

September 27, 2005

**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 DESCRIPTION****A. Fire Name:** Deep Fire**B. Fire Number:** CA-SQF-2526**C. State:** California**D. County:** Tulare County**E. Region:** 05**F. Forest:** Sequoia**G. District:** Tule River**H. Date Fire Started:** 08-12-2004**I. Date Fire Contained:** 08-17-2004**J. Suppression Cost:** \$7,900,000**K. Fire Suppression Damages Repaired with Suppression Funds**

1. Fireline waterbarred (miles): 23.5  
2. Fireline seeded (miles): 0  
3. Other (identify):

**L. Watershed Number:** 1803000201**M. Total Acres Burned:** 3143NFS Acres (**3143**) Other Federal ( ) State ( ) Private ( )**N. Vegetation Types:** Blue Oak Savanna, Chamise Chaparral, and Black Oak Woodland**O. Dominant Soils:** Granitic (DG)**P. Geologic Types:** Granite**Q. Miles of Stream Channels by Order or Class:** Class I/II = 6 mile, Class III/IV = 20 mile**R. Transportation System**Trails: 2.21 miles Tule River Trail adjacent to fire boundary miles, Roads: 6.5 miles**PART III - WATERSHED CONDITION****A. Burn Severity (acres):** 309 (low) 87 (moderate) 2747 (high)**B. Water-Repellent Soil (acres):** 943**C. Soil Erosion Hazard Rating (acres):**      (low) 2283 (moderate) 860 (high)**D. Erosion Potential:** 101 tons/acre**E. Sediment Potential:** 7,175 cubic yards / square mile**PART IV - HYDROLOGIC DESIGN FACTORS**

A. Estimated Vegetative Recovery Period, (years):	<u>7</u>
B. Design Chance of Success, (percent):	<u>70</u>
C. Equivalent Design Recurrence Interval, (years):	<u>1.5-2 years</u>
D. Design Storm Duration, (hours):	<u>6hr</u>
E. Design Storm Magnitude, (inches):	<u>2.1 inch</u>
F. Design Flow, (cubic feet / second/ square mile):	<u>11.4 cfs/mile<sup>2</sup></u>
G. Estimated Reduction in Infiltration, (percent):	<u>30%</u>
H. Adjusted Design Flow, (cfs per square mile):	<u>102 cfs</u>

## **PART V - SUMMARY OF ANALYSIS**

### A. Describe Watershed Emergency:

The Watershed Emergency exists from storm events of average intensity and duration. The storm hydrographs for the past 3 water years (2000 to 2003) indicate an average yearly precipitation of up to 16 inches. This area receives its rainfall roughly from November through April. In December 2003 there existed roughly 16 rain events of which the largest event is documented at 2.74 inches in a 24 hour period<sup>1</sup>.

Associated with these storm events is the very serious addition of rock falls and debris flows. Most of the ephemeral drainages have large accumulations of stored sediment and perched rocks. This poses an additional hazard to the values at risk which exceeds the expected hazard of flooding or loss of control of water and increases the potential for debris and mud flows off of excessively steep slopes.

There is the potential for an excessive response in three of the watersheds within the fire area, particularly Milk Canyon, watersheds E and F in addition to the numerous face drainages in the lower part of the fire area (see watershed map). Rock-fall, debris flows and ash moving onto Highway 190 and into the Tule River during storm events is highly probable. The flume or pipe that supplies drinking water to the city of Springville and head for the Lower Tule River hydroelectric power plant has a high probability of being damaged from soil movement, rock-fall or debris flows. The intake for the flume located immediately downstream and below the fire is at risk as well as community of Springville and communities closer to the fire area. Because of damage to the flume which provided drinking water for the town of Springville the town is currently accessing the Tule River for this water. The intake for drinking water has been relocated at Coffee Camp. Coffee Camp will receive any downstream effect of the fire. The following is a list of the values at risk as a result of the fire. Some of these are shown on the map below.

- ✓ Downstream communities
- ✓ Public Safety along roads from falling rocks and debris flows
- ✓ Lower Tule hydroelectric plant
- ✓ Lower Tule flume
- ✓ Upper Tule hydroelectric plant after-bay and intake for Lower Tule River flume
- ✓ PG&E, SCE, and SBC poles lines and footings within and down slope of the fire area
- ✓ City of Springville drinking water system and supply
- ✓ Lake Success
- ✓ Highway 190, Wishon Road, and forest roads
- ✓ Endemic habitat for California roach (*Lavinia symmetricus*), rainbow trout (*Oncorhynchus mykiss*), Western pond turtle, and foothill yellow-legged frog,
- ✓ Tule River trail, which runs parallel to the base of the fire beneath Highway 190
- ✓ Recreational sites below trail

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<sup>1</sup> Please see hydrology report for the rainfall history within the fire from December 2003 to 1996

It needs to be mentioned that the rainfall data displayed below and utilized in the Hydrologist report was taken from a RAWS station located immediately below the fire and the Wishon Gauging station immediately across the river on the South Fork Middle Fork Tule River.

- ✓ Drift fence to keep stock off State Highway
- ✓ Native plant habitat protection from spread of known populations of noxious weeds
- ✓ Threatened Springville Clarkia
- ✓ Soil productivity
- ✓ Loss of control of water

## B. Emergency Treatment Objectives:

### Heli-mulching

1. To increase ground cover and reduce the watershed response within high burn severity areas.
2. Increase the amount of infiltration and control overland runoff and reduce the amount of hillslope erosion
3. Reduce raindrop impact and the amount of overland flow delivered directly to the stream network.
4. Aid re-vegetation efforts by 1) maintaining a favorable moisture regime, 2) protection of top soil, 3) stabilization of ash (nutrients) on site, 4) insulate the topsoil from solar insulation, 5) providing a growing medium, and 6) protection of soil productivity.
5. Reduce water runoff and sediment delivery the trail and road immediately below the fire.

### Rock Scaling

1. To reduce the potential for upslope boulders to become mobile as a result of erosional processes and damage Wishon road and State Highway 190
2. To improve public safety along the Wishon road and State Highway 190. It is not feasible to close these roads as they provide access to communities.
3. To improve public safety along the Tule River below the fire. This area is a favorite swimming area and is used frequently for recreation.
4. To improve public safety along the Tule River trail.

### Road treatments

1. To keep the road safe for public travel
2. To maintain and protect the forest's investment in the road infrastructure
3. To reduce the potential of flooding downstream
4. To reduce erosion to the downstream aquatic habitat in the Tule River
5. To reduce sedimentation to downstream beneficial uses.

### Trail treatments

1. To control water runoff and sediment delivery from burnt landscapes onto existing trails
2. To reduce sedimentation to riparian habitat and special species habitat

### Signage

1. To provide warning and raise public awareness as to the hazard of driving Highway 190 and the Wishon Road in the vicinity of the burn during rainfall events. Hazards include flooding, debris flow and falling rock
2. To provide warning and raise public awareness of the hazards associated with hiking the river trail during rainfall events in the vicinity of the burn. Hazards include flooding, debris flow and falling rock.
3. To provide warning and raise public awareness of the hazards associated with recreating along the river in the vicinity and downstream of the burn during rainfall events. Hazards include flooding, debris flow and falling rock.

### Campground, River and Trail Closure

1. To protect the public from rock falls, mud flows and flooding during the rainy season.

### Fence Reconstruction

1. To provide for public safety by keeping range stock off of Highway 190 and other travel routes.

### Noxious weed monitoring

1. Monitor for the spread of noxious weeds from known locations to fire as a result of suppression activity.
2. To monitor BAER restoration activities for the introduction of weeds from introduced straw or vehicular traffic.
3. To monitoring the fire area for new populations of noxious weeds as a result of fire suppression restoration.

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

Land 90 % Channel na % Roads 70 % Other 70 % (storm patrol)

D. Probability of Treatment Success

Years after Treatment			
	1	3	5
Fencing	100	100	100
Helimulching	70	75	80
Signs	95	95	95
Rock Scaling	70	75	80
Roads	70	85	95
Trails	70	75	75
Noxious Weeds	70	80	90

The cost plus analysis included the values at risk for the area immediately downstream and within the fire area. The analysis projected roughly four miles downstream and ended at the confluence between the North Fork Tule River and the North Fork Middle Fork Tule River. The value of 70% success was utilized for all treatments since this was the lowest value estimated above. For more information on the assumptions made please see the cost-plus-loss spreadsheets.

E. Cost of No-Action (Including Loss): \$145,291,024

F. Cost of Selected Alternative (Including Loss): \$3,332,850 \$

G. Skills Represented on Burned-Area Survey Team:

<input checked="" type="checkbox"/> Hydrology	(Randy Gould)	<input checked="" type="checkbox"/> Soils	(Randy Gould)
<input checked="" type="checkbox"/> Geology	(Alan King )	<input checked="" type="checkbox"/> Engineering	(John Grenz)
<input checked="" type="checkbox"/> Botany	(Fletcher Linton)	<input checked="" type="checkbox"/> Archaeology	(Fletcher Linton)
<input checked="" type="checkbox"/> Fisheries	(Phil Strand)	<input checked="" type="checkbox"/> Contracting.....	(Patrick Gallegos)

Team Leader:     Terry A. Kaplan-Henry

Email: [tkaplanhenry@fs.fed.us](mailto:tkaplanhenry@fs.fed.us) Phone: 559-784-1500 ex 1181 FAX: 559-781-4744

H. **Treatment Narrative:**

**Land Treatments:**

**Mulching**

Heli-mulching is recommended to provide effective ground cover, reduce sediment transport, help reduce the potential loss of control of water, and provide erosion protection for heritage resources. This treatment is proposed for remote high severity areas within the interior of the fire that has slopes less than or equal to 40%. This action should serve to break up the flow of water off of the steeper upper areas and there by reduce the watershed response during rainfall events.

To implement heli-mulching, straw bales are loaded into helicopter cargo nets and dropped over the burned areas. Straw will be processed so it can be released from cargo nets and spread evenly with a 3-inch average thickness. Straw shall be applied at a rate of 2 tons per acre along treatment units (approximately 500 acres which comprise 22% of the high runoff response areas). This treatment will provide immediate ground cover and reduce hydrologic response and sediment production.

**Accomplishment:** Ground cover was imported to the high severity burn areas with slopes less than 40% in the form of Helimulch was accomplished on 460 acres of the fire at a rate of roughly 2 tons per acre.

A similar treatment is proposed for a 23 acre area adjacent to Highway 190 between the flume and the Tule River. Application will be the same as above; however, crews will be used to apply the straw. This action will provide immediate protection to the river and aquatic habitat.

**Accomplishment:** Ground cover was imported to the high severity burn areas located between highway 190 and the Tule River. This work was accomplished by spreading rice straw using hand crews on 23 acres.

### **Rock Scaling**

Rock Scaling is recommended to reduce the emergency to Health/Safety/Property. Specifically the emergency is to the So. Cal. Edison flume/aqueduct and powerhouse, State Highway 190 and Wishon Rd., the Tule River Trail and camping/recreation facilities due to risks from rolling rocks, rock avalanches, debris slides and storm induced debris torrents, potentially affecting life, property and other resources.

Prior to the burn, vegetation played a key roll in holding loose soil and rock on slopes. When the vegetation and duff were burned away, rocks can become dislodged and start accelerating downslope where they can present an extreme hazard to anything in their path. At risk are people and vehicles on roads, the aqueduct/flume, other structures such as the hydroelectric plant at the confluence of the middle and north forks of the Tule River, utilities, road surfaces and their associated drainage structures, wildlife, cultural resources, wildlife, etc. Debris slides usually occur where thin to deep accumulations of surface soil have lost support and gravity causes a surficial failure. These slides can damage the same "values at risk", but also frequently add large quantities of sediment to creek and stream systems, which can damage other resources.

Treatment is to remove loose rock that is at risk of rolling downslope due to lack of vegetative support, lessening of soil support, potential for dislodging from other rocks rolling from above, or potential for dislodging due to running water during storm events or erosion. Rocks that appear stable and are not likely to become dislodged, or cannot be removed manually would not be removed. Professional judgment will prevail. The Inspector will help determine which rocks will be scaled. Do not remove rocks that will further destabilize other rocks or soil. Rocks would be moved to a stable location or downslope to the road to be removed by loader and dump truck.

**Accomplishment:** This work was not performed.

### **Noxious Weeds Assessment**

Noxious weed monitoring will focus on reconnaissance of roads, dozer lines, and staging areas in order to detect the spread and introduction of weeds in the first year after fire. Assessing the establishment of weeds will prevent the weeds from becoming serious threats to the recovery of native plants.

**Accomplishment:** Noxious weed assessment was performed on 23.5 miles of dozer line and 2.2 miles of trail adjacent and within the fire boundary. Two populations of yellow star thistle were encountered on dozer lines miles apart. These populations were removed and bagged. A request for additional funding to assess weeds in 2006 will follow as a result of this finding.

### **Roads and Trail Treatments:**

#### **Trail treatment**

Trail treatment is predominately storm patrol. Storm patrol would occur in response to rainfall events. Therefore it is expected roughly 20 storm patrol reconnaissance would need to be funded based on events estimated from RAWS stations. This action is recommended in order to maintain trail drainage function and reduce the potential for detrimental affects to aquatic species habitat, recreational value, and maintaining drinking water intake to Springville temporally located at Coffee Camp.

Prior to the storm patrol an initial reconnaissance and maintenance will be performed to be sure all drainage is in place and functioning. After this initial evaluation the trail condition will be documented after each rainfall event. This will continue through the winter or until the area becomes inaccessible.

**Accomplishment:** Storm patrol was implemented immediately post fire, and during the wet season, as access allowed.

## **Road Treatment**

Road treatments focus on correction of drainage problems associated with increases in design flows. Riprap is prescribed to reduce the effects of concentrated water on highly erosive moderate and high severity burn areas. These treatments are proposed to reduce the potential for facilities damage, damage to riparian areas, potential for gully erosion, and downstream impacts to life and property.

General treatment work items identified for roads include installation and rebuilding of waterbars or rolling dips, placement of riprap at strategic locations, and repair of headcuts, reestablishment of drainage patterns, cleaning of culverts and catch basins to accommodate increased flows and installation of MES (metal end sections) and overflow culverts to increase the flow capacity of existing culverts, placement of straw and berm removal with outsloping of the roadway to allow sheeting action of water, rather than flow concentrations.

Contact was made with Cal Trans and Tulare County Roads Department regarding recommended road improvements and hazard signs immediately following the fire. Recommendations for increased culverts were provided and a detailed engineering will be provided.

**Accomplishment:** All identified roadwork has been accomplished. Recommendation on culvert sizing has been discussed with Cal Trans and Tulare County Roads Department.

## **Signage**

The Forest will provide signs at trail entrances, Upper and Lower Coffee Camp, the Stairs, and at least six turnouts along Highway 190 to warn of flood and rock dangers during rain events. All weather posters will be placed on bulletin boards to warn recreationists of flooding and potential rock falls during wet weather. As previously mentioned Cal Trans and Tulare County Roads Department have been contacted regarding flood, debris and falling rock signs along roads in the vicinity of the fire.

**Accomplishment:** Signs have been installed in the immediate vicinity of the fire along Highway 190, near campgrounds and trails and the Washon Road.

## **Other**

**Accomplishment:** Charles Davis, State Conservation Engineer, NRCS (530-792-5622) was contacted relative to the concern for private homeowners in the floodplain of the North Fork Middle Fork Tule River above Springville, CA, Tulare County in regards to the potential for flooding during the rainy season. The National Weather Service will be requested to issue a flood warning for the Springville area once rainstorms are expected. An e-mail has been sent to the meteorologist in charge Stephen Mendenhall ([steven.mendenhall@noaa.gov](mailto:steven.mendenhall@noaa.gov)) as to this effect. Currently there has been no response. Additionally Tulare County Environmental Health has been contacted with this concern. Currently there is not response as to their responsibility to flooding.

**I. Monitoring Narrative:** *(For more detailed information see attached monitoring plan.)*

### **Trails**

Storm Patrol documentation would be performed to monitor the affects of storms and document actions taken to maintain drainage. This documentation would also provide the information to determine if any resource damage is occurring from rainfall events. Storm Patrol forms provided by Riverside Fire Lab. No additional dollars requested.

Trail monitoring was performed during storm patrol.

### **Mulching**

In addition to implementation monitoring to assure contract provisions are carried out as per specifications effectiveness monitoring would be implemented. Soil transects will be placed inside and outside mulching sites to evaluate the effectiveness of the straw mulching. Transects would be installed prior to operations above the vicinity of the RAWS station at Oak Opening and below Bear Creek road at the top of the burn. Additionally a control site that is not treated would be monitored. Documentation of conditions along with photographs will serve to provide information on the initial condition and location of soil transects. Transects would be visited immediately after storm events while the sites remain accessible through the winter and into the spring and summer months of 2005.

Mulching was performed as identified in contract specifications.

Silt fences were installed in the mulched area and in the control area. Three sets of erosion pins were placed immediately uphill from the silt fences to evaluate erosion and displacement. Surveyed transects were performed along the uphill side of the silt fence and the line of erosion pins at each site. These transects were performed post fire in 2004 and this summer 2005 to evaluate the effectiveness of mulching the fire. Preliminary results indicate that the mulched site eroded less than the non mulched site.

### **Road Treatments**

Road treatments would be monitored for implementation during contract administration. Effectiveness monitoring would take place during reconnaissance following storm events unless the road becomes inaccessible due to weather. No additional dollars requested.

Road monitoring was performed during contract administration.

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

			NFS Lands				Other Lands			All
		Unit	# of	WFSU	Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT \$	\$	units	\$	Units	\$	\$
A. Land Treatments										
Helimulching										
Helicopter Application	acre	483	500	\$241,500			\$0			\$241,500
Staging Area	day	250	10	\$2,500						
COR	hr	40	120	\$4,800						\$4,800
CR	hr	77	120	\$9,240						\$9,240
Straw	bale	61	1002	\$61,122						\$61,122
Transport Straw	truck	800	21	\$16,800						\$16,800
Unloading	bale	1.25	1002	\$1,253						\$1,253
Inmate Crew	wk	500	2	\$1,000						\$1,000
Helimulching Subtotal				\$338,215						\$338,215
Weed Assessment										
Noxious Weeds	year	4,350	1	\$4,350			\$0		\$0	\$4,350
Rock Scaling										
See below	mile	13815	3	\$41,445			\$0		\$0	\$41,445
Subtotal Land Treatments				\$384,010			\$0		\$0	\$384,010
B. Channel Treatments										
none				\$0			\$0		\$0	\$0
Subtotal Channel Treat.				\$0			\$0		\$0	\$0
C. Road and Trails										
Roads and trails										
See below				\$77,390			\$0		\$0	\$77,390
Subtotal Road & Trails				\$77,390			\$0		\$0	\$77,390
D. Signs and Fences										
Warning Signs	ea	268	9	\$2,412						
Fencing	ft	2.6	2133	\$5,546			\$0		\$0	\$5,546
Subtotal Signs and Fences				\$5,546			\$0		\$0	\$5,546
E. BAER Evaluation										
Hydrology/Soils	day	650	7	\$4,550			\$0		\$0	\$4,550
Engineering	day	320	7	\$2,240			\$0		\$0	\$2,240
Botany	day	271	3	\$813			\$0		\$0	\$813
Fisheries	day	320	3	\$960			\$0		\$0	\$960
Lands	day	320	3	\$960			\$0		\$0	\$960
Crew Boss	day	132	3	\$396			\$0		\$0	\$396
Geology	day	320	4	\$1,280			\$0		\$0	\$1,280
Team Leader	day	320	10	\$3,200			\$0		\$0	\$3,200
Perdiem	day	100	10	\$1,000			\$0		\$0	\$1,000
Subtotal Assessment Team				\$15,399			\$0		\$0	\$15,399
F. Monitoring				\$0			\$0		\$0	\$0
Soil/Erosion	year	16,950	1	\$16,950			\$0		\$0	\$16,950
Subtotal Monitoring				\$16,950			\$0		\$0	\$16,950
G. Totals				\$499,294			\$0		\$0	\$499,294



			NFS Lands				Other Lands			All	
		Unit	# of	WFSU	Other		# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT \$	\$		units	\$	Units	\$	\$
Land Treatments											
Rock Scaling											
Laborers	hr	45	240	\$10,800				\$0		\$0	\$10,800
Administrator/COR & contract prep	hr	500	10	\$5,000				\$0		\$0	\$5,000
Flagmen	day	37	160	\$5,920				\$0		\$0	\$5,920
COR	day	300	10	\$3,000				\$0		\$0	\$3,000
Signs & flagging equipment	day	150	10	\$1,500				\$0		\$0	\$1,500
Vehicles	day	50	30	\$1,500				\$0		\$0	\$1,500
Mileage	mile	0.35	1500	\$525				\$0		\$0	\$525
Loader + Operator	day	95	80	\$7,600				\$0		\$0	\$7,600
Dump truck + operator	day	70	80	\$5,600				\$0		\$0	\$5,600

			NFS Lands				Other Lands			All	
		Unit	# of	WFSU	Other		# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	SULT \$	\$		units	\$	Units	\$	\$
C. Road and Trails											
Storm patrol	ea	500	20	\$10,000				\$0		\$0	\$10,000
USFS Road 20S97				\$0				\$0		\$0	\$0
Clean inlet area 201(10)	LS	1000	1	\$1,000				\$0		\$0	\$1,000
Remove 12-inch CMP 202(03)a	ea	250	3	\$750				\$0		\$0	\$750
Remove 18-inch CMP 202(03)b	ea	300	5	\$1,500				\$0		\$0	\$1,500
Remove 24-inch CMP 202(03)c	ea	400	1	\$400				\$0		\$0	\$400
Rip the rd to a 12-incch depth using rippers 203(06)	Mile	5000	0.5	\$2,500				\$0		\$0	\$2,500
Reshape the fill to original slope 203(07)	LS	11250	1	\$11,250				\$0		\$0	\$11,250
Reconst Roadway Ditch 203(16)a	LF	5	510	\$2,550				\$0		\$0	\$2,550
Reconst Rolling Dip 203(17)a	ea	250	3	\$750				\$0		\$0	\$750
Reconst Inlet Basin 203(17)b	ea	300	1	\$300				\$0		\$0	\$300
Riprap (Class 3) 251(01)	CY	250	22	\$5,500				\$0		\$0	\$5,500
Blading 306(01)	Mile	2500	0.41	\$1,025				\$0		\$0	\$1,025
Mobilization 601(01)	LS	8790	1	\$8,790				\$0		\$0	\$8,790
Install 24-inch MES 603(03)a	ea	550	3	\$1,650				\$0		\$0	\$1,650
Install 18-inch MES 603(03)b	ea	450	1	\$450				\$0		\$0	\$450
24-inch overfolw 603(05)a	LF	100	90	\$9,000				\$0		\$0	\$9,000
24-inch downpipe 603(05)b	LF	100	30	\$3,000				\$0		\$0	\$3,000
48-inch overfolw 603(05)c	LF	150	80	\$12,000				\$0		\$0	\$12,000
Clean 18-inch inlet 618(04)a	ea	150	2	\$300				\$0		\$0	\$300
Clean SIA and Flume 618(04)b	ea	125	5	\$625				\$0		\$0	\$625
Clean CMP (flush) 618(04)c	ea	300	1	\$300				\$0		\$0	\$300
24-inch Anchor Assemblies 621(06)	ea	250	3	\$750				\$0		\$0	\$750
Dry Mulch and Seed 625(08)	LS	3000	1	\$3,000				\$0		\$0	\$3,000
G. Totals				\$77,390				\$0		\$0	\$77,390