

Date of Report: September 15, 2008

BURNED-AREA REPORT

(Reference FSH 2509.13)

PART I - TYPE OF REQUEST**A. Type of Report**

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

B. Type of Action

- ☐ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
☒ 2. **Interim Report # 3 AMENDS INTERIM #3 DATED SEPTEMBER 3, 2008**
☐ 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)

Item	Cost	Comment
Cost over-run for approved road work	\$68,892	The actual cost of force account work to clean ditches, install dips, and reconstruct driveable roadbed for Harding Truck Trail and Maple Springs Road exceeded the estimated in the Initial 2500-8. This overrun plus the cribwall commitment left a balance of -\$31,702. Authorized line items that were not completed but were unfunded by the overrun were shutdown pending this interim request - the main item was hydromulch monitoring but also small amounts in other authorized line items.
Replace 2 burned retaining walls- Harding Truck Trail	\$60,000	Additional funds needed to complete approved treatment to replace burned retaining walls. The commitment is \$150,690, which is \$36,940 more than the original estimate. The retaining walls estimated in the BAER assessment were based upon round figures per face square foot of wall. The Forest subsequently did a topographic site survey, digital terrain model of the wall sites, geotechnical site investigation and wall design by our Geotechnical Engineer. The actual design needed is slightly larger and more complicated than visualized during the assessment. In addition, the CO's use of 8a contractor is expected to significantly exceed the Engineer's estimate (commitment). The contract needs to be awarded before the end of the fiscal year as it also contains emergency supplemental funding that does not carry over. The Forest is asking for additional authorization sufficient to award the contract.
Total	\$128,892	

PART II - BURNED-AREA DESCRIPTION

- A. Fire Name: Santiago
- B. Fire Number: CA-ORC-068555
- C. State: CA
- D. County: Orange
- E. Region: 05
- F. Forest: Cleveland NF
- G. District: Trabuco
- H. Date Fire Started: October 21, 2007
- I. Date Fire Contained: November 8, 2007
- J. Suppression Cost: \$21,625,000
- K. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): 23
 2. Fireline seeded (miles): 0
 3. Other (identify): 0
- L. Watershed Number: 1807020309
- M. Total Acres Burned: 28,476
NFS Acres (**6,701**) Other Federal () State () Private (21,775)
- N. Vegetation Types:
- Sycamore-Alder-Live Oak Riparian Woodland
 - Chaparral (Coastal Sage Scrub, Xeric, Mesic)
 - Canyon Live Oak Forest
 - Coulter Pine Woodland
 - Big-Cone Douglas-fir Forest
- O. Dominant Soils: Exchequer gravelly silt loam, Blasingame loam, Anaheim clay Loam, Less sloping soil
- P. Geologic Types: Mesozoic to Quaternary sedimentary, volcanic, and shallow intrusive rocks
- Q. Miles of Stream Channels by Order or Class:
- Order 1: 21.8 miles
- Order 2: 12.2 miles
- Order 3: 6.4 miles
- R. Transportation System (Forest Service)
- Trails: 7 miles Roads: 8 miles

PART III - WATERSHED CONDITION

- A. Burn Severity (acres)
- | | | |
|--------------------------|------------------|--------------|
| Entire burn 11,700 (low) | 8,184 (moderate) | 1,799 (high) |
|--------------------------|------------------|--------------|

East end of fire-includes 6660 acres of N.F. & 4594 acres of surrounding lands
4,788 (low) 5,047 (moderate) 1,419 (high)

B. Water-Repellent Soil (acres): 6,281 entire fire; 2,120 N.F lands

C. Soil Erosion Hazard Rating (acres):

- | | |
|-----------------------|--------|
| i. Entire Fire: | |
| 1. Low | 6,098 |
| 2. Moderate | 10,171 |
| 3. High | 12,207 |
| ii. Forest land only: | |
| 1. Low | 35 |
| 2. Moderate | 17 |
| 3. High | 6,648 |

E. Erosion Potential: 33.7 tons/acre

E. Sediment Potential: 17,920 cubic yards / square mile (East end of fire - Forest and surrounding area)

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years):	<u>3</u>
B. Design Chance of Success, (percent):	<u>70</u>
C. Equivalent Design Recurrence Interval, (years):	<u>10</u>
D. Design Storm Duration, (hours):	<u>6</u>
E. Design Storm Magnitude, (inches):	<u>3.9</u>
F. Design Flow, (cubic feet / second/ square mile):	<u>175</u>
G. Estimated Reduction in Infiltration, (percent):	<u>22</u>
H. Adjusted Design Flow, (cfs per square mile):	743

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats

Approximately 6660 acres of Forest Service land and 4594 acres of surrounding area on the east end of the fire were burned. The fire completely burned off all effective cover on the majority of the burned area with the exception of the riparian areas in the bottom of the larger drainages. While soil burn severity was moderate, watershed response to precipitation events is expected to be high over nearly all of the fire area due to loss of cover on steep slopes. Most of the burned area on Forest Service land area has steep slopes ranging from 30 percent to over 100 percent. The area is geologically unstable and mass wasting potential is moderate to high. The potential for increased flows leading to flooding and debris flows is high. Runoff and sediment yield is expected to increase substantially. There will be no effective storage of ash or sediment on slope if materials are entrained and mobilized during runoff events. Vegetation is expected to re-sprout in the majority of the burned area, with expected effective cover re-established within a 3 year period.

Near the Forest Service boundary there are hundreds of homes plus community infrastructure at risk should a storm of any significance, rain on the burned area. On November 30, 2007, between 7 am and 5 pm 1.54

inches of rain fell, as a result minor slides occurred resulting in a foot to one and one half feet of material being deposited at the base of two homes situated below Forest Service System land. At 15:00 on November 30, 2007 a mandatory evacuation was ordered for both Modjeska and Silverado Canyons. This evacuation order was lifted at 7:00 am December 1, 2007. More rain is expected December 1, 2007. A drying and warming trend is predicted for the following week. The recent slides demonstrate the need to get the land treatment implemented expeditiously.

During subsequent patrols of the incident it was determined another threat to human life and property exist. It results from a large downed oak tree and some heavy metal debris that is perched upslope of a home. These items need to be removed to prevent them from sliding downslope into the residence.

The Trabuco Ranger District currently maintains a temporary RAWS station on the ridge between Harding and Silverado Canyon. It has been determined that this station can collect important precipitation data that can be used to provide information that will reduce the risk to the residents living below Forest Service land and support the early warning system being instituted by the County.

Soil Burn Severity

The Forest Service BAER team was tasked to analyze the east end of the fire (approximately 11, 254 acres east of Santiago Canyon Road). Soil burn severity was determined to be 42% low, 45% moderate, and 13% high within the East end of fire (National Forest Service lands and surrounding area). The moderate and high areas of the burn are expected to have a high hydrologic response. Approximately 58% of the area the BAER team analyzed will produce high runoff and sediment yield.

Hydrologic and Erosion Response

Because so much of the burn area is located upslope from the communities in Silverado, Modjeska, Williams and Trabuco, smaller sub-watersheds were delineated to better assess the hazards to these communities. Hydrologic response, relative to downstream values at risk, is most extreme in Harding, Modjeska, Pine, Halfway and Williams Canyons. Post-fire change in peak flows ranges from 4 to 8 times pre-fire flows for the 2-year storm. Sediment yield increases substantially from 11 to 22 times pre fire conditions in the above sub-watersheds. Sediment yield is most extreme in Harding and Modjeska Canyons. The community of Modjeska is located at the mouth of these canyons and is at risk. Post-fire sediment yield is estimated to be 58 acre-feet in Harding Canyon (19 x background) and 56 ac-feet in Modjeska Canyon (12 x background).

Threat to Life

The sites listed below are mostly residential areas that are located directly downstream and downhill of burned forest lands, or roads which are located on forest lands. Lives are potentially at risk in homes that are located in flood prone and debris flow prone areas, or on roads where flash flooding may cause washouts, loss of road structures and control of water.

LOCATION	Hazard & Values at Risk
Modjeska Canyon	Flooding, Debris Flows & Rock Fall Homes along main drainage, below smaller tributaries and below burned slopes. Several bridges. Roads
Harding Canyon	Flooding and Debris Flows Modjeska Reservoir (currently filled with sediment) and the dam. Pipeline from dam to water system. Homes along main drainage, below smaller tributaries and below burned slopes. Several bridges. Roads
Williams Creek	Flooding and Debris Flows Homes, roads and bridges along main drainage.
Silverado Canyon	Flooding and Debris Flows Homes along tributaries to Silverado Creek. Bridges over main channel.
Pine Canyon	Flooding and Debris Flows Homes at bottom of drainage. Bridges Water Quality at Blue Light Mine
Half Way Canyon	Flooding and Debris Flows Homes at bottom of drainage. Bridges.
Live Oak Canyon	Flooding, Debris Flows, and gully erosion from OHV trail Homes below Forest Service land.
Miscellaneous Unnamed Drainages	Flooding, Debris Flows & Rock Fall Homes below smaller tributaries and below burned slopes. Several bridges. Roads

Threat to Property

Forest Road System – The National Forest terrain within the burn is steep and much is considered unstable. The fire stripped area of ground cover and vegetation. This is expected to result in increased, more flashy runoff; down slope movement of ash and sediments; and rock fall. Approximately 60% of the burn within the National Forest boundaries is mapped as moderate to high burn severity. This combined with steep slopes are expected to intensify the runoff response. The road and managed trail systems are identified as values at risk. Numerous locations on the road system are at high risk of loss of function and/or are likely to degrade adjacent resources and add to amount of sediment flowing out of the watersheds. Road drainage facilities need to be prepared to accommodate increased post-fire flows where high and moderate burn severity occurred above roads. Two large road fills supported by wood structures have burned out completely.

The interim #3 report was submitted to cover over runs for the road work. Santiago road work costs are approximately \$128,892 over the estimated costs, largely due to unforeseen storm damage that caused more work and higher costs and in some cases forced the need to do work twice due to storm damage (e.g. blown out endwall). This interim requests funds to cover the additional costs associated with authorized restoration of road drainage, intercepting dips (road), and armored crossing. Funding is also requested to award the construction of the authorized replacements for two burned retaining walls as the actual design needed is more complicated than anticipated during the original assessment.

Most of the costs are associated with road work on Harding Truck Trail which provides important administrative access. This route is one of two roads that traverse from Orange County up to major telecommunication sites providing emergency services communication and is frequently used by those maintaining the facilities. The other road, Maple Springs, is not a reliable route due to seasonal closure (T&E species) and road failure. Harding Truck Trail also serves as a potential emergency exit for the community living in Modejska Canyon. Although currently under fire closure order, the road is popular with the public for hiking, mountain biking and horseback riding.

Trails – Seven miles of trail were burned. Numerous locations on the trail system are at high risk of loss of function and/or are likely to degrade adjacent resources. Lack of vegetative cover on slopes above the trails will result in excessive runoff of water causing severe erosion and damage to drainages that the trails cross.

This will also result in added sediment input to local drainages. Trail drainage facilities need to be prepared to accommodate increased post-fire flows where high and moderate burn severity occurred above roads.

Homes below Forest Service land – Numerous residences in various areas of the burn are below Forest Service land. There is potential for rock fall and sheet wash with soil and ash along with flooding from small ephemeral drainages onto the houses. On November 30, 2007 between the hours of 7:00 am and 5:00 pm there was 1.54 inches of rainfall. Minor slides occurred resulting in a foot to one and one half feet of material being deposited at the base of two homes.

The interim #1 report was submitted to cover over runs for the aerial mulch contract. Several factors had increased the cost per acre for the aerial hydromulch on Santiago versus those costs of \$3,500 dollars an acre from the Angora which were initially used for our estimate.

1. For the contract estimate we expected an airport 9 miles away could be used. It was determined the closest available airport for fixed wing aircraft is 15 miles. This increases the time necessary to apply the material, and the associated costs of fuel and pilot time.
2. Water for the hydromulch mix is more expensive in Southern California.
3. Forest Service overhead administration costs increased because the length of time needed to complete is 24 days (best weather possible and no down days) vs. the 15 days it took to implement Angora. All the FS personnel were local on the Angora incident -- For the Santiago much of the personnel are from off forest so there are the added costs for lodging, per diem, car rentals, computer rentals, etc.

The WO approved a total of \$4,343,500 for the aerial hydromulch treatment. The approval letter is attached. The Region requested and received an additional \$775,600, in order to award the contract and cover the additional overhead cost. The \$775,600 includes \$540,600 in contract bid overrun and \$235,000 for FS overhead and administration.

Mary Moore (aerial mulch implementation lead), who reviewed the bid, said the contractor's bid (the same contractor used on the Angora incident) was reasonable. Bid prices for line item such as lodging were comparable to those from the Angora fire. The additional cost over run is due to greater flight distance and the associated costs.

The \$5000 estimated cost of the removal of the large downed oak tree and heavy metal debris that is perched upslope of a home was also requested. Removal of these items will insure they will not be transported from Forest Service land downslope into a home.

Finally the Forest requested \$3,500 for personnel cost to maintain then dismantle the RAWS station. Cost is estimated at \$800 dollars a year for three years for maintenance for a total of \$2,400. Travel, per diem and personnel cost to dismantle the station in year three are estimated to cost \$1,100.

Total interim #1 request was \$783,600.

Loss or Degradation of Significant Resources

Water Quality – Irvine Lake (aka Santiago Reservoir), a major water supply facility for the City of Irvine about four miles downstream of the national forest, will experience increased sedimentation and some loss of storage and turbidity during peak runoff events. Irvine Ranch Water District will likely incur additional near-term water treatment costs due to post-fire inputs of sediment, ash and nutrients.

Noxious Weeds – There is a substantial risk of introduction of noxious weeds from the dozer lines due to unwashed equipment, and the risk of expansion of the known invasive weed populations within the fire area.

Recreation – There is an extremely high risk of unauthorized OHV activity following the fire. Unauthorized OHV activity will greatly disturb the natural landscape, visual quality, recreational opportunity expectations of forest users, and the ability of the vegetation to regenerate. Past experience shows administrative closures are ineffective in preventing unauthorized OHV activity. The Santiago Fire is adjacent to highly urbanized areas

with an extremely large number of OHV users in the area. Physical barriers plus signage and OHV regulation enforcement by patrol personnel are the only proven effective methods of reducing unauthorized OHV activity.

B. Emergency Treatment Objectives:

- 1) Prevent loss of life and risk to human safety.
- 2) Reduce threat to property on Forest Roads.
- 3) Reduce risk of degradation of significant natural resources, especially T&E plants and the potential spread of noxious weeds, and erosion and loss of landscape integrity by unauthorized OHV activity.

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

Land 80 % Channel NA % Roads 80 % Other NA %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	70	70	70
Channel	NA	NA	NA
Roads	90	100	100
Other			

E. Cost of No-Action (Including Loss): \$30,000,000+

F. Cost of Selected Alternative (Including Loss): \$15,000,000

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 type="checkbox"/>
<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: Randy Westmoreland

Email: rwestmoreland@fs.fed.us

Phone: 530-587-3558

FAX:

H. Treatment Narrative:

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments:

Aerial Hydromulching – A wood and paper mulch matrix with a non water-soluble binder will be applied to Forest Service land on slopes under 50% in the upper portion of the watersheds. Upper watershed headwater bowl areas and small basins directly above homes were the primary areas selected for

hydromulching. This treatment will provide immediate ground cover to help reduce flood peaks and sediment yield downstream in the communities of where there are lives and high values at risk. Headwater bowls were selected to stabilize sediment from becoming mobilized to reduce the initiation of rilling and subsequent debris flows high in the watershed. Mulch will be applied as slurry by helicopter and/or fixed wing aircraft. (Note: Helimulching with dry straw, though less costly than aerial hydromulching, was considered but discounted because it would not likely remain in place due to winds in the area. Seeding was also considered but discounted because research has shown it has little or no effectiveness and can have adverse effects on native plant communities).

Botany - The treatment is noxious weed detection surveys and spot treatment of dozer lines, safety zones, and selected roads affected by the Santiago fire. Assessing the establishment of weeds and treating small outlying populations before they expand will prevent the weeds from becoming serious threats to the recovery of native/rare plants.

Blue Light Mine Tailings Stabilization – The Blue Light Mine is located in Pine Canyon. There is a tailing pile near a processing area in the lower portion of the watershed and is known to contain heavy metals including lead, mercury and arsenic. The tailing pile is near the stream edge and is at risk of being eroded by increased flows as a result of burned areas higher in the watershed. The treatment is to pull the tailings back from the stream and stabilize with erosion control materials.

Channel Treatments: None

Road and Trail Treatments:

Roads

Many forest roads are at risk of loss from post-fire runoff due to deferred maintenance and non-current design standards. Substantial sediment yield can occur under post-fire conditions. Recommended road treatments include restoring drainage function, installing drainage features, storm patrols and BAER warning signs as described below. The treatments proposed will help protect life and property, infrastructure investments, and adjacent resource values and/or preserve critical infrastructure function and assure future availability.

Trails

Seven miles of popular and heavily used trail were burned. Trail treatments to maintain drainage function and tread integrity, installation of intercepting dips to control erosion, and signage to warn users of hazards both on and off the trails.

Protection/Safety Treatments:

Extended Emergency Coordination – This involves communication and coordination with other federal agencies plus state and local agencies with jurisdiction over lands where life and property are at risk from post-fire conditions. The Santiago Fire will likely need followup activities due to the complexity of issues. Actions include but are not limited to coordinating treatments across administrative boundaries, cooperating with other agencies on hazard notification systems, exchanging information and coordinating the BAER implementation plan as needed when subsequent recovery plans are developed by other agencies. The initial cost request plans for this effort to include a primary coordinator assigned to the district to facilitate coordination, and part time technical specialists (i.e., geologist and hydrologist) to aid the coordination for the primary resource issues associated with this fire. Additional coordination needs may ensue, costs for which will need to be requested on an interim 2500-8.

Pipe Rail Barriers – Barriers will be installed at sites highly vulnerable to intrusion by OHV's onto Forest land from adjacent ownerships. This treatment is needed to prevent land damage caused by

unauthorized entry. Without physical protection, vehicular and other damage is expected to be significant on Forest Service land since there is virtually no post-fire vegetation to act as a barrier. Administrative closures have proven to be ineffective in preventing intrusion and damage in this highly urbanized forest setting. Signing of all vulnerable areas will be done in addition to physical barriers.

I. Monitoring Narrative:

See hydromulch effectiveness monitoring plan in project file.

Part VI – Emergency Stabilization Treatments and Source of Funds

Interim # 3

See table below

			NFS Lands			Other Lands			
		Unit	# of		Other	# of	Fed	# of	Non Fed
Line Items	Units	Cost	Units	BAER \$	\$	units	\$	Units	\$
A. Land Treatments									
Hydromulch	acres	3936	1241	\$4,884,100	\$0		\$0		\$0
Aerial mulch team	day	9791.66	24	\$235,000					
Debris removal	ea	5000	1	\$5,000					
Noxious Weed Survey	1	8000	1	\$8,000	\$0		\$0		\$0
Bluelight Mine Tailings	LS	10000	1	\$10,000	\$0		\$0		\$0
Insert new items above this line!				\$0	\$0		\$0		\$0
Subtotal Land Treatments				\$5,142,100	\$0		\$0		\$0
B. Channel Treatments									
None				\$0	\$0		\$0		\$0
Insert new items above this line!				\$0	\$0		\$0		\$0
Subtotal Channel Treat.				\$0	\$0		\$0		\$0
C. Road and Trails									
Restore Rd Drainage	mi	1200	14	\$16,800	\$0		\$0		\$0
Intercepting Dip Trail	ea	160	185	\$29,600	\$0		\$0		\$0
Intercepting Dip Rd	ea	1000	21	\$21,000					
Armored Crossings	ls	1000	4	\$4,000					
Overside Drains	ea	1500	22	\$33,000					
Warning Signs	ea	1000	8	\$8,000					
Information Signs	ea	50	16	\$800					
Replace 2 crib walls	ea	113750	1	\$113,750	\$0		\$0		\$0
Storm Patrol	days	3685	10	\$36,850					
Insert new items above this line!				\$0	\$0		\$0		\$0
Subtotal Road & Trails				\$263,800	\$0		\$0		\$0
D. Protection/Safety									
Extended emergency	Pay Pd	3500	16	\$50,000	\$0		\$0		\$0
Pipe Rail Barriers	ft	30	5500	\$165,000	\$0		\$0		\$0
RAWS Station	ea	2400	1	\$2,400					
Insert new items above this line!				\$0	\$0		\$0		\$0
Subtotal Structures				\$217,400	\$0		\$0		\$0
E. BAER Evaluation									
Salary	days	700	140	\$98,000					
Per diem	days	180	100	\$18,000					
Travel/misc	days	100	100	\$10,000			\$0		\$0
Subtotal Evaluation				\$126,000	\$0		\$0		\$0
BAER Impl. Leader	days	\$340	30	\$10,200	\$0		\$0		\$0
BAER Coord.	days	\$420	20	\$0	\$0		\$0		\$0
Subtotal Implementation				\$10,200					
Insert new items above this line!				\$0	\$0		\$0		\$0
F. Monitoring									
Hydromulch effectvns	plan	\$ 55,760	1	\$55,760	\$0		\$0		\$0
Insert new items above this line!				\$0	\$0		\$0		\$0
Subtotal Monitoring				\$55,760	\$0		\$0		\$0
G. Totals				\$5,970,402					
Previously approved				\$5,815,260					
Total for this request				\$155,142					

PART VII - APPROVALS

1.

/s/ *William Metz*

WILLIAM METZ

Forest Supervisor (signature)

9/3/2008

Date
2.

/s/

Regional Forester (signature)

Date
3.

/s/