USDA-FOREST SERVICE Date of Report: April 15, 1988

BURNED AREA REPORT
(Reference FSH 2509.13, Report FS-2500-A)

PART I - TYPE OF REQUEST

1. Type of Report

[ ] A. Funding (Request for estimated FFF funds)
[X] B. Accomplishment Report

2. Type of Action

[ ] A. Initial (estimated funding is first requested)
[ ] B. Interim

[ ] Updating the initial funding request.
[ ] Supplying information for accomplishments to date on emergency work underway.

[X] C. Final

[ ] Best estimate for funds needed to complete eligible rehabilitation measure.
[X] Following completion of funded work.

PART II - FIRE LOCATION

1. Fire Name (from Form FS-5100-29): PALOMAR
2. Forest Supervisor's Fire No. : INCIDENT #CNF-1367
3. State: CA
4. County: SAN DIEGO
5. Region: 05
6. Forest: 02 (CLEVELAND)
7. Ranger District: 53 (PALOMAR)
8. Date Fire Started: 03 OCT 87
9. Date Fire Controlled: 24 OCT 87
10. Estimated Suppression Costs: $ 2.7 million
11. Fire Suppression Damages Repaired with FFF 102 Funds:

21 miles (firelines waterbarred)
100_____ acres (firelines seeded)
_____ Other (identify)

12. Fire Intensity: 30 % (low) 60 % (medium) 10 % (high)

PART VI - ELIGIBLE EMERGENCY REHABILITATION MEASURES OR TREATMENTS AND SOURCE OF FUNDS

NOTE: Emergency rehabilitation is work done promptly following a wildfire and is not to solve watershed problems that existed prior to the wildfire.

			NFS Lands			Other Lands			All Lands
Line Items	Units	Unit Cost	No. of Units	FFF 092 $	Other $ FFF102	No. of Units	Federal$ CDF	Non-Federal $ private	Total $
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
A. LAND									
100% a. Seeding	Acres	400		2461		74	740		3201
b.									
c.									
d.									
B. CHANNELS									
100% a. Opening water courses	Miles	2000	0.25	500					500
C. ROADS AND TRAILS									
a. ROADS - Riprap low water crossings and road ditches	miles	40M	0.5	20,000	10,150				30,150
b. TRAILS	miles	1000	3		3,000				3,000
D. MAJOR STRUCTURES									
b. sediment/debris basins									
E. TOTAL				$22,961	$13,150		$ 740		$ 36,851

PART VII - APPROVALS

/s/CHARLES R. MARLOW — 4/15/88

Acting Forest Supervisor — Date

/s/ANDREW A. LEVEN for — 4/25/88

Regional Forester (Signature) — Date

BASE MONEY

PART III - NATIONAL FOREST SYSTEM PROBLEM INVENTORY

1. Watershed No. 1870303-02
2. NFS Acres Burned: approximately 2300.
3. Water Repellant Soil: None Observed

4. Vegetation Types: White Sage-Buckwheat, Chamise-Manzanita, Scrub oak-Chaparral Whitethorn, Coulter Pine/Manzanita, Big-cone Douglas Fir-Coulter Pine-Live Oak, Coast Live Oak/White Sage.

5. Geologic Types: 50% Micaceous Shist (Sheephead Soil series and Rock Outcrop) 50% Granodiorite (90% Crouch soils and 10% Cieneba/Tollhouse Series) Slopes 30-60%

6. Soil Erosion Hazard Rating:

_30__ % (low) _50__ % (medium) 20 % (high)

7. Erosion Potential: > cu. yds/sq. miles
8. Miles of Stream Channel by Regional Order or Class:
9. Miles of Forest Service Trail:
10. Miles of Forest Service Road by Maintenance Level:

_____ miles (Level I) _12__ miles (Level II)
_____ miles (Levels III, IV, V)

PART IV - CALCULATED RISK AND CLIMATIC EVALUATION

1. Estimated Vegetative Recovery Period: 3 years. (3 years White sage/Buckwheat

2. Chance of Success Desired by Management: 80 percent.
3. Equivalent Design Recurrence Period: 50 years.
4. Related Design Storm Duration: 6 hours.
5. Related Design Storm Magnitude: 3.5 inches.
6. Related Design Flow 3163 cfsm. Pauma Creek
7. Estimated Reduction in Infiltration: percent.
8. Adjusted Related Design Flow: cfsm.

PART V - SUMMARY OF SURVEY AND ANALYSIS

1. Skills Represented on Burned Area Survey Team ("x" appropriate boxes):

[X] Hydrology	[X] Soils	[ ] Geology	[ ] Range
[X] Timber	[X] Wildlife	[ ] Fire Mgmt.	[X] Engineering
[ ] Contracting	[X] Local Mgmt.	[ ] Research	[ ] Other (identify)

2. Describe Emergency: High risk of damage to structures in the Pamua Valley and Road/culvert damage along State Highway 76 and County roads within the burned area. Significant damaging sediment and debris flows have already occured. Problem areas are several small watersheds on Private land above Pamua Valley and debris in channels below these watersheds.

3. Emergency Rehabilitation Objective: See Appendix A.

All of the suppression rehab was completed including an exceptional effort in the Auga Tibia Wilderness to restore the site to as near natural conditions as possible. No additional downstream flooding or mud flows have occured. Early rains led to good establishment of native/naturalised grasses prompting BIA to drop plans for arial seeding of Indian Reservations. No FFF-092 funds were required.

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

Land 0 % Channel 0 % Roads 0 % Other _____ %

5. Net Environmental Quality Benefit Index:

[X] Significant [ ] Not Significant

6. Net Social Well Being Benefit Index:

[ ] Significant [X] Not Significant

7. Benefit/Cost Ratio: n/a
8. Net Benefits: n/a
9. Cost Effectiveness Index: [X] I. [ ] II. [ ] III. [ ] IV.

all suppression money

PART VI - ELIGIBLE EMERGENCY REHABILITATION MEASURES OR TREATMENTS AND SOURCE OF FUNDS

NOTE: Emergency rehabilitation is work done promptly following a wildfire and is not to solve watershed problems that existed prior to the wildfire.

			NFS Lands			Other Lands			All Lands
Line Items	Units	Unit Cost	No. of Units	FFF 092 $	Other $ FFF102	No. of Units	Federal$ BIA	Non-Federal $ private	Total $
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
A. LAND									
a. Wilderness Reveg.	Acres	2750	100		275,000				275,000
b. Seeding	Acres	52				50	2,000	5,000	7,000
c. Tree Planting	Acre	346				260	90,000		90,000
d.									
e.									
B. CHANNELS									
a. Opening water courses	Miles					1		20,000	20,000 *
b. Stabilizing streambanks	Miles								
c.									
d.									
e.									
C. ROADS AND TRAILS									
a. ROADS	miles				10,000				10,000
b. TRAILS									
c.									
D. MAJOR STRUCTURES									
b. sediment/debris basins									
E. TOTAL				0	$285,000		$ 92,000	$ 25,000	$402,000

PART VII - APPROVALS

/s/CHARLES R. MARLOW — 4/15/88
Acting Forest Supervisor

/S/ANDREW A. LEVEN for — 4/25/88
Regional Forester — Date

APPENDIX A

PALOMAR FIRE REHAB

A COORDINATED RESOURCE MANAGEMENT PROJECT

OF THE

SAN DIEGO COUNTY COORDINATED RESOURCE MANAGEMENT PLANNING GROUP

The Palomar Fire burned in the Palomar Mt. area of eastern San Diego County from Oct. 3, 1987 through Oct. 11, 1987. Fire advance was halted by an unseasonal two inch rainfall on Sunday Oct. 11th. at 16,100 acres. A much larger area (approx. 22,000 acres) was within the boundaries of an indirect control line from Pamua Valley up through the Mission Indian Reserve, Agua Tibia Wilderness and Cutca Valley to Palomar mountain in the area of the Weber Ranch. Nearly 27 miles of Dozer line was constructed during suppression efforts with another 4 miles of handline.

Burn intensities were generally moderate with high intensity fire limited to isolated sites on steep southwest facing slopes with heavy fuels. Soft chaparral (White Sage and Buckwheat) on the slopes above Pamua Valley burned completely leaving several watersheds with no vegetative cover. Timber stands at the higher elevations burned with a moderate intensity ground fire leaving nearly complete cover.

The size of this burn, number of watersheds effected and downstream values in Pamua Valley led to the concern that extensive emergency rehab efforts might be needed to prevent further damage to watersheds and property. On Sunday Oct. 11th. an Interagency Burn Rehab Team was formed to assess the resource damage done by the fire and develop recommendations for post fire rehab treatments. A team leader from each of the Land Management Agencies responsible for Rehab efforts in the fire area held an initial organizational meeting. This group decided to develop a joint rehab report under the Coordinated Resource Management Planning Agreement for San Diego in order to reduce redundant efforts and to develop treatments which are compatible with each agencies and landowners management objectives. CDF and Forest Servive were designated as co-lead agencies to carry on the unified command approach used for suppression activities. Roles and responsibilities for each agency were defined as follows:

California Department of Forestry and Fire : Co-lead agency responsible for Rehab efforts on Private lands and Indian Reservations. This includes rehab of fire suppression related resource disturbance, emergency revegetation treatments and channel clearing activities using handcrews. CDF may sponsor up to 50% of the cost of emergency revegetation treatments if local sponsors recommend such treatments and contribute the remaining 50%. CDF may also sponsor revegetation treatments on Private lands within the Forest boundary.

USDA-Forest Service - Cleveland National Forest : Co-lead agency responsible for rehab of fire suppression related resource disturbance on National Forest System Land (NFS). Rehab efforts for fire-related watershed damage to NFS lands, private lands which effect NFS lands or treatments on NFS lands which protect private lands are also Forest Service responsibility.

USDA-Soil Conservation Service : Emergency burn rehab sponsor for private lands. May contribute up to 50% of the cost of emergency revegetation projects. Provides advice to landowners on soil and watershed protection measures.

USDI-Bureau of Indian Affairs : Emergency burn rehab sponsor for Indian Reservations. Requests 100% of the funding for emergency burn rehab treatments on Indian Reservations.

California Department of Parks and Recreation : Land management agency with specific concerns about rehab methods used on Palomar Mt. State Park and surrounding lands.

At this initial meeting the need for additional specialists and other interested agencies were identified. A second coordination meeting was held on Wed. Oct. 14, 1987 to update all team members and identify the roles and responsibilities of the additional agencies. These are as follows:

County of San Diego - Public Works / Flood Control : Local Sponsor for emergency burn rehab treatments on Private lands. Recommends project to CDF and SCS and coordinates with the County Board of Supervisors to provide 25% of the project funding.

County of San Diego - Office of Disaster Preparedness : Provides sandbags at cost to agencies.

California Department of Transportation : Responsible for maintaining right-of-way for Highway 76 including channel and culvert clearing within the State Right-of-way.

DESCRIPTION OF THE BURNED AREA

The Palomar Fire burned significant acreage on a varity of landownerships with many individuals as well as land management agencies affected. Following is a summary of the landownerships involved subdivided by areas of agency responsibility.

Private property within the CNF boundary.....	1775 acres.
Private property outside the CNF boundary.....	5470 acres.
Indian Reservation within CNF boundary.....	5120 acres.
Indian Reservation outside CNF boundary.....	360 acres.
Palomar Mt. State Park.....	1075 acres.
Cleveland National Forest.....	2300 acres.
Total.....	16100 acres.

A significant concern of the rehab team was the large amount of fire suppression related disturbance resulting from the use of bulldozers to create over 27 miles of control lines. Dozer lines were used on all land ownerships including the Agua Tibia Wilderness and Agua-Tibia Research Natural Area on the

AGENCY RECOMMENDATIONS AND PROPOSED ACTIONS

California Department of Forestry and Fire Protection

CDF will provide Annual Rye Grass seed free of charge to local residents along with a signed out "belly grinder" to apply the seed to private property. In addition CDF is smoothing out all dozer lines, installing water bars to prevent erosion and seeding them with Annual Rye. No broadcast seeding of the burned area on private land is recommended because a rapid recovery of the native vegetation is expected due to moderate burn intensities. These sites are also on the rocky sheephead soil which will reduce potential for rill erosion. Landowners with Timber soils may also qualify for assistance under the California Forest Improvement Program. This program allows the State to cost share with landowners on Timber treatments and reforestation projects. Expected cost of these restoration efforts is $6,000.

Cleveland National Forest

Forest Service is smoothing out all dozer lines, installing water bars to prevent erosion and seeding selected sites on National Forest System Lands and private lands within the Cleveland National Forest boundary which effect NFS improvements. An intensive re-vegetation project will also be initiated on the Agua Tibia Wilderness and immediately adjacent land to restore Native plant cover to the dozer lines to reduce soil and water resource degreadation and damage to wilderness trails from erosion. The following practices will be applied to the Wilderness lands:

Dozer Lines

1. Reshape the firelines where necessary to divert water from running down the raw soil slopes. Use waterbars only as the last resort on the very steep slopes (>50%). These water bars should be no higher than 18".

2. Pull windrow of debris that was piled up along the edge of the fireline, into the main opening. Spread the shrub branches, rocks, and top soil as evenly as possible over the raw mineral soil.

Cleveland National Forest. Approximate mileage and acres effected listed by ownership and agency responsible for rehab are as follows:

CNF	non-wilderness	10 miles	70 acres.
	wilderness	7 miles	56 acres.
Indian Reservation	CDF responsibility	4 miles	20 acres.
Private	CDF responsibility	6 miles	30 acres.
State Park	CDF responsibility	1/4 mile	1 acres.

Major soil/vegetation combinations within the burn area include:

5700 acres of Crouch soil series supporting Conifer Forest, Oak Woodland and small areas of Scrub oak dominated chaparral.

7750 acres of Sheephead soil series with soft chaparral vegetation (sage/buckwheat) except small areas of north slope which support Scrub oak dominated chaparral.

1900 acres of Tollhouse soil series with Chamise-Manzanita dominated chaparral and soft chaparral.

950 acres of Cieneba soil series with soft chaparral species.

Analysis of Burn Intensities and Effect on Water and Sediment Yield

Most of the watersheds above Pamua Valley are in the area dominated by Sheephead soils and soft chaparral vegetation. Due to the relatively low fuel loading in this vegetation type fire intensities were only moderate despite the hot dry weather while this area burned. Sheephead soils, especially on steep slopes, are characterized by having a high percentage of surface rock. On this site the rock cover is from 20-40 percent. Experience with fires in this soil/vegetation combination in other areas has shown rapid recovery of native vegetation following fires. In addition the high cover of rock reduced the potential of a significant increase in erosion and debris production during winter rains. With the exception of approximately 500 acres on the steep south slopes, the Forest and Woodlands burned with a moderate intensity ground fire leaving significant cover on the soil in these areas. The relatively small areas of Tollhouse and Cieneba soil series pose the greatest risk for increased sediment production due to the highly erodable character of these soils. A few small watersheds in the front country above Pamua valley have a high percentage of these shallow granitic soils.

An analysis of the expected change in peak flood flows for a 50 year storm was conducted for several of the major front country watersheds. These analysis showed an expected increase of approximately 30% to 50% for most watersheds. This lead the Rehab team to assess the capacities of channels below these watersheds and the need for channel and culvert clearing to carry the increased water/sediment flows.

3. Spread native shrub and herbaceous seed mix over the fireline. Seeding rate 28 lbs/acre of low elevation seed mix and 13.25 lbs/acre of the high elevation mix. Very light raking to a depth of no more than 1/4 inch or application on recently disturbed soil (no rainfall since disturbance) is recommended.

High Elevation Mix		Low Elevation Mix	
Gnaphalium californicum	1/4 lb/ac.	Eriogonum fasciculatum	12 lbs/ac.
Happlopappus parishii	1/4 lb/ac.	Lotus scoparius	8 lbs/ac.
Eriophyllum confertiflorum	2 lb/ac.	Salvia apiana	2 lbs/ac.
Stipa coronata	1/4 lb/ac.	Mimulus arantiacus	1 lb/ac.
Penstemon spectabilis	1 lb/ac.	Penstemon spectablis	1 lb/ac.
Mimulus aranticus	1 lb/ac.	Lipunis hirsutissimus	3 lb/ac.
Lasthenia chrysostoma	1 lb/ac.	Eriodicton crassifolium	1/2 lb/ac.
Phacelia parryi	1/4 lb/ac.	Stipa Coronata	1/4 lb/ac.
Lupinus hirsutissimus	2 lbs/ac.	Gnaphalium californiacum	1/4 lb/ac.
Adenostoma faciculatum	3 lbs/ac.		
Rhamnus californica	1 lb/ac.		
Cercocarpus betuloides	1 lb/ac.		

4. Apply rice straw mulch at a rate of 1000 lbs. per acre to protect the soil on steep slopes.

5. Hold rice mulch in place on the steep slopes with biodegradable netting.

6. Plant containerized shrubs at points where dozer lines cross trails to speed recovery of these areas. This will help prevent use of the dozer lines as trails and the subsequent erosion such use would cause.

Road Cuts Within The Wilderness

1. Use track mounted backhoe to pull the soil from the fill side of the road up into the deepest part of the road prism.

2. Reshape road prism to the original grade as nearly as possible, making sure that the new profile is entirely outsloped to divert water quickly off of the raw soil.

3. Using the backhoe, pull some topsoil from the upper bank down across the newly graded road prism.

4. Using hand crews, throw the freshly cut brush and tree limbs over the newly graded road prism.

5. Follow steps 3 through 5 of the Dozer line Rehabilitation (ie. spread seed, mulch, net).

Cultural resource inventories were conducted on the dozer lines to determine if restoration efforts might pose a threat to unknown sites. An area of concern is a site which was damaged on private land. Information will be recorded from this site and an Archeologist will recommend measures to protect the area during restoration efforts.

No broadcast seeding is proposed on NFS lands due to the high cover of trees remaining on the sites and moderate burn intensities. Tree planting and other silvicultural treatment needs will be assessed this Fall and implemented over the next several years. Expected cost of these restoration efforts is $300,000.

Bureau of Indian Affairs

BIA will assess and implement needed reforestation on Coulter pine sites which were burned with high intensity (approx. 260 acres). Dozer line restoration will be coordinated with CDF. Estimated cost of this rehab work is 90,000.

Soil Conservation Service

SCS has prepared a document printed by the Upper San Luis Rey Resource conservation District to provide information for homeowners on measures which they can take to protect their property from increased water and sediment flows. An SCS representative will be available to provide advice and engineering consultation to individuals who wish to do watershed improvement work on their property. The Fallbrook Office of SCS will be used as an information clearing house for landowner questions (728-7332). Referrals will be made to the appropriate agencies or information sources. SCS may also participate in emergency watershed restoration following flooding at the request of a local sponser.

Cal-Trans and the County Road Department

Channels and culverts are being cleared and will be maintained by each agency for their areas of responsibility. Cal-Trans for Highway 76 and the County for all County Maintained roads.

REHAB/RESTORATION TEAM MEMBERS

REHAB COORDINATOR

George Gleason

AGENCY TEAM LEADERS

John Gray - CDF
Tom White - USDA-FS (Burn Rehab)
Norm Noyes - USDA-FS (Suppression Restoration)
Jason Jackson - SCS
Gile Stuwart - BIA
Mike Wells - California Department of Parks and Recreation

SPECIALISTS

Dick Marlow / Susan Blankenbaker - Public Information
Vic Smothers / Craig Mahaffey - Soils / Hydrology
Ron Woychak - Resource Advisor / Wildlife Biologist
Maribeth Kottman - Ecologist
Gary Vogt - Landscape Architect
Dorthey Hall - Archeologist
Michael Sampson - Archeologist
Joe Hill - Flood Control
Richard Hamilton - Disaster Preparedness
Lee Dungan - Cartography

OTHER AGENCIES INVOLVED

County of San Diego
- Flood Control
- Office of Disaster Preparedness
- Road Department

California Department of Transportation
Yuima Water District

TEAM MEETINGS

Initial Organizational Meeting	10/11/87
First Full Rehab Team Meeting	10/14/87
Proposal Coordination Meeting	10/20/87
Public Meeting for Pauma Valley	10/21/87
Public Meeting for Palomar Mt.	10/24/87
Close-out meeting - Monte Vista	12/16/87