

# BAER

## Burned Area Emergency Response Engineering Report

Shasta-Trinity National Forests

**Objectives:** Evaluate the effect of the Iron Complex fires on the Forest's infrastructure and the possible damage to the infrastructure, forest resources, and surrounding watershed due to increased runoff from burned slopes.

**Issues:** The issues of concern include current damage and the potential of damage caused by increased runoff. Engineering concerns include culvert blockage and failure, erosion of road surface and road bed, and road damage that poses a safety threat.

### **Observations:**

**A). Background information:** The fire boundary encloses approximately 186 miles of forest roads with the majority of those roads being maintenance level 2 and 3 roads. There are approximately 11 miles of state and county roads within the fire boundary. Overall the roads are in decent shape but do not have adequate drainage structures to handle the increased runoff expected from the fire damage.

**B). Reconnaissance Method:** All reconnaissance was completed by vehicle and foot access. Areas of high/moderate burn severity and specific values were the priority for field survey.

**C). Findings/Description of Emergency:** All road areas surveyed generally have the same issues.

- Undersized/plugged and misaligned culvert pipes.
- Degradation of road surface drainage profile causing runoff to flow down the road.
- Erosion at pipe and dip outlets with no energy dissipaters.
- Berms and/or through cuts that channel water on road surface with inadequate drainage relief and erosion protection.
- Damaged or failed over side drains.
- Large fills with heavy woody debris and sediment above culvert pipes.
- Assumed average ~ 1 stump hole per 2 miles road in high/moderate burn areas. (Assumption for all roads based on roads observed)
- Open cat lines that could suffer erosion and pose a safety concern if not closed.
- Sharp corner, steep slope, and denuded slope/road shoulder pose a safety concern on corner of 4N16.

**Treatment recommendations:**

**A). Management treatments:**

**Eagle Fire**

**33N41**

- Construct rocked critical dip to accommodate overtopping and protect the road fills-3 (\$\*\*\*\*\* each=\$\*\*\*\*\*)
- Place 2” aggregate for ~ 100’ at intersection of 33N41C to prevent loss of road surface. (\$\*\*\*\*\*)
- Clean inboard ditch~0.5 miles (\$\*\*\*\*\*)
- In sloped dip above intersection of 33N41C to drain road into ditch (\$\*\*\*\*\*)
- Reestablish catch basin on outlet of shot gunned pipe dumping onto shoulder of 33N41C. (\$\*\*\*\*\*)
- Riprap outlet catch basin of shot gunned pipe. (\$\*\*\*\*\*)
- Rock dissipater for outlets of shot gunned culverts- 2 (\$\*\*\*\*\*)
- Replace 24” cmp. Bottom completely rusted out, good possibility of under mining and failure of pipe. (\$\*\*\*\*\*)
- Riprap headwall on replacement pipe (\$\*\*\*\*\*)

**33N41C**

- Reestablish ditch from catch basin, for shot gunned pipe on 33N41, to the pipe for the 33N41c road. ~50’ (\$\*\*\*\*\*)
- Construct rocked critical dip-2 (\$\*\*\*\*\*)
- Reconstruct rolling dip-2 (\$\*\*\*\*\*)
- Construct rock dissipator-2 (\$\*\*\*\*\*)

**33N41G**

- Cleanout culvert inlets-2 (\$\*\*\*\*\*)
- Reconstruct rolling dip-2 (\$\*\*\*\*\*)
- Repair stump holes-2 (\$\*\*\*\*\*)

**33N51**

- Repair stump holes-4 (\$\*\*\*\*\*)

**33N05Y**

- Repair Stump holes-4 (\$\*\*\*\*\*)

**4N16**

- Riprap inlet channel and headwall of 2 culvert stream crossings-2 (~20 ton riprap each) (\$\*\*\*\*\*)
- Repair stump holes ~6 (\$\*\*\*\*\*)
- Install a curve sign with recommended 15 mph speed limit on each approach to denuded curve at Cadillac point (recommend MUTCD sign W1-2a or similar) (\$\*\*\*\*\*)

### 33N32

- Out slope road ~3 miles (\$\*\*\*\*\*)

### Roads in the Eagle Ranch area (33N45, 45A, 45C, 45D, 45E, 33N50...)

- Did not get a chance to assess because of active burn in the area. Needs assessment when it is safe to go in.

### Cedar Fire

#### 5N25

- Construct rocked critical dips-6 (\$\*\*\*\*\*)
- Clean culvert inlets-6 (\$\*\*\*\*\*)
- Clean/reestablish ditch and leadoff in through cut~0.25 miles (\$\*\*\*\*\*)

#### 4N28

- Storm patrol for first 3-4 major storm events. (\$\*\*\*\*\*)

#### 4N11

- This road did not get assessed
- Possible storm patrol (\$\*\*\*\*\*)

**B). Monitoring:** Monitoring or storm patrol of roads the first 1-3 years after fire.

**C). National Fire plan proposals, long term project proposals:** Closure of roads in proposed areas for resource protection to reduce damage to road surfaces during wet weather periods. Decommissioning segments of roadways to trails, that are no longer needed for administrative access or that have a high probability to contribute large amounts of sediment deposits into tributaries. Further evaluation and replacement of undersized culverts.

**Consultations:** Members of the BAER Assessment Team and regional engineering personal.

**References:** Best Management Practices booklet by the USDA Forest Service. (Author unknown at this time)