TECHNICAL SPECIALIST REPORT-BAER

Resource: Botany
Fire Name: Blue Cut Month/Year: August 2016
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San Bernardino National Forest

I. Resource Condition Assessment

A. Resource Setting

The Blue Cut Fire began on Tuesday, August 16th, 2016 in Cajon Pass along Old Cajon Blvd., and burned a total of 36,240 acres of San Bernardino NF. The major plant communities affected by the fire include chamise chaparral, mixed chaparral, big cone douglas fir forest, singleleaf pinyon woodland, Joshua tree woodland, canyon live oak woodland, desert transition scrub oak, alluvial scrub, and cottonwood/willow/sycamore riparian scrub.

Chamise and mixed chaparral are the dominant vegetation communities below 6,500ft in the burn. Chamise chaparral occurs on south and west facing slopes and mixed chaparral predominately occupies northern slopes, drainages, and all slopes at elevations over 3,000 feet within the burn area. These vegetation types are dominated by chamise (*Adenostoma fasciculatum*), bigberry manzanita (*Arctostaphylos glauca),* hoaryleaf ceanothus (*Ceanothus crassifolius*), birchleaf mountain-mahogany (*Cercocarpus betuloides*), scrub oak (*Quercus berberidifolia*), California buckwheat (*Eriogonum fasiculatum*), chaparral yucca (*Hesperoyucca whipplei*), hairyleaf yerba santa (*Eriodictyon crassifolius*), and sugar bush (*Rhus ovata*). Most of the chaparral vegetation burned at a moderate intensity. These plants have evolved with fire and will rapidly regenerate in the burn by sprouting and/or seeding. Fire usually kills any seed on the ground surface, however, buried seed remains insulated from extreme temperatures. Some species, especially those of ceanothus, manzanita, and fire-following herbs, are obligate seeders after fire. Chaparral vegetation recovery will be lower in areas previously disturbed by fuelbreaks and some dozerlines constructed during the 2009 Sheep Fire, 2003 Lytle Fire, and 2002 Blue Cut and Louisiana fires. These fuelbreaks and dozerlines were already in the process of type converting from chaparral vegetation to non-native annual grasslands. Repeated ground disturbance will allow for a further increase in non-native plant dominance in the fuelbreaks. Furthermore, the burn has opened up the chaparral canopy, creating opportunities for weed seed in soil adjacent to fuelbreaks to germinate and outcompete native vegetation, thereby allowing for the continued spread of type converting non-native annuals.

Stands of big-cone Douglas fir (*Pseudotsuga menziesii*) occur on north facing slopes and drainages along Lytle Creek Ridge Road and the north facing ridgeline running west of Circle Mountain above 4,500 feet. In 2009, the Sheep fire burned the stands on the south facing slopes of Gobbler's Knob along 3N35. The Blue Cut fire mostly burned around and underneath these stands at a moderate intensity, resulting in observed big cone Douglas fir mortality. Big-cone Douglas firs will sprout after fire; however, the condition of saplings and small burned trees is unclear, and re-sprout depends on burn severity. Given that the affected stands experienced low to moderate burn intensity, higher mortality is expected in trees that were affected by bark beetle and drought before the fire. With the persistence of drought, potential for type conversion to mixed chaparral exists in high intensity burn areas. Mature stands that experienced lower burn intensity will sprout post-fire.

Jeffrey pine forest occurs in a few stands in the higher elevations of Circle Mountain, east of Wrightwood, and burned at low to moderate severity. Jeffrey pine is considered highly fire resistant due to its thick bark, self-pruning branches, and high moisture content needles. Jeffrey pine historically has had short fire intervals of between 9 and 24 years, with these generally being low intensity understory burns. However, fire suppression activities in recent years may lead to an increased understory fuel load and bring higher intensity fires over longer intervals. Portions of the Jeffrey pine stands appear to have most recently burned in 1928, 1940, and 1960.

Singleleaf pinyon pine occurs in the northwest corner of the fire, east of Wrightwood and south of SR-2, generally in the vicinity of Circle Mountain (Photo). Singleleaf pinyon pine is very susceptible to intense fire due to its thin bark and lack of self-pruning. Research has shown that single leaf pinyon can survive a small amount of crown torch, but suffers 100 percent fatality after two-thirds crown scorch. Over half of the pinyon pine communities burned in moderate to high soil burn severity. Historical fire data shows that much of the pinyon community in the fire last burned in 1960, with a smaller portion burning in 1928. The intensities of these fires aren't known. Singleleaf pinyon is very slow growing, requiring 35 years to produce reproductive cones, and 75-100 years to produce full seed crops. Before the introduction of non-native annual grasses which carry a ground fire between trees, fires would have occurred over a longer interval. Shortened fire intervals may lead to type conversion from pinyon forest to chaparral.

Joshua tree woodland is located in the northern sections of the burn along SR-138 and along SR-2 near Wrightwood. The fire burned at low to moderate severity in these areas (Photo). Joshua trees may sprout from the root crown, rhizomes, or branches following fire. Resprouting may be more frequent in populations above 4000 feet elevation. Fire return intervals in desert ecosystems are generally in the range of 35 to 100 years. Fires in Joshua tree woodland were historically rare, only increasing more recently with the introduction of non-native grasses which alter the fuel structure of the ecosystem. According to historical fire data, the majority of Joshua tree stands in the fire have burned within the last 100 years, including large stands east of SR-138 in the 1999 Turtle Fire.

Canyon live oak woodland mostly occurs throughout the north-facing canyons in the north western section of the burn area. Along Upper Lytle Creek Ridge it contributes to big-cone Douglas fir-canyon live oak forest within a matrix of chaparral. In the Horse Canyon and Circle Mountain it co-occurs with singleaf pinyon and Fremont's flannel bush. These areas burns at a moderate to high severity and oaks will re-sprout from the root crown and bole after fire. Open patches close to the road may be vulnerable to non-native plant invasions and type conversion. The canyon oak community types within the Blue Cut burn area established under a 30-125 year fire return interval. The majority of stands burned in 1960 or in the 2009 Sheep Fire. Stands that burned in the Sheep fire are at risk of type conversion to chaparral or non-native annual grasslands.

Riversidean alluvial fan scrub occurs within the major drainages of the fire: in Lone Pine Canyon, near Lytle Creek, and in Cajon Wash, and generally burned at low to moderate severity. Alluvial fan scrub occurs in and around flood channels and can experience infrequent but severe flood events. Plants found in this community include scalebroom, yerba santa, California buckwheat, as well as low density cover of many other sagebrush and chaparral species. This is also the habitat for the Federally-listed slenderhorn spineflower, which can grow on stable benches above and adjacent to the stream channel. Although these habitats experienced low to moderate fire severity it is possible but unlikely that the response of the large watershed area upstream could alter habitat condition through debris flows or erosion of benches from flooding..

Cottonwood/Sycamore riparian woodlands and willow scrub occur mostly along Cajon Wash on the southeastern edge of the fire, but also in scattered drainages throughout the burn. Cottonwood, sycamore, and coast live oak generally occur in the larger drainages, with willow scrub and baccharis found more scattered throughout the intermittent drainages. The riparian vegetation generally burned at low to moderate severity, but there were some areas of high severity in Cajon Wash. Much of Cajon Wash last burned in the 2002 Louisiana fire, with large sections of the wash also burning in 1964 and 1928. Riparian areas that burned in low intensity will readily resprout, but high severity areas may be vulnerable to non-native grass and forb invasion as well as vegetation type conversion.

Invasive weed species: Giant reed (*Arundo donax*), wild oaks (*Avena* spp), cheat grass (*Bromus tectorum)*, rip gut brome (*Bromus diandrus*), bull thistle (*Cirsium vulgare*), Uruguayan pampas grass (*Cortaderia selloana*), sweet fennel (*Foeniculum vulgare*), shortpod mustard (*Hirschfeldia incana*), broadleaved pepperweed (*Lepidium latifolium*), tree tobacco (*Nicotiana glauca*), Russian thistle (*Salsola tragus*), tumble mustard (*Sisymbrium altissimum*), Spanish broom (*Spartium junceum*), Smilo grass (*Stipa miliacea*) and saltcedar (*Tamarix ramosissima*) are known to occur within the burn area.

Habitat disturbance by non-native plants, increased fire frequencies, and fire suppression activities that affect post-fire native succession may influence vegetation-type conversion and lead altered fire regimes. Type-converted areas likely experienced multiple fire events and short fire return intervals during a season. Close to 57% of the Blue Cut Fire was burned within the last 30 years. Some of these areas, especially dozerlines and roads, are disturbed and type-converted due to previous fires and suppression activities.

Table 1. Fire History and Area in Blue Cut Burn Area. Also, see Figure 1.

Fire Name	Fire Year	Years Since Fire	Acres	Percent Cover
Stockton	1991	20-30	18	0.05%
Crowder	1995	20-30	1252	3.46%
Elliot	1999	10-20	944	2.60%
Turtle	1999	10-20	2133	5.89%
Blue Cut (2002)	2002	10-20	3198	8.82%
Louisiana	2002	10-20	5192	14.33%
Grandprix	2003	10-20	53	0.15%
Runway	2004	10-20	1079	2.98%
Sheep	2009	0-10	5635	15.55%
Hill	2011	0-10	769	2.12%
North	2015	0-10	219	0.61%
Blue Cut (2016)	2016	0	36240	100.00%

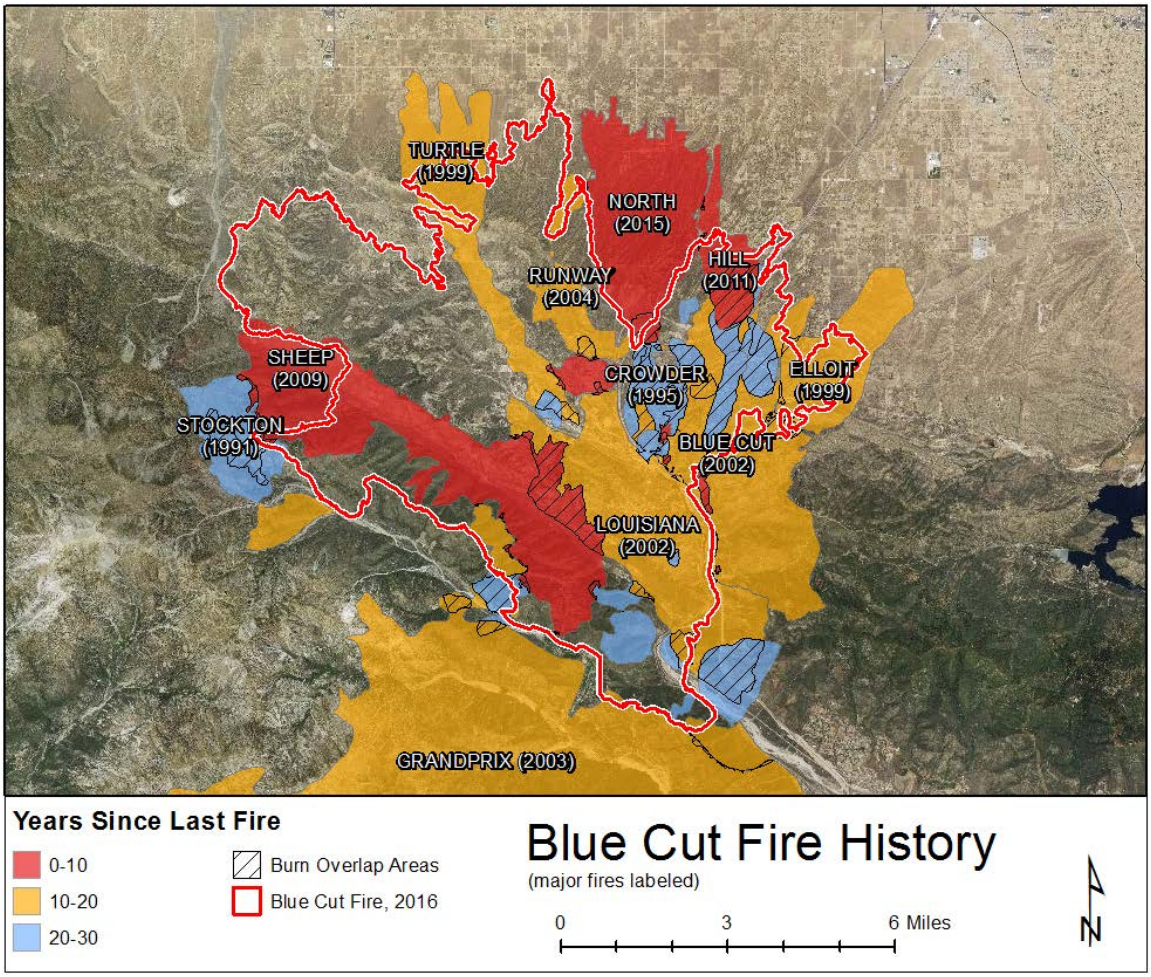

Figure 1. Fire History within Blue Cut fire perimeter. Areas that have experienced previous fires within the burn perimeter are more likely to be type converted. Areas highlighted with cross hatching may already be converted or are highly likely to be type converted since these places have experienced multiple fires within the last 30 years.

B. Findings of on-the ground survey

Values at risk: During fire suppression activities, 5 drop points and 31.5 miles of dozer/hand line were constructed on Forest Service lands. The fire also impacted 29 miles of trails and 77 miles of roads. These may all serve as weed dispersal corridors. Dispersal of weeds from fire equipment movement poses a significant risk to native plant post-fire regeneration. Even though a weed washing station was brought in, seed could have been transported into the burn on suppression vehicles and equipment that arrived on the fire before the washing station was established. This increases the possibility of suppression equipment acting as weed vectors. Roadsides, dozerlines and handlines will be most impacted by this threat.

Rare Species:
The potential values at risk for rare plants inside the burn area are the stability and viability of sensitive plant populations and persistence of the endangered *Dodecahema leptocerus*. The Forest Service Sensitive plants have suitable habitat within the Blue Cut Fire area (see Table 2).

There is a documented occurrence of endangered plant *Dodecahema leptocerus* immediately downstream of the burn area in Cajon Wash. Current presence is confirmed with annual monitoring by the Forest Service in recent years.

Table 2. Forest Service Sensitive Plants and watch list species in the Blue Cut Fire Area

Scientific Name	Common Name	Location within Fire Area	Habitat
Astragalus lentiginosus var. antonius	San Antonio milkvetch	Lone Pine Canyon, and vicinity of Wrightwood	suitable habitat
Calochortus plummerae	Plummer's mariposa lily	Scattered throughout the southern half of the fire	suitable habitat
Castilleja plagiotoma	Mojave indian paintbrush	Scattered throughout the northern half of the fire	suitable habitat
Chorizanthe xanti var. leucotheca	White-bracted spineflower	Lytle Creek, Lone Pine Canyon, Cajon Boulevard	suitable habitat
Dodecahema leptoceras	Slenderhorn spineflower	Cajon wash, 0.25 miles outside of burn perimeter. No known occurrences in burn	suitable habitat
Eriogonum umbellatum var. minus	Alpine sulphur-flowered buckwheat	Cajon wash, and upper Lytle Creek Ridge	suitable habitat
Galium angustifolium ssp. gabrielense	San Antonio Canyon bedstraw	Vicinity of Lone Pine Canyon and Swarthout Canyon road	suitable habitat
Helianthus nuttallii ssp. parishii	Los Angeles sunflower	Species is presumed extinct. Historical records in Lone Pine Canyon	suitable habitat
Juglans californica	Southern California walnut	Vicinity of Cajon Boulevard and Swarthout Canyon road	suitable habitat
Lilium ocellatum ssp. humboldtii	Ocellated Humboldt lily	Unnamed canyon draining into Lone Pine Canyon	suitable habitat
Muhlenbergia californica	California Muhly	Cajon wash, south of Cosy Dell	suitable habitat
Opuntia basilaris ssp. brachyclada	Shortjoint beavertail	Scattered throughout northern half of the fire	suitable habitat
Schoenus nigricans	Black bog-rush	Swarthout Canyon road, Lytle Creek, Lone Pine canyon	suitable habitat
Symphyotrichum defoliatum	San Bernardino aster	Lone Pine Canyon nonspecific location	suitable habitat
Syntrichopappus lemmonii	Lemmon's syntrichopappus	Scattered throughout Cajon Canyon, and vicinity of Interstate 15	suitable habitat

Condition of values at risk:

The condition of the *Dodecahema leptocerus* occurrence on the benches in Cajon Wash is compromised due to competitive pressure from non-native annual grasses (Photo 1). Although this species occurrences is outside of the burn area, it is possible but unlikely that the response of the large watershed area upstream could alter habitat condition through debris flows or erosion of benches from flooding.

The condition of sensitive plant species in the burn area is not well known; though there is

suitable habitat for the sensitive species listed (Table 2), little data is provided on existing populations within the burn area. In general, threatened and sensitive plant species will persist given the following fire events are within the species' historical fire regime. However, altered fire patterns may impact and cause decline in species that are not adapted to frequent fire.

Weed Species:
Many areas in the burn area are dense with annual grasses and non-native annuals (see Noxious Weed Detection Survey Plan). For example, wild oats, ripgut brome, red brome, cheatgrass, tocalote, Russian thistle, and shortpod mustard were scattered throughout the fire area, with the highest concentrations occurring along roads. Many of the individuals were burned, however significant patches of infestations persisted and many of the seeds in the soil bank probably survived due to their high heat tolerance and low/moderate burn intensity. There is a high likelihood that these infestations could greatly hinder the regeneration of native vegetation, especially in the early seral stages, through increased fire intervals and competition for nutrients.

II. Emergency Determination

The unknowing introduction and dispersal of invasive weeds into areas disturbed by fire suppression and rehabilitation has the potential to establish persistent weed populations. In addition, it is highly likely that existent weed infestations will increase in the burn area, due to their accelerated growth and reproduction and a release from competition with natives. These weed populations could affect the structure and habitat function of native plant communities within the burn area. It is expected that most native vegetation would recover if weed invasions are minimized. The high potential for the Blue Cut Fire to increase the dominance of several invasive plant species on the Forest, especially in desert transition scrub oak, constitutes an emergency.

III. Treatments to Mitigate the Botanical Emergency

A. Treatment Type:
    1. Weed detection surveys
    2. Weed infestation treatment
    3. Treatment effectiveness monitoring

B. Treatment Objective:
    1. Accelerated vegetation re-growth/restoration
    2. Decreased disturbance and weed establishment/dispersal
    3. Early detection of weed invasions and consequent manageable eradication

C. Treatment Description:
    1. Conduct weed detection surveys (described in the weed detection survey report)

IV. Discussion/Summary/Recommendations

I recommend weed detection surveys for at least one year post fire, as there is a high potential for weed invasions (see Noxious Weed Detection Survey and Rapid Response Plan). Any new or expanding invasive species will be removed.

Caption: Slenderhorn spineflower habitat, at Cajon Wash, immediately southeast of fire perimeter	**Caption:** Burned singleleaf pinyon woodland, on 3N35 east of Circle Mountain
Caption: Joshua tree woodland along 3N35 west of HWY-138.	**Caption:**