What is a Fire Resilient Forested Landscape?
Treatment Options, Pace and Scale

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Compelling evidence that fuels treatments, which reduce ladder and surface fuels, can be highly effective


Sugarloaf Fire: Treated (above) and Untreated (below) forest within 200 m.
How much of California burned each year before European settlement?

Sept. 22 1900 fire plume in the San Gabriel Mountains, Los Angeles County (taken 25 miles from the fire).

2008 wildfire
• In CA before 1800, fire burned an estimated annual total of 4,400,000 ac, of which 1,200,000 ac was forest.
• In 2008, the largest burn year in modern times 1,360,000 ac burned
• For 1950-1999 average area burned by wildfire was 250,000 ac/yr
• Area annually treated in CA for fuels reduction is about 50-62,000 ac/yr.
• Roughly, we fall behind in burned area by >850,000 ac/yr

TOTAL CALIFORNIA FOREST LAND
33,238,000 ACRES

42.5% Public acres
17.5% Reserve Public acres
40.0% Private acres

5.8 mm Reserve Public acres
14.2 mm Public acres
13.2 mm Private acres


Approximately 1/3 of the state's 100 million acres is forest.
Sierra Nevada: Annual acreage treated, untreated (what would have historically burned minus treated), and the backlog (total acreage needing treatment)
Roadblocks to Increasing Treatment Acreage

Air Quality: Smoke

Declining FS Budget and Personnel

Fewer wood processors

Liability

Regulation & Project Review

Low wood prices & overseas supplies

Litigation
Fuels Treatments and Changes in Canopy Cover on the Moonlight Fire
Solutions?

Old School

New School
Stretch Goals and Backcasting: Approaches for Overcoming Barriers to Large-Scale Ecological Restoration
Backcasting: Defining a desirable future and then working backwards to identify policies and programs that will connect the future to the present.
“If we want to attain a certain goal, what actions must be taken to get there?”
The features of problems for which backcasting is well suited*:
• When a problem is complex.
• When there is a need for major change and marginal changes will be insufficient to solve a problem.
• When dominant trends are part of the problem.
• When a problem is largely a matter of externalities.
• When the timescales are long enough to give considerable scope for deliberate choice.

Axiom: With all the restrictions, prescribed fire will never be practical for large-scale fuels treatment

Fuel Treatment Longevity

How often will fuels-treated areas need to be re-treated to maintain their high-intensity fire resistance?

Depending on the initial treatment type and forest productivity, some studies* suggest every 10-30 years.

It seems unlikely that National Forests can repeat mechanical treatments across all their fire-dependent forest types every 30 years.

Axiom: With all the restrictions, prescribed fire will never be practical for large-scale fuels treatment

Cost

Unless a biomass market develops, most 2\textsuperscript{nd} and future mechanical entries will be ‘service contracts’ at $500-$2000 ac

Prescribed burning costs: Can be as high as $500 ac for small areas, but for large areas costs can decrease to $30/ac\textsuperscript{1} on N.F. lands and $19/ac on N.P. lands\textsuperscript{2}

Areas treated with prescribed fire reduce wildfire size. Wildfire suppression costs vary widely but can range from $300->$3,000 ac\textsuperscript{2}

\textsuperscript{1} Hartsough, B. et al. 2008. Forest Pol. & Econ. 10: 344.
\textsuperscript{2} Husari, S.J. and K.S. McKelvey. 1996. SNEP, Vol. II: 1101
Axiom: With all the restrictions, prescribed fire will never be practical for large-scale fuels treatment

Restoration:
Increasing # of studies suggesting thinning alone cannot restore many ecosystem processes

Recent research found that “despite restrictions” prescribed fire produced similar patterns and effects on vegetation as low-intensity wildfire

New studies have suggested that within 2 low-intensity burns, many ecological attributes are restored

Backcasting: Prescribed fire is the most effective and only practical large-scale fuels treatment


Stretch Goal: “A goal that cannot be achieved by incremental improvements and that requires a significant change in methods.”

“By specifying the ‘unattainable’, people are required to ‘think outside the box’, and significantly improve their performance” (G.E. CEO Jack Welch)

Ex. In 1961 JFK announcing NASA would “land a man on the moon before the decade is out”
Stretch Goal for Fire Resilience:

Concentrated treatment of entire firesheds to improve wildlife habitat, forest restoration, and fire resilience so that they can largely be maintained by fire

- Scaling up projects to 50,000-100,000 ac and a 10 year planning horizon (ex. Collaborative Forest Landscape Restoration Project [CFLRP])

- Collaborative projects based on assessing current forest conditions and identifying a desired future condition

- Economics: Couple revenue generating and losing projects; commit to a steady supply of biomass

- “Institutionalize” monitoring and course correction
Stretch Goals: Scaling Up

Pluses:
Economies of scale treating 5,000-10,000 ac/yr

Size may be more congruent with historic fire scale

Allows phased implementation to control impacts on sensitive species

Treated ‘firesheds’ turned over to wildland and prescribed fire use for most of future maintenance
Collaborative Project Design and Desired Future Conditions

Establish a common baseline—Stakeholders and the public participate from the beginning reviewing an assessment of the project area’s current condition

A common goal—Agree upon a future desired condition

The group discusses and helps develop a restoration plan within economic constraints

The collaboration strives for consensus and accommodation, but eventually votes and moves forward
Jeremy Fried analysis of changes in CA forest biomass using FIA plot re-measurements

**Live tree biomass stock change on NFS lands, by reserve status & disturbance/treatment status**

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<th>Disturbance Kind</th>
<th>Reserved Status</th>
<th>Total (thousand tons per year)</th>
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<th>Unreserved</th>
<th>Total (thousand tons per year)</th>
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**Live tree biomass stock change as a percent of stocks on NFS lands, by reserve status & disturbance/treatment status**

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Every year, CA forests add 1.35 million tons of biomass!
Larger, Long-Term Projects Could Provide A More Predictable Biomass Supply

The infrastructure for processing logs and using biomass has substantially shrunk

Stabilizing supply fluctuations could help reverse this trend

More processing facilities could lower costs and improve project economics
Economics: Coupling Treatment Areas
Revenue from restoration treatments of upper slopes and ridge tops could be used for service contract and prescribed fire costs in wildlife and riparian areas.
“Institutionalize” monitoring and course correction

- Simple monitoring could become a project expense and be peer reviewed
- Results could annually be presented to a project’s collaborative team
- Project plans could be modified in response to monitoring information
- In turn the team could request modifying what’s monitored to investigate developing concerns

“Marriage is a wonderful institution...but who wants to live in an institution?”

From the New Forest Planning Rule
Scaling Up Fuels Treatments: Forest Ecologist Perspective

• Wildland fire and prescribed fire use are the best long-term tools for restoring Sierra Nevada forest resilience

• To be effective projects will need to scale up and move whole ‘firesheds’ to a condition where they can be maintained with fire

• Collaborative project development and oversight coupled with a serious commitment to monitoring seem the best means of increasing the scope and pace of fuels treatments
Radial growth release on a leave tree in a fuels treatment