USDA-FOREST SERVICE FS-2500-8
Date of Report: ***September 23, 2009***

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[X] 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

[ ] 2. Interim Report
[ ] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Station Fire

B. Fire Number: CA-ANF-3622

C. State: CA

D. County: Los Angeles

E. Region: 5

F. Forest: Angeles

G. District: Los Angeles River, San Gabriel River, Santa Clara/Mojave Rivers

H. Fire Incident Job Code: P5E5VL

I. Date Fire Started: August 26, 2009

J. Date Fire Contained: TBD (pending winter rains)

K. Suppression Cost: $86,967,661 as of 09/23/09

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 110 total miles of dozer line (46 on FS land)
2. Fireline seeded (miles): None to date
3. Other (identify): None

M. Watershed Number: M. Watershed Number: **HUC 6**: 180701050201 (Pacoima Wash), 180701050103 (Lower Big Tujunga Canyon), 180701050102 (Middle Big Tujunga Canyon), 180701050101 (Upper Big Tujunga Canyon), 180701050202 (Verdugo Wash), 1807010503992 (Arroyo Seco), 180701050402 (Eaton Wash), 180701050102 (Middle Big Tujunga Canyon), 180701060101 (Upper West Fork San Gabriel River), 180701060102 (Middle West Fork San Gabriel River), 180701020101 (Aliso Canyon), 180902060406 (Little Rock Reservoir), 180902060402 (Little Rock Creek), 180701020102 (Soledad Canyon-Arrastre Canyon), 180701020103 (Lower Soledad Canyon)

N. Total Acres Burned: 161,189
NFS Acres (154,431, 96%) Other Federal (50, 0.0003%) State ( ) Private (6,750, 4%)

O. Vegetation Types: Dominant vegetation types in the burned area consist primarily of shrubland, including lower montane mixed chaparral, ceanothus chaparral, scrub oak chaparral, chamise chaparral, upper montane mixed chaparral, desert transition chaparral, and soft scrub mixed chaparral. Upper slopes contain canyon live oak, interior mixed hardwood, and coast live oak vegetation, transitioning into bigcone Douglas-fir, ponderosa/Jeffrey pine, and mixed conifer vegetation. Single-leaf pinyon occurs on the north side of the burned area, and planted ornamental conifers are scattered throughout. Stream corridors contain riparian mixed hardwood, white alder, willow, cottonwood, and California sycamore vegetation types.

P. Dominant Soils: In descending prevalence: Xerorthents (Chilao, Trigo, Typic & Lithic), Xeropsamments (Pismo, Pacifico) and Haploxerolls (Caperton, Tollhouse).

Q. Geologic Types: San Gabriel Mountains geologic units within the Station Fire are predominantly Precambrian to Miocene granitic rocks, anorthosite, gabbro, amphibolite, granodiorite and others, and subordinate metamorphic rocks, mostly gneiss. They are heavily influenced by major and minor fault zones, often highly fractured and weathered. Canyon bottoms and mountain fronts frequently display Quaternary older alluvial deposits forming elevated, dissected terraces.

R. Miles of Stream Channels by Order or Class: Perennial Channels = 81 miles, Intermittent Channels = 572 miles, Artificial Channels = 5 miles (Stream Order 2 = 43.7 miles, Stream Order 3 = 169.2 miles, Stream Order 4 = 235.5 miles, Stream Order 5 = 132.5 miles, Stream Order 6 = 60.4 miles, Stream Order 7 = 10.4 miles, Stream Order 8 = 0.5 miles)

S. Transportation System

Trails: 223 miles USFS Trails Roads: 133 miles USFS Roads

PART III - WATERSHED CONDITION

A. Burn Severity by total and FS (acres derived from GIS):

Owner	Soil Burn Severity	Acres
Non Forest Service	High	198
	Moderate	3,574
	Low	1,823
	Unburned	1,162
Non Forest Service Total		6,758
USDA Forest Service	High	16,738
	Moderate	97,063
	Low	23,594
	Unburned	17,036
Forest Service Total		154,431
Grand Total		161,189

B. Hydrophobic Soils: Water repellency is present throughout the fire area, including unburned areas. Severity and continuity of is slightly higher in the moderate and high soil burn severity classes, but not dramatically unchanged from unburned condition. Overall, about 80,600 acres (50%) of the fire area has water repellent characteristics, with moderate severity of water repellency at one half to four inches thickness.

C. Soil Erosion Hazard Rating:

Very High – 81,397 acres
High – 31,162 acres
Moderate – 32,074 acres
Low – 13,058 acres
No Data – 2,109 acres

D. Erosion Potential:

ERMiT modeled erosion potential in tons/acre

	Storm Event		
	2 Year	10 Year	25 Year
Background	2	10	16
Post-Fire	10	36	59
Accelerated	8	26	44

The ERMiT model is storm event based; outputs represent a single event rather than over-winter.
Model accuracy assumes +/- 50%.

E. Sediment Potential: Steep linear slopes and steep stream gradients in the burned area result in virtually 100% erosion potential. Relic alluvial fans are deeply incised, and are not functioning as depositional features.

F. Debris Flow Potential: Debris-flow probabilities greater than 80 percent were calculated in response to short, high-intensity storms and longer, lower intensity storms for many of the tributaries to Big Tujunga Canyon, Pacoima Canyon, Arroyo Seco Canyon, West Fork of the San Gabriel River and Devils Canyon. This indicates the potential for significant debris-flow impact both in these drainages and downstream from the drainage area. Along the southern front, calculations for Haines, Cooks, Dunsmore, Pickens and Hall Beckley Canyons and four small watersheds immediately east of Arroyo Seco consistently yielded both high probabilities of occurrence and expected volumes greater than 100,000 cubic meters under short, high intensity storms.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3 - 5

B. Design Chance of Success, (percent): 80%

C. Equivalent Design Recurrence Interval, (years): 2

D. Design Storm Duration, (hours): 12

E. Design Storm Magnitude, (inches): 3.6

F. Design Flow, (cubic feet / second/ square mile): 10.5

G. Estimated Reduction in Infiltration, (percent): 26

H. Adjusted Design Flow, (cfs per square mile): 13.3

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

The Station Fire occurred within the San Gabriel Mountains in the Transverse Range of California, Los Angeles County, California. The burned area is roughly bounded on the east by Interstate 5, to the south by foothill communities from Pacoima to Altadena, north by Antelope Valley foothills and in the east by lands managed by the Angeles National Forest. The Fire burned a total of 161,189acres, of which 16,678 acres (10%) were within the Pleasant View and San Gabriel Wilderness areas. A total of 154,431 (96%) acres burned on National Forest System (NFS) lands and 6,758 (4%) acres burned on non-forest lands. The team assessed both the National Forest System (NFS) lands as well as the private lands burned by the fire. Approximately 73 percent of the entire burn was mapped as having a moderate and high soil burn severity (62% moderate and 11% high). The burn pattern of the fire was such that majority of the fire area burned at moderate soil severity. Soils on north facing slopes and small, discontinuous portions of the fire area have high soil burn severity characteristics. Areas with unburned and low soil burn severity fall within some drainage bottoms, along the fire perimeter and in the east portion of the fire area. See Soil Burn Severity Map in the Project File.

Summary of Watershed Response

The San Gabriel Mountains are some of the most tectonically active and rapidly uplifting mountains in the United States. The forces lifting the mountains to great heights are being counteracted by erosive forces tearing them down, such as gravity, moving water, wind, earthquakes and human activities. When the Station Fire removed vegetative cover and burned surface soil structure, slopes and channels became even more unstable than normal. Dry ravel has already increased dramatically across the entire burned area, and is adding large volumes of loose sediment to ephemeral channels and creek bottoms. Rocks which have lost their supporting vegetation on steep slopes have already started to roll down to roadways or canyon bottoms, or to places where they are stopped by obstructions or gentler slopes. Groundwater which previously fed vegetation is now surfacing as seeps and springs on some slopes and in canyon bottoms, and may initiate slope movements in some areas, even before the arrival of winter rains.

Deep seated rotational landslides and earthflows are relatively few in these mountains, but could occur in deep saturated slopes, especially if shaken by an earthquake. Many earthquake faults crisscross and boarder these mountains, and quakes could significantly increase all types of slope movements when slopes are saturated. Thin surficial slides and deeper translational debris slides will increase due to the destruction of soil structure and loss of root support.

The most dramatic geologic hazard response to the fire will be the increase in destructive debris flows which bring sideslope and channel deposits racing down channel bottoms in a slurry similar to the consistency of concrete, in masses from a few hundred cubic yards to hundreds of thousands of cubic yards of saturated material, destroying everything in its path until it finally loses its momentum or is caught in a debris catchment basin. An emergency assessment of post-fire debris flow hazards for the Station Fire by the U.S. Geological Survey concluded that the Combined Relative Debris-Flow Hazard Rankings calculated in response to the 3-hour-duration storm were either “high” or “severe” for all but 18 of the 678 basins evaluated within the burned area. The 12-hour-duration storm resulted in either “moderately high”, “high”, or “severe” rankings for all but 25 of the basins. The large number of basins with “high” or “severe” rankings that drain into Big Tujunga Canyon, Pacoima Canyon, Arroyo Seco, West Fork of the San Gabriel River, and Devils Canyon indicates the potential for significant debris-flow impact both in these drainages and well downstream from the burned area. The USGS report concludes that “when compared with similar evaluations for past fires, this is the greatest number of basins we have seen with such high [debris-flow] probabilities.”

The Station Fire burned approximately 161,000 acres in the northeastern extent of Los Angeles Basin and adjoining basins. Vegetation is mostly shrub and chaparral with minor inclusions of forested ecotypes. Soils are dominantly coarse textured, shallow, and occur on steep to very steep slopes, rendering them naturally erodible. Geomorphic erosion rates are high, perpetuating shallow coarse soils, especially with pulse erosion following fire as a natural long-term process in this mountain region. Cover is critical for soil stabilization, and is lacking throughout most of the fire area.

Assessment teams found the overall soil burn severity to be 11% unburned and very low, 16% low, 62% moderate, and 11% high. Soils with low burn severity still have good surface structure, contain intact fine roots and organic matter, and should recover in the short-term once revegetation begins and the soil surface regains cover. The moderate to high classes have evidence of severe soil heating in isolated patches; these areas have long-term soil damage and high to very high erosion hazard. The most severely burned slopes occur on steep slopes at higher elevations and mostly on north aspects where pre-fire vegetation density and fuels accumulations were higher. Water repellency is present throughout the fire area, including unburned areas, and was only moderately exacerbated in the hotter burn areas. Eroded soil, by ravel or water, provides the materials for damaging debris flows and stream bulking.

The Station Fire burned fourteen 6th field watersheds within the Los Angeles River, San Gabriel River, Antelope-Fremont Valley, and Santa Clara River 4th field watersheds. The 6th field watersheds were divided into sub-watersheds with "pour points" established at the mouth of creeks, river, or canyons. Pour points are located one tenth to 3 miles below the edge of the burn depending on where the values at risk are located downstream. Pre fire and post fire runoff and sediment yield is referenced for both the 6th field watersheds and at each pour point.

In the Station Fire, 51% of the slopes are greater than 50%, 36% of the slopes are 25-50%, and 13 % of the slopes are less than 25%. The steeper slopes will yield the greatest quantities of sediment during moderate to heavy storms. Most of the steepest areas burned at moderate to high soil severity. Hydrophobic conditions and lack of vegetation cover in the moderate and high burn soil severity will increase the watershed response.

The following 6th field watersheds have 50% or more of the watershed burned: Pacoima Wash (70%), Low Big Tujunga Canyon (53%), Middle Big Tujunga Canyon (95%), Upper Big Tujunga Canyon (64%), Arroyo Seco (63%), and Upper West Fork San Gabriel (72%). The following 6th field watersheds have less than 50% of the watershed burned: Verdugo Wash (22%), Eaton Wash (6%), Middle West Fork San Gabriel (2%), Aliso Canyon (35%), Little Rock Reservoir (24%), Little Rock Creek (11%), Soledad Canyon/Arrastre Canyon (22%), and Lower Soledad Canyon (18%). Watersheds with the greatest area burned will have the largest watershed responses.

The 2 year/12 hour storm event was considered the "design storm" for the purpose of evaluating effects. Runoff response and sediment yields vary from watershed to watershed. The Middle Big Tujunga Canyon is one of the higher output watersheds with a 24.9 x normal (pre-fire) sediment yield and 4.3 x normal (pre-fire) runoff response for a 2 year storm event. The Little Rock Creek is the lowest output watersheds with a 2.6 x normal (pre-fire) sediment yield and 1.1 x normal (pre-fire) runoff response for a 2 year storm event. Additional observations and detailed findings can be found in the Geology, Soils, and Hydrology Specialist Reports.

Values at Risk

The following values were identified during the initial phase of the Station Fire BAER assessment process as "at risk" from post-fire watershed effects that include increased runoff and debris flows, rock and debris fall, erosion and sedimentation, and landslides:

Life: There is a substantial risk to Forest visitors using dispersed recreation sites, State Highway 2, Big Tujunga Road, Angeles Forest Highway, Mt Wilson Road, Mt Gleason Road, level two roads, trails, campgrounds and administration sites on NFS lands as well as facilities on non-federal land both within and outside the Station Fire perimeter, and communities in close proximity to the southern portion of the Station Fire perimeter. Government employees whose duty stations and government housing facilities are within the burned area such as Angeles Crest, Clear Creek, Big Tujunga, Oak Grove and other stations are also at risk. Exposed mine sites may also pose a risk to dispersed recreationist who can now access these sites because of the loss of brush cover.

Property: There are approximately 223 miles of National Forest System Road (NFSR) with in the Station Fire perimeter, with additional mileage adjacent to or below the burned watershed that could be affected. The dominant road features on the landscape are Rincon / Red Box (2N24), Josephine Peak (2N64), Mount Lukens (2N76), Santa Clara Divide (3N17), Mount Gleason (3N17N), and Magic Mountain (4N46) Several camp grounds, picnic areas, private inholdings, special use permitted camps, recreation residence tracts, wilderness areas and trail heads, ski areas, communication sites, and major power lines and a flood control reservoir within the burn area are accessed by the road system. Many water collectors for wildlife (guzzlers) are at risk of washing out or losing pipes from erosion.

There are approximately 133 miles of non-motorized trails impacted by the Station Fire. Significant NFS trails within the burned area include approximately 25 miles of the Pacific Crest National Scenic Trail, 19 miles of the Gabrieleno National Recreation Trail and approximately 11 miles of the Silver Moccasin National Recreation Trail, in addition to portions of the West Fork San Gabriel River Scenic Bike Trail. Trails in the southern portion of the burned area are in close proximity to major urban areas and are highly used by visitors and local residents even during the current burned area closure.

Angeles Crest Fire Station and Monte Cristo Fire Station as well as other Forest Service administrative sites are at risk of damage to structures and water lines from flooding. Many campgrounds, picnic areas, and work stations are also considered at risk. The infrastructure and facilities are a government asset and are needed for long term administrative, emergency, permittee, recreation, and inholder access during and after the fire recovery period.

In addition to the above values, the following assets are at risk: State Highway 2 (Angeles Crest Highway), Angeles Forest Highway, Big Tujunga Canyon Road, Little Tujunga Canyon Road, Sand Canyon Road, Aliso Canyon Road, Mount Wilson Road and Zachau

Canyon Road, reservoirs, and private property within and outside of NF boundary due to increased postfire watershed response (increased flows and sediment, high debris flow potential). For more information see the Hydrology and Geology Specialist Reports in the project record.

Water Quality and Quantity: The most noticeable effects on water quality will be increased sediment and ash from the burned area into Little Rock Reservoir (drinking water source for Palmdale) and other waterbodies in and downstream of the fire area. During storm events this will increase turbidity and contribute to pool filling. Increased nitrogen may occur during the first year after the fire but levels are not expected to change appreciably in the Littlerock Reservoir because only a small percentage of the watershed burned. Natural recovery is the recommended treatment. Ash may also impact water quality and public health.

Burned buildings, facilities, water tanks, shops, and equipment storage sites pose a threat to water quality from the release and mobilization of associated toxic chemicals such as gas, oil, and building materials. The BAER team identified 11 hazardous material sites that were severely burned and analyzed their potential to be transported during rain events. Septic tanks and outhouses in the burned area could also flood during high flows and pollute streams.

These threats to water resources will be the most acute during the first post-fire rainy season from December through February and then decline in severity over the next three to five years as the chaparral recovers, given adequate rainfall. For more information see the Hydrology and Hazmat Specialist Reports in the project record.

Threats to Soil Productivity: There is no effective BAER treatment for soil productivity. The soils impacted by the Station fire support a fire-adapted ecosystem.

Threats to Cultural Resource: Many archaeological sites exist within the Station Fire burn perimeter. The historic sites include structures, organizational camps, mines, homesteads, and trash scatters. The prehistoric sites include rock art, habitation camps, earthovens, bedrock mortars, and lithic manufacturing remains. Most of the sites sustained a complete loss of vegetation and are susceptible to minor slope wash. Seven sites are found to have values at risk, five of which will need emergency treatments to stabilize and protect those values.

Threats to Wildlife: The area affected by the Station Fire supports important habitats and occurrences of federally threatened and endangered species along with their designated critical habitat. Federally listed threatened and endangered species that could be affected by the Station Fire include the following:

- California condor
- Least Bell's vireo
- Santa Ana sucker
- Unarmored threespine stickleback
- Mountain yellow-legged frog
- Arroyo toad

Designated critical habitat occurs for the following species:

- Santa Ana sucker
- Mountain yellow-legged frog

There are also a number of Forest Service Region 5 Sensitive species that may occur in the area and/or have suitable habitat that is affected by the Station Fire. These include the following:

- Santa Ana speckled dace
- Arroyo chub
- Western pond turtle
- Two-striped garter snake
- San Diego horned lizard
- Coastal rosy boa
- San Bernardino mountain kingsnake
- San Bernardino ringneck snake
- California legless lizard
- California spotted owl
- Nelson's bighorn sheep

- Western red bat
- Pallid bat
- Townsend's big-eared bat

Emergency conditions exist for all of the above listed federally threatened and endangered species or their habitat as a result of anticipated post-fire results. For aquatic species, post-fire impacts will include compromised water quality and changes in water chemistry due to ash delivery and hazardous materials, 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 and flushing of species during flood events downstream. These combined impacts may lead to a temporary loss or reduction of suitable stream habitat and localized extirpation of special status species populations. The Santa Ana sucker, speckled dace, arroyo chub, and mountain yellow-legged frog have been identified as being at risk of experiencing extirpation of small isolated occurrences. Extirpation of these occurrences is a critical risk that could result in a threat to viability of these species. Post-fire events may facilitate the spread of non-native aquatic species into previously unoccupied habitats. For all species, there is a concern that until enough vegetative recovery has occurred to deter illegal off-road vehicle travel, habitat degradation will continue. Increased access and visibility due to lack of vegetative cover will result in habitat degradation, disturbance of species, and increased risk of collection for some species (turtles, fish, etc.). For California condors, there is an increased threat of injury/death due to ingestion of microtrash.

Native Vegetation Recovery: Natural regeneration of coniferous and chaparral communities in areas of high soil burn severity will occur slowly, because mature conifers capable of reseeding coniferous stands were killed and climate conditions that define local ecosystems do not facilitate rapid regrowth after exposure to high intensity fire. Recovery and ecological sustainability of the native vegetation within the entire burned area is at risk from invasive weed introduction and population expansion. Areas of ground disturbance (i.e. dozer lines) and regular equipment or crew presence (i.e. staging areas, safety zones, drop points) during suppression operations created a risk of invasive weed introduction, establishment and proliferation. Invasive weed populations known prior to the Station Fire event will increase in the burn area due to naturally accelerated growth rates, high reproduction capabilities, and release from competition with natives. These weed populations could affect the structure and function of native plant communities within the burn area and population expansion will weaken watershed integrity and soil stability, as well as threaten native wildlife habitat. It is expected that most native vegetation would recover over time if noxious weed competition and expansion are minimized.

Rare Plants: Field survey findings, reference material and professional experience indicate sensitive plant populations will experience moderate to major post-fire threats as a result of the Station Fire. Burn severity and high potential for post-fire unauthorized OHV traffic threaten rare plant populations in the fire area.

Summary of Critical Values and Resources

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Value Category	Hazard	At Risk	Emergency Yes/No
Life & Safety	Increased runoff and debris flows, rock and debris fall, erosion and sedimentation, and landslides.	Users of National Forest roads, trails, campgrounds and administration sites; users of major county and state roads, public use of roads, trails, campgrounds, and facilities and homes on non-federal land both within and outside the Station Fire perimeter.	Yes
Property	Increased runoff and debris flows, rock and debris fall, erosion and sedimentation, and landslides. Increased threat of vandalism related to loss of vegetation.	Forest Service roads and trails, recreation infrastructure (i.e. campgrounds) and recreation residences in some locations, Forest Service fire stations and work centers, spring developments that provide critical water source for wildlife. Private homes, reservoirs, and facilities within and outside of the National Forest. State and County roads, highways, utilities, and infrastructure.	Yes
Water Quality	Increase in sediment and ash delivered to the facility.	Water supply for the City of Palmdale is located in the Little Rock watershed at Little Rock Reservoir.	No

	Burned guard station debris and hazardous materials from illegal plantations.	Beneficial use of water.	Yes
Soil Productivity	Increased runoff and debris flows, rock and debris fall, erosion and sedimentation, and landslides.	There is no emergency to soil productivity due to fire-adapted ecosystems.	No
Heritage Resources	Looting and vandalism due to exposure and stability due to minor slope wash potential.	Integrity of Heritage sites.	Yes
Plant Communities	Loss of habitat and landscape biodiversity.	Rare plant species.	Yes
Ecosystem Structure and Function	Post-fire weed introduction and spread.	Natural vegetative recovery, watershed integrity and soil stability.	Yes
Wildlife & Fisheries Resources	Increased scouring and debris flows resulting in changes to channel morphology, lowered water quality, and erosion of streambanks and associated riparian vegetation. Dispersal and increased competition with non-native fauna. Ingestion of microtrash.	Designated Critical Habitat for: • California condor (federally-endangered) • Santa Anna sucker (federally-threatened) • Mountain yellow-legged frog (federally-endangered) • Least Bell's vireo (federally-endangered) • Unarmored threespine stickleback (federally-endangered) • Arroyo toad (federally-endangered)	Yes

The rapid assessment method and short reporting deadline required by the BAER program did not permit the BAER team to evaluate all the threats at site specific locations, given the complexity of values at risk within and downstream of the burned area. However, the BAER Assessment Team worked with cooperating agencies through interagency meetings to identify general initial concerns and information needs, discuss potential treatment recommendations, and discuss the draft BAER report. These meetings helped the BAER team identify general areas of downstream values at risk, and consider treatment options for NFS lands.

Given the predicted effects of the fire on the watershed, all of the resources listed above are at serious risk of mud, flood, and debris flow should a storm occur within the burned area.

B. Emergency Treatment Objectives

As noted above, the greatest threats are to life and property from increased erosion and sedimentation, flooding potential, and increased debris flow potential. For these reasons the primary treatment objectives are to minimize loss of life and risk to human safety, and minimize threats to property. Other treatments are identified to reduce the risk of degradation of significant natural resources including the potential spread of noxious weeds, and protection of cultural resource sites.

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

Land **90** % Channel **--** % Roads/Trails **90** % Protection/Safety **90** %

D. Probability of Treatment Success

The proposed treatments on National Forest System lands can help to reduce the impacts of the fire from storm events, but treatments can not fully mitigate the effects of the fire on the watershed. Detailed information of the treatments summarized below can be found in the specialist reports prepared in support of this funding request.

The BAER team considered and analyzed construction of major debris dams, check dams, and other infrastructure on NFS lands. The team found that these types of treatment would not be appropriate because of the excessively steep slopes within the burn perimeter coupled with projected highly responsive watershed events triggered by even modest rain. Hillslope treatments (such as hydromulching, aerial seeding, and straw application) were not proposed because they are infeasible and/or would not reduce the probability of damage to assets. For more information see the Hydrology Specialist Report and the Soil Specialist report. Other treatments that were considered but not carried forward are identified in the Project File.

The treatments listed below are those that are considered to be the most effective on National Forest System lands given the local setting including topography and access:

LAND
- Noxious Weed Detection Surveys
- Unauthorized Access Vegetative Screening
- Condor Protection and Removal of Microtrash

ROADS/TRAILS
- Road Treatments
- Trail Evaluation and Implementation

PROTECTION/SAFETY
- Interagency Coordination/Implementation Team
- Human Life and Resource protection (Fire Area Closure)
- Hazardous Material Stabilization
- Structure Protection
- Hazard Tree Mitigation
- Abandoned Mine Closure
- Special Status Species Salvage
- Arroyo Toad Protection
- Cultural Resource Site Protection
- Protection Enforcement
- Treatment Effectiveness Monitoring

	Years after Treatment: This refers only to NFS lands, not all lands downstream		
	1	3	5
Land	70	80	100
Channel	n/a	n/a	n/a
Roads/Trails	50	80	90
Protection/Safety	80	80	90

E. Cost of No-Action (Including Loss): See Project File: Summary of cost-risk analysis.

F. Cost of Selected Alternative (Including Loss): See Project File: Summary of cost-risk analysis.

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology	[X] Soils	[X] Geology	[ ] Range	[X] Public Information
[X] Forestry	[X] Wildlife	[ ] Fire Mgmt.	[X] Engineering	[X] Inter-agency coordinator
[ ] Contracting	[X] Ecology	[X] Botany	[X] Archaeology	[X] NRCS
[X] Fisheries	[X] Research	[ ] Landscape Arch	[X] GIS	

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Core Team Members:

- Carly Gibson – Co-team Lead (T)
- Jerry DeGraff - Geologist
- Allen King – Geologist
- Jonathan 'Yonni' Schwartz – Geologist (T)
- Dave Young – Soil Scientist
- Terry Hardy – Soil Scientist
- Jason Jimenez – Soil Scientist
- Eric Nicita – Soil Scientist
- Brad Rust – Soil Scientist/Hazmat
- Joe Gonzales – Hazardous Materials Specialist
- Mary Moore – Hydrologist
- Kyle Wright – Hydrologist (T)
- John Thornton – Hydrologist
- Chris Stewart– Hydrologist
- Tim Biddinger – Hydrologist
- Jeff TenPas – Interagency Liaison
- Cathleen Thompson – Public Information Officer
- Richard Hadley – Public Information Officer (T)
- Ron Ashdale – Safety
- Cliff Johnson – Lands/Engineering
- Rusty LeBlanc – Roads Engineer
- Randy Nagel – Roads Engineer
- Eric Martindale - Roads Engineer
- Keith Stockmann – Economic Analyst
- Brad Burmark – Economic Analyst
- Lisa Northrop – Forest Liaison/BAER Coordinator
- Janet Nickerman – Botanist
- Joanna Clines – Botanist
- Krissy Walker – Botanist
- Kerry Meyers – Botanist (T)
- Tommy Stoughton – Botanist (T)
- Jan Beyer – Ecologist/Botanist
- Robin Eliason – Wildlife Biologist
- Steve Loe – Wildlife Biologist
- Leslie Welch – Wildlife Biologist
- Angelica Mendoza – Wildlife Biologist
- Tom Murphey – Wildlife Biologist
- Meghan Pawlawski – Wildlife Biologist
- Dan Teater – Fisheries
- Rusty LeBlanc – Roads Engineer
- Kelli Brasket – Archaeologist
- Dave Peebles – Archaeologist
- Jeremy Haines – Archaeologist
- Nolan Smith – Archaeologist
- Doug McKay – Archaeologist
- Mark Schug – Geographic Information Systems Specialist
- Jordan Zylstra – Geographic Information Systems Specialist
- Lauren Miller – Geographic Information Systems Specialist (T)
- Keith Stockmann – Economist
- Brad Burmark – Economist
- Brent Roath – R5 BAER Coordinator

(T) indicates trainee

Adjunct Team Members:

- Phil Eisenhauer - Silviculture
- Steve Bear – Silviculture
- Sue Cannon – Geologist (USGS)
- Charlie Luce – Research Hydrologist
- Terry Kaplan-Henry – Hydrologist
- Sarah Reid – Office Support
- Andy Bidwell – Google Earth Technical Specialist
- Andrew Pattison – Google Earth Technical Specialist
- Atlanta NIMO Team
- Carey Crist - Geographic Information Systems Specialist

H. **Treatment Narrative**

The proposed treatments on National Forest System lands can help to reduce the impacts of the fire from storm events, but treatments can not fully mitigate the effects of the fire on the watershed. Detailed information of the treatments summarized below can be found in the specialist reports prepared in support of this funding request.

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The treatments listed below are those that are considered to be the most effective on National Forest System lands given the local setting including topography and access.

Land Treatments

Noxious Weed Detection Surveys: Surveys will begin in 2009 during the resprouting and flowering periods of weed species. Because of differences in flowering times for all potential species, two visits may be required during the growing season. Completion of surveys in riparian areas, dozerlines, and known pre-existing invasive and sensitive plant populations would be the first priority. There were 46 miles of dozer lines on NFS lands. The second survey priorities would be along roads, handlines, and staging areas. Herbicide application would be used in Big Tujunga Canyon utilizing an existing environmental assessment. Detailed weed detection survey guidelines are attached in theProject File.

Unauthorized Access Vegetative Screening: Unauthorized recreational activity, including operation of off-highway vehicles, horseback riding, hiking, mountain biking, and other ground disturbing activities are a threat to National Forest System land. Erosion, spread of invasive species, damage to cultural sites, disturbance to wildlife, destruction of wildlife habitat, impaired water quality, and risks to public safety can result from unauthorized access. Utilize cut vegetation from fuel reduction projects to screen areas denuded of vegetation along roads known for high unauthorized access.

Condor Protection and Removal of Microtrash: Reduce the potential for condors, an Endangered species, to consume microtrash debris. Sites with a concentration of microtrash pose a risk for condors. The fire has removed vegetation and exposed areas where microtrash is now easily accessible by foraging condors. The primary treatment for removal of microtrash is manual clean-up of the site. The sites included for treatment include Mount Lukens, Mount Gleason, and Magic Mountain communication sites.

Channel Treatments

None recommended.

Road and Trail Treatments

Treatment Objectives: Minimize risk of road and trail failure in the burn area through the placement and maintenance of effective water control measures. Prevent the channeling of water on roads and trails. Ensure the diversion of runoff in controlled intervals to reduce erosion and further watershed degradation.

Road Treatments: A determination was made that BAER treatments are required on Forest Service roads 2N24 (Rincon/Red Box), 2N50 (Mt. Lowe), 2N64 (Josephine Peak), 2N65 (Millard Canyon), 2N66 (Brown Mountain), 2N68 (Rising Hill), 2N76 (Mt. Lukens), 2N79 (Grizzly Flat), 3N17 (Santa Clara Divide), 3N29 (Gold Creek), 3N30 (Yerba Buena), 3N32 (Mendenhall Ridge), 3N38 (Doane Ebey), 3N43 (Doane Canyon), 3N55 (Monte Cristo Station), 4N33 (Moody Canyon), and 4N37 (Indian Canyon), and others. For more information see the Roads Specialist Report in the project record.

The following treatments were identified as BAER treatments for the Station Fire burned area:

- Complete Roads Assessment
- Install Roadway Relief Dips.

- Install Vertical Riser CMP (snorkel).
- Install Drainage Armor (riprap rock).
- Install Overside Drains with Flumes.
- Drainage Structure Cleanout (trash racks, catch basins, overside drains, sediment basins).
- Storm Response
- Storm Monitoring

Trail Evaluation and Implementation**:** The BAER Assessment Team has prescribed non-motorized trail treatments including improvements to existing water drainage structures to protect the trail infrastructure from failure and increased sediment flow. Prior to implementation of treatments, a crew will perform trail surveys on identified trails. The result of the survey will dictate subsequent detailed storm proofing treatment recommendations. These treatments are the minimum necessary trail work activity which will protect the trail investment in its current state and protect it from the expected seasonal weather. The four prescribed treatments include:

1. Clearing and improving erosion control structures on the trail treads,
2. Out-slope trail tread and remove berm to allow passage of water and soil,
3. Clear and improve locations on the trails where ephemeral streams cross the tread,
4. Armor spillways with native materials where needed.

Protection/Safety Treatments

BAER Implementation/Interagency Coordination Team: This effort involves communication and coordination with other federal, state, and local agencies with jurisdiction over adjacent lands and inholdings where life and property are at risk from post-fire conditions. Actions include but are not limited to working and coordinating with other agencies on hazard notification systems; permitting the siting of rain gages and soil moisture instruments to monitor conditions within the burn area (in support of National Weather Service forecasts); and exchanging information and coordinating the BAER implementation plan with subsequent recovery plans developed by other agencies.

The initial cost request for this effort includes the management structure as identified below for implementation of the 2500-8. Additional coordination needs may ensue, costs for which will need to be requested on an interim 2500-8.

Over the next 3 years it is critical that appropriate agencies maintain due diligence and continue to inform the public of the potential hazards resulting from post-fire watershed response. A comprehensive joint interagency information and public outreach program, known as the *Coordinated Agency Recovery Effort* (C.A.R.E.), has been established to provide consistent information dissemination regarding postfire stabilization and recovery. The focus of these efforts are on the 23 communities and municipalities adjacent to the Forest that could potentially be impacted by mud or debris flows.

Human Life and Resource Protection (Fire Area Closure): To support the Forest closure order and ensure safety for Forest visitors and protection to Forest resources during the recovery period, gates and closure/warning signs will be placed at trailheads, campgrounds, picnic areas, trail, and road locations adjacent and within the fire perimeter. Site specific location such as Forest roads need to be evaluated annually, to prioitize areas identified as possibly requiring extended closure to protect Federally listed species and associated habitats.

Forest Infrastructure: To protect life and property associated with the public use of the non-motorized hiking trails, campgrounds, picnic areas, and trailheads within and downslope/downstream of the Station Fire, the BAER Assessment Team recommends the temporary, seasonal closure of the burn area to all recreational users. The closures will be accomplished by gate closures and informing the public at strategic locations of access points outside and within the fire perimeter which will effectively close off the burn area.

Road Closure: Gates will be installed at specific locations on the Forest to implement the closure. Precise locations (GPS Latitude/longitude coordinates) are being generated through coordination with the Forest Engineer and District Rangers. A map with proposed gate locations is included in the project record. A boulder barrier will be placed at specific sites where gates and fencing have proven to be ineffective. Boulder barriers are proposed at Fall Creek Road, Mendenhall Road and Military Road at Aliso Canyon.

Hazardous Material Stabilization: A total of 11 sites were severely burned and destroyed with the possibility of easily mobilized toxic chemicals. Most sites have concrete floors surrounded by dirt grades. With heavy rainfall these building foundations will retain 4 to 6 inches of water before spilling out on to the dirt grades and slopes below. It is also recommended that septic tanks and vault toilets are pumped to reduce the potential of sewage being released into the streams. If additional sites are located, an interim request may be submitted for additional stabilization funding. The Forest should continue to expedite removal of hazardous materials.

Structure Protection:
The following treatments are designed to reduce the potential for damage to properties and associated infrastructure.

Erosion and Flood Control: Accelerated hillslope runoff has the potential to flood a diversion channels and deliver sediment at the following Forest Service Administrative Sites: Clearcreek, Arroyo Seco, Shortcut, Angeles Crest, and Monte Cristo. Sandbagging, k-rails, and woodstraw mulch are proposed to reduce overland flow and protect Forest Service assets.

Rock Fall Catch Fences and Mulching: A design combining k-rails and chainlink fencing is proposed to mitigate rock fall and sheet erosion damage to property, and to increase personal safety. Catch fences would be located adjacent to 6 recreation residences (2 each in the Trail Canyon tract, La Paloma tract, and Millard tract). Woodstraw mulching is proposed to minimize nuisance sheet erosion that is expected to deliver sediment to the lots and residences.

Erosion and Flood Control: Accelerated hillslope runoff has the potential to flood a diversion channel and deliver sediment into six (6) recreational residences at the Delta Flats Recreation Residence tract. Woodstraw mulch is proposed to reduce overland flow and increase channel stability.

Debris Flow and Flood Control: There is a high potential for debris flows and flooding to damage three (3) recreation residences in the Big Tujunga tract. The proposed treatment is to construct a protective barrier that would tie into an existing high flow retention wall. Coordinate flood control operations with NRCS for downstream values at risk.

Hazard Tree Mitigation: This treatment will ensure threats to the life and safety of Forest visitors have been properly mitigated after the Forest closure order is rescinded. The objective of this treatment is to fell hazardous trees from high-use areas where people are likely to congregate and be stationary for extended time periods. This treatment is also necessary to remove threats having a high probability of damaging property. These locations include Forest Service roads, 23 campgrounds, 18 picnic areas, 9 trailheads, and 2 fire stations.

Abandoned Mine Closure: This treatment provides for public safety and resource protection by reducing the potential for the public to explore exposed adits, reducing the potential for exposure to chemical hazards, and protect bats and their habitat from vandalism and disturbance. Mines with high visibility have fencing installed around adits and signs installed warning the public of the potential hazards. If the fencing closure is not effective, or if additional sites are discovered, the Forest may request additional funding in an interim request.

Special Status Species Salvage: Severe post-fire watershed responses are expected to impact special status aquatic species and their habitat. For small and isolated populations of TES species (mountain yellow-legged frog, unarmored threespine stickleback, arroyo chub, Santa Ana sucker, and speckled dace), there is a risk of localized extirpations as a result of the exacerbated watershed response. Due to the steepness of the slopes, there are no treatments that would effectively reduce the potential for increased sediment and ash, or debris flows into the occupied habitat. Therefore, capture and removal of fish and frogs and translocation of individuals for 1-3 years until the watershed stabilizes enough to return individuals to the collection sites is recommended. This will be an interagency effort between USGS, USFWS, CDFG, USFS and other local partners. For the mountain yellow-legged frog, the proposal includes removal of individuals from Devil's Canyon with translocation into Little Rock Creek and/or placement in a holding facility such as the LA Zoo or Fresno Zoo (cost not covered under this treatment). Capture of fish from Big Tujunga Creek, Pacoima Wash, and Haines Creek would be accomplished through use of a USFWS permitted contracted consultant. The proposal includes removal of individuals and translocation to an appropriate drainage and/or placement into a holding facility such as the Whitewater Preserve.

Arroyo Toad Protection: There is a population of federally-endangered arroyo toads in Upper Big Tujunga, Alder Creek and Lynx Gulch. This population is in close proximity to the Upper Big Tujunga Canyon Road, Lynx Gulch Road and Alder Creek Road. As a result, this population is highly vulnerable to impacts associated with dispersed recreation use. The fire removed vegetation that previously created a visual screen and barrier. Vegetation that discouraged road shoulder parking was also removed by the fire. The concern is that post-fire recreation use and associated impacts will impact this small and isolated arroyo toad population and

increase the risk of extirpation. Installation of physical barriers to prevent parking along a 2.5 mile stretch of the Big Tujunga Canyon road would help reduce the potential for damage to occupied arroyo toad habitat. Earthen berms are recommended as the barrier and Los Angeles Department of Public Works will provide needed assistance for installation. Carsonite signs would be installed to advise the public of sensitive resource protection needs. Monitor effectiveness of parking restrictions. An interim funding request would be submitted if additional treatments are needed.

Cultural Resource Site Protection: The treatments described below are to reduce impact to archaeological sites from increased watershed response, exposure, and theft.

FS# 05015500042: The objective of this treatment is to minimize post-fire runoff from increased channelization through this archaeological site and by doing so, protect artifacts and subsurface features from erosion, exposure, and theft. The treatment of this site will consist of the creation of two rolling dips, to redirect water flow away from this site; berming road access and the problem channel along the road; placing straw wattles to slow water velocity within channels; wood straw mulch to provide ground cover and a micro-environment for returning vegetation.

FS # 05015500032: The site is part of a NRHP eligible rock art district and consists of cupule boulder rock art and a lithic scatter. The boulders with the cupule rock art are small, easily visible, and are now at risk for theft and vandalism. The site has been vandalized in the past. Treatment will consist of seeding and mulching the site to accelerate vegetative re-growth and will help keep the exposed artifacts and features from view. Native seed will be collected from the local area by botanists and then be hand scattered across the site. Wood straw will be hand applied to the site to stabilize the seeds until germination.

FS # 05015500163: This site consists of at minimum 5 discrete prehistoric thermal features (or earth ovens) that occur within the road prism. The drainage ditch has filled with sediment. Post fire conditions may lead to increased runoff and increased water velocity that may redirect water into the prehistoric thermal features. This will result in the exposure of subsurface deposits and artifacts, and would likely cause materials to erode down slope. At risk is the integrity of this NRHP eligible property, loss of data, and increased exposure of artifacts that may be looted. The treatment type will consist of the mechanical removal of accumulated sediment along a 200ft section of the road. An archaeological monitor should be present at the time of treatment, and subsequent archaeological monitoring for treatment effectiveness is strongly recommended. A bull-dozer is not recommended.

FS # 05015500095: The treatment of this site will consist of: the creation of 1 rolling dip, to redirect water flow away from this feature. Prior to construction/implementation, archaeological testing of the rolling dip should be performed. This testing would consist of the simple auguring of possible rolling dip placement areas to ensure that subsurface features or deposits will not be impacted by rolling dip construction.

Protection Enforcement: Unauthorized access is a threat to the burned watersheds Erosion, spread of invasive species, damage to cultural sites, disturbance to wildlife, destruction of wildlife habitat, and risks to public safety can result from unauthorized access. The Angeles National Forest (ANF) is 70% of all open space in Los Angeles County serving a population of over 11 million. The ANF is the most urban Forest in the nation with one of the highest use levels. The challenge for the ANF is managing the high number of users who gain access unauthorized onto the forest from driving/riding/entering through or around a locked gate or closed sign. This type of unmanaged use can cause damage to natural and cultural resources. Due to increasing population and developments that border the forest, it is difficult to patrol unauthorized access.

Through past BAER experience, the ANF has determined that signage, gates, fencing, and other hard closures that are installed to discourage soil disturbance and assist in allowing natural vegetative recovery are not effective by themselves. Patrolling within and adjacent to the burn area is needed to enforce the closure and deter unauthorized access, vandalism, and damage to National Forest System lands.

Due to the size of the fire area and inablity to install physical barriers over vast areas, funding for 7 GS-7, Level 2 FPOs is requested to patrol the burn area to ensure the Forest Closure Order is enforced.

I. Monitoring Narrative

This monitoring is specifically designed to answer the question: Are BAER treatments functioning effectively or is there a need to maintain, repair, or replace the treatment? The effectiveness monitoring efforts identified for the Station Fire include the following:

Road Treatment Effectiveness Monitoring: Monitor conditions and initiate corrective action, when safe to do so, during and after storm events, for risks such as flash flooding, rock fall, and debris flow clean up. Insure water flow through drainage facilities, including BAER

road treatments, clear blockages to restore drainage function for next storm. Include members from Assessment Team to monitor post-storm watershed response and impacts to systems roads.

Area Closure Effectiveness Monitoring**:** A two person crew will monitor the BAER treatments. The patrols will check signs, information boards, temporary fencing, gate closures. Enforcement Treatment effectiveness will also be monitored. See Monitoring Plan in Project File. Monitor abandoned mines to determine effectiveness of closures and level of use by the public. Evaluate to determine if installation of bat-friendly gates is appropriate. An interim funding request would be submitted if additional treatments are needed.

Heritage Resource Treatment Monitoring: Monitor the effectivness of resource stabilization treatment after the first large storm event for sites: 05015500042, 05015500163, and 05015500095. Monitor the condition of site 05015500032 as protective vegetation resprouts and determine if site is being vandalized or looted.

Hazardous Material Site Stabilization Treatment Effectiveness Monitoring: Monitor effectiveness of treatment by detecting for any off-site migration of hazardous material.

Recommendations

This report is an initial funding request based on a rapid assessment. If additonal treatment needs are identified through more site specific on the ground investigation in cooperation with interested agencies, noxious weed detection surveys, interim requests for additional funding will be filed. These funding requests will identify the purpose for each treatment, and specific treatment specifications, locations, and number of each treatment.

Part VI – Emergency Stabilization Treatments and Source of Funds

			NFS Lands					Other Lands			All
		Unit	# of		Other		# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$		units	$	Units	$	$
A. Land Treatments											
Noxious Weed Surveys	Lump Sum										
Unauthorized Access Vegetative Screening	Lump Sum										
Condor Protection and Removal of Microtrash	Lump Sum										
Insert new items above this line!											
Subtotal Land Treatments											
B. Channel Treatments											
N/A											
Insert new items above this line!											
Subtotal Channel Treat.											
C. Road and Trails											
Road Patrol	Lump Sum										
Road Storm Response	Lump Sum										
Trail Storm Evaluation/Implementation	Lump Sum										
Insert new items above this											

Government Estimated Cost Figures Withheld Per Part 6.1 Federal Acquisition Regulations to promote open and fair competition in purchasing and contracting.

line!	
Subtotal Road & Trails	
D. Protection/Safety	
BAER Implementation/Interagency Coordination	Lump Sum
Human Life and Resource Protection (Fire Area Closure)	Lump Sum
Hazardous Material Stabilization	Lump Sum
Structure Protection	Lump Sum
Abandoned Mine Closure	Lump Sum
Hazard Tree Mitigation	Lump Sum
Species Salvage	Lump Sum
Arroyo Toad Protection	Lump Sum
Cultural Resource Site Protection	Lump Sum
Protection Enforcement	Lump Sum
Insert new items above this line!	
Subtotal Structures	
E. BAER Evaluation	
Assessment Team	Lump Sum

Insert new items above this

line!	
Subtotal Evaluation	
F. Monitoring	
Treatment Effectiveness	Lump Sum
Insert new items above this line!	
Subtotal Monitoring	
G. Totals	
Previously approved	
Total for this request	

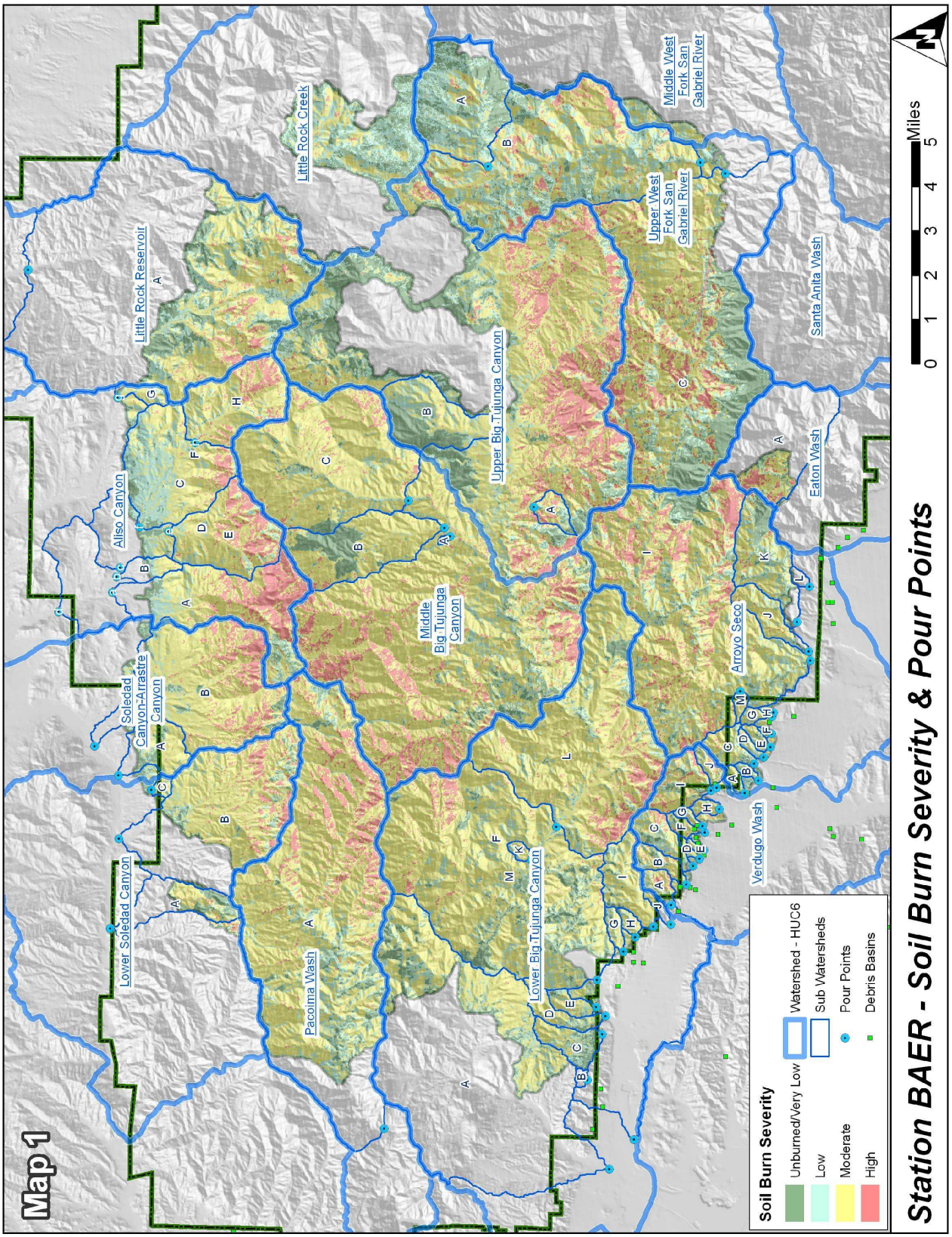
PART VII - APPROVALS

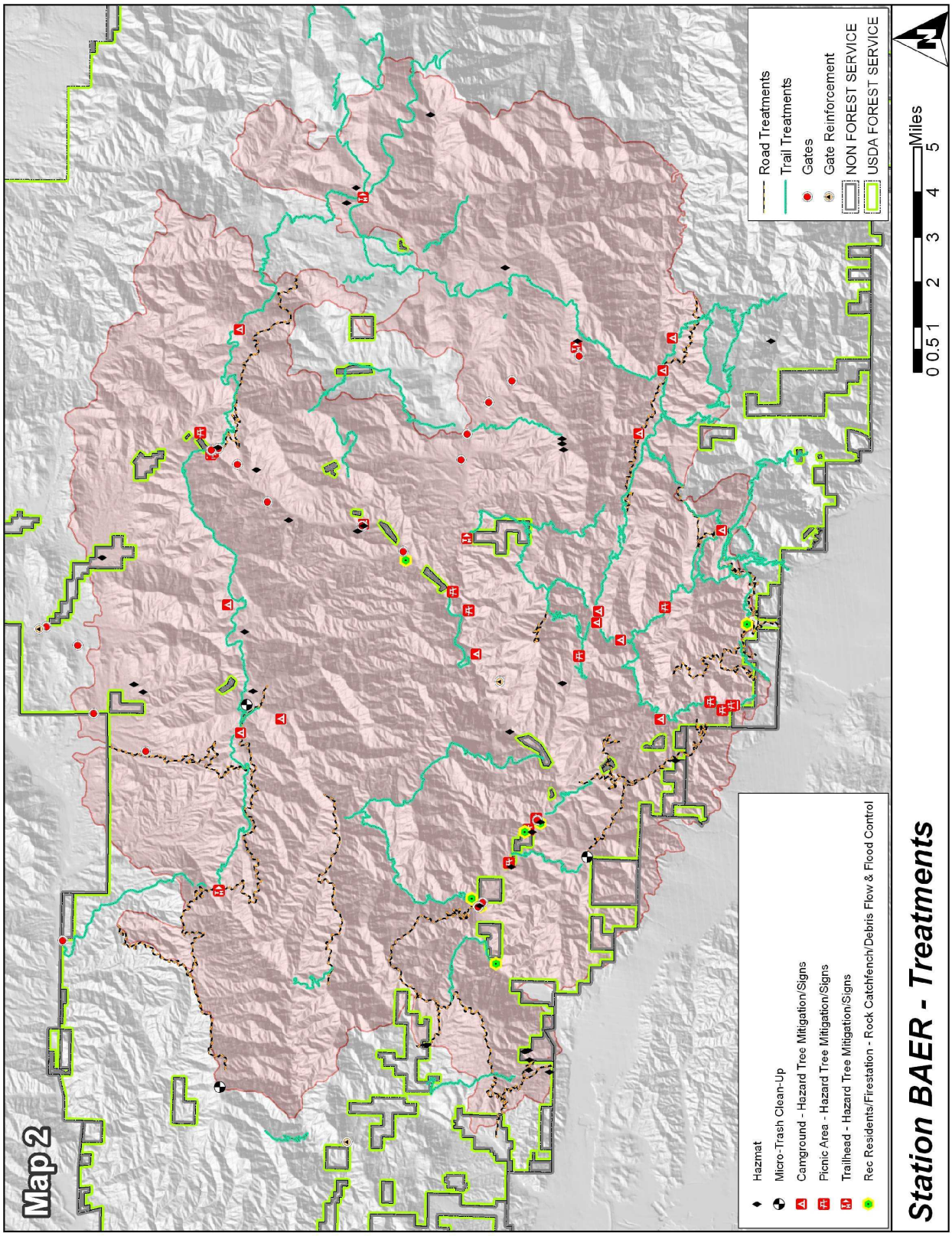
1. _/s/ Jody Noiron_____ _9/29/09__
Forest Supervisor (signature) Date

2. _/s/ George Kulick (for)_____ __9/30/09__
Regional Forester (signature) Date

Appendix A
Station Fire Map Figures

Map 1. Soil Burn Severity & Pour Points
Map 2. Treatments
Map 3. Untreatable Lands
Map 4. Slope
Map 5. Erosion Hazard Rating
Map 6. Wildlife Resources
Map 7. Sensitive Plants & Noxious Weeds


Map 1
Station BAER - Soil Burn Severity & Pour Points
Soil Burn Severity
Unburned/Very Low
Low
Moderate
High
Watershed - HUC6
Sub Watersheds
Pour Points
Debris Basins
Miles
0 1 2 3 4 5
N
Little Rock Creek
Little Rock Reservoir
Middle West Fork San Gabriel River
Upper West Fork San Gabriel River
Santa Anita Wash
Upper Big Tujunga Canyon
Eaton Wash
Aliso Canyon
Middle Big Tujunga Canyon
Arroyo Seco
Soledad Canyon-Arrastre Canyon
Lower Soledad Canyon
Pacoima Wash
Lower Big Tujunga Canyon
Verdugo Wash


Map 2
Station BAER - Treatments
Hazmat
Micro-Trash Clean-Up
Campground - Hazard Tree Mitigation/Signs
Picnic Area - Hazard Tree Mitigation/Signs
Trailhead - Hazard Tree Mitigation/Signs
Rec Residents/Firestation - Rock Catchfench/Debris Flow & Flood Control
Road Treatments
Trail Treatments
Gates
Gate Reinforcement
NON FOREST SERVICE
USDA FOREST SERVICE
0 0.5 1 2 3 4 5
Miles
N

WILDLIFE and FISH TECHNICAL SPECIALIST REPORT
BURNED AREA EMERGENCY REHABILITATION for the STATION FIRE

Resource: Fish and Wildlife
Fire Name: Station Fire – National Forest System Lands
Month/Year: 09/2009
Author Name and Duty Station: Leslie Welch (Wildlife Biologist, Angeles National Forest – LA River Ranger District), Dan Teater (Fisheries Biologist, Tahoe National Forest – American River Ranger District), Robin Eliason (Wildlife Biologist, San Bernardino National Forest – Mountaintop District)

SUMMARY

Important and unique habitats and occurrences of special status fish and wildlife species occur within and downstream of the fire area. Table 1 summarizes the wildlife values-at-risk found in or near the fire.

The following USFWS threatened/endangered species are known from in or near the fire area: nesting least Bell's vireo below the fire area, California gnatcatcher below the fire area, California condor use in the fire area, Santa Ana sucker and critical habitat in and below the fire area, arroyo toad and critical habitat in and below the fire area, mountain yellow-legged frog and critical habitat in the fire area, California red-legged frog occupied habitat below the fire area, unarmored three-spine stickleback below the fire area, and southern steelhead habitat downstream of the fire. There is also a 20-year old record for foothill yellow-legged frog from Bear Creek, but it is assumed to be extirpated.

The following Forest Service Sensitive species are known from in/near the fire: Santa Ana speckled dace, arroyo chub, western pond turtle, two-striped garter snake, San Diego horned lizard, coastal rosy boa, San Bernardino mountain kingsnake, San Bernardino ringneck snake, California legless lizard, Nelson's bighorn sheep, peregrine falcon, California spotted owl, western red bat and pallid bat. Coast Range newt, a California state species of concern and ringtail a California fully protected species, are also known from the 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 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 turtles, frogs and fish.

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.

There are a number of developed springs and wildlife guzzlers in the fire area. Some were not affected by the fire but are at risk of failure due to post-fire sedimentation and debris/rock flows. Several fiberglass guzzlers that burned have been identified as hazardous material that will need to be stabilized and removed.

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 OHVs. The proposed treatment to allow for vegetative recovery through area closures near federally listed and selected Forest Service Sensitive species habitat is critical for allowing these species to persist and recover. It is expected that a minimum of 3-5 years may be needed for this initial and critical phase of vegetation recovery The Forest should assess the success and effectiveness of this effort after three years.

Floods, debris flows and sediment deposits may result in a temporary loss or reduction of suitable stream habitat for special status aquatic species. These small and isolated populations are at great risk of local extirpation as a result of post-fire conditions. Larger populations with more widespread distributions may experience short term impacts, but are expected to recover over time. To avoid the risk of extirpation of small and isolated populations, removal and relocation of individuals may be necessary and has been recommended by a team of species experts.

Table 1. Summary of Wildlife Values-At-Risk in the Station Fire			
Species	**Status**	**Location**	**Summary of Expected Effects**
General wildlife habitat	TES and general wildlife species	Throughout fire area	Loss of sheltering, foraging, and breeding habitat. Loss of food sources (plants and prey). Compromised habitat quality and integrity due to spread of non-native animals and plants. Habitat disturbance and risk to individuals due to increased human access. Long-term degradation of habitat due to OHV, bicycle, pedestrian and dispersed recreation activities. Loss of individuals and habitat due to post-fire flooding, sediment and hazmat deposition, and rockslides.
Santa Ana sucker/Critical Habitat	Endangered	Lower Big Tujunga Creek, Haines Canyon Creek, West Fork San Gabriel River below Cogswell Dam, Soledad Canyon (non-ESA protected, no Critical Habitat)	Short and long term modification of Critical Habitat due to scouring, sediment and debris flows. Modifications to water quality due to sediment, ash and hazmat contributions. Modification of streamside vegetation and streambank conditions. Individuals can be flushed out by high water flows and instream barriers may prevent their re-colonization of previously occupied habitats. Spread of non-native animals and plants into occupied habitat. Habitat degradation, disturbance and risk to individuals due to increased OHV, bicycle, pedestrian and dispersed recreation activities. Any or all of these conditions could lead to extirpation of occurrence.
Unarmored three-spine stickleback	Endangered	Santa Clara River	Short and long term modification of suitable and occupied habitat due to scouring, sediment and debris flows. Modifications to water quality due to sediment, ash and hazmat contributions. Modification of streamside vegetation and streambank conditions. Individuals can be flushed out by high water flows and instream barriers may prevent their recolonization of previously occupied habitats. Spread of non-native animals and plants into occupied habitat.
Santa Ana speckled dace	Sensitive	Lower Big Tujunga Creek, Haines Canyon Creek,	Short and long term modification of suitable and occupied habitat due to scouring, sediment and debris flows.

Table 1. Summary of Wildlife Values-At-Risk in the Station Fire			
Species	**Status**	**Location**	**Summary of Expected Effects**
		West Fork San Gabriel River; Little Tujunga (historic)	Modifications to water quality due to sediment, ash and hazmat contributions. Modification of streamside vegetation and streambank conditions. Individuals can be flushed out by high water flows and instream barriers may prevent their re-colonization of previously occupied habitats. Spread of non-native animals and plants into occupied habitat. Habitat degradation, disturbance and risk to individuals due to increased OHV, bicycle, pedestrian and dispersed recreation activities. Any or all of these conditions could lead to extirpation of occurrence.
Arroyo chub	Sensitive	Big Tujunga Creek, Haines Canyon Creek, West Fork San Gabriel River below Cogswell Dam, Little Tujunga Canyon, Soledad Canyon (introduced), Pacoima Creek, Little Rock Creek (introduced)	Short and long term modification of suitable and occupied habitat due to scouring, sediment and debris flows. Modifications to water quality due to sediment, ash and hazmat contributions. Modification of streamside vegetation and streambank conditions. Individuals can be flushed out by high water flows and instream barriers may prevent their re-colonization of previously occupied habitats. Spread of non-native animals and plants into occupied habitat. Habitat degradation, disturbance and risk to individuals due to increased OHV, bicycle, pedestrian and dispersed recreation activities. Any or all of these conditions could lead to extirpation of occurrence.
Sport fisheries	None	Numerous streams	Short and long term modification of suitable and occupied habitat due to scouring, sediment and debris flows. Modifications to water quality due to sediment, ash and hazmat contributions. Modification of streamside vegetation and streambank conditions. Individuals can be flushed out by high water flows and instream barriers may prevent their re-colonization of previously occupied habitats. Spread of non-native animals and plants into occupied habitat. Habitat degradation, disturbance and risk to individuals due to

Table 1. Summary of Wildlife Values-At-Risk in the Station Fire			
Species	**Status**	**Location**	**Summary of Expected Effects**
			increased OHV, bicycle, pedestrian and dispersed recreation activities.
Southern steelhead	Endangered	Downstream in Santa Clara River	Short and long term modification of suitable habitat due to scouring, sediment and debris flows. Modifications to water quality due to sediment, ash and hazmat contributions.
Mountain yellow-legged frog/Critical Habitat	Endangered	Upper Devil's Canyon	Short and long term modification of Critical Habitat due to scouring, sediment and debris flows. Modifications to water quality due to sediment, ash and hazmat contributions. Modification of streamside vegetation and streambank conditions. Individuals can be killed or flushed out by high water flows. Any or all of these conditions could lead to extirpation of occurrence.
Arroyo toad/Critical Habitat	Endangered	Little Rock Creek, Big Tujunga Creek (Upper Watershed), Alder Creek	Changes to Critical Habitat would be temporal. Habitat modification includes the potential for short term increases in scouring events and sediment. Changes in hydrological function will not eliminate suitable habitat for the arroyo toad.
California red-legged frog	Endangered	Aliso Canyon	A newly documented population of California red-legged exists downstream of the burn area. Short and long term modification of occupied habitat due to scouring, sediment and debris flows. Modifications to water quality due to sediment, ash and hazmat contributions. Modification of streamside vegetation and streambank conditions. Individuals can be killed or flushed out by high water flows. Any or all of these conditions could lead to extirpation of occurrence.
Western pond turtle	Sensitive	Big Tujunga River; West Fork San Gabriel; Soledad Canyon;	Short and long term modification of suitable and occupied habitat due to scouring, sediment and debris flows. Modifications to water quality due to sediment, ash and hazmat contributions. Modification of streamside vegetation and streambank conditions. Individuals can be flushed out by

Table 1. Summary of Wildlife Values-At-Risk in the Station Fire			
Species	**Status**	**Location**	**Summary of Expected Effects**
			high water flows into areas of unsuitable habitat where they are at an increased risk of death or injury. Spread of non-native animals and plants into occupied habitat. Habitat degradation, disturbance and risk to individuals due to increased OHV, bicycle, pedestrian and dispersed recreation activities. Any or all of these conditions could lead to extirpation of occurrence.
Two-striped garter snake	Sensitive	Associated with streams throughout Fire Area	Loss of individuals and short/long term modification of suitable and occupied habitat due to scouring, sediment, debris flows, flooding, hazmat and rockslides. Modification of streamside vegetation and streambank conditions. Spread of non-native animals and plants into occupied habitat. Habitat degradation, disturbance and risk to individuals due to increased OHV, bicycle, pedestrian and dispersed recreation activities.
San Diego horned lizard, coastal rosy boa, San Bernardino mountain kingsnake, San Bernardino ringneck snake, California legless lizard	Sensitive	Throughout Fire Area	Spread of non-native animals and plants into occupied habitat. Habitat degradation, disturbance and risk to individuals due to increased OHV, bicycle, pedestrian and dispersed recreation activities. Loss of individuals and suitable habitat due to post-fire flooding, sediment and hazmat deposition, and rockslides.
California condor	Endangered	Mount Lukens, Magic Mountain, and Mount Gleason communication sites	Death or injury as a result of ingesting now visible micro-trash.
Least Bell's vireo	Endangered	Hansen Lake/Wash below Forest boundary	Scouring of nesting and foraging vegetation with a potential 3-5 year recovery period for suitable habitat.
Coastal California gnatcatcher	Endangered	Hansen Lake/Wash below Forest boundary	Scouring of nesting and foraging vegetation with a potential 3-5 year recovery period for suitable habitat.
California spotted owl	Sensitive	Aliso Cyn Watershed;	Spread of non-native animals and plants into occupied

Table 1. Summary of Wildlife Values-At-Risk in the Station Fire			
Species	**Status**	**Location**	**Summary of Expected Effects**
		Upper Big Tujunga Watershed; Upper West Fork San Gabriel Watershed; Eaton Watershed; Arroyo Seco Watershed; Pacoima Wash Watershed	habitat. Habitat degradation, disturbance and risk to individuals due to increased OHV, bicycle, pedestrian and dispersed recreation activities. Loss of mature tree habitat in drainage bottoms due to debris flows and rock slides.
Peregrine falcon	Sensitive	Nest Site in Big Tujunga Canyon	Disturbance due to increased visibility, access and rock slide activity.
Bald eagle (wintering)	Sensitive	Little Rock Reservoir	None expected
Western red bat, Townsend's big-eared bat, pallid bat	Sensitive	Abandoned mine sites	Disturbance due to increased visibility of mines. Potential for rockslides to block mine entrances. Habitat degradation, disturbance and risk to individuals due to increased visibility of mines and increased dispersed recreation, OHV, bicycle and pedestrian activities. Loss of mature tree habitat in drainage bottoms due to debris flows and rock slides.
Nelson's bighorn sheep	Sensitive	San Gabriel Wilderness	No changes to existing conditions expected.
Wildlife guzzlers and developed springs	None	Throughout Fire Area	Post-fire flooding and sediment/ debris deposition may fill in or undermine spring developments/guzzlers.

I. RESOURCE CONDITION ASSESSMENT

A. Resource Setting

The Station Fire started on August 26th, 2009 and burned 161,188 acres of the Angeles National Forest. This fire is the largest on record for Los Angeles County and the San Gabriel Mountains. The Station Fire was driven by fuels and topography.

The Station Fire area is within the San Gabriel Mountain Range. The fire started in the lower elevation (~3600') area of the front country slopes near the Angeles Crest Station on Highway 2 and spread into the upper elevation mountain areas of the San Gabriel and Pleasant View Ridge Wildernesses. There are approximately 37 cities that surround the fire perimeter.

Elevations within the burn area range from approximately 1,600 to 6,400 feet. The terrain within much of the burn areas is steep and rocky. Slopes are treacherous and access is largely limited to roads and trails because overland travel is very difficult. Off-highway-vehicle (OHV) use is popular in accessible areas such as navigable slopes, low-gradient stream drainages and washes. Areas near water are very popular for both motorized and non-motorized recreational activities. Any areas that are relatively flat or near water are most vulnerable to post-fire damage by illegal vehicle off-road use. Steep hills are also often impacted since they are popular testing areas for OHVs.

Special designation areas within the Station Fire include the following: San Gabriel Wilderness, Pleasant View Ridge Wilderness, Falls Canyon Research Natural Area, the West Fork of the San Gabriel River is a state-designated wild trout stream, part of the Upper Big Tujunga is a Critical Biological Zone, lower Little Rock Creek is a Critical Biological Zone (arroyo toad) and eligible for Wild and Scenic River, Soledad Canyon is a Critical Biological Zone (unarmored three-spine stickleback), and the Aliso-Arrastre Canyon area includes a Special Interest Area.

Soil burn severity varied across the landscape, resulting in a mosaic of fire-related disturbance. Soil burn severities were generally a mix of high and moderate with some small areas of low and unburned. In general, north-facing slopes and watershed headwater areas had higher burn severity than south-facing slopes and stream bottoms. Rocky outcrops showed little to no fire activity. High burn severity results in soil heating or deep ground char, duff is completely consumed, soil structure is often destroyed, infiltration is reduced due to fire-induced water repellency and vegetation is largely consumed by the fire with usually no leaves or needles remaining on trees. Moderate burn severity results in soil heating with some char, soil structure is usually not altered, litter and duff are often deeply charred or consumed, some decrease in infiltration occurs due to fire-induced water repellency and understory foliage and small diameter twigs are consumed but leaves and needles on trees may remain. Low burn severity results in little to no change in runoff response.

Front country canyons of the San Gabriel Mountains drain into the Los Angeles and San Gabriel Rivers. Desert transition canyons on the north slope drain into the Mojave and Santa Clara Rivers. Primary Los Angeles River drainages within the Station fire area include Pacoima Creek, Big Tujunga Creek, Arroyo Creek, Eaton Wash, and Haines Creek. Primary San Gabriel River drainages within the Station fire area include the West Fork of the San Gabriel River. Primary Mojave River drainages within the Station fire area include Little Rock Creek and Aliso

Creek. Primary Santa Clara River drainages within the Station fire area include the Santa Clara River. In addition, there are numerous tributaries, intermittent drainages and washes within the burn area. Primary drainages of concern to aquatic species within the burn area are Pacoima Creek, Big Tujunga Creek, Haines Creek, West Fork of San Gabriel River, Little Rock Creek, Aliso Canyon Creek and Santa Clara River in Soledad Canyon. Special status aquatic-dependent species are present in these streams and post-fire changes to their habitat and populations are a concern.

Dominant vegetation types in the burned area consist primarily of chaparral communities, including lower montane mixed chaparral, ceanothus chaparral, scrub oak chaparral, chamise chaparral, upper montane mixed chaparral, desert transition chaparral, and soft scrub mixed chaparral. The vegetation in the lower elevation portions of the fire is dense, tall (15-20' tall) ceanothus, chamise, scrub oak, and manzanita shrubs with live oaks. Some canyons support bigcone Douglas fir trees. Upper elevation support canyon live oak, interior mixed hardwood, and coast live oak vegetation, ponderosa/Jeffrey pine, and mixed conifer vegetation. Planted ornamental conifers are scattered throughout. Stream corridors contain riparian mixed hardwood, white alder, willow, mule fat, cottonwood, and California sycamore vegetation types. Some portions of the fire area have not experienced any significant large fire activity in the past forty years

Of the acres burned on National Forest System lands, 71.9% is mapped as chaparral of various types. Burn severity was classified as high (9.1%) or moderate (70.9%) for most of those acres. Many of the dominant chaparral shrubs are top-killed but sprout from stem bases after fire; others regenerate from seed stored in the soil, which germinates during late winter or early spring. In addition, a variety of herbaceous species germinate from seeds that have lain dormant in the soil for decades. These plants can produce substantial ground cover by the end of the first growing season. Keeley *et al*. (2008) measured ground cover ranging from 0 to 50% at 250 sites burned in the 2003 southern California wildfires. More than half of the plots had at least 20% cover by June. Cover had a significant negative relationship to fire severity (lower cover with higher severity), but severity explained only a small amount of the variation in cover. At the end of the second growing season, vegetation cover ranged from 25 to 100% at those same plots, with most having between 40 and 70% plant cover. There was no relationship of cover to fire severity the second year.

The fire pattern in the burn area resulted in a mosaic pattern of fire intensities due to the steep topography and incised canyons. Due to the fast recovery and sprouting nature of the shrub species within the burn area, it is expected that both upland and riparian shrub species, and some of the riparian trees, will grow back and provide vegetation cover and structure within the next 2-5 years.

Watershed Response: The San Gabriel Mountains are some of the most tectonically active and rapidly uplifting mountains in the United States. The forces lifting the mountains to great heights are being opposed by opposite forces tearing them down. Forces such as gravity, moving water, wind, earthquakes and human activities interact and combine to bring down small particles to whole hillsides at a time.

Within the burn area, soils are dominantly coarse textured, shallow, and occur on steep to very steep slopes, rendering them naturally erodible. Geomorphic erosion rates are high, perpetuating shallow coarse soils, especially with pulse erosion following fire as a natural long-term process in this mountain region. Cover is critical for soil stabilization and is lacking throughout most of the fire area.

The Station Fire removed vegetative cover and burned surface soil structure, leaving slopes and channels even more unstable than normal. Dry ravel has already increased dramatically across the entire burned area, and is adding large volumes of loose rocky material and sediment to ephemeral channels and creek bottoms. Rocks which have lost their supporting vegetation on steep slopes have already started to roll down to roadways and canyon bottoms or to places where they are stopped by obstructions or gentler slopes. Groundwater which previously fed vegetation is now surfacing as seeps and springs on some slopes and in canyon bottoms and may initiate slope movements in some areas, even before the arrival of winter rains.

Deep seated rotational landslides and earthflows are relatively few in these mountains, but could occur in deep saturated slopes, especially if shaken by an earthquake. Many earthquake faults crisscross and boarder these mountains, and quakes could significantly increase all types of slope movements when slopes are saturated. Thin surficial slides and deeper translational debris slides will increase due to the destruction of soil structure and loss of root support.

The most dramatic geologic hazard response to the fire will be the increase in destructive debris flows which bring sideslope and channel deposits racing down channel bottoms in a slurry similar to the consistency of concrete. Debris flows can range in size from a few hundred cubic yards to hundreds of thousands of cubic yards of saturated material. A debris flow is capable of destroying everything in its path until it finally loses its momentum or is caught in a debris catchment basin.

An emergency assessment of post-fire debris flow hazards for the Station Fire by the U.S. Geological Survey concluded that the Combined Relative Debris-Flow Hazard Rankings calculated in response to the 3-hour-duration storm were either “high” or “severe” for all but 18 or the 678 basins evaluated within the burned area. The 12-hour-duration storm resulted in either “moderately high”, “high”, or “severe” rankings for all but 25 of the basins. The large number of basins with “high” or “severe” rankings that drain into Big Tujunga Canyon, Pacoima Canyon, Arroyo Seco, West Fork of the San Gabriel River, and Devils Canyon indicates the potential for significant debris-flow impact both in these drainages and well downstream from the burned area. The USGS report concludes that “when compared with similar evaluations for past fires, this is the greatest number of basins we have seen with such high [debris-flow] probabilities.”

The Station Fire BAER assessment found the overall soil burn severity to be 11% unburned and very low, 16% low, 62% moderate, and 11% high (Table 2 and 3). Soils with low burn severity still have good surface structure, contain intact fine roots and organic matter, and should recover in the short-term once revegetation begins and the soil surface regains cover. The moderate to high classes have evidence of severe soil heating in isolated patches; these areas have long-term soil damage and high to very high erosion hazard. The most severely burned slopes occur on steep slopes at higher elevations and mostly on north aspects where pre-fire vegetation density

and fuels accumulations were higher. Water repellency is present throughout the fire area, including unburned areas, and was only moderately exacerbated in the hotter burn areas. Eroded soil, by ravel or water, provides the materials for damaging debris flows and stream bulking.

Table 2. Soil Burn Severity (Acres)				
Watershed	**Unburned/Very Low**	**Low**	**Moderate**	**High**
LOS ANGELES RIVER				
Pacoima Wash	681	1,706	9,531	1,430
Lower Big Tujunga	2,087	3,888	19,193	1,018
Middle Big Tujunga	1,285	1,832	19,198	2,956
Upper Big Tujunga	3,866	3,001	11,040	3,606
Verdugo Wash	224	695	1,696	242
Arroyo Seco	1,201	2,435	9,367	1,574
Eaton Wash	134	58	392	146
SAN GABRIEL RIVER				
Upper West Fork San Gabriel	4,361	5,182	10,961	2,112
Middle West Fork San Gabriel	143	232	226	3
ANTELOPE/FREMONT VALLEYS				
Little Rock Reservoir	1,210	1,473	3,859	406
Little Rock Creek	1,195	1,575	826	31
SANTA CLARA RIVER				
Aliso Canyon	723	2,246	6,817	2,087
Soledad Canyon-Arrastre Canyon	624	539	4,058	808
Lower Soledad Canyon	465	556	3,474	517
TOTALS	18,198	24,417	100,637	16,936

Table 3. Soil Burn Severity (Percent)				
Watershed	**Unburned/Very Low**	**Low**	**Moderate**	**High**
LOS ANGELES RIVER				
Pacoima Wash	5%	13%	71%	11%
Lower Big Tujunga	8%	15%	73%	4%
Middle Big Tujunga	5%	7%	76%	12%
Upper Big Tujunga	18%	14%	51%	17%
Verdugo Wash	8%	24%	60%	8%
Arroyo Seco	8%	17%	64%	11%
Eaton Wash	18%	8%	54%	20%
SAN GABRIEL RIVER				
Upper West Fork San Gabriel	19%	23%	49%	9%
Middle West Fork San Gabriel	24%	38%	38%	0%
ANTELOPE/FREMONT VALLEYS				
Little Rock Reservoir	17%	21%	56%	6%
Little Rock Creek	33%	43%	23%	1%

SANTA CLARA RIVER				
Aliso Canyon	6%	19%	57%	18%
Soledad Canyon-Arrastre Canyon	10%	9%	68%	13%
Lower Soledad Canyon	9%	11%	70%	10%
TOTALS	**11%**	**15%**	**63%**	**11%**

The Station Fire burned fourteen 6th field watersheds within the Los Angeles River, San Gabriel River, Antelope-Fremont Valley, and Santa Clara River 4th field watersheds. The 6th field watersheds were divided into sub-watersheds with "pour points" established at the mouth of creeks, river, or canyons. Pour points are located one tenth to 3 miles below the edge of the burn depending on where the values at risk are located downstream. Pre-fire and post-fire runoff and sediment yield is referenced for both the 6th field watersheds and at each pour point.

In the Station Fire, 51 % of the slopes are greater than 50%, 36% of the slopes are 25-50%, and 13 % of the slopes are less than 25%. The steeper slopes will yield the greatest quantities of sediment during moderate to heavy storms. Most of the steepest areas burned at moderate to high soil severity. Hydrophobic conditions and lack of vegetation cover in the moderate and high burn soil severity will increase the watershed response.

The following 6th field watersheds have 50% or more of the watershed burned: Pacoima Wash (70%), Low Big Tujunga Canyon (53%), Middle Big Tujunga Canyon (95%), Upper Big Tujunga Canyon (64%), Arroyo Seco (63%), and Upper West Fork San Gabriel (72%). The following 6th field watersheds have less than 50% of the watershed burned: Verdugo Wash (22%), Eaton Wash (6%), Middle West Fork San Gabriel (2%), Aliso Canyon (35%), Little Rock Reservoir (24%), Little Rock Creek (11%), Soledad Canyon/Arrastre Canyon (22%), and Lower Soledad Canyon (18%). Projected watershed responses will be greatest in watersheds with the largest amount of burned area.

The two year/12 hour storm event was considered the "design storm" for the purpose of evaluating effects. Runoff response and sediment yields vary from watershed to watershed. The Middle Big Tujunga Canyon watershed is one of the higher output watersheds with a 24.9 x normal (pre-fire) sediment yield and 4.3 x normal (pre-fire) runoff response for a two year storm event. Little Rock Creek watershed is the lowest output watershed with a 2.6 x normal (pre-fire) sediment yield and 1.1 x normal (pre-fire) runoff response for a two year storm event. Additional observations and detailed findings can be found in the Geology, Soils, and Hydrology Specialist Reports.

Figures 1 and 2 display the watersheds within the fire areas, percentage of acres burned by watershed, and the expected increased flows during a post-fire two year and five year storm event.

Figure 1

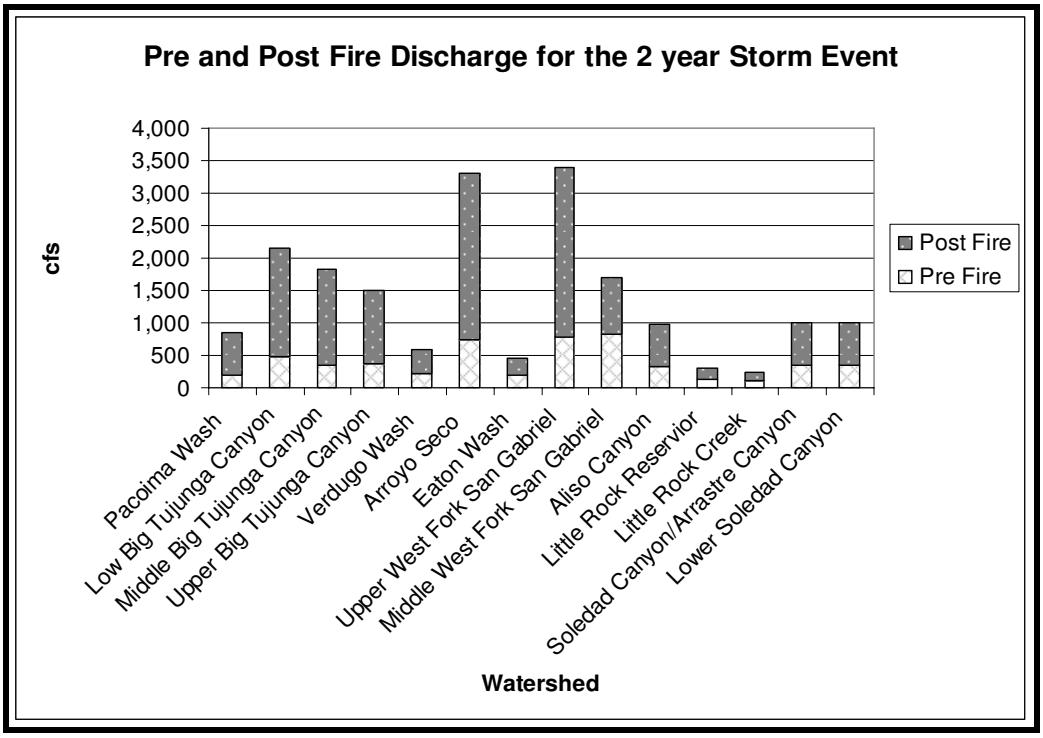
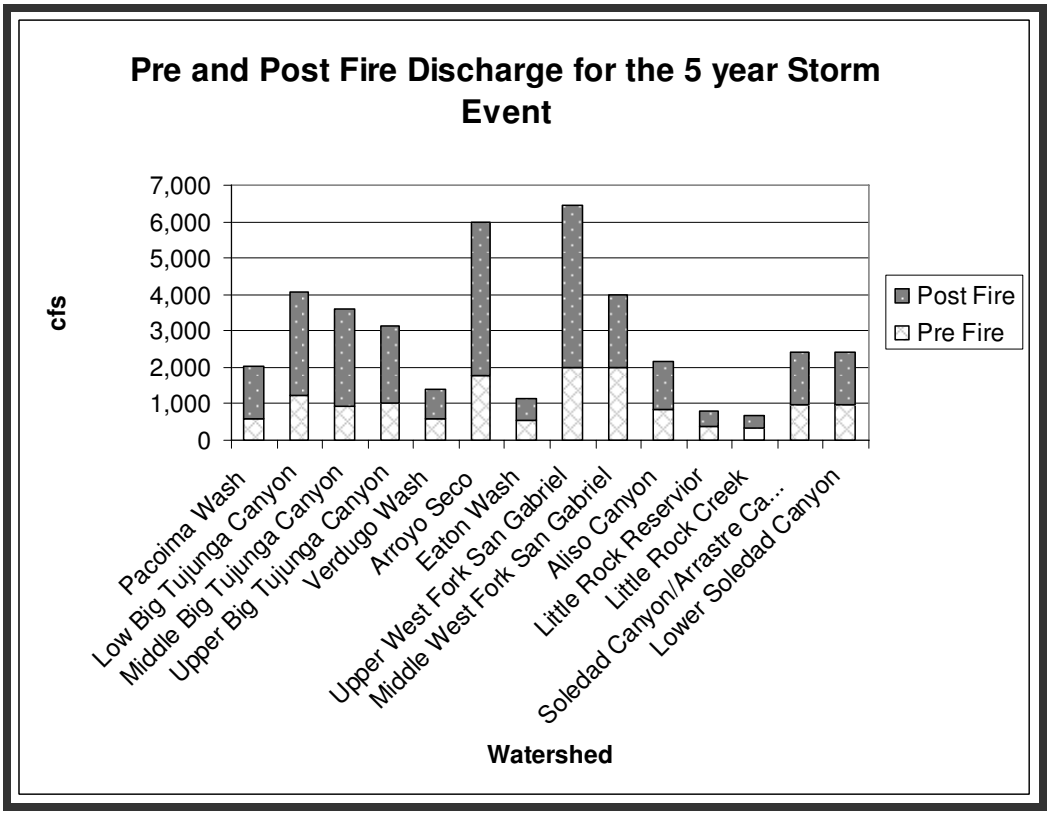


Figure 2



The likelihood of a two year storm event within the next three years is very high. The magnitude of flooding, sediment movement, and debris flows will depend on the sequence of storms; however, it is clear from the modeling that significant movement of water, soil, and debris will occur. The impacts of a two year storm on wildlife habitat and species are expected to be very severe. Should a more severe storm, such as a 10 or 15 year event occur, the impacts to wildlife habitat and species could be catastrophic. This is particularly true for species with small population sizes in areas isolated from other occurrences.

Geological Hazard: An analysis was done to determine likelihood of post-fire debris flows within the Station Fire (see Geological Report for details). Almost all of the basins in the HUC watersheds in the fire area rated "severe" or "high" for the likelihood of debris flows for a 3-hour storm.

Fire Effects for Animals: The following descriptions apply to all of the species discussed individually later in this document. Direct effects as described in this report refer to mortality, injury and disturbance that are the result of events such as flushing flows, displacement, or harassment. Indirect effects are associated with conditions such as modification of habitat and shifts in prey availability. Discussion of effects resulting from the fire and fire suppression activities are provided for background information and are not considered part of the BAER effort. Two excellent sources describing typical responses of animals and aquatic ecosystems to wildfire (both during the fire and during post-fire ecosystem recovery) are: "Wildland Fire in Ecosystems: Effects of Fire on Fauna" (Smith 2000) and "The Effect of Wildland Fire on Aquatic Ecosystems in the Western USA" (Reiman *et al*. 2003).

Appendix A includes a list of all species known to occur in or adjacent to the fire area. This list was compiled using existing Forest Service records, CNDDB database records and from observations in the field during this analysis.

Fire Effects for Terrestrial Species: Fire-related disturbances operate across multiple habitats and spatial scales. Individual animals or small populations may respond to disturbances at the microhabitat level, where fires eliminate or alter important cover through combustion of understory vegetation and surface materials, or filling of interstitial spaces in aquatic substrates with ash and sediment. At the macrohabitat level (*e.g.,* lake, pond, and stream), fires may increase solar radiation and water temperatures, alter hydroperiods and nutrient cycling, and enhance productivity. Landscape attributes such as the spatial distribution of habitat in a watershed may influence the resistance and resilience of a population to disturbance.

The Station Fire was a fairly complete burn with few areas of unburned material within the fire perimeter. Some riparian vegetation in lower watershed areas remained unburned or lightly burned and vegetation on rocky slopes remained in some areas. Headwater reaches of most streams experienced moderate to high burn severity with varying impacts in the riparian drainages. It is expected that flows and sediment regimes will change dramatically for most drainages within the fire area because of the high percent of watershed area burned and severity of the burn.

Effects of fire include direct impacts to animals unable to escape the flames, heat, and smoke. Mobile species such as larger terrestrial animals and avian species generally move ahead of the flames. However, animals can become confused and panic in the smoke and winds, becoming trapped. Burrowing species will generally seek shelter underground and those in deeper burrows are likely to survive. Other species seek shelter in rock crevices, rocky outcrops, streams, and other habitat types less likely to burn. Even wet leaf litter can provide shelter in low intensity burn areas. Since the Station Fire occurred late in the summer, direct losses of nestlings or young and/or separation from parents was probably limited.

Indirect effects include long-term losses of habitat for species dependent on later seral successional habitats and modification of habitat as a result of post-fire erosion, mass wasting, sedimentation, etc. An increase in the abundance and distribution of non-native plant and wildlife species is anticipated and will negatively impact native fauna habitats and populations. For species associated with early seral vegetation, there will be a benefit as mature stands of chaparral are now replaced with new growth.

Fire Effects for Aquatic Species: The landscape within the burn area is steep and erosive. Stream channels carry high sediment loads of sand, gravels, cobbles and sometimes boulders. In this environment, native aquatic species evolved with dynamic flow and sediment regimes. Species evolving in dynamic, disturbance related environments often develop escape mechanisms for survival. Timing of reproduction, duration of larval period, vagility, and resistance to desiccation are characteristics that may determine a species' response to fire. Juvenile and adult frogs and toads can move into water, wet leaf litter, crevices or rodent tunnels to escape direct effects of fire; however, some fires may move too quickly for amphibians to reach refugia.

Effects to aquatic species and their habitats may occur immediately during the fire or later as a result of post-fire precipitation events. Aquatic organisms that survive the fire may die later as a result of fire related injury or stress. Fire-induced effects to aquatic habitats can last for many years until vegetation is established again and sediment and flow regimes stabilize.

Isolated, disjunct populations in fragmented habitats are at greatest risk of localized extirpation. After flushing flows, instream barriers and reduced water flows may make it impossible for species to move back upstream into drainages where they once occurred. In addition, the historic distribution of many species included multiple populations scattered throughout several drainages and connected through major drainages (*e.g.*, Los Angeles River). These interconnected populations are called metapopulations and are very important for species that may be locally extirpated. Metapopulations provide a source for recolonization following localized extirpations resulting from fire and post-fire effects. For some species, metapopulation connections no longer exist and recolonization of historic sites is not possible.

Direct and indirect fire effects can impact aquatic organisms at all life stages including eggs, juveniles and adults. Direct effects to aquatic organisms may include injury/mortality as a result of heavy ash loading to aquatic environments that can smother organisms, clog gills and fill in interstitial spaces important to many benthic aquatic species. Post-fire effects can also result in lethal changes to water quality and chemistry, as well as water quantity.

Indirect effects from fire can be significant for aquatic species. Post-fire conditions influencing species viability include modified shelter, foraging and breeding habitat, increased rates of predation, increased abundance and distribution of non-native species and increased competition for limited resources. These types of aquatic and riparian ecosystem changes can result in stress and mortality for aquatic dependent species. Fire associated impacts to aquatic ecosystems include decreased stream channel stability, greater and more variable discharge, altered coarse woody debris delivery and storage, increased nutrient availability, higher sediment delivery and transport, increased solar radiation and altered water temperature regimes. Post-fire water temperatures may remain high for several years due to decreased shade provided by vegetation. Due to mortality and removal of hillslope and riparian vegetation, it is common for post-fire water flows and sediment transport to increase significantly. High water flows have the potential for flushing individuals out of stream stretches and into downstream areas. In other cases, sediment deposits or debris flows can occur and create conditions where pools and other stream habitats are filled in and organisms are smothered or crushed. Egg-masses are especially susceptible to smothering from excessive sedimentation in aquatic habitats.

For the entire Station Fire area, the estimated increase in sediment delivery for the first year after the fire will be dramatically greater than the normal sediment delivery. Sediment delivery estimates vary by drainage and can be found by sub-watershed in the Station fire BAER Hydrologic/Soils Report. Although less magnified than the sediment delivery response, flow estimates will also be greater than the normal amounts. Specific HUC6 watershed estimated post-fire flow is provided in the Station fire BAER Hydrologic/Soils Report.

Post-fire sediment and debris has the potential to fill in pool habitats and interstitial spaces both within and downstream of the burn area. In southern California, storm events delivering high amounts of precipitation often occur in spring and summer. Benthic aquatic organisms and egg masses will be highly disturbed and mortality is likely to result. Post-fire environmental conditions are likely to be stressful for most aquatic dependent species during the first one to five years needed for vegetation recovery and returned stability of flow and sediment regimes.

Species Specific Condition Assessments

General Wildlife Habitat Condition Assessment: Situated between urban areas and desert habitat, the San Gabriel 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. Chaparral habitat will begin to recover more quickly; forested areas will take decades to reach maturity and obtain the structure needed for species associated with mature conifer habitat.

Multiple manmade structures burned in the Station Fire. The potential introduction of burned structural and household debris into adjacent streams is a critical concern. Amphibians, aquatic macroinvertebrates and fish are extremely susceptible to death, deformity, and illness from environmental toxins because of the pervious nature of their skin and because of their dependence on aquatic environments for all stages of life. Terrestrial species are also at risk from drinking contaminated water or from dermal exposure.

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 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 and include brown trout, green sunfish, fathead minnows, bluegill, mosquitofish, carp, goldfish, bullhead catfish, bullfrog, red-eared slider and crayfish Non-native species compete for resources, modify habitats and pose predation threats to native fish, amphibians and reptiles. There is also potential for post-fire flooding to move rainbow trout from previously trout-free stream reaches into reaches that support TES aquatic species. Rainbow trout pose serious predation threats to species like mountain yellow-legged frogs and minnows.

Special Status Fish Condition Assessment: Within and downstream of the Station Fire, there are four native fish species: unarmored threespine stickleback, Santa Ana sucker, arroyo chub and Santa Ana speckled dace. For these species, cccupied areas often overlap. Condition assessment will be conducted by the watersheds in which they occur and include the following: Lower Big Tujunga, Middle Big Tujunga, Upper Big Tujunga, Pacoima Wash, Upper West Fork San Gabriel, Middle West Fork San Gabriel, Soledad Canyon/Arrastre Creek and Lower Soledad Canyon.

Species Accounts for Special Status Fish

Santa Ana Sucker Species Account: Santa Ana suckers *(Catostomus santaanae)* are currently listed as a Threatened species under the Endangered Species Act. There is a revised rule regarding the designation of Critical Habitat (dated January 04, 2005; 70 Federal Register 426).

Santa Ana sucker currently restricted to Lower Big Tujunga Creek and the North, East and West Forks of the San Gabriel River. Critical habitat for the Santa Ana sucker encompasses 23,719 acres (9,599 hectares) in two separate units in Los Angeles County (U.S. Fish and Wildlife Service 2005). These units are found in the San Gabriel River and Big Tujunga Creek.

Streams in southern California are subject to periodic, severe flooding that can result in drastic decreases in sucker populations (Greenfield *et al*. 1970). Santa Ana suckers are adapted for living in such unpredictable environments and quickly repopulate following floods. Such adaptations include short generation time (early maturity), high fecundity, and a relatively prolonged spawning period. These characteristics enable Santa Ana suckers to recolonize streams rapidly by producing more young over a longer time span. The short generation time allows Santa Ana suckers to reproduce early in life as a means for compensating for high rates of adult mortality. Their small size also probably enables individuals to utilize a greater range of instream refuges than would be available to larger fish during high flows (Moyle 2002).

Within and downstream of the Station fire, there are three occurrences of Santa Ana suckers: 1) Lower Big Tujunga Watershed in Big Tujunga Creek from the Big Tujunga Dam down to below the Forest boundary. The Big Tujunga Creek sucker occurrence starts about four miles below the Big Tujunga dam and extends to the Hansen Dam mitigation bank area (O'Brien pers. comm.). 2) Lower Big Tujunga Watershed in Haines Creek. Young-of-the-year Santa Ana suckers were found in August 2009 in Haines Creek below the 210 Freeway (O'Brien pers. comm.). The largest concentration of Santa Ana suckers are below the confluence of Haines, Big Tujunga, and Little Tujunga Creeks (O'Brien pers. comm). 3) Middle West Fork San Gabriel River Watershed in the West Fork of the San Gabriel River downstream of the Cogswell dam. Both the lower portion of Big Tujunga Creek and the West Fork San Gabriel River are designated as Critical Habitat.

There is an additional Santa Ana sucker population in the Santa Clara River in the Soledad Canyon/Arrastre Canyon and Lower Soledad Canyon watersheds. This is considered an introduced population and in the Final Rule for listing of Santa Ana suckers, this occurrence was excluded from protection under the Endangered Species Act

Unarmored Threespine Stickleback Species Account: The unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) is currently listed by the USFWS as Federally Endangered. Critical Habitat has yet to be proposed or designated for the unarmored threespine stickleback. Historically, the unarmored threespine sticklebacks were found throughout a much larger area including the Los Angeles, San Gabriel, and Santa Ana Rivers, but were extirpated from these areas as a result of the of effects of urbanization (*e.g.,* dewatering of steams, habitat alteration, introduction of exotic predators, and pollution) (U.S Fish and Wildlife Service 2009).

Most sticklebacks complete their life cycle in one year. All of the fish in one area are often uniform in size and age. Occasionally, there will be a few large individuals indicating that a few live for two or possibly three years.

In Soledad Canyon, the Santa Clara River population of unarmored threespine stickleback is located almost entirely on non-Forest Service lands within the Lower Soledad Canyon and Soledad Canyon/Arrastre Canyon watersheds. There is only a small portion of the Santa Clara River on National Forest system lands in the Lower Soledad Canyon watershed; none of the Santa Clara River in the Soledad Canyon/Arrastre Canyon watershed is on National Forest system lands. Sticklebacks are reliably observed on private land at the 1000 Trails RV Campground (Swift, pers. comm.).

Field reconnaissance surveys were focused on areas with known unarmored three-spine stickleback occurrence. Initial efforts were made to assess the upper Santa Clara River watershed in Los Angeles County, an 8-mile (13-kilometer) stretch of Soledad Canyon. In the lower reaches of Soledad Canyon, there is intact riparian vegetation that is outside of the fire perimeter. At the Watchable Wildlife Viewing site on the Soledad Canyon Road, 12 individuals of mixed age classes were observed in run-like habitat. Unarmored threespine stickleback were not observed in any other watersheds within the burn area.

Santa Ana Speckled Dace Species Account: Santa Ana speckled dace (*Rhinichthys osculus*) are on the Forest Service Sensitive species list. The population status of the Santa Ana speckled dace on National Forest System lands is generally unknown. The Santa Ana speckled dace's historic range included the Los Angeles, San Gabriel, and Santa Ana River systems. Santa Ana speckled dace were distributed throughout the upland portions of these systems, but were rare in the lowlands. This taxon currently occupies only remnants of its historical range, with a limited distribution in the headwaters of the Santa Ana and San Gabriel Rivers (Riverside County Integrated Project 2003).

Santa Ana speckled dace inhabit 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 (Wells *et al*. 1975, Moyle 2002.). Spawning takes place throughout the summer and peaks during June and July (Moyle 2002).

Within the Station Fire area, Santa Ana speckled dace are known to occur in the following locations: Big Tujunga Creek, Haines Creek and in the Upper and Middle West Fork San Gabriel Watersheds.

The largest remaining population of Santa Ana speckled dace on the Angeles National Forest is in the lower reaches of the east, north, and west forks of the San Gabriel River, including Cattle Canyon, Bear Creek, and Fish Canyon (Swift *et al.* 1993). Other reported occurrences include Pacoima Creek, Little Tujunga Creek, and Big Tujunga Creek, but more recent information indicates these populations may now be extirpated (Moyle *et al.* 1995). Camm Swift (pers. comm.) noted that Santa Ana speckled dace are still in Haines Creek below the two ponds

downstream of the 210 freeway. There were no observations of Santa Ana speckled dace during post-fire field visits, though no focused surveys were conducted.

Arroyo Chub Species Account: The arroyo chub (*Gila orcutti*) is a Forest Service Sensitive Species. Arroyo chub is currently most abundant in areas outside its native range (Swift *et al.* 1993). The species is native to the Los Angeles, San Gabriel, Santa Ana, Santa Margarita, and San Luis Rey Rivers and to Malibu and San Juan Creeks (Moyle *et al.* 1995). It was successfully introduced outside of its native watercourses as a baitfish in the 1930s and 1940s, along with introduced plants or with mosquito fish, and now occurs in many reservoirs and in central-coast and desert-side streams (Swift *et al.* 1993). These include the Santa Clara, Santa Ynez, Santa Maria, Cuyama, and Mojave River systems and other smaller coastal streams (*e.g.*, Arroyo Grande Creek) (Moyle *et al.* 1995, Swift *et al.* 1993). Arroyo chub is found in slow-moving or backwater sections of warm to cool (50–75.2 ° F) streams with mud or sand substrates. Depths are typically more than 16 inches (40 centimeters). This taxon is adapted to wide fluctuations in water temperature. Spawning occurs in pools or in quiet edge waters (Moyle *et al.* 1995). It is recommended to work closely with species expert groups and universities to stay current on emerging scientific information regarding this species.

Arroyo chub disperse both upstream and downstream as conditions permit. Dispersal is facilitated by flooding events (Moyle 2002). Fisher and Swift (1989, quoted in Riverside County Integrated Project 2002) noted that arroyo chub dispersal within the mainstem of the Santa Margarita River appeared to increase dramatically after El Niño rains produced floodwaters that heavily scoured the vegetation within the drainage, widening channels and reducing channel depths, thus creating habitat conditions that favored the chub and reduced exotic fish presence.

There is little information on the actual number of arroyo chub within the Station Fire area. Native arroyo chub are known from the following locations: Pacoima Creek in the Pacoima Wash watershed; Big Tujunga Creek, Haines Creek, and Little Tujunga Creek in the Lower Big Tujunga watershed; Big Tujunga Creek in the Middle Big Tujunga watershed; Big Tujunga Creek in the Upper Big Tujunga watershed; West Fork of the San Gabriel River below Cogswell dam in the Middle West Fork San Gabriel watershed.

Arroyo chub in Haines Creek are below the 210 Freeway near where Big Tujunga and Little Tujunga converge (Swift pers. comm.). In lower Big Tujunga, arroyo chub are found in Big Tujunga Creek from the dam downstream to areas below the Forest boundary (O'Brien pers. comm., Swift, pers. comm.). Above the Big Tujunga Dam reservoir, arroyo chub occur in an approximate one mile stream stretch up to the Fall Creek confluence. Arroyo chub are not found beyond this point which corresponds with a gradient increase and naturalized population of trout (O'Brien, pers. comm.; Swift, pers. comm.). Arroyo Chub were recently reintroduced into the lower Arroyo Seco from Big Tujunga and appeared to have reestablished a population below Devil's Gate Dam above Brookside Golf Course (below the 210 Freeway) (Loe, pers. comm.). In the Arroyo Seco drainage, arroyo chub occur in Arroyo Seco downstream of Hwy 134 crossing and the Rose Bowl (Swift, pers. comm.). Non-native arroyo chub were found during field surveys on 9/13/09 in Little Rock Creek about five miles above Little Rock Reservoir. This non-native population of arroyo chub was probably introduced during trout stocking efforts (Loe, pers. comm.).

Robust populations of arroyo chubs were observed during the post-fire assessment in Pacoima Creek and Big Tujunga Creek.

Habitat Condition Assessment by Watershed: Watersheds in the burn area with special status fish populations include Lower Big Tujunga, Middle Big Tujunga, Upper Big Tujunga, Middle West Fork San Gabriel, Upper West Fork San Gabriel, Pacoima Wash, Soledad Canyon/Arrastre Creek and Lower Soledad Canyon.

Lower Big Tujunga and Middle Big Tujunga Watershed Condition Assessment: Special status fish species present in the Lower Big Tujunga watershed include Santa Ana sucker, Santa Ana speckled dace and arroyo chub. Special status fish species present in the Middle Big Tujunga watershed include Santa Ana speckled dace.

Approximately 53% of the Lower Big Tujunga Watershed burned with 8% in the unburned/very low category, 15% in the low category, 73% burned in the moderate severity, and 4% experienced high severity burn. The entire Big Tujunga Creek reach below the Big Tujunga dam is identified as a drainage that "can be impacted by debris flows generated from side tributaries" on the Debris-Flow Hazard model for a three hour duration, one year recurrence storm.

For Big Tujunga Creek, the hydrology/soils response analysis predicts a 5X increase in water flow and a 30Xincrease in sediment below the dam and a 4X increase in flow and a 20X increase in sediment at the bottom of the creek from a two year storm event. Severe flooding, scouring, and debris flows are likely. The extreme amounts of sediment delivery will dramatically reduce water quality for Santa Ana suckers, Santa Ana speckled dace and arroyo chub.

For Haines Creek, the predicted watershed response for a two year storm event is a 4X increase in flow and a 25X increase in sediment. The Haines Creek Santa Ana sucker, Santa Ana speckled dace and arroyo chub occurrence is below the Forest boundary and below the debris basin. The debris basin will catch some of the sediment but if the basin overtops, the occupied portion of the stream can be expected to scour severely. The predicted debris-flow hazard rating for Haines Creek is "severe".

About 95% of the Middle Big Tujunga watershed burned: 5% in unburned/low, 7% in low, 76% in moderate, and 12% in high. The two year storm post-fire watershed response is expected to produce about 3X increase water flows and about a 20X increase in sediment delivery to the downstream Santa Ana sucker, Santa Ana speckled dace and arroyo chub habitat. Some of the post-fire generated sediment is expected to be controlled at the Big Tujunga dam where it will fall out in the reservoir above the dam and eventually be removed through routine maintenance activities. The Big Tujunga Dam is currently undergoing a retro-fit. As a result, the valves that control waterflows are not operational and flows released into the lower portion of Big Tujunga cannot be controlled. A larger storm event could result in spillway conditions with more severe potential impacts (*e.g.,* extreme scouring, flooding, etc.) to downstream habitats. The Big Tujunga Creek portion in the Middle Big Tujunga watershed is also rated as "severe" or "high" for the geological hazard rating, meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event.

Field reconnaissance surveys were conducted between September 10 and 18, 2009 and a helicopter flight was taken on September 16, 2009. Due to time constraints, the flight and field reconnaissance were focused on drainages with Santa Ana sucker Critical Habitat and known occupancy. Portions of Big Tujunga Creek regularly go dry in mid-to late summer. The length of Santa Ana sucker Critical Habitat in the fire is 17.63 miles; of that, 0.04 miles was in high severity burn, 10.14 miles was moderate, 4.40 miles was low and 3.05 miles was unburned.

Field surveys were focused on locations of deeper pools most likely to persist until the rainy season, providing refugia for the Santa Ana sucker, arroyo chub and Santa Ana speckled dace. Five juvenile Sana Ana suckers (approximately 41-80 mm standard length) were observed in Lower Big Tujunga along the Big Tujunga Canyon Road (GPS point: 11E381763, 11N3795450). Although one dead Santa Ana sucker was observed during field investigations in Lower Big Tujunga, it was not possible to determine the cause of mortality. Multiple arroyo chub were observed. No Santa Ana speckled dace were observed.

The Station Fire resulted in impacts to Santa Ana suckers and their Critical Habitat. It also impacted Santa Ana speckled dace, arroyo chub and their suitable/occupied habitat. Direct effects to habitat include removal of vegetation and changes in water quality. In the Station Fire, some riparian areas burned at low or moderate severity while others were completely denuded of vegetation. It is possible that lethal water temperatures and acute toxicity from smoke and ash may result in downstream effects to Santa Ana sucker Critical Habitat and Santa Ana speckled dace and arroyo chub habitat outside of the burn area.

There is a concern that the post-fire watershed response in both Big Tujunga and Haines Creek has a potential to cause severe or catastrophic impacts to Santa Ana suckers, Santa Ana speckled dace and arroyo chub through direct impacts (*e.g.,* death and injury to individuals during debris flows, etc.), loss of habitat quality (*e.g.,* water quality loss due to sediment and ash, impacts to breeding habitat, changes in water chemistry, etc.), or complete flushing of fish from currently occupied areas. Sediment delivery and debris flows can reduce water quality, silt in spawning sites and reduce prey availability. Water quality may be affected by increases in sediment delivery, ash deposition, debris flows, and changes in turbidity. Fish and their food source (*e.g.,* aquatic invertebrates) can be completely eliminated if buried or suffocated by sediment. Some individuals may be able to escape this by swimming to stream edges or hiding around large logs underwater. Under normal circumstances, sediment drops out as it moves downstream, allowing for a decrease in impacts. However, the magnitude of the sediment delivery expected for Big Tujunga Creek reduces the possibility that this normal process will produce measurable benefits within the area of occupied Santa Ana sucker, Santa Ana speckled dace and arroyo chub habitat.

If very high flows occur, there is a possibility that substantial numbers of fish could be swept far downstream. Because of numerous instream barriers, recolonization upstream would be impossible. Additionally, there are few areas of suitable habitat beyond the Hansen Dam mitigation bank area. As a result, native fish in this area would be vulnerable to high rates of mortality.

With vegetation along roads and trails now gone, 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 Santa Ana suckers, Santa Ana speckled dace, arroyo chub 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.

The site is also at risk of loss of habitat quality if non-native plants spread or become established in the riparian/aquatic habitat. There is a concern that non-native animals such as bullfrogs, fathead minnows, crayfish, goldfish, green sunfish and large-mouthed bass may increase their distribution into areas where Santa Ana suckers, Santa Ana speckled dace and arroyo chub occur. This increased distribution could occur as a result of post-fire storm events or as a result of well-meaning public moving animals into burned areas. Non-native species impact native aquatic populations through predation, competition for resources, and potential introduction of disease, parasites, and bacteria.

Burned structures and illegal garbage dump sites are a potential source of hazardous materials that can result in injury or death of Santa Ana sucker, Santa Ana speckled dace and arroyo chub. If introduced into the stream, hazardous materials can not only poison or sicken individuals, but structural debris and garbage can also result in changes to habitat quality/availability. Multiple structures located next to Big Tujunga Creek and its tributaries were burned in the fire. Several illegal garbage dump sites have also been located within the burn area and have been identified as a potential source of contaminants threatening Big Tujunga Creek. In general, soluble and insoluble toxins introduced to occupied native fish habitat pose a threat to individual fish in all life forms. Fish are extremely susceptible to death, deformity, and illness from environmental toxins because of the pervious nature of their skin and because of their dependence on aquatic environments for all stages of life. Soluble toxins may experience enough dilution by the time they would reach the fish occurrence that they may not be a factor. The same may be true for insoluble toxins and irritants.

Because of the steep, highly erosive slopes and the prediction of extreme loss of watershed function, slope or channel treatments to protect Santa Ana sucker, Santa Ana speckled dace and arroyo chub in the Lower Big Tujunga Watershed are not possible. This combined with the fact that these are small and isolated populations increases the concern that post-fire events will either result in localized extirpation or loss of viability due to a drastic reduction in the number of individuals.

On 9/20/09, a meeting was held to discuss the watershed response predictions relative to special status aquatic species present in the burn area. The meeting included Liz Gallegos (USGS), Adam Backlin (USGS), Chris Delith (USFWS-Ventura), Della Snyder-Velto (USFWS-Ventura), Camm Swift (Entrix, Inc. Ventura), Lisa Northrop (USFS-ANF), Steve Loe (USFS-Retired from SBNF), Tim Hovey (CDFG), Jesse Bennett (USFWS-Carlsbad), John O'Brien (CDFG-Los Alamitos), Mary Moore (USFS-Lake Tahoe Basin Mgmt Unit), Meghan Pawlowski (USFS-SBNF), Robin Eliason (USFS-SBNF), and Dan Teater (USFS-Tahoe National Forest).

Due to the extreme risk to these native fish populations and lack of any effective treatment alternatives, the consensus of the biologists was that an immediate effort should be made to collect Santa Ana suckers and arroyo chub from Big Tujunga Creek. If adequate numbers are

determined to be present, Santa Ana speckled dace will also be included in this collection effort. Salvaged fish will be placed in an off-site facility with the option of returning individuals to the drainage once the watershed has stabilized and suitable stream conditions are restored. The regulatory agencies (USFWS and CDFG) are working out the details (how many to remove, where to hold them, etc.) and plan to conduct a recovery mission prior to the onset of winter rains. Without this action, the biologist team believes there is an extremely high likelihood of localized extirpation of native fish as a result of post-fire watershed response.

Upper West Fork San Gabriel River Habitat Condition Assessment: Special status fish species present in the Upper West Fork San Gabriel River watershed include Santa Ana speckled dace. Approximately 72% of the Upper West Fork San Gabriel watershed burned in the Station fire. Of that, 19% was unburned/very low soil burn severity, 34% is low, 49% is moderate, and 9% is high. The two year storm model predicts a 4X increase in flow and 16X increase in sediment at the Cogswell dam. This portion of the West Fork of the San Gabriel River is also rated as "severe" for the geological hazard rating, meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event.

The Station Fire resulted in impacts to Santa Ana speckled dace and their suitable/occupied habitat. Direct effects to habitat include removal of vegetation and changes in water quality. In the West Fork San Gabriel, some riparian areas burned at low or moderate severity while others were completely denuded of vegetation.

There is a concern that the post-fire watershed response in West Fork San Gabriel has a potential to cause severe or catastrophic impacts to Santa Ana speckled dace through direct impacts (*e.g.,* death and injury to individuals during debris flows, etc.), loss of habitat quality (*e.g.,* water quality loss due to sediment and ash, impacts to breeding habitat, changes in water chemistry, etc.), or complete flushing of fish from currently occupied areas. Sediment delivery and debris flows can reduce water quality, silt in spawning sites and reduce prey availability. Water quality may be affected by increases in sediment delivery, ash deposition, debris flows, and changes in turbidity. Fish and their food source (*e.g.,* aquatic invertebrates) can be completely eliminated if buried or suffocated by sediment. Some individuals may be able to escape this by swimming to stream edges or hiding around large logs underwater. Under normal circumstances, sediment drops out as it moves downstream, allowing for a decrease in impacts. However, the magnitude of the sediment delivery expected for West Fork San Gabriel Creek reduces the possibility that this normal process will produce measurable benefits within the area of occupied Santa Ana speckled dace habitat.

If very high flows occur, fish will likely be swept downstream to the upper reaches of Cogswell Reservoir. Under normal circumstances, the upper reaches of Cogswell Dam may provide some refugia for Santa Ana speckled dace. As long as instream barriers are not present, fish will be able to recolonize upstream areas.

With vegetation along roads and trails now gone, 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 Santa Ana speckled dace 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.

The site is also at risk of loss of habitat quality if non-native plants spread or become established in the riparian/aquatic habitat. There is a concern that non-native aquatic species may increase their distribution into areas where Santa Ana speckled dace occur. This increased distribution could occur as a result of post-fire storm events or as a result of well-meaning public moving animals into burned areas. Non-native species impact native aquatic populations through predation, competition for resources, and potential introduction of disease, parasites, and bacteria.

Burned structures and illegal garbage dump sites are a potential source of hazardous materials that can result in injury or death of Santa Ana speckled dace. Only one structure is known to have burned in proximity to West Fork San Gabriel. No illegal garbage dump sites have been located within the area. If introduced into the stream, hazardous materials can not only poison or sicken individuals, but structural debris and garbage can also result in changes to habitat quality/availability. Introduction of toxins is not expected to present a risk to Santa Ana speckled dace or their habitat.

Because of the steep, highly erosive slopes and the prediction of extreme loss of watershed function, slope or channel treatments to protect this occurrence are not possible. This combined with the fact that this is a small and isolated population increases the concern that post-fire events will either result in localized extirpation or loss of viability due to a drastic reduction in the number of individuals.

The 9/20/09 interagency biologist meeting addressed the status of the Santa Ana speckled dace in West Fork San Gabriel. The consensus of the biologists was that no effort would be made to collect Santa Ana speckled dace from West Fork San Gabriel. This recommendation was based on the fact that Santa Ana speckled dace source populations exist in the San Gabriel drainage outside of the fire impacted area. Additionally, it is believed that Cogswell Reservoir could provide some refugia for fish until suitable stream habitat conditions are restored. Once post-fire conditions have stabilized, Santa Ana speckled dace could be translocated to the upper West Fork San Gabriel area if necessary using fish from East Fork, North Fork and West Fork below Cogswell Dam. It is recognized that post-fire conditions could result in localized extirpation or reduced viability of Santa Ana speckled dace in Upper West Fork San Gabriel. However, this concern is offset by the occurrence of viable and genetically comparable Santa Ana speckled dace populations outside of the burn area.

<u>Middle West Fork of the San Gabriel River Watershed Condition Assessment:</u> Special status fish species present in the Middle West Fork San Gabriel watershed include Santa Ana sucker, Santa Ana speckled dace and arroyo chub. Only 2% of the Middle West Fork San Gabriel Watershed burned (24% in unburned/very low, 38% in low, 38% moderate, and 0% in high).

Santa Ana suckers and their designated Critical Habitat occur downstream of Cogswell Dam. Middle West Fork San Gabriel also includes suitable and occupied habitat for Santa Ana speckled dace and arroyo chub. The dam and the low percentage of burn in this portion of the

watershed are expected to help minimize impacts to the stream and associated aquatic species. The Station Fire did burn a significant amount of the Upper West Fork of the San Gabriel River Watershed. However, Cogswell Dam is expected to offset many of the potential impacts associated with water quality. Depending on precipitation levels, there could still be periods of time when water releases are increased over the normal schedule. Post-fire impacts are not expected to result in a loss of viability or reduction in the availability of suitable habitat for Santa Ana sucker, Santa Ana speckled dace and arroyo chub in the Middle West Fork of the San Gabriel watershed..

Pacoima Wash Watershed Condition Assessment: Special status fish species present in the Pacoima Wash watershed include arroyo chub. Approximately 70% of the Pacoima Wash watershed burned during the Station fire; 5% of the watershed has unburned/very low soil burn severity, 13% is rated low, 71% is rated moderate, and 11% is rated high. For a two year storm event, the predicted increase in water flow in Pacoima Creek is 3.5X and sediment delivery is a 20X increase. There is a high potential for severe impacts to species and habitat in Pacoima Creek. The Pacoima Creek area is also rated as "high" for the geological hazard rating, meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event.

The Station Fire resulted in impacts to arroyo chub and their suitable/occupied habitat. Direct effects to habitat include removal of vegetation and changes in water quality. In Pacoima Canyon, some riparian areas burned at low or moderate severity while others were completely denuded of vegetation. It is possible that lethal water temperatures and acute toxicity from smoke and ash may result in downstream effects to arroyo chub habitat outside of the burn area.

There is a concern that the post-fire watershed response in Pacoima Creek has the potential to cause severe or catastrophic impacts to arroyo chub through direct impacts (*e.g.,* death and injury to individuals during debris flows, etc.), loss of habitat quality (*e.g.,* water quality loss due to sediment and ash, impacts to breeding habitat, changes in water chemistry, etc.), or complete flushing of fish from currently occupied areas. Sediment delivery and debris flows can reduce water quality, silt in spawning sites and reduce prey availability. Water quality may be affected by increases in sediment delivery, ash deposition, debris flows, and changes in turbidity. Fish and their food source (*e.g.,* aquatic invertebrates) can be completely eliminated if buried or suffocated by sediment. Some individuals may be able to escape this by swimming to stream edges or hiding around large logs underwater. Under normal circumstances, sediment drops out as it moves downstream, allowing for a decrease in impacts. However, the magnitude of the sediment delivery expected for Pacoima Creek reduces the possibility that this normal process will produce measurable benefits for arroyo chub habitat within the burn area.

Under high water flow conditions, fish could be swept far downstream. Fish who survive this journey will be deposited in the upper reaches of the Pacoima Reservoir. Pacoima Reservoir could provide refuge for arroyo chub until upstream habitat conditions stabilize. Instream barriers could make recolonization of upstream areas difficult or impossible.

With vegetation along roads and trails now gone, 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 arroyo chub 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.

The site is also at risk of loss of habitat quality if non-native plants spread or become established in the riparian/aquatic habitat. There is a concern that non-native animals such may increase their distribution into areas where arroyo chub occur. This increased distribution could occur as a result of post-fire storm events or as a result of well-meaning public moving animals into burned areas. Non-native species impact native aquatic populations through predation, competition for resources, and potential introduction of disease, parasites, and bacteria.

Burned structures and illegal garbage dump sites are a potential source of hazardous materials that can result in injury or death of arroyo chub. If introduced into the stream, hazardous materials can not only poison or sicken individuals, but structural debris and garbage can also result in changes to habitat quality/availability. No structures were burned in the proximity of Pacoima Creek. Illegal garbage dump sites do occur along the Santa Clara Divide Road within the burn area, but their distance from the creek minimizes their potential as sources of contaminants threatening aquatic species in Pacoima Creek. In general, soluble and insoluble toxins introduced to occupied native fish habitat pose a threat to individual fish in all life forms.

Because of the steep, highly erosive slopes and the prediction of extreme loss of watershed functioning, slope or channel treatments to protect this occurrence are not possible. This combined with the fact that this is a small and isolated population increases the concern that post-fire events will either result in localized extirpation or loss of viability due to a drastic reduction in the number of individuals.

The 9/20/09 interagency biologist meeting addressed the status of the arroyo chub in Pacoima Creek. The consensus of the biologists was that no effort would be made to collect arroyo chub from Pacoima Creek. This recommendation was based on the fact that arroyo chub occur outside of the burn area in the upper reaches of Pacoima Reservoir. It is believed that Pacoima Reservoir could provide some refugia for fish until suitable stream habitat conditions are restored. Once post-fire conditions have stabilized, arroyo chub could be translocated to the upper reaches of Pacoima Creek if appropriate and necessary. It is recognized that post-fire conditions could result in localized extirpation or reduced viability of arroyo chub in the upper reaches of Pacoima Creek. However, this concern is offset by the occurrence and expected persistence of arroyo chub in association with the upper reaches of Pacoima reservoir.

<u>Soledad Canyon/Arrastre Creek and Lower Soledad Canyon Watershed Condition Assessment:</u>
Special status fish species present in the Soledad Canyon/Arrastre Creek and Lower Soledad Canyon Watersheds include unarmored threespine stickleback and Santa Ana sucker (introduced and not federally listed). Approximately 22% of the Soledad Canyon/Arrastre Canyon watershed burned and 18% of Lower Soledad Canyon watershed burned. In Soledad Canyon/Arrastre Canyon, 10% was unburned/very low, 9% was low, 68% was moderate, and 13% was high burn severity. In the Lower Soledad Canyon watershed, 9% was unburned/very low, 11% was low, 70% was moderate, and 10% was high burn severity. At the confluence of Indian Canyon and

Soledad Canyon, there is a predicted 2X increase in flows and a 7X increase in sediment. At the confluence of Mill/Maddox and Soledad Canyons, there is a predicted 3X increase in flows and a 21X increase in sediment. The portions of these the burned area in the two watersheds are also rated as "moderately high", "moderately low," and "low for the geological hazard rating meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event.

No occupied unarmored threespine stickleback habitat occurs within the burn area. All impacts to the unarmored threespine stickleback and its occupied habitat will be associated with downstream impacts resulting from post-fire events. The Santa Clara River in Soledad Canyon is a broad flat drainage with the capacity to handle high volumes of water and sediment. Impacts to unarmored threespine stickleback and their habitat will depend on the size and sequence of storms.

Unarmored threespine stickleback in the Santa Clara River could be adversely affected by high flows, sediment loading and/or debris torrents. Sediment delivery and debris flows can reduce water quality, silt in spawning sites and reduce prey availability. Water quality may be affected by increases in sediment delivery, ash deposition, debris flows, and changes in turbidity. Fish and their eggs can be completely eliminated if buried or suffocated by sediment. Some individuals may be able to escape this by swimming to stream edges or hiding around large logs underwater. Under normal circumstances, sediment drops out as it moves downstream, allowing for a decrease in impacts. The amount of sediment being delivered at any one time influences the potential for this normal process to produce measurable benefits within sensitive habitat areas.

Burned structures and illegal garbage dump sites are a potential source of hazardous materials that can result in injury or death of amphibians and fish. If introduced into the stream, hazardous materials can not only poison or sicken individuals, but structural debris and garbage can also result in changes to habitat quality/availability. Although not identified, it is likely that illegal garbage dump sites occur within the burn area. In general, soluble and insoluble toxins introduced to streams pose a threat to amphibians and fish in all life forms.

During the 9/20/09 interagency meeting to discuss management of potentially impacted special status fish and amphibian species, strategies for management of the Soledad Canyon unarmored threespine stickleback were also discussed. One proposal includes taking unarmored threespine stickleback from San Felipe Creek and relocating them in Soledad Canyon in the event of localized extirpation. The San Felipe Creek unarmored threespine stickleback originated from Soledad Canyon (Swift, pers. comm.), so they represent a viable and genetically appropriate source for reintroductions. According to Swift, unarmored threespine stickleback from Soledad Canyon were relocated to San Felipe Creek in the 1970s and 1980s to establish a self-sustaining refugia population (Swift pers. comm.). The San Felipe River stickleback population is outside the historic range of the species. .

Another proposal includes collection of a portion of the Soledad Canyon unarmored threespine stickleback population and relocation to San Francisquito Canyon. The stickleback would be translocated to formerly-occupied stream stretches in San Francisquito Canyon Creek. The San

Fracisquito Canyon population of unarmored threespine stickleback was last documented in 2005 and is believed to have been extirpated as the result of post-fire events.

Genetic testing is underway to determine the connection between these various populations. The results of this genetic testing will help determine the potential for either collecting or relocating unarmored threespine stickleback.

Sport Fisheries Condition Assessment: Both rainbow and brown trout occur in streams within the Station Fire area. Rainbow and brown trout have been stocked in some perennial drainages on the Forest. Rainbow trout are known to occur in Big Tujunga Creek, West Fork San Gabriel River, Pacoima Canyon and Arroyo Seco. Brown trout are known to occur in Mill Creek, although little is known regarding the recreational sport fishing aspect. Resident trout fisheries provide popular recreational fishing opportunities on the Angeles National Forest.

The West Fork San Gabriel River was designated as a "Wild Trout Stream" by the California Department of Fish and Game (CDFG). Arroyo Seco is also known as a recreational trout fishery and is most heavily used in the spring. Since some of the drainages burned very hot, fish may have died as a result of water heating, gas exchange, or ash loading to streams. It is often difficult to locate fish that have died from a fire since they decay quickly or are readily eaten by scavengers. During post-fire surveys, biologists from USGS documented dead rainbow trout in Big Tujunga Creek (Backlin, pers. comm.).

Primary post-fire effects to trout habitat will include high flows, scouring, sediment loading and/or debris torrents. Sediment delivery and debris flows can reduce water quality, silt in spawning sites and reduce prey availability. Water quality may be affected by increases in sediment delivery, ash deposition, debris flows, and changes in turbidity. Fish can be killed if buried or suffocated by sediment. Where the fire removed riparian vegetation, adverse changes to trout habitat may include modified water temperature, food and cover. Excessive inputs of ash may cause localized changes in water pH and create unsuitable habitat conditions for trout.

High runoff and sediment movement could scour trout eggs and young-of-year. High sediment loading in riffle and pool habitats may result in fewer prey items such as aquatic macroinvertebrates available for trout and/or suffocation of trout eggs. Healthy trout populations in stream sections not extensively impacted by the fire and post-fire conditions can provide fish to repopulate impacted stream reaches. It is possible that some streams may experience localized extirpation of trout populations due to high post-fire stream flows and sediment loading

Southern Steelhead Condition Assessment: Rainbow trout primarily exhibit two life history strategies along the California coast. Individuals which exhibit the resident life history strategy are referred to as "rainbow trout" or "resident rainbows" and those that exhibit the anadromous life history strategy are referred to as "steelhead". Both life forms may exist within the same stream and they may successfully reproduce with each other, exhibiting what is otherwise known as a polymorphic life history structure. A polymorphic life history structure allows this species to persist in habitats that are highly variable and unstable due to conditions such as drought and flashy flows.

Historically, steelhead fish were distributed throughout Pacific coast states and much of California. West coast steelhead populations have been divided into 15 Distinct Population Segments (DPSs) based on natural geographic boundaries that foster genetic isolation (National Marine Fisheries Service 1997). Each DPS is treated as a distinct population by the National Marine Fisheries Service (NMFS) for determinations on the need for listing as threatened or endangered. Southern California Evolutionarily Significant Unit (ESU): listed as Endangered (National Marine Fisheries Service 1997), Critical Habitat Designated (National Marine Fisheries Service 2000), withdrawn & vacated (National Marine Fisheries Service 2002a), Range Extension for southern California ESU (National Marine Fisheries Service 2002b), newly Proposed Critical Habitat (National Marine Fisheries Service 2004).

Currently, there are no known occupied sites of southern steelhead (*Oncorhynchus mykiss*) within the Station Fire perimeter. Since the fire did not burn within the critical habitat watershed there would be no impact to individuals or occupied habitat. For the watersheds that provide suitable habitat (Santa Clara River), the flooding and sedimentation that is expected to occur is not expected to impact populations or the suitable habitat.

Mountain Yellow-Legged Frog Condition Assessment: Mountain yellow-legged frogs are federally listed as Endangered. Mountain yellow-legged frogs are completely aquatic year-round.

There are five known populations of mountain yellow-legged frogs on the Angeles National Forest. Only the Devil's Canyon population occurs within the burn area. Devil's Canyon also includes designated Critical Habitat for the mountain yellow-legged frog In addition to the known occurrence in Devil's Canyon, the Station Fire contains other areas of suitable mountain yellow-legged frog habitat and historic occurrences in multiple drainages.

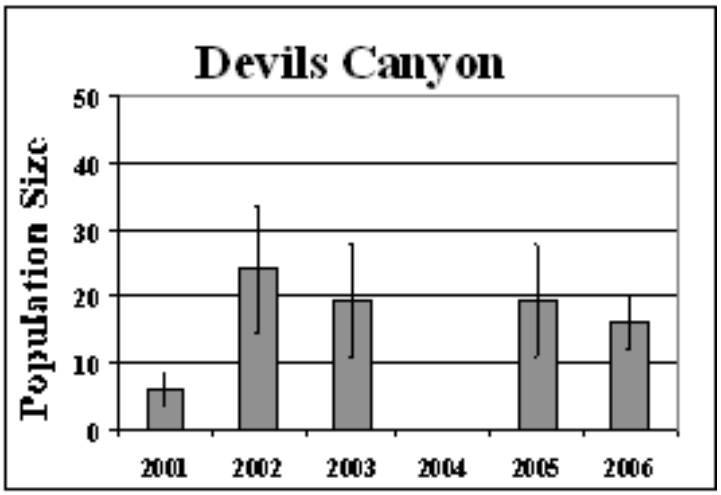
Within the burn perimeter, historic mountain yellow-legged frog populations include the following: Big Tujunga – Woodwardia Canyon (1941), Switzer Campground (1967), W. Fork San Gabriel River (1970), W. Fork San Gabriel River @ Shortcut Cyn (1970), Lower Big T (1930), Mill Ck (1958), Narrows (1959), Big Tujunga between Wickiup and Wildcat Canyons (1959). While it is likely that this species is extirpated from historic occurrence sites in the burn area, there is a small possibility that this species persists undetected in some remote sites.

Forest Service biologists Tom Murphey, Meghan Pawlowski, and Angelica Mendoza accompanied USGS biologists Adam Backlin and Liz Gallegos to the Devil's Canyon occurrence on 9/17/09 to assess the habitat condition after the fire. They found several small pools in the drainage bottom that supported frogs. The largest pool was about 8' across and 3' deep. The other pools were no deeper than 12".

USGS biologists estimate the Devil's Canyon population of frogs at about 20 adults. This population is regularly monitored by USGS. Figure 3 displays the population estimate based on their monitoring between 2001 and 2006. USGS believes that the population estimate through 2009 remains consistent with the numbers displayed below (Robert Fisher, per. comm.). USGS observations indicate that although the Devil's Canyon yellow-legged frog occurrence regularly

produces eggs and tadpoles, the rate of survivorship from tadpole to adult is very low (Backlin pers. comm.).

Figure 3



During a 9/16/09 post-fire visit to the site, USGS biologists took water samples to be evaluated and compared to other samples taken during each normal visit. While most of the analysis is still being run, they did note that the pH was 8.4, compared to a normal visit pH of 7.5.

Although the occupied and Critical habitat for mountain yellow-legged frog in Devil's Canyon is at the top of the drainage, the post-fire impacts are expected to be severe. The south-facing slopes above the Critical Habitat experienced moderate and high soil severity burn while the north-facing slopes were either unburned or low burn severity. The slopes above the habitat are extremely steep and highly erosive.

The predicted post-fire watershed response for a two year storm in Upper Devil's Canyon at the bottom of the Critical Habitat is about two times as much water delivery and a 561% increase in sediment delivery. Even before the onset of precipitation, dry ravel from the burned slopes above the occupied pools is already occurring. The large increase in sediment delivery predicted for this site will likely exceed the potential for high water flows to effectively flush material out of the system. As a result, some pools may experience a temporary loss of capacity due to sediment loading.

The Upper Devil's Canyon area is rated as "severe" for the geological hazard rating, meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event. Based on the modeling, there is a very real potential for the pools to be filled with dry ravel and sediment over the next few years. In the future, flows may flush the sediment from these pools and they would be established again. However, if the post-fire events and subsequent habitat modifications result in eradication of all frogs or reduce numbers below what is needed to sustain a viable population, this important occurrence could be completely extirpated.

For overwintering, mountain yellow-legged frogs utilize spaces underneath rocks and interstitial spaces between rocks. Overwintering occurs when temperatures cool; as a result, many frogs may move to their overwintering sites prior to the onset of the first big deliveries of sediment and debris to the pool habitat. Their ability to survive burial in sediment and debris is uncertain and will depend on the sequence of storms. If pools fill as expected, overwintering tadpoles will most certainly perish. If pool habitat is lost, emerging frogs that survive the sediment/debris flows will not have aquatic habitat necessary for survival and breeding.

After the 2003 Old Fire, post fire flooding and debris flows scoured City Creek and filled pools with sediment in occupied mountain yellow-legged frog habitat. A high precipitation year followed in 2005 and resulted in re-establishment of pool habitat. No mountain yellow-legged frogs were detected during monitoring efforts in 2004. In 2005 and 2006, monitoring efforts detected a small number of mountain yellow-legged frogs in City Creek. In 2007, mountain yellow-legged frog reproduction was confirmed in City Creek. However, it is still not known if this site supports a viable population.

In summary, primary concerns for mountain yellow-legged frogs and Critical Habitat in Devil's Canyon are associated with the potential for large amounts of sediment and debris to bury juveniles/adults or to fill pools and temporarily eliminate essential habitat for tadpoles and adults. Until adequate flows occur with the ability to scour these pools, habitat suitability will be heavily compromised. This site is also at risk for the introduction of non-native plants and animals that would further degrade habitat quality and impact the frog through predation, competition and disease introduction.

The predicted extreme loss of watershed function and the steep, highly erosive slopes make it infeasible to do slope or channel treatments to protect this occurrence. Because of the small number of individuals in this very isolated population and the predicted extreme post-fire watershed response, this occurrence is considered to be at an almost certain risk of extirpation or loss of viability.

During the 9/20/09 interagency meeting to discuss management of potentially impacted special status fish and amphibian species, strategies for management of the Devil's Canyon mountain yellow-legged frog population were also discussed. The consensus of the biologists was that due to the extreme risk to the occurrence and the lack of any effective slope/channel treatment alternatives, an immediate effort should be made to remove frogs from the site for placement in a holding facility. Translocation of frogs into the Little Rock Creek was also discussed. USFS, USFWS and CDFG will work together to identify a short and long term strategy. The objective is to remove frogs from the site before weather conditions make such an effort impossible.

Arroyo Toad Condition Assessment: Arroyo toads are federally-listed as Endangered. Within the Station Fire, arroyo toads are known to occur in the Upper Big Tujunga Creek watershed. Downstream of the fire area, they are known to occur in the Santa Clara River and Little Rock Creek. Outside of the Upper Big Tujunga Creek area, there are no other known occurrences of arroyo toad in the fire perimeter. There are historic occurrences in Mill Creek and Lower Big Tujunga Creek, but these are belied to be extirpated. Pacoima Canyon is considered suitable

habitat for arroyo toads but is not known to be currently occupied (Fisher, pers. comm.). It is possible that undetected populations of arroyo toads may exist within the fire area.

Little Rock Creek Occurrence: The Little Rock Creek arroyo toad occurrence and Critical Habitat is located in the Little Rock Reservoir watershed and is downstream of the fire area. Approximately 24% of the Little Rock Reservoir watershed burned: 17% in unburned/low, 21% in low, 56% in moderate, and 6% in high. The two year storm post-fire watershed response is not expected to produce much change in water flows to the occupied toad habitat and about a 7X increase in sediment delivery.

No arroyo toad occupied or Critical Habitat burned in Little Rock Creek. Therefore, there are no changes to vegetative screening and barriers protecting this habitat. There is no expected increase in vulnerability of toads/tadpoles associated with illegal collection. Since so much of the Forest will be closed indefinitely to recreation use, there may be increased recreation use on the unburned Little Rock Reservoir area, including illegal use of the closed the Little Rock OHV area. Displaced visitor use may reduce the effectiveness of existing arroyo toad protective measures. No burned structures are known from the area above or upstream of the occupied habitat, so there is no known risk of hazardous materials affecting water or habitat quality. The risk of non-native animals and plants being spread or established in the habitat is relatively low due to the lack of habitat disturbance from fire and lack of known non-native sources upstream from the site.

Upper Big Tujunga Creek Occurrence: This arroyo toad occurrence is in the Upper Big Tujunga Watershed. About 64% of the Upper Big Tujunga watershed burned: 18% in unburned/low, 14% in low, 51% in moderate, and 17% in high. The two year storm post-fire watershed response is expected to produce about 2.5X increase water flows to the occupied toad habitat and about a 12X increase in sediment delivery. The Big Tujunga Creek portion of the Upper Big Tujunga watershed is rated as "severe" or "high" for the geological hazard rating, meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event.

Suitable arroyo toad habitat requires stable and vegetated upper terraces along with periodic flooding that reworks stream channel sediments and alters pool location and form, In general, sediment delivery and the resulting sand bar formation is beneficial for arroyo toad habitat. However, severe levels of flood and debris flow could adversely alter habitat and potentially cause loss of individual toads. The settling of ash in aquatic systems can result in changes to water chemistry (pH, etc.) that could affect the health of toads, tadpoles, and egg strands. The loss of shade in the riparian area can also impact habitat conditions (*e.g.,* temperature, dissolved oxygen, water quantity due to increased evaporation, etc.) that can affect toads, tadpoles, and egg strands. Stream habitat important for reproduction can be modified by excessive amounts of sediment deposition.

Based on the hydrological modeling, there is a very high potential for debris flows in occupied arroyo toad habitat. At this time of year, arroyo toads are burrowed in sandy banks and soils until spring. If large amounts of sediment and debris are deposited on top of their burrow sites, it is not known if individual toads would be capable of digging out. It is possible that some

individuals would be killed or injured by debris flows. Large amounts of sediment and boulders may interfere with the availability of burrowing, overwintering, foraging, and breeding habitat. Large debris flows can also result in severe scouring of channels and could alter banks or terraces where toads are burrowed.

Prior to the fire, the arroyo toad habitat in Upper Big Tujunga was not visible from the highway. The visual and physical barriers created by the vegetation helped deter recreation and illegal OHV use in the area. With vegetation along the road and stream now gone, the riparian/aquatic habitat is at high risk of increased disturbance associated with waterplay and dispersed recreation. Dispersed recreation has been previously documented as impacting the Upper Big Tujunga arroyo toad habitat. Waterplay and dispersed recreation can result in the following impacts to arroyo toads 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.

The site is also at risk of loss of habitat quality if non-native plants spread or become established in the riparian/aquatic habitat. There is a concern that non-native animals such as bullfrogs, fathead minnows, crayfish, goldfish, green sunfish and large-mouthed bass may increase their distribution into areas where arroyo toads occur. This increased distribution could occur as a result of well-meaning public moving animals into burned areas. Non-native species impact native aquatic populations through predation, competition for resources, and potential introduction of disease, parasites, and bacteria.

No structures were burned upstream in proximity of the occupied toad habitat. However, there are areas of illegal garbage dumping that could pose a pollution threat to arroyo toads. In general, if soluble and insoluble toxins are transported to occupied arroyo toad habitat, there could be a threat to individual toads in all life forms. Amphibians are extremely susceptible to death, deformity, and illness from environmental toxins because of the pervious nature of their skin and because of their dependence on aquatic environments for critical developmental life stages. Irritants, soluble and insoluble toxins may experience enough dilution by the time they reach the arroyo toad occurrence that they may not result in measurable impacts. An abandoned shooting range upstream in Lynx Gulch was evaluated and determined to be not likely to pose a hazardous materials threat to the arroyo toad occurrence.

Because of the steep, highly erosive slopes and the prediction of extreme loss of watershed function, slope or channel treatments to protect this occurrence are not possible. This combined with the fact that this is a small and isolated population increases the concern that post-fire events may lead to a reduction in the number of individuals at this site. Reduced numbers could lead to a loss of viability for this population. It is believed that young of the year may have suffered a high rate of mortality as a result of the fire. Additionally, reproductive success may be hampered until sufficient riparian vegetation is recovered and stream conditions stabilize (3-5 years).

The 9/20/09 interagency biologist meeting addressed the status of the arroyo toad in the Upper Big Tujunga Creek Watershed. The consensus of the biologists was that no effort would be made to collect arroyo toads from this occurrence. Instead, primary focus will be to limit parking

in the area as a means of managing access to the creek, dispersed recreation activities and waterplay.

California Red-Legged Frog Condition Assessment: California red-legged frogs are federally-listed as Threatened. Currently, there are no known occurrences of California red-legged frogs within the fire perimeter. However, there is one occurrence in Aliso Canyon downstream of the fire perimeter. There is a historic record for red-legged frogs in Pacoima Creek near the Forest boundary that is presumed extirpated. While it is likely that this species is extirpated from drainages in the fire, there is a small possibility that this species persists undetected in some remote sites.

For Aliso Canyon Creek, the hydrology/soils response analysis predicts a 3X increase in water from a two year storm event and a 19X increase in sediment in the first year over pre-fire conditions. Severe flooding, scouring, and debris flows are likely. The extreme amounts of sediment delivery will dramatically reduce water quality and habitat suitability for the California red-legged frog

The Aliso Canyon population of California red-legged frogs is within the 2004 Crown Fire burn area. There is evidence of site modifications as a result of the Crown Fire and post-fire events. However, this population was not previously monitored and it is not possible to know how it was impacted by the Crown Fire. Monitoring conducted in October 2009 indicates a very low number of tadpoles and young of the year suggesting that reproduction and recruitment is low. If this occurrence is still recovering from the 2004 Crown Fire and post-fire effects, this would make them especially vulnerable to any additional impacts.

Deep pools are an important component of California red-legged frog habitat. Based on the hydrological modeling, there is high potential for pools to be filled with debris and sediment over the next few years. Tadpoles occupying pools that become filled with sediment and debris will die. If pool habitat is lost, frogs that survive the sediment/debris flows will not have aquatic habitat necessary for survival and breeding. In the future, flows may flush the sediment from these pools and they would be established again to their pre-fire conditions. In the meantime, population viability could be severely impacted.

There is a concern that the post-fire watershed response in Aliso Canyon has potential to cause severe or catastrophic impacts to the California red-legged frog through direct impacts (*e.g.,* death and injury to individuals during debris flows, etc.), loss of habitat quality (*e.g.,* water quality loss due to sediment and ash, impacts to breeding habitat, changes in water chemistry, etc.), or complete flushing of individuals from currently occupied areas. Sediment delivery and debris flows can reduce water quality, silt in pools important for reproduction and reduce prey availability. Water quality may be affected by increases in sediment delivery, ash deposition, debris flows, and changes in turbidity. Frogs and their food source (*e.g.,* aquatic invertebrates) can be completely eliminated if buried or suffocated by sediment. Some individuals may be able to escape this by swimming to stream edges, hiding around large logs/boulders underwater or leaving the stream channel. Under normal circumstances, sediment drops out as it moves downstream, allowing for a decrease in impacts. However, the magnitude of the sediment

delivery expected for Aliso Canyon Creek reduces the possibility that this normal process will produce measurable benefits within the area of occupied California red-legged frog habitat.

If very high flows occur, there is a very real possibility that substantial numbers of frogs could be swept far downstream. This risk is greatest for tadpoles and recently metamorphosed individuals. Individuals who survive this flushing event will not be able to return to upstream areas because of numerous instream barriers. Their opportunity to recolonize would depend upon their ability to survive until adults and then return to their natal habitat. If suitable habitat does not occur downstream, frogs swept into this area would be vulnerable to high rates of mortality. This site is also at risk for the introduction of non-native plants and animals that would further degrade habitat quality and impact the frog. There is a concern that non-native animals such as bullfrogs, crayfish and goldfish may increase their distribution into areas where California red-legged frogs occur. This increased distribution could occur as a result of post-fire storm events or as a result of well-meaning public moving animals into burned areas. Non-native species impact native aquatic populations through predation, competition for resources, and potential introduction of disease, parasites, and bacteria.

Burned structures and illegal garbage dump sites are a potential source of hazardous materials that can result in injury or death of California red-legged frogs. If introduced into the stream, hazardous materials can not only poison or sicken individuals, but structural debris and garbage can also result in changes to habitat quality/availability. Several illegal garbage dump sites have also been located within the burn area and have been identified as a potential source of contaminants threatening Aliso Canyon Creek. In general, soluble and insoluble toxins pose a threat to frogs in all life forms. Frogs are extremely susceptible to death, deformity, and illness from environmental toxins because of the pervious nature of their skin and because of their dependence on aquatic environments for the reproductive stages of life. Irritants, soluble and insoluble toxins may experience enough dilution by the time they would reach the frog occurrence that they may not be a factor.

In summary, primary concerns for California red-legged frogs in Aliso Canyon are associated with the potential for large amounts of sediment and debris to bury tadpoles/juveniles/adults or to fill pools and temporarily eliminate essential habitat for tadpoles and adults. Until adequate flows occur with the ability to scour these pools, habitat suitability will be heavily compromised.

Because of the steep, highly erosive slopes and the prediction of extreme loss of watershed function, slope or channel treatments to protect this occurrence are not possible. This combined with the fact that this is a small and isolated population increases the concern that post-fire events will either result in localized extirpation or loss of viability due to a drastic reduction in the number of individuals.

During the 9/20/09 interagency meeting to discuss management of potentially impacted special status fish and amphibian species, strategies for management of the Aliso Canyon California red-legged frog population was not discussed. This occurrence was not known at the time of the meeting. Therefore, there was no interagency discussion regarding potential actions for this site.

Western Pond Turtle Condition Assessment: The western pond turtle is a Forest Service sensitive species. It is the only turtle native to southern California. It ranges from Washington to Baja California. These turtles are highly associated with aquatic habitats. On warm days, they will stay in the water. In cool weather, pond turtles leave the water to bask in the sun. Pond turtles lay eggs in late spring in well-drained silty soil in upland areas up to several hundred feet away from water. These nests are highly susceptible to predators, people, and vehicles. Pond turtles overwinter in shallow upland burrows, under deep leaf litter, or in muddy pool bottoms.

Western pond turtles have declined precipitously over the last few decades throughout their range. This is especially true for populations occurring in southern California. Habitat loss and degradation coupled with non-native species introductions (including predatory game fish and bullfrogs) are thought to be major factors in the decline. In southern California, pond turtles historically occurred in all major coast facing drainages with a disjunct population in the Mojave River.

Within the burn area, western pond turtles are known to occur in Big Tujunga Creek (Lower, Middle, and Upper Big Tujunga Watersheds), Alder Creek (Upper Big Tujunga Watershed), Pacoima Creek (Pacoima Watershed), Haines Creek (Lower Big Tujunga Watershed), West Fork San Gabriel (Upper and Middle West Fork San Gabriel Watersheds) and the Santa Clara River (Lower Soledad Canyon and Soledad Canyon/Arrastre Canyon Watersheds).

During the field reconnaissance for the Station fire, western pond turtles were found in Pacoima Creek (1 adult female and 1 unsexed juvenile). A dead western pond turtle was found in Upper Big Tujunga Creek near the confluence with Lynx Gulch. The carapace was burned severely and it is likely that this turtle was caught away from the water during the fire. Turtles were observed at the debris basin in Haines Creek but a positive identification of species was not made.

Lower Big Tujunga Occurrences: There are two occurrences of pond turtles in the Lower Big Tujunga Creek Watershed: Big Tujunga Creek below the dam and Haines Creek. Approximately 53% of the Lower Big Tujunga Watershed burned with 8% in the unburned/very low category, 15% in the low category, 73% burned in the moderate severity; and 4% experienced high severity burn. The entire Big Tujunga Creek reach below the Big Tujunga dam is identified as a drainage that "can be impacted by debris flows generated from side tributaries" on the Debris-Flow Hazard model for a 3-hour-duration, 1-year recurrence storm.

For Big Tujunga Creek, the hydrology/soils response analysis predicts a 5X increase in water flow and a 30Xincrease in sediment below the dam and a 4X increase in flow and a 20X increase in sediment at the bottom of the creek from a 2-year storm event. Severe flooding, scouring, and debris flows are likely.

For Haines Creek, the predicted watershed response for a 2-year storm event is a 4X increase in flow and a 25X increase in sediment. The debris basin will catch some of the sediment but if the basin overtops, the occupied portion of the stream can be expected to scour severely. The predicted debris-flow hazard rating for Haines Creek is "severe".

Middle Big Tujunga Occurrence: About 95% of the Middle Big Tujunga watershed burned: 5% in unburned/low, 7% in low, 76% in moderate, and 12% in high. The 2-year storm post-fire watershed response is expected to produce about 3X increase water flows and about a 20X increase in sediment delivery. Some of the post-fire generated sediment is expected to be controlled at the Big Tujunga dam; it will fall out in the reservoir above the dam and would be removed through their maintenance activities. The Big Tujunga Dam is currently undergoing a retro-fit. As a result, the valves that control water flows are not operational and flows released into the lower portion of Big Tujunga cannot be controlled. A larger storm event could result in spillway conditions with more severe potential impacts (*e.g.,* extreme scouring, flooding, etc.) to downstream habitats. The Big Tujunga Creek portion in the Middle Big Tujunga watershed is also rated as "severe" or "high" for the geological hazard rating, meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event.

Upper Big Tujunga Occurrence: About 64% of the Upper Big Tujunga watershed burned: 18% in unburned/low, 14% in low, 51% in moderate, and 17% in high. The 2-year storm post-fire watershed response is expected to produce about 2.5X increase water flows to the occupied turtle habitat and about a 12X increase in sediment delivery. The Big Tujunga Creek portion in the Upper Big Tujunga watershed is also rated as "severe" or "high" for the geological hazard rating, meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event.

Pacoima Wash Occurrence: Approximately 70% of the Pacoima Wash watershed burned during the Station fire; 5% of the watershed has unburned/very low soil burn severity, 13% is rated low, 71% is rated moderate and 11% is rated high. For a two year storm event, the predicted increases in water flow in Pacoima Creek are 3.5X and sediment delivery is a 20X increase. There is high potential for severe impacts to species and habitat in Pacoima Creek. The Pacoima Creek area is also rated as "high" for the geological hazard rating, meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event.

Upper West Fork San Gabriel River Occurrence: Approximately 72% of the Upper West Fork San Gabriel watershed burned in the Station fire. Of that, 19% was unburned/very low soil burn severity, 34% is low, 49% is moderate, and 9% is high. The two year storm model predicts a 4X increase in flow and 16X increase in sediment at the Cogswell dam. This portion of the West Fork of the San Gabriel River is also rated as "severe" for the geological hazard rating, meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event.

Middle West Fork of the San Gabriel River Occurrence: Only 2% of the Middle West Fork San Gabriel Watershed burned (24% in unburned/very low, 38% in low, 38% moderate, and 0% in high).

Soledad Canyon/Arrastre Creek and Lower Soledad Canyon Occurrences: Approximately 22% of the Soledad Canyon/Arrastre Canyon watershed burned and 18% of Lower Soledad Canyon watershed burned. In Soledad Canyon/Arrastre Canyon, 10% was unburned/very low, 9% was low, 68% was moderate, and 13% was high burn severity. In the Lower Soledad Canyon watershed, 9% was unburned/very low, 11% was low, 70% was moderate, and 10% was high

burn severity. At the confluence of Indian Canyon and Soledad Canyon, there is a predicted 2X increase in flows and a 7X increase in sediment. At the confluence of Mill/Maddox and Soledad Canyons, there is a predicted 3X increase in flows and a 21X increase in sediment. The portion of the fire in these two watersheds is also rated as "moderately high," moderately low, and "low" for the geological hazard rating, meaning the potential for significant landslides is very high for a "3-hour duration 1-year recurrence" rainfall event.

Summary of Potential Impacts to Western Pond Turtle: It is likely that individual pond turtles 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 turtles in the landscape relative to the flows and slide activity.

Deep pools are an important component of western pond turtle habitat. Based on the hydrological modeling, there is potential for pools to be filled with debris and sediment over the next few years. Turtles occupying pools that become filled with sediment and debris may be injured or killed. If pool habitat is lost, turtles that survive the sediment/debris flows may not have aquatic habitat necessary for feeding and cover. In the future, flows may flush the sediment from these pools and they would be established again to their pre-fire conditions. In the meantime, population viability could be severely impacted.

There is a concern that the post-fire watershed response has potential to cause severe or catastrophic impacts to the western pond turtle through direct impacts (*e.g.,* death and injury to individuals during debris flows, etc.), loss of habitat quality (*e.g.,* water quality loss due to sediment and ash, impacts to breeding habitat, changes in water chemistry, etc.), or flushing of individuals from currently occupied areas. Sediment delivery and debris flows can reduce water quality, silt in pools important for cover and reduce prey availability. Water quality may be affected by increases in sediment delivery, ash deposition, debris flows, and changes in turbidity. Food source (*e.g.,* aquatic invertebrates) can be completely eliminated if buried or suffocated by sediment. Some individuals may be able to avoid instream impacts by swimming to stream edges, hiding around large logs/boulders underwater or leaving the stream channel. Under normal circumstances, sediment drops out as it moves downstream, allowing for a decrease in impacts. However, the magnitude of the expected sediment delivery reduces the possibility that this normal process will produce measurable benefits within areas of occupied western pond turtle habitat.

Prior to the fire, some of the areas occupied by western pond turtles 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, 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 western pond turtles 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.

If very high flows occur during times when the turtles are utilizing stream habitat, it is possible for individuals to be swept downstream. If suitable habitat does not occur downstream, turtles swept into these areas would be vulnerable to high rates of mortality.

The site is also at risk of loss of habitat quality if non-native plants spread or become established in the riparian/aquatic habitat. There is a concern that non-native animals such as red-eared sliders, bullfrogs, crayfish, sunfish, largemouth bass and goldfish may increase their distribution into areas where western pond turtles occur. This increased distribution could occur as a result of post-fire storm events or as a result of well-meaning public moving animals into burned areas. Non-native species impact native aquatic populations through predation, competition for resources, and potential introduction of disease, parasites, and bacteria.

Burned structures and illegal garbage dump sites are a potential source of hazardous materials that can result in injury or death of western pond turtles. If introduced into the stream, hazardous materials can not only poison or sicken individuals, but structural debris and garbage can also result in changes to habitat quality/availability. Multiple burned structures and illegal garbage dump sites have been located within the burn area and have been identified as a potential source of contaminants threatening streams occupied by the western pond turtle

In summary, primary concerns for the western pond turtle are associated with the potential for large amounts of sediment and debris to bury juveniles/adults or to fill pools and temporarily eliminate essential habitat for cover and feeding. Until adequate flows occur with the ability to scour these pools, habitat suitability will be heavily compromised. Occupied areas are also at risk for the introduction of non-native plants and animals that would further degrade habitat quality and impact the turtle through predation, competition and disease introduction. The loss of vegetative barriers/screens and the resulting recreation use present a significant impact to turtles and their habitat.

Because of the steep, highly erosive slopes and the prediction of extreme loss of watershed function, slope or channel treatments to protect this occurrence are not possible. This combined with the fact that these turtles generally occur as small and isolated populations, increases the concern that post-fire events will either result in localized extirpation or loss of viability due to a drastic reduction in the number of individuals.

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 were observed during the field surveys between September 10 - 20, 2009 at the following locations: Pacoima, Big Tujunga, Alder Creek, and West Fork San Gabriel River. One dead garter snake was found in Alder Creek and the cause of death was likely heat-related from the fire. Another garter snake with a broken back was observed in Upper Big Tujunga. The cause of injury is not known.

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.

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, 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.

Burned structures and illegal garbage dump sites are a potential source of hazardous materials that can result in injury or death of two-striped garter snakes. If introduced into the stream, hazardous materials can not only poison or sicken individuals, but structural debris and garbage can also result in changes to habitat quality/availability. Multiple burned structures and illegal garbage dump sites have been located within the burn area and have been identified as a potential source of contaminants threatening streams occupied by the two-striped garter snake.

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 significant impact 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 Diego coast horned lizard, coastal rosy boa, San Bernardino mountain kingsnake, San Bernardino ringneck snake, 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.

California Condor Condition Assessment: California condor is federally listed as Endangered. Condors are known to occasionally visit the Mount Lukens communication site in the Lower Big Tujunga watershed. Other communication sites considered as potential use areas for the California condor include Magic Mountain and Mount Gleason in the Pacoima Wash watershed. These sites are identified as potential because of their proximity to other known condor use areas.

Post-fire erosion and flooding is not expected to affect California condors. However, the Station Fire has removed vegetation and exposed areas where micro-trash is concentrated. Impacts to this species will be associated with the increased visibility of micro-trash and risk of ingestion by adults and chicks. Condors are curious and will actively seek out areas where there is an abundance of micro-trash. Consumption of garbage and particularly micro-trash is of concern because it has been documented to cause sickness and mortality in condor chicks. When nesting adults consume micro-trash, they return to the nest where it is regurgitated. The regurgitated micro-trash is then consumed by chicks that lack the ability to eject this material. As a result, micro-trash accumulates in their stomach and leads to injury or death. Garbage is the leading cause of death for chicks in southern California.

Least Bell's Vireo Condition Assessment: Least Bell's vireo is federally listed as Endangered. There are no records of nesting least Bell's vireo in the burn perimeter. However, nesting least Bell's vireos are known to occupy non-Forest lands in the vicinity of the Hansen Dam flood control basin in the Lower Big Tujunga watershed. This area is approximately four miles below the burn perimeter. It is possible that least Bell's vireos may occur in the fire area but have gone undetected.

Based on predicted debris flows and flooding, concerns for the least Bell's vireo include the potential for complete or partial removal of riparian vegetation and suitable nesting habitat. While riparian vegetation generally recovers within 3-5 years, there is the potential for both short and long-term impacts. If vireos that normally nest at this site 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.

Multiple illegal garbage dump sites were burned in areas upstream of the occupied least Bell's vireo habitat. This poses a risk of potential habitat contamination associated with burned hazardous materials being washed into the area.

If riparian vegetation is removed as a result of debris flows or flooding, there is an increased risk of non-native plants 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 least Bell's vireo habitat.

Coastal California Gnatcatcher Condition Assessment: Coastal California gnatcatcher is federally listed as Endangered. This species is a year-round resident that nests in alluvial fan scrub and coastal sage scrub habitat. There are no records of nesting California gnatcatcher in the burn area. However, there is a CNDDB record for California gnatcatchers on non-Forest lands in the vicinity of the Hansen Dam flood control basin in the Lower Big Tujunga watershed. This area is approximately four miles below the burn perimeter. It is possible that California gnatcatchers may occur in the fire area but have gone undetected.

Concerns for California gnatcatchers include loss of nesting habitat from increased debris flows and flooding that may scour out parts of the alluvial fan scrub vegetation. Alluvial fan scrub habitat that is elevated above the stream channel is less likely to be impacted by scouring debris flows and floods.

While suitable California gnatcatcher habitat can be expected to recover within 3-5 years, there is the potential for both short and long-term impacts. Multiple illegal garbage dump sites were burned in areas upstream of the potentially suitable habitat. This poses a risk of potential habitat contamination associated with burned hazardous materials being washed into the area.

If riparian vegetation is removed as a result of debris flows or flooding, there is an increased risk of non-native plants 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 California gnatcatcher habitat.

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.

Territory sizes vary widely depending on habitat type, with territories becoming larger in the high-elevation, conifer dominated sites. 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. (Stephenson and Calcarone 1999).

There are several California spotted owl territories with nest stands partially or entirely within the fire perimeter. 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.

The concern for the California spotted owl is that substantial habitat for this declining species has been lost or degraded as a direct result of fire or dozerline construction in suitable habitat. Spotted owl sites within the burn perimeter are not likely at an increased risk as a result of flooding and sedimentation. However, it is possible that rock slides and debris flows could impact some areas of suitable habitat.

The greatest post-fire concern for this species and its habitat is associated with the potential for increased disturbance. Prior to the fire, many of the areas occupied by the California spotted owl 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 recovery of suitable habitat for the spotted owl. Vehicles, bicycles, horses and pedestrian traffic may increase the potential for introduction of non-native plants into previously unoccupied areas.

Peregrine Falcon Condition Assessment: Peregrine falcons were removed from the Endangered Species list in 1999. Peregrine falcons are known to nest in Big Tujunga Canyon. Fledglings have been observed at the Big Tujunga Canyon site, so there is evidence of successful reproduction. The 2009 nesting status is not known.

If the Big Tujunga Canyon peregrines successfully nested in 2009, their offspring would have fledged prior to the start of the Station Fire. No peregrine falcons were observed during field visits to the area after the Station Fire. The heat and flames in Big Tujunga Canyon were intense enough to melt the avian avoidance balls on the powerlines that span the canyon. Peregrines in the area would have been subjected to intense conditions including thick smoke and may not have been able to escape the fast-moving fire. The fire would not be expected to negatively affect the cliff habitat that peregrines use for nest sites. However, their prey base has been modified as a result of the burn.

Until the site stabilizes, peregrine falcons and their nest site may be at risk of additional disturbance associated with rolling rock and debris. If post-fire conditions improve access to the site, they may be at increased risk of legal or illegal collections by falconers.

Bald Eagle Condition Assessment: Bald eagles were removed from the Endangered Species list in 2007 and are now considered a Forest Service Sensitive species. There are currently only a few nesting locations of bald eagles in southern California. There are no records of nesting bald eagles on the Angeles National Forest. There are records of a wintering bald eagle at the Little Rock Reservoir between December and April. Little Rock Reservoir is not within the burn area, so perching and foraging habitat was not affected. If the bald eagle from the Little Rock Reservoir utilizes night roosting habitat away from the reservoir, this habitat may have been impacted by the fire. There is suitable conifer forest night roost habitat that was lost or severely reduced in quality as a result of the fire.

Sensitive Bat Condition Assessment: The Station Fire area provides habitat for three Forest Service Sensitive bats: western red bat, Townsend's big-eared 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 mastiff bat, big brown bat, Mexican freetail bat, little brown bat, western pipestrille, Yuma myotis, small-footed myotis, hoary bat and California myotis. 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.

There are 34 abandoned mines recorded in the fire area (Schwartz, pers. comm.). Other abandoned mines not documented and recorded by the ANF may exist in the fire area. The fire eliminated vegetation that previously concealed mine adits from view or deterred access. There are now an unidentified number of abandoned mines in the fire area that may be highly visible and accessible and creating "attractive nuisances" to the public. It will take years for vegetation to recover enough to provide screening for these mines.

Increased visibility and accessibility has created a situation where bats and bat habitat in these abandoned mines are now susceptible to increased levels of disturbance and vandalism. Additionally, bat roosting habitat can be lost if adits and shafts collapse or become blocked by rolling debris such as rocks or down wood.

Nelson's Bighorn Sheep (NBS) Condition Assessment: Nelson's bighorn sheep is a Forest Service sensitive species. Within the burn perimeter, habitat known to be utilized by bighorn sheep occurs in the Middle West Fork San Gabriel watershed. This area is located in the San Gabriel Wilderness. There are no concerns for bighorn sheep habitat as a result of post-fire effects. However, if the Station Fire results in decreased numbers of deer, predators such as the mountain lion may rely more heavily on other prey species such as the bighorn sheep.

Spring Developments and Guzzlers: There are a number springs/guzzlers in the Station Fire. Some of these contain features such as tanks, piping, troughs, or parabolic fiberglass structures. Many were visited during the BAER assessment, but others remain to be visited. To date, the BAER team did not identify any springs/guzzlers at risk from post-fire watershed events.

The concerns are that fire and post-fire effects may directly damage the developments and render them inoperable. Rolling rock and debris can damage or bury springs and guzzlers. Additionally, the burned area around these developments has increased the potential for sediment

from the surrounding burned slopes to fill the water drinkers. Natural springs can also be covered by erosion and sediment with a loss of important wildlife watering sites.

B. Description of Treatments

The following treatments have been developed to help mitigate the emergencies to wildlife species/habitats in the Station Fire.

Treatment 1: Condor Protection and Removal of Micro-trash: The fire removed vegetation that previously covered small pieces of garbage referred to as "micro-trash". California condors are at risk of injury and/or death from ingestion of micro-trash.

a) Treatment Type: Land
b) Treatment Objectives: Reduce the potential for condors to consume micro-trash debris. Protection of an Endangered species.
c) Treatment Description and Location: Sites with a concentration of micro-trash pose a risk for condors. The fire has removed vegetation and exposed areas where micro-trash is now easily accessible by foraging condors. The primary treatment for removal of micro-trash is manual clean-up of the site. The sites included for treatment include Mount Lukens, Mount Gleason, and Magic Mountain communication sites.
d) Responsible staff: Leslie Welch

Treatment 2: Vegetation Recovery/Closure: The fire has removed vegetative barriers, screening and fences that previously protected riparian/aquatic and general wildlife habitats. These areas are now extremely vulnerable to disturbance, erosion, etc. due to easy access by vehicles, mountain bikes, and people. These impacts added cumulatively to those of the fire may result in long-term losses or possible extirpation of some rare species populations.

a) Treatment Type: Land and protection and safety treatments
b) Treatment Objectives: Allow for vegetative recovery and protection of vulnerable and important habitats/species from OHV damage and disturbance. These habitats/species include: mountain yellow-legged frog, arroyo toad, speckled dace, Santa Ana sucker, arroyo chub, rainbow trout, spotted owl, bats roosting in abandoned mines, numerous Forest Service Sensitive species, and general wildlife species and habitats.
c) Treatment Description and Location: To meet safety objectives, a general closure has been proposed and is anticipated to last one year. Roads selected for closure include those most likely to be impacted by illegal OHV use, bicycle use and pedestrian traffic. However, some areas may need closures beyond the first growing season to help ensure the successful recovery of native vegetation and protection of sensitive habitats. Priority areas identified as possibly requiring extended closure include critical/occupied habitat for federally-listed species, spotted owl nest stands, and Forest Service Sensitive species aquatic habitat. Carsonite signs would be installed to alert the public to safety hazards or sensitive resources to avoid. Monitoring to determine effectiveness of closure and success of vegetative recovery is included in the Vegetative Recovery treatment write-up.

Treatment 3: Management of Abandoned Mines: The fire eliminated vegetation that previously concealed mine adits from view. There are now an unidentified number of abandoned mines in the fire area that may be highly visible and creating "attractive nuisances" to the public. It will take years for vegetation to recover enough to provide screening for these mines. As such, they pose a long-term safety risk to the public. Additionally, increased visibility has created a

situation where bats and bat habitat in these abandoned mines are now susceptible to increased levels of disturbance and vandalism. Safety and wildlife concerns associated with mines located around the fire perimeter or closure boundary may not be effectively managed by the proposed road and trail closures.

a) Treatment Type: Protection and Safety
b) Treatment Objectives: Provide for public safety; protect bats and their habitat from vandalism and disturbance.
c) Treatment Description and Location: Monitor abandoned mines to determine effectiveness of closures and level of use by the public. Evaluate to determine if installation of bat-friendly gates is appropriate. An interim funding request would be submitted if additional treatments are needed.
d) Responsible staff: Leslie Welch

Treatment 4: Species Salvage: Severe post-fire watershed responses are expected to impact special status aquatic species and their habitat. For small and isolated populations of TES species (mountain yellow-legged frog, unarmored threespine stickleback, arroyo chub, Santa Ana sucker, and speckled dace), there is a risk of localized extirpations.

a) Treatment Type: Land and Treatment Monitoring
b) Treatment Objectives: Maintain viability of TES species at risk.
c) Treatment Description and Location: Capture and removal of fish and frogs and translocation of individuals for 1-3 years until the watershed stabilizes enough to return individuals to the collection sites. This will be an interagency effort between USGS, USFWS, CDFG, USFS and other local partners. For the mountain yellow-legged frog, the proposal includes removal of individuals from Devil's Canyon with translocation into Little Rock Creek and/or placement in a holding facility such as the LA Zoo or Fresno Zoo (cost not covered under this treatment). Capture of fish from Big Tujunga Creek, Pacoima Wash, and Haines Creek would be accomplished through use of a USFWS permitted contracted consultant. The proposal includes removal of individuals and translocation to an appropriate drainage and/or placement into a holding facility such as the Whitewater Preserve.
d) Responsible staff: Leslie Welch

Treatment 5. Arroyo Toad Protection: There is a population of federally-endangered arroyo toads in Upper Big Tujunga, Alder Creek and Lynx Gulch. This population is in close proximity to the Upper Big Tujunga Canyon Road, Lynx Gulch Road and Alder Creek Road. As a result, this population is highly vulnerable to impacts associated with dispersed recreation use. The fire removed vegetation that previously created a visual screen and barrier. Vegetation that discouraged road shoulder parking was also removed by the fire. The concern is that post-fire recreation use and associated impacts will impact this small and isolated arroyo toad population and increase the risk of extirpation.

a) Treatment Type: Land
b) Treatment Objectives: Protection of federally listed species
c) Treatment Description and Location: Install physical barriers to prevent parking along a 2.5 mile stretch of the Big Tujunga Canyon road. Earthen berms are recommended as the barrier and Los Angeles Department of Public Works will provide needed assistance for installation. Carsonite signs would be installed to advise the public of sensitive resource

protection needs. Monitor effectiveness of parking restrictions. An interim funding request would be submitted if additional treatments are needed.

d) Responsible staff: Leslie Welch

C. Findings, Emergency Conditions, and Treatments by HUC6 Watersheds

1. Common to All Watersheds

Values At Risk: General wildlife species/habitat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is our determination that an emergency **does** exist for general wildlife and TES species throughout the entire burned area as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency situation can be mitigated by the following treatments.

- Closure/vegetative recovery
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Hazardous waste removal

2. Pacoima Wash (Los Angeles River Watershed)

Values At Risk: The Pacoima Wash Watershed supports three Forest Service Sensitive aquatic species (western pond turtle, two striped garter snake, and arroyo chub in Pacoima Creek), three mapped territories for California spotted owls and potential habitat for the California condor (Magic Mountain). There is also occupied or suitable habitat for other Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is our determination that an emergency **does** exist for California condor, arroyo chub, two-striped garter snake, western pond turtle and California spotted owl in the Pacoima Wash Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency situation can be mitigated by the following treatments:

- Translocation of arroyo chub
- Closure/vegetative recovery
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Microtrash cleanup
- Hazardous waste removal

3. Lower Big Tujunga (Los Angeles River Watershed)

Values At Risk: The Lower Big Tujunga Watershed supports four Forest Service Sensitive aquatic species (western pond turtle, Santa Ana speckled dace, two-striped garter snake, and

arroyo chub in Big Tujunga Creek; speckled dace, arroyo chub, two-striped garter snake, and western pond turtle in Haines Creek; and habitat or occurrences for four federally listed species (Santa Ana sucker in Big Tujunga Creek and Haines Creek; Santa Ana sucker Critical Habitat in Big Tujunga Creek; California condor at Mount Lukens; and least Bell's vireo and California gnatcatcher in the Hansen Dam Area. There is also occupied or suitable habitat for other Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does** exist for arroyo chub, western pond turtle, Santa Ana speckled dace, two-striped garter snake, and Santa Ana sucker in Lower Big Tujunga Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency situation can be mitigated by the following treatments:

- Translocation of arroyo chub, speckled dace, Santa Ana sucker
- Closure/vegetative recovery
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Micro-trash cleanup
- Hazardous waste removal

4. Middle Big Tujunga (Los Angeles River Watershed)

Values At Risk

The Middle Big Tujunga Watershed supports three Forest Service Sensitive aquatic species (western pond turtle, two-striped garter snake and arroyo chub in Big Tujunga Creek), and one Forest Service Sensitive bird (Peregrine falcon) . There is also occupied or suitable habitat for other Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does** exist for arroyo chub, pond turtle, two-striped garter snake, and peregrine falcon in Middle Big Tujunga Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency situation can be mitigated by the following treatments:

- Translocation of arroyo chub
- Closure/vegetative recovery
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Hazardous waste removal

5. Upper Big Tujunga (Los Angeles River Watershed)

Values At Risk: The Upper Big Tujunga Watershed supports one Endangered species (arroyo toad), three Forest Service Sensitive aquatic species (western pond turtle, aquatic two-striped

garter snake, and arroyo chub in Big Tujunga Creek), a bat colony, and several locations of spotted owl nesting (Forest Service Sensitive). There is also occupied or suitable habitat for other Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does** exist for arroyo chub, pond turtle, two-striped garter snake, arroyo toad, and California spotted owl in Upper Big Tujunga Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency situation can be mitigated by the following treatments:

- Translocation of arroyo chub
- Closure/vegetative recovery
- Access management
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Hazardous waste removal

6. Verdugo Wash (Los Angeles River Watershed)

Values At Risk: The Verdugo Wash Watershed does not support any known occurrences of federally listed species. There is occupied or suitable habitat for Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, two-striped garter snake, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does** exist for Sensitive species including two-striped garter snake in Verdugo Wash Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: The emergency situations as discussed above can be mitigated by the following treatments:

- Closure/vegetative recovery
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Hazardous waste removal

7. Arroyo Seco (Los Angeles River Watershed)

Values At Risk: The Arroyo Seco Watershed has a confirmed occurrence for the Forest Service sensitive California spotted owl. There is occupied or suitable habitat for other Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, two-striped garter snake, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does** exist for Sensitive species including California spotted owl and two-striped garter snake in Arroyo Seco Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency situation can be mitigated by the following treatments:

- Closure/vegetative recovery
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Hazardous waste removal

8. Eaton Wash (Los Angeles River Watershed)

Values At Risk: The Eaton Wash Watershed does not support any known occurrences of federally listed species. There is occupied or suitable habitat for Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, two-striped garter snake, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does** exist for Sensitive species including the two-striped garter snake in Eaton Wash Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency situation can be mitigated by the following treatments:

- Closure/vegetative recovery
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Hazardous waste removal

9. Upper West Fork San Gabriel River (San Gabriel River Watershed)

Values At Risk: The Upper West Fork San Gabriel River Watershed has records of four Forest Service Sensitive species (California spotted owl, Santa Ana speckled dace, two-striped garter snake and Nelson's bighorn sheep). An occurrence of mountain yellow-legged frog (Endangered) and designated Critical Habitat also occurs in this watershed. There is occupied or suitable habitat for Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does** exist for Santa Ana speckled dace, mountain yellow-legged frog, California spotted owl, two striped garter snake and other general wildlife species in the Upper West Fork San Gabriel River Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency situation can be mitigated by the following treatments:

- Translocation of speckled dace
- Translocation of mountain yellow-legged frog

- Closure/vegetative recovery
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Hazardous waste removal

10. Middle West Fork San Gabriel River (San Gabriel River Watershed)
Values At Risk: The Middle West Fork San Gabriel River Watershed has records for five Forest Service Sensitive species (western pond turtle, Santa Ana speckled dace, two-striped garter snake, arroyo chub and Nelson's bighorn sheep). There is also a population of the federally-Endangered Santa Ana sucker along with designated Critical Habitat. There is occupied or suitable habitat for Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does not** exist for any federally listed, Forest Service Sensitive or general wildlife species in Middle West Fork San Gabriel River Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: Since no emergency exists, no treatments are proposed for this watershed.

11. Aliso Canyon (Antelope/Fremont Watershed)
Values At Risk: The Aliso Canyon Watershed has confirmed occurrences for the Forest Service sensitive California spotted owl. There is one occurrence of the federally endangered California red-legged frog. There is occupied or suitable habitat for Forest Service Sensitive species such as coast horned lizard, two-striped garter snake, coastal rosy boa, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does** exist for California red-legged frog, California spotted owl and two-striped garter snake in the Aliso Canyon Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency situation can be mitigated by the following treatments:
- Translocation of the California red-legged frog
- Closure/vegetative recovery
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Hazardous waste removal

12. Little Rock Reservoir (Antelope/Fremont Watershed)
Values At Risk: The Little Rock Reservoir Watershed has federally Endangered arroyo toads and designated Critical Habitat. It is also known to support two-striped garter snake and introduced arroyo chub. There is occupied or suitable habitat for Forest Service Sensitive species such as bald eagle, coast horned lizard, coastal rosy boa, San Bernardino ringneck snake, San Bernardino

Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does not** exist for any federally listed, Forest Service Sensitive or general wildlife species in the Little Rock Reservoir Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: Since no emergency exists in this watershed, no treatments are proposed.

13. Little Rock Creek (Antelope/Fremont Watershed)

Values At Risk: The Station Fire did not burn enough of the Little Rock Creek Watershed to result in post-fire watershed responses that could affect TES species viability. .

Emergency Determinations: It is my determination that an emergency **does not** exist for any federally listed, Forest Service Sensitive or general wildlife species in the Little Rock Creek Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: Since no emergency exists in this watershed, no treatments are proposed.

14. Soledad Canyon/Arrastre Canyon (Santa Clara River)

Values At Risk

The Soledad Canyon/Arrastre Canyon Watershed supports occurrences/habitat for two Forest Service Sensitive species (western pond turtle and two-striped garter snake). It also has occupied habitat for the federally Endangered unarmored threespine stickleback. All three of these species occur in the Santa Clara River but none of its riparian habitat occurs on Forest System lands in this watershed. There is occupied or suitable habitat for Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does** exist for unarmored threespine stickleback, western pond turtle and two-striped garter snake in the Soledad Canyon/Arrastre Canyon Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency can be mitigated by the following treatments:

- Translocation of the unarmored threespine stickleback
- Closure/vegetative recovery
- Detection monitoring/removal of non-native plants
- Detection monitoring/removal of non-native animals
- Hazardous waste removal

15. Lower Soledad Canyon (Santa Clara River)
Values At Risk: The Lower Soledad Canyon Watershed supports occurrences/habitat for two Forest Service Sensitive species (western pond turtle and two-striped garter snake). It also has occupied habitat for the federally Endangered unarmored threespine stickleback. All three of these species occur in the Santa Clara River, but only a small amount of this riparian habitat occurs on Forest System lands in this watershed. There is occupied or suitable habitat for Forest Service Sensitive species such as coast horned lizard, coastal rosy boa, San Bernardino ringneck snake, San Bernardino Mountain kingsnake, western red bat, Townsend's big-eared bat and pallid bat. See Condition Assessment for discussion of threats.

Emergency Determinations: It is my determination that an emergency **does** exist for unarmored threespine stickleback, western pond turtle and two-striped garter snake in Lower Soledad Canyon Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency: This emergency situation can be mitigated by the following treatments:

- Translocation of unarmored threespine stickleback
- Closure/vegetative recovery
- Detection monitoring/removal for non-native plants
- Detection monitoring/removal of non-native animals
- Hazardous waste removal

III. DETERMINATIONS OF EFFECTS FOR BAER TREATMENTS

Multiple BAER treatments have been proposed for the Station Fire. These treatments have been assessed to determine if their implementation would impact TES species and to develop Design Criteria needed to mitigate or reduce impacts. Treatments will be coordinated with Forest Service biologists to ensure the appropriate Design Criteria are used during implementation to limit potential impacts to TES species. As described to the BAER team biologists, proposed treatments are not expected to result in impacts to T/E species or the Primary Constituent Elements of designated Critical Habitat. The treatments may affect individual Forest Service Sensitive animals but are not expected to result in a trend toward federal listing for any species.

IV. DISCUSSION/SUMMARY/RECOMMENDATIONS

Multiple growing seasons will be required before watershed conditions begin to stabilize and the benefits of vegetative screens/barriers are manifested. Various treatments have been recommended to address post-fire effects. In addition, there are other actions that would benefit the wildlife resources within the burn area. These include, but are not limited to the following:

1. Coordinate with USFWS, CDFG and USGS to identify concerns and opportunities for management of special status species.
2. Evaluate status of sensitive plant and animal populations and habitat.
3. Conduct three to five year post –fire monitoring for Forest Service Sensitive Wildlife and Plant Species.
4. Monitor the effects of fire retardant on vegetation recovery in the Station Fire area.

5. Assess the threat of vegetative type conversion at the margins of the Station Fire by sampling vegetation recovery at increasing distances from nonnative invasive grass and forb vegetation.
6. Conduct protocol surveys of special status aquatic species such as California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, unarmored threespine stickleback, mountain yellow-legged frog, arroyo toad, Santa Ana sucker, arroyo chub, Santa Ana speckled dace.
7. Conduct stream habitat evaluations to document conditions such as water quality and macroinvertebrate populations.
8. Map all California spotted owl habitat using pre-fire imagery. Assess post-fire potential habitat for California spotted owl using recent imagery.
9. Conduct three years of forest-wide protocol surveys for California spotted owls (especially at known pre-fire occupied nest locations) including nest sites and associated PACs that experienced low, moderate and high intensity burning. Inventory remaining California spotted owl suitable habitat within the fire area utilizing existing protocol and direction.
10. Develop interpretive and education outreach material to discourage release of non-native animals and spreading /introduction of plants and "wildflower" seeds.
11. Monitor mule deer and bighorn sheep nutrition in areas that have burned and areas that have not burned. Monitor changes in mule deer and bighorn sheep productivity and abundance. Changes in the productivity of mule deer may affect mountain lion predation rates on bighorn sheep.
12. To document post-fire response, conduct 3-5 years of breeding bird surveys in representative habitat types.
13. Continue to inventory and treat populations of non-native aquatic species.
14. Under what scenarios does chaparral recover as expected historically vs. when would type conversion occur? Sample species composition and cover over time in areas of different burn severity, time since last fire, proximity to roads and other disturbed sites.
15. Noxious weed NEPA for treatments, inventory & monitoring of populations, and data input to corporate databases (NRIS & Forest GIS)
16. Volunteers: weed pull days, noxious weed mapping/monitoring/education days.
17. Invasive noxious weed control to protect watershed characteristics and sensitive TES plants & animals.
18. Maintain OHV closures in Little Rock Reservoir in order to protect arroyo toad habitat and occurrence.

V. ASSESSMENT TEAM

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VI. REFERENCES

Fisher, R. and C. Swift. 1998. Preliminary Survey of the Fish of the Santa Margarita Watershed., San Diego and Riverside Counties, CA.

Greenfield, D.W.; Ross, S.T.; Deckart, G.D. 1970. *Some aspects of the life history of the Santa Ana sucker,* Catostomus (Pantosteus) santaanae (Snyder). California Department of Fish and Game 56: 166–179.

Keeley, Jon E.; Brennan, Teresa; Pfaff, Anne H. 2008. Fire severity and ecosystem responses following crown fires in California shrublands. Ecological Applications 18(6): 1530-1546.

Moyle, P.B.; Yoshiyama, R.M.; Williams, J.E.; Wikramanayoke, E.D. 1995. *Fish species of special concern of California.* 2d ed. California Department of Fish and Game. Rancho Cordova, California.

Moyle, P.B. 2002. *Inland fishes of California.* 2d ed. University of California Press, Berkeley, California; 517 p.

National Marine Fisheries Service. 2004. Endangered and threatened species; designation of critical habitat for seven evolutionarily significant units of Pacific salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*) in California. Federal Register 69(237): 71880-71980.

National Marine Fisheries Service. 2002a. *Consent decree vacating critical habitat.* United States District Court for the District of Columbia, Memorandum Order April 30, 2002.

National Marine Fisheries Service. 2002b. *Endangered and threatened species, range extension for endangered steelhead in southern California.* Federal Register 67(84): 21586-21598.

National Marine Fisheries Service. 2000. *Designated critical habitat: Critical habitat for 19 evolutionarily significant units of salmon and steelhead* ***in Washington, Oregon, Idaho, and California.***

National Marine Fisheries Service. 1997. Endangered and threatened species: Listing of several evolutionary significant units (ESUs) of West Coast steelhead. Federal Register 62(159): 43937-43954.

Rieman, B., D. Lee, D. Burns, R. Gresswell, M. Young, R. Stowell , J. Rinne and P. Howell. 2003. Status of native fishes in the western United States and issues for fire and fuels management. Forest Ecology and Management 178 (Issues 1-2): 197-211. Available:

Riverside County Integrated Project. 2003. *Western riverside county multi-species habitat conservation plan (MSHCP).* [Online]. Available: http://rcip.org/conservation.htm.

Riverside County Integrated Project. 2002. *Preliminary administrative draft western riverside county* multi-species habitat conservation plan. [Online].
Available: http://www.rcip.org/conservation.htm [2002, March 25].

Smith, Jane Kapler, [ed.] 2000. Wildland fire in ecosystems: effects of fire on fauna. Gen. Tech. Rep. RMRS-GTR-42-vol. 1. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 83 p. Available: http://www.fs.fed.us /rm/pubs/rmrs_gtr042_1.html

Stephenson, J.R. and G.M. Calcarone. 1999. Southern California Mountains and Foothills Assessment: Habitat and Species Conservation Issues. General Technical Report GTR-PSW-172. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 402 p.

Swift, C.C.; Haglund, T.R.; Ruiz, M.; Fisher, R.N. 1993. *The status and distribution of freshwater fishes of southern California.* Bulletin, Southern California Academy of Sciences 92(3): 101-167.

U.S. Fish and Wildlife Service. 2005. Endangered and Threatened wildlife and Plants; Final Rule to Designate Critical Habitat for the Santa Ana Sucker (*Catostomus santaanae*). 70 Federal Register 426.

U.S Fish and Wildlife Service. 2009. Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsoni*) 5-Year Review: Summary and Evaluation. Ventura, CA: U.S. Fish and Wildlife.

Wells, A.W.; Diana, J.S.; Swift, C.C. 1975. *Survey of the freshwater fishes and their habitats in the coastal drainages of southern California. Final Report.* Sacramento, CA: Inland Fisheries Division, California Department of Fish and Game.,

Personal Communications:

Backlin, Adam. 2009. Personal communication of September 21, 2009. Ecologist, U.S. Geological Survey – BRD.

Fisher, Robert. 2009. Personnal communcation of September 21, 2009. Aquatic Biologist, U.S. Geological Survey – BRD.

Loe, Steve. 2009. Personal communication. of September 2009. Wildlife Biologist, San Bernardino National Forest.

O'Brien, John. 2009. Personal communication of September 21, 2009. Associate Fisheries Biologist, California Department of Fish and Game.

Schwartz, J. 2009. Personal communication of September 2009. Santa Clara/Mojave Rivers Ranger District Resource Officer, Angeles National Forest.

Swift, Camm. 2009. Personal Communication of September 21, 2009. Fisheries Biologist, Entrix Corporation, Ventura, CA.

VII. APPENDICES

A. List of Wildlife Species Known or Likely to Occur within the Station Fire Are

APPENDIX A

Wildlife Species Observed or Known to Occur in or Adjacent to the Burn Area		
Species	**Scientific Name**	**Status***
INVERTEBRATES		
Crayfish	*Procambarius clarkii*	Non-native
FISH		
Santa Ana Speckled dace	*Rhinichthys osculus*	FSS
Santa Ana sucker**	*Catostomus santaanae*	FT
Arroyo chub	*Gila orcutti*	FSS
Rainbow trout**	*Oncorhynchus mykiss*	Sport fish
Goldfish	*Carassius auratus*	Non-native
Fathead minnows	*Pimephales promelas*	Non-native
Green sunfish	*Lepomis cyanellus*	Non-native
Large-mouthed bass	*Micropterus salmoides*	Non-native
Bluegill	*Lepomis macrochirus*	Non-native
Mosquitofish	*Gambusia affinis*	Non-native
Common Carp	*Cyprinus carpio*	Non-native
Bullhead catfish	*Ameiurus nebulosus*	Non-native
Unarmored Threespine Stickleback	*Gasterosteus aculeatus williamsoni*	FE
AMPHIBIANS		
California newt	*Taricha torosa torosa*	CSC
Black-bellied Slender Salamander	*Batrachoseps nigriventris*	None
Pacific Slender Salamander	*Batrachoseps pacificus*	None
Western toad	*Bufo boreas*	None
Arroyo toad	*Bufo californicus*	FE
California treefrog	*Pseudacris (Hyla) cadaverina*	None
Pacific treefrog	*Pseudacris (Hyla) regilla*	None
California Red-legged frog	*Rana aurora draytonii*	FT
Mountain yellow-legged frog	*Rana muscosa*	FE
Bullfrog	*Rana catesbeiana*	Non-native
REPTILES		
Southwestern Pond Turtle	*Actinemys marmorata pallida*	FSS
Red-eared slider	*Trachemys scripta elegans*	Non-native
Zebra-tailed Lizard	*Callisaurus draconoides*	None
Western fence lizard	*Sceloporus occidentalis*	None
Sagebrush lizard	*Sceloporus graciosus*	None
Side-blotched lizard	*Uta stansburiana*	None
San Diego (Coast) horned lizard	*Phrynosoma coronatum blainvillii*	FSS
Western Skink	*Eumeces skiltonianus*	None
Western whiptail	*Cnemidophorus tigris*	None
Southern Alligator lizard	*Elgaria multicarinata*	None
California Legless Lizard	*Anniella pulchra*	FSS
Western blind snake	*Leptotyphlops humilis*	None
Coastal Rosy Boa	*Charina trivirgata roseofusca*	FSS
San Bernardino ringneck snake	*Diadophis punctatus modestus*	FSS
Racer	*Coluber constrictor*	None
Coachwhip	*Masticophis flagellum*	None

Wildlife Species Observed or Known to Occur in or Adjacent to the Burn Area		
Species	**Scientific Name**	**Status***
Striped Racer (California whipsnake)	*Masticophis lateralis*	None
Western Patchnose Snake	*Salvadora hexalepis*	None
Gopher snake	*Pituophis catenifer*	None
Common kingsnake	*Lampropeltis getula*	None
San Bernardino mountain kingsnake	*Lampropeltis zonata parvirubra*	FSS
Long-nosed Snake	*Rhinocheilus lecontei*	None
Two-striped garter snake**	*Thamnophis hammondii*	FSS
Western Black-headed Snake	*Tantilla planiceps*	None
Lyre Snake	*Trimorphodon biscutatus*	None
Night Snake	*Hypsiglena torquata*	None
Western Rattlesnake	*Crotalus viridis*	None
Southern Pacific rattlesnake	*Crotalus viridis helleri*	None
BIRDS		
Cooper's hawk	*Accipiter cooperii*	None
Sharp-shinned hawk	*Accipiter stiatus*	None
Red-shouldered Hawk	*Buteo lineatus*	None
American Peregrine falcon (nesting)	*Falco peregrinus*	FSS
Golden Eagle	*Aquila chrysaetos*	CA Fully Protected
California Condor	*Gymnogyps californianus*	FE
Swainson's hawk	*Buteo swainsoni*	FSS
Common Raven	*Corvus corax*	None
Red-tailed hawk	*Buteo jamaicensis*	None
Merlin	*Falco columbarius*	None
Prairie Falcon	*Falco mexicanus*	None
Turkey Vulture	*Cathartes aura*	None
Northern Harrier	*Circus cyaneus*	CSC
American kestrel	*Falco sparverius*	None
American Crow	*Corvus brachyrhynchos*	None
Western Screech-Owl	*Megascops kennicottii*	None
Northern Pygmy-Owl	*Glaucidium gnoma*	None
Barn Owl	*Tyto alba*	None
California spotted owl	*Strix occidentalis occidentalis*	FSS
Northern Saw-whet Owl	*Aegolius acadicus*	None
Short-eared Owl	*Asio flammeus*	CSC
Long-eared Owl	*Asio otus*	None
Great Horned Owl	*Bubo virginianus*	None
Mallard	*Anas platyrhynchos*	None
Double-crested Cormorant	*Phalacrocorax auritus*	None
American coot	*Fulica americana*	None
Great Blue Heron	*Ardea herodias*	None
Green Heron	*Butorides virescens*	None
Killdeer	*Charadrius vociferus*	None
Greater Roadrunner	*Geococcyx californianus*	None
Western Scrub jay	*Aphelocoma californica*	None
Steller's jay	*Cyanocitta stelleri*	None
Mountain quail	*Oreortyx pictus*	None

Wildlife Species Observed or Known to Occur in or Adjacent to the Burn Area		
Species	**Scientific Name**	**Status***
California Quail	*Callipepla californica*	None
Lesser Nighthawk	*Chordeiles acutipennis*	None
Common Poorwill	*Phalaenoptilus nuttallii*	None
Spotted Dove	*Streptopelia chinensis*	None
Band-tailed Pigeon	*Patagioenas fasciata*	None
Rock Dove	*Columba livia*	None
Mourning Dove	*Zenaida macroura*	None
Red-naped Sapsucker	*Sphyrapicus nuchalis*	None
Red-breasted Sapsucker	*Sphyrapicus ruber*	None
Williamson's Sapsucker	*Sphyrapicus thyroideus*	None
Northern Flicker	*Colaptes auratus*	None
White-headed Woodpecker	*Picoides albolarvatus*	BCC
Nuttall's Woodpecker	*Picoides nuttallii*	BCC
Downy Woodpecker	*Picoides pubescens*	None
Hairy woodpecker	*Picoides villosus*	None
Acorn Woodpecker	*Melanerpes formicivorus*	None
Clark's Nutcracker	*Nucifraga columbiana*	None
Anna's Hummingbird	*Calypte anna*	None
Costa's Hummingbird	*Calypte costae*	BCC
Calliope Hummingbird	*Stellula calliope*	None
Black-chinned Hummingbird	*Archilochus alexandri*	None
Rufous Hummingbird	*Selasphorus rufus*	None
Allen's Hummingbird	*Selasphorus sasin*	BCC
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	None
Violet-green Swallow	*Tachycineta thalassina*	None
Cliff Swallow	*Petrochelidon pyrrhonota*	None
White-throated swift	*Aeronautes saxatalis*	None
Barn Swallow	*Hirundo rustica*	None
Bushtit	*Psaltriparus minimus*	None
Ruby-crowned Kinglet	*Regulus calendula*	None
Golden-crowned Kinglet	*Regulus satrapa*	None
Pacific-slope Flycatcher	*Empidonax difficilis*	None
Hammond's Flycatcher	*Empidonax hammondii*	None
Dusky Flycatcher	*Empidonax oberholseri*	None
Ash-throated Flycatcher	*Myiarchus cinerascens*	None
Willow Flycatcher	*Empidonax traillii*	SE
Olive-sided Flycatcher	*Contopus cooperi*	CSC
Western wood pewee	*Contopus sordidulus*	None
Black Phoebe	*Sayornis nigricans*	None
Say's Phoebe	*Sayornis saya*	None
Phainopepla	*Phainopepla nitens*	None
Warbling Vireo	*Vireo gilvus*	None
Hutton's Vireo	*Vireo huttoni*	None
Solitary Vireo	*Vireo solitarius*	None
Least Bell's vireo	*Vireo bellii pusillus*	None
Coastal California gnatcatcher	*Polioptila californica californica*	FT
Blue-gray Gnatcatcher	*Polioptila caerulea*	None

Wildlife Species Observed or Known to Occur in or Adjacent to the Burn Area		
Species	**Scientific Name**	**Status***
California Thrasher	*Toxostoma redivivum*	None
Hermit thrush	*Catharus guttatus*	None
Swainson's Thrush	*Catharus ustulatus*	None
American dipper	*Cinclus mexicanus*	None
Cedar Waxwing	*Bombycilla cedrorum*	None
Western Bluebird	*Sialia mexicana*	None
Mountain Bluebird	*Sialia currucoides*	None
White-breasted Nuthatch	*Sitta carolinensis*	None
Pygmy Nuthatch	*Sitta pygmaea*	None
Western Meadowlark	*Sturnella neglecta*	None
European Starling	*Sturnus vulgaris*	None
Oak titmouse	*Baeolophus inornatus*	BCC
Wilson's warbler	*Wilsonia pusilla*	None
Yellow-rumped Warbler	*Dendroica coronata*	None
Black-throated Gray Warbler	*Dendroica nigrescens*	None
Hermit Warbler	*Dendroica occidentalis*	None
Yellow Warbler	*Dendroica petechia*	CSC
Townsend's Warbler	*Dendroica townsendi*	None
MacGillivray's Warbler	*Oporornis tolmiei*	None
Orange-crowned Warbler	*Vermivora celata*	None
Nashville Warbler	*Vermivora ruficapilla*	None
American Robin	*Turdus migratorius*	None
Western Kingbird	*Tyrannus verticalis*	None
Brown Creeper	*Certhia americana*	None
Northern Mockingbird	*Mimus polyglottos*	None
Brown-headed Cowbird	*Molothrus ater*	None
Dark-eyed Junco	*Junco hyemalis*	None
Loggerhead Shrike	*Lanius ludovicianus*	CSC, BCC
Wrentit	*Chamaea fasciata*	None
Green-tailed Towhee	*Pipilo chlorurus*	None
California Towhee	*Pipilo crissalis*	None
Spotted Towhee	*Pipilo maculatus*	None
Common Yellowthroat	*Geothlypis trichas*	None
Canyon Wren	*Catherpes mexicanus*	None
Marsh Wren	*Cistothorus palustris*	None
Rock Wren	*Salpinctes obsoletus*	None
Bewick's Wren	*Thryomanes bewickii*	None
House Wren	*Troglodytes aedon*	None
Mountain Chickadee	*Poecile gambeli*	None
Purple Martin	*Progne subis*	CSC
Lawrence's Goldfinch	*Carduelis lawrencei*	BCC
Lesser Goldfinch	*Carduelis psaltria*	None
American Goldfinch	*Carduelis tristis*	None
Bullock's Oriole	*Icterus bullockii*	None
Hooded Oriole	*Icterus cucullatus*	None
Song Sparrow	*Melospiza melodia*	None
Lark Sparrow	*Chondestes grammacus*	None

Wildlife Species Observed or Known to Occur in or Adjacent to the Burn Area		
Species	**Scientific Name**	**Status***
Rufous-crowned sparrow	*Aimophila ruficeps*	None
Black-throated sparrow	*Amphispiza bilineata*	None
Sage sparrow	*Amphispiza belli*	None
House Sparrow	*Passer domesticus*	None
Fox Sparrow	*Passerella iliaca*	None
Golden-crowned Sparrow	*Zonotrichia atricapilla*	None
White-crowned Sparrow	*Zonotrichia leucophrys*	None
Black-chinned Sparrow	*Spizella atrogularis*	BCC
Chipping Sparrow	*Spizella passerina*	None
Lazuli Bunting	*Passerina amoena*	None
Western Tanager	*Piranga ludoviciana*	None
Evening Grosbeak	*Coccothraustes vespertinus*	None
Blue Grosbeak	*Guiraca caerulea*	None
Black-headed Grosbeak	*Pheucticus melanocephalus*	None
Cassin's Finch	*Carpodacus cassinii*	None
House Finch	*Carpodacus mexicanus*	None
Purple Finch	*Carpodacus purpureus*	None
MAMMALS		
Virginia Opossum	*Didelphis virginiana*	None
Ornate Shrew	*Sorex ornatus*	None
Broad-footed Mole	*Scapanus latimanus*	None
Pallid bat	*Antrozous pallidus*	FSS
Townsend's big-eared bat	*Corynorhinus townsendii*	FSS
Western mastiff bat	*Eumops perotis*	None
Big brown bat	*Eptesicus fuscus*	None
Mexican freetail bat	*Tadarida brasiliensis*	None
Little brown bat	*Myotis lucifugus*	None
Western pipistrelle	*Pipistrellus hesperus*	None
Yuma myotis	*Myotis yumanensis*	None
Small-footed myotis	*Myotis cillolabrum*	None
Hoary bat	*Lasiurus cinereus*	None
California myotis	*Myotis californicus*	None
Western red bat	*Lasiurus blossevillii*	FSS
Coyote	*Canis latrans*	None
Ringtail	*Bassariscus astutus*	CA Fully Protected
Raccoon	*Procyon lotor*	None
Striped Skunk	*Mephitis mephitis*	None
Western spotted skunk	*Spilogale gracilis*	None
Long-tailed Weasel	*Mustela frenata*	None
Bobcat**	*Lynx rufus*	None
Gray Fox	*Urocyon cinereoargenteus*	None
Mountain Lion	*Puma (Felis) concolor*	None
American Black bear**	*Ursus americanus*	None
American Badger (historic)	*Taxidea taxus*	None
Mule deer**	*Odocoileus hemionus*	None
San Gabriel Mountains Bighorn Sheep	*Ovis canadensis nelsoni*	FSS

Wildlife Species Observed or Known to Occur in or Adjacent to the Burn Area		
Species	**Scientific Name**	**Status***
Botta's Pocket gopher	*Thomomys bottae*	None
Broad-footed Mole	*Scapanus latimanus*	None
Dusky-footed woodrat**	*Neotoma fuscipes*	None
Desert woodrat	*Neotoma lepida*	None
California Pocket mouse	*Chaetodipus californicus*	None
San Diego Pocket Mouse	*Chaetodipus fallax*	None
Spiny Pocket Mouse	*Chaetodipus spinatus*	None
Brush mouse	*Peromyscus boylii*	None
California mouse	*Peromyscus californicus*	None
Canyon mouse	*Peromyscus crinitus*	None
Cactus mouse	*Peromyscus eremicus*	None
Deer mouse**	*Peromyscus maniculatus*	None
Piñon Mouse	*Peromyscus truei*	None
Norway rat	*Rattus norvegicus*	None
Black rat	*Rattus rattus*	None
California Ground squirrel**	*Spermophilus beecheyi*	None
California Vole	*Microtus californicus*	None
House Mouse	*Mus musculus*	None
Western Gray squirrel	*Sciurus griseus*	None
Merriam's chipmunk	*Tamias merriami*	None
Lodgepole chipmunk	*Tamias speciosus*	None
Agile Kangaroo Rat	*Dipodomys agilis*	None
Black-tailed Jackrabbit	*Lepus californicus*	None
Desert cottontail	*Sylvilagus audubonii*	None
Brush Rabbit	*Sylvilagus bachmani*	None

*FE = Federally Endangered
FT = Federally Threatened
CE = State of California, Endangered
FSS = Forest Service Sensitive, Region 5 Sensitive List;
CSC = California Species of Concern
BCC = Birds of Conservation Concern
CA Fully Protected

**At least one dead or injured animal was observed.

BOTANY TECHNICAL SPECIALIST'S REPORT
BURNED AREA EMERGENCY REHABILITATION for STATION FIRE

Resource: Botany
Fire Name: Station Fire – National Forest System Lands **Month/Year:** 09/2009
Author Name: Janet Nickerman, Joanna Clines, Jan Beyers with assistance from Kerry Myers, Tommy Stoughton and Krissy Day.
Author Duty Station: Angeles, Sierra National Forest, PSW Research Station and the San Bernardino National Forest.

Thickleaf yerba santa resprouting after a fire. (photo by Stoughton)

I. SUMMARY

The Station Fire started on August 26, 2009 and burned 161,188 acres. It is the largest fire in the recorded history of Los Angeles County. Until now, the largest fire was 75,000 acres. There are approximately 37 cities that surround the fire perimeter. The fire area is extremely steep, inaccessible and it supports some important and unique habitats. There is occupied and potential habitat for one federal endangered plant species and eleven Forest Service Sensitive plant species. Thirty seven plant communities were burned or impacted by suppression activities.

Some of these habitats and species are at risk to further losses. For example, disturbances/degradation from post-fire impacts of sediment and ash delivery will result in loss of water quality, scouring of riparian systems and loss of wildlife habitat at natural springs and spring developments due to sediment delivery and erosion. In addition, vegetation community

recovery is at risk for delayed recovery due to invasive species and illegal Off Highway Vehicle (OHV) activity.

Summary of Initial Concerns

- Invasive species spread (see Specialist Report for Noxious Weeds and Non-native invasive plant species).
- Illegal Off Highway Vehicle traffic ie, Impacts to habitat/vegetation as a result of loss of barriers and off-road vehicle incursions
- Disturbance associated with increased need for road maintenance to prepare for winter storms
- Increased dispersed recreation use due to loss of native vegetative barriers

Vegetation Recovery:

- All plant communities are subject to delayed recovery due to illegal OHV activity and invasive species infestations
- Desert scrub and high intensity burns in coniferous plant communities are the most vulnerable to delayed recovery.

Federal Endangered and Forest Sensitive Plant Species Habitat and Occurrences

Federal Endangered Species:

- Lower Big Tujunga Canyon (slender horned spineflower)

Forest Service Sensitive Plant Species:

- Mill Creek - (San Gabriel manzanita)
- Pacifico Campground (Short joint beavertail)
- On Big Tujunga Canyon Road (California satintail)
- Mt Gleason Area (Mt Gleason paintbrush and Palmer's mariposa lily)
- On Santa Clara Divide Road (San Gabriel Mountain Sunflower)
- Upper Chilao/Horseflat Campground (San Gabriel Mountain Sunflower, Chickweed Starry Puncturebract, Southern skullcap, Transverse Range phacelia, San Gabriel Linanthus, Alkali Mariposa Lily and Palmer's mariposa lily)
- Westfork of the San Gabriel River (Falls Canyon Research Natural Area)

II. RESOURCE CONDITION ASSESSMENT/ VALUES AT RISK

A. Fire Summary

The Station Fire burned over 161,188 acres of the Angeles National Forest. The fire burned through chaparral and other fire-adapted plant communities that are generally expected to recover naturally, provided that invasive plants are not able to establish at the expense of the native plants and provided that illegal OHV recreation is prevented. About 11% of the area burned at a high severity, 62% at moderate severity, and 16% burned at low severity. About 11% of the area within the burn area consists of unburned islands or patches.

Dominant vegetation types in the burned area consist primarily of chaparral communities, including lower montane mixed chaparral, ceanothus chaparral, scrub oak chaparral, chamise chaparral, upper montane mixed chaparral, desert transition chaparral, and soft scrub mixed

chaparral. The vegetation in the lower elevation portions of the fire is dense, tall (15-20' tall) ceanothus, chamise, scrub oak, and manzanita shrubs with live oaks. Some canyons support bigcone Douglas fir trees, canyon live oak, interior mixed hardwood, and coast live oak vegetation. Upper elevations support ponderosa/Jeffrey pine, and mixed conifer vegetation. Planted ornamental conifers are scattered throughout. Stream corridors contain riparian mixed hardwood, white alder, willow, mule fat, cottonwood, and California sycamore vegetation types. Some portions of the fire area have not experienced any significant large fire activity in the past forty years. By acreage, montane mixed chaparral, ceanothus mixed chaparral, and scrub oak chaparral were most abundant (Table 1).

Table 1. Station fire burned vegetation types.

Vegetation Type	Acres	Vegetation Type	Acres
Bigcone Douglas-Fir	14,324.0	Buckwheat	906.1
Mixed Conifer	2,099.3	Birchleaf Mountain Mahogany	3,021.4
Ponderosa/Jeffrey Pine	3,956.1	Ceanothus Mixed Chaparral	17,310.3
Singleleaf Pinyon Pine	301.7	Chamise	2,620.7
Non-Native/Ornamental Conifer	89.7	Montane Mixed Chaparral	67,338.1
Ornamental Hardwood/Conifer	27.0	Manzanita Chaparral	1,666.6
Black Oak	10.8	Rabbitbrush	67.5
California Bay	164.6	Scrub Oak	14,344.0
Canyon Live Oak	11,779.8	Soft Scrub Mixed Chaparral	3,971.9
Coast Live Oak	808.7	Sumac Shrub	1,782.1
Coastal Mixed Hardwood	320.2	Tucker / Muller Scrub Oak	97.3
Interior Mixed Hardwood	1,516.2	Basin Sagebrush	373.9
Montane Mixed Hardwood	109.0	California Juniper (shrub)	104.8
Baccharis (Riparian)	30.1	Desert Mixed Shrub	46.7
California Sycamore	122.7	Great Basin Chaparral Transition	4,028.4
Fremont Cottonwood	117.3	Semi-Desert Chaparral	1,020.1
Riparian Mixed Hardwood	576.9	Annual grasses and forbs	291.2
White Alder	295.0		
Willow (Shrub)	216.3	Barren	664.75
Riversidean Alluvial Scrub	69.6	Urban	995.42
California Sagebrush	690.6	Water	148.47

A. Values at Risk –
Plant Communities:

The majority of the vegetation within the fire area consists of various types of chaparral and other shrubland communities within their normal burn rotation interval. Large portions of these areas had not burned for 30+ years. All plant communities are subject to delayed recovery due to

illegal OHV activity and invasive species infestations. Desert scrub and moderate to high intensity burns in coniferous plant communities are the most vulnerable to delayed recovery. Desert communities typically get less rainfall which delays recovery and high intensity burns in coniferous forest have a high mortality rate and fewer trees are likely to recover. Additionally, fewer conifer seeds will survive in the seed bank.

Illegal OHV activity is a threat to national forest land. Erosion, user conflicts, spread of invasive species, damage to cultural sites, disturbance to wildlife, destruction of wildlife habitat, and risks to public safety can result from unauthorized OHV use. For example, if dirt bikes drive cross country (not following existing trails), they will run over plants, small mammals and reptiles, compact the soil of recovering areas and encourage other riders for follow newly formed illegal trails. In these newly impacted areas, native vegetation either won't grow or will be stunted. Highly disturbed areas favor the establishment of invasive species and limit native vegetation recovery.

The Angeles National Forest (ANF) covers 70% of the open space in Los Angeles County with a population of over 11 million. This large population base results in very high legal and illegal use of Off Highway Vehicle (OHV) areas on the forest. OHV riders on the ANF may be similar to riders in other parts of the county but the difference is the large number of people who live and recreate in LA County.

The challenge for the ANF is managing the high number of non-conforming riders, OHV users that illegally gain access onto the forest from driving around a locked gate or closed signs. This type of user causes conflict with non-motorized users and damage to natural and cultural resources. Due to increasing population and developments that border the forest, it is becoming increasing difficult to patrol illegal OHV.

After the Marek Fire, the ANF posted 200 carsonite signs and 15 wooden trails during winter and spring 2009. All signs were all removed from 1 to 24 hours after installation. In addition, fences, rock barriers and vegetative screening were installed to control illegal OHV. All measures were ineffective and uncontrolled OHV continues in many areas. The only successful measure was gate closure in areas with steep side walls immediately adjacent to the gates. In this case, riding around the gate was not possible.

Several invasive species that are known to impact California native plant communities are present (cheatgrass, soft chess, wild oats, black mustard, rip gut brome). All these species are easily transported by vehicles.

The spread of noxious weeds and other non-native invasive plant species is a threat to native plant communities in and adjacent to the Station Fire area. The spread of Spanish broom, arundo, tree of heaven and non-native annual grasses are of the greatest concern as 1) there are large infestations of these species present, 2) they have the potential to expand quickly, 3) are hard to control, 4) they have the ability to quickly overcome and degrade native habitats, 5) fire and ground disturbing activities are known to promote the establishment of these species (Fire Effects Information System 2003, Bossard *et. al* 2002). Tamarisk, yellow star thistle and spotted knapweed are noxious weeds not presently known within the burned area but have the potential

to invade after fire. These invasive species are of concern because they degrade all habitats and native species.

Arundo resprouting three weeks after burning (photo Nickerman)

B. Values At Risk – Plants
Federal Endangered:

Slender horned spineflower (*Dodecahema leptoceras*)
Slender horned spineflower is a federal listed endangered species. Slender- horned spineflower is a small, spreading annual in the buckwheat family (Polygonaceae), with stems reaching 3-15 cm across. This annual has a basal rosette of leaves, from which rise dense flowering stalks. Slender-horned spineflower is distinguished from other spineflowers by the presence of 6 terminal awns and 6 hooked basal awns on each involucre. The involucre in this species is a group of bracts that have been fused together to enclose approximately 3 white to pink flowers within each involucre, blooming April through June. The greatest threats to viability are development, vegetation/fuel reduction treatments and illegal OHV.

Forest Service Sensitive Plants:

San Gabriel manzanita (*Arctostaphylos gabrielensis*)
San Gabriel manzanita is found in the Mill Creek Summit area in the Angeles National Forest. It is a narrow endemic with only one known location. It is a dicotelydon in the Ericaceae family. It is a shrub 1–2 meters with a large, spheric burl. The stems are erect and twigs finely

tomentose. The leaves are also erect with the following measurements: petiole 5–8 mm; blade 2–4 cm, 1.5–2.5 cm wide, elliptic, ovate, or oblong-ovate, base ± wedge-shaped to rounded, margin entire, surfaces alike, bright green, shiny, sparsely puberulent, becoming glabrous, smooth. The inflorescence has the following characteristics: branches 4–7; axes ± crowded; bracts generally 3–5 mm, scale-like, deltate, acuminate, sharp-pointed; lowest bract 10–15 mm, leaf-like, ± lanceolate; pedicel 5–10 mm, white-hairy; immature axes 5–20 mm, crowded. The flower is white and hairy. The fruit 8–14 mm wide, subspheric, sparsely puberulent; stones ± separable or fused into 1 ± depressed-spheric unit, surface pitted between ribs.

Threats include fuel reduction projects, illegal OHV activities, camping, hiking off designated trails, trail maintenance and trail construction, tree planting and plantation maintenance.

Palmer's mariposa lily (*Calochortus palmeri* var. *palmeri*)
It is sparsely distributed across central and southern California from the Tehachapi Mountains and the La Panza Range south to the San Rafael, San Gabriel, San Bernardino, San Jacinto, and Santa Rosa mountains. The California Natural Diversity Database (2004) reports 33 occurrences of *Calochortus palmeri* var. *palmeri.* Although some of these are outside of National Forest System lands; at least twenty four occurrences appear to occur within the San Bernardino, Angeles, and Los Padres National Forests.

Palmer's mariposa lily has a fairly broad distribution and is found in at least seven mountain ranges. In some areas it is locally common, but in most locations the size of the population is small (less than 100 plants). Within its range in southern California, some occurrences of *Calochortus palmeri* var. *palmeri* are found in areas that are remote and largely free from human disturbance, some occur in areas subject to human uses (primarily grazing, dispersed and developed recreation and roads). For some occurrences there is no current information available regarding the status of plants and habitat.

Palmer's mariposa lily can be affected by overgrazing, trampling, flooding, erosion, off highway vehicles, and development projects. The species is most vulnerable to impacts from grazing between April and August, when the plant is flowering and setting seed. This taxon is also affected by dispersed and developed recreation.

Alkali mariposa lily (*Calochortus striatus*)
It is a rare endemic of moist alkaline areas in the arid interior of southern California and southern Nevada. *Calochortus striatus* occurs in the southern Sierra Nevada, in the western, central and southern Mojave Desert, at the north base of the San Bernardino Mountains, in the southern San Joaquin Valley, and in southern Nevada. The California Natural Diversity Database (2004) lists 45 occurrences and nine general locations. In California, populations are scattered in Kern, northeastern Los Angeles, and southern and central San Bernardino counties. The largest populations of this species occur at several localities within Edwards AFB.

This species is associated with mesic soils in the desert, and is therefore highly vulnerable to habitat loss and degradation resulting from water diversions that affect hydrology. The greatest threats to the viability of this species from activities occurring on National Forest Service lands

are effects of Special Use Permits and Plan of Operations water extractions/diversions (USDA Forest Service 2002), grazing impacts, removal by collectors, type conversion and illegal OHV.

Mt Gleason paintbrush (*Castilleja gleasonii*)
Fewer than 10 occurrences of *Castilleja gleasonii* are known, all located on the Angeles National Forest. The primary distribution is at Messenger Peak/Flat, Mount Gleason, Lightning Point Campground, and east to Chilao, Horse Flats, and the Little Rock Creek area of the San Gabriel Mountains. In the Liebre Mountains, a population was recently identified at Knapp Ranch, a recently acquired parcel of land and several more occurrences were found west of Knapp Ranch, in upper Cienaga Canyon, and at the west end of Liebre Mountain at the saddle between Liebre Gulch and Salt Creek.

The primary threat to Mt Gleason paintbrush is its preference for habitat that is also popular for human recreation activities (i.e., gentle slopes and an open understory). Occurrences are reportedly threatened by their proximity to campgrounds (Horse Flats, Bandido, Chilao Flats, Messenger Flats, and Lightning Ridge). Designated trails (e.g., the Pacific Crest Trail) are present in the vicinity of occurrences. Fuel wood gathering and communication site maintenance at Mount Gleason are potential threats, and off-highway vehicle activity is a potential threat at Mount Gleason and Messenger Flat. Any of these occurrence areas could be at risk of impacts from vegetation/ fuels treatments and tree planting.

San Gabriel Mountain Sunflower (*Hulsea vestita gabrielensis*)
San Gabriel Mountain Sunflower is documented in the southern high Sierra Nevada, Glass Mountains, San Gabriel and San Bernardino mountains in California (Wilken 1993; USDA Forest Service 2003). The Glass Mountain occurrence is in the Inyo National Forest (USDA Forest Service 2003). San Gabriel Mountain sunflower occurs on the San Bernardino and Angeles National Forests. It is known from collections made at San Gorgonio Peak and Sugarloaf Peak in the San Bernardino Mountains and on Mt. Baden-Powell and Mt. Williamson in the San Gabriel Mountains. The greatest threats to viability are horticultural collecting, vegetation/fuel reduction treatments, illegal OHV and road maintenance.

California satintail (*Imperata brevifolia*)
California satintail occurs at widely scattered locations throughout the Southwestern United States. In California, the plant has historically been found in the San Joaquin Valley, the Mojave Desert around Death Valley, and in widely scattered locations in the Transverse and Peninsular mountains. Other reported locations include the foothills around Chico, and Lake County. The Chico and Lake County occurrences appear to be horticultural introductions (Hrusa per com). The greatest threats to viability are water extraction and road maintenance.

San Gabriel Linanthus (*Linanthus concinnus*)
San Gabriel Linanthus is endemic to the San Gabriel Mountains in Los Angeles and San Bernardino Counties. The known range of *Linanthus concinnus* is approximately 30 miles wide and 15 miles long, limited to the San Gabriel Mountains, from Mount Lowe east to Timber Mountain and as far north as Largo Vista. The type specimen was collected form the eastern edge of the species' range from Lytle Creek Canyon at 6000 feet in 1900 by H. M. Hall and deposited in the UC herbarium as Hall 1443. Threats to *Linanthus concinnus* include road use and maintenance, a large number of hiking trails that bisect populations, trail maintenance,

presence of invasive nonnative grass such as *Bromus tectorum*, mountain bikes, equestrian use along trails and illegal OHV activity.

Short joint beavertail(*Opuntia basiliaris brachyclada*)
Short joint beavertail occurs primarily along the northern slopes of the San Gabriel Mountains. There are several reports east of Cajon Pass in the northern San Bernardino Mountains, extending through Horsethief Canyon and Summit Valley to the Mojave River Forks south of Hesperia. It also occurs on the coastal slope of the transverse ranges in the Cajon Pass area at Mormon Rocks. The greatest threats to viability are horticultural collecting, vegetation/fuel reduction treatments and illegal OHV.

Transverse Range phacelia (*Phacelia exilis*)
Transverse Range phacelia occurs in the San Bernardino National Forest in the Big Bear area, Horseflats Campground and possibly from the Western Transverse Range on the ANF and LPNF. This species has been collected on the SBNF from Van Dusen Canyon, East Holcomb Valley, the Castle Glen Preserve, and the north shore of Baldwin Lake. Primary threats to Transverse Range phacelia on Forest System lands are hydrological impacts from ground-disturbing activities (especially during winter and spring when soils are wet), water diversions, fire suppression activities, fuels reduction and vegetation treatments, roads construction and road maintenance, non-native species invasion, water development projects, vehicle use off designated roads, trampling from hikers, equestrians and mountain bikes, and other forest uses. The greatest threats to viability are horticultural collecting, vegetation/fuel reduction treatments and illegal OHV.

Southern skullcap (*Scutellaria bolanderi ssp. austromontana*)
This plant is known from the San Bernardino Mountains, Peninsular Ranges, and southern Mojave Desert in Los Angeles, Riverside, San Bernardino and San Diego counties. Southern skullcap appears to have low vulnerability across its range, although its vulnerability on the San Bernardino National Forest is unknown. It is presumed stable within the Peninsular Range portion of its habitat; but such an assessment needs further verification. Also, information is needed about the distribution and population numbers of this species. More information is needed to confirm the presence of this species on National Forest System lands and regarding population trends and potential threats. The greatest threats to viability are water extraction, vegetation/fuel reduction treatments and illegal OHV.

Chickweed Starry Puncturebract (*Sidotheca caryophylloides*)
Chickweed starry puncturebract is endemic to the southern high Sierra Nevada, Transverse Ranges and San Jacinto Mountains. Chickweed starry puncturebract has been collected from Pine Mountain, Reyes Ridge, and Reyes Peak on the Los Padres National Forest and the vicinity of Mount Baldy in the San Gabriel Mountains on the Angeles National Forest (CalFlora 2002). In the San Bernardino Mountains occurrence locations include Strawberry Peak, Lake Arrowhead, Running Springs, Deep Creek, Keller Peak, Deer Lick, Big Bear Lake, and Big Bear Valley (Krantz, et. al. draft 2000) on the San Bernardino National Forest. The greatest threats to viability are vegetation/fuel reduction treatments and illegal OHV.

Research Natural Area

The Falls Canyon Research Natural Area (RNA) lies within the burned area on the north slope of Mt. Wilson. The target elements are bigcone Douglas-fir and canyon live oak. Two trails that run through the RNA could serve as conduits for weed spread into the RNA from roadside populations along the Mt. Wilson access road. Weeds could outcompete tree seedlings in moderate and high severity burned areas. Hikers and mountain bikers wandering off the trail due to open conditions could also compromise vegetation recovery in localized areas.

Dominant vegetation types in the burned area consist primarily of shrubland, including lower montane mixed chaparral, ceanothus chaparral, scrub oak chaparral, chamise chaparral, upper montane mixed chaparral and soft scrub mixed chaparral. Upper slopes contain canyon live oak, interior mixed hardwood, and coast live oak vegetation, transitioning into bigcone Douglas-fir, ponderosa/Jeffrey pine, and mixed conifer vegetation. Single-leaf pinyon occurs on the north side of the burned area, and planted ornamental conifers are scattered throughout. Stream corridors contain riparian mixed hardwood, white alder, willow, cottonwood, and California sycamore vegetation types.

C. Summary of Findings for Fire Area

The following tables summarize the post-burn conditions of the fire area in terms of burn severity.

Table 2. Acres of major vegetation categories (percentage in parentheses) by burn severity class (National Forest System lands only).

COVER TYPE	High	Moderate	Low	Unburned	Total Acres
Conifer	4,244 (20.4%)	7,963 (38.3%)	4,150 (20.0%)	4,414 (21.2%)	20,771
Oak/hardwoods	3,159 (21.5%)	6,636 (45.1%)	2,049 (13.9%)	2,865 (19.5%)	14,709
Ornamental		17 (61.0%)	7 (26.3%)	3 (12.7%)	27.0
Riparian	224 (16.5%)	798 (58.8%)	218 (16.1%)	117 (8.6%)	1,358
Chaparral/shrub	9,205 (8.1%)	80,792 (70.9%)	15,522 (16.1%)	8,367 (7.3%)	113,886
Desert shrub	37 (0.7%)	2,439 (43.8%)	1,975 (35.4%)	1,123 (20.1%)	5,574
Herbaceous	3 (1%)	101 (33.7%)	93 (31.3%)	102 (34%)	299
Barren	11 (1.7%)	238 (35.7%)	142 (21.3%)	274 (41.2%)	665
Urban	14 (1.4%)	333 (33.4%)	361 (36.1%)	288 (28.9%)	995
Water	2 (1.3%)	24 (15.8%)	48 (32.7%)	74 (50.2%)	148
Total Acres	16,900 (10.7%)	99,340 (62.7%)	24,565 (15.5%)	17,628 (11.1%)	158,433

D. Discussion of Findings and Emergency Conditions by HUC6 Watersheds

1. All Watersheds Lower Big Tujunga (Los Angeles River Watershed)

Values At Risk
Vegetation Recovery:

Emergency Determinations
Recovery for all vegetation communities: It is my determination that an emergency **does** exist for vegetation recovery for all plant communities as a result of post-fire effects of the Station Fire. This is due to invasive species infestation and illegal OHV activity.

Treatments to Mitigate the Emergency
The emergency situations as discussed above can be minimized through invasive species detection surveys for new and expanding populations and protection enforcement for illegal OHV activity (see Overall Treatment That Applies to Entire Burn Area).

2. Lower Big Tujunga (Los Angeles River Watershed)

Values At Risk
Slender horned spineflower

Emergency Determinations
*Slender horned spineflower: It is my determination that an emergency **does** exist for the slender horned spineflower downstream in the Lower Big Tujunga Watershed as a result of post-fire effects of the Station Fire. It is likely that there will be increased debris and hydrologic flow. This could transport or bury seeds under sediment. It is possible the entire seed bank could be buried under a thick layer of debris. It's important to note that this population is off Forest Service land on private land.

Treatments to Mitigate the Emergency
The emergency situations can not be mitigated because upstream burn slopes are greater then 60%. Slope stabilization treatments at 60% or greater are ineffective.

Values At Risk
California satintail

Emergency Determinations
*California satintail: It is my determination that an emergency **does** exist for the California satintail in the Lower Big Tujunga Watershed as a result of post-fire effects of the Station Fire. The population is in an open area that will be subject to road maintenance and vehicle traffic. There will be an increase in road maintenance due to dry ravel and winter debris flows. As the road graders drive on the roads they scrape both the road bed and the road sides. One pass with a grader can eliminate this population.

Treatments to Mitigate the Emergency
See Overall Treatment That Applies to Entire Burn Area:

3. Middle Big Tujunga (Los Angeles River Watershed)
Values At Risk
Mt Gleason paintbrush and Palmer's mariposa lily

Emergency Determinations
Mt Gleason paintbrush and Palmer's mariposa lily: It is my determination that an emergency **does** exist for the Mt Gleason paintbrush and Palmer's mariposa lily in the Middle Big Tujunga Watershed as a result of post-fire effects of the Station Fire. The population is in an open area that will be subject to dispersed recreation, increased recreation in unburned area with occupied habitats, tree planting, road maintenance and vehicle traffic. Any of these activities can reduce viability and impact the species.

Treatments to Mitigate the Emergency
Overall Treatment That Applies to Entire Burn Area:

Management Concerns:

a) Treatment Type: Extended Area Closure (minimum of three years)
b) Treatment Objectives: Illegal OHV activity is extremely difficult to control when the site is open and void of vegetation. If the site is closed for three years, vegetation will regrow and establish some cover. This will both discourage illegal OHV and allow Mt Gleason paintbrush and Palmer's mariposa lily to have three full growing seasons before they are subject to disturbance.

c) Treatment Description and Location: Close gates between Mendenhall Ridge Road (3N37) at Dillon Divide and Santa Clara Divide Road (3N17), Santa Clara Divide Road (3N17) at Sand Canyon and Angeles Forest Highway, Indian Canyon Truck Trail (4N37) at Soledad Canyon, Arrastre Canyon (4N33) at Soledad Canyon and (4N32) at Aliso Canyon.

d) Treatment Cost:

See Engineering/Roads Treatments. Cost of new gates are covered in Engineering/Roads Treatment plan.

4. Upper Big Tujunga (Los Angeles River Watershed)
Values At Risk
San Gabriel Mountain Sunflower (*Hulsea vestita gabrielensis*), Transverse Range phacelia (*Phacelia exilis*), Chickweed Starry Puncturebract (*Sidotheca caryophylloides*), Southern skullcap (*Scutellaria bolanderi* ssp. *austromontana*), San Gabriel Linanthus (*Linanthus concinnus*), Alkali Mariposa Lily (*Calochortus striatus*) and Palmer's mariposa lily (*Calochortus palmeri var palmeri*).

Emergency Determinations
It is my determination that an emergency **does** exist for San Gabriel Mountain Sunflower (*Hulsea vestita gabrielensis*), Transverse Range phacelia (*Phacelia exilis*), Chickweed Starry

Puncturebract (*Sidotheca caryophylloides*), Southern skullcap (*Scutellaria bolanderi* ssp. *austromontana*), San Gabriel Linanthus (*Linanthus concinnus*), Alkali Mariposa Lily (*Calochortus striatus*) and Palmer's mariposa lily (*Calochortus palmeri var palmeri*) in the Upper Big Tujunga Watershed as a result of post-fire effects of the Station Fire. Threats include dispersed recreation, illegal OHV, increased recreation in unburned area with occupied habitats, tree planting, road maintenance and vehicle traffic. Any of these activities can reduce viability and impact the population.

Treatments to Mitigate the Emergency
See treatment plan for all areas:

1. Management Concerns:
   e) Treatment Type: Area Closure
   f) Treatment Objectives: Illegal OHV activity is extremely difficult to control when the site is open and void of vegetation. If the site is closed for three years, vegetation will regrow and establish some cover. This will both discourage illegal OHV and allow Mt Gleason paintbrush and Palmer's mariposa lily to have three full growing seasons before they are subject to disturbance.

   g) Treatment Description and Location: Close gates on Santa Clara Divide Road (3N17) between Mill Creek and Highway 2 for a minimum of three years.

   h) Treatment Cost:

See treatment plan for cost breakdown.

5. Upper West Fork San Gabriel River (San Gabriel River Watershed)
Research Natural Area (RNA):
Values At Risk
The Falls Canyon Research Natural Area (RNA) lies within the burned area on the north slope of Mt. Wilson, between the access road and the West Fork of the San Gabriel River.

Emergency Determinations
Species Name/Value at Risk: It is my determination that an emergency **does not** exist for Falls Canyon Research Natural Area in the Upper West Fork San Gabriel River Watershed as a result of post-fire effects of the Station Fire.

Treatments to Mitigate the Emergency
No treatments are recommended.

6. Little Rock Creek (Mojave River Watershed)
Values At Risk
San Gabriel Mountain mazanita and short joint beavertail

Emergency Determinations
It is my determination that an emergency **does** exist for San Gabriel Manzanita and short joint beavertail in the Little Rock Creek Watershed as a result of post-fire effects of the Station Fire.

Threats include dispersed recreation, illegal OHV, increased recreation in unburned area with occupied habitats, road maintenance, vehicle traffic and tree planting. Any of these activities can reduce viability and possible eliminate the entire population.

Treatments to Mitigate the Emergency
The emergency situations as discussed above can be mitigated coordination with Forest Service for tree planting and a closure at Mt Pacifico Campground for a minimum of three years. Due to the viability threat for the San Gabriel Manzanita, Mill Creek Plantation should not be replanted.

11. Management Concerns:

i) Treatment Type: Area Closure

j) Treatment Objectives: Illegal OHV activity is extremely difficult to control when the site is open and void of vegetation. If the site is closed for three years, vegetation will regrow and establish some cover. This will both discourage illegal OHV and allow San Gabriel Mountain Manzanita and short joint beavertail to have three full growing season before they are subject to disturbance.

k) Treatment Description and Location: Close gates on Santa Clara Divide Road (3N17) between Mill Creek and Highway 2 for a minimum of three years.

l) Treatment Cost:

See Engineering/Roads Treatments. Cost of new gates are covered in Engineering/Roads Treatment plan.

OVERALL TREATMENT THAT APPLIES TO ENTIRE BURN AREA:
Treatments:

Noxious Weed Detection Surveys and Expansion Treatment
Surveys will begin in 2009 during the resprouting periods of weed species. Surveys will continue into the spring to capture the annual invasive species. Because of differences in flowering times for all potential species, two visits may be required during the growing season. Completion of surveys in riparian areas, dozerlines, and known invasive and sensitive plant populations would be the first priority. The second survey priorities would be along roads, handlines, and staging areas. Surveys of the general habitats in the burned area would be the lowest priority. Detailed weed detection survey guidelines are attached in Appendix A of the Noxious And Invasive Non-Native Weeds Specialist Report and Noxious Weed Detection Survey Plan.

Weed detection surveys to determine whether ground disturbing activities related to the Station Incident and the fire itself have resulted in the expansion of noxious weeds is requested for the first year. Estimated costs are based on the assumption that two visits would be necessary because of the differences in flowering times. In addition, the amount requested will cover reporting costs.

OHV Vegetative Screening:
Illegal OHV activity is a threat to national forest land. Erosion, user conflicts, spread of invasive species, damage to cultural sites, disturbance to wildlife, destruction of wildlife habitat, and risks to public safety can result from unauthorized OHV use.

The Angeles National Forest (ANF) covers 70% of the open space in Los Angeles County with a population of over 11 million. This large population base results in very high legal and illegal use of Off Highway Vehicle (OHV) areas on the forest. OHV riders on the ANF may be similar to riders in other parts of the county but the difference to the large number of people who live and recreate in LA County.

The challenge for the ANF is managing the high number of non-conforming riders, OHV users that illegally gain access onto the forest from driving around a locked gate or closed signs. This type of user causes conflict with non-motorized users and damage to natural and cultural resources. Due to increasing population and developments that border the forest, it is becoming increasing difficult to patrol illegal OHV.

It is critical to vegetation recovery that illegal OHV is controlled. This will give the vegetative a chance to grow. Vegetative screening is using previously cut vegetation such as scrub oaks, chamise and other chaparral plants placed over obvious unauthorized OHV entrances and trails. There are many fuels reduction projects on the ANF. The cut vegetation is piled and burned. Some of this cut vegetation can be placed over illegal trails and unauthorized to disguise the illegal routes.

Treatment Effectiveness Monitoring and Enforcement Patrol:
Illegal OHV activity is a threat to national forest land. Erosion, user conflicts, spread of invasive species, damage to cultural sites, disturbance to wildlife, destruction of wildlife habitat, damage to watershed and risks to public safety can result from unauthorized OHV use.

Seven, level 2 enforcement patrols will monitor the BAER treatments and give citations to riders enganged in illegal OHV activity. The will also check that signs, information boards, temporary fencing, and gate closures are present and functioning properly to maintain closure integrity. Treatments include maintenance, repair, or replacement of closure features as needed during the closure period. They will also notify law enforcement if necessary.

III. ADDITIONAL DISCUSSION/SUMMARY/RECOMMENDATIONS

While the fire area may be safer for public entry after a year, it will take longer for vegetative recovery to provide for protection for specially listed plant species, aquatic, riparian, bat, and spotted owl habitats. Opening the fire area after a year may necessitate additional “interior” treatments to provide adequate protection for these habitats. It is likely that fences and/or barriers will be needed in many places to prevent damage to recovering vegetation communities, aquatic and riparian habitats.

APPENDIX A

Vegetation Resources Condition Assessment:

VEGETATION RECOVERY:

CHAPARRAL DOMINATED PLANT COMMUNITIES:

- 10-50% ground cover by the end of the first growing season. . Cover will be dominated by herbaceous species and some shrub regrowth.
- 20-70% ground cover by the end of the second growing season. Cover will be dominated by herbaceous species and some shrub regrowth.
- Shrub cover will have largely replaced herbs in 5 years
- Shrub cover will achieve pre-fire appearance in 10 to 15 years.
- In 15 to 25 years, chaparral will recover with an intact seed bank.
- Desert communities will take longer to recover (the number of years is unknown).

CONIFER DOMINATED PLANT COMMUNITIES*:
BIG CONE DOUGLAS FIR FOREST:
Low to Moderate Intensity Burn:

- Trees will resprout and canopy will develop a pre-fire canopy in 10 to 15 years.

High Intensity Burn:

- Pre-fire trees and pre-fire tree seed bank will not recover for many decades.

MIXED CONIFER FOREST:
Low to Moderate Intensity Burn:

- Trees will not resprout. An unknown number of trees were killed. Trees must grow from seeds in surrounding soils. Tree canopy will take many decades to recover.

High Intensity Burn:

- Pre-fire trees and pre-fire tree seed bank will not recover.
- Where the fire burned into coniferous canopies, areas will be slow to recover and there will likely be a shift in dominance to montane chaparral species and canyon live and scrub oaks. This will take place in 5 to 10 years.

*Global climate change may introduce unknown factors into vegetation recovery.

Impacts of the Fire on Vegetation and Expected Recovery: The following information is derived from the Fire Effects Information System (www.fs.fed.us/database/feis) except where otherwise cited.

Based on scientific studies and personal observations, the probability that the most vegetation will recover rapidly, without any treatment, is high. Natural revegetation is expected to reduce erosion and overland water flow in high hazard areas. Given an average amount of winter rainfall, natural recovery to proceed at an acceptable level in most of the fire area, especially by the second year after the fire (see discussion below).

Of the National Forest System lands burned, 113,886 acres (71.9%) are mapped as chaparral of various types (Table 2). Burn severity was classified as high for 9,205 acres (9.1%) of the chaparral and moderate for 80,792 acres (70.9%). Many of the dominant chaparral shrubs are top-killed by fire but sprout from stem bases, often within a few weeks ("sprouters"); others regenerate from seeds stored in the soil, which germinate during late winter or early spring ("seeders"). Some species both sprout and produce seedlings. In addition, a variety of herbaceous species ("fire followers") germinate from seeds that have lain dormant in the soil for decades. These plants can produce substantial ground cover by the end of the first growing season.

Chaparral Communities:

Keeley et al. (2008) measured first-year ground cover ranging from 0 to 50% at 250 sites burned in the 2003 southern California wildfires. More than half of the plots had at least 20% cover by June 2004. Cover had a significant negative relationship to fire severity (lower cover with higher severity), but fire severity explained only a small amount of the variation in cover. At the end of the second growing season, vegetation cover ranged from 25 to 100% at those same plots, with most having between 40 and 70% plant cover. There was no relationship of cover to fire severity the second year (Keeley et al. 2008). The herbaceous species that appear in abundance the first couple of years will be disappearing by the third year after fire, replaced by growing shrubs and some opportunistic herbaceous species, including (unfortunately) naturalized weedy species in areas near roads and fuel breaks. By 5 years after fire chaparral areas have the appearance (and soil-protecting properties) of low-stature shrublands; maximum cover is not usually reached until 15-25 years after fire.

Chamise and Mixed Chaparral

All chaparral shrub species have the ability to regenerate rapidly after fire through seed germination or resprouting (Keeley 1977). Fire usually kills seeds on the soil surface. However, buried seeds remain insulated from extremely high temperatures, provided that the soil is relatively dry (summer and fall conditions). Some seeds, especially those of ceanothus and fire-following herbs, only germinate after fire. Chaparral species that are obligate seeders after fire are resilient to fire-free intervals of 100 years or more (Keeley, 1976). Some of these species germinate in response to fire-related opening of the seed coat, while others respond to chemicals in the ash. In addition to seed germination, chaparral shrub species are adapted to resprout from the root structure (lignotuber) following fires that have removed all vegetation above ground. This adaption allows for quick recovery of vegetation cover within chaparral habitat. In many chaparral species, including toyon, laurel sumac, and chamise, new sprouts may reach from 1 to 2 feet in height in one growing season following a fire.

Moreno and Oechel (1991) investigated the effect of fire intensity on the germination of shrubs and herbs in chaparral. They piled brush onto established plots prior to burning to achieve different fire intensities. Increasing fire intensities promoted earlier germination of *Ceanothus greggii*, but resulted in decreased germination of chamise (*Adenostoma fasciculatum*). Amongst herbs, fire-following annuals such as *Phacelia brachyloba* were resistant to increasing fire intensity. Deerweed (*Lotus strigosus*) was stimulated by all levels of increased fire intensity.

In the Station fire, the chaparral that burned included chamise (*Adenostoma fasciculatum*), laurel sumac (*Malosma laurina*) and scrub oak (*Quercus berberidifolia*). These species sprout vigorously after fire. Other common elements included buckwheat (*Eriogonum fasciculatum*), white sage (*Salvia apiana*), and Eastwood manzanita (*Arctostaphylos glandulosa).* All of these species regenerate from seed after fire, and fire enhances seed germination.

In the first spring after a fire there is abundant growth of deciduous, semi-woody and herbaceous plants that arises from the seed bank or from underground rhizomes or bulbs. Keeley et al. (1981) studied first year post-fire herbaceous cover within the perimeter of the Laguna and Boulder Fires in San Diego County. These fires occurred during late September and early October in 1970. Average herbaceous cover measured between 30 and 80 percent. Common native species included annual snapdragon (*Antirrhinum coulterianum*), pincushion flower (*Chaenactis artemisiaefolia*), popcorn flower (*Cryptantha intermedia*), and annual lotus (*Lotus salsuginosus*).

Sage Scrub

Similar in some aspects to chaparral, sage scrub habitat is also fire adapted. While many sage scrub plant species will resprout or successfully seed following a fire, overall vegetation recovery may be lower than that of chaparral. Depending on patch size, surrounding land use and habitat type, sage scrub may be more susceptible to type conversion following a fire.

About 13% of the burned Forest Service acres are mapped as conifer-dominated vegetation (20,771 acres; Table 2). Fire severity is fairly evenly distributed across categories, with slightly more moderate (38%) than high, low, or unburned (in the 20% range). Much of the conifer vegetation is native bigcone Douglas-fir (*Pseudotsuga macrocarpa*) forest or woodland (14,324 acres). Low and moderately burned bigcone Douglas-fir can be expected to recover to the same type, as mature trees resprout from branch buds if the needles are scorched but not burned off (Minnich 1988). Tree canopies develop gradually, so full canopy may not return for 5 years or more. Montane chaparral occurs in the understory of many bigcone Douglas-fir stands and will recover fairly quickly through sprouting shrubs. Where fire severity was high in bigcone Douglas-fir (3,553 acres), the sites will probably regenerate as montane chaparral at first. Bigcone Douglas-fir seedlings need shade to establish, so the return of a conifer canopy will take many decades in the high severity burn stands (50-100 years; Minnich 1980, Keeley 2006).

Desert Scrub

Desert shrub plant communities make up 5,574 acres of the Station Fire burned area (3.5%). Much of this is desert chaparral, which recovers from fire more slowly than coast-facing chaparral (Hanes 1971). Most of the burned desert shrub communities were mapped as moderate or low burn severity (Table 2), which should allow for complete vegetation recovery if invasive species and off-road vehicle use can be controlled. However, illegal OHV riding is expected to increase due to the open nature of the burned vegetation, modest regrowth rates, and relatively gentle terrain. It will take an unknown number of years for the desert vegetation communities to return.

Coniferous Forests

Bigcone Douglas-fir and associated canyon live oak (*Quercus chrysolepis*) provide a key vegetative component of many Protected Activity Centers for the Forest Service-sensitive California spotted owl (see wildlife section for discussion of fire effects on California spotted owls).

Ponderosa/Jeffrey pines and mixed conifer forest comprised the prefire vegetation on about 6,000 acres of the Station Fire. Most of this type burned under low and moderate severity, with considerable tree canopy retained; scorched needles will provide protective ground cover when they fall as well. Initial regeneration in burned pine and mixed conifer stands will consist of understory shrubs, such as ceanothus and manzanita, plus some herbaceous species (Keeley 2006). Conifer seedlings will occur in the second and subsequent years postfire in the vicinity of surviving seed trees. Large areas where all tree canopies were killed will be dominated by shrubs and herbaceous plants for many years until seed can dispersed into the stands from distant surviving trees. Overall about 670 acres of native pine and mixed conifer forest is mapped as high severity burn. Plantations of exotic conifers tended to burn with high severity as well.

Oak and Riparian Woodlands

Various kinds of upland hardwoods, predominantly oaks, characterized about 9% of the burned area (14,709 ac) (Table 2). For this vegetation category, 3,159.3 acres (21.5%) is mapped as high burn severity and 6,632.2 acres (45%) is mapped as moderate. Canyon live oak is the most common type (11,780 acres), often growing adjacent to or intermingled with bigcone Douglas-fir. Oaks may be top-killed by fire, but most species sprout from branches or the ground after even high severity fire (Franklin et al. 2006). Oaks that don't resprout the first year after fire may sprout in year 2 or 3. Shrubs and herbaceous plants appear in the understory of burned oak stands. One study in the Peninsular Range found over 25% cover of shrubs and herbaceous plants one year after fire (stands previously dominated by conifers or oaks), increasing to over 60% the second year postfire (Franklin et al. 2006).

Coast Live Oak is a fire-resistant tree that is usually not killed even by high-intensity fire (Dagit 1995); it resprouts from surviving crowns, trunks, or roots. Survival and subsequent recovery of coast live oaks from fire is largely dependent upon fire intensity and immediate area vegetation conditions which affect the fuel loads within the immediate area of the tree. Several decades will be needed for vegetation to return in appearance to typical oak woodland.

Stream channel the vegetation is composed of mixed live oak woodland and chaparral vegetation. Riparian woodland vegetation impacted by the fire included Cottonwood, Sycamore, coast live oak, and willow. While understory vegetation within the riparian zone was largely burned away, canopy cover of most trees was left intact. Due to the short duration of the fire within the riparian zone and dormant condition of species such as cottonwood, sycamore and willow, damage or mortality of trees is expected to be minimal. All of the tree species are capable of surviving and resprouting following a fire. While sycamore willow and cottonwood trees may be top-killed by fire, all are capable of resprouting vigorously from the roots and undamaged limbs. Recovery of these species was observed within the Vail Fire area and sycamores were observed to recover through stump sprouting after an intensive fire completely burned a large stand of sycamores within Chino Canyon, Riverside County (Wells pers. obs.).

Understory vegetation recovery within the riparian zone is expected to occur due to similarities between fire and stream scouring, which riparian plants are adapted to and even require for successful regeneration and establishment.

Although small in area (only 1,358 acres; 0.9% of burned area), riparian plant communities provide an important resource for many kinds of wildlife. Riparian woodland vegetation affected by the fire included cottonwood, sycamore, white alder, coast live oak, and willow. While understory vegetation within the riparian zone was largely burned away, some tree canopy cover was left intact in many areas. All of the tree species are capable of surviving and resprouting following a fire (Keeley 2006). Recovery of riparian areas is typically quite rapid, although expansion of scattered populations of giant reed (*Arundo donax*) could interfere with native plant recovery if not controlled.

Vegetation Burn Severity Among the HUC-4 Watersheds

Overall burn severity proportions do not tell the whole story on how effectively vegetation cover will re-establish in the burned area or how individual plant communities will fare in a given area. Drainages that were mapped as having relatively more high severity burn can be expected to have somewhat slower vegetation recovery and thus, perhaps, more prolonged increased sediment movement and flood flow. The amount of each major vegetation category in each burn severity class was calculated for each main watershed area.

1) Los Angeles River drainage

a. Pacoima Wash, acres of burn severity for major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	389.4	932.1	199.5	123.6	1,644.7
Oak/hardwoods	139.9	578.6	133.2	102.1	953.8
Riparian	4.1	28.5	17.0	5.3	54.9
Chaparral/shrub	894.2	7,924.9	1,315.8	425.5	10,560.4
Desert shrub	0.2	7.5	5.2	1.4	14.3
Herbaceous		23.1	27.4	17.7	68.2
Barren	2.1	32.0	5.7	5.0	44.8
Urban		4.0	2.0	0.5	6.5
TOTAL	1,429.9	9,530.8	1,705.8	681.0	13,347.5

A considerable area of high severity burned conifer forest exists in this drainage, predominantly bigcone Douglas-fir.

b. Lower Big Tujunga River, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	85.0	501.5	115.7	101.6	803.8
Oak/hardwoods	197.0	983.7	124.8	89.7	1,395.2
Plantations		16.5	7.1	3.4	27.0
Riparian	17.0	181.2	43.2	54.0	295.4
Chaparral/shrub	718.6	17,355.5	3,415.5	1,619.5	23,109.0
Herbaceous		38.2	40.4	38.7	117.3

Barren	0.9	42.5	41.9	96.2	181.4
Urban		54.2	63.7	52.8	170.7
Water		0.9	0.7	3.6	5.2
TOTAL	1,018.5	19,174.2	3,852.9	2,059.4	26,105.0

Riparian areas in this drainage are colonized by giant reed in many places. Exotic vegetation is present around recreation residence tracts.

c. Middle Big Tujunga, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	575.8	1,038.4	94.8	99.6	1,808.6
Oak/hardwoods	266.9	484.1	35.5	16.5	803.0
Riparian	95.1	212.6	34.8	13.6	356.1
Chaparral/shrub	2,009.4	17,236.8	1,544.1	1,060.8	21,851.0
Desert shrub	2.0	65.9	25.2	6.9	100.0
Herbaceous	0.5	9.6	3.1	3.9	17.2
Barren	2.2	58.7	7.9	4.0	72.8
Urban	2.0	75.7	61.5	33.4	172.7
Water	1.8	16.5	25.4	46.1	89.8
TOTAL	2,955.8	19,198.4	1,832.2	1,285.0	25,271.3

Considerable high severity burned conifer and chaparral vegetation characterize this drainage.

d. Upper Big Tujunga, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	1,196.9	1,801.7	654.3	753.7	4,406.8
Oak/hardwoods	800.7	854.1	237.4	316.2	2,208.4
Riparian	34.6	118.5	15.1	0.8	169.0
Chaparral/shrub	1,563.7	8,053.8	1,880.1	2,533.7	14,031.3
Desert shrub	4.5	111.8	120.9	185.3	422.5
Herbaceous	0.6	2.9	2.9	4.3	10.7
Barren	0.5	17.4	14.8	21.9	54.5
Urban	4.4	79.3	74.8	50.1	208.7
Water			0.1		0.1
TOTAL	3,605.8	11,039.6	3,000.5	3,866.1	21,512.0

e. Verdugo Wash, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	2.3	16.3	15.5	11.4	45.5
Oak/hardwoods	26.0	115.9	50.5	18.4	210.8
Riparian		6.4	2.1	0.6	9.1
Chaparral/shrub	187.2	1,115.2	429.1	96.1	1,827.6
Barren	0.0	1.2	0.7		2.0
Urban	0.6	5.7	2.8	2.2	11.3
TOTAL	216.1	1,260.6	500.8	128.6	2,106.2

f. Arroyo Seco, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	171.2	401.5	141.0	159.6	873.3
Oak/hardwoods	467.2	1,131.1	323.5	415.2	2,336.9
Riparian	10.8	38.5	21.5	18.9	89.7
Chaparral/shrub	914.0	7,112.6	1,464.1	399.7	9,890.4
Desert shrub	0.1	8.9	1.7	6.0	16.8
Barren	1.5	28.3	21.1	45.4	96.3
Urban	2.1	55.0	62.0	38.5	157.6
TOTAL	1,566.9	8,776.0	2,034.8	1,083.3	13,461.0

g. Eaton Wash, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	2.8	34.2	13.7	45.8	96.5
Oak/hardwoods	41.5	62.2	13.1	36.7	153.6
Chaparral/shrub	101.4	292.5	30.5	45.3	469.7
Barren		3.0	1.0	5.2	9.3
Urban		0.1	0.1	1.1	1.2
TOTAL	145.8	392.0	58.4	134.2	730.3

Very few acres of this watershed were affected by the Station fire.

2) San Gabriel River

a. Upper West Fork San Gabriel, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	322.1	1,128.1	1,567.4	1,924.8	4,942.4
Oak/hardwoods	556.4	1,529.2	895.3	1,637.8	4,618.7
Riparian	12.7	78.6	58.7	13.2	163.3
Chaparral/shrub		8,154.9	2,541.3	637.1	12,546.9
Desert shrub	1.0	17.0	37.9	19.3	75.2
Herbaceous	1.2	5.4	4.7	6.6	17.9
Barren	0.4	7.8	19.4	44.8	72.4
Urban	4.6	35.7	36.2	53.4	129.9
Water		4.2	21.1	24.3	49.6
TOTAL	2,112.1	10,961.0	5,181.9	4,361.3	22,616.3

Fire effects in this drainage varied by slope exposure, as in many others, with more high and moderate severity burn mapped on south-facing slopes. The Falls Canyon Research Natural Area lies in the upper portion of this drainage on the north slope of Mt. Wilson. The mixed fire severities experienced by the target element bigcone Douglas-fir and canyon live oak vegetation should provide interesting research opportunities as vegetation recovers. Fire effects in the San Gabriel Wilderness Area portion of this drainage were largely moderate.

b. Middle West Fork San Gabriel, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer		6.5	14.5	27.5	48.5
Oak/hardwoods	1.6	26.1	20.8	27.0	75.4
Chaparral/shrub	1.9	193.9	196.4	87.4	479.6
Barren			0.0	1.1	1.1
TOTAL	3.4	226.5	231.8	143.0	604.7

3) Antelope-Fremont River

a. Little Rock Reservoir, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	92.2	580.3	318.5	188.4	1,179.5
Oak/hardwood	128.2	374.9	67.6	75.0	645.6
Riparian	2.9	12.7	2.4	0.4	18.4
Chaparral/shrub	176.2	2,298.2	609.5	566.6	3,650.6
Desert shrub	6.8	592.5	475.0	379.5	1,453.9
TOTAL	406.3	3,858.6	1,473.1	1,209.9	6,947.9

b. Little Rock Creek, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	4.7	176.3	698.8	752.5	1,632.4
Oak/hardwoods	9.6	115.9	101.7	49.0	276.2
Riparian	2.1	13.7	8.8	2.3	27.0
Chaparral/shrub	9.6	340.8	365.3	193.8	909.5
Desert shrub	4.5	178.3	379.2	158.2	720.3
Barren		0.6	10.1	15.8	26.5
Urban		0.2	10.9	23.0	34.0
TOTAL	30.5	825.9	1,574.9	1,194.5	3,625.8

The burned areas in this drainage were mostly classified as moderate or low severity. Vegetation recovery should be relatively rapid. Many of the conifer stands in this area experienced what should be a beneficial understory burn.

4) Santa Clara River

a. Aliso Canyon, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	1,096.4	981.5	209.3	112.3	2,399.5
Oak/hardwoods	286.7	162.9	15.7	32.7	498.0
Riparian	24.6	59.5	13.3	6.7	104.0
Chaparral/shrub	668.3	5,084.6	1,262.8	315.2	7,330.9
Desert shrub	7.7	473.1	678.6	187.7	1,347.1
Herbaceous	0.1	3.3	7.4	26.3	37.2
Barren	2.3	27.1	11.4	9.3	50.1

Urban	0.4	23.0	45.7	32.4	101.4
Water	0.1	1.8	1.4	0.4	3.8
TOTAL	2,086.6	6,816.9	2,245.6	723.0	11,872.1

b. Soledad Canyon-Arrastre Canyon, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	125.6	87.5	12.3	26.4	251.8
Oak/hardwoods	204.3	118.7	10.8	39.6	373.3
Riparian	14.2	23.1	0.2	0.0	37.5
Chaparral/shrub	456.9	3,154.6	184.2	109.4	3,905.1
Desert shrub	3.3	424.7	132.3	136.2	696.5
Herbaceous			0.0	0.0	0.0
Barren	1.5	18.8	7.4	23.8	51.6
Urban				0.1	0.1
TOTAL	805.9	3,827.5	347.2	335.4	5,315.9

c. Little Soledad Canyon, acres of burn severity by major vegetation categories

	High	Moderate	Low	Unburned	Total
Conifer	179.8	277.1	94.4	86.4	637.7
Oak/hardwood	33.3	98.7	19.1	9.2	160.3
Riparian	6.5	24.8	1.2	1.6	34.0
Chaparral/shrub	289.9	2,473.9	283.2	277.0	3,324.0
Desert shrub	6.5	559.1	119.1	42.6	727.3
Herbaceous	0.7	18.1	7.4	4.0	30.2
Barren	0.1	0.2	0.2	1.7	2.1
Urban			0.9	0.4	1.3
TOTAL	516.8	3,451.7	525.5	423.0	4,916.9

References Cited

Burns, Charmion; Sauer, Jonathan. 1992. Resistance by natural vegetation in the San Gabriel Mountains of California to invasion by introduced conifers. Global Ecology and Biogeography Letters 2: 46-51.

Franklin, Janet; Spears-Lebrun, Linnea A.; Deutschman, Douglas A.; Marsden, Kim. 2006. Impacts of a high-intensity fire on mixed evergreen and mixed conifer forests in the Peninsular Ranges of southern California, USA. Forest Ecology and Management 235: 18-29.

Hanes, Ted L. 1971. Succession after fire in the chaparral of southern California. Ecological Monographs 41(1): 27-52.

Keeley, Jon E. 2000. Chaparral. Chapter 6 in Barbour, M. G.; Billings, W. D. (editors), North American terrestrial vegetation. 2nd edition. New York: Cambridge University Press; 204-253.

Keeley, Jon E. 2006. South coast bioregion. Chapter 15 in Sugihara, N, G.; van Wagtendonk, J. W.; Shaffer, K. E.; Fites-Kaufman, J.; Thode, A. F. (editors), Fire in California's ecosystems. Berkeley, CA: University of California Press; 350-390.

Keeley, Jon E.; Brennan, Teresa; Pfaff, Anne H. 2008. Fire severity and ecosystem responses following crown fires in California shrublands. Ecological Applications 18(6): 1530-1546.

Minnich, R. A. 1980. Wildfire and the geographic relationships between canyon live oak, Coulter pine, and bigcone Douglas-fir forests. In Plumb, T. R. (editor), Proceedings of the symposium on ecology, management and utilization of California oaks. Berkeley, CA: USDA Forest Service, Pacific Southwest Forest and Range Experiment Station; 55-61.

Pannkuk, Chris D.; Robichaud, Peter R. 2003. Effectiveness of needle cast at reducing erosion after forest fires. Water Resources Research 39(11), doi:10.1029/2003WR002318.

Riggan, Philip J.; Goode, Suzanne; Jacks, Paula M.; Lockwood, Robert N. 1988. Interaction of fire and community development in chaparral of southern California. Ecological Monographs 58(3): 155-176.