The Kings River Project

Sierra National Forest
Pacific Southwest Research Station
Southern California Edison
Kings River Project

- Project developed from KRAS and PSW research studies
- Established in 1994
  - KRAS - Determine if forest ecosystems can be managed using the uneven-aged mgt. system and Rx fire to maintain essential components & support various uses
  - PSW - Funded for Interdisciplinary Ecosystem Research
Broad PSW Studies

- Demography of the CA spotted owl
- Variation in the abundance and productivity of forest birds
- Occurrence of fisher
- The Teakettle Experiment
- Experimental watershed research
The Kings River Project Purpose

- Restore historical pre-1850 forest conditions across a large landscape using the uneven-aged silvicultural system with regeneration in groups and prescribed fire
Mosaic of Different Aged Groups
Historic Forest Conditions

Why is the historical pre-1850 forest condition the Vision or Desired Condition for the Kings River Project?
Historic Forest Conditions

Data sources used by Ramiro Rojas to develop an image of the historical forest:

- Late 1800s and early 1900 written accounts
- Early oblique photos (1890’s to 1930’s)
- Historic forest reconstruction by contemporary researchers
- Examinations of stand data from 1900 to 1935
- Cruise Reports and data from 1910 to 1922
- Aerial photographs 1940

Images portrayed by some of these sources
“The virgin forest is uneven-aged, or at best even-aged by small groups, and is patchy and broken; hence it is fairly immune from extensive devastating crown fire.”

“Local crown fires may extend over a few hundred acres, but stands in general are so uneven-aged and broken and have such a varied cover type that a continuous crown fire is practically impossible.”

Show and Kotok 1924
“The virgin stands are not even-aged”.  

“In relatively few sections of this large region are the stands uniform in age. All age classes are not present, as they would be in a true selection forest. Stands are usually made up of small even-aged groups, the ages of the groups differing by periods of 10 to 20 years.”
Dunning 1923
“In this belt the forest presents a rather open stand in which the yellow pine occurs pure or predominant. The timber is often of large dimensions and very merchantable, but it stands rather scattered, reducing the acreage cut.”

Flintham 1904
“The dense fir forests present the typical virgin condition, in which all ages and stages of development may be noted as younger growth pushes up to take a place in the forestcrown. (sic) The stand of red fir is generally very dense, ....”

Flintham 1904
Kings River Project
Historic Forest Conditions

The historic forests of the Kings River Project were dominated by large trees.

The historic forest was greatly affected by frequent low intensity fire.
Kings River Project
Historic Forest Conditions

• The historic yellow pine and mixed-conifer forests of the Kings River Project had relatively low tree densities.
Historic forest stand structures were uneven-aged

The historic mixed-conifer and pine forest had a lower frequency of shade intolerant individuals.
Uneven-aged Management Field Techniques

- Located large stands using traditional approaches
- Established stand boundaries & reforestation groups in existing understocked patches
- Used appropriate thinning guidelines
- Thinned the matrix while looking for and accentuating obvious groups
Uneven-aged Mgt. Results

- Uneven-aged group selection & thinning:
  - Stands contain natural openings, reforestation groups, medium and large size trees
  - They are a mosaic of different aged groups separated horizontally
  - With 0.5 to 3 acre reforestation groups
Uneven-aged Mgt. Costs

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Uneven-aged Mgt. Summary
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- Prescriptions were successful
- Thinning existing trees between groups
  - Accentuated existing patchy structure
  - Patches became more single storied decreasing vertical diversity
  - Across a stand, horizontal diversity of patches increased
- Added cost over even-aged mgt. was small
Mosaic of Different Aged Groups
Lessons Learned - Burning
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- Repeated entries with cool burns in the winter and spring work best
- Hash browns fuel type
  - Burns hotter & faster than bear clover
  - Burns at higher humidity & fuel moisture
- Cost
  - About $100 per acre
Preliminary Conclusion

Although some post sale work and burning remains to be done, it is clear a typical Ranger District can implement uneven-aged group selection, thinning and underburning across a large landscape at costs comparable to traditional even-aged management.