United States Department of Agriculture
Forest Service
San Bernardino National Forest
1824 S Commercenter Circle
San Bernardino, CA 92408
909-383-5588 (Voice)
909-383-5770 (Fax)
909-383-5616 (TTY)

File Code: 2520 **Date:** May 8, 2000
Route To: Ecosystem Conservation Staff

Subject: Willow Fire Interim Burned Area Report
To: Regional Forester

Summary
The Interim Accomplishment Report for FS lands within the 1999 Willow Fire is enclosed. It is also supplied on a floppy disk in the Interium BAER Notebook.

Some changes were made to the original prescriptions based on recommendations of specialists involved in the actual implementation. A brief narrative describing these changes as well as accomplishments to date and plans for implementation of the remainder of the rehabilitation efforts are listed under each treatment category.

The approved funding amount for each treatment category and what we have spent to date (when known) is also provided. These expenditures are approximate as having one job code for all treatments makes accounting difficult. We have set up spreadsheets to track costs of each treatment and will be able to provide a more accurate accounting of costs in the Final Accomplishment Report. Total funding approval as of February 25, 2000, is $1,487,375. The attached spreadsheet has been revised to show the latest approved funds in the WFSU column. Transaction Registers through February 2000 indicate we have spent $494,056 on treatments (does not include $200,000 spent on BAER team and administration). Additional purchases or contract costs may not be included.

Heritage Resource costs are higher than expected for the following reasons: 1) the large number of known heritage resource sites within the burned area, 2) extensive BAER treatments that were proposed for locations containing archaeological sites, thus the need to hire contract archaeologists to complete treatment implementation before winter storms, and 3) the need to complete treatments on archaeological sites to protect them from surface erosion. Due to the extensive amount of archaeological work completed and work still in progress, detailed heritage resource information and photos will be submitted in the final report. There may be a need to request additional funding in a future interim report to cover the increased costs of archeological BAER treatments.

Highlights of our accomplishments include:

Treatment Type	Treatments Funded	Treatments Completed	Treatments Ongoing or in Progress
Land	24	12	11
Channel	2	1	1
Roads and Trails	5	1	4
Structures	3	1	2

Effectiveness Monitoring	13 submitted for funding	N/A	N/A

Treatment locations were mapped using GPS equipment and were digitally photographed. Treatment photos are enclosed along with the treatment location map.

On October 28th, representatives from the Washington Office and several Regional Offices (National BAER Coordinators) participated on a field review of the Willow Canyon rehabilitation area. The review was very helpful to the implementation staff and offered many opportunities for dialogue between staff groups.

On November 18th, a press release was issued concerning the Willow BAER effort. The following day, two newspapers (San Bernardino and Lake Arrowhead) and one television station (San Bernardino) participated in a field tour of the Willow Canyon rehabilitation area.

In the beginning of April, a soil scientist from the BAER team returned to address safety issues and to observe how the treatments responded to winter storm events. He found that since the fire, the watersheds have not been subjected to heavy winter or intense rainfall events and several of the hazards described in the original report continue to exist. He recommended providing public information on the hazards within the burned area prior to the reopening. This will be accomplished through the news media, the internet, flyers, signing, public contacts, and public meetings. Most treatments are intact but some need of a limited amount of maintenance or repair.

We are working with BLM to reopen areas of the fire area as soon as possible. The Pacific Crest Trail and the Deep Creek Hot Springs are the most popular use areas within the burn, and we expect to reopen them to the public by early summer once all public safety criteria are met.

Randy Davis from the Bridger-Teton National Forest and Todd Ellsworth from the Stanislaus National Forest deserve a great deal of thanks for their willingness to come to the San Bernardino National Forest and spend 30 days to assist in the planning, purchasing of materials, and implementation of treatments. Their leadership and instruction resulted in treatments being installed according to specifications, and the treatments have proven effective during winter and spring storms. We are also very grateful for the Region's response to our emergency needs and willingness to assist us through the BAER process.

Sincerely,

/s/ Gene Zimmerman
GENE ZIMMERMAN
Forest Supervisor

enclosures

cc: gschmitt@fs.fed.us
mcopenhagen@fs.fed.us

USDA FOREST SERVICE **FS-2500-8 (8/93)**

Date of Report: September 29, 1999

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[ ] 1. Funding Request for Estimated WFSU Funds
[X] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

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

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

[ ] 3. Final report-following completion of work

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: WILLOW B. Fire Number: BDF - 6545

C. State: CALIFORNIA D. County: SAN BERNARDINO

E. Region: PSW R5 F. Forest: SAN BERNARDINO NF

G. District: MOUNTAIN TOP RD

H. Date Fire Started: 8/28/99 I. Date Fire Controlled: 9/10/99 1800 hr

J. Suppression Cost: $12,000,000

K. Fire Suppression Damages Repaired with WFSU Funds:
1. Fireline waterbarred (miles) 70
2. Fireline seeded (miles)

3. Other (identify) Topsoil respread on firelines; special specs near TES plant sites.

L. Watershed Numbers: 1809020801 Deep Creek; 18090208 Mojave River.

M. NFS Acres Burned: 40,845 Total Acres Burned: 63,675
Ownership type: ( ) State (X) BLM 15,866 Acres (X) Private 6,961 Acres
(X) Department of Defense 3 Acres (Dam spillway)

N. Vegetation Types: Riparian Forest, Riparian Scrub, Mixed Evergreen Forest, Jeffrey Pine Forest, Pinyon-Juniper Woodland, Chaparral, Interior Desert Scrub, meadow, Pebble Plain, Oak Woodland.

O. Dominant Soils: Lithic and Typic Xeropsamments, Lithic and Typic Xerochrepts, Entic and Typic Haploxerolls

P. Geologic Types: Quartz monzonite, Limestone/Dolomite, Quartzite, Diorite, Alluvium.

Q. Miles of Stream Channels by Order or Class:

Perennial = 121 miles Intermittent = 525 miles Ephemeral = miles

R. Transportation System:

Trails: 23 miles Roads: 108 miles
(Pacific Crest Trail, Hawes Ranch Trail, Muddy Springs Trail)

PART III - WATERSHED CONDITION

A. Fire Intensity (acres): 45,675 (low) 8,780 (moderate) 7,289 (high) 1931 (unburned)

B. Water-Repellent Soil (acres): 11,519 [Note this is the acreage of fire caused or increased water-repellency. Most soils in this area had some degree of natural non-wettability pre-fire.]

C. Soil Erosion Hazard Rating (acres):

11,690 (low) 30,669 (moderate) 21,316 (high)

D. Erosion Potential: 5 tons/acre average for entire burned area (2 year, 6 hour storm)

E. Sediment Potential: 3,621 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period: 3 years (Based on Devil Fire Hydrologic Response, not replacement of pre-fire vegetative character)

B. Design Chance of Success: 80 percent

C. Equivalent Design Recurrence Interval: 50 years

D. Design Storm Duration: 24 hours

E. Design Storm Magnitude: 11.8 inches

F. Design Flow: 353 cubic feet per second per square mile

G. Estimated Reduction in Infiltration: 23 percent

H. Adjusted Design Flow: 435 cubic feet per second per square mile

PART V - SUMMARY OF ANALYSIS

A. Describe the Emergency: Based on the BAER Team field survey and analysis the following emergencies exist (unless otherwise noted these emergencies are on NFS lands):

Threats to Human Life: In the vicinity of the Pacific Crest trail (National Scenic Trail), The Mojave Forks Dam spillway, and State Highway 173 fire loosened boulders pose a threat for public injury/fatality from rockfall. On the Pacific Crest Trail, the Hawes Ranch trail (2W14/2W08 Arrowhead side), and the Muddy Springs trail (2W02) public safety is at risk from trail and crossing washout and overtopping from overland flow, increased peak flow, and mud/debris flows, potentially resulting in loss of life and stranding of recreationists. On private lands (NRCS federal lead agency jurisdiction) some specific residents (sixteen houses including those listed below) and incidental roadway users in the Apple Valley area are at risk for injury/fatality during storm runoff events at specific locations near drainages, and potential channel migration locations below low burn intensity/high slope instability portions of the burned areas in some of the Mojave and Rabbit Lake subwatersheds: 1) Central Road - South end at the west side of the road a single home; 2) 9037 Pauhaska Road a single home with several outbuildings; 3) Southwest of Roundup Way and Flora Vista Street intersection; 4) Drainage across Roundup way between Monte Vista and Cerra Vista Streets; 5) South end of Bella Vista Street a single home with 10 additional homes downstream from it; 6) south end of Bella Vista Street a single home and diversion; 7) South end of Cerra Vista Street two ownerships with multiple homes/structures and an earthen dam which is expected to breach as well as two roads; 8) Southside of Buena Vista Street and Konrad Lane a single home; 9) 9038 Buena Vista Street a single home and road; 10) South end of Mesa Vista Street a house, outbuilding, and parking area: 11) South end of Mesa Vista Street two houses; 12) South end of Mesa Vista Street a single house; 13) 20993 Carnelian Road a single home with several adjacent homes.

Incidental use of the area by residents in the following areas (both BLM and private lands where either BLM or NRCS are the lead federal agencies) due to high percentage of burned watershed in the vicinity poses a threat for injury and stranding, although additional field work is necessary to determine if homes and structures are directly at risk as follows: "The village" inholding within BLM (23 residences mostly burned); Bowen Ranch; Southeast of Bowen Ranch (approximately 10 misc. homes and structures); a suspected occupancy trespass on BLM lands north of Juniper Flats at the head of a drainage; the Luna Ranch (burned down); the Squints Ranch landing strip houses and access roads (private lands within NFS lands, with NRCS as the lead federal agency).

Public safety is at risk, within and downstream from high and moderate intensity burned areas, from road/trail/OHV route and crossing washout and overtopping from overland flow, increased peak flow, and mud/debris flows potentially resulting in loss of life and stranding of travelers on Forest Development Road 3N14 (also a State Point of historic Interest Road) near Bowen Ranch, 3N14 near Hopi Springs, 3N14 near Willow Canyon, 3N16 east of Big Pine Campground, 3N16 at Holcomb Creek, 3N34D on the Arrowhead side of Deep Creek (access to Devil's Hole), the Juniper Flats Road (BLM), Juniper Flats Spur Road (BLM), Ord Mountain Spur Road (BLM), 3N11, the 3N88 Haul Road (Special Use Permit) at the bottom of the switch backs at the 36" culvert crossing, private roads in the Corto watershed outside of the burn, private roads west of the burn in Apple Valley in the Mojave River watershed, the Bowen Ranch Road (SV104), and 1W17 (the Rodondo Trail).

Threats to Property: On the Pacific Crest Trail, Hawes Ranch Trail, and Muddy Springs trail the trail tread and all crossings (except for the bridge over Deep Creek) are at risk of obliteration by erosion, landsliding, or burial by sediment as the result of the fire (even in the low intensity portions of the burned area where vegetative removal and loss of root strength has resulted in high potential for gravitational and dry ravel erosion). In addition to the roads and trails listed in the loss of life section above, Forest Development Roads 3N14, 3N56, the Willow Canyon Road, and Round-up Way are at risk of drainage structure failure and running surface damage as the result of increased runoff and sedimentation from high and moderate intensity burn areas. Cut and fill slopes of roads within high and moderate burn intensity areas are at risk of increased erosion leading to loss of use of the road. Homes, local roads, road drainage structures, and other structures in the Apple Valley area (NRCS lead federal agency) and within the burned area are at risk for damage from flooding, sediment deposition, and undercutting from increased peak flows (see specifics under loss of life above). The Omya industrial plant wellhead and well casing in the Crystal creek channel (special use permit on NFS lands) is at risk for damage by burial or channel incision/migration and would result in a significant economic impact to the plant if the water supply is disrupted. Coxey dam is at risk of breaching. Five shotgun culverts under State Highway 173 are at risk of causing significant fill slope erosion and threatening the highway itself. Forty-five spring developments are at risk of being buried by deep sediment deposits within the high and moderate burn intensity portions of the burn.

Threats of Loss of Control of Water: Potential for loss of control of water exists within most subwatersheds of Deep Creek, Mojave River, Lucerne Valley, and Rabbit Lake watersheds. While most streams within the burned area are expected to have an increase flow of ten to seventy percent, some specific streams are expected to have sediment yield increases in excess of three hundred to fourteen hundred percent. Where these streams reach low gradient reaches or where they exit the mountain front (Mojave and Rabbit Lake watersheds) and spill onto alluvial fans, bedload deposition in the channel is expected (even in the low intensity burn areas). This includes valuable stream reaches for Threatened

and Endangered Species. In stream channels without clearly defined inner gorges, extreme channel migration is expected to occur. On alluvial fan areas in Apple Valley sub-divisions, diversion into residents is likely (NRCS with BLM in upper watershed). Where these streams encounter roads and other improvements, diversion of stream flows into road side ditches or entrenched roadways is expected to occur. This includes the roads and trails previously mentioned, as well as other specific road crossings and locations as follows: the BLM's Juniper Flats Road and area, the Cottonwood Springs area (BLM).

Threats of Significant Water Quality Deterioration: In addition to significant increases in sediment described previously, additional significant effects to water quality are expected as the result of the Willow fire. As related to all beneficial uses of water in the high and moderate intensity burned headwaters (specifically including the Willow Creek subwatershed) of the Deep Creek drainage (T&E aquatic biota, Endangered Toad habitat, Wild trout habitat, human water consumption, body contact recreation, etc.) significant water quality impacts are expected. State and EPA threshold values for chronic suspended sediment and dissolved solids as related to aquatic biotia mortality described in the Basin plan are expected to be exceeded by several fold in the post storm baseflow. This is in addition to acute ash flush and storm flow sediment levels that are anticipated. Ash effects to water quality in Coxey Pond and all streams in the burn are expected. As noted above sediment impacts to specific springs is also anticipated. A preexisting, vegetatively semi-stabilized, gully head cut in the Cienga Springs area threatens to rapidly migrate and encompass at least 15 additional acres in the gully as the result of the high and moderate intensity burn effects of runoff into this now denuded headcut. Degradation in the upper channels and aggradation in the lower channel of Crystal Creek is expected. Inner gorge failures, channel aggradation, pool filling, scour and/or fill of fish habitat, change in substrate of toad habitat, increased sediment load, loss of riparian vegetation from sediment impacts in Deep Creek are expected. Change in substrate of toad habitat, ash/nutrient loading in Kinley Creek. Change in substrate of potential toad habitat in Willow Creek. Increased sediment loads into Holcomb Creek from Deer Nat, Barrel Springs, and Ingham Holcomb Creeks. Degradation in high gradient reaches, aggradation in low gradient reaches, loss of riparian vegetation in lower channel, loss of ponds, increased sediment loads to Holcomb creek, ash and nutrient loading in Cox Creek. Degradation in high gradient reaches, aggradation in low gradient reaches, loss of woody debris in channel, ash nutrient flushing in Willow Canyon. Degradation in high gradient reaches, aggradation in low gradient reaches, loss of riparian vegetation in lower channel, loss of ponds, increased sediment loads to Holcomb Creek, ash and nutrient loading in Hawes Holcomb Tributary.

Within the Juniper Flats watershed a large percentage of riparian vegetation was consumed. Many of the streambanks are considered to be unstable now that the protective vegetative cover is gone. Streambank erosion will result in water quality deterioration in this area that provides critical habitat for TES birds.

Threats of Significant Soil Loss: High intensity burn occurs on 7,289 acres accenting hydrophobic conditions while removing overstory vegetation and organic cover. The majority of high burn intensity area is in the Dawn Oidia, Coxey, and Willow Creek watersheds. This area is also very cobble and gravelly effectively mulching the soil surface. Of 5,800 acres of the high intensity burned areas in yellow pine conifer type in the upper watershed are expected to have first winter erosion rates of 11 to 15 tons per acre even with 35 to 50 percent ground cover from surface rock fragments. This represents a significant threat to long term soil productivity from erosion, as well as a source of fine and suspended

sediment, and dissolved solids and the effect these have on water quality. The toe and footsteps contain deeper, high productivity soils that are susceptible to both rill and gully erosion. These areas are scattered throughout the high intensity burn areas including remote, inaccessible terrain.
Threats to Ecosystem Stability, Threatened/Endangered/Sensitive Species, and significant Cultural/Heritage Resources: Significant cultural/heritage resource sites (listed on, determined eligible for, or potentially eligible for the National Historic Register) including a BLM formally designated Area of Critical Environmental Concern and ancestral sites of current significance (including known burials) to Native Americans are at risk from exposure by surface erosion, channel migration, soil deposition, impacts by illegal OHV and other traffic (as the result of protective vegetative and other barrier destruction by the fire), and looting as the result of the fire. Endangered plant and animal species at specific risk of extinction as the result of the fire are threatened by erosion of soil from plant occurrences, deposition of sediment over plant occurrences, deposition of sediment into valuable aquatic habitat (toads, fish, and snakes), and modification of habitat by sediment deposition and channel migration which will favor exotic species which may then complete the outcompetition of these T&E species. Direct effects to individual animals from sediment and burial of their dens (tortoises) resulting in mortality is expected. Loss of nesting trees (owls) from channel erosion and mass wasting in two locations is expected.

More specifically, recovery populations of arroyo toad necessary for prevention of extinction of this species utilizes terrace areas adjacent to Deep Creek near Warm Spring for burrowing. Previously these areas had been successfully blocked by vegetative barriers to illegal OHV traffic. As the result of the fire these valuable areas are now likely to experience a reoccurrence of illegal OHV traffic (even if a closure order is utilized). Further downstream in Deep Creek filling of existing beaver dams is expected to result in enhancement of habitat for exotic species which compete with, or prey upon, arroyo toads. Beavers are introduced and their dams in combination with post-fire sediment loading will create channel morphology changes in lower Deep Creek which would eliminate toad habitat (elsewhere in the burned area existing beaver dams will result in post fire benefits). Allowing water to route in a natural stream pattern and deposit sediment in terraces rather than mid channel is critical.

Endangered carbonate plants are at risk from traffic from illegal OHV use since protective exclusionary vegetation has been burned near these sites.

The forty-five springs that are at risk for sediment burial currently provide critical riparian habitat for TES species. Burial of the surface water and associated riparian vegetation and habitat associated with the springs in addition to the springs themselves is an emergency. Coxey Pond (behind the dam) provides similar important riparian and aquatic habitat for TES species, so protection of the dam is critical for protection of the habitat also. Prevention of filling of the pond by sediment is also key to preventing impacts to TES species in this very arid environment.

On "pebble plains" habitat a specific T&E plant is the sole habitat for a rare butterfly which also uses the unique pebble plain soil in key parts of its life cycle. Over 20% of this habitat and host plant burned at less than high intensity. However, fire caused loss of minimal amounts of soil or soil stored seed from these sites could cause extinction of this butterfly.

TES plant and animal habitat, as well as hundreds of archaeological sites occur dispersed throughout the burned area (NFS and BLM). Much of the area is relatively gentle in slope and now that vegetative

barriers have been removed by the fire, the extensive illegal OHV use of the area poses a threat to inappropriate trafficing off roads and trails and into critical areas where direct impact to biological and cultural resources could occur. In addition previously abandoned or obliterated road/trail routes leading through TES and archaeological sites have now had their vegetative screening and cover, and in some cases wooden barriers removed by fire, and are likely to experience traffic into the critical areas once again.

Heritage site CA-SBr-3781 (BLM) is at risk from erosion and streambank undercutting. Critical sites in the BLM ACEC are at risk from burial by sedimentation, looting of exposed features, and illegal OHV traffic causing direct impacts. A previously vegetatively semi-stabilized four-lobed headcut gully exists on the edge of a heritage resource site in the Coxey drainage and threatened to completely consume the site as the result of the vegetative removal on the headcut and increased flow as the result of high and moderate burn intensities in the upper watershed.

Invasive weed expansion (cheat grass) into much of the burned area is expected to occur, and because of its expansion into several older burns which re-burned in the Willow fire, may result in a type conversion from Pinyon Pine Forest type to cheat grass (Pinyon regeneration killed with little or no seed source remaining due to increased fire recurrence interval). This threat is real, known, and apparent, not speculative. Cheat grass invasion specialists from the Intermountain Research Station and the University of California at Riverside were brought in to specifically evaluate this potential. In addition, Salt Cedar is known to occur in the vicinity of the Deep Creek Hot Spring, and is an invasive tree that outcompetes native riparian vegetation in arid areas. Replacement of native riparian vegetation by salt cedar, and its effect on depth to the watertable would have significant impacts on TES species.

B. Emergency Treatment Objectives:

To address the above emergencies identified by the BAER Team, the following objectives were identified:

To reduce the potential for loss of life, property, and significant physical, biological, and cultural resource values at both the source areas, as well as at the potential effect areas, with a variety of previously demonstrated effective treatments. Specifically, to the maximum extend possible, protect riparian and aquatic TES species which are highly high susceptible to sedimentation related impacts by reducing sediment from surface erosion, road (and road related) erosion, and upper watershed channel scour as well as to provide for through flow (rather than deposition) of sediment in certain important stream reaches.

To provide information to the specifically effected public and general public about potential threats.

To prevent damage and destruction of emergency treatments, and the burned area in general, as well as specifically on TES plant and archaeological sites, by illegal OHV use in this extremely high OHV use area, so that the treatments and the natural recovery of the burned area can occur as rapidly as possible, thereby reducing effects to significant physical, biological, and cultural resources.

Consistent with new USDA-USDI BAER/EFR policy, elimination/reduction of threats to life, to property, of significant soil loss, of significant water quality deterioration, of loss of control of water, of permanent type conversion/loss of TES habitat, to significant heritage/cultural resources, to ecosystem stability, from invasive weeds, and to minor infrastructure are objectives for the Willow fire, as well as efficient use of monitoring to determine treatment effectiveness or to determine when fallback treatments may be necessary.

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

Land 95 % Channel 95 % Roads 95 % Other ___ %

D. Probability of Treatment Success

	<----Years after treatment-----> 1	3	5
Land	90%	100%	
Channel	90%	100%	
Roads	90%	100%	
Other			

E. Cost of No Action (Including Loss): $ 33,649,162.00

F. Cost of Selected Alternative (Including Loss): $ 7,345,396.00

[Note: Use of cost-plus-risk anlaysis during the development of treatments resulted in elimination of the widespread use of the following treatments: grass seeding (low probability of success), hydromulching (high cost than mulching with tackifier), Log Erosion Barriers (higher cost than other treatments and lower probability of success), Hand trenching (lower probability of success), quarry rock versus high cost OHV fences (even higher costs due to transportation costs), road closure rather than French Drain (lower probability of success), limited closure (lower probabilityof success).

G. Skills Represented on Burned-Area Survey Team:

[XX] Hydrology	[XX] Soils	[XX] Geology	[XX] Range
[ ] Timber	[XX] Wildlife	[ ] Fire Mgmt.	[XX] Engineering
[ ] Contracting	[XX] Ecology	[XX] Research	[XX] Archaeology
[XX] Botany	See attached list for full team skill listing		[XX] Fish Biologist

Team Leader: Rob Griffith/Todd Ellsworth/Gil Garcia FAX:
Phone: (909) 884-6634 x 3160 (Gil)_____ Electronic Address: ggarcia@fs.fed.us

Implementation leaders:
Coord. and support leaders :

Robin Butler/Dev Volgarino FAX: (909) 866-8192
Phone: (909) 866-3437 x 3225 (Robin) Electronic Address: rbutler@fs.fed.us
Phone: (909) 866-3437 x 3236 (Dev) Electronic Address: dvolgarino@fs.fed.us

Treatment support leaders:

Randy Davis/Todd Ellsworth
Phone: (307) 739-5521 (Randy) Electronic Address: rdavis03@fs.fed.us
Phone: (209) 962-7825 (Todd) Electronic Address: tellsworth@fs.fed.us

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.

The following are the proposed emergency treatments for the Willow Fire. These treatments were developed based on the BAER objectives, team recommendations of proven effective treatments (including local experience from the 1994 Devil Fire), and line officer/agency administrator input, as well as interagency cooperative discussion. Due to the high values at risk, multiple treatment types may occur in the same area, to address the same emergency situation, thereby improving the overall effectiveness of mitigating the emergency. Preventative treatments are targeted at the high and some of the moderate intensity burned areas. Control treatments are targeted at areas down watershed from high and moderate intensity burned areas, as well as at specific sites of high values at risk. Treatments with low probability of success were eliminated by use of preliminary least cost plus risk analysis to refine treatments for specific emergencies.

LAND TREATMENTS

Natural Vegetative Recovery

This cost-free treatment consists of allowing on-site vegetative material to sprout or germinate to reduce the emergency conditions over most of the burned area, which has been a successful treatment locally following previous fires. After careful evaluation, cheat grass is not expected to alter postfire successions in the Willow fire area, and thus not diminish the probability of success of this treatment. For this treatment to be effective, disturbance by grazing livestock and off-route trafficing by vehicles must be prevented for at least the first growing season. ***Monitoring*** to determine if fallback alternative treatments are necessary would occur after the first spring season subsequent to the burn.

Interim Report: Treatment ongoing. Regrowth of vegetation was observed during treatment implementation and monitoring. As expected, perennial species of willows, roses, sedges and grasses were the first to repond. Following a rain in October, cheatgrass sprouted in some locations disturbed by fire suppression activities. In March, resprouting of woody species and perennials had occurred but few plants had germinated from seed in the higher elevations. In the lower elevations, the non-native grasses had begun to grow in moziac patterns along with some native fire following species. Rainfall in the higher elevations of the burned area is approximately 17 inches below normal. On April 30, 2000, a botanical survey was performed on 5 acres at

elevations ranging from 6800 to 6900 feet. See "Shrub Planting" section of photo notebook for the plant species list.

Funded Amount: **Cost-free**
Spent to Date: **Observation costs here have been included in other treatments.**

Maintain Soil Productivity on Areas of High Burn Intensity (Strip Tillage)
Till 8 foot contour strips about 25 feet apart using a D-6 dozer with 3 ripper shanks and wings to promote lift and shatter rather than mixing of the soil profile. Depth should be 6 to 18" to achieve maximum infiltration. This treatment creates a series of furrows which disturbs the hydrophobic layer and creates an opportunity for surface flow to penetrate the soil. This treatment is proposed on approximately 200 acres having a high burn intensity, in moderately deep Typic Xerochrepts above 3N16, between Big Pine Flat and Greenlead Creek in the Upper Holcomb Creek watershed (higher probability of success than seeding, LEBs, or other hillslope treatments on these sites).

Interim Report: Treatment completed. 200 acres were subsoiled to a depth of 8-12" using a D-6 cat with 2 wings. Site was mapped using GPS equipment and surveyed prior for heritage resources and TES species. Three archaeological sites were identified, mapped, recorded and any potential impacts were avoided through monitoring during the treatment. Digital photos were taken and follow up photos are needed for 3 years. Treatment was monitored in April and was intact. No evidence of movement of material was noted due to lack of hard rainfall. Ash and native mulch had blown into the tilled strips. Will continue to monitor effects on storm runnoff and vegetative recovery within this treatment area. See digital photos labeled "Strip Tillage".

Funded Amount: **$10,000**
Spent to Date: **$ 6,253**

Stabilizing Road Cut and Fill Slopes (Mulch/Tack)
To reduce the high erosion and sedimentation rates (and their direct effect to TES riparian and aquatic species), the loss of flow capacity within inside ditches and the potential failure of portions of the road system the road cut and fill slopes will be stabilized by applying tackifier and straw mulch (machine mulching) at a rate of 2 tons/acre (one 74 pound bale per 800 square feet) to cut and fill slopes on forest system roads within primarily high and moderate burn intensity portions of the burn area (385 acres) (less expensive than hydromulching) .

Interim Report: Road cut and fill slopes were surveyed for heritage resources and TES species along 25 system roads. No heritage resource or TES concerns were identified. Locations for tackifier were mapped with milages during the surveys and given to Engineering for contract. Forest hydrologist will initiate contract. Treatment not yet completed at this time.

Funded Amount: **$245,250**
Spent to Date:

Prevention of Erosion at Warm Spring (Warm Spg straw wat)

Install straw wattles, trench erosion barriers, and water bars as needed on previously vegetatively closed OHV roads and trails within the inner gorge to Deep Creek at Warm Spring. Failure to protect this population of arroyo toad could lead to extinction of this species in the Deep Creek drainage. Warm Spring terrace fence and the straw wattles were to be delivered by helicopter (hence the high per unit cost).

Interim Report: Treatment completed November 1999. Straw wattles were installed at base of slope, water bars and check dams were constructed, and 97 bales of straw were distributed over the 3 acre site to hold soil on the slope. Treatment materials were flown in by helicopter and Back Country Horsemen packed out tools and extra supplies as a cooperative effort. Thirty pounds of locally collected flat-top buckwheat seed was distributed over unauthorized trails and roadbeds. Prior to implementation, treatment areas were surveyed for heritage resources, TES plants and potential effects of treatments on endangered arroyo toads. One previously recorded archaeological site was known within proposed treatment area and no new sites were identified. Heritage resource information was updated and monitored during ground disturbing activities and avoided altogether. Additional heritage resource information needs to be collected from a small area within the site. Prevention of unauthorized OHV use at this site is crutial for this treatment to be effective. Some waterbars were damaged by OHV and need reconstruction. Wattles were not damaged and treatment is still effective. The straw mulch remained in place in this treatment location possibly due to the depth in which it was distributed (3-5 inches verses 1-2 inches where it blew around). Monitoring of seedling establishment in non-mulched locations will occur over the summer. The SBNF submitted a revised treatment description/funding request to the RO on 1/25/2000 which the WO approved. This redirected funds from fence construction to funding for public contact and information. See digital photos labeled "Warm Springs Treatments".

Funded Amount: **$10,300**
Spent to Date: **$10,000**

<u>Protection of Spring Habitats in Areas of Higher Burn Intensities</u> <u>(Spring Prot)</u>
Sediment deflectors or traps (wattles, bales, bags, logs) will be constructed above springs in moderate and high intensity burn areas. Infrastructures (developments and fences) at some of the springs need to be repaired due to fire damage. Approximately 45 springs are present within the burn area, 26 of these springs are developed. Nineteen of the springs are present in moderate and high intensity burn areas. These springs are in danger of being impacted by sediment or mudflows that would reduce their ability to provide water to TES species and other unique aquatic biota in a semi-arid environment.

Interim Report: Treatment ongoing. Springs will be visited to determine if they are still flowing after spring snowmelt in June. Sediment deflectors or traps (wattles, bales, bags, logs) may be constructed above springs where sedimentation and erosion have interferred with waterflow.

Funded Amount: **$ 57, 000** **for 19 springs in moderate and high intensity burn areas**
Spent to Date: **$ 0**

Protection of Heritage Sites (Arch site Erosion Protection CA-SBR-294, SBR 5578, SBR-5579, SBR-3781 (BLM), Treat Recor)
Of the hundreds of sites within the burn, these are extremely high value sites at significant risk. (see archaeology report for more details).

To prevent the loss of artifacts and disturbance to features they will be mapped and diagnostic, sensitive surface artifacts collected. Soil will be stabilized with the use of straw wattles to hold soil in place or direct flow of run-off and limit the amount of down-cutting of cultural deposit.

In one case, to reduce the potential for expansion of gully headcuts and the potential for loss of cultural resources, the headcut will be stabilized (added benefit for the riparian and stream system). Headwalls will be reshaped to a 2:1 slope, lining with filter fabric and placing 6"-12" riprap on the new slopes. Willow stakes could be punched into the area to accelerate recovery. (See hydrology design for further details). Another site is at risk from streambank erosion, and will have armor placed on the edge of the site closet to the drainage with sandbags stacked in a pyramid type formation. Plant native willow along the sandbagged area. Strip mulch with straw above the site near the break in slope.

Some sites will be seeded and planted with native vegetation.

Some sites will simply be recorded prior to other BAER erosion control work occurring on the site.

Interim Report:

HR Site SBR-294: See treatment above for Prevention of Erosion at Warm Spring. This is the same location. All erosion treatments completed. Heritage resource site will be evaluated using hand tools. This is mitigation for endangered arroyo toads which occupy the same site. Heritage resource site evaluation scheduled for completion by June, 2000. Native seed was collected from unburned islands as close to the site as possible and is being grown at our district nursery for outplanting in the fall of 2000. Additional seed which was collected locally prior to the fire was raked in during the month of February. See digital photos labled "Warm Springs Treatment."

Funded Amount:	**$22,942**	**and $15,000 OHV grant from Forest**
Spent to Date:	**$ 6,165**	**includes 3,505 from Warm Sp. and 2,560 for arch estimate**
	$ 15,000	**OHV grant**

HR Site SBR-5578/H: Coxey Creek Headcut completed 11/5/99. Proposed treatments of headcuts would have impacted a sensitive heritage resource site. As a consequence, all proposed treatment areas within site boundaries were excavated to recover archaeological data prior to implementation. When the hydrologists visited the area for implementation, remarkable vegetative recovery was observed in wet areas. It was decided that this site could be protected with fewers impacts by utilizing and enhancing the vegetative recovery. Four headcuts were reshaped, covered with natural fiber (jute) matting and native, locally collected wild rose and

willow cuttings were planted through the matting. Rock was hand carried to the site and placed on the surface of the matting at the flow path to prevent undercutting beneath the matting.

Interim Report: Treatment of archaeological site where direct impacts of headcut stabilization threatened site was conducted prior to implementation. This work included archaeological excavation and surface collecting of diagnostic artifacts in the areas of proposed treatments. Archaeological monitoring was conducted during treatment. Rose and willow cuttings on upper banks were hand watered weekly due to limited amount of rainfall. Roses survived, willows did not. Other perennial native plants are resprouting well beneath and amongst the jute matting. Treatments at this location remain in good shape and are functional. Sandbag dam was removed this winter. See digital photos labeled "Coxey headcuts".

Funded Amount:	**$ 21,800**	
Spent to Date:	**$ 6,770**	**hydros, bios, crews, materials**
	$ 13,800	**for archaeological contract as of 11/99**
	$ 5,600	**digital camera, GPS unit**
Total to date:	**$ 26,170**	

<u>HR Site SBR-5579</u>: Willow Canyon treatment completed 11/8/99. This prescription was revised to protect the archaeological site from a larger storm event that could cause channel to migrate and deeply scour the heritage resource site. Revised treatment used a combination of sandbag berms, a single-fence-reinforced sandbag deflector, and a double-fence-reinforced straw bale deflector. Three continuous rows of wattles were placed on the hillslope and straw was spread in a swath as prescribed.

Interim Report: Treatment of archaeological site where direct impacts from construction of deflection walls threatened sensitive subsurface deposits was conducted prior to implementation. This work included archaeological excavation and surface collecting of diagnositic artifacts in the areas of proposed treatments. Archaeological monitoring was conducted during treatment. Wattles, berms and deflectors remain intact to date. Straw mulch that remained dry due to lack of rainfall blew around in 70 mile an hour winds. It accumulated in piles throughout the treatment area. Wattles were chewed on by animals at this site as evidenced by several 5 inch long rips in the wattles. Need to check if herps get caught in the silt fence. No other treatments are needed here. Monitoring will continue. See digital photos labeled "Willow Canyon 5579".

Funded Amount:	**$ 18,513**	
Spent to Date:	**$ 12,150**	**hydros, bios, crews,materials**
	$ 17,600	**archaeological contract as of 11/99**
Total to Date:	**$ 29,750**	

<u>HR Site SBR-3781:</u> BLM land, N/A to National Forest system lands

<u>Heritage Resource Sites at Risk:</u> Properties - CA-SBR-295, -449, -458, -475, -478, -479, -481, -483, -938, Deep Creek 1

Based on limited data, these sites are determined most at risk due to high visibility from illegal surface collecting and subsurface excavation for artifacts. Sites will be mapped in detail and photos taken that provide current observations and conditions.

Interim Report: **CA-SBR-295,-475,-478, -479, and Deep Creek 1 have been completed. CA-SBR-449,-481,-483, and –938 are scheduled for completion by June,2000.**

Funded Amount: **$ 9,600**
Spent to Date: **$**

Interim Report: **CA-SBR-458 has not been completed and is scheduled for completion by June, 2000.**

Funded Amount: **$ 2,130**
Spent to Date: **$**

Vegetative Blockage (Shrub planting) This treatment consists of planting local native shrubs at key locations along road routes within high and moderate intensity areas within the burn to block off-route vehicle access to important TES and archaeological sites, once the area closure is lifted, and prior to natural regeneration providing adequate blockage. 2,500 containers of seven species would be outplanted.

Interim Report: Local seeds of rubber rabbitbrush, flat top buckwheat, flannelbush, manzanita, birchleaf mt. mahogany and curl leaf mahogany, and native grasses were collected from unburned islands and locations adjacent to the fire. Seedlings are currently being grown at our district nursery for outplanting in fall of 2000. The SBNF submitted a revised funding request to the RO on 1/25/2000 which was approved by the WO for labor costs to outplant the potted stock. See photos labeled "Shrub Planting".

Funded Amount: **$ 23,175**
Spent to Date:

Seeding/slash This treatment consists of applying locally collected native plant seed and slash on 100 acres to high and moderate intensity burn areas adjacent to key locations noted under the Vegetative Blockage treatment as a way of extending this treatment to a larger area (costs are primarily for slash transportation from unburned areas).

Interim Report: Seed collection and dispersal of 6 species completed October 21, 1999. Rubber rabbitbrush, several buckwheat species, squirrel tail grass and curl leaf mt. mahogany seeds were collected from adjacent unburned lands and placed in tarps. Tarps were driven, then carried to selected locations of high intensity burn and areas in need of vegetative cover to protect TES habitat from vehicle entry after the fire area is reopened. The tops of rabbitbrush and sagebrush were also cut from plants and distributed over sites to enhance microclimate and promote seed germination. Large accumulations of curl leaf mt. mahogany duff with ripened seed were collected beneath the plants, placed in the tarps and distributed in this manner also as mulch over

burned soils. An additional 30 pounds of cleaned, locally collected rabbitbrush seed was donated and raked into sites in January.

Funded Amount: $ 20,000
Spent to Date: $ 19,720

TES Plant and Rare Butterfly Habitat Protection (TES Plant Road Rest)
To prevent further losses of TES plant (See Botanist report) and an associated rare butterfly habitat, previously vegetatively stabilized roads and non-system roads into occupied habitats are proposed for partial (temporary) closure. Roadbeds will be hydrologically stabilized to prevent drainage rerouting and running surface erosion. A subsoiler will be used to treat the roadbeds and increase infiltration. (Hand intensive work and need for on-site monitors create high costs per mile)

Interim Report: Treatment ongoing. 3N50 (1 mile), 3N39 (1 mile), and 2 miles of unauthorized roads were subsoiled and hydrologically stabilized as of December 19, 1999. Heritage resource and TES species surveys were completed for 9 miles of roads proposed for this treatment. Emergency Consultation with SHPO for heritage resources and with USFWS for endangered plants is ongoing and needed prior to completion of several of the remaining roads.

Funded Amount:	**$ 80,000**	
Spent to Date:	**$ 6,000**	**on roads contract as of 1/2000**
	$ 3,000	**in resource personnel salary as monitors on the ground**
	$ 2,500	**in planning/coordination salaries**
	$_____	**archaeological surveys/documentation**
Total estimated to Date:	**$**	

Cheatgrass Eradication in Pebble Plain/Rare Butterfly Habitat
(TES Plant Site Cheat Grass Eradication)
This treatment will prevent further degradation/losses of pebble plain/rare butterfly habitat. The treatment objective is to initially apply proven treatments on a small scale in sensitive pebble plain habitat, and also to informally *monitor* invasive cheatgrass dominance at the landscape level to determine the need for comprehensive non-BAER follow up treatments. The proposed treatments are to apply the grain harvest method on a small scale.

Interim Report: Six monitoring plots were set up in two Pebble Plains locations in October 1999. This included mapping the plots, identifying with rebar, photographing and collecting baseline data for comparison this spring. We are also working with botanical staff at Victorville College to locate, map and install the landscape level cheatgrass monitoring plots. The Forest resubmitted the Interium Monitoring Request to RO on 1/25/2000 which they sent to the WO. The WO awaits an OK from fiscal and then it will be considered for approval. The Forest awaits news of this request.

Funded Amount **$ 5,100**
Spent to Date: **$ 2,584 includes work on PP monitoring sites**

Willow Regeneration in Riparian Zones (Willow Plant)
Due to high intensity burns in some of the riparian zones, regeneration is expected to be patchy and supplemental planting necessary within valuable riparian willow habitat (multiple TES species dependent upon this habitat, which in some cases could be lost to invasive Salt Cedar type conversion). Willow cuttings will be collected from local sources and slip planted.

Interim Report: Cuttings have been collected from Deep Creek drainage and are being grown at the District Nursery. They will be outplanted in the spring. Other locations that may need cuttings will be evaluated after this winter and will be collected, grown this summer and outplanted in the fall of 2000. See digital photo labeled "Willow Cuttings".

Funded Amount: **$ 6,000**
Spent to Date: **$ 0**
$ 500 **to date from OHV grant for Warm Spring, includes collection, cuttings and growing at District Nursery.**

Route Revegetation (Route Reveg) This treatment provides for revegetation of previously revegetated abandoned OHV routes and trails on BLM lands within the Juniper Flats ACEC and other locations, using local BLM proven methods for arid environment revegetation. (see detailed description on BLM resource report).

Interim Report: N/A to National Forest System lands

Reduce Streambank Erosion and Sedimentation in Cox Cr and Willow Cyn (LEBs)
To minimize adverse effects on water quality and channel conditions in the high burn intensity Cox Creek and Willow Canyon Watersheds trap increased sediment loads from upland, floodplain, and terrace sources and reduce the stream erosive energies by constructing LEBs on upland hillslope areas and vortex log erosion barriers (VLEBS) on floodplains and terraces on 20 acres. Structures will be placed on gently sloping upland, floodplain areas less than 15% slope within 100 feet of perennial and intermittent streams within the Cox Creek and Willow Canyon watersheds. (Cost per acre based in part on low number of acres being treated and access in the specific areas proposed for treatment).

Interim Report: Completed November 13, 1999. Treatment called for LEBS on 20 acres within Willow and Cox Canyon watersheds. Implementation team members visiting site in October found many areas that met slope conditions were too rocky or the slopes were too irregular to allow usage of rigid log barriers. They also found that there were several areas that could benefit from hillslope treatment due to their proximity to the stream, but which were on slopes too steep for LEB effectiveness. In these locations straw wattles and straw mulching were proposed.

Archaeological and TES plant concerns were expressed for this proposed treatment due to potential ground disturbing activities. Prior to implementation, treatment areas were plotted

using GPS equipment and 200 acres were surveyed for heritage resources and TES plants. Twelve heritage resource sites were identified through survey of the proposed treatment areas. These sites were mapped and recorded. Impacts to sensitive heritage resource site were avoided by withdrawal or through monitoring during treatments. Several locations with TES plant habitat was excluded from this treatment. LEB's were constructed from burned trees on the average of 12" DBH but up to 24 DBH with lengths of 5 to 40 feet. They were anchored by natural barriers or stakes and backfilled with soil and slash. Where logs bowed above the surface, the log was undercut to reduce the amount of soil used in backfill. Lebs were monitored in March and April. They remain effective and require no further treatment at this time. See digital photos labeled "Willow/Cox treatments".

203 wattles were installed Willow Canyon into 3" deep trenches. They were secured with large metal staples and ash-free soil was distributed behind the wattle. No specific sites for wattles were needed in Cox Canyon. Wattles were checked in March for effectiveness. They worked well in the steeper canyons where the soil collected to the top level of the wattles. See digital photos labeled "Willow/Cox treatments".

50 bales of rice straw mulch were distributed 1-2" deep in Willow and Cox Canyons in intensely burned areas with little or no needlecast or rock to protect soil. Straw in protected areas remained on site, while straw in other locations blew around and redistributed in piles throughout the treatment areas. We found the pine needle drop to be the best mulch. See digital photos labeled "Willow/Cox treatments".

Funded Amount: $ 20,000
Spent to Date: $ 55,769

This project is overbudget by $35,769 due to implementation costs and an over-accomplishment of 10 acres. Savings from other Land Treatments are expected to cover this deficit.

Jeffery Pine Planting
This treatment is to plant native Jeffery Pine in the Willow Creek Drainage for ecosytem stability.

Interim Report: This was initially not funded due to lack of information. The SBNF submitted a revised treatment description/funding request to the RO on 1/25/2000 which was also not funded.

Funded Amount: $ not funded
Spent to Date: $ 0

CHANNEL TREATMENTS
Protecting Crystal Creek and the OMYA Mine Well Head (Well Deflect)
Construct a debris flow wall to protect the well head and casing adjacent to Crystal Creek from the predicted post-fire sedimentation and increased debris flow potential that will otherwise bury or damage the well head. Loss of this well head or disruption of water service from it will have significant

economic effects on local industry. Treatment will also prevent channel degradation or lateral migration of the channel that would remove the fill adjacent to the well head and well casing.

Interim Report: This project was determined to be Omya's responsibility because it is under their Special Use permit. The SBNF will not be implementing this treatment.

Funded Amount: $ not funded
Spent to Date: $ 0

Beaver Dam Removal in Deep Creek (Beaver Dams)

This treatment provides for breaching 6 Beaver dams in lower Deep Creek to prevent them from changing channel morphology with a direct adverse effect to arroyo toads, and will favor species which compete wtih arroyo toads for food and prey upon young toads. 6-8 beaver dams in lower Deep Creek (T3N R3W Sec 17 & 18) will be breached using dynamite and a come-a-long with grapple hook puller. Breach ways will be wide (approximately 1/3 the channel width) and placed in an alternate pattern from dam to dam to create a meandering thalweg rather than mid-channel placement.

I**nterium Report: The SBNF resubmitted a detailed treatment description/funding request to the RO which was approved by the WO on February 25, 2000. Planning has been done for this project but the actual work has not been completed. Emergency Consultation with the USFWS for the endangered arroyo toad is in progress.**

Funded Amount: $ 9,200
Spent to Date: $ 0

Coxey Pond (Sed Store @ Coxey Pond)
Due to higher than normal upstream flows, sediment deposition is expected in Coxey Meadow and Pond, to maintain this aquatic ecosystem, Coxey Pond will be deepened and cleared of sediment encroaching emergent vegetation using an excavator, as was successfully accomplished after the 1994 Devil fire. This will allow the pond to receive more sediment while retaining aquatic habitat for sensitive wildlife species and species of high public interest. A wildlife monitor will be on site to ensure that two-striped garter snakes are not impacted. An archaeological monitor will be on site to protect the adjacent cultural site.

Interim Report: Completed October 16, 1999. The Coxey dam remained intact this winter.

Funded Amount: $ 6,000
Spent to Date: $ 3,050

Develop a Detailed Headcut Stabilization Plan for the Cienga Springs Headcut (Cienega Gully)
This treatment provides for the hydrologically engineered stabilization of a previously vegetatively semi-stabilized gully headcut which post fire is expected to receive increased flows causing the headcut to extend further upstream towards forest system road 3N16 and potentially result in a loss of the road as

well as to prevent a steeper groundwater gradient that will accelerate a change in vegetation from meadow grasses to sage and other dry site vegetation.

Interim Report: Not funded.

Funded Amount: $ not funded
Spent to Date: $ 0

ROADS AND TRAILS
Reducing Stream Sedimentation at Road Stream Crossings (Armor x-ings)
To reduce the total sediment delivered to stream courses from high and moderate intensity burned areas, and areas directly contributing post fire sediment to TES habitat within the burn area, road surfaces within 0.125 miles of perennial and intermittent streams will be rocked on 32.7 miles of Forest System roads. (This is one of the treatments with the highest probabilities of success). On site design by a hydrologist and engineer during implementation will be used to refine this treatment to site specific conditions, reducing the length of some of these rocked segments and eliminating the need for others perhaps.

Interim Report: Aggregate surface was completed on Forest Roads 3N34 and 3N34D. Aggregate segments of roadbed on 3N16, 3N14, and 4N16 are scheduled to be completed by May 30, 2000.

Funded Amount: $ 245,250 (only approved where topography and delivery indicate need)
Spent to Date: $ 44,396 3N34 and 3N34D
$ 40,000 estimate to be spent on 3N16, 3N14, 4N16
$ 5,175 Contract Administration

Prevent impacts to OMYA Mine Haul Operations Due to Stream Crossing Failure (3N88 CMP)
To prevent road loss or failure of forest system road 3N88 (under special use permit), replace the existing 36" culvert with three 60" culverts. Existing culvert capacity is inadequate to pass 50 year post-fire peak flows of 2,516 cfs on the OMYA Mine Haul Road.

Interim Report: Was not funded by BAER. This is a road that is under a Special Use Permit. Permittee is required by terms of permit to cover this cost. Permittee chose to monitor at this time.

Funded Amount: $ not funded
Spent to Date: $ 0

Prevent further accelerated rill and gully erosion on Juniper Flats Road (Juniper Fl Rd)
To prevent increases in erosion and sedimentation expected as a result of the fire the Juniper Flats road (BLM) needs increased road drainage and basic erosion control (over 88 percent of this watershed burned, some to moderate burn intensity). Treatments include grading, installing drainage features, energy dissipaters, etc. Below lead off ditches there is a need for the installation of energy dissipaters.

Adjacent to stream crossings install rolling dips to limit the potential for out of channel diversions down the roadway. Rolling dips (smoothed over driveable berms that are slightly elevated above the road surface) will be used to help drain the road surface.

Interim Report: N/A, not on National Forest system lands

Rockfall Signing on PCT (Rockfall sign) This treatment consists of designing, building, and installing four signs for the Pacific Crest Trail warning users of fire caused rockfall hazards. Signs would be installed prior to lifting of the area closure.

Interim Report: Area remains closed to all foot, vehicle and equestrian traffic. Reopening of the Pacific Crest Trail and Deep Creek Hot springs is expected in early summer. Signs have been ordered, received and are being installed. See copy of sign in section labeled "Public Information".

Funded Amount: $1,280
Spent to Date: $ 155 signs
$ posts and installation

System Roads (FDR Drainage)
Specific segments of roads within high and moderate intensity portions of the burned area are proposed for treatment. Protect loss of embankment at some drainage installations with construction of grouted concrete cutoff walls, and downstream slope protection including grouted rock spillways, toe walls, and/or riprap. This will protect the embankment, allowing high flows to top the embankment without significant soil loss. Construct intercepting dips and install overside drainage structures (Big and Little Mac) with riprapped outlets to relieve surface runoff from roadway at more frequent intervals thereby reduce surface erosion on roadways. Additionally, augment some existing drainage structures with improved inlets. Install rock rip rap at outlets to overside drainage structures as energy dissipators to decrease flow velocity and erosion . In addition removing berms from critical sections of roads, outsloping, and placing rock surfacing to decrease surface erosion. In one location, it was recommended to install a french drain to stabilize a portion of road. Road 3N14 includes some surface rocking for particularily erodable areas. See Road Logs, Exhibit B for site specific work locations. In some cases BAER work will be supplemented by 10% fund already available on Forest

Interim Report: Treatment completed under contract 50-914-0-1L02. Treatment revised to eliminate grouted rock spillways and toe walls. All other items remained same. See digital photos labeled "Road Treatments".

Funded Amount: $174,000 plus 310,000 contributed from Forest
Spent to Date: $ 120, 350
$ for arch and botany surveys

Patrolling (Storm Patrol)
Additional patrols should be utilized during the duration of the first winter, especially where treatments are implemented or resources needing protection exist. This treatment would provide for an ongoing patrol through the first winter to take immediate flood patrol action, to ensure that the closure is not breached, to reduce damage during storm events, to repair vandalized/damaged treatments, to ensure that emergency treatments are not damaged by illegal OHV use (for example, motorcycles using dozerline waterbars as jumps), and to ensure that barriers and signs are not removed. This treatment will provide protection to general wildlife, pebble plain/rare butterfly, endangered carbonate plant, sensitive plant, mule deer, riparian, desert/alluvial, and aquatic habitats.

Interim Report: Treatment ongoing. Met with BLM to determine strategy for patrols that would compliment each agency along the boundary. This coordination continues. Law Enforcement personnel continue to contribute time and coordinate with each agency on problem areas. We have people covering the fire closure area, distributing flyers and talking with the public throughout the week. We increase this effort on Fridays and weekends out of BAER funds. Problems have been encountered on the desert side where access to Deep Creek Hot Springs is frequently breached. Public safety is still the number one concern. If the public breached the closure at the Hot springs in the lower portion of the watershed and a storm brought rains to the top of the watershed, the public could be hurt or killed by flooding and mudflows. Large granitic boulders which fell on the Pacific Crest Trail are now being removed using other funds. Unauthorized woodcutting poses a threat to TES species and natural regeneration within the fire area. As trees are cut, it creates openings which encourage more unauthorized vehicle use. Most of the trees and brush redistributed on the dozer lines along the fire perimeter have also been removed illegally for firewood. Several emergency treatments are located adjacent to the roads and can be affected by off road driving. Both the seeded areas and those recovering on their own are at stake from unauthorized driving. Barriers are installed as needed and closure fences are constantly in need of repair. Culvert inlets have been checked during significant storm events but have not needed cleaning to date. Additional monitoring will continue.

Funded Amount: $ 40,000
Spent to Date: $

Area Closure/Revegetation (Closure: Gates, Fencing, OHV Block, Signs, public info, Law enforc)
This temporary closure of the burned area for the first winter serves the purpose of preventing many threats to public safety during the upcoming winter, and to allow time for the treatments and natural recovery to become effective. Lifting of the closure would then be subject to subsequent season *monitoring* to determine if emergency conditions threatening public safety have been appropriately reduced. This area is traversed by numerous roads and trails, and receives a tremendous amount of OHV use, both on designated routes and from illegal off-route use. The lack of vegetation caused by the fire has resulted in a significant threat to emergency treatments, natural recovery, TES species, and archaeological sites in the form of increased illegal off-route OHV use. The temporary gating of roads and trails, detouring traffic onto alternate routes, signing of roads and trails to inform area users of the hazards of the area, and installation of other devices on non-system travel ways will prevent the reduction of treatment effectiveness, as well as prevent increased erosion on areas now lacking natural barriers and will reduce the sedimentation of important downslope/stream areas. Educate people about the closure effects of the fire on the land and the additional human impacts through signing, public

meetings and press releases. Law enforcement (not paid for by BAER, but covered by reprioritization of workload) provides for compliance with the closure order. Patrolling for the first winter to ensure treatment maintenance (repair vandalization) will be necessary, especially from the low elevation desert side of the burn.

Interim Report: New gate locations and lead off fencing were surveyed for heritage resources and TES plants. Temporary fencing and signing was installed across roads leading into burned area closure. 9 new gates were installed January-March. Wing fencing to exclude vehicles around gates began in January and continues to date. Educational closure signs were installed on gates in February. Signs were designed to be used after the reopening also by placing open area decals over the closed area decals. See digital photos labeled "Fire Area Signing".

USFS and BLM attended a public meeting on the fire area closure in Apple Valley on October 14, 1999 which was organized by BLM. From the USFS, two BAER team members, Forest Public Affairs Officer, and volunteer coordinator manned information tables at the well attended meeting. BAER reports and WO response documents were distributed to those that requested them. Information flyers describing the fire area closure with maps were distributed and a specific flyer entitled "Why are the Hot springs closed?" was especially helpful. Questions were answered regarding the fire, treatments, safety and potential emergencies. Forest visitors were redirected to open areas and maps were provided. BLM did an excellent job of relaying public information with a slide show and they also distributed flyers.

Following the fire and through the present, the Forest Public Information Officer (PIO) has given interviews to numerous newspapers and fields many media calls. The PIO met with Deep Creek Hot Spring's locals regarding the fire area closure resulting in the closure information being posted on the hot springs website. PIO distributed the Forest Order for the closure to the public along with the Hot Springs handout. Talking points to answer questions from the public regarding the closure and safety issues were distributed to all USFS employees. Meetings continue with the BLM staff and local forest visitors regarding the closure. PIO has worked to include all interested parties in the reopening plans. Forest PIO and staff have monthly meetings on the reopening process. Forest is dedicated to reopening locations in a timely manner within the burned area if they will not inhibit burned area recovery and treatment objectives. See section labeled "Public Information".

The SBNF submitted a revised treatment description/funding request to the RO which was approved by the WO on February 25, 2000. It redirected fence construction funding to public education. Temporary jobs are ready to be filled for these positions. Personnel will be in place to protect treatments at Warm Spring for Deep Creek Hot Springs reopening in early summer.

Funded Amount:	**$ 40,000**	**gates and installation**
	$ 20,000	**fencing**
	$ 10,000	**OHV block**
	$ 5,000	**signs**
	$ 30,000	**PIO contacts, publicmeetings entire fire area/closures/reopenings**

	$108,000	**7 day public educational coverage for 2 years at Warm Spring from redirected fence funding**

Total funding to date: $213,000

Spent to Date:	**$ 35,500**	**gates and installation**
	$	**fencing**
	$ 3,500	**OHV block for fence materials/ labor to date at Warm Springs**
	$ 1,720	**signs (does not include installation costs)**
	$	**PIO contacts, public meetings entire fire area/closures/reopenings**
	$	**7 day public educational coverage for 2 years at Warm Spring from redirected fence funding**

STRUCTURES

Prevention of damaging OHV use at Warm Spring (Warm Spg OHV Fence)

Reinforce approximately ¼ mile of existing cable fences at the decommissioned 4WD road (T3N R3W Sec 12) to prevent access to the hillslope treatment area and arroyo toad habitat. Due to vegetation removal by the fire this area is attractive to illegal OHV recreation activities. In addition, cable fences (~1/4 mi) will be installed at the edge of the Warm Spring terrace (T3N R3E SW 1/4 Sec. 14) to prevent crushing of toads and their habitat by OHVs that illegally enter Deep Creek floodplain areas. It is essential that this area be protected from post-fire illegal OHV use because of predicted higher erosion rates and surface runoff due to vegetation removal. Failure to protect this population of arroyo toad could lead to extinction of this species in the Deep Creek drainage. Fencing will be constructed of 2 strands of cable and well-casing posts set in concrete. Materials for reinforcing the existing fence can be delivered by truck, other materials must be flown in by helicopter, thus resulting in the high cost per unit (plus the need for biologist and archaeology monitors). Green sticker funds already available on Forest are being used to supplement BAER funding for this effort. Alternative methods for transporting material to the site (perhaps volunteer 4WD club transportation) will be investigated during implementation to attempt to lower the unit cost of this treatment.

Interim Report: After recent field visits to the Warm Spring treatment sites with BAER implementation team and Forest OHV staff, it was determined that the cable fence proposed in the original BAER report would not effectively control OHV and hiking access to the treated area. This is due to the open, flat, desert type terrain and the fact that the shrub vegetation that originally acted as natural barriers to the area burned in the fire. A Forest Order in place prior to the fire and currently in effect restricts access to this location to promote recovery to an endangered toad species. Public use in this location has been historicially high due to local residents living adjacent to the Forest accessing the area through their back yards and the world famous Deep Creek Hot Springs located adjacent to the site. Public access had successfully been eliminated prior to the fire.

A new treatment description with a redirection of funds from fencing to public education was approved by the WO on 2/25/2000. This would more effectivly protect the completed 3 acre

BAER treatment (wattles, check dams and straw mulch) needed to prevent sedimentation to endangered toad habitat and a significant heritage resource site. This site has been accessed by OHV's since the treatment was completed. A 1/2 mile of smooth wire fence and signing to prevent off road vehicle access was completed in March. This was funded by OHV fence in previous treatment.

Replacement and Extension of Barriers for Illegal Off-Road Vehicle Activity (Juniper Flat OHV Fence)
To prevent off-road vehicular activity in areas previously blocked by vegetative barrier in the BLM ACEC : Build well casing/cable fencing on the east side of Juniper Flats Road south from the cattle guard to the powerline road. The costs reflect the need for archaeological monitors.

Interim Report: N/A, not on National Forest system lands.

NRCS EWP If a cost share partner can be found, these treatments would provide for direct protection of subdivision areas in Apple Valley. NRCS is the lead agency for this.

Interim Report: N/A, not on National Forest system lands

Caltrans The shotgun culverts under SR173 are the responsibility of Caltrans, and the need for work will be evaluated, designed, and implemented by Caltrans.

Interim Report: N/A, not on National Forest system land

California Spotted Owl Nests (Owl Nests)
To maintain habitat suitable for nesting and reproduction in two owl territories where nest trees were burned to increase chances of retaining habitat suitability. Place at least 1 nest platform and 1 nest box within suitable trees and in specific locations which provide attributes similar to known nests in Southern California.

Interim Report: Was not funded

TES Fences and Barriers (TES Fences)
New temporary fences are needed to block sensitive sites from OHV activities and livestock prior to vegetative recovery of screening and blockage.

Interim Report: 3N77 fence at south end of endangered plant (OXPAG) completed. North end of 3N77 fence/barrier is underway and additional fence construction to protect endangered plants at White Mountain before fire area is reopened needs to occur. Surveys are needed to decide exact locations needing fence construction. This area is included in the fire closure so it was not a priority for completion over the other BAER treatments. Now that those are complete, this is the next treatment to complete. All fence materials have been ordered and received. Fence assessment surveys will begin in June.

Funded Amount: **$34,000**
Spent to Date: **$ 13,380** **fence materials**

Clean out/Repair Guzzlers (Fiberglass)
A Burned fiberglass guzzler presents a health and safety hazard due to blown fiberglass. The fiberglass will be dug up and removed from the site. (Minor infrastructure where closure will not remove the hazard)

Interim Report: Ongoing. Guzzler surveys were completed throughout the fire. Two fiberglass guzzlers burned and need to be removed or buried. We have determined access routes for burial of one guzzler and are working on logistics for the other. Work will be completed in the summer of 2000.

Funded Amount: **$1,400**
Spent to Date: **$ 300** **guzzler surveys**

BLM OHV fence (OHV Fence-BLM) This treatment provides for temporary OHV barrier fence to protect natural vegetative recovery in non-TES and non-Archaeological site areas (less expensive that more sensitive sites).

Interim Report: N/A, not on National Forest system lands

BLM Riparian fences (Riparian Fence-BLM) This treatment provides for temporary spot barrier fencing around important riparian areas, for the specific purpose of protecting the natural vegetative recovery being relied upon for restoration of these areas.

Interim Report: N/A, not on National Forest system lands

EFFECTIVENESS MONITORING
This monitoring is specifically designed to answer the question: Did the BAER treatments provide the needed protection and rehabilitation of the burned area? The five effectiveness monitoring efforts identified for the Willow fire include: 1) Effectiveness monitoring to determine if the treatments on the former Warm Springs OHV route have infact provided for restoration to the pre-fire vegetatively closed condition, and if the important TES and archaeological resources being protected by the treatments have in fact been protected; 2) Effectiveness monitoring to determine if the beaver dam treatment in lower deep creek has had the intended effect on channel morphology, sediment deposition, and introduced species populations (CDFG is a partner for this monitoring); 3) Effectiveness monitoring to determine if the suite of treatments throughout the burned area designed to prevent impacts to arroyo toads have prevented such; 4) Effectiveness monitoring on the Juniper Flats ACEC traffic blockages to confirm that significant resources have been protected, and that the treatments are still intact; and 5) Effectiveness monitoring to confirm that BAER treatments to prevent impacts to TES species via blockage of traffic damage to natural vegetative recovery has been successful. See the detailed

monitoring plans for specific monitoring plan design, monitoring report due dates, and plans for results dissemination.

Need for fallback treatments Monitoring
This monitoring is specifically designed to answer the question: Have primary treatments been effective, of do fallback treatments need to be implemented? The three fallback monitoring efforts identified for the Willow fire include: 1) TES plant recovery via natural vegetative recovery treatment (if natural recovery has not occurred, intensive fallback treatment methods will be implemented); 2) Horizontal well sediment burial on BLM (if well has not been protected by other treatments, a specific fallback treatment will need to be implemented); and 3) Natural vegetative recovery on BLM lands (if natural vegetative recovery has not occurred, artificial revegetation treatments will be implemented). See the detailed monitoring plans for specific monitoring plan design, monitoring report due dates, and plans for results dissemination.

Interim Report: The SBNF submitted a revised Detailed Monitoring Plan to the RO on 1/25/2000 which was forwarded to the WO. A copy of the plan is included here. We are awaiting approval of this plan.

Monitoring Request ($144,561) -- The San Bernardino National Forest (SBNF) is currently part of the Southern California Conservation Strategy (brought on by litigation with Southwest Center for Biodiversity). As part of the settlement agreement with the plaintiffs, the SBNF is especially sensitive to potential impacts to any T/E species. In most areas of the Willow Fire, natural vegetative recovery was the treatment of choice. However, due to the extreme sensitivity of these habitats, monitoring to determine if natural recovery is indeed occurring is important in case corrective actions are needed. The detailed monitoring plans outline efforts needed to determine if fallback treatments are needed to prevent further impacts to several federally-listed species within the Willow Fire area. Without monitoring, unnecessary impacts might occur.

The SBNF biologists have prepared draft Biological Assessments that include BAER treatment and monitoring effort impacts on arroyo toad and carbonate plant species. The BAs will be submitted to U.S. Fish and Wildlife Service for Section 7 Formal Consultation to determine effects for listed species.

1. Prevention of Erosion at Warm Springs (Warm Spg straw wat) **and Prevention of Damaging OHV Use at Warm Springs** (Warm Spg OHV Fence)
a) Treatment: Straw wattles, trench erosion barriers, water bars, fencing, and seeding with native plants was accomplished on the slopes above Warm Springs to stabilize soils, limit erosion, and discourage off-road vehicle traffic that would increase sediment delivery concerns.
b) Management Concerns: Are important TES habitats being impacted or lost due to erosion, sedimentation, or illegal activities? Are follow-up treatments needed? Arroyo southwestern toads and their habitat could be adversely affected by fire effects relating to their habitat, including changes in sediment, water and vegetation. Arroyo toads are federally-listed as an endangered species. Arroyo southwestern toads are susceptible to adverse impacts due to changes in water and sediment regimes. In addition, toad habitat quality is often affected by changes in riparian vegetation. The Willow Fire will result in higher peak stream flows and sediment delivery to occupied and potential

suitable arroyo toad habitat in the Deep Creek drainage. Since arroyo toads favor wide alluvial terraces, greater sediment delivery may create additional habitat if it is deposited in terraces and then vegetated. However, if high sediment loading occurs during egg laying and embryonic development (April-July) then toad eggs and young toads could be scoured or suffocated. Also if stream flows are too swift, toad eggs could be washed away.

c) Objectives: To determine if the suite of watershed treatments in the Warm Springs area designed to prevent impacts to arroyo toads and their habitat have been effective. Monitoring to evaluate if the treatments on the former Warm Springs OHV route have in fact provided for restoration to the pre-fire vegetatively-closed condition. And, to determine if the important TES resources have actually been protected by the treatments as designed.

d) Parameters: Arroyo toad presence; Arroyo toad habitat characters

e Locations: Deep Creek from the Mojave Forks Dam upstream to the fire boundary.

f) Frequency and Duration: Arroyo toad methodology: annually in spring for two years. Cultural Resource methodology: Twice monthly visits between March and December for two years.

g) Monitoring Design and Methodology: Monitor arroyo toad in Deep Creek from the Mojave Forks Dam upstream to the fire boundary in accordance with standard protocols for these species. Compare post-fire monitoring data with pre-fire data for this species to determine changes that may have occurred due to fire related impacts. 1) For two years, annually monitor arroyo toad populations in the Deep Creek drainage according to protocol. When toad population surveys are conducted in the spring also collect channel cross section data that can be used to measure changes in channel morphology, stream terrace and floodplain development, and pool habitat filling and scour. Suggested areas for cross sections include: upstream of the Mojave Forks Dam, upstream of the gaging weir, above and below warm springs and the Devils Hole area.

2) Conduct 2000 and 2001 Color Infrared Flights of Deep Creek at 1-3 meter resolution to detect pool and stream bank/terrace habitat changes. Pool and stream bank/terrace habitat will be quantified and compared.

3) Utilize pre-fire Stream Condition Inventory (SCI, Devils Hole 1996) to monitor physical and biological changes in Deep Creek. Re-survey Deep Cr. SCI site one and two years post-fire using Region 5 protocol.

h) Monitoring Reporting: By February each year for two years. Written to District and SO wildlife/aquatic specialists. Infrared flight information will be stored and reported in GIS. SCI will be reported both to the Forest and submitted to the Regional SCI Database.

i) Cost:

3 person crew, 1 week = $2,500/yr X 2 years	$ 5,000
Flight @ $7,000/flight X 2 flights	$14,000
Interpretation of aerial photos--GIS technical specialist for 2 weeks	$ 2,500
SCI: 3 person crew X 1 week = $2,500/yr X 2 years	$ 5,000
Annual reporting $1,000 per year for two years	$ 2,000
Total	**$28,500**

j) Personnel: District Biologists, Forest Fisheries Biologists

k) Responsible Official: District Ranger

l) Follow-up Actions: Design and implement follow-up treatments as needed.

2. Protection of Heritage Sites (Arch site Erosion Protection CA-SBR-294)

a) Treatment: Straw wattles, trench erosion barriers, water bars, fencing and seeding with native plants was accomplished on the slopes above Warm Springs to stabilize soils, limit erosion, and discourage off-road vehicle traffic that would increase sediment delivery concerns.
b) Management Concerns: Are important archaeological sites being impacted or lost due to erosion, sedimentation, or illegal activities? Has increased visibility and access resulted in vandalism of sites? The archaeological site consists of occupation debris indicating continued use probably on a seasonal or limited basis. Artifacts and features observed include numerous milling features (mortars and metates), several rock art (cupule) boulders, ground stone tools, pottery, and lithic debitage. Human remains have been reported from this site. Because of the natural warm springs, the site was no doubt used for ceremonial activities by Native Americans for many millennia. Limited archaeological investigations conducted during the 1970's identified tools for processing plant remains for food, trade items from the coast, quality stone being transported in from hundreds of miles away but could not determine ages of occupation or use. The site measures approximately 300 (N/S) x 100 (E/W) meters and is located on a terrace above Deep Creek. Vegetation on site was burned completely exposing surface artifacts and cultural deposits. Illegal OHV activities also impact the archaeological site and threaten critical habitat of the arroyo toad. Increased visibility of surface artifacts and soil erosion from steep slope behind the site and potential vandalism is a concern.
c) Objectives: **To determine if slope treatments were effective and if post-fire impacts are occurring to an archaeological site in Deep Creek. Also to determine need for further treatment if impacts are occurring.**
d) Parameters: Archaeological sites and artifacts.
e) Locations: In the Warm Springs area of Deep Creek.
f) Frequency and Duration: Visit monthly March through December for three years.
g) Monitoring Design and Methodology: Initial site treatment will include detailed mapping to provide a baseline of information from which to monitor treatment results and the potential for other disturbances (artifact looting) over a three year period. Photo points of specific treatment areas, culturally sensitive areas or diagnostic artifacts will be keyed to the map for easy reference and relocation. Monitoring data will include site number, location, description of project and what is being monitored. A monitoring form will prompt the collection of observations and data including date, time, weather conditions, site conditions, illegal OHV use in the area, missing artifacts, illegal digging, erosion, exposure of artifacts or features, recommendations for other protection measures and other observations. Appropriate action should follow assessments. If surface artifacts have been removed or there is evidence of subsurface disturbance in culturally sensitive areas, data recovery (excavation) should be implemented.
g) Reporting: Archaeologist will prepare yearly interim monitoring report and final report after third winter and distribute to BAER team leader, regional office BAER coordinator, and to archaeologists currently involved with BAER work. Results will also be incorporated in annual report as required by the Programmatic Agreement Among the U.S.D.A. Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance With Section 106 of the National Historic Preservation Act for Undertakings on the National Forests of the Pacific Southwest Region.
h) Cost:

GS 11 Hydrologist: 250/day X 2 days/year X 2 years	$ 1,000
GS 11 Archaeologist: 250/day X 20 days/year X 2 years	$10,000
Supplies (film, developing, stakes, etc.) and Mileage:	$ 1,500
Total	**$ 12,500**

i) Personnel: Archaeologist; Hydrologist
j) Responsible Official: District Ranger
k) Follow-up Actions: Design and implement follow-up treatments as needed.

3. Protection of Heritage Sites (Arch Site Erosion Protection CA-SBR-295, -449, -458, -475, -478, -479, -483)

a) Treatment: Various, including slope treatments and natural vegetative recovery.

b) Management Concerns: Are important archaeological sites being impacted or lost due to erosion, sedimentation, or illegal activities? Has increased visibility and access resulted in vandalism of sites? Archaeological sites consisting of surface artifacts and cultural deposits based on either previous record or current observations. Cultural remains vary from site to site but artifacts and features include milling features, ground stone artifacts, different lithic materials, shell beads, trade and post contact items and several with ceramics. The sites are at risk from illegal artifact collecting due to exposed sensitive or diagnostic artifacts and potential for soil erosion.

b) Objectives: **To determine if slope treatments were effective in protecting the archaeological sites; to determine if post-fire impacts are occurring to various archaeological sites throughout the fire; to determine need for further treatment if impacts are occurring.**

c) Parameters: Archaeological sites and artifacts.

d) Locations: At heritage resource sites CA-SBR-295, -449, -458, -475, -478, -479, -483, along Deep Creek.

e) Frequency and Duration: Visit sites annually in April and October for two years.

f) Monitoring Design and Methodology: Initial site treatment will include detailed mapping to provide a baseline of information from which to monitor treatment results and the potential for other disturbances (artifact looting) over a three year period. Photo points of specific treatment areas, culturally sensitive areas or diagnostic artifacts will be keyed to the map for easy reference and relocation. Monitoring data will include site number, location, description of project and what is being monitored. A monitoring form will prompt the collection of observations and data including date, time, weather conditions, site conditions, illegal OHV use in the area, missing artifacts, illegal digging, erosion, exposure of artifacts or features, recommendations for other protection measures and other observations. Appropriate action should follow assessments. If surface artifacts have been removed or there is evidence of subsurface disturbances in culturally sensitive areas, then data recovery/excavation should be implemented.

g) Reporting: Archaeologist will prepare yearly interim monitoring report and final report after third winter and distribute to BAER team leader, regional office BAER coordinator, and to archaeologists currently involved with BAER work. Results will also be incorporated in annual report as required by the Programmatic Agreement Among the U.S.D.A. Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance With Section 106 of the National Historic Preservation Act for Undertakings on the National Forests of the Pacific Southwest Region.

h) Cost:

GS 11 Hydrologist: 250/day X 3 days/year X 2 years	$ 1,500
GS 11 Archaeologist: 250/day X 15 days/year X 2 years	$ 7,500
Supplies (film, developing, stakes, etc.) and Mileage:	$ 1,000
Total	**$10,000**

i) Personnel: Archaeologist; Hydrologist

j) Responsible Official: District Ranger
k) Follow-up Actions: Design and implement follow-up treatments as needed.

4. Protection of Heritage Sites (Arch Site Erosion Protection CA-SBR-5579/H)
a) Treatment: Various, including slope treatments, road treatments, and natural vegetative recovery. Straw wattles were installed at the site.
b) Management Concerns: Are important archaeological sites being impacted or lost due to erosion, sedimentation, or illegal activities? Has increased visibility and access resulted in vandalism of sites? Archaeological site consists of a subsurface deposit with many milling features and artifact categories represented which may represent a camp or series of activity areas along Willow Canyon. Cultural remains identified include lithics, pottery, groundstone tools, points and burnt (animal) bone. The site is located along both sides of the terrace along Willow Canyon and measures approximately 120 (N/S) x 400 (E/W) meters. The treatment area most susceptible to impacts from runoff and erosion measures 50 x 80 meters along the south bank.

In the vicinity of the site, the burn intensity was high and the soils were very hydrophobic (water infiltration exceeded 40 seconds at one inch depth) on the slope immediately above the site. A two-year storm event is predicted to produce flows 40% above normal. Sedimentation rates are predicted to be 12.6 times normal. A storm exceeding the two year event, but less than a ten-year event would cause flows to exceed the height of the site, i.e., the site could be inundated and/or eroded by stream flow. The greater sediment production levels also have the potential to fill the channel and possibly cause it to migrate into the site (especially if a log or rock debris jam causes sediment to back up in the channel). The valley gradient is very gentle in the vicinity of the site and there is evidence of channel meandering from past events. Increased visibility of surface artifacts and soil erosion from steep slope behind the site. The site is at risk due to exposed artifacts, increased potential for vandalism, collection of any diagnostic artifacts destroying the site integrity, and increased erosion potential.
c) Objectives: **To determine if the adjacent treatments were effective in protecting the archaeological sites; to determine if post-fire impacts are occurring to various archaeological sites throughout the fire; to determine need for further treatment if impacts are occurring.**
d) Parameters: Archaeological site and artifacts.
e) Locations: At heritage resource site CA-SBR-5579/H in Willow Canyon.
f) Frequency and Duration: Up to four times a year (post snow melt; after summer thunderstorm events) for two years.
g) Monitoring Design and Methodology: Initial site treatment will include detailed mapping to provide a baseline of information from which to monitor treatment results and the potential for other disturbances (artifact looting) over a three year period. Photo points of specific treatment areas, culturally sensitive areas or diagnostic artifacts will be keyed to the map for easy reference and relocation. Monitoring data will include site number, location, description of project and what is being monitored. A monitoring form will prompt the collection of observations and data including date, time, weather conditions, site conditions, illegal OHV use in the area, missing artifacts, illegal digging, erosion, exposure of artifacts or features, recommendations for other protection measures and other observations. Appropriate action should follow assessments. If treatments are not deemed successful then data recovery should be implemented.
h) Reporting: Archaeologist will prepare yearly interim monitoring report and final report after third winter and distribute to BAER team leader, regional office BAER coordinator, and to archaeologists

currently involved with BAER work. Results will also be incorporated in annual report as required by the Programmatic Agreement Among the U.S.D.A. Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance With Section 106 of the National Historic Preservation Act for Undertakings on the National Forests of the Pacific Southwest Region.

i) Cost:

GS 11 Hydrologist: 250/day X 2 days/year X 2 years	$1,000
GS 11 Archaeologist: 250/day X 4 days/year X 2 years	$2,000
Supplies (film, developing, stakes, etc.) and Mileage:	$1,000
Total	**$4,000**

j) Personnel: Archaeologist; Hydrologist

k) Responsible Official: District Ranger

l) Follow-up Actions: Design and implement follow-up treatments as needed.

5. Protection of Heritage Sites (Arch Site Erosion Protection CA-SBR-5578/H)

a) Treatment: Various, including slope treatments, road treatments, and natural vegetative recovery. Straw wattles, straw bale checkdams, and seeding was done at the site.

b) Management Concerns: Are archaeological sites and artifacts being lost or degraded from post-fire impacts (erosion, sedimentation, illegal activities, etc.)? Are follow-up treatments needed to protect the sites? Have the sites been adequately documented in case they are impacted? Is the adjacent headcut impacting the heritage site? This site may be one of the most significant in the mountain range. BAER surveys identified a number of previously-unknown but important features, preliminarily suggesting the site may have been a gathering point for a number of different groups. Archaeological site consists of occupation material with milling features (bedrock and portable) and artifact categories represented which may represent a camp or series of activities along Coxey Creek. Cultural remains observed include pottery representing four different wares, abalone shells, and a lithic debitage, projectile points and groundstone tools.

In the vicinity of the site, the burn intensity was high and the soils were very hydrophobic (water infiltration exceeded 40 seconds at one inch depth) on the slope immediately above the site. A two-year storm event is predicted to produce flows 40% above normal. Sedimentation rates are predicted to be 12.6 times normal. A storm exceeding the two year event, but less than a ten-year event would cause flows to exceed the height of the site, i.e., the site could be inundated and/or eroded by stream flow. The greater sediment production levels also have the potential to fill the channel and possibly cause it to migrate into the site (especially if a log or rock debris jam causes sediment to back up in the channel). The valley gradient is very gentle in the vicinity of the site and there is evidence of channel meandering from past events. The site is at risk due to exposed artifacts, increased potential for vandalism, collection of any diagnostic artifacts destroying the site integrity, and increased erosion potential. The site is also at risk due to a large channel headcut that threatens to eat away the terrace that includes the site deposit.

c) Objectives: **To determine if slope treatments were effective in protecting the archaeological sites; to determine if post-fire impacts are occurring to various archaeological sites throughout the fire; to determine need for further treatment if impacts are occurring.**

d) Parameters: Archaeological sites and artifacts.

e) Locations: At heritage resource site CA-SBR-5578/H along Coxey Creek.

f) Frequency and Duration: Up to four times a year (post snow melt; after summer thunderstorm events) for two years.

g) Monitoring Design and Methodology: Initial site treatment will include detailed mapping to provide a baseline of information from which to monitor treatment results and the potential for other disturbances (artifact looting) over a three year period. Photo points of specific treatment areas, culturally sensitive areas or diagnostic artifacts will be keyed to the map for easy reference and relocation. Monitoring data will include site number, location, description of project and what is being monitored. A monitoring form will prompt the collection of observations and data including date, time, weather conditions, site conditions, any headward erosion and downcutting, missing artifacts, illegal digging, erosion, exposure of artifacts or features, recommendations for other protection measures and other observations.

Appropriate action should follow assessments. If treatments are not deemed successful then data recovery/excavation should be implemented.

h) Reporting: Archaeologist will prepare yearly interim monitoring report and final report after third winter and distribute to BAER team leader, regional office BAER coordinator, and to archaeologists currently involved with BAER work. Results will also be incorporated in annual report as required by the Programmatic Agreement Among the U.S.D.A. Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance With Section 106 of the National Historic Preservation Act for Undertakings on the National Forests of the Pacific Southwest Region.

i) Cost:

GS 11 Hydrologist: 250/day X 5 days/year X 2 years	$2,500
GS 11 Archaeologist: 250/day X 4 days/year X 2 years	$2,000
Supplies (film, developing, stakes, etc.) and Mileage:	**$1,000**
Total	**$5,500**

j) Personnel: Archaeologist; Hydrologist

k) Responsible Official: District Ranger

l) Follow-up Actions: Design and implement follow-up treatments as needed.

6. Protection of Springs Habitats in Areas of Higher Burn Intensities (Spring Prot)

a) Treatment: The Initial Request included approval for treatments to protect springs and ensure surface water flow post-fire in the medium and high intensity areas of the burn. However, subsequently, the project soil scientist recommended waiting until spring 2000 to determine which springs were affected and taking action at that point with follow-up treatments.

b) Management Concerns: Will the springs still function post-fire? Will there be available water for local wildlife populations? Are follow-up treatments necessary to ensure surface water availability? There are approximately 49 springs within the Willow Fire area, with 19 in the medium/high intensity burn areas. Water is generally considered a limiting factor for wildlife populations in many parts of the San Bernardino National Forest. Small isolated springs offer valuable water and associated vegetation, providing food, cover, nesting sites, and migration oases/stopovers for many species, including several sensitive species. Initial surveys during the Willow Fire also suggested the possibility that some of these springs support unique invertebrates: SBNF biologists will be contacting local universities for possible research projects. Loss of surface water due to siltation after the fire is potentially a significant impact for many wildlife species already under stress.

c) Objectives: To determine if the springs still function post-fire or if follow-up treatments are needed to restore spring morphology, sediment deposition, and flow regimes.
d) Parameters: Presence of surface water.
e) Locations: Throughout the burn, especially in high and medium intensity burn areas.
f) Frequency and Duration: Annually after snowmelt for two years. Springs with treatments will be visited again in fall prior to the wet season.
g) Monitoring Design and Methodology: Springs will be visited to determine if they are still flowing after spring snowmelt. Sediment deflectors or traps (wattles, bales, bags, logs) may be constructed above springs where sedimentation and erosion have interfered with waterflow. Springs that received treatments will be monitored one to two times annually for two years to ensure treatments are working as planned.
h) Reporting: Time frame for annual/final report: By February each year for two years. Written to District and SO wildlife/aquatic specialists.
i) Cost:

15 days, 2 people, for two years, $3000/yr	$9,000
Reporting of treatment effectiveness (2000 & 2001)	$ 200
Total for Monitoring	**$9,200**

j) Personnel: District Biologist; Resource Officer; Resources staff; Fire personnel
k) Responsible Official: District Ranger
l) Follow-up Actions: Design and implement follow-up treatments as needed.

7. All Land Treatments Monitoring:
a) Treatment: All of the treatments approved in the BAER request (excluding "no treatment").
b) Management Concerns: What are the actual watershed responses in the burned area during the critical post-fire period? Do any of the BAER treatments need maintenance or supplementation?
c) Objectives: To evaluate and determine effectiveness of all BAER treatments implemented in the Willow Fire. Also to design and recommend additional treatments where needed.
d) Parameters: Visual observations and photographs of conditions within and adjacent to the burned area; results of other monitoring efforts.
e) Locations: Multiple locations throughout the burned area.
f) Frequency and Duration: Immediately in response to any reported problems; Following storm events and runoff periods, with emphasis on the spring snowmelt period. Surveillance will be on-going.
g) Monitoring Design and Methodology: Each treatment will be monitored periodically for three years after implementation. Fallback treatment needs will be developed and submitted as needed.
h) Reporting: Immediate verbal report to line officer if need for maintenance action is identified. Brief written reports to document site visits will be kept in a Willow Fire Project File.
i) Cost:

Implementation: Coordination/supervision	$ 800
GS-5 technician--20 days/year for 2 years=40 days @ $111/day	$4,440
Vehicle	$1,000
Total	**$6,240**

j) Personnel: District Botanists; Temporary botanists.
k) Responsible Official: District Ranger

l) Follow-up Actions: Design and implement follow-up treatments as needed.

8. Natural Vegetative Recovery - Carbonate Plant Habitat Recovery

a) Treatment: No treatment--allow the burned area vegetation and ecosystem to recover naturally.

b) Management Concerns: Natural vegetative recovery of endangered plant habitat may be inhibited by post-fire erosion and/or illegal activities such as off-road vehicle driving since the fire increased accessibility in carbonate plant habitat. There are five federally-listed plant species that occur on carbonate substrates: all are endemic to this part of the San Bernardino mountains are and at risk from a variety of impacts including limestone mining, dispersed and developed recreation, fire, off-road vehicle traffic, system road development, cattle grazing, and miscellaneous uses. Three of the five plants (*Eriogonum ovalifolium* var. *vineum*, *Oxyethca parishii* var. *goodmaniana*, and *Astragalus albens)* are known to occur within the fire area; the western-most known occurrences for each species were lost during the fire, possibly compromising the distributional range of the species. All of these species are federally-endangered. Extensive monitoring of these occurrences has occurred over the last several years, providing a solid comparative baseline. Of 43 pre-existing carbonate study plots within the Willow Fire, at least 20 monitored occurrences of federally-listed carbonate endemic plants burned.

c) Objectives: To determine if Threatened, Endangered, and Sensitive plant species have recovered via natural vegetative processes or if fallback treatments are needed. The purpose is to monitor pre-existing habitat monitoring sites within the fire to determine if the "no treatment" action was successful, or if there is a need for follow-up treatment if disturbance or post-fire effects are affecting ecosystem recovery.

d) Parameters: Listed plant presence and density.

e) Locations: On the north slope at known occupied carbonate plant locations.

f) Frequency and Duration: Monitoring will be performed once every 2 months during the 2000 and 2001 growing seasons.

g) Monitoring Design and Methodology: Using pre-existing vegetation sampling sites (from an sampling 3-year sampling effort), vegetation cover, survival, growth characteristics, and germination counts of the listed plants will be measured. Within plots, germination counts by species, survival, and growth and flowering of surviving germinants will be measured. Photo plots will also be used annually to determine cover percentage. The monitoring protocol will follow the pre-existing standards for plants (additional soil collection is not proposed under BAER, although separate funds may be sought to perform the soil nutrient analysis in conjunction with the BAER monitoring). The protocol includes photographing and measuring the existing 0.1 ac plots to quantify abundance (count) data, by species, for each structural layer (herb, shrub, overstory). All species within the plots will be recorded, with the focus on densities of the listed carbonate endemic plants.

h) Reporting: Annual reporting will summarize and interpret the monitoring results by December 31 each year, and the final report in 2002 will provide recommendations for application of results. The annual and final results will be provided to the SBNF Management Team and to the Regional Office in Interim Reports.

i) Cost:

GS-11	4 days X 2 years	$250/day	$ 2,000
GS-7	46 days X 2 years	$145/day	$13,340
GS-5	37 days X 2 years	$111/day	$ 8,214

GPS Receiver	$ 4,000
Film and Developing, $300/yr x 2 years	$ 600
Rebar	$ 200
General supplies (e.g. tape, flagging, quadrats)	$ 400
Vehicle: FOR and mileage	$ 2,000
Total	**$ 30,754**

j) Personnel: District Botanists; Temporary botanists.
k) Responsible Official: District Ranger
l) Follow-up Actions: Integrate findings into Carbonate Habitat Management Strategy; Integrate findings into Fire Prevention/Suppression planning; Design and implement follow-up treatments as needed.

Interium Report: On October 28 and 29, 1999, a carbonate site containing the endangered plants *Eriogonum ovalifolium* var. *vineum* and *Astragalus albens* was surveyed and prepared for ongoing monitoring. The site is located on the eastern side of the upper reaches of Dry Canyon within the Willow Fire burned area. Sampling plots containing unburned, partially burned and burned EROVV were sruveyed (30 sampling plots total, with 10 each of the various degrees of burn). Ten sampling plots containing unburned ASAL were surveyed. Permanent markers and labels were installed at eash sample so that future monitoring at this could be repeatable and consistant. This level of monitoring is less intensive and costly than the described monitoring method above. We would like to use a combination of both methods. A monitoring notebook with data forms, methodology and maps was set up for continued monitoring and photos were taken along each transect and stored on color slides. NOTE: Although monitoring funds were not approved at this time, we were told they probably would be and could not miss this opportunity to set up the plots.

9. Natural Vegetative Recovery - Pebble Plains Plant Habitat and Rare Butterfly Habitat
a) Treatment: No treatment--allow the burned area vegetation and ecosystem to recover naturally.
b) Management Concerns: Natural vegetative recovery of pebble plains habitat (including sensitive plants and rare butterflies) may be inhibited by post-fire erosion and/or illegal activities such as off-road vehicle driving since the fire increased accessibility in pebble plain plant habitat. The Coxey Meadow/Little Pine Flat pebble plain complex, located on ridges and lowlands in the Coxey Meadow and Horse Springs area, burned, scorching the edges and interiors of several of the pebble plains. This habitat consists of unique clay soils covered with a pebble surface. Plants in this habitat are small and matted; five SBNF Sensitive and Watch List plant species occur here (*Arabis parishii, Ivesia argycoma, Dudleya abramsii* var. *affinis, Castilleja plagiotoma,* and *Arabis dispar).* Post-fire recovery potential of these species is unknown. There is also the potential for cheatgrass to increase within pebble plain habitat after fire.

Two extremely rare butterflies, only recently described, are known from the fire area in pebble plain habitats. *Euphilotes battoides vernalis*, a blue butterfly, is known only from a 1-square mile area of pebble plain habitat around Coxey Meadow. Its entire life history is tied to a single host plant, Kennedy's buckwheat (*Eriogonum kennedyi* var. *kennedyi*). The second butterfly, a checkerspot (*Euphydryas editha erlichi*) has also been observed in the same area. The Ord Mountains, the type

locality for the checkerspot, are also within the fire perimeter. It is known to use *Castilleja plagiotoma* as a host plant. Direct losses of habitat (and host plants) from fire and/or further fragmentation of these restricted habitats types is a concern relative to the butterflies. Additional concerns include: increased accessibility to off-road vehicle use where natural vegetative screening, barriers, and protective fences have burned; losses of this year's pupae if soil temperatures resulted in death; cheatgrass invasion resulting in competition with pebble plain species and also changing the fire cycle in the habitat.

c) Objectives: To determine if Threatened, Endangered, and Sensitive plant species have recovered via natural vegetative processes or if fallback treatments are needed. The purpose is to monitor pre-existing habitat monitoring sites within the fire to determine if the "no treatment" action was successful, or if there is a need for follow-up treatment if disturbance or post-fire effects are affecting ecosystem recovery.

d) Parameters: Native plant presence and density. Butterfly presence and density.

e) Locations: Coxey Meadow/Little Pine Flat pebble plain complex.

f) Frequency and Duration: Monitoring will be performed once every 2 months during the 2000 and 2001 growing seasons.

g) Monitoring Design and Methodology: Quantitative monitoring of pebble plain habitat at Coxey Meadow/Little Pine Flat consists of establishing and photographing a set of transects and sampling quadrats to assess resprout and germination vigor. Survival, growth (mm stem-length), and flowering (# inflorescences) will be measured. Measurements will include germination counts by species, survival, and growth and flowering of surviving germinants. The district biologist will work with Gordon Pratt (U. C.-Riverside) to determine presence/absence of butterflies for comparison with his previous data.

h) Reporting: Annual reporting will summarize and interpret the monitoring results by December 31 each year, and the final report in 2002 will provide recommendations for application of results. The annual and final results will be provided to the SBNF Management Team and to the Regional Office in Interim Reports.

i) Cost:

GS-11 Bot	4 days	$250/day	$1,000
GS-11 Bio	4 days	$250/day	$1,000
GS-9 Bio	7 days	$200/day	$1,400
GS-9 Bot	16 days	$200/day	$3,200
GS-5 Bio tech	7 days	$111/day	$ 777
Film and Developing, $100/yr x 3 years			$ 300
Rebar			$ 100
General supplies (e.g. tape, flagging, quadrats)			$ 300
Vehicle			$ 300
Total			**$8,377**

j) Personnel: District Botanists; Temporary botanists, District Biologists

k) Responsible Official: District Ranger

l) Follow-up Actions: Integrate findings into Pebble Plains Habitat Management Strategy; Integrate findings into Fire Prevention/Suppression planning; Design and implement follow-up treatments as needed.

Interium Report: On October 18-20,1999, six pebble plain sites within two locations of the Willow fire burned area were identified, surveyed and prepared for ongoing monitoring. The

first location is found near Shay Spring in the Little Pine Flat Area. The second location is found along Coxey Creek just west of Lizard Spring. Plants in unburned, transitional and burned areas were recorded along transects within each of the six sampling plots. Each pebble plain site was also marked and labeled for repeatable future monitoring. A monitoring notebook with data forms, maps was set up for continued montitoring and photos were taken along each transect and stored on color slides. NOTE: Although monitoring funds were not approved at this time, we were told they probably would be and could not miss this opportunity to set up the plots.

10. Natural Vegetative Recovery - TES Species Habitat

a) Treatment: No treatment--allow the burned area vegetation and ecosystem to recover naturally.

b) Management Concerns: Natural vegetative recovery of endangered plant habitat may be inhibited by post-fire erosion and/or illegal activities such as off-road vehicle driving since the fire increased accessibility in sensitive plant habitat.

c) Objectives: To determine if Threatened, Endangered, and Sensitive plant species have recovered via natural vegetative processes or if treatments are needed. The purpose is to monitor previously-known tat occurrences within the fire to determine if the "no treatment" action was successful, or if there is a need for follow-up treatment if disturbance or post-fire effects are affecting ecosystem recovery.

d) Parameters: Native plant presence and density.

e) Locations: Throughout the burned area--known occurrence sites.

f) Frequency and Duration: Visits will be performed once per year from 2000 through 2001.

g) Monitoring Design and Methodology: Because there are many TES occurrences within the fire perimeter, the relatively quick and easy element occurrence standard developed by the California Natural Diversity Database will be used. Each previously-known TES plant occurrence within the burned area will be visited and surveyed for occurrence presence. A California Native Species Field Survey Form will be filled out (including fields for plant presence, abundance, phenology, and general qualitative habitat description and site information).

h) Reporting: Reporting will consist of sending the California Native Species Field Survey forms to the California Natural Diversity Database once per year in 2000 and 2001. The form includes fields for plant presence, abundance, phenology, and general qualitative habitat description and site information. The annual and final results will be provided to the SBNF Management Team and to the Regional Office in Interim Reports.

i) Cost:

GS-7	25 days/yr x 2 yrs	$145/day	$ 7,250
GS-5	20 days/yr x 2 yrs	$111/day	$ 4,440
Film and Developing, $200/yr x 2 yrs			$ 400
Vehicle			$ 700
Total for TES Monitoring			**$12,790**

j) Personnel: District Botanists; Temporary botanists.

k) Responsible Official: District Ranger

l) Follow-up Actions: Design and implement follow-up treatments as needed.

11. Natural Vegetative Recovery - Cheatgrass Competition:

a) Treatment: No treatment--allow the burned area vegetation and ecosystem to recover naturally.

b) Management Concerns: Natural vegetative recovery of the burned area may be inhibited by post-fire cheatgrass invasions. Of particular concern are areas supporting sensitive species/resources.

c) Objective: To monitor the post-fire dominance of cheatgrass, at representative sites across the burn landscape and assess need for additional treatments. The current default treatment for post-fire cheatgrass eradication is to not perform intensive manipulative treatments until unacceptable densities of cheatgrass are detected through monitoring. Should this monitoring detect unacceptable densities and biomass of cheatgrass, follow-up treatments may be prescribed. This monitoring design was developed by Dr. Richard Minnich at University of California--Riverside, and has proven to be an effective indicator of cheatgrass density on the landscape scale.

d) Parameters: Cheatgrass presence, density, and persistence.

e) Locations: At selected sites in the burn (possibly use existing range condition transects within the Deep Creek allotment part of the burn).

f) Frequency and Duration: Monitor the transect annually when the cheatgrass is at its red-ripe phenological stage (usually April or May, depending on climate) for three years.

g) Monitoring Design and Methodology:

- Choose 10 sites within the fire perimeter that show initial relative prevalence of cheatgrass. This will be performed during spring 2000, when post-fire cheatgrass will be readily detectable.
- At each site, establish a permanent 100 m transect along a randomly selected compass bearing.
- Monitor the transect annually when the cheatgrass is at its red-ripe phenological stage (usually April or May, depending on climate).
- For each monitoring, 20 cm x 20 cm quadrats are used to collect all standing vegetation at 3m intervals along the transect. These samples are separated by cheatgrass and "other", dried, and weighed for an assessment of biomass.
-The biomass values are normalized for expression in units of kg/ha.

h) Reporting: Annual reporting will summarize and interpret the monitoring results and be provided to Dr. Richard Minnich at University of California--Riverside and Dr. Robin Tausch for analysis. A final report in 2002 will provide recommendations for application of results. The annual and final results will be provided to the SBNF Management Team and to the Regional Office in Interim Reports.

i) Cost:

GS-11	2 days	$250/day	$ 500
GS-9 Bio	10 days	$190/day	$1,900
GS-9 Bot	10 days	$190/day	$1,900
Film and Developing, $100/yr x 2 years			$ 200
Rebar			$ 100
General supplies (e.g. tape, flagging, quadrats)			$ 300
Vehicle			$ 200
Total			**$5,100**

j) Personnel: District Botanists; Temporary botanists, District biologists.

k) Responsible Official: District Ranger

l) Follow-up Actions: Design and implement follow-up treatments as needed.

12. Natural Vegetative Recovery - Spotted Owl Habitat:

a) Treatment: No treatment--allow the burned area vegetation and ecosystem to recover naturally.

b) Management Concerns: The fire may have eliminated or reduced habitat suitability below the level where the spotted owl territories will be occupied. Nesting sites, cover, and prey base may have been affected. Increased accessibility may result in vehicle disturbance to the nesting areas. If these territories are lost, will the spotted owl viability in this part of the mountain range be significantly threatened?

c) Objectives: To evaluate whether the "no treatment" has been successful in retaining spotted owl habitat suitability post-fire. Regional and Forest direction for spotted owls is to maintain suitable for nesting and foraging habitat for all known territories. There are four California spotted owl territories within the Willow Burn, with two of those having lost habitat to the fire (See Biological Report for details). The monitoring effort will determine whether habitat enhancement measures (e.g., build brush piles for prey; install nest boxes, etc.) or other fallback treatments are needed.

d) Parameters: Spotted owl territory occupancy and nesting success

e) Locations: Dry Canyon, Deep Canyon, Silver Creek, and Crystal Creek Canyon.

f) Frequency and Duration: Frequency of visits is determined by Region 5's spotted owl nesting survey protocol and varies depending on occupancy (up to 5 visits/year to each site). Duration is for two years.

g) Monitoring Design and Methodology: Revisit all four nest stands to determine nest site suitability and productivity in years 2000-2001. Following Region 5's standard California spotted owl nesting survey protocol, the four territories within the fire (Deep Canyon, Dry Canyon, Silver Creek, and Crystal Creek) will be monitored for territory occupancy, nesting success, and reproductive success. If more trees die and suitability declines in the territories, the fallback treatment of installing nest structures in those territories could be implemented and monitored using the same methodology. Monitoring results will be reported annually by September 30 to the SBNF Forest Biologist and the Mountaintop District Ranger.

h) Reporting: Monitoring results will be reported annually by September 30 to the SBNF Forest Biologist and the Mountaintop District Ranger. Annual reports will be prepared by the contract biologist. Monitoring of treatment success and stand survival will be done in 2000 and 2001.

i) Cost:

Contract owl specialist - $4000/year (4 visits/site X 4 sites X $250/day) x 2 years	$8,000
Administration - $500/year x 2 years	$1,000
Total:	**$9,000**

j) Personnel: District Biologist and contract biologist.

k) Responsible Official: District Ranger

l) Follow-up Actions: Design and implement follow-up treatments as needed.

13. Beaver Dam Removal in Deep Creek (Beaver Dams)

a) Treatment: Beaver and beaver dam removal from arroyo toad habitat in Deep Creek. (*Note: this treatment was not approved in the Initial Request; however, it is being resubmitted in the Interim Report/Request. If it is not approved, this monitoring effort is not applicable).**

b) Management Concerns: Have beavers rebuilt dams and is arroyo toad habitat diminishing in quality and quantity? Arroyo southwestern toads are an endangered species and dependent upon shallow pool habitats for breeding and adjacent gravel bar/riparian areas for foraging and estivation/hibernation. Deep Creek is one of only three `desert' populations and essential for arroyo toad recovery. Arroyo toad habitat in lower Deep Creek is expected to be impacted by post fire sedimentation impacts that would probably fill beaver pond pools resulting in stream flow spreading possibly in a braided channel pattern rather than the natural meandering stream pattern that would be expected in this stream reach. If arroyo toads are not able to reproduce and survive in lower Deep Creek, it is likely that this species will eventually die out in the Deep Creek drainage.

c) Objectives: To determine if the beaver dam treatment in lower Deep Creek has had the intended effect on channel morphology, sediment deposition, and introduced species populations (CDF&G is a partner for this monitoring).

d) Parameters: Beaver and beaver dam presence. Arroyo toad habitat components.

e) Locations: Deep Creek from the Mojave Forks Dam upstream to the gaging weir.

f) Frequency and Duration: One visit in spring for three years.

g) Monitoring Design and Methodology: Deep Creek from the Mojave Forks Dam upstream to the gaging weir will be monitored to ensure beavers do not reestablish in this reach. If beavers are sighted, CDF&G or ADC will be contacted for eradication. In addition, bullfrog removal will continue past 2000 as funding allows. Amphibian surveys will be conducted for two consecutive years in the treatment reach.

h) Monitoring Reporting: Time frame for annual/final report: By February each year for two years. Written to District and SO wildlife/aquatic specialists.

i) Cost:

2 days/nights, 3 person crew, for two years, $1,200/yr	$2,400
Reporting of treatment effectiveness (2000 & 2001)	$ 200
Total:	**$2,600**

j) Personnel: Fisheries biologist, Wildlife biologists.

k) Responsible Official: District Ranger

l) Follow-up Actions: Design and implement follow-up treatments as needed. Coordination with California Dept. of Fish and Game for additional beaver eradication if needed.

1. **PART VI - EMERGENCY REHABILITATION TREATMENTS AND SOURCE OF FUNDS BY LAND OWNERSHIP**

			NFS Lands			Other Lands (BLM/NRCS)			All
Line Items	Units	Unit	Number	WFSU	Other	Number	Fed	Non-Fed	Total
		Cost $	of Units	$	$ see below	of Units	$ _____	$ _____	$
					ident.		ident.	ident.	
A. LAND TREATMENTS									
Strip Tillage	ac	50	200	10,000					10,000
Mulch/Tack	ac	650	385	250,250					250,250
Warm Spg.									
straw wat.	mi	20,600	0.5	10,300					10,300
Spring Prot.	ea	3,000	19	57,000					57,000
Arch Site	Erosion	Protect							
SBR-294	ea	22,942	1	22,942					22,942
SBR-458	ea	2,130	1	2,130					2,130
SBR-5578	ea	21,800	1	21,800					21,800
SBR-5579	ea	18,513	1	18,513					18,513
SBR-3781	ea	6,679				BLM 1	6,679		6,679
Treat Recor	ea	800	12	9,600					9,600
Shrub grow	ea	6	2,500	15,000					15,000
Shrub plant	ea	3.27	2,500	8,175					8,175
Seeding/Slash	ac	200	100	20,000					20,000
TES plant									
road rest.	mi	10,000	8	80,000					80,000
TES plant site									
cheat grass									
eradication	pk	5,623	1	5,623					5,623
Willow plant	ac	600	10	6,000		BLM 12	7 ,200		13,200
Route Reveg	mi	5,600				BLM 30	168000		168,000
LEBs	ac	1,000	20	20,000					20,000
Jeff Pine Planting	ac	1.50	10,000	NF					NF
Sub-total				**557,333**			181,879		739,212
B. CHANNEL TREATMENTS									
Well deflect	ea	28,000	1		# 28,000				28,000
Beaver dams	ea	1,533	6	9,200					9,200
Sed. Store @									
Coxey Pond	cu yd	60	100	6,000					6,000
Cienega gully	ea	75,000	1	NF					NF
Sub-total				**15,200**	28,000				43,200
C. ROADS AND TRAILS									
Armor Xings	mi	7,500	32.7	245,250					245,250
3N88 CMP	ea	9,900	1		# 9,900				9,900
Juniper Fl Rd	ea	14,513				BLM 1	14,513		14,513
Rockfall sign	ea	320	4	1,280					1,280

FDR Drainage									
3N14	mi	43,000	3.5	150,500					150,500
3N16	mi	4,500	4	18,000	! 300,000				318,000
3N38	mi	5,500	1	5,500					5,500
3N34D	mi				! 10,000				10,000
Storm Patrol	days	200	200	40,000					40,000
Closure									
Gates	ea	5,000	8	40,000		BLM 2	10,000		50,000
Fencing	mi	5,000	4	20,000		BLM 1	5,000		25,000
OHV block	mi	5,000	2	10,000		BLM 0.5	2,500		12,500
Signs	ea	50	100	5,000		BLM 20	2,000		7,000
Public info	pk	30,000	1	30,000		BLM 0.5	15,000		45,000
Law enfor	days	300	200		" 60,000	" BLM 100	30,000		90,000
Patrol (treat. vandal repair)	days	200	200	NF		BLM 200	40,000		40,000 BLM FS NF
Public contact and info	Days	270	400	108000					108,000
Sub-total				**673,530**	379,900		119013		1,172,443

D. STRUCTURES

Warm Spg									
OHV fence	mi	217600	0.5	Was 108,800 but 108,000 redirected to public contact and info	& 15,000				15,000 This is CA Parks and Rec. funds
Juniper Flat									
OHV fence	mi	25,905				BLM 3	77,715		77,715
NRCS EWP	?	?				?	?	?	?
CalTrans	>	>				>		>	>
Owl Nests	SOHA	7,300	2	NF					NF
TES fences	mi	8,500	4	34,000					34,000
Fiberguzzler	ea	1,400	1	1,400					1,400
OHV fence	mi	1,200				BLM 18	21,600		21,600
Riparian fen.	ea	800				BLM 4	3,200		3,200
Sub-total				**35,400**	15,000		102,515		152,915

E. BAER EVALUATION/ADMINISTRATIVE SUPPORT

Team Costs									
Salary	days	345	254	87,630		36*	12,420		100,050
Travel	days	70	254	17,780		36*	2,520		20,300
Gov Veh.	days	15	254	3,810		36*	540		4,350
Rent. Veh	ea	1,180	3	3,540		--	--		3,540

Consultants									
Hydro	day	1,086	21	22,806		--	--		22,806
GIS	day	1,094	12	13,128		--	--		13,128
Soils	day	556	11	6,116		--	--		6,116
Digital Image	ea	33,500	1	33,500		--	--		33,500
Helicopter	ea	680	12	8,160		--	--		8,160
Meeting Rm	ea	1,466	1	1,466		--	--		1,466
Copier/FAX	ea	350	1	350		--	--		350
Supplies	ea	1,968	1	1,968		--	--		1,968
sub-sub-total				**200,254**			15,480		215,734
Effectiveness	Monitor	**Not fund as of 4/2000**							
Warm spring	yr	14,250	2	28,500					28,500
Land treatme	yr	3,120	2	6,240					6,240
Beaver dam	yr	1,300	2	2,600	@1000				2,700
Effectiveness	Monitor	**Not fund as of 4/2000**							
CA-SBR294	yr	6,250	2	12,500					12,500
CA-SBR 295,449,458, 475,478,479, 483	yr	5,000	2	10,000					10,000
CA-SBR 5579	yr	2,000	2	4,000					4,000
CA-SBR 5578	yr	2,750	2	5,500					5,500
Fallback	Monitor	**Not fund as of 4/2000**							
Spring habit	yr	4,600	2	9,200					9,200
Nat veg rec									
Carbonate	yr	15,377	2	30,754					30,754
Pebble pl	yr	4,189	2	8,377					8,377
TES	yr	6,395	2	12,790					12,790
Cheatgrass	yr	2,550	2	5,100					5,100
Spotted owl	Yr	4,500	2	9,000					9,000
sub-sub-total				**144,562 NF**	1,000				145,562
Sub-total				**344,816**	1,000		15,480		361,296

F. TOTALS (minus monitoring request) _

				1,481,718	423,900		418,887		2,429,066

NOTE: TOTAL IN WFSU COLUMN DOES NOT INCLUDE $144,561 MONITORING REQUEST

NF USFS items not funded in original or interim requests

* BLM 27 days Salary (est.) $9,315 Travel (est.) $1,890 Vehicle (est.) $405 Each agency pays its own.
NRCS 9 days Salary (est.) $3,105 Travel (est.) $ 630 Vehicle (est.) $135 Each agency pays its own.

\# Special Use Permit Road. Permittee may be required by terms of the permit to cover this cost, otherwise show as WFSU.

& CA Parks and Rec. funds already available on Forest.

@ CDFG Animal Control

? NRCS EWP work with Cost-share partner, possibly SBCFCA. Treatments still being developed to address protection of homes and roads from sediment, early warning system needs, notification needs.

> Caltrans SR173 shotgun culvert treatments.

! 10% funds already on Forest for work on this road.

" Law enforcement is not paid for by BAER, but rather must come from re-prioritization of workload (as per Departmental (USDA and USDI) direction)

^ BLM = $425,443 NRCS = $3,870 plus EWP

; EWP Cost Share Partner plus Caltrans SR173 shotgun culvert treatments.

PART VII – APPROVALS

1. **/s/Gene Zimmerman** May 8, 2000
Forest Supervisor, San Bernardino NF Date

2. _____ _____
Regional Forester, Pacific Southwest Region Date

3. _____ _____
Director of Water, Soil, and Air Management, WO Date

Willow Fire BAER Team (* denotes core team member)

Rob Griffith, Co-Team Leader, Forest Service (FS) Pacific Southwest Regional Office *
Todd Ellsworth, Co-Team Leader, FS Stanislaus National Forest (STF) *
Cathleen Thompson, Team Leader trainee/Team Manager, FS Pacific Southwest Regional Office*
Gil Garcia, Co-Team Leader, FS San Bernardino National Forest (BDF)
Mike Florey, Roads, FS BDF *
Bob Ota, Roads, FS BDF
Daniel McCarthy, Archaeology, FS BDF *
Sally Cunkelman, Archaeology, BLM Barstow*
Marilyn Malazovsky, Archaeology, FS BDF
Dorit Phinney, Archaeology, FS STF *
Ann Boyd, Archaeology, FS Eldorado National Forest*
Tanya Egan, Natural Resources Specialist, BLM Barstow*
Larry Morgan, Rangeland Management Specialist, BLM Barstow
Patti Novatz, Rangeland Management Specialist, NRCS Bakersfield
Robin Tausch, Cheat Grass Expert, FS Research Branch, Reno
Rich Minnich, Grass Invasion Expert, UC Riverside
Rick Everett, Vegetation Specialist, FS Research Branch, Riverside
Steve Loe, Forest Ecosystem Management Officer, FS BDF
Michael Parenti, Hydrologist, Private Industry Consultant*
Christine Mai, Hydrologist, FS Eldorado National Forest*
Bob Hawkins, Hydrologist, FS Inyo National Forest*
Dev Volgarino, Botanist, FS BDF*
Scott Eliason, Botanist, FS BDF*
Marc Stamer, Botanist, FS BDF*
Susan Stearns, Botanist, FS BDF*
Melody Lardner, Botanist, FS BDF
Robin Butler, Biologist, FS BDF*
Linda Stamer, Biologist, FS BDF*
Ann Carlson, Aquatic Biologist/Ecologist, FS Tahoe National Forest*
Steve Anderson, Biologist, FS Southern California Province Conservation Strategy Team*
Veronica Magnusen, Biologist, FS BDF
Rick Aguayo, District Conservationist, NRCS, Apple Valley*
Dave Krietemeyer, Area Engineer, NRCS, Fresno*
Doug Forest, Forester, CDF BDU
Paul Hardwick, GIS Analyst, Private Industry Consultant*
Sean Redar, GIS Analyst, FS BDF*
Chris Chandler, GIS Analyst, FS BDF*
Steve McWilliams, Soils, FS Santa Fe National Forest*
Eric Schroder, Soils, FS Tahoe National Forest*
Jeff Tenpas, Soils, Private Industry Consultant*
Allan King, Geologist, FS Los Padres National Forest*
Vern McLean, Geologist, FS Inyo National Forest*
Audrey Sranton, Trails Specialist, FS BDF*
Dave Relph, Trails Specialist, FS BDF
Amy Terry, Trails Specialsis, FS BDF
Sue Zahn, Trails Specialist, FS Cleveland National Forest
Dale Deneweth, OHV Specialist, FS BDF
Greg Hoffman, OHV Specialsit, FS BDF
Pete Loundbury, Mojave RCD Rep., Apple Valley
Glenn Pruim, San Bernardino County Flood Control District Rep., San Bernardino
Fuad Modiri, San Bernardino County Flood Control District Rep., San Bernardino
Art Bishop, Apple Valley Fire District Rep., Apple Valley
Jim O'Hare, Province/Regional Technical Oversight Team and Contract Inspector, FS Arcadia
Mike McCorison, Province/Regional Technical Oversight Team, FS Arcadia