

**Burned Area Emergency Response
Roads/Engineering Report
King Fire
Eldorado National Forests
October 13, 2014**



Submitted by: _____ /s/

**Eldorado National Forest
King Fire BAER
Roads / Engineering
BAER SPECIALIST REPORT**

Eldorado National Forests R-5
Placerville, CA.

Date: Oct 13, 2014

Assessment By: Rusty LeBlanc, Civil Engineering Technician, Stanislaus N.F.
Antonio Cabrera, Civil Engineer, Sierra N.F. (trainee)
Shane Edmunds CRWQCB.
Craig Kusener, Civil Engineering Technician, Plumas N.F.

I. Potential Values at Risk

- A. Risk to life and safety.
- B. Loss of road access to public utilities, recreation opportunities, private land and administrative site within the fire area.
- C. Values at Risk Eleven Pines Road14N08

II. Resource Condition Assessment

- A. Resource Setting -
 - 1. National Forest Service System Roads (NFSR) with in the burn perimeter is in the maintenance level – 2, 3, 4 & 5 category single lane native, aggregate surface and paved. Maintained for high clearance vehicles and passenger car. Road designs are both insloped and outsloped with inside ditch lines and cross drain culverts with an average diameter of 18 inches. Larger culverts exist on perineal drainages some with diameters of 48 to 72 inches.
 - 2. There are approximately 343 miles of road on National Forest on lands, excluding El Dorado County, Sacramento Municipal Utility District access, private and cost share. Of these 343 miles, 267 miles of NFSR were accessible and surveyed for purposes of this report and 196 miles are proposed for treatment.

Table below list the NFSR maintenance levels:

Operational Maintenance Level	Miles
1 – BASIC CUSTODIAL CARE (CLOSED)	78
2 – HIGH CLEARANCE VEHICLES	194
3 – SUITABLE FOR PASSENGER CARS	23
4 – MODERATE DEGREE OF USER COMFORT	47
5- HIGH DEGREE OF USER COMFORT	1
Total	343

B. Findings of the On-The-Ground Survey

1. The King fire burned approximately 97,717 acres with a mix of burn severity in the high, moderate, low range.
2. On the ground reconnaissance of roads within and adjacent to the fire perimeter were assessed by BAER team road engineers to determine any values at risks to life and safety, invested road improvements (property) and adjacent resources, and which roads held the highest potential for water diversion, and fire related flood damage.

C. Values at Risk

Life and Safety: As a result of the high severity burned watersheds on over 20 percent of the landscape of the King fire. Risks to life and safety of Forest visitors, personnel and contractors entering certain areas of the burn are very likely and pose a major risk, due to burned Hazard trees, rock fall, debris flows and flooding along some roadways.

Property: Post burn conditions and the predicted watershed response are indicating increase runoff and the movement of sediment, and debris downslope, into roadway drainage features, such as roadside ditches, culvert inlets, overside drains, roadway dips and run outs. Once these drainage features become impacted and over whelmed by the increased runoff, their function fails, allowing uncontrolled water to divert, resulting in a very likely risk of major damage to the invested road improvements, loss of road function and the denial of access along some road segments.

Resource Values / Water Quality: As a result of the increased runoff, with sediment, and debris movement into roadway drainage features, causing the failure of the road drainage function. This occurrence poses a very likely risk to adjacent resources and downstream values and could result in impacts to water quality and soil productivity.

Proposed treatments to mitigate the Values at Risk:

Life and Safety: Accepted and economical BAER treatments to mitigate the risk to life and safety posed by hazard trees and rock fall, debris flows, and flooding. Encourage Forest leaders to keep the enter fire area administratively closed to the general public until risks have been

mitigated. At main entry points of roads accessing the fire area. Install closure gates, and BAER Closure and Information signs. The Elven Pines road 14N08 will have these gates and signs install at entry points. At main entry points and other areas of public use entering the fire area install BAER warning signs. Along roadways install intermediate signs warning of tree and rock fall. Install Eldorado NF typical traffic control gates at main entry points of the fire area as designated by the Eldorado NF. Install 3'x 6' "Road Closed "and information signs at the new gate locations. Install BAER warning signs "Entering a Burned Watershed" falling trees, rocks, flooding. These signs are installed at main entry points and other areas of public use of the fire area that are open.

Property: In high severity burned watersheds upslope of roads, there is a very likely risk of road drainage function failing due to the anticipated increased flow of water and sediment moving into established roadway drainage features. Culvert inlet modifications, the installation of critical dips, debris racks, low water crossings, fill slope protection, drainage armor, restoring overall drainage of roads to function at full capacity and storm inspection and response are all accepted and economical BAER road treatments. Many of these treatments will be installed and applied over approximately 68.0 miles of maintenance level 3, 4, and 5 roads, and some of these treatments will be installed and applied over approximately 124.0 miles of maintenance level – 2 roads.

The Eleven Pines road 14N08 is a maintenance level-3 bituminous surface road of high value with critical access needs, values at risk along certain segments and drainage crossing have been evaluated by BAER Team engineers, geologist, and hydrologist. In addition to treatments identified for maintenance level-3, 4, and 5, additional designed and constructed treatments are proposed at eight locations and include the installation of new relief culverts, and critical asphalt rolling dips, designed to divert and lead off water and debris from moving down road grades and accommodate log truck hauling as well.

Resource Values / Water Quality: Restoring overall drainage function along with installing culvert inlet treatments, critical dips, drainage armor, low water crossings and fill slope protections, will help to control water and sediment from moving off site, reducing the risk to adjacent resources, and downstream values.

III. Emergency Determination

This assessment determines an emergency and risk related to the road system and adjacent resources based on the likelihood of the following threats.

- A. Life and Safety— Tree and rock fall, debris flows, and flooding.
- B. Property – Loss of control of water, blocked or plugged drainage features causing water to divert and overtop road crossings creating loss of road function and denial of access.
- C. Soil Productivity and Water Quality— both on and off site were determined to be a low value at risk.

IV. Discussion/Summary/Recommendations

- A. Hazard Tree mitigation, recommendation for roadside hazard trees are to be salvaged and removed through a timber sale as soon as possible; especially along the 14N08 (Eleven Pines). If this does not occur in a timely manner and the fire area is opened to the public burned hazard trees along roadways will become a risk to life and safety, and are recommended be mitigated as described in this report.
- B. Implement BAER road treatments before winter rains as described in this report.
- C. Coordinate with Botany to mitigate noxious weeds on road segments proposed for treatment.
- D. Barricade on either end of the burned out Brush Creek Bridge allowing for safe turn access and discouraging use.

V. Contacts and References

- A. INFRA Travel Routes Inventory, quad maps.
- B. BAER Team meetings and discussions.
- C. Eldorado National Forest- GIS Shop