. Emergency Determination – Least Bell's Vireo

The risk assessment matrix in **Table 5** was used to determine the probability of damage/loss for least Bell's vireo.

Based on the likelihood of habitat damage due to increased OHV access/disturbance, increased non-native invasive plants, and debris flows, the risk determinations for least Bell's vireo are:

- Cajon Creek 1-4 (in and downstream of the fire) : VERY HIGH (Very Likely probability and Major magnitude of consequences)
- Lost Lake (in the fire): HIGH (Likely probability and Major magnitude of consequences)

The BAER assessment team has determined that an emergency condition exist for the critical natural value of the federally endangered least Bell's vireo.

C. Treatments to Mitigate the Emergency – Least Bell's Vireo

No specific treatment is proposed to treat threats to least Bell's vireo habitat due to the infeasibility and ineffectiveness of treatments to stabilize the amount of watershed affected in the Blue Cut fire. This type of habitat is resilient and expected to recover. Treatments to effectively reduce the risk of debris flows and flooding are not feasible.

The greatest threat to least Bell's vireo habitat is the additional loss/degradation of habitat and disturbance caused by off-highway driving due to the loss of vegetative and other barriers. The BAER assessment team has proposed Forest Closure Treatments that includes installation of barriers, gates, fencing, and vegetation barriers to try to limit the amount of illegal cross-country vehicle use that is expected due to the lack of vegetation. The Forest Closure Treatments will help reduce the risk of death/injury to least Bell's vireo from vehicles driving off road. It will

also help speed the rate of habitat recovery by reducing the risk of spreading and establishing non-native plants.

In addition, the BAER assessment team has proposed a Weed Detection and Rapid Response treatment will reduce the risk of San Bernardino kangaroo rat habitat degradation from non-native invasive plants.

5. Desert Tortoise (*Gopherus agassizii*)

A. Resource Condition Assessment – Desert Tortoise

a) Resource Setting – Desert Tortoise

The desert tortoise is federally-listed as threatened in 1990 (55 FR 12178) and listed as threatened under the California Endangered Species Act in 1989. The desert tortoise has a revised Recovery Plan. Critical habitat for the desert tortoise was designated on February 8, 1994 (59 FR 5820). No designated or proposed Critical Habitat for desert tortoise occurs on or near the SBNF.

The desert tortoise is a large, herbivorous reptile and the only naturally occurring tortoise in the Mojave Desert. Large individuals can reach 15 inches in length. Their shells are generally highly domed and unhinged; some variation in the shape of the shell occurs among individuals, particularly across its range.

Desert tortoises occur in the California desert from below sea level to an elevation of 7,300 feet, but the most typical habitat is below 5,500 feet. The desert tortoise is most commonly found within the desert scrub vegetation type, primarily in creosote bush scrub vegetation, but also in succulent scrub, cheesebush scrub, blackbush scrub, hopsage scrub, shadscale scrub, microphyll woodland, and Mojave saltbush-allscale scrub.

Within these vegetation types, desert tortoises potentially can survive and reproduce where their basic habitat requirements are met. Throughout most of the Mojave Region, tortoises occur most commonly on gently sloping terrain with soils ranging from sand to sandy-gravel and with scattered shrubs, and where there is abundant inter-shrub space for growth of herbaceous plants. Throughout their range, however, tortoises can be found in steeper, rockier areas. This species normally excavates a burrow under bushes, overhanging soil or rock formations, or digs into soil in the open.

Desert tortoises in the Mojave Desert are primarily active between May and June, with a secondary activity period from September through October. During inactive periods, tortoises hibernate, aestivate, or rest in subterranean burrows or caliche caves, spending as much as 98 percent of their time underground. During active periods, they usually spend nights and the hotter portion of the day in their burrow. Tortoises construct and maintain a series of single opening burrows, which may average from 7 to 12 burrows at a given time.

Common ravens, gila monsters (*Heloderma suspectum*), kit foxes (*Vulpes macrotis*), badgers (*Taxidea taxus*), roadrunners (*Geococcyx californianus*), and coyotes are all natural predators of the desert tortoise. These predators typically prey upon 2- to 3-inch long juveniles, which have a thin, delicate shell. Desert tortoise decline is attributed to destruction and degradation of habitat

by urbanization, agriculture, mining, livestock grazing, and off-road vehicle activity; predation; and disease. Upper respiratory tract disease, which prompted the emergency listing of the desert tortoise, has continued to spread. Although some roads have been fenced to prevent entry by desert tortoises, individuals continue to be killed by vehicular traffic.

The Recovery Plan for desert tortoise listed a number of threats for this species, including those that result in mortality and permanent habitat loss across large areas, such as urbanization, and those that fragment and degrade habitats, such as proliferation of roads and highways, off-highway vehicle activity, poor grazing management, and habitat invasion by nonnative invasive species. Indirect impacts to desert tortoise populations and habitat are also known to occur in areas that interface with intense human activity.

Another threat is the increased frequency of wildfire due to the changes in desert plant communities from invasions by non-native plant species. These changes affect fire frequency and can negatively affect the desert tortoise by altering habitat structure and species available as food plants. Off-highway vehicle activity, roads, livestock grazing, agricultural uses, and other activities contribute to the spread of non-native species.

Landfills potentially affect desert tortoises and their habitat through fragmentation/loss of habitat, introduction of toxins/trash, increased road kill of tortoises on access roads, and increased predator populations. Large-scale renewable energy projects have been approved and proposed within desert tortoise habitat, threatening more effects to habitat and tortoises. Additional threats include disease and predation, illegal collections, and climate change.

a) Fire Effects – Desert Tortoise

The northern edge of the fire area supports suitable habitat for desert tortoise. All of the area below about ~4500’ in elevation with desert soil and vegetation types (generally north of Highway 138) is considered occupied habitat if suitable soils and habitat components are present.

No focused surveys for desert tortoise were conducted as part of the BAER assessment. The northern edge of the fire area supports suitable habitat for desert tortoise. All of the area below about ~4500’ in elevation with desert soil and vegetation types is considered occupied habitat if suitable soils and habitat components are present. No tortoise sightings were reported to or by the Blue Cut Fire Resource Advisors. In areas where the fire overlapped suitable habitat for tortoise, the fire behavior was very low and spotty due to the sparseness of vegetation to carry fire. That area was mapped as low soil burn severity **(**see the map packet**)**. Individual tortoises could have been affected by the fire.

Table 4. Desert Tortoise Habitat (in acres) By Soil Burn Severity

Habitat Type	Land Ownership	Unburned/ Very Low	Low	Moderate	High	Grand Total
Occupied Habitat	**NFS**	2,235	4,182	3,062	4	9,484
	Non-NFS	1,238	2,094	446	0	3,777
TOTALS		3,472	6,276	3,508	5	13,261

b) Post-Fire Watershed Effects– Desert Tortoise

A post-fire risk to desert tortoises is lack of cover and forage plants where vegetation burned off. Lack of cover increases predation and collection by people. Additionally, lack of vegetation increases the off-road cross-county vehicle traffic that puts tortoises at more risk of collection or injury/death from being run over or crushed in burrows. Changes in plant communities caused by non-native plants and recurrent fire can negatively affect the desert tortoise by altering habitat structure and species available as food plants.

There are two primary threats to the desert tortoise and its habitat directly tied to the Blue Cut Fire. First, there is increased potential of OHV use within the burn area. Even after the faster recovering species like chamise, scrub oak and buckwheat get re-established, the open nature of the vegetation and the slow recovery of the woody species such as manzanita and *Ceanothus* species (that would serve as a barrier to OHV activity) allows for an increase in off-road vehicle travel. The second threat is increased potential for type conversion of native vegetation.

B. Emergency Determination – Desert Tortoise

The risk assessment matrix in **Table 5** was used to determine the probability of damage/loss to desert tortoise. Based on the likelihood of habitat damage due to increased OHV access/disturbance and type conversion, the desert tortoise risk determination is:

- HIGH (Likely Probability and Moderate Magnitude of Consequences)

The BAER assessment team has determined that an emergency condition does exist to desert tortoise.

C. Treatments to Mitigate the Emergency – Desert Tortoise

The BAER assessment team has proposed Forest Closure Treatments that includes installation of barriers, gates, fencing, and vegetation barriers to try to limit the amount of illegal cross-country vehicle use that is expected due to the lack of vegetation. The Forest Closure Treatments will help reduce the risk of death/injury to desert tortoises from vehicles driving off road. It will also help speed the rate of habitat recovery by reducing the risk of spreading and establishing non-native plants.

In addition, the BAER assessment team has proposed a Weed Detection and Rapid Response treatment will reduce the risk of San Bernardino kangaroo rat habitat degradation from non-native invasive plants.

6. Summary of Threatened/Endangered Wildlife

Four of the species (southwestern willow flycatcher, least Bell's vireo, San Bernardino kangaroo rat, and arroyo toad) are wash/riparian species that have evolved with periodic habitat disruptions and the dynamic conditions found in that habitat type. Post-fire watershed response events (*e.g.*, flooding, debris flows, sediment delivery, etc.) will likely affect some of the habitat conditions for a few years after the fire. Left alone without other disturbances, the habitat would recover within 5-10 years. However, where vegetative screening and barriers were lost due to fire, those areas may be subjected to additional impacts from OHVs and people. Additionally, OHV incursions encourage and spread disturbance-tolerant non-native invasive species. Those cumulative effects could have long-term negative consequences for the T/E animals and their

habitat. The last of the T/E species, desert tortoise, is not expected to be threatened by post-fire watershed response events but the effects from increased OHV access and lack of vegetative cover and forage does pose a threat.

The proposed BAER treatments of Forest Closure, Weed Detection and Rapid Response, interagency coordination with partners and special use permit holders, and monitoring are critical to protecting the habitat and species from additional post-fire impacts. Appendix C includes Design Features that are to be shared with implementation personnel and cooperators for any activities that will occur in T/E habitat.

7. Water Sources

A. Resource Condition Assessment – Water Sources

There are a number of developed springs, fiberglass guzzlers, and cement guzzlers within the fire perimeter. Function of water sources is critical to provide water for a number of wildlife species in this dry area. The water source infrastructures represent a substantial government investment over many years. Thirteen of the developed springs that were assessed are at risk of filling with sediment (losing function of providing a water source) or loss of infrastructure due to erosion.

B. Emergency Determination – Water Sources

The risk assessment matrix in **Table 5** (from Chapter 2520 – Watershed Protection and Management) was used to determine the probability of damage/loss from hazardous waste. The risk determination for losing/compromising the integrity of developed water sources is:

- HIGH Risk (Likely Probability and Moderate Magnitude of Consequences)

The BAER assessment team has determined that an emergency condition does exist from exposure to the waste presented by burned fiberglass.

C. Treatments to Mitigate the Emergency –Developed Spring/Guzzler Sediment Deflector Treatment

A sediment deflector will be used to protect identified wildlife water structures from potential sediment flow. Treatments could include sediment deflectors (wattles, sandbags, logs, or water bars) or traps constructed by hand above the spring development infrastructure to reduce the amount of sediment entering the water tanks and to protect the infrastructure from erosion/flooding. Volunteers will be recruited from Quail Forever to complete the work under the guidance of the GS-6 biological technician.

8. Hazardous Waste

A. Resource Condition Assessment – Hazardous Waste from Fiberglass Guzzlers

One fiberglass wildlife water guzzler burned in the fire. As a result of the damage, fiberglass pieces will continue to litter the area posing a threat to animals that might gather pieces for nest/den material.

B. Emergency Determination – Hazardous Waste from Fiberglass Guzzlers

The risk assessment matrix in **Table 5** (from Chapter 2520 – Watershed Protection and Management) was used to determine the probability of damage/loss from hazardous waste. The hazardous waste risk determination is:

- VERY HIGH Risk (Very Likely Probability and Moderate Magnitude of Consequences)

The BAER assessment team has determined that an emergency condition does exist from exposure to the waste presented by burned fiberglass.

C. Treatments to Mitigate the Emergency – Hazardous Waste from Fiberglass Guzzler

The proposed treatment is to remove the burned fiberglass guzzler for proper disposal. Removal would require a crew with hand tools and appropriate PPE to disassemble the guzzler and truck it to a landfill for disposal.

9. Abandoned Mines

A. Resource Condition Assessment – Abandoned Mines

The Blue Cut fire increased the safety hazard of three open mine adits and one vertical ventilation shaft along the Sheep Canyon Road. During the Sheep Fire (2009) BAER implementation, the mine adits were closed with bat-friendly gates and the ventilation shaft was fenced. All features were marked with warning signs.

The burning of vegetation during the Blue Cut fire has made these features clearly visible from the Sheep Canyon Road just above the community of Lytle Creek. The Blue Cut fire burned the warning signs and compromised the fence around the vertical shaft, posing an increased threat to public safety.

B. Emergency Determination – Abandoned Mines

The risk assessment matrix in **Table 5** (from Chapter 2520 – Watershed Protection and Management) was used to determine the probability of threat to public safety due to exposed mines. The hazardous waste risk determination is:

- HIGH Risk (Likely Probability and Moderate Magnitude of Consequences)

The BAER assessment team has determined that an emergency condition does exist to public safety from the abandoned mines.

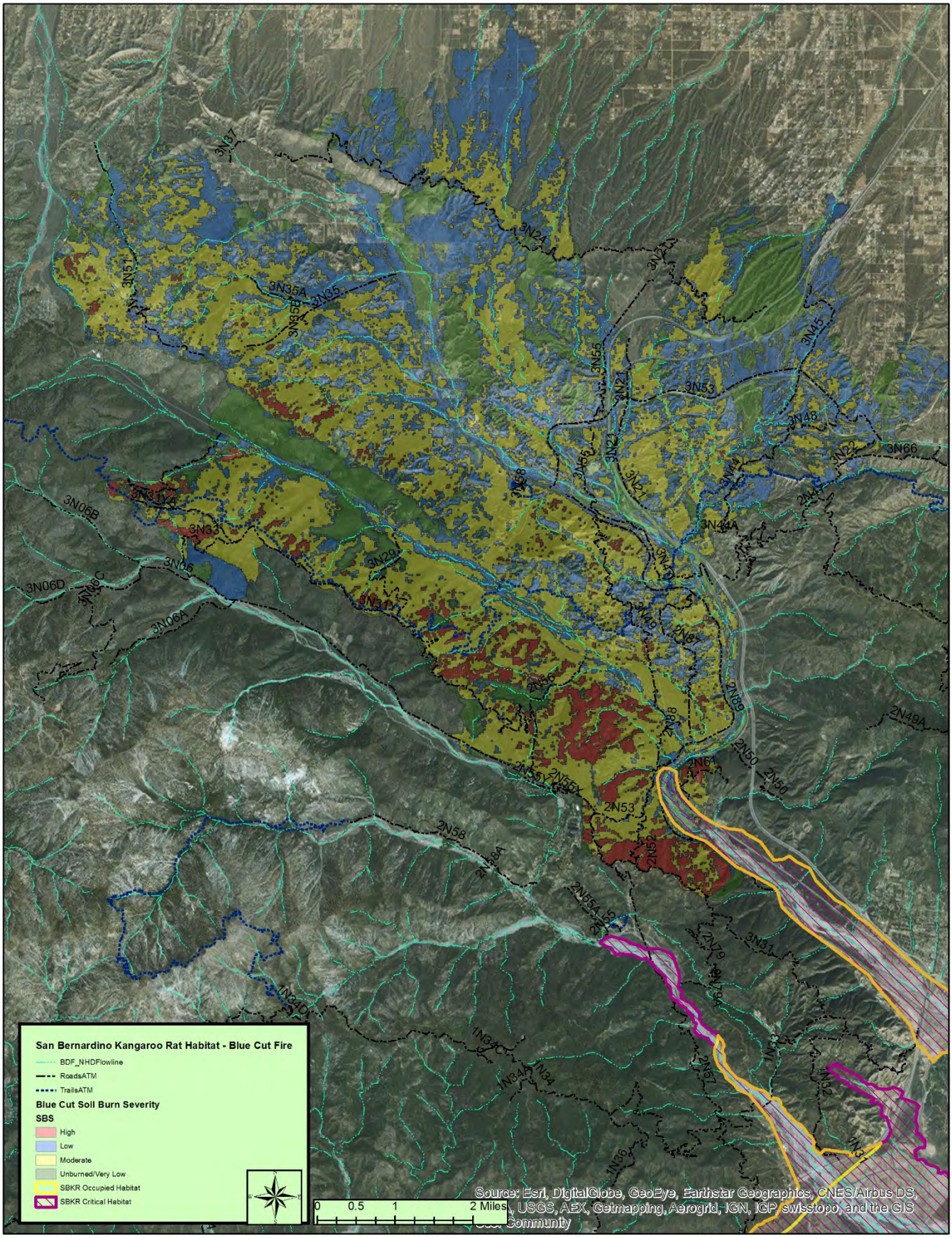
C. Treatments to Mitigate the Emergency – Abandoned Mines

The proposed treatment is to fix the burned fence around the vertical ventilation shaft and replace burned signs at all of the mines.

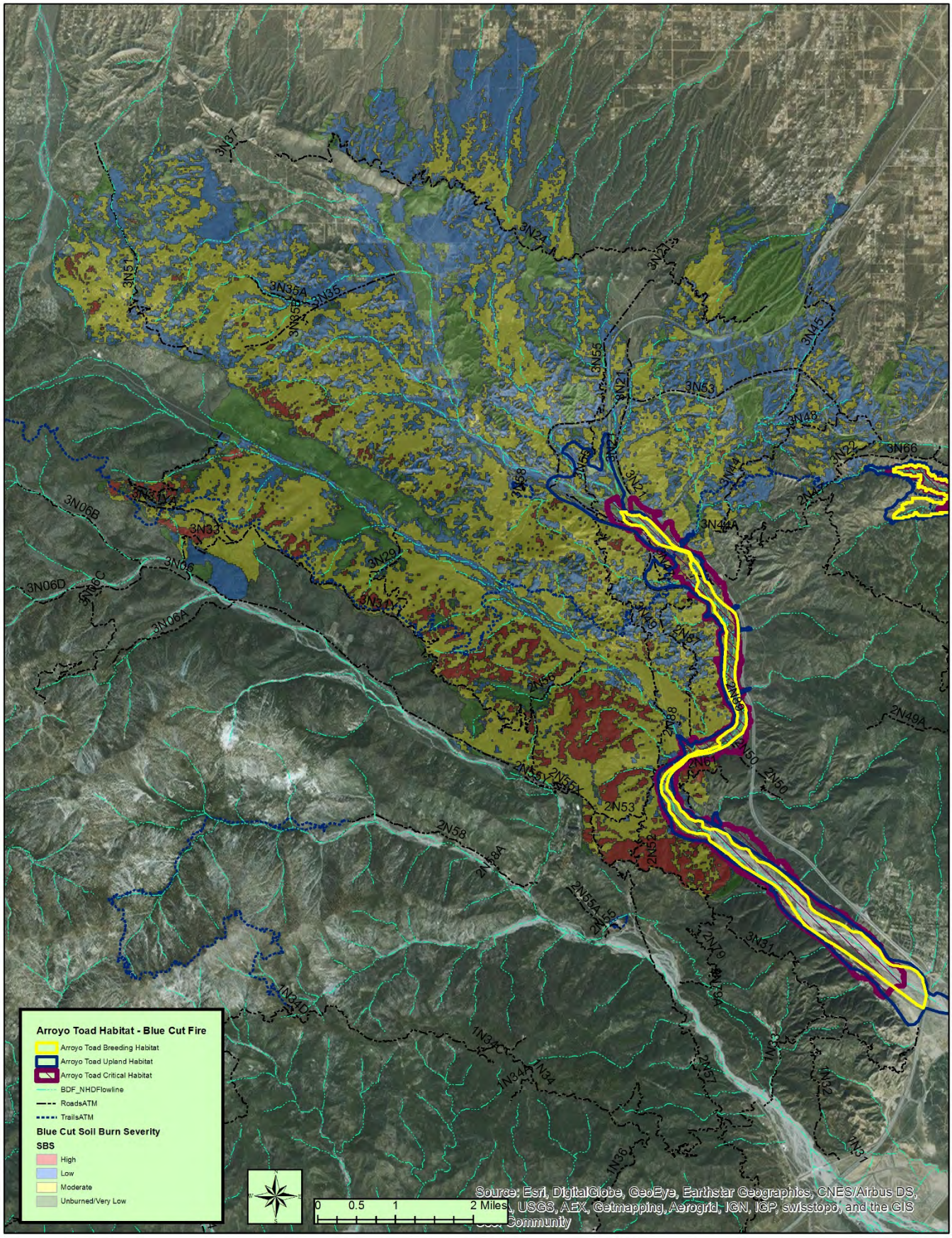
10. Treatment Effectiveness Monitoring

Monitoring the effectiveness of the above-described BAER treatments will be used to determine if additional treatments are needed to protect the T/E habitat and species. This includes monitoring the BAER Forest Closure Treatments, mine closure treatment, and spring/guzzler deflection treatment.

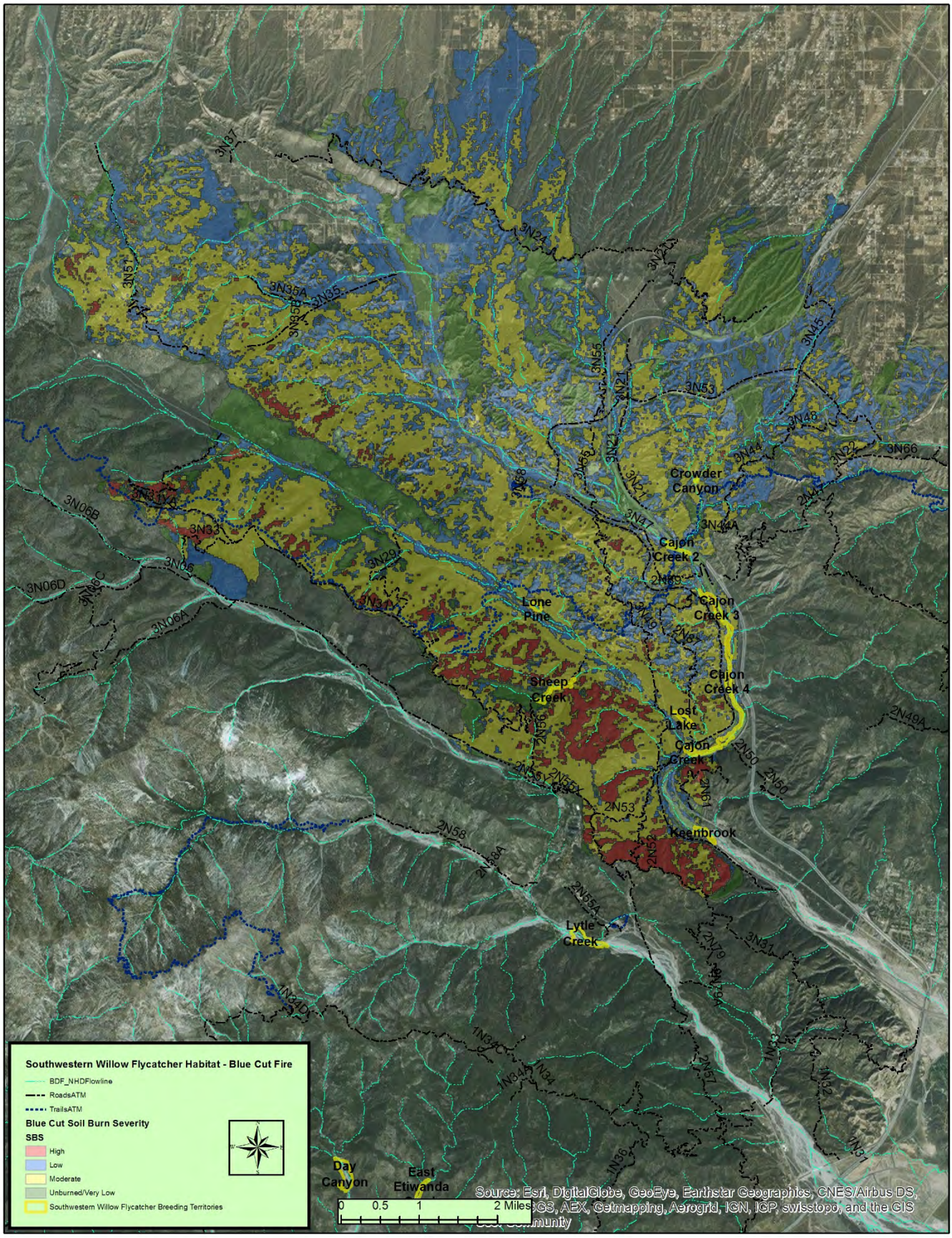
Map Packet


San Bernardino Kangaroo Rat Habitat - Blue Cut Fire
BDF_NHDFlowline
RoadsATM
TrailsATM
Blue Cut Soil Burn Severity
SBS
High
Low
Moderate
Unburned/Very Low
SBKR Occupied Habitat
SBKR Critical Habitat
0 0.5 1 2 Miles
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

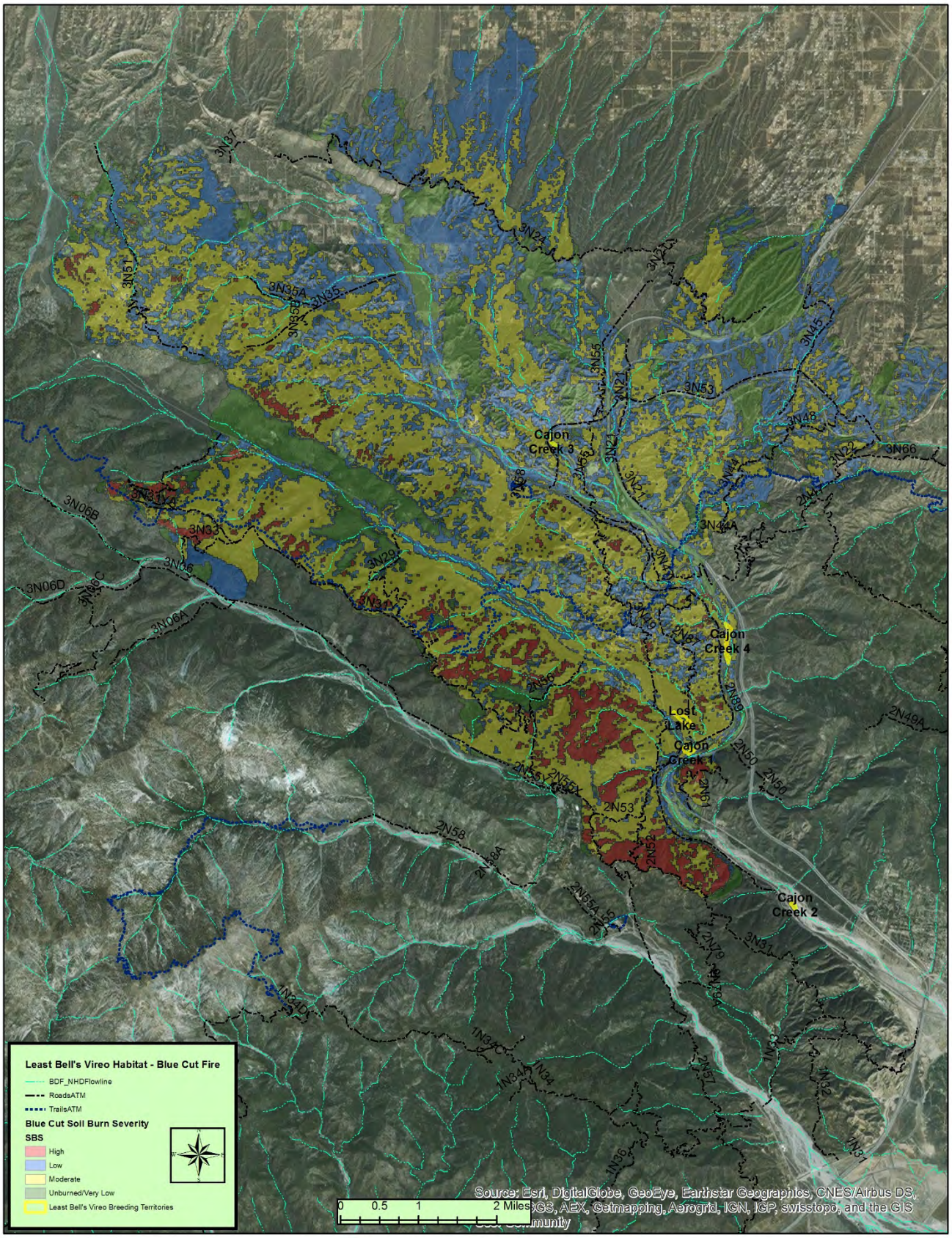
Map Packet


Arroyo Toad Habitat - Blue Cut Fire
Arroyo Toad Breeding Habitat
Arroyo Toad Upland Habitat
Arroyo Toad Critical Habitat
BDF_NHDFlowline
RoadsATM
TrailsATM
Blue Cut Soil Burn Severity
SBS
High
Low
Moderate
Unburned/Very Low
0 0.5 1 2 Miles
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

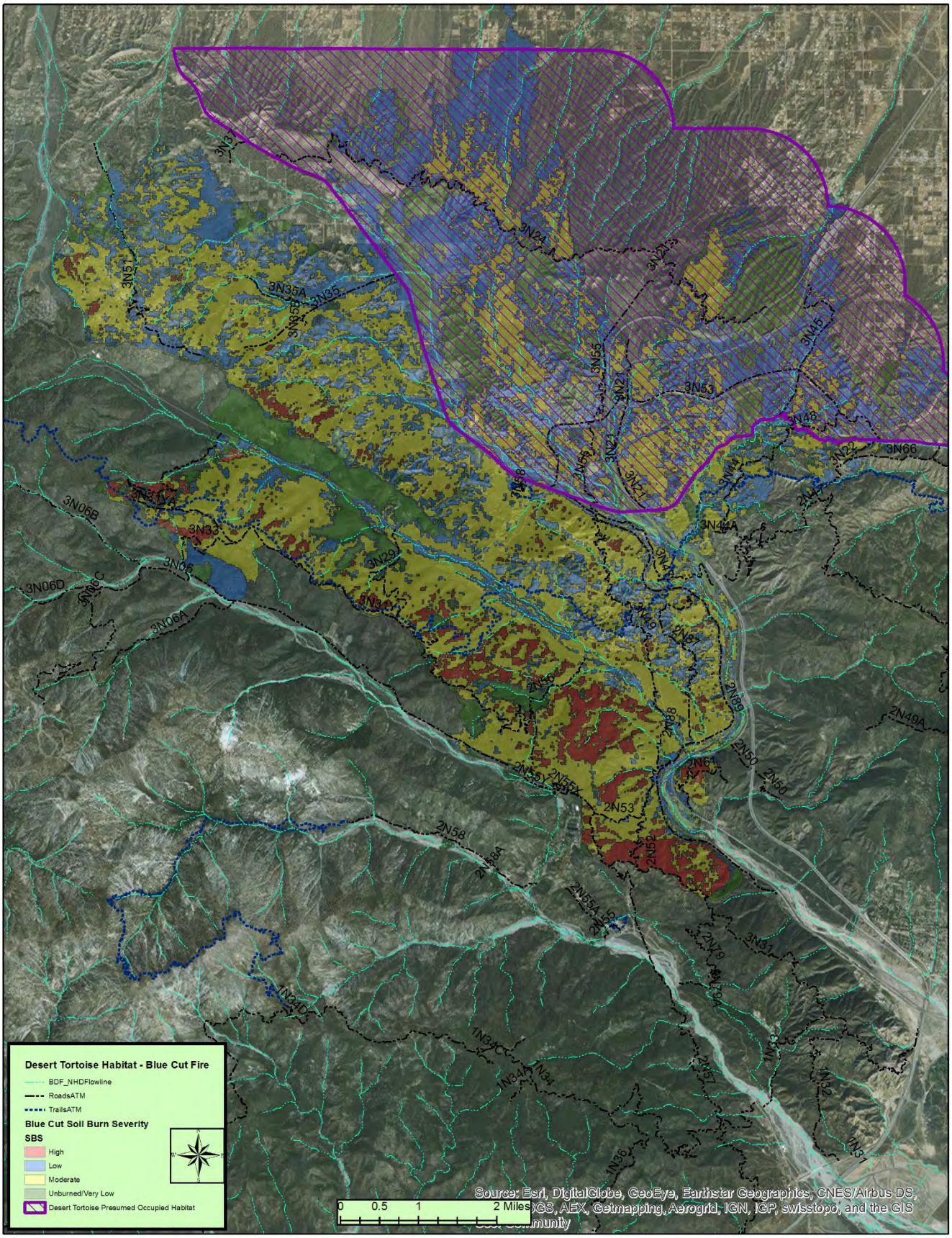
Map Packet


Southwestern Willow Flycatcher Habitat - Blue Cut Fire
BDF_NHDFlowline
RoadsATM
TrailsATM
Blue Cut Soil Burn Severity
SBS
High
Low
Moderate
Unburned/Very Low
Southwestern Willow Flycatcher Breeding Territories
0 0.5 1 2 Miles
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Crowder Canyon
Cajon Creek 2
Cajon Creek 3
Cajon Creek 4
Cajon Creek 1
Lone Pine
Sheep Creek
Lost Lake
Keenbrook
Lytle Creek
Day Canyon
East Etiwanda

Map Packet


Least Bell's Vireo Habitat - Blue Cut Fire
BDF_NHDFlowline
RoadsATM
TrailsATM
Blue Cut Soil Burn Severity
SBS
High
Low
Moderate
Unburned/Very Low
Least Bell's Vireo Breeding Territories
0 0.5 1 2 Miles
Cajon Creek 3
Cajon Creek 4
Lost Lake
Cajon Creek 1
Cajon Creek 2
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map Packet


Desert Tortoise Habitat - Blue Cut Fire
BDF_NHDFlowline
RoadsATM
TrailsATM
Blue Cut Soil Burn Severity
SBS
High
Low
Moderate
Unburned/Very Low
Desert Tortoise Presumed Occupied Habitat
0 0.5 1 2 Miles
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

APPENDIX A: DEVELOPED WATER SOURCE CONDITION ASSESSMENT

Spring/ Trough/ Guzzler	Surveyed By*	Condition Assessment	Risk from Post-Fire Watershed Events	Proposed BAER Treatment
023W trough	RE, DF	Dry, spring notebook says it is fed from valve in station. Capt was not there and other engine crew members did not have knowledge of the spring.	No	
05W guzzler	DF, EW, JZ	clean, dry, wattles installed after sheep fire seemed to have held some sediment. Need to removed burned wattles and install new ones	Yes - sediment	Install sediment deflectors
11W trough	DF, EW, JZ	clean, dry, not connected, pipe located running up canyon toward spring 02W	Yes - sediment	
02W Tank	DF, EW, JZ	dry, not sure if it was just a tank for PCT hikers	No	
11W trough (upper)	DF, EW, JZ	clean, dry, not connected, some tubing located running up canyon toward spring 02W	Yes - sediment	
02W Spring	DF, EW, JZ	damp seep, not much flow. Small trough nearby was not connected to spring, evidence of tubing was present. Steel pipe running from small trough downslope toward other troughs	Yes - sediment	
Spring 03W	DF, EW, JZ	did not visit spring site but looked at area. Site is outside burned area and is not threatened from post fire events	No	
guzzler 21W	DF, EW, JZ	fiberglass guzzler, destroyed by fire. Needs to be removed	Yes	Removal
valverne spring	DF, EW, JZ	did not visit spring site but looked at area. Site is outside burned area and is not threatened from post fire events	No	
trough 05W	DF, CG	UTL, area is overgrown with riparian vegetation. In an unburned section of the canyon. May be threatened by debris flows coming from upstream.	Yes - debris flows	Install sediment deflectors
blue cut spring	DF, CG	UTL, area pretty dry	No?	
guzzler 03W	DF, CG	clean, well maintained, water in catch basin. Upper edge was above sediment level, potential threat from debris flows	Yes - debris flows	Install sediment deflectors
guzzler 02W	DF, CG	filled with sand, next to wash coming off of South bound 15 fwy. Channel moved, wattles may help, needs to be cleaned. High threat due to proximity to north and bluecut fires.	Yes - debris flows and sediment	Install sediment deflectors

APPENDIX A: DEVELOPED WATER SOURCE CONDITION ASSESSMENT

Spring/ Trough/ Guzzler	Surveyed By*	Condition Assessment	Risk from Post-Fire Watershed Events	Proposed BAER Treatment
guzzler 10W	DF, CG	clean, in good shape. Fence around it is coming down, Not sure if fence is needed. No threats from post fire events. Bobcat living in tank.	No	
guzzler 25W	DF, CG	clean, well maintained. No threats from post fire events	No	
guzzler 24W	DF, CG	clean, well maintained, water in catch basin. In unburned area. Lots of wildlife sign. No threats from post fire events.	No	
guzzler 08W	DF, CG	clean, well maintained, low threat from debris coming downslope from road/fire above. Wattles may help keep debris out of guzzler.	Yes - debris and sediment	Install sediment deflectors
guzzler 07W		not visited, looks like may need wattles based on topo map	Yes - sediment	Install sediment deflectors
guzzler 09W		Kim B said this one silts in and wattles may help. Not visited, looks like may need wattles based on topo map	Yes - sediment	Install sediment deflectors
guzzler 18W		not visited, looks like may need wattles based on topo map	Yes - sediment	Install sediment deflectors
guzzler 16W		not visited, access through private		
trough 13W		not visited, access through private		
trough 12W and Spring 1W (Tunnel fault spring)	Suppression Repair team	Spring is in the interior of fire. No suppression damage. High fire intensity has damaged riparian area	Yes - sediment	Install sediment deflectors
guzzler 05W (Lone Pine Guzzler)	Suppression Repair team	High severity fire, no suppression damage. Wattles up slope of the guzzler have burned	Yes - sediment	Install sediment deflectors
guzzler 11W (Crowder)	Suppression Repair team	Undamaged by fire. No suppression repair needed.	No	
trough 14W Lone Pine Spring Trough	Suppression Repair team	Undamaged. Outside the fire.	No	
Clyde Spring	Suppression Repair team	Undamaged. Outside the fire.	No	

**DF= Drew Farr, RE= Robin Eliason, EW= Emma Williams, CG= Cesar Garcia*

APPENDIX B: Other Wildlife Species of Interest Affected by the Blue Cut Fire

Summary

The following Forest Service Sensitive species are known from or have the potential to occur in/near the fire: two-striped garter snake, northern three-lined boa, southern California legless lizard, San Bernardino mountain kingsnake, San Bernardino ringneck snake, San Gabriel Mountains slender salamander, California spotted owl, migrant willow flycatcher, fringed myotis, pallid bat, Townsend's big-eared bat, and San Gabriel mountains bighorn sheep. Western pond turtles historically occurred in Lone Pine Canyon.

Watchlist species known from the Blue Cut Fire area include: long-legged myotis, long-eared myotis, silver-haired bat, hoary bat, coast horned lizard, common poorwill, western bonneted bat, western small-footed bat, Cooper's hawk, osprey, golden eagle, prairie falcon, peregrine falcon, long-eared owl, common yellowthroat, gray flycatcher, hermit thrush, Swainson's thrush, purple martin, Lawrence's goldfinch, MacGillivray's warbler, olive-sided flycatcher, Bell's sparrow, warbling vireo, solitary vireo, yellow warbler, yellow-headed blackbird, yellow-breasted chat, American badger, mountain lion, and San Diego pocket mouse.

Non-natives known from the Blue Cut fire area include brown-headed cowbirds, bullfrogs, European starling, and red-eared slider. Sport fish existed in Lost Lake where some game fish were stocked. No other sport fish exist in the Blue Cut fire area.

The above-mentioned species and their habitats within the fire perimeter have been affected by the fire and suppression activities. The habitats and species occurrences are at risk to further losses, disturbances, and habitat degradation from post-fire watershed events. For aquatic/riparian species, these impacts include reduced water quality and changes in water chemistry due to ash delivery, hazardous materials, and changes in water temperature from loss of canopy shading; scouring of riparian/aquatic vegetation and changes in streambed/pool habitat due to debris flows and sediment delivery; flushing of species during flood events downstream and the potential for localized extirpations due to barriers that prevent re-colonization.

For all species, there is a concern that until enough vegetative recovery (3-5 years or longer) has occurred to deter off-road vehicle use, habitat degradation may occur. Increased access and visibility due to lack of vegetative cover will result in habitat degradation, disturbance of species, and increased risk of collection for species such as tortoises, tadpoles, fish, etc.

Another concern for all species is the spread of non-native plants and animals into rare species and general wildlife habitat. Post-fire events may facilitate the spread of non-native aquatic species into previously unoccupied habitats. This concern is elevated for streams with special status species where high water flows have the potential for washing non-native aquatic species into downstream reaches beyond their original location.

The greatest risk to all wildlife habitats and species are the cumulative effects of fire, post-fire watershed impacts, and the potential long-term disturbance and habitat impacts from increased access by people and driving off of official system roads/trails. It is expected that a minimum of 3-5 years may be needed for this initial and critical phase of vegetation recovery.

APPENDIX B: Other Wildlife Species of Interest Affected by the Blue Cut Fire

General Wildlife Habitat Condition Assessment: Situated between urban areas and desert habitat, the San Bernardino Mountains function as an island of wildlife habitat. The fire area supports multiple vegetative communities and a wide range of native wildlife species. As vegetation recovers, wildlife in the fire area will once again recolonize. Species dependent on mixed conifer stands will be affected the longest since it will be decades before timbered areas will be established again. Until vegetation in the area recovers, native wildlife species within the fire area will experience a shortage of shelter and escape. Some species may have difficulty finding adequate food supplies and breeding sites, including many species of neotropical migratory birds that nest in this area.

Stopover riparian habitat for migrating birds continues to decline in availability and quality. Stopover habitat is critical for foraging and resting and when it is not available, survivorship for all species of migrating birds is affected. The fire has affected availability of chaparral, riparian, and conifer habitat for migratory birds. The predicted watershed responses of flooding, debris flows, and sedimentation will likely hinder recovery of riparian vegetation for several years. As watersheds stabilize over the next 3-5 years, riparian vegetation should recover and once again provide suitable habitat for nesting and foraging birds.

Human use of the burn area is one of the primary concerns related to post-fire recovery of habitat and species. In much of the burn area, shrubs and trees that may have once screened areas from public view are now gone. People traveling roads and trails are now able to see areas that were previously undetected. Without dense vegetation to block their access, there is an increased risk of individuals seeking out new areas to explore by foot or by using motorcycles, 4-wheel drives, and bicycles.

Without vegetative screening to block the view and impede access, dispersed recreation activities (*e.g.*, off-road driving and biking, fishing, picnicking, waterplay, camping, hiking, etc.) will increase. Habitats at greatest risk include streams, ponds and wet meadows. Changes in access and dispersed recreation use will hinder vegetative recovery, result in higher disturbance to already-stressed animals, increase the risk of rare animals (such as desert tortoise) being collected for pets, and increase the risk of introduction/spread of non-native plants and animals.

Within the fire area, there are documented occurrences of non-native species with the potential to affect native species, including some of the TES species. Many of these non-native animals are riparian associates (bass, bluegill, mosquitofish, carp, koi, goldfish, bullfrog, and red-eared sliders). Others, like European starling and brown-headed cowbird, compete with or displace native birds. Non-native species compete for resources, displace native animals, modify habitats, and pose predation threats to native fish, amphibians and reptiles.

Sport Fisheries Habitat Condition Assessment

The only site in the fire area where fishing occurs was Lost Lake where there were a number of different stocked or dumped non-native fish species. This was a popular recreation fishing site. However, the extended drought had lowered the water level progressively in late 2015. By late-summer 2016, Lost Lake was essentially dry and lacked fish. It is possible that seismic activity or nearby well drilling could have also contributed to Lost Lake going dry but neither of those have been investigated or validated.

APPENDIX B: Other Wildlife Species of Interest Affected by the Blue Cut Fire

The Blue Cut BAER team predicted some post-fire sediment delivery to Lost Lake. Given the current conditions, no effects to sport fisheries are expected. If Lost Lake fills up and fish are re-introduced, post-fire sediment may affect water quality and fish during/after storm events even for a few years post-fire.

Condition Assessments - Forest Service Sensitive Fish

Santa Ana Speckled Dace Condition Assessment: Santa Ana speckled dace (*Rhinichthys osculus*) is a Sensitive species. This taxon occupies only remnants of its historical range, with a limited distribution in the headwaters of the Santa Ana and San Gabriel Rivers. On the San Bernardino National Forest, small Santa Ana speckled dace populations are reported from the main stem of Lytle Creek, Cajon Wash, Lone Pine Canyon, Strawberry Creek, Plunge Creek, City Creek, Mill Creek (*i.e.*, a population was found just downstream of the San Bernardino National Forest boundary in August 1997, but has not been observed since flash flood event in September 1997 and the South Fork of the San Jacinto River. Flood control structures that do not allow fish migration have isolated forest populations.

Santa Ana speckled dace inhabits a number of stream and channel types, small springs, brooks, and pools in intermittent streams and large rivers. In general, this species requires abundant cover and well-oxygenated clear water flowing over shallow cobble and gravel riffles. The preferred summer water temperature is 63 º F–68 º F. In one study for the San Gabriel River, adult Santa Ana speckled dace show a preference for gravel substrate and a lesser preference for cobble substrate, a preference for flowing habitats (riffle, run, glide), and variability in depth preference. Juveniles show a preference for sand and gravel, pool and riffle habitat. In this same study, fry were found exclusively in edgewater habitat over silt at depths of less than 17 cm where there was no measurable.

Maturation is most likely to occur by two years. Spawning takes place throughout the summer and peaks during June and July. Rising water temperatures and flows in intermittent streams may induce spawning. Spawning occurs over rocks and gravel, where the larvae remain until emerging and moving to warm shallow areas in the stream. Speckled dace appear to be moderately tolerant of high water temperatures and low dissolved oxygen. Recruitment success can be low during high-flow years. Flooding contributes to the downstream dispersal of the species. Santa Ana speckled dace generally feed on small benthic invertebrates such as larvae of hydropsychid caddisflies, baetid mayflies, and chironomid and simuliid midges.

Lytle Creek and Cajon Creek/Wash may experience and loss of water quality (ash, sediment, debris) especially during the first storms, some flooding, and some localized debris, depending on the size of post-fire events. Dace in Cajon Creek/Wash may be more threatened than those in Lytle Creek. See the discussion under San Bernardino kangaroo rat for Lytle Creek and under arroyo toad for Cajon Creek/Wash.

Condition Assessments - Forest Service Sensitive Amphibians

San Gabriel Mountain Slender Salamander Condition Assessment: San Gabriel Mountain Slender Salamander (*Batrachoseps gabrieli*) is known from only a few localities, all in the eastern San Gabriel Mountains including Lytle Creek in the Blue Cut fire area.

APPENDIX B: Other Wildlife Species of Interest Affected by the Blue Cut Fire

San Gabriel Mountain slender salamander has been found on northwest-facing talus slopes or near water in mixed hardwood-conifer forest habitats containing oaks (*Quercus* spp.), pines (*Pinus* spp.), big cone Douglas-fir (*Pseudotsuga macrocarpa*), white fir (*Abies concolor*), California laurel (*Umbellularia californica*), Oregon big-leaf maple (*Acer macrophyllum*), and incense cedar (*Calocedrus decurrens*). The known elevational range of this salamander is 3,800–7,780 feet. When active near the surface, San Gabriel Mountain slender salamander typically occurs in talus and under large rocks, rotting logs, downed tree limbs, and bark. Specimens have been collected within 50 feet of a stream.

Surface activity of San Gabriel Mountain slender salamander is probably limited to a few months in the winter and early spring. Individuals are relatively common during February and March near the surface, even when soil surface temperature is just above freezing. Presumably, these salamanders move deep within the talus, where conditions are cooler and moister, during the dry months of summer and early fall.

If San Gabriel Mountain slender salamander conforms to patterns exhibited by Tehachapi slender salamander (*Batrachoseps stebbinsi*), which resembles it and is also a talus dweller, it forages in leaf litter and under bark and rotten logs for food. The two species' diets may also be similar, consisting of small spiders, mites, and various insects.

Eggs and larval salamanders in the aquatic systems could be affected by high flows, scouring, sediment loading and/or debris torrents. Sediment delivery and debris flows can reduce water quality, silt egg-laying sites and reduce prey availability. Water quality may be affected by increases in sediment delivery, ash deposition, debris flows, and changes in turbidity. Larval salamanders can be killed if buried or suffocated by sediment. Excessive inputs of ash may cause localized changes in water pH and degrade conditions. As adults, this species is found in rocky areas and talas slopes.

Adult salamanders and their habitat may be impacted by rock slides and debris flows. Depending on the size of post-fire events, Lytle Creek may experience some localized debris flows and loss of water quality. Effects to salamanders would vary depending on the life stage and timing of post-fire watershed response events. Adults in the upland will experience less risk than eggs or larval salamanders tied to the aquatic systems.

Condition Assessments - Forest Service Sensitive Reptiles

Two-Striped Garter Snake Condition Assessment: The two-striped garter snake is a Forest Service Sensitive species. This species inhabits streams and ponds and preys on aquatic invertebrates, tadpoles, small fish, frogs, and toads. They are expected to occur in all watersheds within the burn area. Two-striped garter snakes are known from the riparian areas within the fire area.

It is likely that individual two-striped garter snakes will be injured or killed during debris flows, rockfalls/landslides, and flooding. The level of direct impacts would vary depending on time of year of the storm event and the location of the snakes in the landscape relative to the flows and slide activity.

APPENDIX B: Other Wildlife Species of Interest Affected by the Blue Cut Fire

Prior to the fire, some of the areas occupied by two-striped garter snakes were shielded by dense vegetation. The visual and physical barriers created by the dense vegetation helped deter recreation and illegal OHV use in the area. With vegetation along roads, trails and streams now gone in places, the riparian/aquatic habitat is at high risk of increased disturbance associated with waterplay and dispersed recreation. Waterplay and dispersed recreation can result in the following impacts to two-striped garter snakes and their habitat: harassment, injury, death, increased risk of collection, decreased water quality and impacts to streambanks and riparian vegetation. Pedestrian, bicycle and OHV traffic can delay vegetative recovery and stream restoration. Occupied areas are also at risk of loss of habitat quality if non-native plants spread or become established in the riparian/aquatic habitat.

In summary, primary concerns for the two-striped garter snake are associated with the potential for individuals to be injured or killed by debris flows, floods and rock slides. The prey base for this species is compromised and this could result in additional stress to foraging individuals. Occupied areas are also at risk for the introduction of non-native plants and animals that would further degrade habitat quality and impact the snake through predation, competition and disease introduction. The loss of vegetative barriers/screens and the resulting recreation use presents a risk to the two-striped garter snake and its habitat.

Sensitive Terrestrial Reptiles Condition Assessment: Forest Service Sensitive reptiles known from within the fire area include the following: San Bernardino mountain kingsnake, San Bernardino ringneck snake, orange-throated whiptail, and southern California legless lizard.

All of these species are at increased risk of disturbance, injury or mortality. With cover, foraging and reproductive habitat either reduced or completely removed, these species are especially vulnerable to additional environmental stressors. Individuals and their habitat may be impacted by rock slides, debris flows and flooding. Anthropogenic stressors will most likely be associated with recreation activities.

Prior to the fire, many of the areas occupied by these species were shielded by dense vegetation. The visual and physical barriers created by the dense vegetation helped deter recreation and illegal OHV use in the area. With vegetation along roads, trails and streams now gone, suitable habitat is at high risk of increased disturbance associated with dispersed recreation. Dispersed recreation can result in the following impacts to these species and their habitat: harassment, injury, death, increased risk of collection, decreased water quality and impacts to streambanks and riparian vegetation. Pedestrian, bicycle and OHV traffic can delay vegetative recovery and stream restoration.

An increase in the abundance and distribution of non-native plant and wildlife species is anticipated and will negatively impact habitat and populations of sensitive reptile species. Vehicles, bicycles, horses and pedestrian traffic may increase the potential for introduction of non-native plants into previously unoccupied areas.

APPENDIX B: Other Wildlife Species of Interest Affected by the Blue Cut Fire

Condition Assessments – Forest Service Sensitive Birds

California Spotted Owl Condition Assessment: California spotted owls are a Forest Service Sensitive species. Spotted owls are found in mature forests, typically where there is a dense, multi-layered canopy. They use a wide range of wooded and forested habitats and nest stands often have a well-developed hardwood understory. However, some high-elevation territories (above 6,500 feet) consist primarily or solely of conifers and some low-elevation territories (below 3,000 feet) are found in pure hardwood stands. At lower elevations, they occur in coast live oak, alder, and sycamore woodlands along riparian areas. At higher elevations, they occur in mixed conifer/hardwood forests, and are often associated with big cone Douglas-fir and black oak.

California spotted owls are a territorial species with large acreage requirements (at least 300 acres of mature forest per pair), spotted owls in southern California are clustered in disjunct mountain and foothill areas where suitable habitat exists. These clusters are often surrounded by large areas of unsuitable habitat.

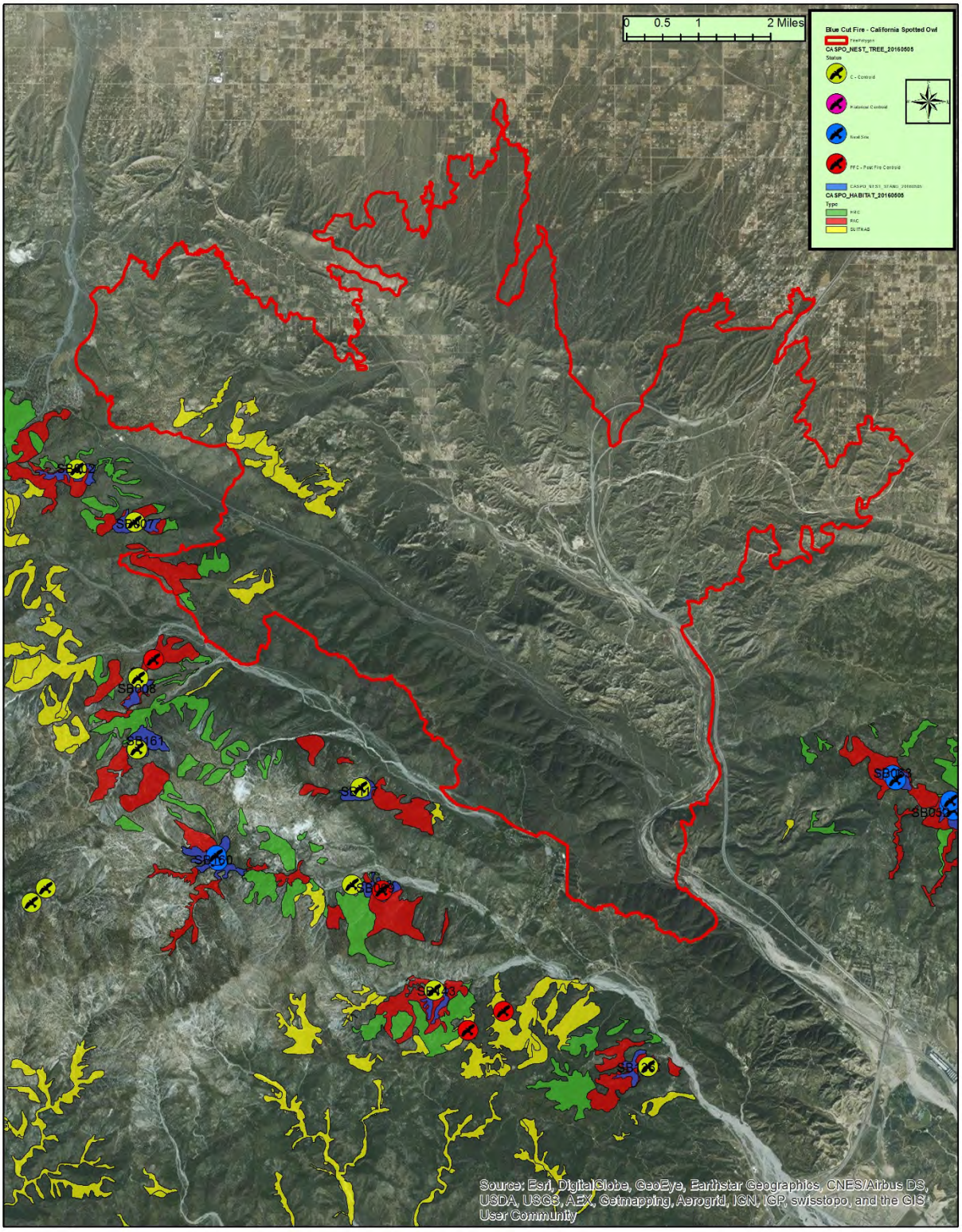
Spotted owl response to fire in southern California is not well documented. While early seral habitats may provide suitable foraging habitat, this will be of little benefit to birds if suitable roosting and nesting habitat is not available in close proximity. Understory burns in forested stands may benefit spotted owls by opening up additional foraging habitat. If mortality in the overstory reduces canopy closure, this could decrease the suitability of nesting habitat.

There is one spotted owl territory (Upper Lone Pine Canyon – SB007) that has Protected Activity Center and Home Range Core mapped in the fire perimeter (see the map packet). There is also mapped Suitable habitat within the fire boundary.

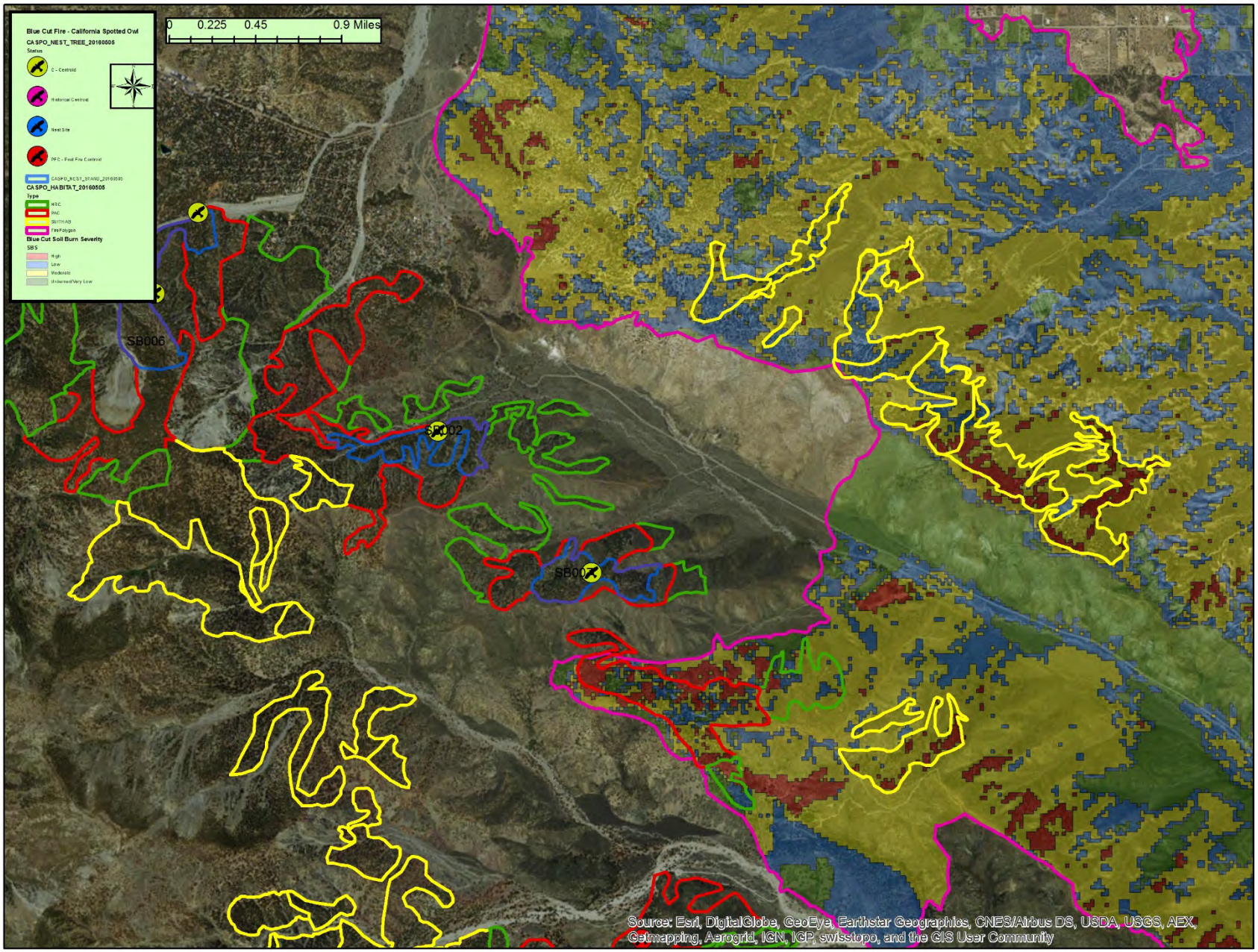
Mapped Owl Habitat	
Soil Burn Severity	**Acres**
Upper Lone Pine Canyon (SB007)	
Outside the Fire Perimeter	288.30
Unburned/Very Low	20.45
Low	48.80
Moderate	107.32
High	56.31
TOTAL for SB007	**572.18**
Mapped Suitable Habitat	
Unburned/Very Low	1.85
Low	108.62
Moderate	344.38
High	101.10

The Lone Pine Canyon Nest Stand did not burn; it is outside the fire perimeter. Many of the bigcone Douglas fir trees along 3N31Y had brown needles but did not appear to have had the trunks burned enough to girdle the trees. It is possible that the needles died from heat and the

trees may not be dead. **It is recommended that the trees be re-assessed by a forester next spring to determine if they are alive and not assumed that they are dead.**



APPENDIX B: Other Wildlife Species of Interest Affected by the Blue Cut Fire



APPENDIX B: Other Wildlife Species of Interest Affected by the Blue Cut Fire

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Condition Assessments - Mammals

Sensitive Bat Condition Assessment: The Blue Cut Fire area provides habitat for two Forest Service Sensitive bats: Townsend's big-eared bat, fringed bat and pallid bat. A number of other bat species not included on the Forest Service Sensitive list are known from the fire area and are as follows: western small-footed myotis, long-eared myotis, little brown myotis, long-legged myotis, Yuma myotis, western red bat, spotted bat, western bonneted bat, hoary bat, and silver-haired bat.

Tree-roosting bats likely experienced injury or mortality as a direct result of the fire. All bat species have experienced a loss of foraging habitat and a modified prey base.

No abandoned mines are recorded in the fire area. Fire can eliminate vegetation that previously concealed mine adits from view or deterred access. In those cases, it takes years for vegetation to recover enough to provide screening for these mines. If there are mine adits with bat habitat that are not known, they could be affected. Other than that, post-fire watershed responses are unlikely to directly affect bats.

APPENDIX C: BAER Treatment Design Features

Design Features were developed for BAER treatments that will be implemented in Threatened and Endangered species habitat. **These measures will also be given to cooperators (*e.g.*, utilities, railroads, special use permittees, Caltrans, SCE, S. CA gas, County of San Bernardino, Union Pacific Railroad, BNSF railroad, Kinder Morgan, LA DWP, etc.) who propose to implement emergency actions on NFS lands.** These measures were included in the Emergency Consultation with U.S. Fish and Wildlife Service initiated by the SBNF for emergency actions related to the Blue Cut fire.

Design Features for Threatened/Endangered Species/Habitat Protection – Slender-horned spineflower, arroyo toad, San Bernardino kangaroo rat, southwestern willow flycatcher, least Bell's vireo, and desert tortoise

- Where work is conducted in or near T/E habitat or Critical Habitat, a biological monitor will be present.
- A biological will be present for work planned in occupied or Critical Habitat for arroyo toad, San Bernardino kangaroo rat, and desert tortoise. To protect animals in burrows, the biologist will work with crews to avoid equipment use and walking in habitat suitable for burrowing by arroyo toad, San Bernardino kangaroo rat, and desert tortoise. Pre-work surveys will look for active burrows and mark them for avoidance. Monitors will be on site to ensure that avoidance happens and to watch for individuals.
- Where work is conducted where water is present, a biologist will survey for arroyo toad tadpoles and egg masses. If any are found, those areas will be avoided.
- Vehicles will avoid areas that have water present. If crossings are necessary, the biologist will identify a crossing with the least likelihood of affecting aquatic habitat and water quality. The number of vehicles crossing wet crossings should be limited to the greatest extent possible.
- Where work is planned in suitable habitat for southwestern willow flycatcher or least Bell's vireo, a biologist will flag suitable habitat and guide crews to minimize activities that would degrade habitat conditions (riparian vegetation).
- Following the Forest Service guidelines, all vehicles and equipment coming on to NFS lands will be washed and inspected to minimize the risk of introducing and transporting non-native species to the site.
- Project administrators, inspectors, and personnel will be provided information on rare animals, rare plants, and weeds within project areas and provided direction for what to do if those species are encountered (including notification of a district biologist or botanist).
- Observations of any sensitive species or their diagnostic signs during project activities will be conveyed to the project field supervisor the day observed. The field supervisor will convey this information to the District Biologist.
- Nighttime (after dusk and before dawn) work (and use of artificial lighting) will not be permitted unless under special permission from the Forest Service.
- No side-casting of materials is permitted.
- Temporary overburden piles would be stored in road bed or other previously-disturbed site/clearing. Exceptions would require Forest Service approval.
- Pursuant to Forest Service Manual (FSM) Section 2081.03 guidelines for weed control, all equipment, vehicles, and tools (*e.g.*, augers, chain saws, hand clippers, pruners, etc.)

will be washed with a high pressure water/air system before entering the SBNF and before moving to new project sites. A wash log will be kept with the crew at all times. If a biological monitor is present, they will also retain a copy of the wash log.

- All material from off-site sources (fill, base material, fill, rock and gravel, straw, mulch, etc.) used for erosion control, rehabilitation of temporary routes/landings, and/or route maintenance must be certified weed-free (S-6, LMP Part 3, p. 5). Fill material will be dry before transporting to the site to minimize the risk of introducing non-native aquatic plants, pathogens, and invertebrates (*e.g.*, snails, mussels, chytrid, etc.).
- Project personnel will not bring pets to the work sites.
- Feeding of all wildlife is prohibited.
- Collecting of any wildlife or plants is prohibited.
- Trash and food shall be contained in closed containers and removed from the job site daily to reduce attractiveness to opportunistic wildlife species. All construction debris will be removed at the end of the job.
- If bird nests are found during project implementation, activities will cease in the immediate area until the Project/District Biologist is notified. The biologist will determine whether activities may resume or whether to stop activities until young have fledged and the nest is vacant (as determined by the project biologist).
- Crews will not intentionally injure or kill wildlife species (including snakes). Instead, animals will be allowed to leave the work area before work resumes.
- The project manager will coordinate with the biologist to minimize disturbance of existing downed logs and rock outcrops that are suitable for rare species. If disturbance is unavoidable, a biologist may need to be present to monitor for sensitive species during disturbance of the habitat. Equipment, supplies, materials, and soil/gravel, etc. will not be stored on or against logs or rock outcrops.