

# **WILDFIRES AND WATER QUALITY PROTECTION ON NATIONAL FORESTS IN CALIFORNIA**

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# PRESENTATION OVERVIEW

- Wildfire effects on water quality
- USFS water-quality protection programs
- Overview of 2008 fire season
- Reduction of fire risks on national forests

# NATIONAL FORESTS AND WATER IN CALIFORNIA

- About 45% of California's runoff originates on national forests
- National forests provide water to the CVP, SWP, EBMUD, and many other public drinking water systems
- National forests manage watersheds to meet objectives for beneficial uses (FSM 2540)





# **WILDFIRE CONSEQUENCES AFFECTING WATER RESOURCES**

- Removal of vegetation and soil cover
- Ash deposition
- Soil hydrophobicity





**2007 Angora Fire, Lake Tahoe Basin Management Unit  
(2008 photo)**



2007 Moonlight Fire, Plumas National Forest  
(2008 photo)





**2008 Panther Fire, Siskiyou Complex, Klamath National Forest  
(2008 photo)**





2008 Gap Fire, USGS hydrologic instrumentation on private land near the Los Padres NF (USGS 2008 photo)





# RUNOFF AND EROSION: RECENT RESEARCH RESULTS

- Hillslope runoff increased 2 to 1,200 X above pre-fire flows
- Short-term increases in groundwater discharge and base flow
- Hillslope erosion increased up to 5 orders of magnitude above pre-fire rates



# USFS PROGRAMS TO PROTECT WATER QUALITY DURING AND AFTER WILDFIRES

- Suppression actions
- Suppression rehab
- BAER
- LaSER



# WILDFIRE SUPPRESSION POLICIES FOR WATER-QUALITY PROTECTION

- Standards/guides from Forest Plans
- Delegations of authority (large fires)
- AREPs/READs
- Fires managed to minimize adverse effects of unplanned ignitions
- MIST
- Aerial retardant guidelines
- BMPs





# SUPPRESSION REHABILITATION

- Restoration of areas affected by fire suppression
- Uses firefighting resources
- Funded by fire suppression program



# Burned Area Emergency Response (BAER)

- Protection for lives, property, and critical natural and cultural resources
- Not intended to prevent all erosion
- Assessment, Implementation, Monitoring
- Funded by fire program



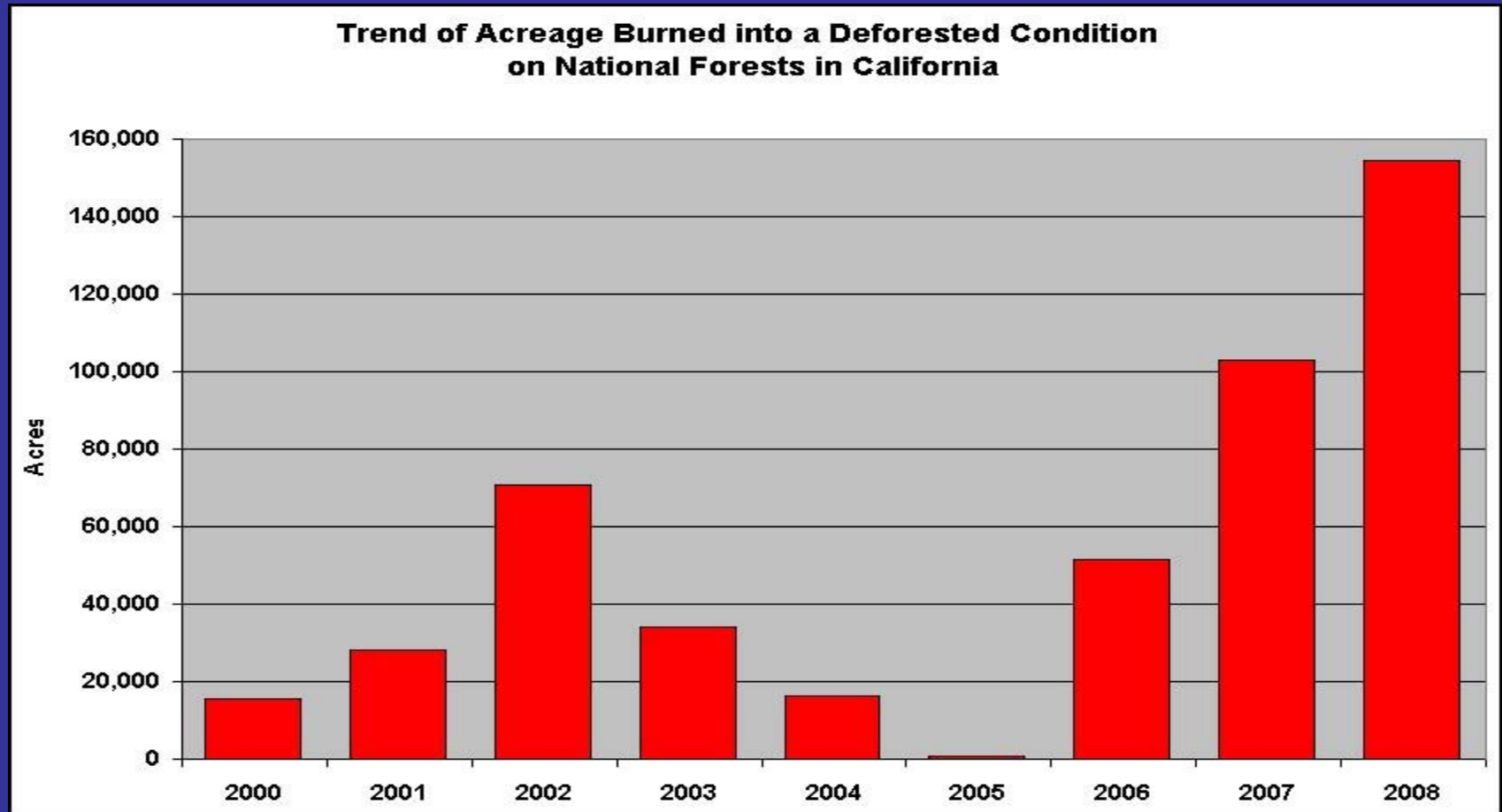


# Large Scale Event Recovery (LaSER)

- Replanting of native conifers in areas where natural regeneration is unlikely
- Funded by a combination of USFS fire, vegetation, and watershed programs and grants
- Limited by available funding (in contrast to timber harvests)



# FIRE SEVERITY HAS INCREASED IN RECENT YEARS

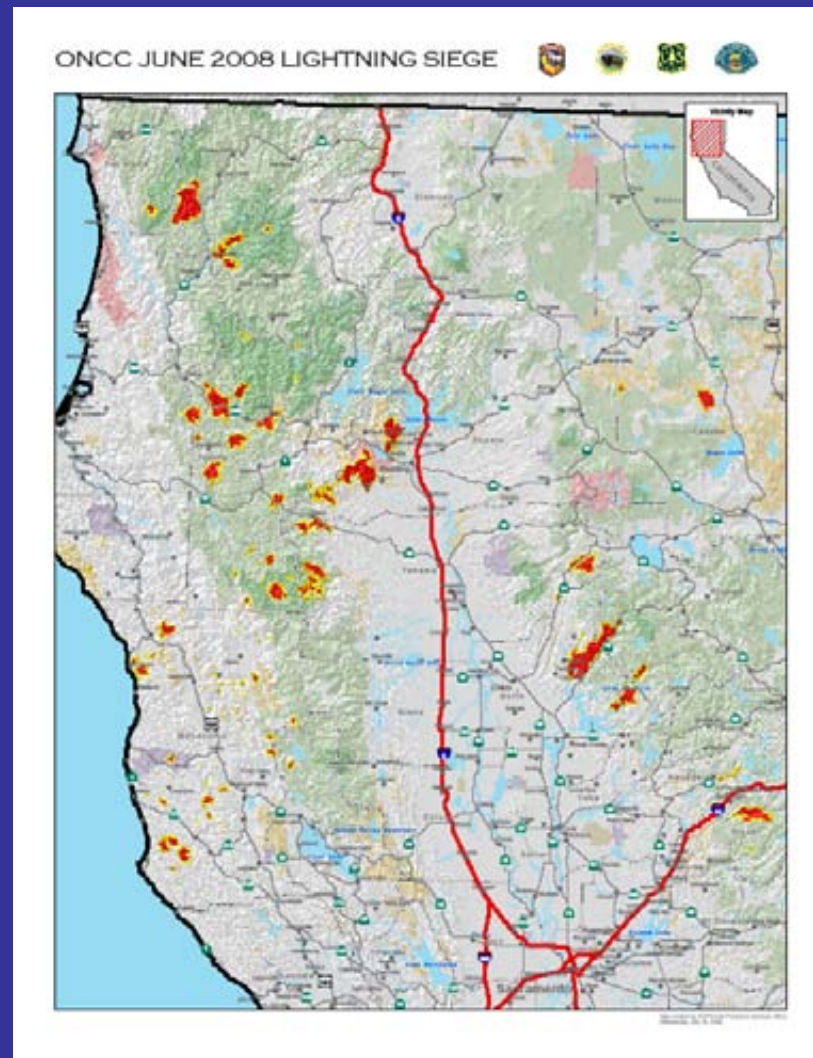




# **2008 NATIONAL FOREST FIRE SEASON IN CALIFORNIA: OVERVIEW**

**41 major fires and complexes  
Total burned area 1,082,700 acres  
Total cost \$734 million**

# 2008 NORTHERN CALIFORNIA LIGHTNING FIRES





# USFS 2008 FIRE SEASON: HUMAN COSTS

- 12 firefighter fatalities
- 219 structures destroyed
- Numerous evacuations
- Extended periods of poor air quality



# USFS 2008 FIRE SEASON: RESOURCE COSTS

- Total burned area 1,082,700 acres
  - 730,540 acres NFS lands
  - 84,184 acres deforested
- Water and air quality impacts—extent unknown
- Fish and wildlife impacts—extent unknown
- Global warming—extent unknown



# Burned Area Emergency Response (BAER): 2008 Fire Season

- 119,000 acres high burn severity
- Total BAER funds \$21,350,000
  - 65% hillslope erosion treatments
  - 4% channel treatments
  - 19% road and trail treatments
  - 6% protection and safety
  - 1% monitoring
  - 8% assessment



# 2008 NATIONAL FOREST FIRE SEASON IN CALIFORNIA--REFORESTATION

- 84,184 acres deforested in areas open for reforestation
- Total cost estimated at \$33 million
- Unit cost \$389 per deforested acre
- USFS currently able to replant about 25% of burned and deforested acres per year (in contrast to 100% for timber harvests)



# REDUCING FIRE RISK ON NATIONAL FORESTS—FUELS MANAGEMENT

- Hand and mechanical thinning
- Prescribed fire
- Timber harvests/salvage



# SCOPE OF THE FUELS CHALLENGE

- 400,000 acres/yr lost to wildfire
- USFS treats fuels on 200,000 ac/yr
- About 45% of NFS lands are high priorities for treatment
- Treatments need to be repeated every 20 yrs
- Need to treat at least 450,000 ac/yr to break even



# FUELS TREATMENTS EFFECTS ON WATER QUALITY

- Runoff and peak flows
  - Mechanical thinning-- up to 4X
  - Prescribed fire-- up to 2X
  - Salvage logging-- not enough info available
- Erosion and sediment transport
  - Mechanical thinning– 1 to 22 X
  - Prescribed fire– 2 to 33 X
  - Salvage logging– 1 to 100X
- Effects of fuels treatments are variable but generally less adverse than effects of wildfire

# REGULATORY ISSUES

- **Statewide MAA covers USFS fire and fuels activities**
- **MAA status currently under negotiation**
- **Regional waivers of WDRs cover most fire and fuels activities**
- **Reporting and monitoring requirements vary between regions**
- **Proposed changes are likely to lower unit costs and increase production**



# CONCLUSIONS

- Wildfires adversely affect water quality
- The USFS has programs to reduce adverse effects of fires
- These programs cannot eliminate erosion from burned areas
- Fire numbers, size, and severity are increasing
- Fuels treatments may have limited and temporary adverse effects on water quality but can prevent substantially greater impacts from wildfires
- An increase in the rate of fuels treatments is needed to protect lives, property, and water quality

*THANK YOU*

