

Date of Report: 2/10/03

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

A. Type of Report

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

B. Type of Action

- ☐ 1. Initial Request (Best estimate of funds needed to complete eligible rehabilitation measures)
☒ 2. Interim Report (3)
 ☐ Updating the initial funding request based on more accurate site data or design analysis
 ☒ Status of accomplishments to date
☐ 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTIONA. Fire Name: TroughB. Fire Number: P53744C. State: CAD. County: Colusa, GlennE. Region: 05F. Forest: 08G. District: 53H. Date Fire Started: 8/8/2001I. Date Fire Controlled: 9/11/01J. Suppression Cost: \$14 million

K. Fire Suppression Damages Repaired with Suppression Funds

1. Fireline waterbarred (miles): 12.1 dozer; 22.9 handline
2. Fireline seeded (miles): 0.0
3. Other (identify): 2.0 miles brush covered

L. Watershed Number: 1802011502M. Total Acres Burned:

NFS Acres(24,000) Other Federal (0) State (0) Private (980)

N. Vegetation Types: Chaparral, serpentine chaparral, montane chaparral, knobcone pine, riparian, mixed conifer, true firO. Dominant Soils: Henneke, Dubakella, SheetironP. Geologic Types: Franciscan metavolcanics, serpentine belt

Q. Miles of Stream Channels by Order or Class:

Order 1 = 233; Order 2 = 77; Order 3 = 29; Order 4 = 16; Order 5=10; Order 6=7; Order 7=5

R. Transportation System

Trails: 4.5 miles Roads: 20.4 miles

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 11,926 (low) 7,795 (moderate) 5,187 (high)

B. Water-Repellent Soil (acres): 4500

C. Soil Erosion Hazard Rating (acres):
547 (low) 11,637 (moderate) 9,729 (high) 3,067 (very high)

D. Erosion Potential: 4.0 tons/acre

E. Sediment Potential: 960 cubic yards / square mile

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 7

B. Design Chance of Success, (percent): 90

C. Equivalent Design Recurrence Interval, (years): 2

D. Design Storm Duration, (hours): 6

E. Design Storm Magnitude, (inches): 2.0

F. Design Flow, (cubic feet / second/ square mile): 95

G. Estimated Reduction in Infiltration, (percent): 27

H. Adjusted Design Flow, (cfs per square mile): 130

Engineering flow estimates using USGS regional runoff curves give a Q50 = 350 csm.

PART V - SUMMARY OF ANALYSIS

A. Describe Watershed Emergency:

On August 8th the fire started in chaparral along the Fouts Springs road west of Stonyford on the Grindstone Ranger District. Weather the first few days was hot, dry and with erratic winds. The first day the fire moved east towards Stonyford. A wind shift the second day caused the fire to move west. When this happened the fire jumped Stony Creek, destroyed facilities at Davis Flat recreation area, ran upslope and burned cabins located at Happy Camp and Bonnieview, then into the Snow Mountain wilderness where it was finally contained.

The brush covered slopes were blackened with very little residual vegetation. The fire burned at moderate to high intensity over major portions of the area. Hydrophobic layers exist at the soil surface and beneath the ash

layer in high and some moderate burned areas. The resulting increased rate of runoff and erosion poses threats to life, property, and resources noted below. A county road serves as access to Fouts Springs Youth Facility, Forest Service campgrounds and Mount St. John Communication Site. Expanded discussion of treatment methods is an attachment.

Roads: Potential for culvert failure due to increased flows or debris; insloped and bermed road sections have potential for stream diversion if culverts plug. County road management officials report presence of mobile debris in channels above county road.

Erosion: High consumption of vegetation opened up areas to unauthorized cross-county vehicle use, which would result in aggravated short and long term erosion. Erosion on high to very high erosion rate soils will deliver ash and sediment to three stream systems vital for rainbow trout, pond turtles and amphibians.

Recreation residences: The few remaining cabins in the Happy Camp and Bonnieview area are located along Paradise Creek. Most of the upper watershed was burned at moderate to high intensity and were assessed for vulnerability to flood flows or debris torrents.

Hazard trees: The fire left many hazard trees in high risk areas such as recreation sites and along well travelled roads.

Stream Diversion: Two streams have been diverted by past management on formerly private land, resulting in several headward eroding nick points in each of the receiving streams. Increased post-fire flows will increase erosion and channel instability.

Heritage Resources: Known prehistoric properties have been exposed to either erosion damage or vehicle access. The threat of damage is particularly acute in the Davis Flat OHV staging area, where there is a high density of high value sites adjacent to campgrounds and parking areas popular with OHV users. Other known sites must be evaluated for potential risk of post fire damage.

Sensitive Plants: The fire destroyed an enclosure of woolly star plants. The site is vulnerable to vehicle damage.

Noxious Weeds: Dozer lines, handlines and helispots all have the potential to become sites of noxious weed infestation. Fire camp and the helibase were located in yellow starthistle areas. Also, equipment was not washed prior to work on the fire.

Wilderness: Three large areas of the wilderness were burned at high intensity. Vegetation burned were two stands of red fir, and a reburn of a former red fir stand that burned in 1987. Based on the original response of the reburn area, the sites will come back to *ceanothus cordulatus*. Before proposing any BAER response, we need to assess 1) whether intervention is appropriate under wilderness management direction, and 2) if so, whether BAER funding is appropriate.

The burned area contains several wet meadows that have gully erosion resulting from past grazing practices. Further downstream there are some small landslides. Meadows in the wilderness that have gully headcuts would be stabilized with native rock.

B. Emergency Treatment Objectives:

1. Reduce the risk of loss of water control (stream diversion and overland flow) and unacceptable erosion by upgrading Forest road drainage to accommodate expected increased streamflow, debris production, and overland delivery of water to the roads and channels. Clean channels above county road as needed to reduce risk of culverts plugging.
2. Prevent cross country vehicle travel until natural vegetative control recovers.
3. Evaluate the degree of risk to life and property at recreation residences.
4. Fall hazard trees in high risk areas.
5. Treat streambanks to reduce the amount of ash and sediment entering major streams.
6. Return diverted streams to original channels.

7. Prevent erosion and vehicle damage to cultural resources.
8. Prevent vehicle damage to sensitive plant populations
9. Monitor dozer lines, handlines and helispots for noxious weed infestations.
10. Treat headcuts in burned over streams at Crockett Camp.
11. Stabilize gullies in wilderness meadows, if determined to be necessary.

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

Land 90 % Channel 95 % Roads 75 % Barriers 90 %

D. Probability of Treatment Success

| | Years after Treatment | | |
|--------------|-----------------------|-----|-----|
| | 1 | 3 | 5 |
| Land | 90 | 90 | 90 |
| Channel | 80 | 90 | 100 |
| Roads | 90 | 90 | 100 |
| Other | | | |
| Barriers | 100 | 100 | 100 |
| Hazard Trees | 100 | 100 | 100 |
| | | | |
| | | | |
| | | | |

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

- Land..... \$ 2,450
- Channel..... \$ Not yet determined
- Roads..... \$Not yet determined
- Barriers and Signing..... \$300,110
- Hazard Trees..... \$Unacceptable health & safety risk

F. Cost of Selected Alternative (Including Loss):

- Land..... \$ 67,640
- Channel..... \$ Not yet determined
- Roads..... \$Not yet determined
- Barriers and Signing..... \$233,440
- Hazard Trees..... \$ 6,000

G. Skills Represented on Burned-Area Survey Team:

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

Team Leader: Robert Faust

Email: rfaust@fs.fed.us

Phone: (530) 934-1152

FAX: (530) 934-7384

H. Treatment Narrative:

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

Land Treatments: See attachment 1

Channel Treatments: See attachment 1

Roads and Trail Treatments: See attachment 1

Structures: See Attachment 2 Rationale for Installation of OHV Erosion Prevention Barriers.

New with this report

I. Fire Rehabilitation Treatments.

With the Trough fire occurring in late fiscal year 2001, most of the BAER treatments were applied in FY2002. Interim report #2 was submitted in April 2002. This interim report #3 provides an update on expenditures and effectiveness monitoring of treatments. Items discussed are those funded in Part VI of this report.

Land Treatments

Mulch

Straw mulch was applied by hand to areas around the Davis Flat OHV area. Hillsides were mulched to reduce runoff into the camping area. Streambanks located near the camping and OHV staging areas were mulched to prevent erosion into streams and to keep people off the denuded slopes.

Rice straw was aerially applied to steep areas and along stream channels. Aerial application of rice straw was done in conjunction with San Dimas Technology and Development Center (SDTDC). SDTDC mission was to develop a straw processing technique and a helicopter straw spreading system. Information from this study was utilized on two other fires (Oregon and Darby) in California in 2001. In 2001, techniques learned from this study were used in Region 5 as well as Regions 3 and 4. Kim Clarkin from SDTDC is preparing a technical paper on this study. She also made a presentation at the R5 BAER training session in Reno (December 2002). Forest Hydrologist Faust made a similar presentation at the Wildlife Society Fire Conference in San Diego (Dec. 2002). He is also publishing a paper on this technique. Many gains were achieved in developing this method of straw application. Cost of aerial application is on par with hand mulching but it is much faster and it can treat steeper or non-accessible areas.

Wattles

Straw wattles were installed on one section of streambank and on slopes above two archeology sites. Even though soil erosion was not great on these slopes, the wattles stopped surface runoff and trapped sediment.

Channel Treatments

Diversion and Protection

Archeological site protection – a perennial stream was eroding a streambank adjacent to an archeological site. Most of the watershed above the site was burned at high intensity. The BAER team estimated that increased peak flows would cause more bank erosion and some loss of the site. About 30 feet of streambank was rocked to prevent further bank undercutting and loss of the arch site.

Two other archeological sites were protected from surface erosion by the use of straw wattles.

Channel diversion – two areas in the Brittan Ranch area had streams moved from an unnatural location to the original channel. In the distant past and prior to a Forest Service land exchange, private landowners diverted one stream to flow along an access road and the other to a very small channel. The BAER team estimated that increased runoff from the former diversions would cause severe bank cutting and deposition of soil into a main channel.

Channel clearing

Stream channels (intermittent order 1 and 2 streams) above roads that contained standing burned vegetation were identified for channel clearing. The Mendocino Hotshots cut and removed burned vegetation about 10 feet up from the channel bottom for a distance of about 50 feet above the culvert. This was done to reduce culvert plugging potential on county and Forest Service roads.

Headcut structures

An intermittent stream near Crockett Camp had two five foot high headcuts. The headcuts were on the WIN list for rehabilitation. The fire burned the watershed above the headcuts. The BAER team determined that the headcuts would accelerate upstream movement since the ground cover was burned. The headcuts were treated in the Fall of 2001. The area was examined in 2002 and the headcut treatment was successful. High water flows and sediment movement were evident in the channel above the treatment area.

Roads and Trails

Road Contract

Roads in the burned area were inventoried for their ability to withstand extra surface and stream runoff due to denuding of the slopes. The county road to the Fouts Springs California Youth Authority Detention Center had many undersized culverts. Since the county did not have the funds to upgrade the culverts, there was a concern that a culvert could plug, despite the channel clearing, and wash out the road. An alternate route to the Center was determined but this road needed to be upgraded to handle winter traffic.

A road contract was developed to improve drainage on eight roads for 13.5 miles. Engineering, with assistance from hydrology, did the construction staking.

Under the contract, most of the roads were outsloped. Approximately 100 road rolling dips were added to insloped and outsloped roads. Twenty-three culverts were either installed or upgraded and 1,180 tons of riprap were added to culvert outlets as energy dissipators to reduce stream erosion. About 0.80 acres of disturbed areas were seeded and mulched. Twenty-three culvert inlets were cleaned or had catch basins constructed. Twenty-five metal end sections were added to culverts. Gates were installed on two roads to restrict wet season access.

After initial reconstruction, Fall storms generated road runoff that caused rills on the hillside. Contract changes were made to add additional drainage structures. Even with closer spaced (50-70 feet apart) rolling dips there was enough surface runoff from the brushfield soils to cause rill erosion on the hillside below the road.

A main road to access the Forest's electronic site was improved to handle road water. A portion of this road traversed serpentine soil. Since this road provided access to the site during wet weather, road maintenance

funds were used to rock this section of road. This was a good example of BAER funds improving road drainage to handle fire induced runoff and road maintenance funds to upgrade the road for wet weather use.

End sections on culvert inlets worked very well as only one end section became plugged and caused a minor road washout. C&M foreman Gaddini conducted storm patrols and said "culvert end sections are very worth the money". One can only speculate how many culverts were not plugged due to the installed end sections.

Storm Patrol

The BAER report requested funding for 10 storm patrols. Since last winter was dry, only six storm patrols were conducted. Minor work was done by hand to remove small debris. A backhoe was used to clear the one culvert that became plugged.

Fireline Barriers

Railroad ties were installed to block OHV access to three firelines.

Hazard Tree Removal

Burned conifer trees were removed along the county road to Fouts Springs, in three Forest Service campgrounds and along one OHV trail. Unfortunately the fire killed many trees and the campground areas now look like clearcuts.

Structures

Sensitive Plant Fence

A fence protecting sensitive plants in the Fouts Springs staging area needed replacement of wood corner posts and wire.

Staging Area Barriers

Wood barriers confining OHV riders to staging areas were burned when the fire went through the area. These barriers, plus others, were installed prior to re-opening the area to use. Roughly 20,300 feet of barriers were installed by inmate crews, C&M crews, OHV specialists and motorcycle club volunteers.

Trail Closure Barriers

OHV trails entering the burned area were closed with a Forest Closure Order. To ensure that Forest users did not ride OHV's in the burned area, the trail entrances were blocked with wood barriers.

Roadside Barriers

Prior to the fire, wood tie barriers lined several roads. These barriers prevented OHV users from leaving the road prism and venturing into other areas. Four hundred fifty feet of roadside barriers were installed along two roads.

H. Monitoring Narrative:

Noxious weeds

Planned Action

A noxious weed monitoring plan was submitted and approved in April 2002. A team of botanists walked many miles of dozer lines (outside of the wilderness) and hand lines in and outside of the wilderness. The main concern was the spread of yellow star thistle and other invasive plants such as plumeless and Canadian thistles into the Snow Mountain wilderness.

Firelines were walked once in the late spring and once in mid-summer. Yellow Star Thistle was present along roads prior to the fire. It appears that where firelines tied into roads that YST had spread onto the firelines outside of the road prism. No invasive or noxious weeds were encountered in the wilderness. However, three locations near roads have invasive plants that need to be eradicated.

A sample of rice straw mulched areas were surveyed to determine presence of noxious weeds. No introduction of YST or Wild Lettuce could be attributed to the mulch. Adjacent non-mulched areas had these plants due to seed being present in the soil.

Implemented Action

The Noxious Weeds Coordinator's monitoring report is attached.

OHV barriers

Planned Action

OHV barriers at the ends of fire lines need to be checked for effectiveness in keeping OHV vehicles off unauthorized areas. One person day is required to check the firelines five times during the year. Ocular observation by one person would determine if vehicles have been driving around the barriers or if barriers have been damaged or removed. Barriers in need of repair would be noted and action taken to correct the situation.

Implemented Action

OHV barriers burned in the fire were replaced using inmates, OHV club volunteers and Forest personnel. There was pressure from the OHV community to open the staging areas for Thanksgiving weekend. District personnel worked very hard to get the barriers installed to meet this timeline.

Stream Diversion

Planned Action

Stream diversions need to be checked to assure they are functioning as planned. An early and end of winter field check of the stream diversions should be sufficient to determine their effectiveness. This monitoring can be done in a day by one person walking into the Brittan Ranch from road 18N06. Water flow in the diversion channels should be within their streambanks and with no obstructions in the channel. The person could make minor corrections to the channel while on site.

Implemented Action

Two people walked into the Brittan Ranch and observed the stream diversions. One diversion that required rocking the channel for sixty feet was functioning perfect. The other diversion of moving the stream back into the natural channel also was working well. Some hand work was done to remove branches blocking the diversion.

Mulch

Planned Action

Mulch and wattles were used to control surface erosion. Mulch was being used to keep soil in place on some firelines, streambank slopes and slopes above roads.

Implemented Action

Two types of mulch were observed during the year.

Hand Straw Mulching – Hand straw mulching was done by inmates and volunteers on areas that would drain into the camping or OHV staging areas. Mulch kept the soil and water in place instead of flowing into occupied areas or into streams.

Aerial Straw Mulching - After application, there were clumps of straw and a layer of fine straw covering about 40% of the soil surface. Over the year, the fine straw blew into brush stobs. Ground cover decreased to about 20%. The clumps remained in place and caught sheet and rill erosion. (See Photo). This project was done in cooperation with San Dimas Technology and Development Center. Kim Clarkin at SDTDC presented the results of helicopter straw mulching at the R-5 BAER training session in Reno, Nevada in December 2002. She will also be writing a technical paper verifying the validity of this treatment method.

Forest Hydrologist Bob Faust presented this technique at the Wildlife Society Fire Conference in San Diego, California in December 2002.

Aerial mulching techniques were publicized on the National Fire Plan website under Rehabilitation & Restoration (see Exhibit 1).

Aerial Hydromulching - Hydromulching done by Erickson Air-Crane was examined several times with Ryan Becker (SDTDC) and a company official from the hydromulch supplier. The hydromulch, a bonded fiber matrix, was applied to streambanks. It provided 95-100% cover. The hydromulch survived the summer heat and sunlight and was in place for the fall rains. After six inches of rain, some of the hydromulch dissipated leaving roughly 60% ground cover on the steep slopes. This product does very well in preventing soil erosion. The only drawback with the product is it does inhibit some native seed germination. This technique was presented in Reno and San Diego. Bob Faust is publishing a paper on both of these techniques.

Planned Action

Surface erosion monitoring was conducted on the Fork fire to get better estimates of erosion. A similar effectiveness evaluation is planned for this fire. Plots were established to measure surface erosion from burned and treated slopes. Straw wattles were used as catchment basins. The volume of dirt was measured in the wattle with use of erosion pins. Watershed area was measured above the wattle by hip chain.

Implemented Action

Erosion pins were measured twice during the winter. The high school student doing the measurements was working on a draft report when the data was mistakenly discarded.

Wattles

Planned Action

Wattles are being used to keep surface runoff from entering archeological sites.

Wattles will also be examined to determine if water is flowing underneath the structure or out the ends. At the time of monitoring, the crew can stake down the areas of wattle not in contact with the ground.

Monitoring will consist of a two person crew visiting the treatment areas four times during the winter.

Implemented Action

Wattles were observed after the first Fall rains. They were performing as planned. During the winter they were briefly looked at while in transit to the mulch sites. The wattles collected a small amount of soil as the soil had a moderate rock content.

Botanist's Survey of Straw Mulched Areas

Memorandum

To: Robert Faust
CC: David Isle
From: Peter Nilles
Date: 9/19/2013
Re: Post Trough Fire Weeds: Mulched Units

In response to concerns that weed seed infested mulch was air-dropped onto burned sites in the Trough Fire (2001), a team of two trained noxious weed surveyors inspected three of these sites on July 19, 2002.

The weed team inspected sites # 6, 7, and 9 located along road 18N03 near Davis Flat. All three sites did contain Yellow Star Thistle (*Centaurea solstitialis*) around some perimeters; however, these infestations seemed to clearly emanate from previously infested roadsides. Also found in all three sites were moderate amounts of Wild Lettuce (*Lactuca spp.*) a weedy species, probably non-native (positive identification pending), and not thought to be a serious problem displacing native colonizing plants.

For comparison, and in order to establish an ecological context, the surveyors inspected non-mulched areas adjacent to mulched sites. The non-mulched areas showed similar patterns of infestation of *Lactuca spp.* and Yellow Star Thistle, suggesting that seed banks of these species existed in the soil prior to the fire, and were not introduced as part of the mulch.

Two native species found in large numbers in all three sites were Prickly Poppy (*Argemone munita*) and Golden Eardrops (*Dicentra chrysantha*). Both species are typical native colonizing plants that would be expected after a fire.

In conclusion, as of the date of inspection, the mulch used for erosion control after the Trough Fire appears to have been free of noxious weed seeds.

Peter G. Nilles
Asst. Forest Botanist
Noxious Weed Coordinator
Mendocino National Forest

CONFIDENTIAL

Botanist's Noxious Weed Survey Results

BAER EVALUATION REPORT 2002

TROUGH FIRE

MENDOCINO NATIONAL FOREST

Location: The survey included approximately 46 miles of fire line - the entire perimeter of the 2001 Trough Fire. The survey was largely located in the Snow Mountain Wilderness. Drop points were adjacent to the fire line with several exceptions located in the interior of the burned area; the main helibase north of Stonyford was also surveyed to gauge possible weed seed sources. Additionally, beyond the burned area perimeter to the east, was dozer line running from DP1 north to DP8 and west to DP7; this line was also surveyed.

Township: 17-18N
Range: 6-8W

Feature: Dozer line, hand line, drop points (DP 1-16), helispots (1-11) and helibase.

Area: 784 acres (2 visits).

Dates: Two separate surveys, June 10,11,17-20,25 and July 24,25, 29,30,31, 2002.

Cost and Job Code:

Total Cost: \$12,969.68
Job Code: H53744

Survey Goals:

BAER surveys were conducted along selected disturbance features that occurred as a result of wild-land fire fighting, such as dozer lines, hand lines and drop points. The goal of the survey was to monitor weed introduction and spread as a result of these activities.

This report will reflect different degrees of concern for different categories of weedy plant. For example, *agrestals* are less of a concern because these weeds are not likely to spread if a disturbance regime is not maintained. *Invasives*, however, are a serious concern because they are likely to spread even without a disturbance regime. *Noxious Weeds* are legally designated by the State as plants that pose serious problems in agricultural situations.

The "noxious" designation will be indicated in the report, although it should be noted that these plants may not pose the same risk to wild lands as they do to agricultural lands.

Also, it will be indicated in the report whether weeds appear to have occurred in the survey area prior to the fire related disturbance, and if so, whether spread has occurred post-fire. This will differentiate between weed populations that have been introduced as a result of fire fighting activities, and those that previously existed.

Results:

The following weeds were found along lines and at drop points usually adjacent to roads: *Cirsium vulgare*, *Centaurea solstitialis* (Yellow Star Thistle), *Verbascum thapsus*, *Bromus tectorum*, *Arctium minus*, *Rumex* spp., *Cyperus esculentus*, *Phalaris* spp., *Bromus rubens*, *Poa* spp., *Sorghum halepense*, *Elymus glaucus*, *Rubus discolor*, and *Lactuca serriola*. *Cirsium cymosum* – Peregrine thistle – was found at several sites and

identification was confirmed by state weed specialists. All weeds appear to have occurred in the area before the fire, although fire related disturbance may have resulted in some spread of the species. None of these weeds are state rated noxious, nor are they considered invasive on the Mendocino N.F.

As expected, Yellow Star Thistle (YST) was a significant presence in disturbed areas adjacent to roads. In all cases this species appears to have been present in significant numbers prior to the fire. However, YST appears to have made significant inroads along dozer and hand lines adjacent to roads. This is a significant concern especially within the Snow Mountain Wilderness, where it is hoped that YST presence can be controlled and spread prevented. Disturbed areas and other sites of concern adjacent to the Wilderness will be monitored in 2003, and biological control agents utilized. YST was removed by hand pulling at the following sites: one plant near Wolf Creek (TA1) and 35 plants east of Mine Camp (TA2).

In response to concerns that mulch infested with weed seed was air-dropped onto burned areas, three sites were surveyed on July 19, 2002: # 6, 7, and 9 located along road 18N03 near Davis Flat. All three sites did contain Yellow Star Thistle around some perimeters; however, these infestations seemed to clearly emanate from previously infested roadsides. Also found in all three sites were moderate amounts of Wild Lettuce (*Lactuca spp.*) a weedy species, probably exotic, and not thought to be a serious problem displacing native colonizing plants. For comparison, and in order to establish an ecological context, the surveyors inspected non-mulched areas adjacent to mulched sites. The non-mulched areas showed similar patterns of infestation of *Lactuca spp.* and Yellow Star Thistle, suggesting that seed banks of these species existed in the soil prior to the fire, and were not introduced as part of the mulch.

Mechanical hand eradication took place on the dozer line along 20N76 where *V. thapsus* and *C. vulgare* were removed.

The following three weed occurrence sites are considered high priority invasives on the MNF. These sites of concern will be monitored for several years, and eradication will be planned.

Aegilops cylindrica (Goat Grass) was found and eradicated near DP1 on 6/10. Goat Grass has a noxious rating of "B" from the state.

Cytisus scoparius (Scotch Broom) was found adjacent to and in Stony Creek across from Davis Flat Campground on 6/10. No removal. Scotch Broom has a noxious rating of "C" from the state.

Genista monspessulana (French Broom) was found along the road to Happy Camp on private property on 6/10. No removal. French Broom has a noxious rating of "C" from the state.

Glossary of Terms:

Weed: a subjective term used to describe any plant considered to be a nuisance - or valueless - that grows profusely, and to the exclusion of desired plants.

Noxious Weeds: legal designation used specifically for plant species – usually exotic - that have been determined to be major pests of agricultural ecosystems. They are subject by law to certain restrictions, as listed by the State of California. The state grades these plants A to E in order of agricultural concern – only "A" and "B" noxious weeds will be noted in this report:

"A": An organism of known economic importance subject to state (or commissioner when acting as a state agent) enforced action involving: eradication, quarantine, containment, rejection, or other holding action.

"B": An organism of known economic importance subject to: eradication, containment, control or other holding action at the discretion of the individual county agricultural commissioner.

"C": An organism subject to no state enforced action outside of nurseries except to retard spread - at the discretion of the commissioner.

Agrestal Weeds (Agrestals): typically agrestals cannot compete successfully with wild species for wild habitats; they grow on newly disturbed habitat, but are usually displaced by native plants if the habitat is disturbed no further.

Invasive Species (Invasive Plant or Weed; Invasive): a nonnative species that – once established with disturbance - displays rapid growth and spread, allowing it to establish over large areas, displacing native plants. Invasive species **do not** necessarily require reoccurring disturbance to spread.

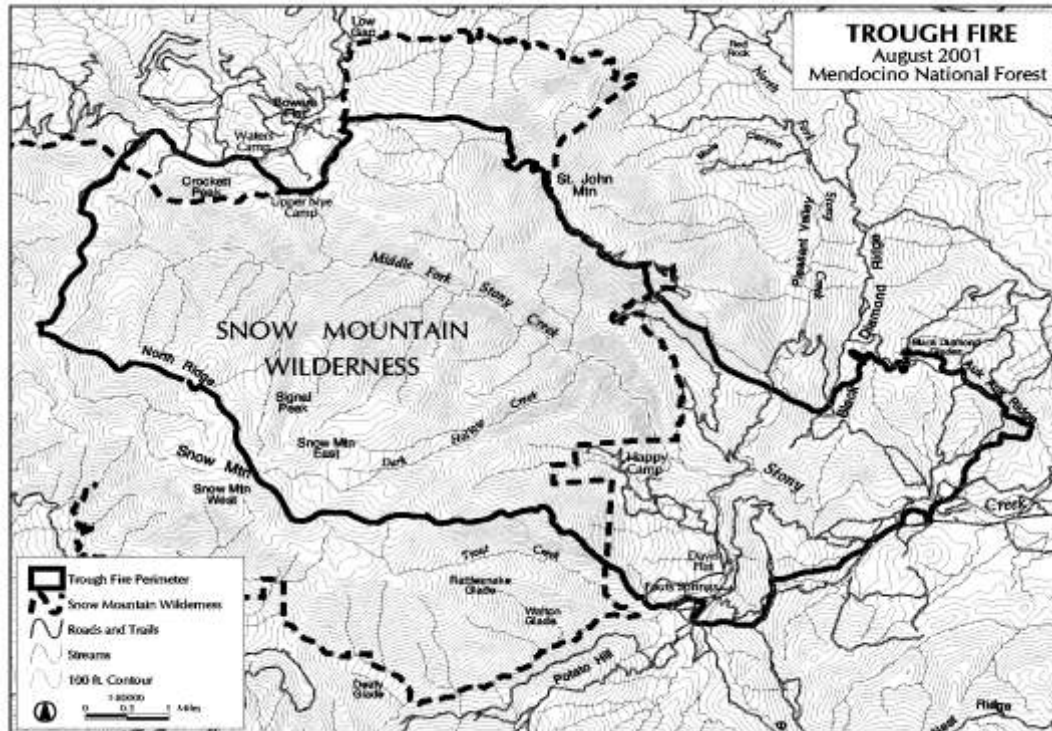
Native Species: Indigenous; plants that occur in a particular region, ecosystem, and habitat without direct or indirect human actions.

Exotic: Non-native, foreign, introduced; plants that occur artificially in locations beyond their known historical natural ranges.

Peter Nilles
Noxious Weed Coordinator
Mendocino N.F.
13Jan2003

Photographs of Trough Fire BAER Treatments

Noxious Weeds



Photograph 1. Outline of the Trough fire. Dark solid black line is the fire perimeter. Noxious weeds were surveyed for on 12 miles of dozer line and 23 miles of handline. Most of the handline was in the wilderness. It was critical to determine no invasive were introduced in fire suppression activities.

Photographs of Trough Fire BAER Treatments (continued)

OHV Barriers

Roadside Barriers



Photograph 2. Members from the Oakland and Valley Climber motorcycle clubs volunteered to install railroad tie barriers. Footings are dug into the ground. The horizontal railroad tie is secured to the footings with reinforcement bar that needs pounded in by hand.

Staging Area Barriers



Photograph 3. Inmates were used to install railroad tie barriers in the campground areas and adjacent staging areas.

Photographs of Trough Fire BAER Treatments

(continued)

Stream Diversions



Photograph 4. When settlers built a road into Brittan Ranch, they diverted the stream to the right. This created a new an erosive channel. With previously burned slopes contributing increased water in an erosive channel, the BAER team prescribed a stream diversion . The old channel was re-established and lined with filter cloth and rock.

Streambank Protection



Photograph 5. An eroding streambank on the edge of archeological site was rocked to protect the streambank and arch site from predicted increased peak water flows.

Photographs of Trough Fire BAER Treatments

(continued)

Mulch Treatments

Hand Mulch



Photograph 6. Inmates were used to hand mulch a hillside that drains into the Davis Flat OHV staging area.

Photographs of Trough Fire BAER Treatments (continued)

Aerial Straw Mulch



Photograph 7. A type 2 helicopter with a four hook carousel and four nets was used to spread straw. An inmate crew loaded the nets.



Photograph 8. Helicopter dispersing straw on a watershed that drains to a road culvert. Application rate was one ton per acre.

Photographs of Trough Fire BAER Treatments (continued)



Photograph 9. Initial straw preparation techniques produced straw which was clumpy. Ground cover is about 40%.



Photograph 10. Adjacent hillside on private land has many rills running down-slope to a stream.

Photographs of Trough Fire BAER Treatments (continued)



Photograph 11. Clump of straw stopping a rill (dotted line).



Photograph 12. Sheet erosion caught by clump of straw.

Photographs of Trough Fire BAER Treatments

(continued)

Hydromulch



Photograph 13. An Erickson Air-Crane helicopter making a tight turn air drop of hydromulch. Besides aerial straw mulching, aerial hydromulching was another technique evaluated by San Dimas Technological Development Center.



Photograph 14. Hydromulch (gray color) adhering to a steep stream bank after a hot summer.

Photographs of Trough Fire BAER Treatments (continued)

WATTLES



Photograph 15. Youth from the nearby Fouts Springs California Youth Authority Detention Camp were used to place wattles along a streambank. Without the wattles, soil would have moved into the trout stream.



Photograph 16. The upper line of wattles (marked in purple) were installed to protect an archeological site on the flat. The wattles stopped rills from eroding the site.

Photographs of Trough Fire BAER Treatments (continued)

Road Drainage Improvement Road Contract



Photograph 17. Culvert in jeopardy! Watershed above this culvert was totally burned at high intensity.



Photograph 18. Value of a culvert end section passing rocks and muck.

Photographs of Trough Fire BAER Treatments (continued)

Road Contract



Photograph 19. Culvert end section blocked by unburned woody debris in the channel. The plugged culvert caused water to overflow the stream banks and washout some of the road.



Photograph 20. Rolling dips with rock rip rap were used to drain water from the road surface. This road was originally insloped with a ditch, but is now outsloped.

Photographs of Trough Fire BAER Treatments

(continued)



Photograph 21. This photograph shows the erosiveness of the burned area. Road water runoff from a rolling dip is creating rills that flow into an intermittent channel. Distance of road collecting water is less than 75 feet. Change orders to the road contract were made to add more rolling dips, where feasible, to correct these situations.

Photographs of Trough Fire BAER Treatments (continued)

Hazard Tree Removal



Photograph 22. Inmates were used to fall hazard trees in the campgrounds and along roads and trails of Davis Flat OHV recreation area.

Exhibit 1. Aerial Mulching Techniques were
in the National Fire Plan newsletter.

Burned Area Emergency Rehabilitation

Improved Fire Rehabilitation Mulching Techniques

California



The Trough Fire (2001) on the Mendocino National Forest provided an area to perfect two aerial mulching
techniques to rehabilitate areas burned in wildfires. Applying mulch by helicopter is much faster, safer and in most cases less costly than applying by hand. Also, helicopter drops can occur on high erosion sites not accessible to hand crews. Feasibility and cost of applications were evaluated.

In 2001, aerial rice straw spreading started on the Mendocino, and being successful, was then used on burned areas of the Shasta-Trinity and Stanislaus Forests. Cooperators with the Mendocino National Forest were California Straw Supply Coop, West Wind Helicopters and San Dimas Technological and Development Center.



San Dimas and the rice straw coop worked together to perfect straw chopping and baling techniques to produce a straw bale that would break apart as it fell through the air. The West Wind helicopter pilot used various speeds and altitudes to get the best straw coverage.

Erickson Air-Crane funded the aerial hydromulch technique. They used a newly developed bonded fiber matrix, paper, water and wheat seed to mulch steep stream banks. The large helicopter was very maneuverable and could lay a 40-foot strip of hydromulch (1/2 acre) in one pass. The hydromulch binds with the soil, creating an erosion resistant

“skin” on the soil surface.

Both treatments are being monitored for longevity of material and effects on native plant regeneration.

Aerial straw mulching is also being used this year on the Haymen Fire (Colorado), Biscuit Fire (Oregon) and McCauley Fire (Sequoia).

This winter the Forest Hydrologist will be making a presentation at the 2002 Fire Conference. This presentation will cover the “how to’s” of site evaluation, area layout, helicopter use, application techniques, straw specifications and effectiveness monitoring.

Initial Request

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

| Line Items | Units | Unit Cost | NFS Lands | | Other \$ | Other Lands | | | | All |
|-----------------------------------|---------|-----------|------------|--------------|----------|-------------|--------|------------|------------|-----------|
| | | | # of Units | WFSU SULT \$ | | # of units | Fed \$ | # of Units | Non Fed \$ | Total \$ |
| A. Land Treatments | | | | | | | | | | |
| Mulch | acres | 900 | 65 | \$58,500 | | | \$0 | | \$0 | \$58,500 |
| Wattles | feet | 2 | 4400 | \$8,800 | | | \$0 | | | \$8,800 |
| | | 0 | 0 | \$0 | | | \$0 | | \$0 | \$0 |
| | | | | \$0 | | | \$0 | | \$0 | \$0 |
| <i>Subtotal Land Treatments</i> | | | | \$67,300 | | | \$0 | | \$0 | \$67,300 |
| B. Channel Treatments | | | | | | | | | | |
| Diversion & protection | ea | 1200 | 3 | \$3,600 | | | \$0 | | \$0 | \$3,600 |
| Channel clear (NFS) | ea | 300 | 15 | \$4,500 | | | \$0 | | \$0 | \$4,500 |
| Channel clear (Co.) | ea | 300 | 25 | \$7,500 | | | \$0 | | \$0 | \$7,500 |
| Headcut structures | ea | 300 | 8 | \$2,400 | | | | | | \$2,400 |
| | | | | \$0 | | | \$0 | | \$0 | \$0 |
| <i>Subtotal Channel Treat.</i> | | | | \$18,000 | | | \$0 | | \$0 | \$18,000 |
| C. Road and Trails | | | | | | | | | | |
| Road contract | job | ##### | 1 | \$316,500 | | | \$0 | | \$0 | \$316,500 |
| Storm Patrol | days | 650 | 10 | \$6,500 | | | \$0 | | \$0 | \$6,500 |
| Fireline barriers | job | 5000 | 1 | \$5,000 | | | | | | \$5,000 |
| Hazard tree removal | job | 10000 | 1 | \$10,000 | | | \$0 | | \$0 | \$10,000 |
| | | | | | | | | | | |
| <i>Subtotal Road & Trails</i> | | | | \$338,000 | | | \$0 | | \$0 | \$338,000 |
| D. Structures | | | | | | | | | | |
| Sensitive plant fence | ea | \$500 | 1 | \$500 | | | \$0 | | \$0 | \$500 |
| Barriers, staging area | ln. ft. | 7.6 | 20300 | \$154,280 | \$30,290 | | \$0 | | \$0 | \$184,570 |
| Barriers, trail closure | ln. ft. | 6.08 | 42 | \$255 | | | \$0 | | \$0 | \$255 |
| Barriers, roadside | ln. ft. | 6.08 | 448 | \$2,724 | | | \$0 | | \$0 | \$2,724 |
| | | | | | | | | | | |
| <i>Subtotal Structures</i> | | | | \$157,759 | | | \$0 | | \$0 | \$188,049 |
| E. BAER Evaluation | | | | | | | | | | |
| Survey team | day | 360 | 106 | \$38,160 | | | \$0 | | \$0 | \$38,160 |
| RO support | job | 1500 | 1 | \$1,500 | | | \$0 | | \$0 | \$1,500 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Line Items | Units | Unit Cost | NFS Lands | | Other \$ | Other Lands | | | | All |
| | | | # of Units | WFSU SULT \$ | | # of units | Fed \$ | # of Units | Non Fed \$ | Total \$ |
| F. Monitoring Cost | | | | \$0 | | | \$0 | | \$0 | \$0 |
| Noxious weeds | survey | 12,034 | 1 | \$12,034 | | | | | | \$12,034 |
| OHV barriers | day | 250 | 5 | \$1,250 | | | | | | \$1,250 |
| Stream Diversion | day | 300 | 2 | \$600 | | | | | | \$600 |
| Mulch and wattles | day | 300 | 6 | \$1,800 | | | | | | \$1,800 |
| | | | | \$0 | | | | | | \$0 |
| G. Totals | | | | \$636,403 | | | \$0 | | \$0 | \$666,693 |

Actual Expenditures

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

[illegible]

PART VII - APPROVALS

1. Michael J. Brenner (for)
Forest Supervisor (signature)

2/13/03
Date

2. _____
Regional Forester (signature)

Date _____