

USDA-FOREST SERVICE

FS-2500-8 (7/00)

Date of Report: 9/24/01

**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 #1  
    ☒ Updating the initial funding request based on more accurate site data or design analysis  
    ☐ Status of accomplishments to date  
☐ 3. Final Report (Following completion of work)

**PART II - BURNED-AREA DESCRIPTION**

- A. Fire Name: Darby                      B. Fire Number: TCU-6632  
C. State: California                      D. County: Calaveras and Tuolumne  
E. Region: 5                              F. Forest: Stanislaus  
G. District: Calaveras  
H. Date Fire Started: 9/05/01              I. Date Fire Contained: 9/16/01  
J. Suppression Cost: \$21,100,000  
K. Fire Suppression Damages Repaired with Suppression Funds  
    1. Fireline waterbarred (miles): 30  
    2. Fireline seeded (miles): 0  
    3. Other (identify): 0  
L. Watershed Number: 1804001001 (North Fork Stanislaus River); 1804001003 (Lower Middle Fork Stanislaus River); 1804001005 (Knight-Rose).  
M. Total Acres Burned: 14,288  
    NFS Acres(10,767 )    Other Federal (233 )    State (0 )    Private (3,288 )

N. Vegetation Types: Low elevation chaparral, canyon live oak, ponderosa pine, mixed conifer

O. Dominant Soils: Metamorphic soils: Josephine, moderately deep, and Districlithic Xerochrepts; Granitic Soils: Holland, moderately deep, Fiddletown, and Lithic Xerumbrepts; Volcanic soils: Cohasset, McCarthy and Lithic Xerumbrepts.

P. Geologic Types: Metamorphic (35%), Granitic (55%), Volcanic (10%)

Q. Miles of Stream Channels by Order: Perennial: 6.9 miles; Intermittent: 4.7 miles; Ephemeral: 58.6 miles.

R. Transportation System

Trails: 6 miles      Roads: 38 miles

### **PART III - WATERSHED CONDITION**

A. Burn Severity (acres): 9486 (67%) (low) 2660 (18%) (moderate) 2142 (15%) (high)

B. Water-Repellent Soil (acres): 1700

C. Soil Erosion Hazard Rating (acres):  
9486 (low) 2160 (moderate) 2642 (high)

D. Erosion Potential: 7 tons/acre

E. Sediment Potential: 1800 cubic yards / square mile

### **PART IV - HYDROLOGIC DESIGN FACTORS**

A. Estimated Vegetative Recovery Period, (years): 5

B. Design Chance of Success, (percent): 80

C. Equivalent Design Recurrence Interval, (years): 25

D. Design Storm Duration, (hours): 6

E. Design Storm Magnitude, (inches): 2.8

F. Design Flow, (cubic feet / second/ square mile): 60

G. Estimated Reduction in Infiltration, (percent): 15

H. Adjusted Design Flow, (cfs per square mile): 65

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

### **A. Describe Watershed Emergency:**

Values at risk were determined by the Darby BAER Team. Although the overall burn severity of the fire was not extreme there are several locations where the following emergencies were determined:

#### **Threat to Life**

- 1) Candy Rock Road (Road 4N03 West) – There is a high risk to travelers on about two miles of this forest road due to an increased risk of rockfall caused by the fire. Slopes are steep above the road and rockfall is very likely where burn severity has removed vegetation and exposed rock that can crash down on to the road. The Candy Rock road is very accessible to the public and is used as ingress to the North Fork Stanislaus River for fishing, swimming and hiking. There is a public parking area at the end of the road adjacent to the river.
- 2) The “3/4 Mile Flume” – There is a very high risk to loss of life for construction workers rebuilding this section of the Utica Flume and Ditch system due to an increased risk of rockfall caused by the fire. The Utica Power Authority operates the flume under a FERC license and expects to rebuild the flume in-kind beginning as soon as possible. The entire length of the 4,000 foot flume was consumed by the fire. The flume traversed a very steep slope (ranging from about 75% to over 100%) across a small watershed that was burned to a high severity. The heat of the fire consumed all stabilizing vegetation and cracked and exposed rocks that could fall downslope onto workers.
- 3) Road 4N30 – There is a threat to life to travelers on this road below an area of high burn severity near Douds Landing. Flood or debris flow threats exist in the drainages that cross the road. This road is very accessible to the public from nearby communities since roads leading to it are open year round.
- 4) McKays Landslide – There is a threat to life for employees of the Northern California Power Authority (NCPA) who conduct monitoring on the landslide. This 8 acre deep-seated landslide is just above McKays Reservoir. Several years prior to the fire a network of six motion detecting monitoring locations were established to evaluate movement of the slide. Access to the monitoring sites is by trail from near the top of the slide. The face of the slide is steep – about 55% and greater. The Darby fire burned about 6 acres of the slide to a severity that removed most of the ground cover, exposed the access trail to surface erosion, exposed a rock outcrop with rockfall potential on to the trail, killed some trees and damaged or destroyed all the monitoring sites. The Darby BAER team geologist and the NCPA geologist met at the landslide and concurred that the fire intensity was not significant enough to aggravate hydrogeologic processes that would initiate a sudden mass failure. However, the fire presented a high risk threat to safety of NCPA personnel conducting monitoring on the face of the slide by increasing surficial erosion processes that may destabilize the trail, activate rockfall and create hazard trees that could fall on monitoring personnel.

#### **Threat to Property**

- 1) Forest Development Road System – Numerous locations on the road system are at high risk of loss of function and/or are likely to degrade adjacent resources. Road drainage facilities need to be prepared to accommodate increased post-fire flows where high and moderate burn severity occurred above roads.

- 2) Trails – The Candy Rock Trail, providing river access from the end of the Candy Rock Road, has been damaged as a result of the fire. About 20 wooden stairs were burned along the trail and burned trees have fallen across the trail. Although this is a short, unofficial trail, it is popular since it provides the only river access in the vicinity.

#### Loss or Degradation of Significant Natural Resources

- 1) Soil Productivity – There are two areas of about 60 acres each where soil loss is likely to degrade site productivity. One is at the Douds Landing area where high burn severity on Holland soils is expected to erode substantially without treatment. The other site is on a north and west facing slope immediately adjacent to McCormick Creek. Erosion and sedimentation from this site, if untreated, is expected to degrade site productivity and damage a sensitive reach of McCormick Creek.
- 2) Stream Channel Stability and Aquatic Habitat – About 0.6 miles of McCormick Creek downstream of the crossing of Road 4N03 is a low gradient, fine textured stream channel that is sensitive to damage from upstream erosion and sedimentation effects of the fire. This reach is also habitat for an isolated population of foothill yellow legged frog. This species is currently listed as Forest Service Sensitive and is proposed for listing under the federal Endangered Species Act. The effects of the fire may alter the instream and adjacent riparian wintering habitat to the extent that loss of the local population could occur.
- 3) Significant Archaeological Sites – There are three sites that are subject to loss of integrity as a result of the Darby fire. Two prehistoric sites, known as the Garden Site and the McWiggles Site, include housing relics and a bedrock mortar site that are at risk of damage from erosion. A homestead site, known as Douds Landing, contains relics of human occupancy dating to the 19<sup>th</sup> century. The well known Douds site is immediately adjacent to a popular road (4N30) and loss of its fire-exposed artifacts will probably result in unacceptable degradation of critical cultural resources by public removal. Another significant heritage site within the fire is McCormick Meadows, a substantial prehistoric village site, occupies both national forest and private land. The fire burned lightly on the public land but the private landowner put substantial dozer line through the site. There is a risk of noxious weeds expanding on the private land and migration of those weeds onto the public land in the next 1-3 years.
- 4) Plant Species Composition – There is a substantial risk of invasion of noxious weeds due to a very high density of firelines on this fire that were constructed by equipment that was not cleaned of weeds prior to ingress into the fire area. About 30 miles of dozer lines were built, and in addition about the same mileage of roads were traveled by suppression related vehicles from fire camps and staging areas that contained noxious weeds. As a result of this occurrence there is a strong expectation of noxious weed invasion threatening native plant community composition.

#### B. Emergency Treatment Objectives:

- 1) Prevent loss of life and risk to human safety.
- 2) Reduce threat to property on Forest Roads.
- 3) Reduce risk of degradation of significant natural resources.

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

Land 90 % Channel N/A % Roads 90 % Other N/A %

D. Probability of Treatment Success

|         | Years after Treatment |    |     |
|---------|-----------------------|----|-----|
|         | 1                     | 3  | 5   |
| Land    | 80                    | 90 | 100 |
|         |                       |    |     |
|         |                       |    |     |
| Channel | N/A                   |    |     |
|         |                       |    |     |
|         |                       |    |     |
| Roads   | 90                    | 95 | 100 |
|         |                       |    |     |
| Other   | N/A                   |    |     |
|         |                       |    |     |

E. Cost of No-Action (Including Loss): **\$ 503,950**

F. Cost of Selected Alternative (Including Loss): **\$ 208,970**

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"/> Lands (FERC) |
| <input type="checkbox"/> Forestry             | <input checked="" type="checkbox"/> Wildlife | <input type="checkbox"/> Fire Mgmt.         | <input checked="" type="checkbox"/> Engineering | <input type="checkbox"/>                         |
| <input type="checkbox"/> Contracting          | <input type="checkbox"/> Ecology             | <input checked="" type="checkbox"/> Botany  | <input checked="" type="checkbox"/> Archaeology | <input type="checkbox"/>                         |
| <input checked="" type="checkbox"/> Fisheries | <input type="checkbox"/> Research            | <input type="checkbox"/> Landscape Arch     | <input checked="" type="checkbox"/> GIS         |  |

Team Leader: Jim Frazier

Email: jfrazier@fs.fed.us

Phone: 209-532-3671 FAX: 209-533-1890

Team Members:

Hydrology: Melanie Greene (LTBMU), Sharon Grant (STF)

Soils: Alex Janicki (STF) and Todd Ellsworth (INF)

Geology: Alan Gallegos (SNF)

Fisheries and Wildlife: Mollie Hurt (LTBMU)

Lands (FERC/Special Uses): Ted Franks (STF, Retired)

Engineering: Mike Bradshaw and Rusty LeBlanc (STF)

GIS: Jim Schmidt, Joyce Mousseau and Mark Schugg (STF)

H. **Treatment Narrative:**

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

### Land Treatments:

**Aerial Straw Mulching** – Aerial application of certified weed free rice straw will be conducted on approximately 60 acres of high burn severity in the Douds Landing area to reduce erosion on highly erodible granitic soils. Aerial application will be more cost-effective and efficient than hand mulching in this area since there is no road access to the interior of the site. (Mechanical shredding was considered here but was discounted due to an insufficient amount of woody material to shred). Aerial straw application on about 10 acres of riparian area with high burn severity in McCormick Creek will provide supplemental cover to the lop and scatter treatment described below. Additional cover is needed to provide a good buffer to mitigate damage to this sensitive stream reach that is subject to substantially altered channel morphology. Aerial application will be most cost-effective because straw can be quickly flown from the Douds Landing staging area thus saving vehicular delivery costs to McCormick Creek, the driving distance to which is very lengthy.

**Shredding** – Mechanical shredding of submerchantable trees and brush skeletons using a low ground pressure masticating shredder will be conducted on about 60 acres of moderate burn severity in McCormick Creek. The purpose of this treatment is to provide a first-winter ground cover on the burned area immediately upslope from a sensitive reach of McCormick Creek. This site has a sufficient quantity of shreddable material.

**Riparian Conservation Area Lop and Scatter** - As part of the treatment to protect the sensitive reach along McCormick Creek, hand lop and scatter will complement aerial straw application. The numerous submerchantable trees in this area will be hand felled, bucked and scattered to provide a coarse matrix of cover to contain ash flow and help retain the straw application on site. The wood and straw cover are intended to both protect channel stability and improve first-year wintering habitat for the foothill yellow legged frog. At present, the hiding and burrowing cover preferred by this species for winter occupancy is nearly absent since the fire consumed nearly all cover in the riparian area.

**Archaeological Site Stabilization** – Hand straw mulch will be applied at the Garden Site to protect its resources from erosion following the fire. A culvert realignment near the McWiggles Site will direct streamflow away from the bedrock mortar site that is likely to be damaged by the expected increase in flows caused by the fire upslope of this site. At the Douds Landing historic homestead site, collection of artifacts is the only feasible way to mitigate the emergency created by the fire at this very accessible site. Exposure of this site due to consumption of ground cover cannot be treated by other known means. Removal of artifacts by the public is imminent thus rendering collection urgent and worthwhile for this potentially NRHP-eligible site. Critical heritage resources are likely to be unacceptably degraded if the artifacts are not collected. Collection will be done by grid pattern recording and extraction. Cataloging and analysis of the artifacts will be done at a later time using heritage resource program funds.

**“3/4 Mile Flume”** - The Federal Energy Regulatory Commission (FERC) has regulatory authority over land treatments related to the proposed reconstruction of this portion of the Lower Utica Flume and Ditch System (License # 2019). The Forest Service will notify the FERC in writing that the post-fire burned area survey by the Darby Fire BAER team revealed life and resource threatening rockfall hazards caused by the fire.

**McKays Reservoir Landslide** – The Forest Service will notify the Northern California Power Agency in writing of the hazards discovered at this site by the Darby Fire BAER team, and NCPA's consequent responsibilities under their Special Use Permit for monitoring movement of the landslide. As permit holder, NCPA acknowledges risks such as fire and has the responsibility to conduct land treatments necessary to rectify its consequences within the permit area.

Channel Treatments: None

Road and Trail Treatments:

Candy Rock Road (4N03) below quarry:

- A. Administrative closure and warning sign to mitigate threat to life.
- B. Road drainage facility preparation, culvert modification and emergency storm patrol to mitigate threat to property.

Doud's Landing (4N30):

- A. Administrative closure and warning sign to mitigate threat to life.
- B. Road drainage facility preparation, culvert modification and additional Big Mac to mitigate threat to property.

McKays Road (4N38):

- A. Administrative closure and/or warning sign on paved portion of road to mitigate threat to life.
- B. Road drainage facility preparation, culvert realignment at cultural resource site and emergency storm patrol to mitigate threat to property and resources.

5N07, North of Griswold Creek:

- A. Road drainage facility preparation and intercepting dips to mitigate threat to property.

5N07, South of Griswold Creek:

- A. Road drainage facility preparation, intercepting dips and culvert modification to mitigate threat to property.

McCormick Meadows/Hungry Flat Area (4N03 system):

- A. Road drainage facility preparation, intercepting dips, snorkels and culvert upsize and/or Metal end section to mitigate threat to property and soil, water and aquatic resources.

Candy Rock Trail to Swimming Site:

- A. The threat to human safety on this non-system trail is mitigated by closure of the Candy Rock Road (4N30). No BAER treatment is planned.

The following is a description of each of the treatments described above:

Road Drainage Facility Preparation - This treatment prepares existing drainage facilities to handle the enhanced post-burn flows. It removes floatable and transportable debris, gravel bars, and the like from catch basins and immediate upstream channels to make existing drainage facilities as effective and efficient as possible to handle the anticipated post-burn flows. This also includes opening ditches, dips, lead-off ditches, overside drains, removing undesirable outside berms, and the like, and clearing channels, culvert catch basins and outlets of floatable, gravel bars, and other debris.

Intercepting and/or Relief Dips – This treatment intercepts and/or relieves water from the roadway at more frequent intervals to augment existing drainage facilities, and to keep water from running long distances down the roadway. Depending on soil types and traffic needs, these dips may be rocked and the outlets may be rip-rapped or may have an overside structure such as a Little Mac or a Big Mac.

Emergency Storm/Flood Patrol - This treatment provides a workforce and equipment to identify and repair storm damage, where feasible, during and after periods of runoff in order to prevent otherwise greater damage from occurring.

Snorkels: The objective of this treatment is to allow continued flow of water through culverts in natural drainages after the normal, channel grade inlet is plugged by debris flows

Culvert Modifications: This treatment improves the function of culvert installations. It includes culvert extensions, replacements, metal end sections, and the like. The purpose of this treatment is to enhance function related to fire-increased water flows; it is not intended as long term betterment.

Warning Signs: The objective of this treatment is to mitigate the threat to life. It may be used by itself or in combination with an administrative closure.

Administrative Closure: The objective of this treatment is to mitigate the threat to life, property, and/or adjacent resources in the short term following the fire; that is, until the fire-caused risk satisfactorily abates. It includes physical barriers such as temporary gates or barricades to close roads to public use during periods of high risk, such as winter, and can be supported by a Forest Order for enforcement.

Structures: None

#### **H. Monitoring Narrative:**

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

Noxious Weeds – Noxious weed monitoring is proposed to determine if noxious weed invasion will occur in the fire area. There is a strong likelihood of this occurrence due to an extremely high density of fire suppression activities and lack of equipment cleaning prior to entering the fire area. About 30 miles of dozer lines were constructed and about 30 miles of roads plus numerous staging and associated areas were utilized. Many staging areas outside the fire perimeter contained noxious weeds through which vehicles and equipment were driven prior to entering the fire area. Cost estimates for the proposed monitoring are for the first year (2002) and reflect hiring personnel for this task. If existing employees are available the costs could decrease, but at this time it is likely that the existing workforce will be fully occupied with other work priorities. See the botany specialist report for monitoring plan details.

Other Monitoring – A separate monitoring plan will be submitted in an interim 2500-8 for monitoring the effectiveness of treatments such as aerial straw mulching, shredding, riparian area protection and selected road treatments.



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

|                                   |      |      |    |                  |  |  |            |            |                  |
|-----------------------------------|------|------|----|------------------|--|--|------------|------------|------------------|
| <b>A. Land Treatments</b>         |      |      |    |                  |  |  |            |            |                  |
| Aerial Straw Mulching             | ac   | 290  | 70 | \$20,300         |  |  | \$0        | \$0        | \$20,300         |
| Shredding                         | ac   | 200  | 60 | \$12,000         |  |  | \$0        |            | \$12,000         |
| RCA Lop and Scatter               | ac   | 140  | 30 | \$4,200          |  |  | \$0        | \$0        | \$4,200          |
| Arch Site Stabilizing             | ea   | 1500 | 2  | \$3,000          |  |  | \$0        | \$0        | \$3,000          |
| <i>Subtotal Land Treatments</i>   |      |      |    | <b>\$39,500</b>  |  |  | <b>\$0</b> | <b>\$0</b> | <b>\$39,500</b>  |
| <b>B. Channel Treatments</b>      |      |      |    |                  |  |  |            |            |                  |
| None                              |      |      |    | \$0              |  |  | \$0        | \$0        | \$0              |
|                                   |      |      |    | \$0              |  |  | \$0        | \$0        | \$0              |
|                                   |      |      |    | \$0              |  |  | \$0        | \$0        | \$0              |
|                                   |      |      |    | \$0              |  |  | \$0        | \$0        | \$0              |
| <i>Subtotal Channel Treat.</i>    |      |      |    | <b>\$0</b>       |  |  | <b>\$0</b> | <b>\$0</b> | <b>\$0</b>       |
| <b>C. Road and Trails</b>         |      |      |    |                  |  |  |            |            |                  |
| Road Drainage Prep                | mi   | 500  | 38 | \$19,000         |  |  | \$0        | \$0        | \$19,000         |
| Intercepting Dips                 | ea   | 2000 | 15 | \$30,000         |  |  | \$0        | \$0        | \$30,000         |
| Storm Patrol                      | days | 1200 | 12 | \$14,400         |  |  |            |            | \$14,400         |
| Snorkels                          | ea   | 5000 | 5  | \$25,000         |  |  | \$0        | \$0        | \$25,000         |
| Culvert Modification              | ea   | 5865 | 6  | \$35,190         |  |  |            |            | \$35,190         |
| Warning Signs                     | ea   | 1000 | 3  | \$3,000          |  |  |            |            | \$3,000          |
| Administrative Closure            | ea   | 5000 | 3  | \$15,000         |  |  | \$0        | \$0        | \$15,000         |
| <i>Subtotal Road &amp; Trails</i> |      |      |    | <b>\$141,590</b> |  |  | <b>\$0</b> | <b>\$0</b> | <b>\$141,590</b> |
| <b>D. Structures</b>              |      |      |    |                  |  |  |            |            |                  |
| None                              |      |      |    | \$0              |  |  | \$0        | \$0        | \$0              |
|                                   |      |      |    | \$0              |  |  | \$0        | \$0        | \$0              |
|                                   |      |      |    | \$0              |  |  | \$0        | \$0        | \$0              |
|                                   |      |      |    | \$0              |  |  | \$0        | \$0        | \$0              |
| <i>Subtotal Structures</i>        |      |      |    | <b>\$0</b>       |  |  | <b>\$0</b> | <b>\$0</b> | <b>\$0</b>       |
| <b>E. BAER Evaluation</b>         |      |      |    |                  |  |  |            |            |                  |
| Salary                            |      |      |    | \$55,750         |  |  | \$0        | \$0        | \$55,750         |
| Travel                            |      |      |    | \$2,700          |  |  | \$0        | \$0        | \$2,700          |
| IR Photography                    |      |      |    | \$15,000         |  |  |            |            | \$15,000         |
| <b>G. Monitoring Cost</b>         |      |      |    | <b>\$0</b>       |  |  | <b>\$0</b> | <b>\$0</b> | <b>\$0</b>       |
| Noxious Weeds                     |      |      |    | \$27,880         |  |  |            |            | \$27,880         |
| <b>H. Totals</b>                  |      |      |    | <b>\$282,420</b> |  |  | <b>\$0</b> | <b>\$0</b> | <b>\$282,420</b> |
|                                   |      |      |    |                  |  |  |            |            |                  |

**PART VII - APPROVALS**

- \_\_\_\_\_

Forest Supervisor (signature)

\_\_\_\_\_

Date
- \_\_\_\_\_

Regional Forester (signature)

\_\_\_\_\_

Date

## **TECHNICAL SPECIALIST'S REPORT BURNED AREA EMERGENCY REHABILITATION**

**Botany and Noxious Weeds  
Darby Fire September 25, 2001  
Margaret Willits  
Botanist, Stanislaus National Forest, Mi-Wok Ranger District**

### **I. Resource Condition Assessment**

**INTRODUCTION:** This report describes the condition of botanical resources and the degree of threat from noxious weeds in the Darby Fire area, for the purpose of preparing the 2500-8 Report

#### **A. Initial Concerns**

1. Capacity of the vegetation to recover: In areas burned at high intensity, the capacity for the native vegetation to provide rapid cover of the soil may have been diminished.
2. Sensitive Plants: There are no known Threatened, Endangered plants or plants proposed for listing. The fire may have negatively impacted mountain ladyslipper (*Cypripedium montanum*), a Forest Service sensitive plant species with one known occurrence in the burn area. Suppression may have affected *Lomatium stebbinsii* and, possibly, *Allium tribracteatum*. The entire area has not been surveyed for sensitive plants and there is suitable habitat for *Allium tribracteatum*, *Cypripedium montanum*, *Erythronium tuolumnense*, *Hydrothyria venosa*, *Lomatium stebbinsii*, and *Mimulus pulchellus*.
3. Noxious Weeds: Burned areas provide opportunities for invasive plants to establish extremely quickly because of disturbed soil, release of nutrients, and lack of competition. Noxious weeds could have been introduced to the area during fire suppression. There were no wash stations at the fire for vehicles and equipment. In addition, Sudden Oak Death disease could also be introduced if vehicles or equipment came from contaminated areas.

#### **B. Findings of the on-the-ground survey**

Summary of findings:

There were known populations of two sensitive plant species, *Cypripedium montanum*, and *Lomatium stebbinsii*, within the fire and associated fireline area and possible sightings of a third, *Allium tribracteatum*. There is also suitable habitat for *Erythronium tuolumnense*, *Hydrothyria venosa*, and *Mimulus pulchellus*. *Cypripedium montanum* was visible after the fire. It is not clear whether it will survive. *Allium tribracteatum* and

*Lomatium stebbinsii* habitat had some damage from suppression efforts, but was not directly affected by the fire.

The only area of concern for vegetative recovery is above Doud’s Landing. This will be addressed in other specialist reports.

An emergency exists for risk of noxious weed introduction and spread throughout the firelines and the burned area. I am requesting \$27,880 to survey and conduct early control throughout the firelines during 2002. It is expected that this preventive approach will have a 99% chance of success in combination with a Calaveras Ranger District noxious weed project that is already in process. It is much easier to stop noxious weed establishment and spread at early stages before they set seed and become established.

Additional Information

1. Capacity of the vegetation to recover: The Darby Fire burned 14,280 acres of coniferous forest, chaparral, and oak woodland on Forest Service and private land. Fire suppression was under the direction of the California Department of Forestry and Fire (CDF). This report will only treat the 10,767 acres of Forest Service land. Elevations range from 1,200 feet in the Stanislaus canyon to about 4,700 feet at the northeastern boundary of the burn. Much of the burn includes the steep slopes of the North and Middle Forks of the Stanislaus River and more gentle slopes in the Griswold and McCormick Creek watersheds. Based on records in GIS, approximately one-third of the area burned in the last forty years, primarily in prescribed fires. Approximate 140 acres have burned in wildfire in five fires from 1963 – 1993. The records may only go back to 1950. Prescribed fires from 1992 to 1998 have underburned 3,366 acres within the fire perimeter and another 4,181 acres within the contingency line. Most areas that have not burned have generally been unburned for longer than would be natural.

Overall, the fire burned at lower severity than other large fires on the Stanislaus National Forest. Seventeen percent of the Forest Service land burned at high severity, primarily in chaparral (CC and QC). The rest was a moderate or low severity. High severity areas were generally on south aspects at lower elevations. There are patches of unburned vegetation, particularly at the higher elevations and near rivers and streams. Table 1 shows number of acres burned at low, low/moderate, moderate, or high intensity for each vegetation type, taken from a burn severity map. The vegetation map was based satellite imagery and was done at a finer resolution than the burn severity mapping. Small areas of distinctive vegetation may not have the correct severity. In addition, the vegetation layer has been created through programs that can average values and alter boundaries. It is intended to be used primarily in large scale, coarse filter analyses. Therefore, this summary reflects general trends and patterns only.

Table 1. Vegetation Types in Relation to Burn Intensity

|  |                  |  |  |
|--|------------------|--|--|
|  | Burn<br>Severity |  |  |
|--|------------------|--|--|

| Vegetation Type              | Low         | Low/Moderate | Moderate    | High        | Total Acres  |
|------------------------------|-------------|--------------|-------------|-------------|--------------|
| BA- Barren                   | 6           | 5            | 2           | 3           | 15           |
| CC- Foothill Mixed Chaparral | 560         | 528          | 581         | 1327        | 2996         |
| DP- Douglas-Fir - Pine       | 279         | 54           | 51          | 16          | 400          |
| GR- Unknown Grass            | 147         | 68           | 30          | 74          | 320          |
| MP- Mixed Conifer- Pine      | 942         | 107          | 124         | 32          | 1205         |
| PD- Gray Pine                | 45          | 19           | 25          | 15          | 104          |
| PP- Ponderosa Pine           | 841         | 315          | 370         | 96          | 1622         |
| QC- Canyon Live Oak          | 644         | 513          | 266         | 166         | 1589         |
| QW-Interior Live Oak         | 1519        | 572          | 328         | 95          | 2514         |
| WA- Water                    | 2           |              |             |             | 2            |
| <b>Total Acres</b>           | <b>4986</b> | <b>2180</b>  | <b>1777</b> | <b>1824</b> | <b>10767</b> |

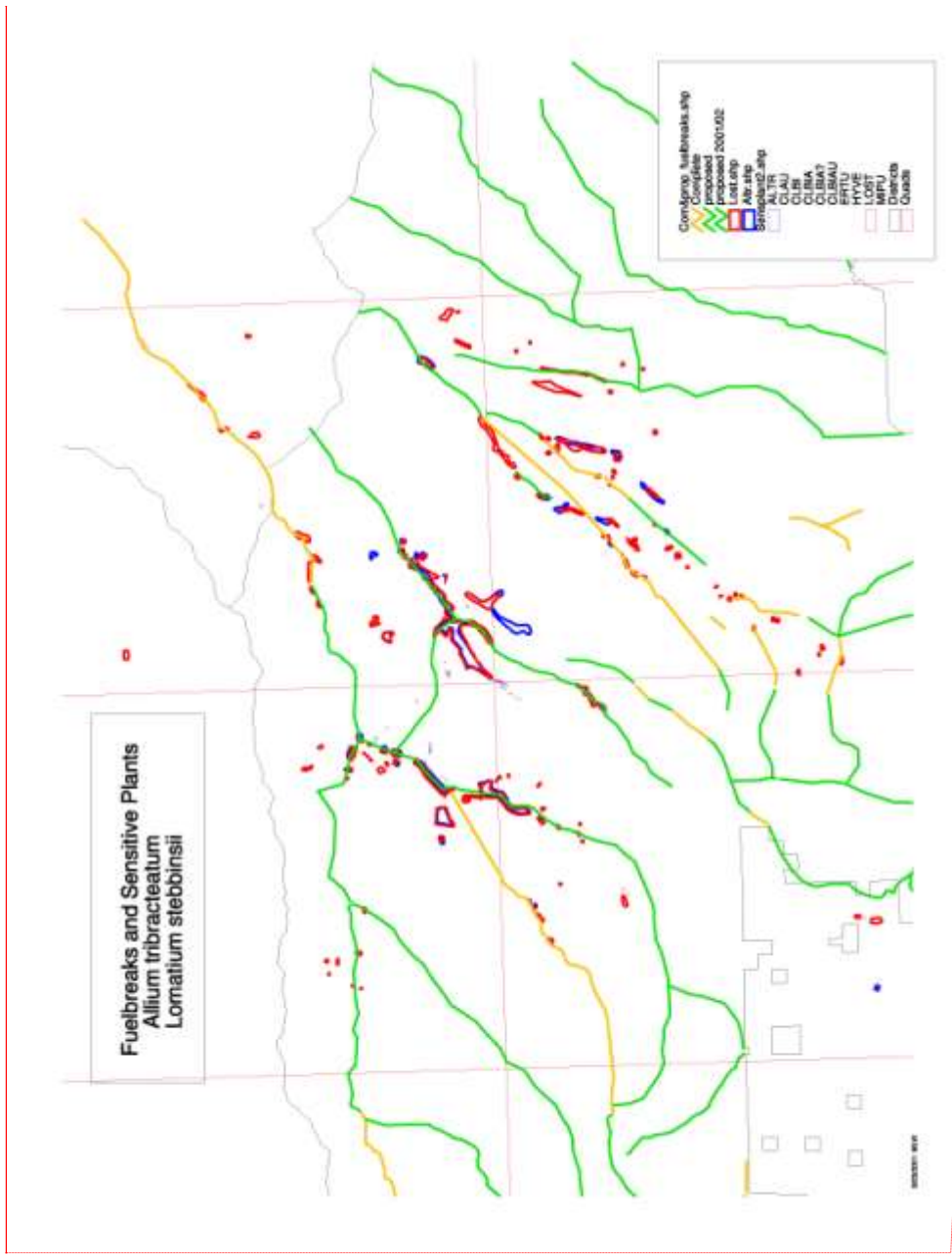
The areas of high severity burn are of most concern to the BAER process since these are the areas most likely to have problems regenerating or to present immediate hazards. Most of the high severity was chaparral. Chaparral areas often burn. Many species, including chamise (*Adenostoma fasciculatum*), can sprout from roots. Chamise was observed at the edge of many of the chaparral areas with high severity burn. It has adaptations that can cause it to burn intensely and rapidly (see summary in USDA Forest Service, 2001). High severity burn areas in the Pilot fire on Groveland (1991), which had a lot of area of chaparral, resprouted and have revegetated. The amount of regrowth of grasses and forbs may be affected by the rainfall pattern in the fall (J. Haas pers. comm.).

There were a few areas of high intensity in forest vegetation types. Most of these were small, but the area above and around Doud's Landing was a larger area of high severity burn. This area will be addressed in the soils, hydrology, and engineering sections.

2. Sensitive Plants: This analysis is based on revisits of known sensitive plant populations and habitat evaluation for other species that could occur in the area of the fire. The known population of *Cypripedium montanum* (mountain ladyslipper) within the fire still had visible stems, but fire had burned litter and duff up to the stems. A buffer of young hardwoods, primarily dogwood (*Cornus nutallii*), below the occurrence may have helped to reduce the severity of the burn in that area. Based on observations in Washington, *Cypripedium montanum* will sometimes survive a low-intensity fire in which most of the duff layer is left intact. However, it usually does not survive a fire of an intensity in which the duff layer is consumed (pers. comm. D. Knecht, with J. Haas, February 13, 1997). It is not known whether this occurrence of two plants will survive and regrow next year. A rough GIS model of *Cypripedium montanum* habitat using elevation, soil type, and aspect shows that less than 20% of this habitat burned at moderate to high intensity. If there are other populations of *Cypripedium montanum* in the fire perimeter, they may also not be fully consumed. *Cypripedium montanum* is the sensitive species most likely to be negatively affected by fire.

There were three known populations of *Lomatium stebbinsii* (Stebbin's lomatium) and two possible populations of *Allium tribracteatum* (three-bracted onion) on lava caps near the fire line. Lava cap areas in the fire were visited and none had burned. The primary effects to these species from the fire would be due to suppression activities. Fire lines went through all *Lomatium stebbinsii* populations and one of the *Allium tribracteatum* populations, but were minimized to reduce impacts. Since these species grow in volcanic openings, most populations are along proposed and existing fuelbreaks and can be affected by fire suppression (See attached map).

*Erythronium tuolumnense* (Tuolumne fawn lily), *Hydrothyria venosa* (veiny aquatic lichen), and *Mimulus pulchellus* (pansy monkeyflower) could also be present in the fire area. *Erythronium tuolumnense* grows on very steep slopes and is unlikely to be affected by fire suppression. It generally expands after fire and benefits from fire. *Hydrothyria venosa* grows in small perennial streams with low sediment and cool water temperatures. It is usually found in forested areas. That habitat burned and low severity in this fire, so it is unlikely to have been affected. *Mimulus pulchellus* grows on shallow slopes in vernal moist areas. It has usually been found on volcanic soils in the occurrences closest to the fire. Several staging areas were set up in areas that would normally be wet enough to support *Mimulus pulchellus*. The two areas that were observed appear to have too much other vegetation to be good habitat. However, actual effects are not known.



**Comment [UFS1]:** I have not been able to get this to print. I include it as a postscript file and have also converted it to a JPG file incase others can use it in one of those forms.

3. Noxious Weeds: Weeds spread after fire due to the increased light and the nutrients in the ash. The open dozer lines are also very susceptible to invasion. This fire was all below 4,800' and most of the common weeds could establish well at that elevation. Surveys for noxious weeds were not complete on private or public lands before the fire. All members of the BAER team were encouraged to watch for weeds and report them. County agricultural extension agents and Forest Service personnel were also asked about weed distribution.

Yellow star-thistle, a state list C noxious weed, is the most likely noxious weed in the Darby Fire. Yellow star-thistle is present in the Candy Rock area down to the adit and at the McKay staging area. It is also present on private land near Darby Road and along Highway 4, at the staging areas in Murphy's, at Clark Flat near the start of the fire, and at the fire camp at the Calaveras fairgrounds. The Calaveras Ranger District is currently preparing a project to treat yellow star-thistle near Candy Rock. Some of that occurrence is on very steep ground and may be very difficult to treat manually.

Of greater concern are the state list A and B weeds. There is a possible sighting of spotted knapweed (*Centaurea maculosa*), a state list A noxious weed, on the Middle Fork of the Stanislaus (C. Chainey-Davis, pers. comm. 2001). This is in a very inaccessible area. Observation from a helicopter indicated that the fire may have burned down to this site. Spotted knapweed is also reported from Arnold (M. Mutz pers. comm. 2001).

Bull thistle (*Cirsium vulgare*) was present in many areas south and east of the North Fork of the Stanislaus River. It was in many of the clearcuts on private land and was also in McCormick and upper McCormick meadows. The state noxious weed list will be revised in November, 2001 and could include bull thistle (M. Chamber, pers. comm., 2001). It is of greatest concern in meadows where it will not be eventually shaded out.

In addition to the spread of existing populations, a major threat is the introduction of more weeds into the fire area on equipment. There were no equipment washing stations for vehicles arriving at or leaving the Darby fire. According to a CDF press release, there were 49 bulldozers, 37 water tenders, 148 engines, and 13 helicopters on the fire on September 10 and numerous trucks and other support vehicles. Approximately one-half of the bulldozers were from CDF. CDF operators told me that they usually clean the dozers after a fire unless they are called directly to another fire. Two private operators also told me they cleaned their dozers, but were not sure all operators did. Several of the private bulldozers had come directly from the Leonard and Creek fires.

Another concern is the possible transport of *Phytophthora ramorum*, the pathogen that causes Sudden Oak Death disease (SOD). Relatively little is known about this disease and its means of spread. Currently it is limited to seven coastal counties. It may spread through infected host plants such as rhododendron and huckleberry and on dead wood and debris from infected plants. It may also spread aerially and in soil. The risk it poses is high due to the role of oaks economically and ecologically (Kliejunas 2000) and there is no effective means of treatment. At least three of the CDF bulldozers came from counties that report SOD.

There are at least 24 miles of bulldozer line on Forest Service land. Field surveys showed that there are more lines than have been mapped. There is approximately one and one-half times as much dozer line on private land. Many of the roads in and into the fire were graded and the graders also were not washed. In addition, there are nine helispots, five drop points, two safety zones, and one staging area on Forest Service land. This adds up to almost 400 acres of soil that was disturbed by unwashed equipment and presents a high risk for the introduction and spread of noxious weeds, and possibly SOD following the Darby Fire. There are large areas of oaks in the Darby fire area that could be killed by this pathogen.

## **II. Emergency Determination**

Most areas of vegetation were not burned with enough severity to create an emergency. One particular area near Doud's Landing will be addressed in other specialist reports.

There is an emergency with respect to noxious weeds. The primary threat to the recovery of the vegetation is the potential for spread of noxious weeds and other invasive, non-native plants. There were no provisions for washing equipment on this fire and dozers came from thirteen different private sources and eleven different CDF locations. Most were from lower elevations or the coast. Both of these regions are high in noxious weeds. In addition, Sudden Oak Death disease could have been introduced.

## **III. Treatments to mitigate the emergency**

No emergency revegetation treatments are recommended. Seeding with grasses can be detrimental to native plant recovery, and is not likely to be effective at holding soil in place in the steeper areas where erosion is of most concern. The emergency treatments recommended in the soils, hydrology, and geology reports do not pose a problem for botany or TES plants.

The treatment would be monitoring for noxious weeds in areas of soil disturbance by equipment. The objective would be to find any introduced noxious weeds before they are able to set seed and spread. This would be accomplished by surveying dozer lines, graded roads, and other impacted sites for noxious weeds for three years with limited hand pulling of small populations that area found. The cost would be \$27,880 to monitor 387 acres at \$72/acre.

## **IV. Discussion/Summary/Recommendations**

**NOXIOUS WEED MONITORING:** Monitoring is proposed for 3 years to determine whether noxious weeds were introduced into the burned area and dozer lines or have expanded from known locations. This would involve two teams of two GS-5 biotechs walking the approximately 30 miles of dozer lines and driving the roads twice each year,



once for earlier season weeds (late May to early June) and once in summer (late June to early July), to ensure detection of species with different life cycles and blooming periods. A staging area, three helispots, two safety zones, and five drop points will also be inspected. If weeds are found at the helispots, then the six more remote helispots will also be surveyed. There would also be a follow-up visit to any noxious weed locations that have been found in order to check for later yellow-star-thistle (plants were found in bloom in mid September this dry year). The surveyors will look with binoculars into the burned areas visible from the dozer lines and roads and in some cases they will walk through the burned area away from dozer lines and roads. They may use a spotting scope for the spotted knapweed in the Stanislaus canyon and for remote helispots. The field surveyors will search for any California State Noxious Weeds ([www.cdfa.ca.gov/weedhome](http://www.cdfa.ca.gov/weedhome)), especially yellow star-thistle. Surveyors will also search for invasive pest plants such as bull thistle and tocolote and will be trained to recognize symptoms of Sudden Oak Death disease. If noxious weeds are detected, the surveyors will GPS the locations for mapping in the Forest GIS layer, fill out a Weed Location Form, and then if there are just a few plants, they will remove the plants at that time by their roots, place them in a plastic bag, and dispose of them in a safe manner. If large infestations are found that would take a more significant investment of resources and time to eradicate, the Forest Botanist will be consulted and the appropriate control actions will be planned. If any noxious weeds are found near mapped archeology sites, and archeologist would be consulted before any other action is taken except in the road prism. The goal will be to prevent seed set of any weeds located during the surveys.

The first year of surveys will require more time to ensure that all the dozer lines are found using satellite photos and ground surveys. Some of the areas of the fire are remote and can take 2 hours to reach.

**The budget for the noxious weed monitoring and early eradication is as follows:**

|   |         |
|---|---------|
| 2002  |         |
| GS-9 2 pay periods time:                                    | \$4,500 |
| 2 pair of GS 5 biotechs for 4.5 pay periods the first year, |         |
| \$18,000  |         |
| (\$100/day cost to govt = \$1,000 /PP)                      |         |
| Vehicles, mileage - \$4,880/year                            |         |
| \$4,880   |         |
| Supplies  | \$500   |
| <b>TOTAL:</b>   |         |
| <b>\$27,880</b>   |         |

Slightly lower costs are expected for 2003 and much lower costs in 2004, if there is care the first year,

The probability of success, which is defined as averting new noxious weed infestations as a result of the fire and the suppression effort, is 99%. The probability of preventing spread to existing weeds is slightly lower due to the inaccessibility (steep slopes and remote canyons) of some of the populations, but will probably be aided by the eradication project that is currently being planned by the Calaveras Ranger District. There is no known means of eradication for Sudden Oak Death, but monitoring would help to determine if it can establish in this area.

The cost of not conducting the noxious weed surveys would vary depending on the intensity of the use where they could establish and the amount of time before an infestation would be noted and treated. As an example, if the yellow star-thistle populations at the fire camp, and two staging areas had been treated, that and equipment cleaning would greatly reduce the spread of noxious weeds (<15 acres vs. ~400 acres of monitoring required now). An example of possible costs follows: Approximately 30 miles of generally wide dozer lines, which add up to an estimated 290 acres, it would cost over \$150/acre to hand spray with herbicide, only after a NEPA analysis had been conducted for herbicide use, which would cost approximately \$7,000. The cost for this example would be over \$50,000 for the first year. Add to this an exponentially greater cost if yellow star-thistle (for example) spread beyond the dozer line into the newly disturbed burn. The cost of herbicide application in this generally steep terrain would be at least \$200/acre, and access becomes increasingly difficult, raising the cost of reaching the site to control the weeds. The weed could also be spread by vehicle traffic to other areas. There is no yellow star-thistle known in the forest areas beyond the burn. In addition, over time yellow star-thistle develops a greater variation in phenology and may require more visits and applications to catch all of the plants.

## VI. References Cited

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Mutz, M. September 14, 2001. Assistant Agricultural Commissioner, Calaveras County.

**TECHNICAL SPECIALIST'S REPORT**  
**BURNED AREA EMERGENCY REHABILITATION**  
**Noxious Weeds**  
**Darby Fire October 3, 2002**  
**Margaret Willits**  
**Botanist, Stanislaus National Forest, Mi-Wok Ranger District**

**INTRODUCTION:** This interim report describes the findings from the first year of noxious weed monitoring in the Darby Fire area, for the purpose of preparing the interim 2500-8 Report

**Summary of findings:**

The emergency continues to exist for risk of noxious weed introduction and spread throughout the firelines and the straw application areas. For FY 2003 I am requesting \$22,550 to continue monitoring on unsurveyed firelines and in the 63 acres where new infestations were found.

**Additional Information**

**NOXIOUS WEED MONITORING:** Monitoring covered 13.7 miles of dozer line and 20.3 miles of road (approximately 200 acres). All lines were GPSed as they were surveyed to help provide more accurate location information for future years. In addition, the 62 acres of straw bale bombing were surveyed. Monitoring was accomplished by a crew of four student hires with a more experienced crew leader. Volunteers from three local groups were used for some of the road surveys on two days. A botanist trained the crew and accompanied them initially on their work. The monitoring covered all areas once. Where weeds were found (approximately 63 acres), two visits were made. One small wetter area was visited a third time. Not all of the fire lines could be surveyed. Many ( 8.2miles) dozer lines had already been used for fire salvage or hazard tree removal and had no vegetation present.

Several existing infestations of yellow star-thistle (*Centaurea solstitialis*) were found. They were associated with power and water projects at Rattlesnake Hill, by McKays dam, and at a T CPA facility below Hunter Reservoir. Weeds were pulled where they were spread by bulldozing for fire line and a safety zone. An existing infestation of tocolote (*Centaurea melitensis*) was found in a bale bomb area and a timber marking crew found more in a nearby timber salvage unit.

The main new infestations were in the areas of the rice straw application. The certified weed free straw was contaminated with yellow star-thistle. The pattern of distribution indicated that the weed seed had come in the small bales. In addition, a single yellow star-thistle plant was found on one dozer line on the Calaveras side and an area with Italian thistle (*Carduus pycnocephalus*), milk thistle (*Silybum marianum*), yellow star-thistle, and tocolote (*Centaurea melitensis*) was found on the Mi-Wok side.

Inquiries by the Marian Chambers of Tuolumne County agriculture, found that all of the bulldozers that came from counties infected with Sudden Oak Death are cleaned before they go on fires.

MONITORING PLAN FOR 2003: Monitoring was proposed for 3 years to determine whether noxious weeds were introduced into the burned area and dozer lines or have expanded from known locations. *The results of this first year of monitoring indicate a clear need to continue for at least two more years.* In the second year we would revisit the areas of new infestation and where infestations were spread by fire suppression in late May to early June, late June, and with a final visit in late August to catch late developing plants. We will also monitor the 8.2 miles of dozer line that were not surveyed this year and up to 2 miles of roads. This would involve a team of four GS-4 biological technicians with a more experienced crew leader. We will use other employees for the late season follow-up. The botanist or another person will coordinate hiring, training, and compiling the information and maps.

If noxious weeds are detected, the surveyors will GPS the locations, fill out a Weed Location Form, and remove the plants at that time by their roots, place them in a plastic bag, and dispose of them in a safe manner. All dozer lines that are surveyed will be GPSed.

The budget for the noxious weed monitoring and early eradication is as follows:

|   |              |
|---|--------------|
| FY 2003:  |              |
| GS-9 for 2 pay periods time:                                      | \$4,500      |
| 4 GS 4 biotechs for 3 pay periods<br>(\$cost to govt = \$800 /PP) | \$9,600      |
| Crew leader for 3 pay periods<br>(Approximately 1,500/PP)         | \$4,500      |
| Late season help 1 week, 2 people<br>(Approximately \$900 each)   | \$1,800      |
| Vehicles, mileage -   | \$2,000      |
| <u>Supplies</u>   | <u>\$150</u> |
| TOTAL:  |              |
| \$22,550  |              |





