Recovering from wildfire

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Presentation goals

- Present a process for determining post fire management strategy
- Discuss post fire land management practices and their pros and cons
- Show examples of post high severity fire treatments and regrowth

Post-fire assessment process

1) First, survey property to identify issues:
   - What is the severity of fire impacts?
   - What values are at risk?
     - Access? – integrity of the road system
     - Vegetation? – Regrowth? Exotic weeds
     - Soil productivity/water quality? – erosion risk
2) Define your goals
   - Research treatment options and costs
   - Refine your goals
3) Contact a professional / Or DIY if small
   - Develop a plan

Fire impacts depend on fire severity

Map Vegetation Burn Severity

- *Low* – doesn't burn the canopy, most needles remain on tree, some scorching, ground still has some litter cover

- *Moderate* – burns into canopy and burns needles from some but not all trees, consume part of ground cover, largest most vigorous trees survive

- *High* - Most trees killed, most foliage and litter consumed

Increase in area burned at high severity

- Due to changes in forest structure due to fire suppression and climate change
- Area burned at high severity increased from 17% to 30%
- High severity patches doubled from 1984 to 2006

Year	10 year average percent high severity	Mean patch size of high severity fire	Mean max
1984	17%	6.9 acres	124 acres
2006	30%	13.0 acres	292 acres

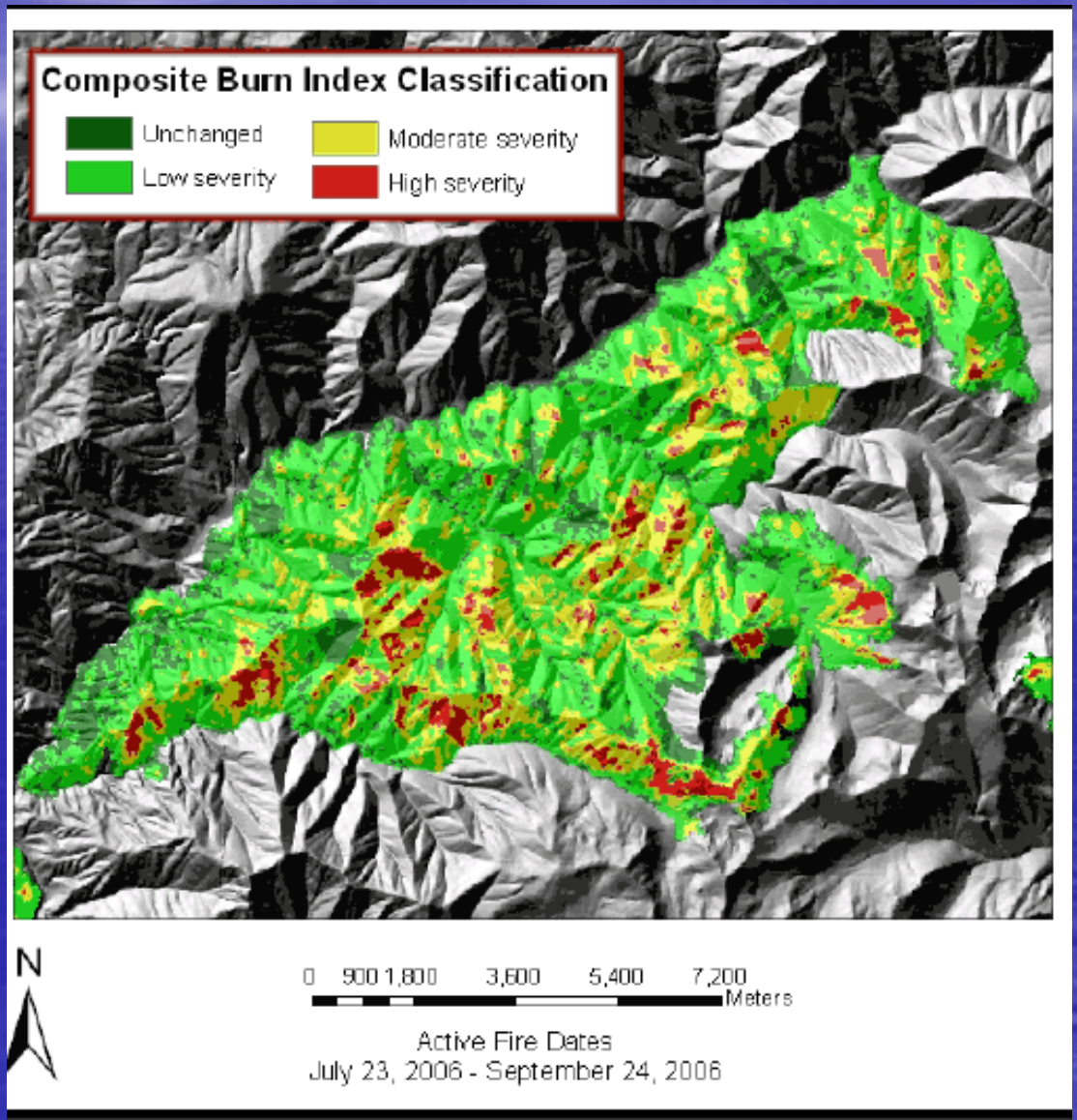
Forest structure has changed

- Recent estimates of Californian prehistoric fire area
  - between 4.4 and 11.9 million acres/ year or
  - 5% - 12% of the states lands burned annually

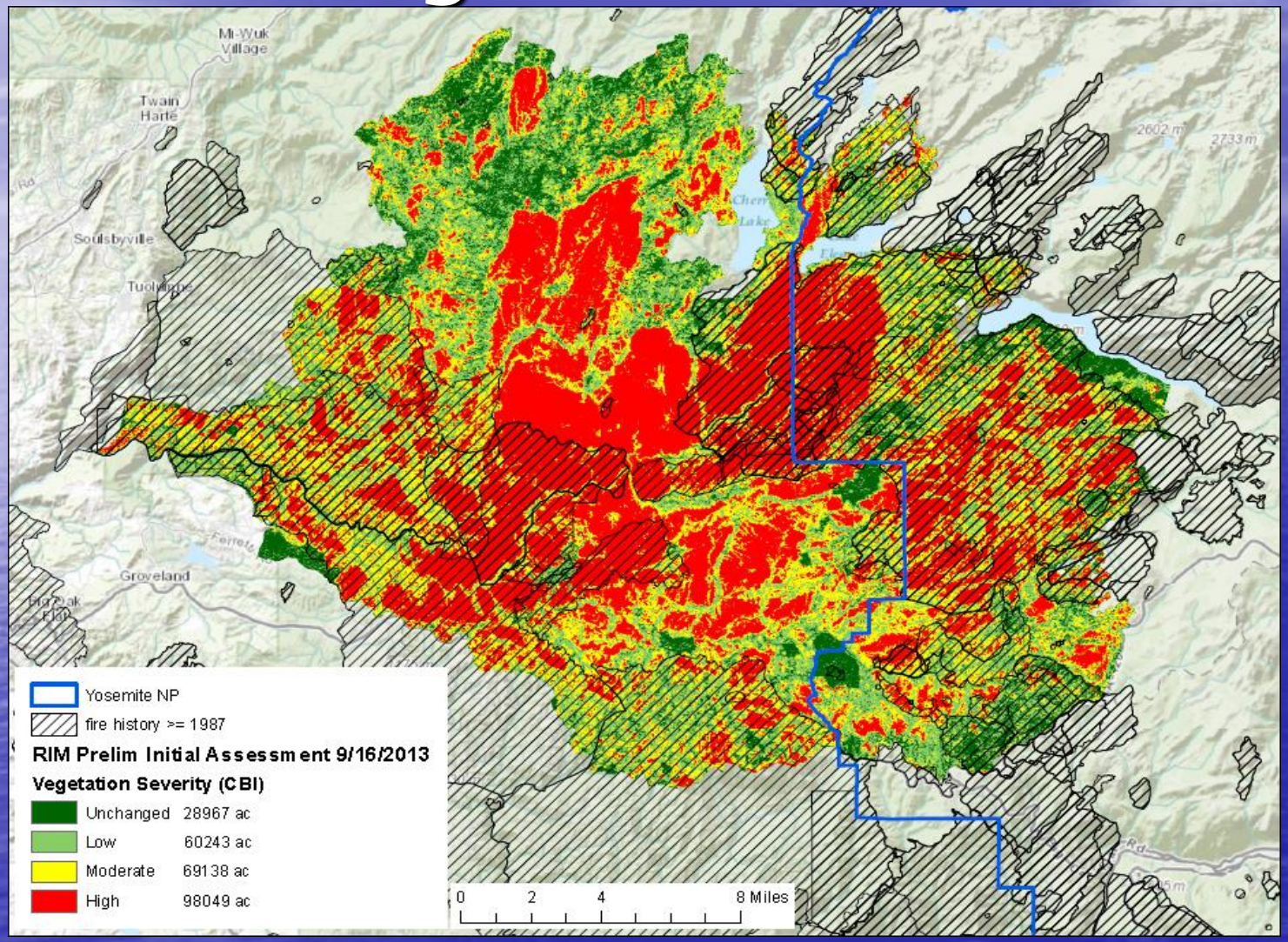
- *"The trees of all of the species stand more or less apart in groves, or in small irregular groups, enabling one to find a way nearly everywhere, along sunny colonnades and through openings that have a smooth, parklike surface". John Muir 1894*

Increase in high severity fires

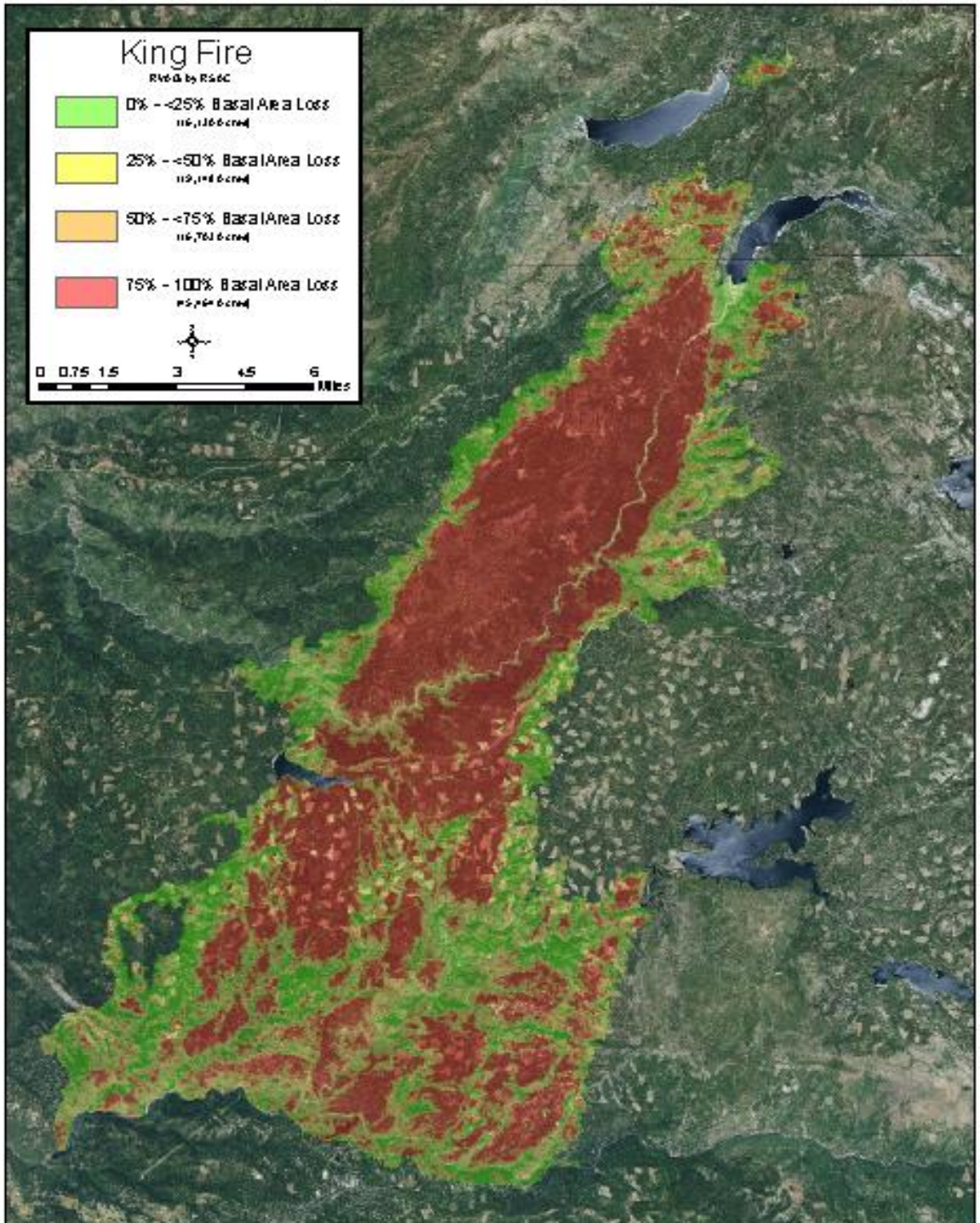
- Fires are now more likely to be of high severity meaning that most or all trees are killed
- Still a lot of variety in severity
  - Hancock fire 2006



Rim Fire Vegetation Burn Severity

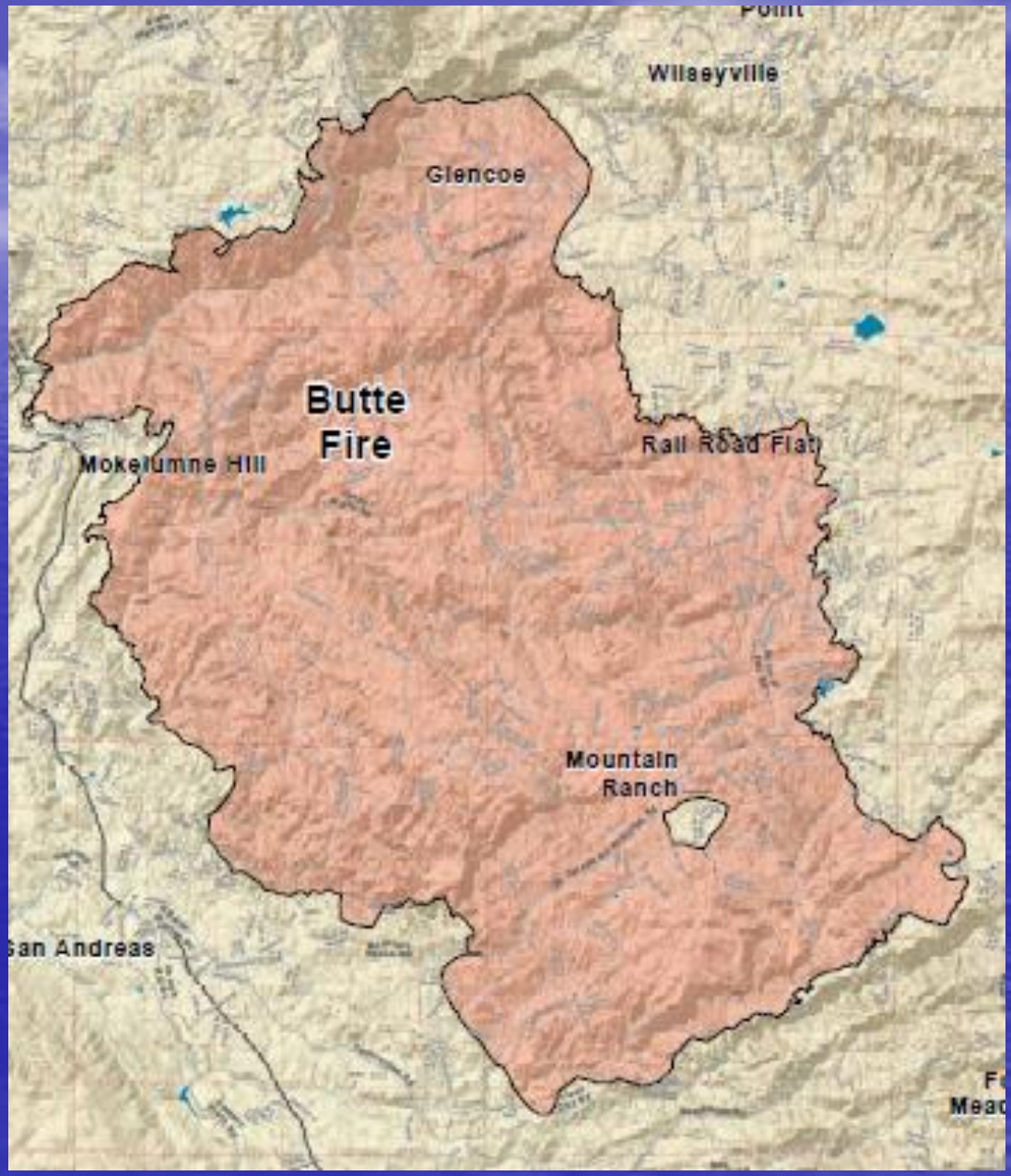


High = 38%, Mod. = 27%, Low = 23%, None = 11%,
63,000 acre patch of high severity fire


King Fire
0% - <25% Basal Area Loss
25% - <50% Basal Area Loss
50% - <75% Basal Area Loss
75% - 100% Basal Area Loss
0 0.75 1.5 3 4.5 6
Miles

1) First, survey your property to identify issues:

- What is the severity of fire impacts?
- What values are at risk?



Low Severity Fire - most trees survive

- Erosion risk – Low
  - Leaves/needles not consumed - ground will have some litter cover
- Tree removal/replanting – low
  - Most trees survive, plenty of seed source for next generation
- Road risk – Low
  - Most vegetation survives therefore no extra water to accommodate
- Weeds – Low
  - In areas where cover is gone or suppression equipment used

Moderate Severity - burns needles from some trees, some cover, biggest trees survive

- Erosion risk – Moderate
  - In areas without ground cover
- Tree removal/replanting – low
  - May want to remove dead trees in some areas, plenty of seed source for next generation of conifers, oaks may resprout
- Road risk – Low
  - Some vegetation killed leading to some extra water to accommodate
- Weeds – Moderate
  - In areas where cover is gone or suppression equipment used

High Severity - Most trees killed, most foliage and litter consumed

- Erosion risk – Highest
  - No ground cover for several seasons until shrub and herbaceous plant regrowth, highest on slopes
- Tree removal/replanting – Highest if conifer
  - Remove dead trees for safety and fuels, plant if no tree conifer seeds source nearby, tend oak resprouts
- Road risk – Highest
  - All the water that used to be used by trees goes into ground, ditches and streams
- Weeds – Highest
  - Most area bare and susceptible to weeds

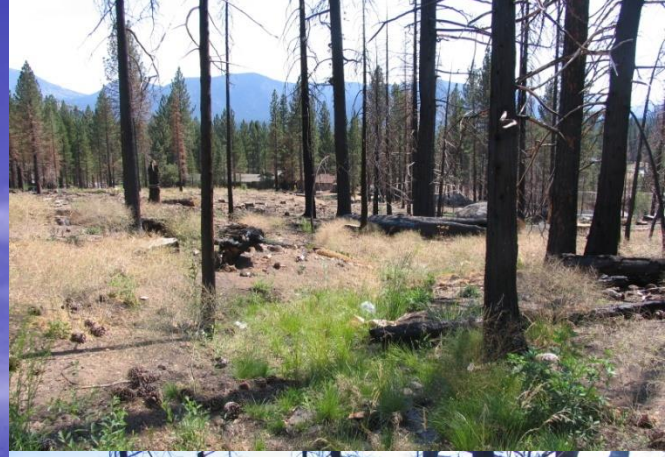
Is a plant still alive? Will vegetation come back after a fire?

- YES Riparian plants
  - Have a lot of water and recover first
  - Within week to same season

- YES Herbaceous plants and shrubs
  - May resprout or seeds may be in the seed bank
  - Cover starts to get established first season after, complete within about four seasons

Angora Riparian Regrowth

September 2007



September 2008

November 2007

December 2008

May 2008

July 2009

2007 Angora fire in South Lake Tahoe

2007

2009

- Shrub regrowth substantial within two years, seven years later there are seas of brush 6’ tall

Will the trees recover after fire?

- MAYBE Oaks
  - Leaves will come back in spring or may resprout from stump if cambium is dead (more likely for live oaks, small diameter trees in moister areas)
  - Next season for leaves, sprouts, up to 3 growing seasons to determine if crown will recover
- NO Conifers
  - Not if most needles are brown or gone. They are not able to put on new needles or resprout
  - Depends on distance from seed source, brush phase: 30 to 100 years

Sand fire burned areas complex

Process

1) First, survey your property to identify issues – map the resources at risk and problem areas

2) **Define your goals**
   - Research treatment options and costs
   - Refine your goals

3) Contact a professional / Or DIY if small
   - Develop a plan

Erosion control

- Objective: Protect water quality and site productivity (most important 1st/2nd winter)

Practice	Pros	Cons
Mulching with straw/ wood chip	Effective at 60% ground cover	Expense: $250-$930/acre (helimulch), $500-$1200/acre hand
Contour felling	Effective if done correctly	Expense: $420-$1,200/ acre requires expertise
Straw/fiber wattles/rolls	Moderately effective with large rainfall events	Expense: $1,100-$4,000/ acre requires expertise
Silt fence	Effective when properly installed, must be cleaned out to maintain	$50/role + labor = @ $200/fence
Seeding	Often not effective	$20-$170/acre
Water bars	Effective if done correctly	Requires heavy equipment


7
9
9
Angora Debris Project Sign
County of El Dorado and Cal/EPA
Parcel #
Address
Photo Documentation
Impacted Area
Foundation Verification
Removal Complete
Confirmation Sampling
Erosion Control
County Approval

Remove dead trees

- Produce wood products/ Recover costs/ Reduce future fuels/Improve safety

Practice	Pros	Cons
Mechanical harvesting methods/ larger projects	Can offset treatment costs Effective when done quickly Removes largest fuels Removes danger to planters /firefighters /structures	Will require paperwork When delayed value drops and can interfere with regeneration May create smaller fuels Reduces snag habitat Potential for road construction /soil impacts
Hand felling/DIY backyard	Flexible timing, do it yourself Doable for small areas	Typically not marketing the materials Oaks not a commercial species

Time to tree decay

Years after tree death	White fir	Ponderosa/ Jeffrey pine	Sugar pine	Douglas-fir
1	10-20% volume decayed	25% of sapwood bluestained	Extensive bluestain in sapwood	Minimal decay, some cracks in heartwood
2	50% volume decayed	All wood bluestained, 50% of sapwood decayed	75% sapwood decayed	25-50% sapwood decayed
3	100% volume decayed	All sapwood and some heartwood decayed	All sapwood and some heartwood decayed	All sapwood and 1” heartwood decayed
4	--	70% of volume decayed	50% volume decayed	2” heartwood decayed
5	--	90% volume decayed	50% volume decayed	3” heartwood decayed

Replant trees

- Objective: Accelerate growth of forest /woodland

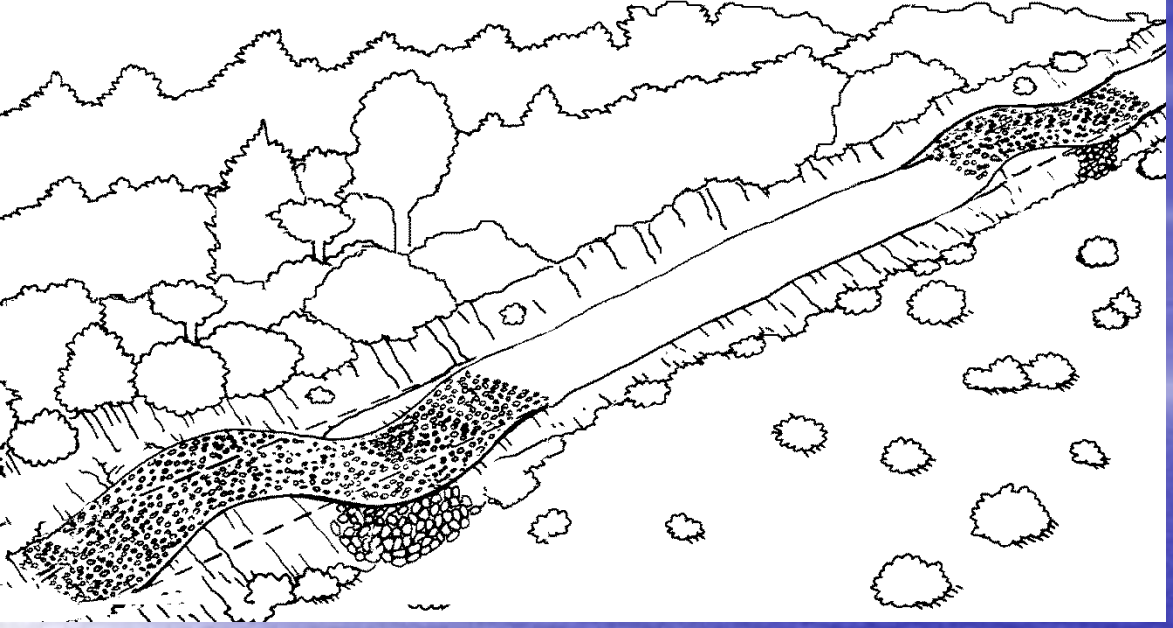
Method	Pros	Cons
Bare root and container planting	Establishes conifers more quickly (30-50 years) Restores carbon sequestration potential Control species and genotype of future forest	Expense: $500-$1,000/acre Reduces future shrub habitat Requires on-going maintenance Past performance may not be a predictor of future success
Acorn planting in fall	Inexpensive, can be gathered locally Germination can be high if done right Can establish deep roots right in the ground	Damage from animals may be high - may require tree shelters, fencing


KEEP
TAHOE
BLUE

Road system upgrades

- Maintain road system / Protect water quality

Methods	Pros	Cons
Maintain/ clean culverts	Effective, only needs to be done a few winters	Requires time and vigilance Must be onsite
Upgrade road/ • Outslope with rolling dips • Armor with rock • Install larger culverts	Effective with long lasting benefits	Expensive Requires technical expertise/ heavy equipment Expensive Expensive



Vegetation control

- Control non-natives / Reduce competition to conifers

Methods	Pros	Cons
Herbicide	Mixed results	Expense: Requires licensed applicator
Herbicide/ hand grubbing	Effective	Hand grubbing very labor intensive – not for large areas

3) Contact a professional / Or DIY if small

- Natural Resources Conservation Service for technical assistance
- Registered Professional Forester for Timber Harvest
- Licensed Timber Operator
- Certified Arborists
- Licensed Pesticide Control Advisor
- Master Gardeners

Thank you!

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