

Water Plan Forest Management – Resource Management Strategy

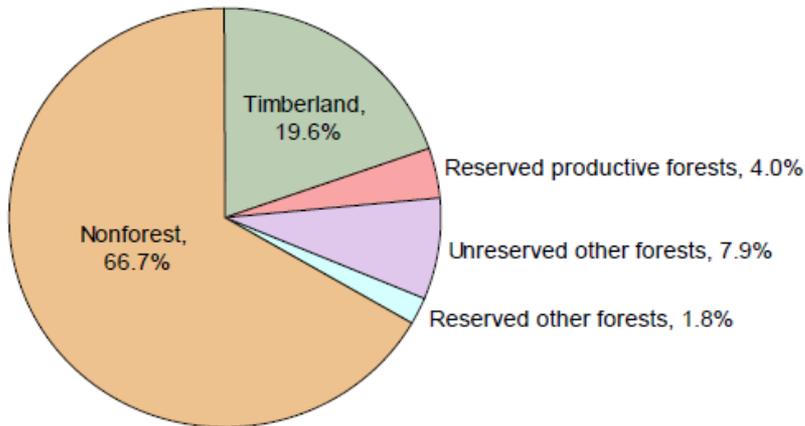
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Forest Land Base

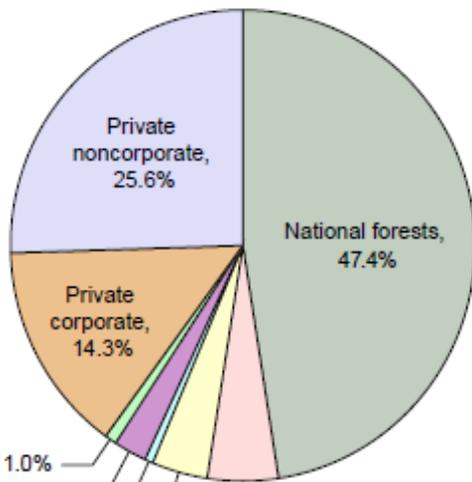
Approximately 32 million acres of forest land across California.



Much of California's water supply originates in the upper reaches of forested watersheds.

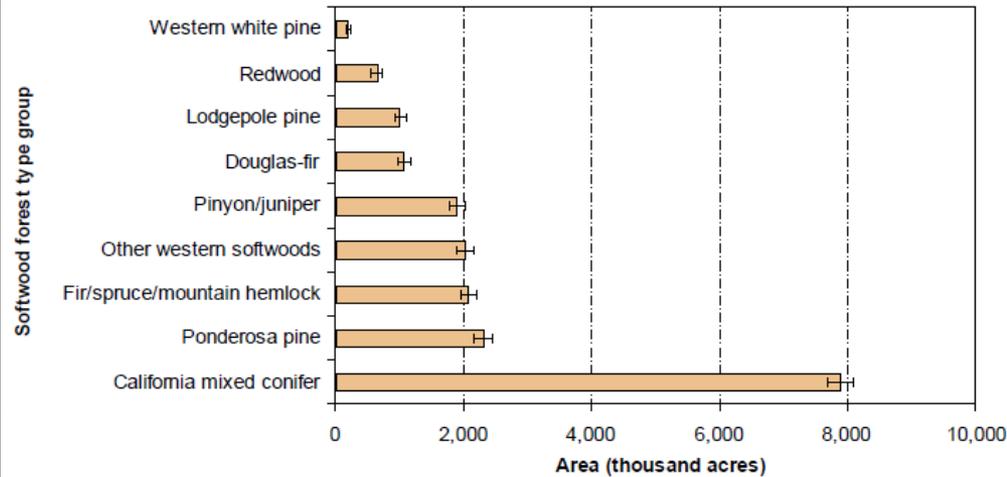


Ownership



Mixed ownership requires a collaborative approach to managing California's water resources.

Forest Types



Effects of Forest Management on Water Supply and Water Quality

California's water supply is mostly generated in forested upper watershed areas.

- Research suggests management has a limited role on water yield.
- Wildfire behavior can influence forest hydrology; affecting hillslope erosion and downstream water resources.
- Studies have shown water quality to be more directly influenced by water

Urban Forests - Benefits



Filtering storm water

Potential energy savings from shade

Filters air pollution

Lowers air temperatures

Carbon sequestration and other environmental benefits



Meadows



Mountain Meadow near Truckee.

Meadows are found in abundance across the Sierra.

EXTENT - Estimated at over 10,000 meadows covering 300,000 acres.

FUNCTION – Natural reservoirs, storing and releasing water.

ISSUE – Many meadows are in a degraded state that limits their capacity to store and release water.

SOLUTION – Meadow restoration does not create new water, but improves the timing and distribution of stream flow.

Riparian Forests



Riparian forests are located immediately adjacent to streams, lakes, or other water bodies

EXTENT – Riparian forests along valley corridors are greatly diminished, but are still extensive across upper watersheds.

FUNCTION – A transition zone between aquatic and terrestrial habitats; affect stream temperature.

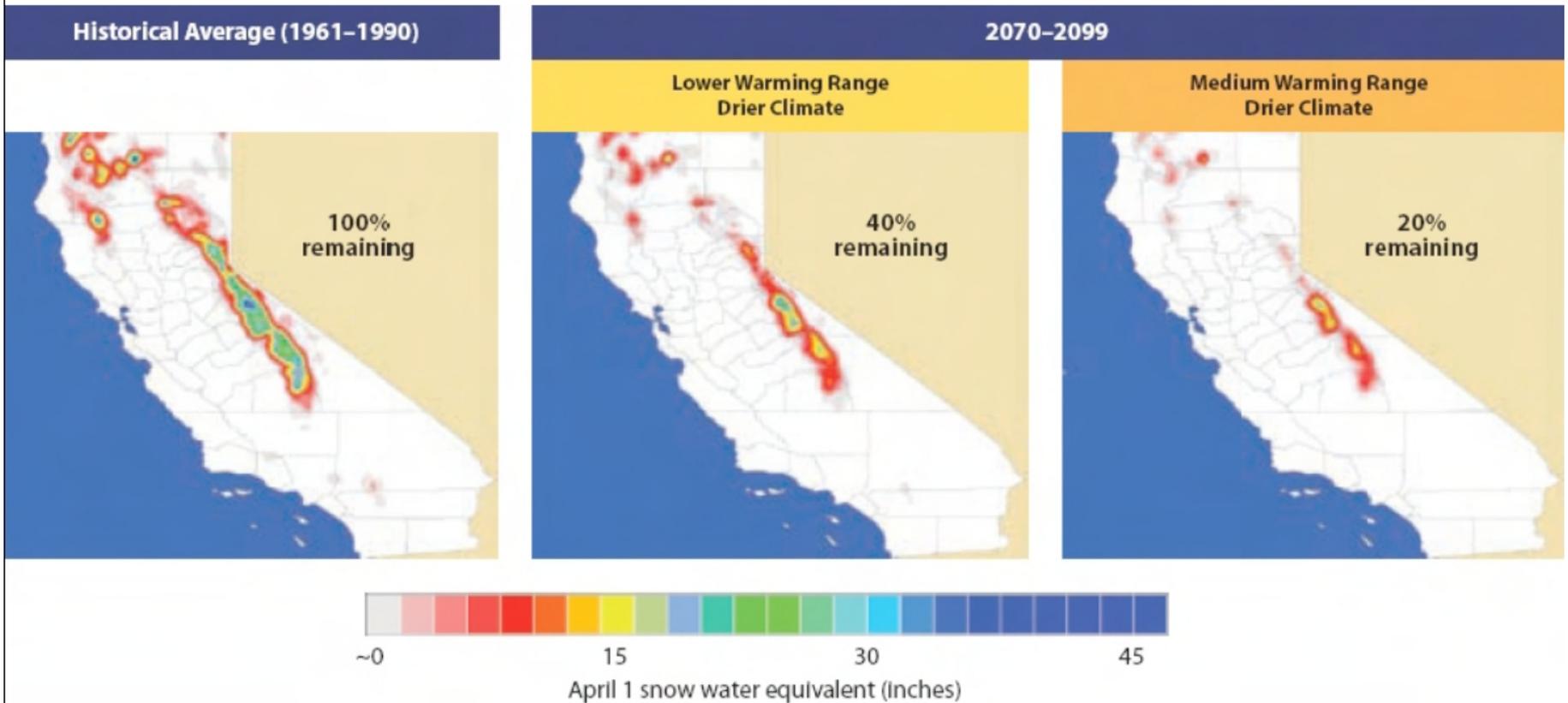
ISSUE – Prone to invasion by non-native species; management actions can impair channel morphology.

SOLUTION – Restoration to maintain natural channel morphology and address invasive species issues.

Water Resources Climate Change

- More extreme precipitation events and seasons
 - Deeper droughts and higher floods
- Decreasing and less reliable snow pack
- Coastal areas face salt water intrusion
- Large wildland fires may trigger flooding and dangerous erosion and debris flows

Climate Impact – Water Resources



Historic and predicted decline in snowpack

Wildfire - Extent

Extent of wildfire

Area burned annual average of 320,000 acres; large inter-annual variability 31,000 (1963) to 1.37 million acres in 2008.



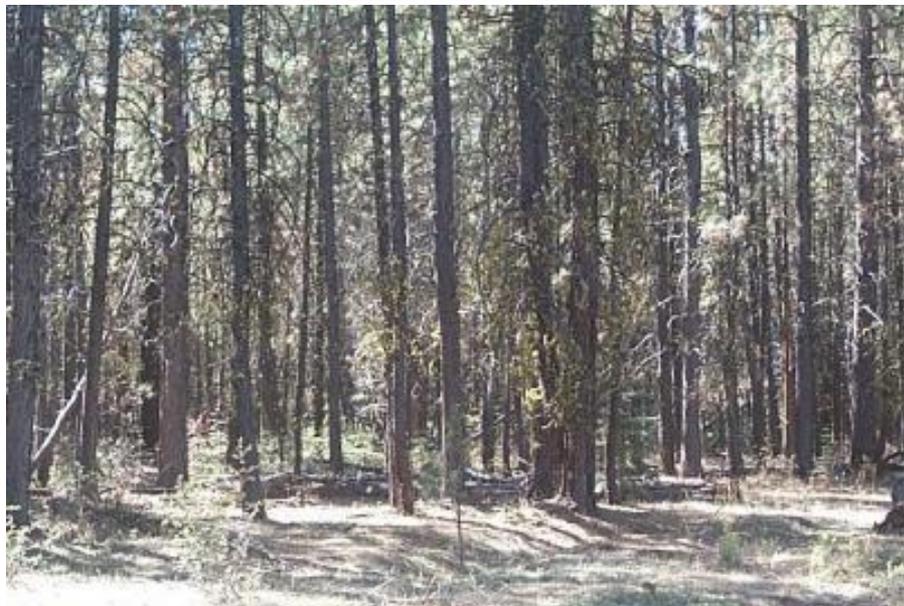
Vegetation Management – Wildfire Impacts

Types of impacts:

- *Post-Fire Erosion*
- *Sediment/water quality*
- *Peak Flow*
- *Nutrients*
- *Water Yields*
- *Smoke and air pollution*



Vegetation Management – Fuel Reduction Projects

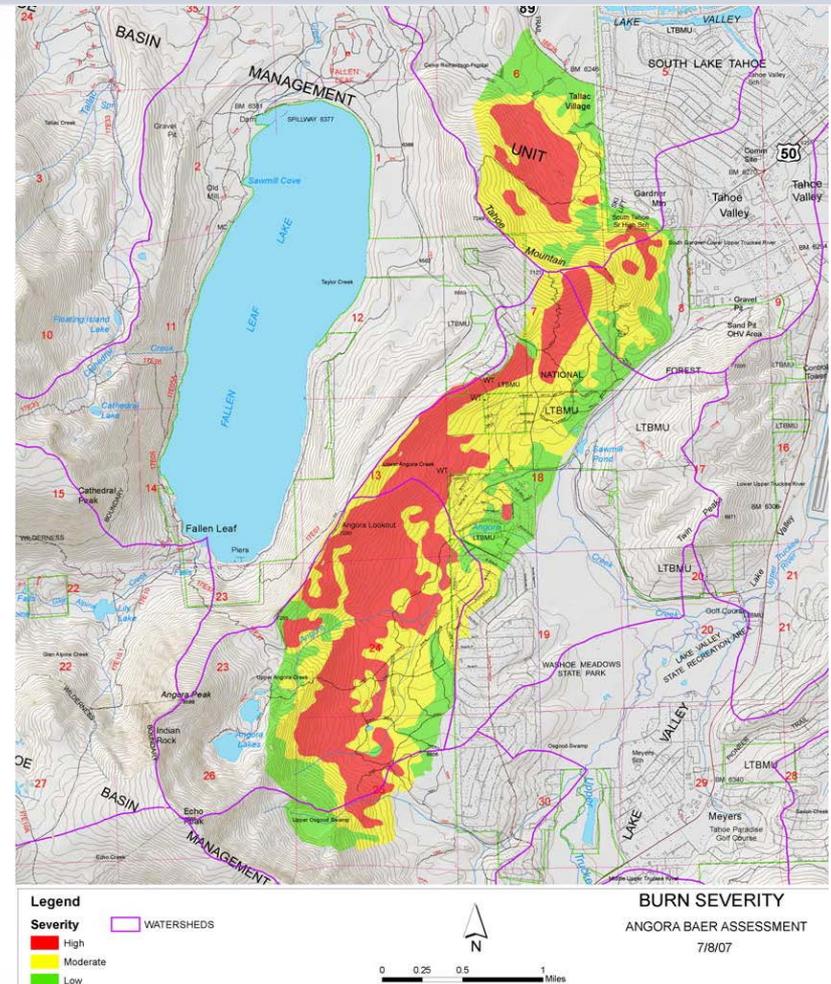


Fuel reduction projects typically thin forest stands and reduce the risk of high severity crown fires.

Strategies to Reduce Impacts from Wildfire

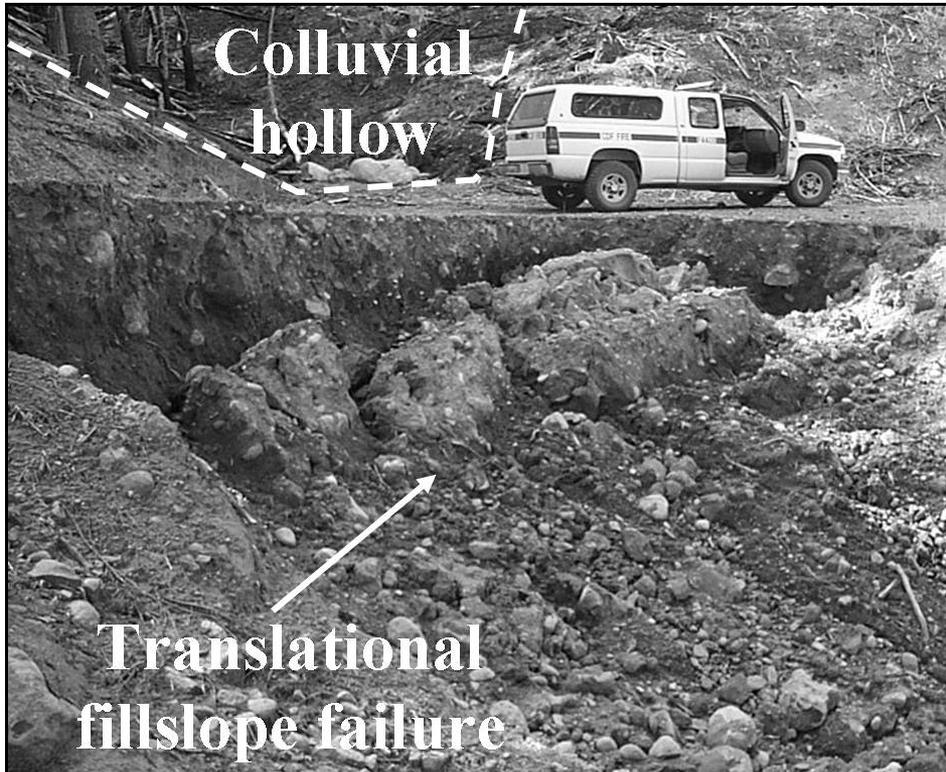
Firefighting tactics – protection to water quality

- *Restrictions on applying fire retardant over water courses.*
- *BAER teams*
- *Assessment Teams on State and private lands*
- *Actions to reduce hillslope erosion*



Angora wildfire, 2007

Road Management



Source: MacDonald and Coe

Forest Roads – Water Quality

EXTENT - Thousands of miles of forest roads throughout forests in California.

FUNCTION – Primarily used to access timber.

ISSUE – These mostly unpaved roads can effect hydrology and water quality when improperly designed or poorly maintained.

SOLUTION – Road improvements or decommissioning for roads that are no longer necessary.

Marijuana Cultivation – Environmental Impacts

Environmental Impacts Include:

- Use of fertilizers, herbicides, and insecticides. Often chemical are used in close proximity to nearby streams and water courses.
- Example: Recent (November, 2012) court proceeding for a person who pleaded guilty to growing over 2,000 plants on the Shasta-Trinity National Forest.



Major Issues / Recommendations

Research: Studies are needed to better understand the effects of forest management on water quantity and water quality.

Monitoring: Continued monitoring needed to evaluate the current conditions and trends (e.g. stream gages, precipitation gages..).

Coordination: Fragmented and uncoordinated activities can have conflicting objectives within the same watershed.

Funding: Progress in watershed restoration and tree planting for urban forests are often limited by available funding.

Costs for Implementation Measures

Sample of Costs for Restoration Actions

Meadow Restoration: \$1,000 - \$2,500 per acre

Riparian Forests: comparable to vegetation management

Vegetation Management: \$500 per acre (grass, shrub)

Road Management: \$6,520 - \$13,580 per mile (unit cost on NFS lands)

Marijuana Cultivation Clean Up: \$5,000 - \$10,000 per 10 acres.

Urban Forestry: \$45 - \$160 (tree planting); \$13 - \$65 maintenance)