

Burned Area Emergency Response BAER

- ▶ Jeff TenPas, Regional BAER Program Manager
 - ▶ USDA Forest Service

FIRES AND FLOODS

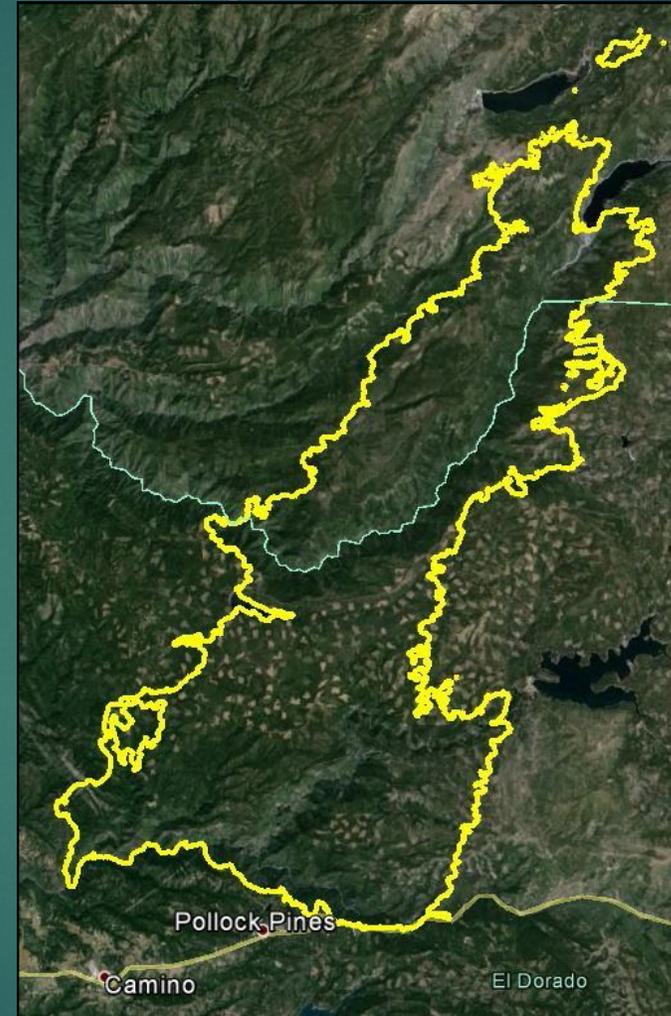
- ▶ The Emergency Is Not Over
When The Fire Is Out

Introduction

Main Topics

- Fire History and Severity
- Post-Fire Response and Risks
- Forest Service BAER Program
- Interagency Cooperation

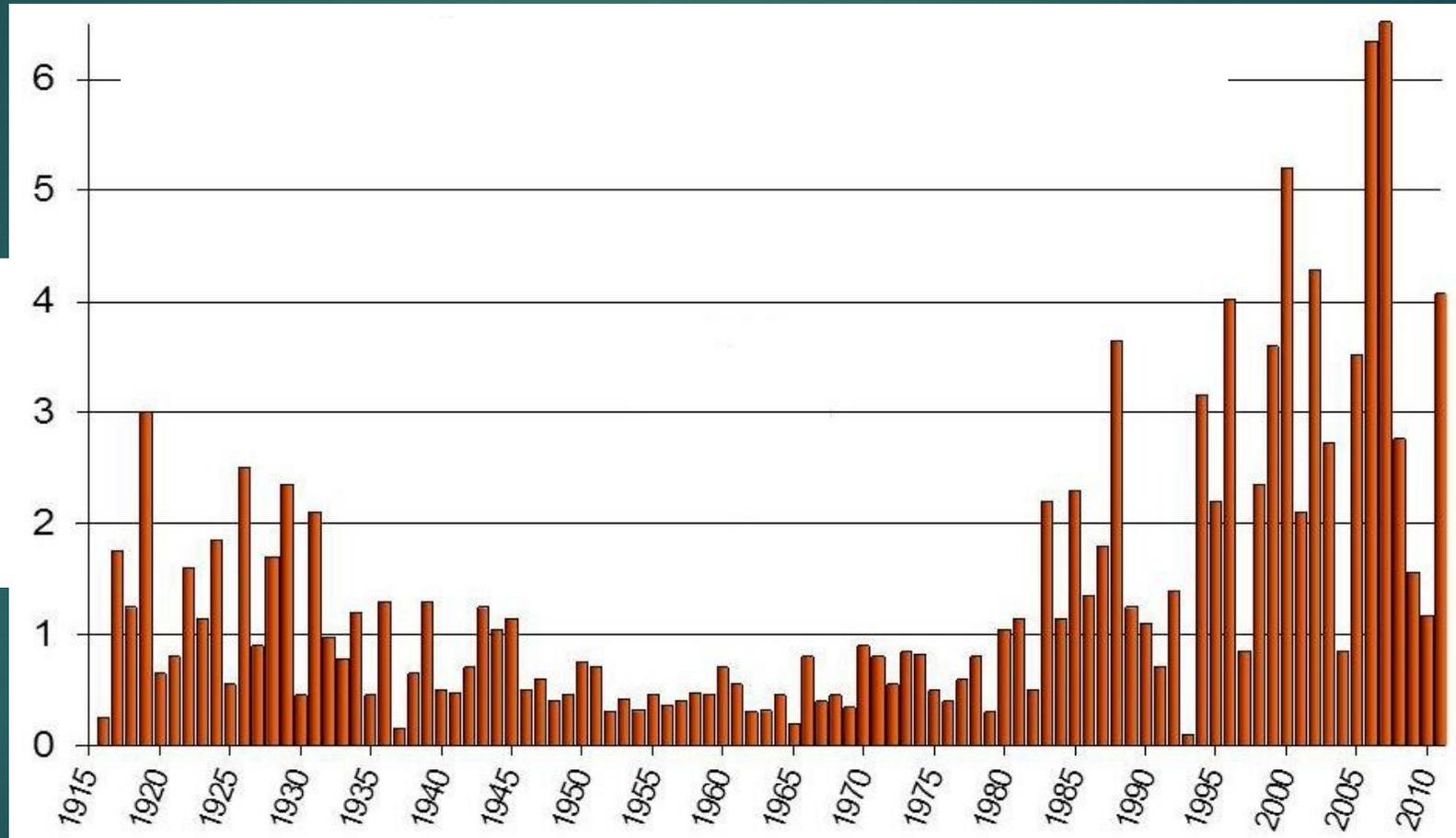
King Fire Burn Area



Source: USFS & Google Earth

Historical Fire - Western U.S.

Acres Burned on Federal Lands in Western U.S. States



Source: National Interagency Fire Center



Fire Severity and Fire Effects

**Low severity burn and
mosaic pattern = few
negative effects**



Fire Severity and Fire Effects



High severity burn and concentrated pattern = significant negative effects

Large and High Severity



The Response

- ▶ Less Infiltration
 - ▶ More Runoff
 - ▶ Faster Runoff
 - ▶ Higher Flood Peaks
-
- ▶ It is a Different Watershed







2012 Bagley Fire (Shasta County)

▶ La Canada Flintridge (2010)





Debris flow/Flash flood
from Old/Grand Pre burn area

Greenwood Avenue
Devore, CA
Dec 25, 2003



The Aftermath



The Union Democrat
LEADING NEWSPAPER OF THE MOTHER LODGE
 Sonoma, California, Tuesday, Dec. 29, 1992

139th Year, Number 127 35¢ PER COPY INCLUDING TAX

Teen driver killed in mudslide

By PAUL PAYNE and PATTY FULLER

'Road workers were trying to close the grade, but they (the line of cars) were one of the last to get through'
 — CAPT. DAVE DEGREDEL, California Department of Forestry

Todd Hallman, 18, of Greentown was killed last night after a wave of mud and rocks loosed by heavy rains washed his car off Old Priest Grade near Maccahan, down a steep canyon and into a rain-swollen creek.

Todd was returning home in a torrential rainstorm after dropping his girlfriend off at her home. His car plunged several 200 feet down the canyon face, which had been partially cleared by fire in August, a Calaveras Highway Patrol spokesman said.

Rescue officials said Todd was driving up the grade just before 8:30 p.m. in a line of about four cars.

"It gave them one hell of a ride," said Capt. Dave DeGrendel of the Calaveras Department of Forestry, who was forced to abandon rescue attempts shortly after midnight due to driving rain. "Road workers were trying to close the grade just before it happened, but they (the line of cars) were one of the last to get through."

DeGrendel said the car slid down the canyon into a seasonal creek that flows from Priest Reservoir, but were unable to reach it last night after four hours because of water rushing over the car and downed trees on top of it, DeGrendel said.

The Tuolumne County Sheriff's Department search and rescue team responded to the accident scene at about 4 a.m. today and recovered the body. The car, a 1987 Ford Taurus, was heavily submerged in about 18 feet of water, rescuers said. Hampering the recovery mission was more rain.

Sheriff's Deputy Jim Scruggs, a member of the rescue party, was caught in the canyon between two mudslides late this morning, Assistant Sheriff Mike Costa said.

County road crews were reportedly closing Old Priest Grade last night when a heavy downpour struck the area. It washed huge boulders loose from the terrain, which had been stripped of trees and brush in the Maccahan Fire last August.

The moving debris easily swept the car from the road, Fire Battalion Chief Mike Schmitt said.

He said the lack of vegetation was the leading cause of the mudslide. The absence of trees allowed the car to wash completely down the canyon and into the creek, he said.

Heavy rain added to the problem, he said.

"Cars go all the way to the bottom now," said — See TEEN, back page

What is BAER ?

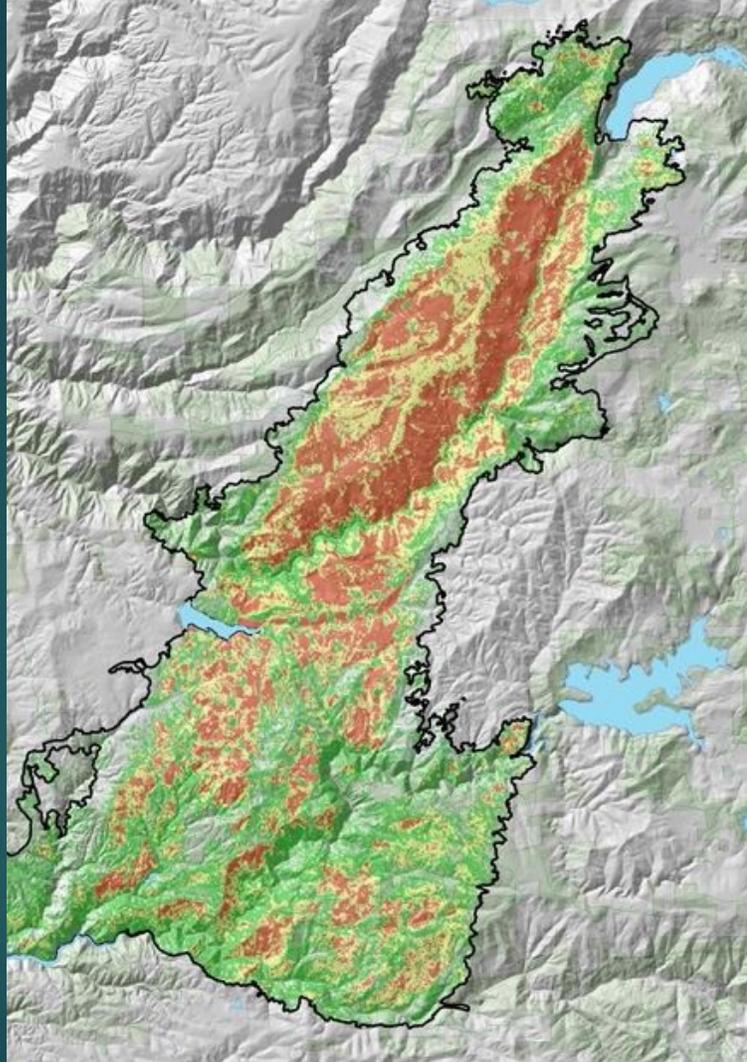
A program to identify imminent post-wildfire threats to human life and safety, property and critical natural or cultural resources on federal land and take immediate actions to manage unacceptable risks.



BAER Assessment

- ▶ Rapid
- ▶ Multi-Disciplinary
- ▶ Interagency and Coordinated

Soil Burn Severity Map



The 2014 King Fire

- 97,000+ acres burned
- Largest in Eldorado National Forest history
- Soil Burn Severity
 - 23% Severe
 - 23% Moderate
 - 54% Low
- Multiple municipal water supply reservoirs affected (SMUD, PCWA, GDPUD)

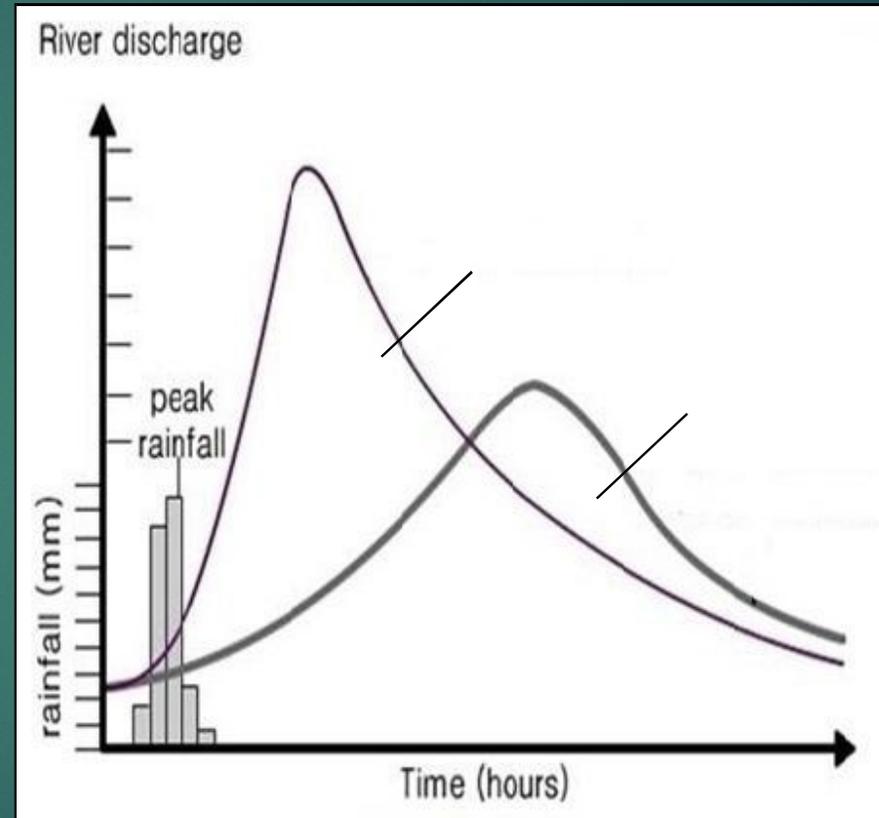
Runoff Coefficients

Plot	K (mm/ hr)	Runoff rate (mm/hr)	% Runoff / Runoff coefficient
Natural (unburned)	85	9	10/0.10
Low watershed response	60	34	36/0.36
Moderate watershed response	43	52	55/0.55
High watershed response	25	69	73/0.73

Post-Fire Runoff

Changes in Runoff Hydrograph following a Forest Fire

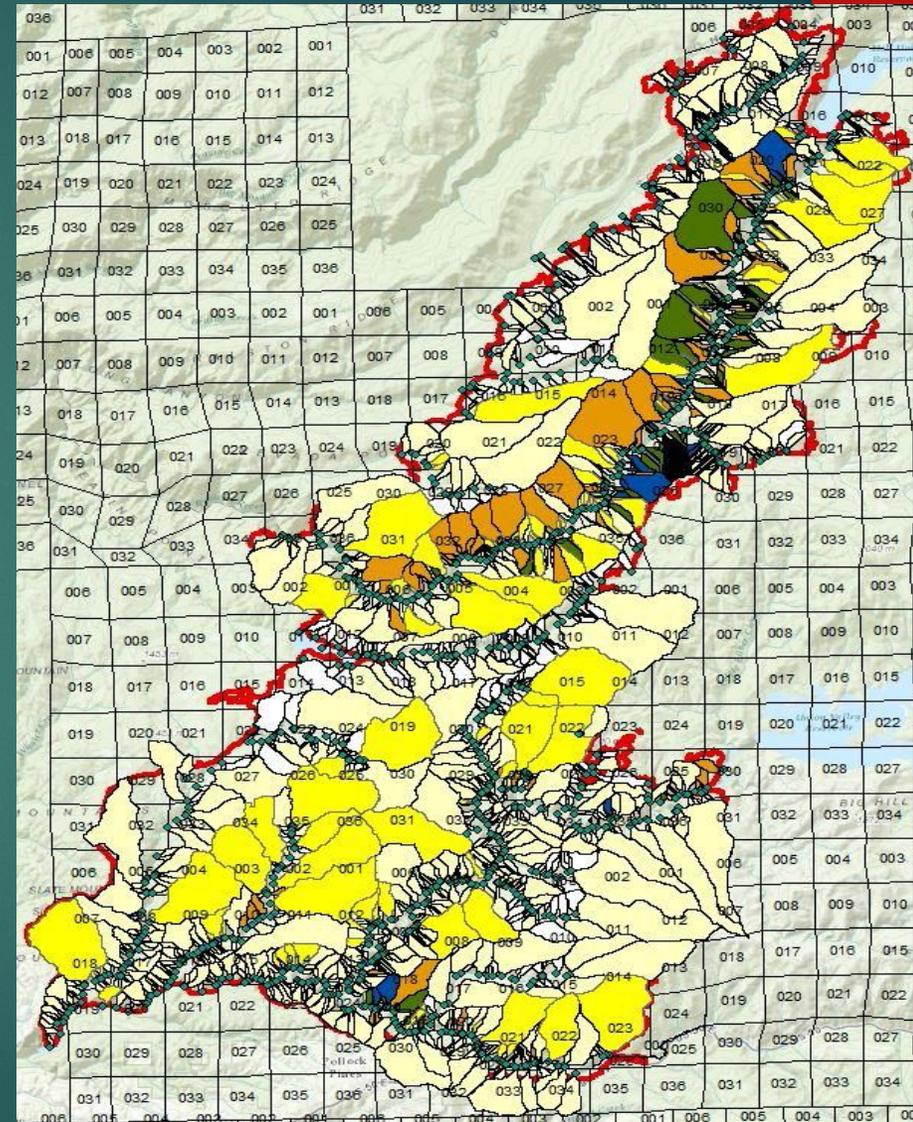
- More rapid response time
- Higher peak flows
- Greater runoff volume
- More frequent runoff events
- Post-fire peak runoff and runoff volume can increase 1 – 3 orders of magnitude



Note: this figure is generalized to demonstrate trends only; actual observations of nominal change vary widely.

Post-Fire Debris Flow

- USGS Post-Fire Debris Flow Hazard Assessment (applied to select fires in Western US)
- Rubicon drainage contains highest risk for debris flows (darker colors)
- Data used to inform USFS King Fire Restoration Project development



Identify Values at Risk

- ▶ Life and Safety
- ▶ Property and Infrastructure
- ▶ Natural Resources
- ▶ Cultural Resources

Emergency Response Examples

Flood mitigation (hillslope, channel)

- ▶ Value=life, property

Erosion prevention (hillslope, channel)

- ▶ Value=soil productivity, water quality

Storm proofing

- ▶ Value=roads, trails, buildings

Early detection/rapid response

- ▶ Value=noxious weed expansion

Safety hazard warning signs/ closure gates

- ▶ Value=human safety

Site stabilization/ hazard tree removal

- ▶ Value=cultural resources



Road Treatments

Watercourse Crossing Treatments

→ Emergency Treatments at Watercourse Crossings

- Relief Culvert
- Flared Culvert Inlet



Relief Culvert on 11 Pines Road
(2014 King Fire)

Flared inlet improves flow rate and helps prevent debris plugging by ramping debris up above the flow



Flared Culvert Inlet

Colby Fire

- ▶ La Canada Flintridge (2010)



Colby Fire



INTERAGENCY COLLABORATION

- ▶ Different Situations and Different Arrangements
- ▶ Interagency Teams and/or Liaisons
- ▶ Shared Burn Severity Maps and Risk Assessments
- ▶ Joint Public Meetings
- ▶ Ending in Mutual Understanding of Missions and Responsibilities

Agency Partners

- ▶ Cities
- ▶ Counties
- ▶ Flood Control Agencies
- ▶ Water Suppliers
- ▶ Offices of Emergency Services
- ▶ CalFire
- ▶ CalTrans
- ▶ FEMA
- ▶ Natural Resource Conservation Service
- ▶ NOAA – National Weather Service
- ▶ USACE
- ▶ USGS