

Date of Report: February 17, 2006

BURNED-AREA REPORT
(Reference FSH 2509.13)**PART I - TYPE OF REQUEST**

A. Type of Report

- ☒ 1. Funding request for estimated WFSU-SULT funds
- ☐ 2. Accomplishment Report
- ☐ 3. No Treatment Recommendation

B. Type of Action

- ☒ 1. Initial Request (Best estimate of funds needed to complete eligible rehabilitation 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 DESCRIPTIONA. Fire Name: Sierra FireB. Fire Number: CA-CNF-300C. State: CAD. County: Orange and RiversideE. Region: 5F. Forest: Cleveland NF

G. District: Trubuco RD

H. Date Fire Started: 02/06/06

I. Date Fire Contained: February 12, 2006

J. Suppression Cost: \$7.1 million

K. Fire Suppression Damages Repaired with Suppression Funds

- 1. Fireline waterbarred (miles): 24.65 miles of fireline constructed. Unknown miles waterbarred.
- 2. Fireline seeded (miles): 0 miles
- 3. Other (identify): 24 miles of fire line bladed

L. Watershed Number: 18070202 Santa Ana

M. Total Acres Burned: 10,584

NFS Acres(1,759) Other Federal () State (771) Private (8,054)

N. Vegetation Types: Chamise Chaparral, Coastal Sage Scrub, Mixed Chaparral, Sycamore/Live Oak Riparian Woodland and Tecate Cypress.

O. Dominant Soils: Rock outcrop; Cieneba series – shallow sandy loams; and Anaheim series – shallow clay loams on 30 to 70% slopes.

P. Geologic Types: Marine and Non marine sedimentary rocks including coarse grained sandstone, conglomerate, siltstone and shales; mixed volcanics; and landslide deposits.

Q. Miles of Stream Channels by Order or Class:

1st order – 43.9; 2nd order – 18.8; 3rd order – 7.5; 4th order – 7.4

R. Transportation System

Trails: 2.4 miles Roads: Total 35.6 miles, 4.1 miles of Forest System Roads

PART III - WATERSHED CONDITION

A. Burn Severity (acres): Total NFS and other lands: 2284 (Unburned); 1008 (low); 5626 (moderate); 1666 (high).

NFS lands only: 231 (low); 941 (moderate); 587 (high).

B. Water-Repellent Soil (acres): 5927

C. Soil Erosion Hazard Rating (acres):

3292 (low) 2813 (moderate) 4479 (high)

D. Erosion Potential: 15.6 tons/acre 1st year (Feb. – Mar. 2006); (Rowe, Countryman and Storey, 1949).
6.3 tons/acre 2nd year (full year)

E. Sediment Potential: 4,633 cubic yards / square mile 1st year

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 7
(source: Rowe, Countryman, Storey, 1949, indicating significant reduction in erosion and sedimentation after the 7th year following a fire in chaparral for this topography)

B. Design Chance of Success, (percent): 100

C. Equivalent Design Recurrence Interval, (years): 5

D. Design Storm Duration, (hours): 24

E. Design Storm Magnitude, (inches): 8

F. Design Flow, (cubic feet / second/ square mile): 40

G. Estimated Reduction in Infiltration, (percent): 16

H. Adjusted Design Flow, (cfs per square mile): 110

PART V - SUMMARY OF ANALYSIS

A. Description of Watershed Emergency:

Introduction

The Sierra Fire burned 10,584 acres of National Forest System (NFS) lands and private lands. Burn severity in the fire area includes 1,666 acres (16%) of high burn severity, 5,626 acres (53%) of moderate burn severity, 1,008 acres (10%) of low burn severity and 2,284 acres (22%) unburned. On National Forest System lands, 587 acres (33.4%) were high burn severity, 941 acres (53.5%) were moderate burn severity, and 231 acres (13.1%) were low burn severity or unburned. Slopes range from 30 to 75% with some areas of very steep slopes in the headwaters of Fremont Canyon and Coal Canyon.

Affected watersheds include 1) Fremont Canyon, 2) Gypsum Canyon, 3) Blind Canyon, and 4) Coal Canyon. A 106 acre area above Santiago Reservoir and a 67 acre area that drains directly into the Santa Ana River was burned with mostly low to moderate burn severity.

1. Ninety percent of the Fremont Canyon watershed (6,741 acres) burned with 1,401 acres (21%) of high burn severity, mostly in the upper 1/3 of the watershed; 4,062 acres (60%) of moderate burn severity mostly in the middle of the watershed; and 639 acres (9.5%) of low to no burn severity mostly in the lower one mile section of Fremont Canyon. An area of 639 acres (9.5%) of the watershed is outside of the fire. A narrow corridor along the riparian area above the lower one mile section of Fremont Canyon Creek has a narrow band of evenly mixed low to moderate burn severity. The lower one mile of the canyon has a low gradient reach where sediment is deposited. It is expected that most of the sediment generated in the watershed will be deposited in this reach. The upper 1/3 of the watershed is located on NFS lands and the rest of the watershed is owned by the Irvine Ranch Company. Small parcels of private land are located within the NFS boundary. The BAER Team was not able to determine the ownership of these small parcels.
2. Eighty percent of Gypsum Canyon watershed (3,573 acres) burned with 77 acres (2%) high burn severity, 882 acres (25%) of moderate burn severity, and 1,888 acres (53%) of low burn severity or unburned. All of Gypsum Canyon is on private lands owned by the Irvine Ranch Company.
3. Forty eight percent of Blind Canyon watershed (1,560 acres) burned with 107 acres (7%) of high burn severity, 498 acres (32%) of moderate burn severity, and 152 acres (10%) of low burn severity or unburned. The State Route (SR) 241 toll road is east of the main Blind Canyon channel and construction of a large fill for the toll road has resulted in modification of the mouth of the channel as it enters Santiago Creek. Most of the area that burned in Blind Canyon is owned by Irvine Ranch Company.
4. Forty eight percent of Coal Canyon watershed (1,473 acres) burned with 81 acres (6%) of high burn severity, 151 acres (10%) of moderate burn severity, and 473 acres (32%) of low burn severity or unburned. The only areas that burned in Coal Canyon are the steep upper slopes in the head waters of the drainage. Most of the area that burned in Coal Canyon is located on NFS lands. The unburned portion of Coal Canyon is State Park lands and State Fish and Game lands.

Slopes are steep and highly dissected ranging between 30 and 70 percent, with a large portion of the fire area having slope gradients greater than 60%. Water repellent soils in the fire area could be up to 56% of the fire area for a total of 5,927 acres. A portion of the fire area has up to 6 % rock outcrop and runoff on these areas will be rapid. Water is expected to run off the rock outcrop and the areas with water repellent soils, rather than infiltrate the soils. The fire area has several areas that are mapped as Quaternary Landslide Deposits and existing debris slide scars were observed in the fire area. The farthest downstream site affected by the fire is a flood control dam known as the Villa Park Dam flood control dam. This dam is 1.5 miles downstream from the Irvine County Park and 3 miles downstream from the fire area.

The northern end of the Trabuco Ranger District, including North Main Divide Road, has shown a trend of unauthorized mechanized vehicle use including “street legal”, “non-street legal”, and mountain bike use off of designated routes. As a result, “social trails” have developed and continue to be regularly used by the public even though signing and various corrective measures have been put in place. OHV use, though not permitted in these areas, has been an ongoing law enforcement and management concern.

Threats to Life and Property

Flooding, debris flows and sediment bulk flows are a threat to human life and property (vehicles crossing channels). Several areas were identified where human life is at risk from flooding. Those areas include:

1. All of the road/channel crossings on the Irvine Ranch Land Reserve.
2. One road/channel crossing near the bottom of Gypsum Canyon. A construction project at the mouth of Gypsum Canyon has caused the Gypsum Creek channel to be filled with road fill and is obstructing the channel. There is no culvert to pass flows under the fill at the road/channel crossing at the south end of Gypsum Canyon Road where the pavement ends. The site poses a potential danger to vehicles and/or persons attempting to cross when Gypsum Creek runs high with storm runoff from the burned area. Bedload or debris deposition at the road crossing has high potential to divert the flow of Gypsum Canyon Creek towards the heavily used intersection of East Santa Ana Canyon Road and Gypsum Canyon Road south of SR 91.
3. One road/channel crosses below the SR 241 Tollroad, a concrete box culvert that drains Blind Canyon. The BAER Team conducted a rapid reconnaissance of SR 241 in the Blind Canyon watershed to determine how the Blind Canyon Creek was routed through the highway fill. It appeared from the map and air photos that fill for the highway construction was placed in and blocked the Blind Canyon Creek. The BAER Team observed that a very large concrete box culvert was constructed under the highway. The BAER Team could not see the main upstream inlet and could not access the culvert outlet but estimated it to be approximately 20 feet wide and 15 feet tall. The main concern in Blind Canyon was the low water crossing below the SR 241 Bridge over Santiago Creek. This crossing poses great risk to those attempting to cross Blind Canyon Creek during and following storm events and during periods when the creek is flowing with high water.
4. A section of private road in the low gradient reach of Fremont Creek.
5. Three road crossings at the Irvine County Park. Two of those crossings, known as the Upper and Lower Arizona crossings, are concrete surfaced with several pipes and the surface is about 5 feet above the channel bed. There is a levee on the south side of Santiago Creek that has a paved trail on it. This trail will put trail users in close proximity to the floodplain during times when Santiago Creek is swollen with runoff. The channel at the westerly crossing is 200 feet wide and the BAER Team observed that 20 school children were using the crossing at the time of the BAER Team field visit. The BAER Team met with Michael Minianci, Supervisory Park Ranger, to discuss potential threats to the park from post-fire storm runoff. Ranger Minianci said that the park nature center is host to a student education program. The BAER Team told the Ranger that due to the amount of watershed the Sierra Fire burned over, higher than normal stream flows should be expected after heavy rainstorm events. Mr. Minianci said that when the river was running high due to storm events, the park was usually closed and they would call the schools and tell them not to come to the park. There is a third low water crossing just downstream of the Irvine County Park boundary. We were told by the Ranger Minianci that this a temporary crossing for construction traffic involved in building a Boy Scout Camp on Irvine Ranch property on the north side of the creek. When we visited the site we observed that both sides of the road crossing were strung with temporary plastic fencing.
6. The Nature Center Day Use Area near Santiago Creek, directly across where Fremont Creek enters Santiago Creek. There is a day use area with a gravel parking lot, several picnic tables, a “porta-potty” and an information kiosk on the south side of Santiago Creek at the confluence with Fremont Canyon

Creek. The site appears to be a staging area for the Fremont Canyon Wilderness area managed by the Nature Conservancy for Irvine Ranch. The printed information on the kiosk indicates that the site is operated by the Irvine Ranch. The Nature Conservancy conducts weekly docent-led hikes, monthly equestrian rides and mountain-bike outings in Fremont Canyon on weekends. Using this site during times of high runoff could pose a risk due to its proximity to the mouth of Fremont Canyon. Fremont Canyon burned at 81% high and moderate severity. This should have the greatest response of all the watersheds in the burn area for peak flow increases over normal. If debris and bedload are deposited at the channel mouth, they could cause the channel bottom to aggrade to the point where the flood terrace upon which the day use area sits is subject to flooding.

7. The Villa Park Dam flood control dam is 1.5 miles downstream from the Irvine County Park. The 118 foot high dam has a reservoir capacity of 15,600 acre-feet and a reservoir area of 480 acres. This structure has ample space to contain any post fire runoff and mitigate any potential hazards posed by the Sierra burn area. The BAER Team did not evaluate values at risk downstream of the Villa Park Dam. However, it was noted that the channel is confined by riparian vegetation and seems to be constricted by the Cannon Road crossing, 1.5 miles downstream from the Villa Park Dam. The area behind the flood control dam appears to see heavy use as a dispersed recreation site. The BAER Team observed several trails in the bottom of the impoundment that is used for equestrian, bicycle and foot traffic. The BAER Team recommends that users of this facility should be made aware that there is potential flooding from a rapid rise in water level should a flash flood roll down the Santiago Creek bed from the burn area.

In summary, users in the Fremont Canyon section of the Black Star Southern California Edison (SCE) Road face increased risk from rockfall and debris being washed onto the road during storm events. Forest users in Fremont Canyon face increased risk if caught in drainage channels and flood plains during high intensity rainstorms. Forest visitors and users of the off-forest land within and downstream of the Fremont Canyon Creek, Blind Canyon and Gypsum Canyon should be vigilant preceding, during, and following storms and evacuate high-risk areas such as floodplains, and the Fremont Canyon Wilderness Area. Debris flows in Fremont Canyon and other areas could potentially create temporary dams in drainage bottoms which, when they fill with water and then breach, can cause dangerous flood events downstream. The sites that pose the highest potential risk are those that are downstream of steep side canyons that drain high burn severity ridges. The access road from the Irvine County Park is low on the flood terrace and could potentially be at risk of washing out if the Santiago Creek channel were to erode the south bank.

Property

1. There are approximately 4 miles of affected roads on National Forest Service lands, including the North Main Divide Road. These roads are considered a government investment or asset and are needed for fire and other emergency vehicles, administrative, and recreational access. The North Main Divide Road is the only point of public motorized access for the northern-most portion of the Trabuco Ranger District. The section of the road that is in, and adjacent to, the burned area is approximately 3.5 miles in length. The North Main Divide Road provides access to Sierra Peak, which has been used for many years for industry, utility, and government two-way radio and microwave relay radio as a designated communication site. Thirteen leases are currently issued for electronic communication uses at this site. Sierra Peak serves the Los Angeles Ranally Metro Area (RMA) of "5,000,000 plus" for population reached from this site. This is the highest population category for communication sites. Vehicular access to this site is essential.
2. Over 25 miles of road are located on private lands and state lands, which fall under jurisdiction of Southern California Edison, California Department of Fish and Game, Irvine Ranch Land Trust (managed by The Nature Conservancy) and various other private parties.
3. The Irvine County Park is located downstream of the fire area along Santiago Creek and Santiago Reservoir is located downstream from a 106 acre area that had low to moderate burn severity. The Irvine County Park has constructed a levee to confine Santiago Creek on the north side of Santiago

Creek. The park is situated about 7,000 feet down channel from the confluence of Santiago Creek and Fremont Creek.

4. Southern California Edison's high voltage power line bifurcates the fire in a North-South direction parallel to and immediately outside the boundary of the Cleveland National Forest, and Metropolitan Water District's pipeline penetrates the area at the north end.
5. Two areas of geological/geotechnical concern were identified during the survey which relate to changed conditions as a result of the fires.
 - a. The first of these is located on North Main Divide Road on the west side of Sierra Peak. This area is characterized by sandstone terraces overlain by unconsolidated material and Holocene landslide deposits. Some of these slide features are quite evident upon panoramic visual inspection. The site is distinguished by SCE's high voltage powerline tower 361. Two pre-existing slides exist here. The first is located in the saddle immediately east of the tower knoll. North Main Divide Road bifurcates this feature, which appears to have moved recently (within the last year, probably following the period of intense rain of January or February of 2005). The second landslide feature is located on the north side of the tower 361 knoll. On February 16, 2006, Mark Marquette and Michelle Bearmar met with Jim Ruther, the roads manager from SCE, to discuss this site. Ruther indicated that SCE is well aware of the situation. After the heavy rains of 2005 a tension crack developed below the tower and extended approximately 150 feet to the west. Since its discovery geologists and engineers from SCE have been monitoring the feature. As a result of the fire, the monitoring system (wooden stakes and coated wire) is no longer functional. Additionally, the rains earlier in the year have all but sealed the eastern 110 feet of the crack. Below the tower is a large area (approximately 70 feet by 70 feet) which has failed and deposited rock and debris (silt, sand and boulders) approximately 150-200 feet below the failed slope.
 - b. The second area of concern was found in the drainage bottom of the middle section of Fremont Canyon. This property is owned by Irvine Ranch Land Trust and managed by The Nature Conservancy. The roads which pass through this section have been maintained by SCE as access roads for the power line towers. The slopes which leave this area are steep and the roads which wind down from them pass through the drainage bottom. Additionally at least 6 springs join the creek in this section of the canyon. The creek gradient here is approximately 7 percent and all roads – creek interfaces are native surface. This area burned with a moderate burn severity and the hill slopes above are void of vegetation and ground cover.
6. Several private in-holding parcels within the National Forest Boundary were visited in T4S, R7W, Section 7 SBMB. There were no permanent improvements on these parcels other than several graded pads and a burned and collapsed structure. All three sites had pre-existing drainage and water control problems and there was no evidence of road maintenance having been performed in a long time.

Loss of Control of Water

Due to the timing of the Sierra Fire in the middle of February it was determined that 60% of the average annual rainfall has already occurred. Based on a 5 year, 24 hour storm, it is expected that up to 110 cubic feet per second (cfs) per square mile of water will flow out of the fire area. The amount of runoff is expected to erode at least 15.6 tons per acre and generate at least 4,633 cubic yards/square mile of sediment in the first year after the fire. Sediment will be increased over 16 times over pre-fire conditions. The risk of loss of control of water is mostly to the roads in the area, both forest system roads and private roads. High runoff is expected to occur on the slopes above the roads and flow down the roads to the nearest water flow control point. This water flow is expected to exceed the existing over side drains on the roads and cause erosion of soil and fill material of the road that could lead to road damage and inaccessibility of the roads. Additionally, sediment and ash from the fire will deposit in other road drainage features, such as water bars and ditch lines.

Fremont Canyon and the reach of Santiago Creek canyon downstream of the confluence with Fremont Canyon Creek is expected to see a major increase in peak flow and flood frequency as a result of 81% of the watershed burning at high and moderate burn severity. The channel of Fremont Canyon Creek is expected to have severe deposition of flood debris about ¾ mile upstream from the canyon mouth and at the confluence with Santiago Creek. Gypsum Canyon mouth is blocked by road fill. This has high potential to divert runoff towards the intersection at East Santa Ana Canyon Road. It is expected there will be a flush of ash and a release of sediments that were stored in the watershed from the first storm runoff events.

The BAER Team conducted a rapid reconnaissance of SR 241 in the Blind Canyon watershed to determine how the Blind Canyon Creek was routed through the highway fill. It appeared from the map and air photos that fill for the highway construction was placed in and blocked the Blind Canyon Creek. The BAER Team observed that a very large concrete box culvert was constructed under the highway. The BAER Team could not see the main upstream inlet and could not access the culvert outlet but estimated it to be approximately 20 feet wide and 15 feet tall. The main concern in Blind Canyon was the low water crossing below the SR 241 Bridge over Santiago Creek. This crossing poses great risk to those attempting to cross Blind Canyon Creek during storm events and during periods when the creek is flowing with high water.

Hydrologic and Erosion Response

Rowe, Countryman, and Storey (1949) was used to model post-burn runoff and sediment yield. Table 1 summarizes the results. Note that Fremont watershed has the highest response and Blind has the second highest response. The burn severity, the modeled erosion and hydrologic response, coupled with a field assessment of downstream values warrant a **high level of concern relative to Fremont, Blind, and Gypsum watersheds**. Values at risk are primarily people traveling across road stream crossing points during storm events. See threats to human life and property above, as well as Notification of Threats below and Appendix A.

Table 1: Sediment Yield and Runoff Response by Watersheds (1st year)

Watershed	Total W/S acreage	% of High & Mod Burn	Erosion ¹ Ac-ft	Erosion ¹ t/ac	Erosion ² x Normal	Post-Fire ³ Runoff cfs/sq.mi.	Post-fire ³ Runoff x normal
Blind	1,560	39	9.8	10	9.5	68	1.7
Coal	1,473	16	3.8	4	3.8	48	1.2
Gypsum	3,573	27	15.5	7	6.7	60	1.5
Fremont	6,741	81	88.0	21	20	96	2.4
Santa Ana	175	2	*	*	*	*	*
Santiago	365	8.2	*	*	*	*	*
Total	13,887						

* Negligible response; the increase in background is not considered to be significant

¹ Annual Sediment yield from burned watershed

² Post-fire change in sediment yield above pre-burn level

³ Runoff response based on the 5 year storm event

Long Term Soil Productivity

Soils in the fire area are vulnerable to accelerated erosion compared to pre-fire conditions due to the lack of soil cover. There are 4,479 acres within the fire area that have high soil erosion hazard rating, 2,813 acres that have moderate soil erosion hazard rating and 3,292 acres that have low soil erosion hazard rating. These soils are very vulnerable to disturbance, especially on the existing fire lines that have been rehabilitated (water barred) through fire suppression rehabilitation/repair. Threats to soil productivity are more related to gully erosion that may occur on user-created OHV trails from numerous access points. An estimate of 150 acres may be directly affected by unrestricted vehicle incursion onto firelines surrounding

slopes. Also see OHV treatments below. If water bars are damaged by unauthorized vehicle use, severe erosion could occur in the form of rutting, rilling and gully erosion.

The erosion rates are thought to be within the natural range of variability for the fire-dependent soil chaparral ecosystem present. These systems do have a high natural rate of erosion which results in shallow soils and often eroded surfaces with cobble pavement. An estimated 56% of the burned area is hydrophobic; however much of this area is thought to be hydrophobic before the fire due to natural oils in the chaparral vegetation. High erosion hazard conditions will increase because of the loss of soil cover.

Increase in erosion rates will be highest in the Fremont watershed, particularly in the upper watershed on Forest Service lands. Vegetative re-growth is expected to stabilize the watershed to near pre-burn erosion rates within 7 years.

Vegetation and Botany

The major native plant communities within the fire area are Chaparral, Sycamore/Live Oak Riparian Woodland, and Tecate Cypress. The chaparral plant community includes Coastal Sage Scrub, Mixed Chaparral, and Chamise Chaparral.

The Sierra Peak area is identified as an "Area of High Ecological Significance" in the 'Southern California Mountains and Foothill Assessment' (Stephenson & Calcarone, 1999). This area is also a key part of an important habitat corridor between the Santa Ana Mountains and the Chino Hills (particularly for large carnivores such as mountain lions). Unique soils in this area support a number of rare plants, including a meta-population of the rare Tecate cypress (*Cupressus forbesii*), a Regional Forester's sensitive species, which occurs in the Sierra Peak and Gypsum Canyon area. Overly frequent fire is a threat to ecosystem stability in this area, specifically to the Tecate Cypress. Four sensitive plants are known to occur within the Sierra Fire area and all four of these plants are highly restricted in distribution. Braunton's milk-vetch (*Astragalus brauntonii*) is federally listed as Endangered by the U.S. Fish & Wildlife Service, but it only occurs on State and private lands within the fire area in lower Coal and Gypsum Canyons. The Heart-leaved pitcher sage (*Lepechinia cardiophylla*), a Regional Forester's sensitive species, occurs in the Sierra Peak and Gypsum Canyon areas and the Many-stemmed Dudleya (*Dudleya multicaulis*), a Regional Forester's sensitive species, occurs in the Sierra Peak area.

Known Heart-leaved pitcher sage and Many-stemmed dudleya populations within the fire perimeter on National Forest System lands were surveyed after the fire. Both populations of known Heart-leaved pitcher sage were unburned. However, the population just southwest of Sierra Peak has the potential to be impacted by erosion off a fire suppression dozer line put in tangentially on the southwest boundary of the population. The one population of Many-stemmed dudleya within the fire perimeter on National Forest lands is in an area of light burn severity and was not reviewed during this assessment. The population of Heart-leaved pitcher sage could be negatively influenced by erosion off the new dozer line. The known population of Many-stemmed dudleya should not be negatively affected by a light burn severity.

The Sierra Fire burned through and killed about 15% of this Coal Canyon grove of Tecate Cypress which is predominately on State and private land. Most of this area of the grove was 19 years old. The Green Fire, which burned in 2002 in Coal and Gypsum Canyon, burned almost the entire grove and the majority of the trees within the unburned portion of the grove are only 3 years old. A small (8 ft.) tree had abundant cones and should reproduce fine if not re-burned in the first 10 years after the fire. A small portion of the burned grove is located on Cleveland NF lands and had sparse trees which were 60 to 80 years old. This area should be monitored for reproductive success. As a precaution, seed could be collected now (the only time it is readily available) and broadcast within areas of insufficient seed fall. A small proportion of the seed collected could be grown out in pots for more intensive reforestation (if necessary) in this small area on National Forest land.

Most of the riparian vegetation within the Sierra Fire burned with low to moderate severity. All of these tree and shrub species re-sprout vigorously from roots after fire. Coast Live Oak is a fire-resistant tree that is usually not top-killed even by high-intensity fire. Live Oak re-sprouts from surviving crowns and trunks.

In the Sierra Fire, the chaparral that burned at high burn intensity was mostly Chamise chaparral in the upper eastern parts of the fire. Only one week after the Sierra Fire, sprouting of shrubs, growth of grass from rhizomes, and growth of bulbs was observed on burned chaparral areas. Vegetation recovery in the fire area is expected to take 7 years.

Noxious Weeds

During fire suppression activities, 1 drop point, 2 helispots, and approximately 25 miles of dozer lines were constructed or reestablished; these may serve as weed dispersal corridors and suppression equipment can act as weed vectors. Movement of fire suppression and rehab equipment can disperse and spread noxious weeds to and from areas within the fire and among home units. Dispersal of weeds from fire equipment movement poses a significant risk to the native plant post-fire regeneration. Roadsides and dozer lines will be most impacted by this threat.

Equipment tankers, engines, dozers, and excavators were not washed or inspected for dirt/plant parts on the way into the fire during suppression and rehabilitation efforts. Because of this, The BEAR Team had no way of knowing if invasive noxious weed seeds were introduced to roadsides and dozer lines within the fire area or along the perimeter.

No invasive noxious weed populations were found by the BAER Team within the burn area or along the access roads outside of the burn area. Existing weed populations could have been present within the burned area but, because of the time of year (mid-winter) and the recent fire, evidence was not easily observable.

If any weeds were introduced, they could take advantage of the disturbance associated with the fire and displace native vegetation, degrade habitat function, lower ecosystem stability.

Coastal Sage Scrub and Grassland habitats could be degraded by Artichoke Thistle.

Chaparral, Grassland, and Tecate Cypress habitats could be displaced by Yellow Star Thistle.

Riparian Woodland habitat could be destabilized by Giant Reed Grass.

The unknowing introduction of invasive noxious weeds into areas disturbed by fire suppression and rehabilitation has the potential to establish persistent weed populations which, in turn, could affect the structure and habitat function of plant communities within the burn area. Consequently, monitoring of roads, dozer lines, and staging areas is necessary to detect the spread and introduction of weeds in the first year after fire. Monitoring the establishment of weeds, and immediately hand-removing any plants, will prevent the weeds from becoming serious threats to the recovery of native plants.

Heritage/Cultural Resources

There are at least 22 prehistoric sites, 75 isolates and 1 historic lookout within or adjacent to the burn area. Three of the 22 prehistoric sites were adjacent to two suppression lines. None of the sites adjacent to the suppression lines were affected. An intuitive pedestrian survey was conducted of the suppression lines and no new heritage sites were observed. Two new heritage resources were recorded within the burn area and include a historic coal mine on private land and a prehistoric camp on Irvine Company land. The fire should not have significantly affected any of the heritage values within the burn area. This area has been burned within the last 35 years; therefore any damage due to a fire event has already occurred. The true risk to the sites is the increase in access due to the removal of the vegetation. Generally, most of these sites were difficult to access due to heavy vegetation; however, now that the vegetation has been removed, access to the sites is relatively easy. Therefore, the result of the fire is that the heritage resources are more vulnerable to looting and being driven over by off highway vehicles.

Recreation – Off Highway Vehicle (OHV)

The Sierra Fire has created several mechanized vehicle management issues. It has caused natural areas adjacent to roads to become accessible. Vegetation along roadways in most areas, prior to the Sierra Fire, was too dense to allow mechanized travel in undesignated areas. After the Sierra Fire, large denuded areas have become extremely accessible. In addition, hand-lines and dozer-lines that were connected to roads as part of the suppression efforts are now visible and accessible.

Following fire suppression rehabilitation/repair, hand and dozer lines allow for proper drainage that prevents sedimentation and accelerated erosion. However, they are not designed to support mechanized vehicular use. When wheeled visitors use these suppression lines as routes of travel, the drainage features become damaged and no longer function properly. This leads to compaction, sedimentation, and accelerated erosion. This problem is magnified because additional “social trails” tend to be pioneered as spurs off of the suppression lines, creating a vast system of unauthorized, poorly constructed trails.

Use by wheeled visitors on new routes or fuel breaks promote many problems. “Social trails” tend to travel straight to their destination point, often traversing along ridgelines and straight down the fall line of slopes causing adverse impacts to sensitive habitat areas, causing soil erosion, causing fragmentation and destruction of sensitive habitat, and disturbing and/or damaging cultural resource sites. Once social trails are created they require many years of non-use or rehabilitation before the areas are restored.

The fire has opened access to populations of Heart-leaved pitcher sage. If access is not controlled, this population will suffer direct damage to individual plants, and degradation of the soil resource that the plants depend on.

Cultural resources are also present in the burned area. If access to these areas is not controlled, the heritage resources will be more susceptible to trampling and looting.

B. Emergency Treatment Narrative and Objectives:

Because the majority of the high severity burn area is inaccessible and on slopes exceeding 60%, most of the burned area is too steep and or rocky to meet the site selection criteria for hillslope treatments and is therefore untreatable. BAER hillslope treatments are not effective or proven on slopes steeper than 60%. Unfortunately, these are the steep slopes that are most prone to slope failure. Hillslope treatments are generally not proposed on moderate burn severity lands for a combination of reasons such as the quick vegetative response in shrub communities.

Notification of Threats

The BEAR Team recommended contacting representatives of government agencies responsible for emergency response, land managers such as Irvine Ranch, Irvine Regional Park, Nature Conservancy and other affected parties describing the potential risk posed by post-fire runoff from the Sierra Fire. The BAER Team also recommended that a thorough search of property owners within the fire area and downstream to the Villa Park Dam flood control dam be conducted and these property owners should be contacted. Contacts will be at least by telephone and followed up with a letter and a copy of the BAER report, as well as an on-site meeting wherever possible. See Appendix A for a list of contact persons. In addition, the BAER Team recommended that representatives of SR 241 be contacted and sent a copy of the BAER, recommending that their engineers evaluate water control structures for Blind Canyon to handle the flows expected out of Blind Canyon.

Line Officers on the Cleveland will be meeting with the various property owners and agency representatives in the immediate future.

Road Treatments

Restore drainage function to 4.0 miles of National Forest System road for this winter's rainfall season. This includes: cleaning culverts and catch-basins, ditch lines, and clearing vegetation blocking drainage ways; grade road to drain properly; make the existing drainage facilities and features as effective as possible to handle the anticipated post-burn flows. This proposed treatment will ensure that these roads remain passable for the remainder of this winter for access to the Sierra Peak communication site. If additional treatments or road maintenance are needed following this winter's rains but prior to next winter's storms, an Interim FS 2500-8 will be prepared at a future date.

The effectiveness of this treatment will lead to a positive cost benefit in the form of reduced maintenance needs. The potential impact of moderate rainfall damage would exceed this treatment's expense.

1. Install 18" overside drains, 11 each as staked by the BAER Team road specialist. The effectiveness of this treatment will lead to a positive cost benefit. Example: A road slump of 50 cubic yards could cost \$42.00 per cubic yard to replace. This would be more than double the cost of this treatment.
2. Install 2 each warning signs (North Main Divide Road). This is mainly a safety issue for the public, permittees, and administrative personnel. The "no action" option would not be in the public interest.
3. Storm patrol. Includes pre-storm closure and post-storm assessment. The effectiveness of this treatment will lead to a positive cost benefit in the form of reduced maintenance needs. The wet native surface of this road is easily damaged by vehicle traffic. Additional maintenance expense would be required after each storm event to bring the road back to its intended standard.
4. Close roads immediately before, during and up to 3 days after a storm in order for the high clay content native surface roads to dry adequately.

The total cost of this treatment is **\$42,517**

The following treatments are recommended for roads on private and other lands (and will be addressed with downstream landowners and agency administrators).

1. Restore drainage function
2. Install rolling dips
3. Install rolling dips with lead-off ditches
4. Install 18" over side drains
5. Repair and re-install over side drains
6. Install rip rap as energy dissipaters on existing over side drains
7. Install flared (metal) end section on culverts
8. Install gates
9. Install signs, warning or information
10. Storm patrol, including pre-storm closure and post-storm assessment.

Off Highway Vehicle Control Treatments

Alternative "A" – Combination of barriers, visual screening, and patrolling

The treatments listed below are intended to be implemented concurrently. They are not to be interpreted as stand-alone options. The following 5 treatments are recommended to deal with unauthorized OHV use that would lead to soil erosion and watershed deterioration, damage to sensitive habitat and damage to cultural resources.

1. Installation of gates at strategic locations

Treatment Objective: Gates will serve to prevent access to seldom used roads, therefore, reducing linear miles of potential off-road access and minimizing patrol areas.

Treatment Description: Construct and install gates at locations designated by the Forest. This would include temporarily gating off the northern portion of the North Main Divide Road near its junction with Skyline Drive until treatments have been satisfactorily incorporated. Gate design will meet specifications and drawings supplied by the Forest Service, and is the standard used by the Cleveland National Forest for areas subject to vandalism.

Treatment Cost: \$5,200 x 8 gates = **\$41,600**

2. Installation of pipe barriers at specific locations

Treatment Objective: Pipe barriers will prevent motorized access to accessible suppression lines and burned areas.

Treatment Description: Construct and install pipe barriers at locations designated by the Forest Service. Pipe barrier design will meet specifications and drawings supplied by the Forest Service, and is the standard used by the Cleveland National Forest for areas subject to unauthorized motorized access.

Treatment Cost: **\$109,300**

3. Piling of brush at visible access points

Treatment Objective: Piling of brush at visible access points will reduce the temptation to access suppression lines. The brush will hide potential points of entry, and will make overland access undesirable or difficult.

Treatment Description: Brush will be piled at visible terminal ends of suppression lines where they are accessible by vehicles, both motorized and non-motorized. It will be piled to the density and length prescribed by the Forest Service and will be sufficient to substantially reduce suppression line visibility and access.

Treatment Cost: **\$7,940**

4. Installation of signs

Treatment Objective: Signing will notify the public of closed and sensitive areas. If a Law Enforcement Officer issues a violation notice, signing will give the Officer better standing in court.

Treatment Description: Carsonite signs will be posted at most locations where pipe barriers are placed, except for those locations where the piping supplements gates. The signs will state that the area is sensitive and/or closed. One sign will be placed at each location where piping exists. In locations that more than 50 feet of piping is placed, signs will be posted with an approximate spacing of 50 feet between each sign. Topography and visibility will also be used to determine appropriate sign locations.

Treatment Cost: **\$4,500**

5. Additional monitoring/enforcement patrols

Treatment Objective: Additional monitoring/enforcement patrols will deter potential entry to the burned area and will provide the Forest Service with immediate knowledge of breached areas, resource damage, and needed repairs.

Treatment Description: Provide monitoring/enforcement patrol for treatment area 2.5 days (20 hours) per week. This would likely consist of several patrol passes on weekends and occasional patrols on weekdays. Patrols would likely be performed by a Forest Protection Officer or a Law Enforcement Officer. The patroller will document problem areas and recommend corrective actions.

Treatment Cost: **\$33,150**

The total for concurrent implementation of all treatments is **\$195,365**

Effectiveness for Alternative “A” is expected up to 90% since this is a 24 hour per day, 7 day per week (barriers plus patrolling) treatment option. Based on the Forest’s experience with treatments following the Cedar and Paradise fires of October/November 2003, the pipe barriers (which were not visually intrusive) effectively fulfilled the need for making areas inaccessible to vehicles, were not prone to vandalism (an important factor in the urban interface of southern California), and allowed natural regeneration on burned areas. Because of the large number of public entering the Forest within the urban interface, patrols also served a purpose for providing a conservation education opportunity, in addition to warnings on user behavior.

Alternative “B” – Patrolling only

10 Hours per Day Hour Monitoring/Enforcement Patrols

Treatment Objective: Monitoring/enforcement patrols will deter potential violators and assist in their detainment; and will provide the Forest Service with immediate knowledge of breeched areas, resource damage, and needed repairs.

Treatment Description: Provide monitoring/enforcement patrol for treatment area 7 days per week, 10 hours per day. This would consist of full time patrol everyday. Patrols would likely be performed by a Forest Protection Officer or a Law Enforcement Officer. The patroller will document problem areas and recommend corrective actions.

Treatment Cost: **\$110,362.50 per year for up to three years**

Effectiveness for Alternative “B” is expected to be no more than 40%, since the area will be vulnerable for 16 hours per day (2 hours would be considered travel to, and from, the site).

Ecosystem Stability and Sustainability

Sensitive Plants

Treatment Type: Plant monitoring of one population of Heart-leaved pitcher sage

Treatment Objective: Determine any possible slope or erosion effects between the existing plant population and the areas of waterbarred suppression dozer line.

Treatment Description: Botanist survey focusing on individual plants and the soil resource.

Treatment Cost: Total **\$350** (1 GS-11 Botanist for One Day + Vehicle). A supplemental BAER request could be filed if negative effects are documented and emergency treatments are feasible and necessary.

Tecate Cypress

Treatment Type: Seed collection and broadcast

Treatment Objective: Insure the stability and reestablishment of a unique sensitive plant species which has been affected by repeated fires.

Treatment Description: Collect tecate cypress cones and seeds within the next 2 weeks and broadcast them on areas of insufficient seed rain, within the historic population boundaries. This emergency treatment is only proposed for the small portion of the grove of Cleveland NF land which is approximately 4 acres in size. The work would be conducted by a certified silviculturist (none are currently on the Cleveland National Forest) to collect cones, prepare a prescription, and document stand record information. A supplemental BAER request may be filed for treatment efficacy monitoring in FY 2007. Reforestation activities would be accomplished with non-BAER funds.

Treatment Cost: Total **\$3,000** (certified silviculturist, 5 days including travel)

Noxious Weeds

Treatment Type: Surveying roads and dozer lines for evidence of noxious weeds and the removal of any small infestations.

Treatment Objective: Evaluate and eliminate the potential for noxious invasive weed establishment and spread, as a result of fire.

Treatment Description: Inspect and monitor for newly established weed occurrences. Monitoring will include documentation and hand pulling small new weed occurrences at the time of inspection, and subsequent entry into the FACTS database. New weed occurrences will be pulled to root depth, placed in sealed plastics bags, and properly disposed. See specialist report for more details.

Inspections and monitoring will be once during May/June 2006. If any plants are found and treated based upon the first year's survey, additional funds for continued survey and treatment may be requested in the future. BAER funding is only requested for the first year after the fire. If no plants are found during the first year, no funds would be requested in BAER for the second year or beyond.

Treatment Cost: Total **\$ 3,000** (2 GS-05's for One Week + Vehicle)

C. Probability of Completing Treatment Prior to First Major Damage-Producing Storm:

Roads **0 %** OHV Access Control **100 %** Ecosystem Stability **100 %**

D. Probability of Treatment Success

Treatment	Years after Treatment		
	1	3	5
Noxious Weed Control	90	90	90
Collect and Redistribute Tecate Cypress Seed	75	95	95
Roads	70	80	100
OHV Control	90	90	90

E. Cost of No-Action (Including Loss):

Road treatments - \$107,100 to repair roads plus lost access to Sierra Peak Communication Site, which could affect function of communication site. This includes \$23,000 to repair 11 overside drains and 40 additional fill failures on 4 miles of road. Assume for each site that a 50 cubic yard road failure will occur at each of site. The cost to repair each site would be \$42 per yd³ X 50 yd³ X 51 sites.

OHV Control Treatment - \$145,000 to repair up to 12 miles of unauthorized OHV trail. Includes site preparation and straw mulch of gully erosion and damage caused by unauthorized OHV use. \$196,000 to implement current recommendations to prevent further degradation.

F. Cost of Selected Alternative (Including Loss):

\$290,017.00

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	<input checked="" type="checkbox"/> Soils	<input checked="" type="checkbox"/> Geology	<input type="checkbox"/> Range	<input checked="" type="checkbox"/> Recreation
<input type="checkbox"/> Forestry	<input type="checkbox"/> Wildlife	<input type="checkbox"/> Fire Mgmt.	<input checked="" type="checkbox"/> Engineering	<input type="checkbox"/>
<input type="checkbox"/> Contracting	<input type="checkbox"/> Ecology	<input checked="" type="checkbox"/> Botany	<input checked="" type="checkbox"/> Archaeology	<input type="checkbox"/>
<input type="checkbox"/> Fisheries	<input type="checkbox"/> Research	<input type="checkbox"/> Landscape Arch	<input checked="" type="checkbox"/> GIS	

Team Leader: Alan J. Gallegos

Email: ajgallegos@fs.fed.us

Phone: 559-297-0706 ext. 4862

FAX: 559-294-4809

Cleveland National Forest Contact:

Bernice Bigelow, bbigelow@fs.fed.us; phone 858-674-2919; fax 858-673-6192

H. Treatment Narrative: See above

I. Monitoring Narrative:

Monitoring will need to be conducted to find and prevent newly established weed occurrences. Monitoring will include documentation and hand pulling small new weed occurrences at the time of inspection. New weeds occurrence will be pulled to root depth, placed in sealed plastic bags and properly disposed.

Documentation of new infestations will include:

1. GPS negative and positive inspection results
2. Incorporate data into FACTS and GIS spatial databases
3. Establish photo points
4. Map perimeter of new infestations
5. Estimate number of plants per square meter
6. Treatment method
7. Dates of treatment
8. Evaluate success in subsequent inspection

Inspections and monitoring will be once during May/June 2006. Based upon the first years survey, additional surveying may be requested for up to three years.

Part VI – Emergency Rehabilitation Treatments and Source of Funds by Land Ownership

Sierra BAER Treatment Costs - Forest Service Land

Treatment	Unit	Quantity	Unit Cost	Total
Road				
Restore Drainage Function	Mile	4	\$1,017.00	\$4,068.00
Install 18" Over-side Drains	Each	11	\$1,021.00	\$11,231.00
Install riprap on existing OSD	Each	14	\$42.00	\$588.00
Warning Signs 48x96	Each	2	\$715.00	\$1,430.00
Information Signs 18x12	Each	0	\$293.00	\$0.00
Storm Patrol	Storm	7	\$3,600.00	\$25,200.00
			Subtotal	\$42,517.00
OHV				
OHV Piping	Linear Feet	4,327	\$25.00	\$108,175.00
Gates	Each	8	\$5,200.00	\$41,600.00
Pile Brush	Square Feet	19850	\$400/1000 sq ft	\$7,940.00
Carsonite signs	Each	90	\$50.00	\$4,500.00
Monitoring days	day	130	\$218.00	\$33,150.00
			Subtotal	\$195,195.00
Ecosystem Sustainability				
Sensitive Species				
Heart-leaved Pitcher Sage	day	1	\$350.00	\$350.00
Tecate Cypress Cone Collection	day	5	\$600.00	\$3,000.00
Noxious Weeds				
Monitoring	day	15	\$200.00	\$3,000.00
			Subtotal	\$6,350.00
BAER Assessment Cost				
Salary time				\$27,440.00
Travel expenses				\$5,152.00
			Subtotal	\$32,592.00
BAER Implementation				
BAER Implementation Coordinator				\$10,000.00
			Subtotal	\$10,000.00
Total Cost				\$286,824.00

PART VII - APPROVALS

1. /s/ Tina J. Terrell 2/23/06
Forest Supervisor (signature) Date

2. /s/ Marlene Finley (for) 3/1/06
Regional Forester (signature) Date

Appendix A – List of Contacts for BAER Report

Richard Halsey

Director/Fire Ecology
The California Chaparral Field Institute
P O Box 545
Escondido, CA 92033
(760) 822-0029 (o)
(760) 746-0025

Alissa Ing or Ken Kietzer

Inland Empire District State Park
17801 Lake Paris Dr.
Paris, CA 92571
(951) 940-5617 (o)
(619) 548-5441 (c)

Trish Smith

Mellisa Baynes
The Nature Conservancy
1400 Quail St. Suite 130
Newport Beach, CA 92660
(714) 832-5435 (o)
(714) 955-2810 (c)

Brian Sheldon

Preserve Manager
California Department of Fish & Game
(949) 285-3448 (o)
(949) 640-9958 (c)

George Ewan

Orange County Fire Authority
1 Fire Authority Rd.
Irvine, CA 92602
(714) 573-6059

Rich Benites

Orange County Flood Control Division
(714) 567-6306
P.O. Box 4048
Santa Ana, CA 92702-4048

Michael Miniaci

Irvine County Park
Irvine Regional Park
1 Irvine Park Road
Orange, CA 92862

Jim Ruther

Southern California Edison
1444 E. McFadden Ave, Bldg. D
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Santa Ana, CA 92711-1982

John Graves

Irvine Ranch Land Reserve Trust
320 Commerce DR
Suite 150
Irvine, CA 92602
(714) 508-4752

Bob Hewitt

USDA-NRCS
(951) 654-7139 (office)
(951) 961-8131 (cell)

Dave Heilig

USAD-NRCS
(951) 684-3722 x 102

Pat Brennan

Environment Reporter, The Orange County
Register
625 N. Grand Ave.
Santa Ana, CA 92701
pbrennan@notes.freedom.com
(714) 796-7865

SR Tollroad 241 Contact - A contact was not made and should be made to inform them of our assessment and recommend that their engineers evaluate their water control structures for Blind Canyon.

All private property owners within the fire perimeter and downstream to the Villa Park Dam flood control dam.