

**Hazardous Materials Assessment**  
**Rim Fire Burned Area Emergency Response – Stanislaus National Forest**  
**September, 2013**

*By: Casey C. Shannon, Hydrologic Technician/Burned Area Emergency Specialist*  
*Inyo National Forest*

**Resource Condition Assessment**

**Resource Setting**

The 256,000 acre Rim Fire burned within watersheds of the Tuolumne River and its tributaries, including South, Middle and North Forks of the Tuolumne River and Clavey River near Sonora and Groveland, CA. The area is characterized by steep, rocky mountainous canyons and ridges divided by deep river canyons, the Tuolumne River canyon being the largest. The elevations range from 2000 feet along the Tuolumne River to 8000 feet in the upper Cherry Creek area. Most of the fire area is unpopulated, with the exception of the Highway 120 corridor where several small towns, recreation developments and businesses exist. Highway 120 is the primary route to Yosemite National Park. A complex system of Forest roads is found within the fire area. Within the fire area, several structures and houses were burned as a result of the fire such as miscellaneous Forest Service infrastructure and property, infrastructure under Special Use Permit by the Forest and Private. The burned structures and other infrastructure along with other environmental effects present a potential hazardous waste source that can pose a threat to soil and water quality, aquatic habitat, wildlife and to human health and safety.

**Findings of the On-The-Ground Survey**

**1. Identify Potential Values at Risk**

The following areas/sites were identified as potential values at risk concerning hazardous material (Hazmat) releases as a result of the fire and were assessed in the field during on the ground surveys:

- Jawbone Guard Station (Forest Service or FS)
- Berkeley-Tuolumne Camp (FS Special Use Permit)
- San Jose Camp (FS Special Use Permit)
- Spinning Wheel Dispersed Camping Area (FS)
- Pilot Ridge Lookout (FS)
- South Fork Camp (FS)
- Carlon Day Use (FS)
- Cherry Lake Recreation Sites (Forest Service)
- Lost Claim Camp (FS)
- Cottonwood Road/Upper Jawbone Creek (FS)
- Sawmill Mountain Area (FS)
- Skunk Creek Dispersed Camp (FS)
- Yosemite Lakes/1000 Trails Resort (Private)
- Tawonga Camp (Private)
- Meyers Ranch (Private)
- Buck Meadows Area (Private and FS)

## **2. Describe Condition of Values At Risk**

The following describes conditions of values at risk with Forest Service property:

### Jawbone Guard Station

The site is located in the Jawbone Creek watershed. Jawbone Creek channel is within close proximity. The guard station was completely consumed by fire. Burned building refuse remains where the station burned. During storm runoff, remaining ash residue does have the ability to migrate off site and transport into a drainage swale next to the site. The swale drains to Jawbone Creek nearby. The potential for burned debris to reach the swale is likely. Water quality in Jawbone Creek could be impaired. A small garage building at the camp was not burned.

### Berkeley -Tuolumne Camp (City of Berkeley, Special Use Permit)

The camp is located near the South Fork Tuolumne River. All but a few outbuildings of the camp were burned by the fire. Copious amounts of burned residential refuse remains at the site over a 4-5 acre area. Residential structures consumed by wildfires may contain concentrated amounts of heavy metals, such as arsenic, barium, beryllium, copper, chromium, cadmium, lead and zinc (CIWMB, 2007). Most of the largest structures are located within 25 to 50 feet of the river, situated on steep slopes of bedrock. Burned refuse can easily transport into the river during a heavy storm event, impacting water quality and aquatic habitat. The slopes above the camp burned moderate to high severity and increased runoff into the camp is likely. The burned structures contained large amounts of furniture, appliances, hazardous materials and assorted mechanical equipment and tools. Some of the burned buildings contained large amounts of hazmat such as oils, chlorine, paints, sprays etc. and the ash residue is readily available for transport to the river. There is an imminent threat to water quality from the site to the river when a large storm occurs if containment or cleanup actions are not taken in the short term. It is recommended the Forest initiates full clean up and removal of solid and hazardous waste at this site with the responsible party (City of Berkeley) as soon as possible to reduce the potential for severe impacts to water quality when large storms occur the first few years after the fire.

At the time this report was written, the City of Berkeley had contracted with an environmental firm (American Integrated Services) to implement major storm water control measures (sandbags, etc.) at the site to prevent off site transport of hazardous materials. The effort is currently and effectively in progress and at this point BAER treatments are not necessary and no emergency condition exists.

At Berkeley-Tuolumne Camp, it is strongly recommended the Forest moves forward with complete site cleanup of hazmat and solid waste in a rapid fashion to reduce potential water quality impacts in the near term.

### San Jose Camp (City of San Jose, Special Use Permit)

The San Jose Camp is located near the Middle Fork Tuolumne River. Nine tent structures were burned. The burned refuse from these structures have minor amounts of hazardous waste. The tents are located closely together and the waste is moderately concentrated. A drainage swale leads to the river

that has the potential to transport waste. A storage building was burned located close to the river that contained hazardous materials (paints, oils, solvents, etc.). A drainage swale adjacent to the building drains to the river that has the ability to transport hazardous waste to the river. A mobile home trailer burned in the same area as the storage shed. The burned refuse from the trailer is on slopes directly above the river and transport of waste to the river is likely. No other concerns with this site.

#### REDACTED Dispersed Camp Area

An ephemeral drainage to the Middle Fork Tuolumne River REDACTED and two abandoned automobiles located within and adjacent to the channel. The site is located within 300 yards of the river. Steep slopes upstream of the site burned moderately and will likely generate runoff that could cut into the dump site. The deposit is located on an outward bend of the stream. A threat of contaminants (possibly metals) from the deposit rinsed by high runoff from the dump site to the river is likely and water quality could be impacted. Heritage values of the site could also be impacted if the deposit is eroded. The automobiles may still have hazmat present and if so a minor amount, they should be removed from the stream channel and properly disposed.

Two other REDACTED were located in the REDACTED area. There are no threats due to the fire associated with these sites, there are located on flat terraces away from channels and have little potential for runoff to move hazmat offsite. Another abandoned automobile was also found on flats and the fire poses no threat, the truck is considered solid waste with no hazmat.

#### *Chemically treated wood barricades – Spinning Wheel and Ferretti Road Areas*

Open areas near the river were barricaded (pre-fire) for REDACTED protection and OHV trespass issues with chemically treated wood 6"x 6" x 6' lumber, treated with Chromium/Copper/Arsenate (CCA), chemicals listed as toxic substances by the State of California (DTSC,2008). At both sites, 198 barricades were counted and approximately 50% are burned or partially burned. The burned barricades and remaining ash are classified by the State of California as hazardous waste and are prone to leaching into soils, and present a threat of site contamination to soil and water (H.M. Solo-Gabrielle et al, 2001). At Spinning Wheel, the hazmat is within 100 to 200 yards of the river and water quality may be impacted if ash residue is transported by surface flows or through soils via groundwater.

The Rim fire BAER Recreation and Heritage assessment teams are proposing to remove and dispose of the hazmat as part of their treatments to replace the burned barricades in order to protect heritage resources and to control OHV trespass and use trail development. Approximately 1232 feet of barricades are affected at Spinning Wheel and another 665 feet are affected at Ferretti Road sites.

#### *Ferretti Road Barricades*

The same situation applies with hazardous waste and disposal along the Ferretti Road on FS lands 1 mile south-east of the Hamby Trailhead where open areas were barricaded for OHV trespass reasons and Botany sensitive species protection. Approximately 80 barricades exist in this area - up to 50% are burned or partially burned. There is no surface water near this site that could be affected.

### *Tuolumne River Trail - Burned Staircase Sections*

The Rim Fire BAER Recreation team identified a burned trail staircase structure for treatment in Tuolumne Canyon to replace. Treated wood waste (TWW) generated from the removal of burned wooden staircase structures identified for replacement on the Tuolumne River Trail should be disposed of per State and Forest Service standards. The refuse should not be burned. The smoke of burned TWW is highly toxic. The burned TWW presents a site contamination potential if residue migrates off site due to runoff.

### Pilot Ridge Lookout

The lookout was not burned, and outbuildings were burned near the lookout building. Burned refuse will likely transport off-site and into drainages.

### South Fork Camp

A toilet building was burned at the site (near Tuolumne River and South Fork Tuolumne River confluence). The waste vaults or pits are now open and exposed to water and may fill and overflow waste to the river. The open pits also present a danger as visitors could accidentally step into open pits.

### Carlton Day Use

A small diesel fuel spill (>1 gallon) was located on the road next to the South Fork Tuolumne River. Spill was marked for suppression crews to remove contaminated soil and dispose. No other hazmat concerns with this site.

### Cherry Lake Recreation Sites

No hazmat concerns were found at these sites.

### Lost Claim Camp

No hazmat concerns were found at this site. When campers abandoned the site when evacuation orders were given, at one of the campsites large amounts of food supplies were left behind in bear boxes, left open.

### Cottonwood Road/Upper Jawbone Creek Watershed Area

Other than hazmat found at the Jawbone Station and Meyers Ranch (Private), no other hazmat concerns were found in the area.

### Sawmill Mountain Area

No hazmat concerns were found in this area.

### Skunk Creek Dispersed Camp

No hazmat concerns were found at this camp.

**The following describes conditions of values at risk with private property:**

### Yosemite Lakes/1000 Trails Resort

No hazmat concerns with this site

### Tawonga Camp

A water pump house was burned that is located on the banks of the Middle Fork Tuolumne River and presents a minor threat to water quality if burned refuse moves into the river. Refer to NRCS to advise private owner. No other hazmat concerns were identified.

### Meyers Ranch

A residential building was destroyed by the fire on this private property. Burned refuse is located upslope near a spring/seep area with a small stream. It is likely the refuse will migrate to the stream area from storm runoff if containment measures are not implemented or the refuse is removed and disposed. Refer to NRCS to advise private owner. No other hazmat concerns were identified with this site.

### Buck Meadows Area (Private and FS)

Several FS roads and private inholdings were surveyed in this area. No hazmat concerns were identified.

### Burned residences on Private lands adjacent to FS lands observed

Two large private residences in the Spinning Wheel area were burned completely, adjacent to the Middle Fork Tuolumne River and burned refuse has the potential for transport to the river. At the time of observation, hazmat contractors were conducting clean up and removal activities and the water quality threat is diminished.

Three private structures were burned along FS road 1303 ½ mile north of Highway 120. The sites are located away from surface water and on low angled slopes and have a low threat of contamination to FS lands.

### **Hazardous Waste Disposal Requirements, State and Forest Service**

Disposal of treated wood waste must be handled by a State licensed hazardous waste contractor and disposed of at a State approved landfill designated for Treated Wood Waste (TWW). Forest Service employees are directed by guidelines to not handle hazardous waste or disposal. If Forest Service personnel handle hazardous waste (not recommended!) proper skin, eye and respiratory protection equipment should be used and waste properly disposed or contained.

### **3. Emergency Determinations**

#### Jawbone Guard Station

Hazardous waste from the burned guard station will likely migrate into an adjacent drainage swale that leads to Jawbone Creek nearby, a perennial stream, impacting water quality unless cleanup or containment of materials onsite occurs.

#### San Jose Camp

Burned structure refuse at the camp will likely move off site into adjacent drainages that can reach the South Fork of the Tuolumne River nearby, impacting water quality unless cleanup or containment onsite occurs.

#### REDACTED Dispersed Camp Area – REDACTED in channel

Hazardous materials are likely to transport off site downstream into the Middle Fork Tuolumne River in the event of increased runoff from burned slopes upstream erodes into the dump deposits. Water quality impacts to the river are likely.

#### Pilot Ridge Lookout

Refuse from burned outbuildings at the site can move off site into drainages and cause water quality impacts when runoff is present in ephemeral channels, if not contained or removed before runoff producing storms occur.

### **4. Treatments to Mitigate the Emergency**

1. Treatment Type: Containment of hazmat release at San Jose Camp, Jawbone Guard Station and Pilot Peak Lookout.

Treatment Objective: To prevent off site/on site soil contamination and impacts to water quality in streams as a result of uncontained storm driven refuse debris.

Treatment Description: Install silt fencing around downslope perimeter of burned structure refuse until cleanup and disposal action can be conducted at identified sites (See Table 1, item 1). Monitoring and maintenance of fencing should be conducted after large storm events and corrective measures taken. Probability of treatment success: Likely. Treatment cost: \$20,000. Funding request has been approved previously.

2. Treatment Type: Containment of hazardous materials, Spinning Wheel Dispersed camp area (Table 1, item 2).

Treatment Objective: To reduce potential for hazmat release to stream channel and impact to water quality downstream from concentrated dump materials.

Treatment Description: Install geotextile filter cloth underlayment over dump deposits along stream channel and apply class 3 rock rip rap deflector wall over cloth. Wall to be built will be approximately 2-3 feet tall by 30 feet in length. No soil disturbance to cultural deposit shall occur. Cloth and rock to be placed on deposits without soil/dump deposits movement. It is recommended an experienced watershed specialist provide design instruction during implementation and a trails specialist experienced with rock wall construction. Probability of success: Likely. Treatment cost:

**Table 1: Treatment locations and Treatment Types:**

| Site   | Description   | Prescription/Treatment   |
|--|---|--|
| 1. San Jose Camp, Jawbone Guard Station, Pilot Peak Lookout outbuildings | Nine burned structures on western end of San Jose camp, 1 house at Jawbone Station and four outbuildings at Pilot Peak. | Install Silt Fencing on downslope perimeter of structures to prevent transport of hazmat off burned sites.                     |
| 2. REDACTED Dispersed Camp Area  | Exposed dump materials located in stream channel near Middle Fork Tuolumne River  | Apply geotextile filter cloth and class 3 rock rip rap on cultural deposits along channel to protect water quality downstream. |
|  |   |  |

**Recommendation to Forest:** Take appropriate action to conduct removal and disposal actions for all burned structure refuse in the short term to minimize the potential for water and soil contamination. Containment of hazard waste from burned structures is a temporary mitigation, and may not prevent some amount of off-site contamination. This includes burned property on special use permitted facilities. Final stabilization and reduction of environmental threats will be complete when final removal and disposal is complete.

**I. References**

California Integrated Waste Management Board (CIWMB) 2007. Assessment of Burned Debris Report for the Cedar and Paradise Fires, San Diego County, CA. December 2003.

State of California Department of Toxic Substances Control (DTSC): Requirements for Generators of Treated Wood Waste, December 2008.

Elsevier Journal of Hazardous Materials, Characteristics of Chromium Copper Arsenate treated wood ash, H.M. Solo-Gabrielle, T.G. Townsend, B. Messick, V. Calitu, University of Florida 2001.

**II. Appendix A:**

1. Treatment cost worksheet
2. Hazmat study reference
3. Treatment location maps
4. Site photos.

## Appendix A

### 1. Treatment Worksheet

#### Spinning Wheel Dispersed Camping Area

Brief summary of treatment description:

Install geotextile filter cloth underlayment and rock rip-rap wall overlay to protect historic can dump deposit along ephemeral stream channel bank from scour, and to prevent release of hazardous materials from dump downstream that will likely impact water quality and beneficial uses to Middle Fork Tuolumne River.

Probability of Treatment Success: Likely

#### **Treatment Name Costs: REDACTED Hazmat Containment/Heritage Site Protection**

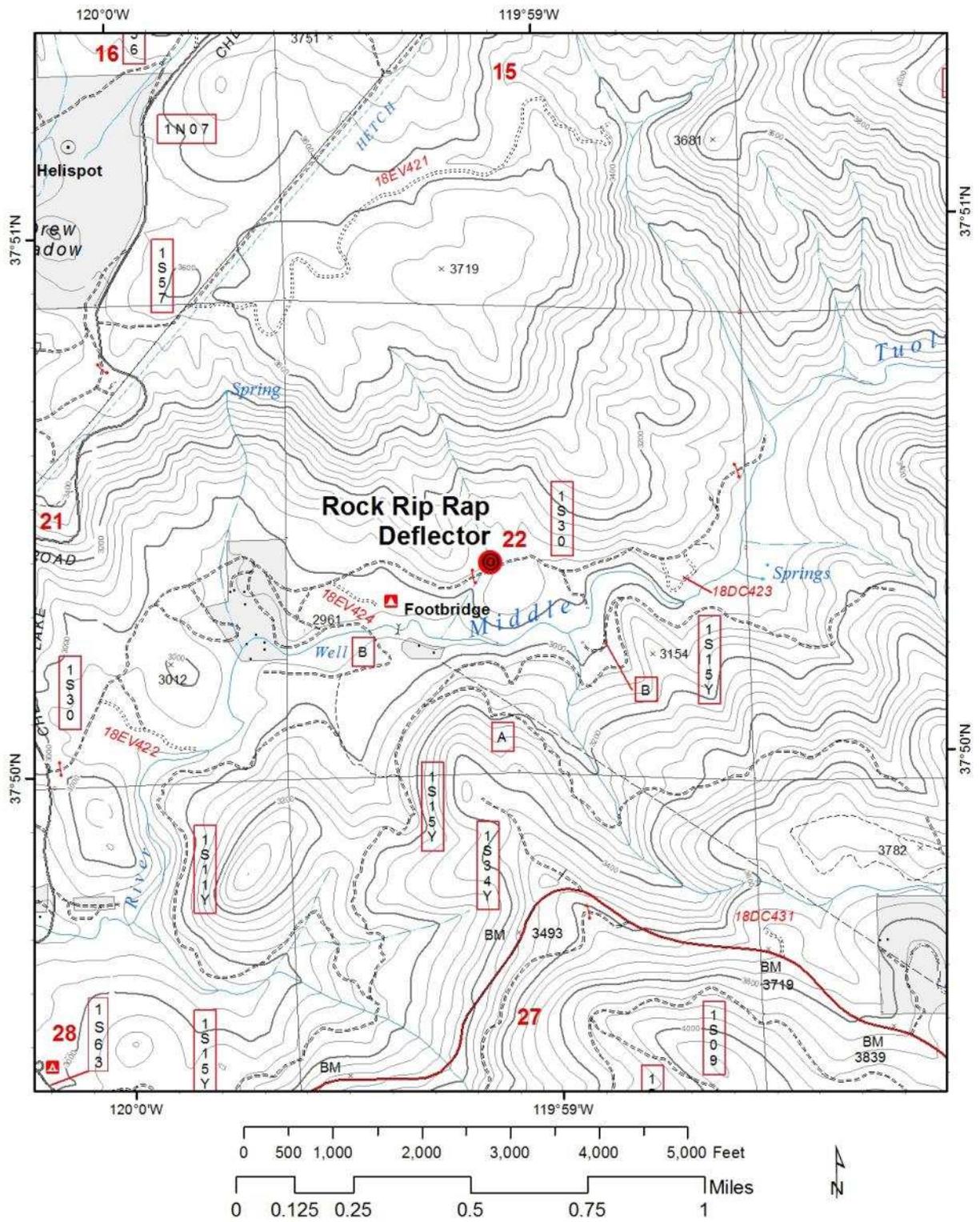
| Item  | Unit       | Unit Cost | # of Units | Cost |
|---|------------|-----------|------------|------|
| Geo-Textile Filter Cloth                        | 100' x 12' |           | 1          | 200  |
| Geo-Textile Filter Cloth                        | roll       | 200       | 1          | 200  |
| Class 3 Rip Rap Rock, delivered to site         | Ton        | 75        | 35         | 2625 |
| 100-5 Tread Crew Workwear, 100                  | day        | 2200      | 1          | 2200 |
| 1 OS-9 Waterwheel Specialist or Trails          | day        | 400       | 1          | 400  |
| Per Diem, Lodging                               | day        | 120       | 10         | 1200 |
| Overhead 50% Contingency, vehicles, tools, etc) |            | 754       | 1          | 754  |
|   |            |           |            | 0    |
|   |            |           |            | 0    |
| Total Request                                   |            |           |            | 5784 |

### 2. Burned Residential Structures, Hazmat Threat Study Reference

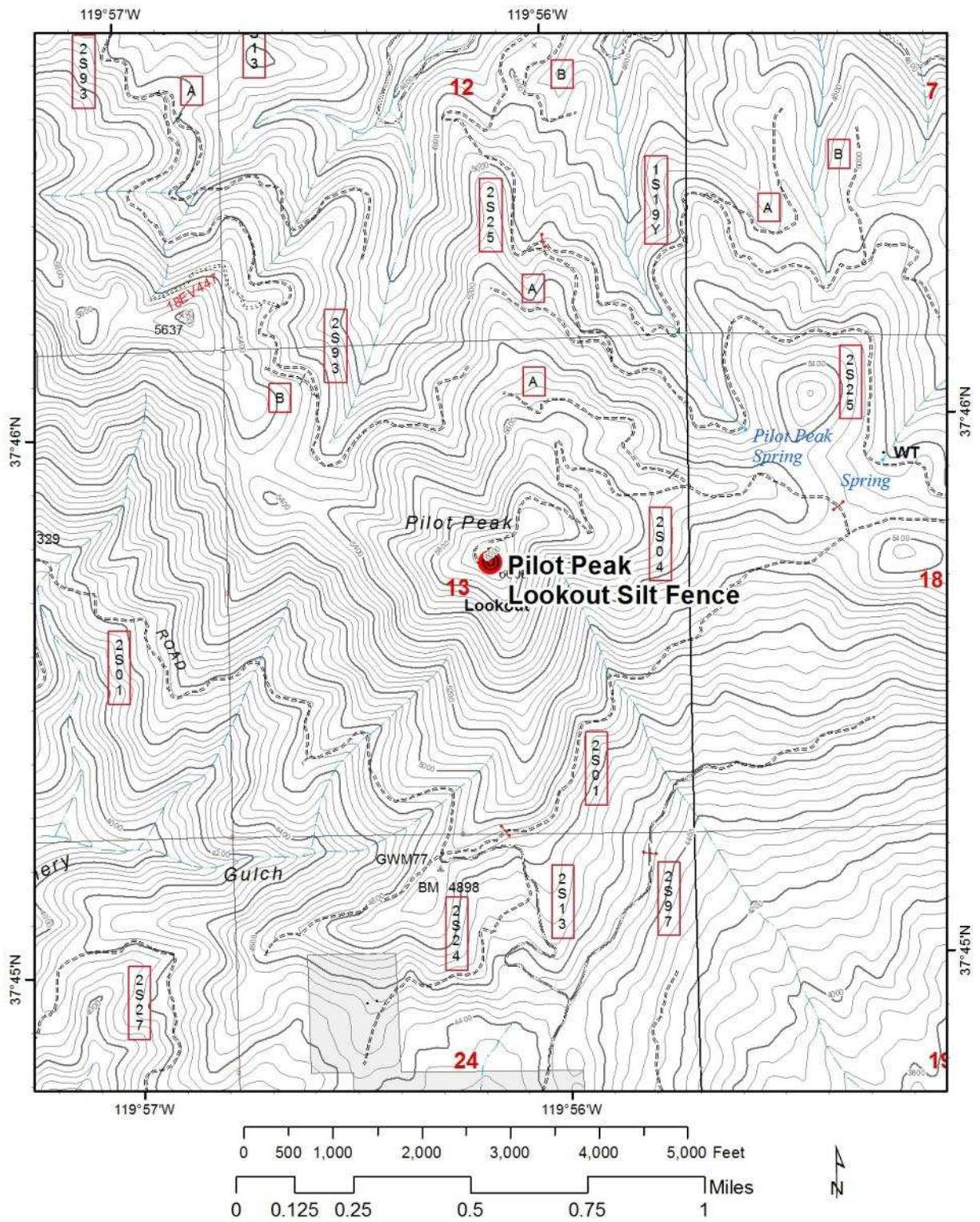
It is possible with the large amounts of solid waste available for transport off-site, there are hazardous materials usually found within burned structure debris. The California Integrated Waste Management Board (CIWMB) has stated that ash and debris from residential structures consumed by wildfires may contain concentrated amounts of heavy metals, such as arsenic, barium, beryllium, copper, chromium, cadmium, lead and zinc (CIWMB, 2007). Further, according to the CIWMB, the occurrence of these metals in burned residential debris has been demonstrated in the "Assessment of Burned Debris Report for the Cedar and Paradise Fires, San Diego County, CA" dated December 2003. It is also known that asbestos remains are found in burned debris and poses a threat when disturbed and airborne. Common household products found in burned structures are usually present such as pesticides, fertilizers, paints and thinner, automobile products and other petroleum based products. If the debris are not contained or removed from the site, contamination of soils and water could occur as a result of the first major storm events in the fire area.

### 3. Treatment location maps





**Map 2:** Spinning Wheel Rock Rip Rap wall site



**Map 3:** Pilot Peak Lookout Silt Fencing Installation Location

# Jawbone Guard Station Hazmat Containment



**Map 4:** Jawbone Guard Station Hazmat Containment Location Map (Silt Fence)



**Photo 1:** Berkeley-Tuolumne Camp burned refuse by river. Imminent water quality impact threat.



**Photo 2:** San Jose Camp burned storage shed with hazmat, install silt fencing at base to contain refuse.

There is a potential for burned materials transport to river 100 yards below.



**Photo 3:** Dump site near REDACTED area with threat of hazmat release from increased flows caused by the fire during a large storm event. Hazmat could transport downstream to Middle Fork Tuolumne River. Rock Rip wall along channel edge will deflect flows away from dump materials.