Overstory and understory vegetation management to meet fire resilience and wildlife habitat objectives

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Outline

- Developing vegetation objectives from historical stand data: an example
  - Historical stands were fire resilient and biodiverse
  - Research plots, Stanislaus NF, CA
    - 80 years of overstory and understory changes from before logging to present
  - Using historical stands as a guide: thinning prescriptions for restoring forest complexity & resilience to fire
- Similarities in scale of within-stand organization across dry forests with history of frequent fire

“Methods of Cutting” study plots Established in 1929

MC11

Heavy cut

MC10

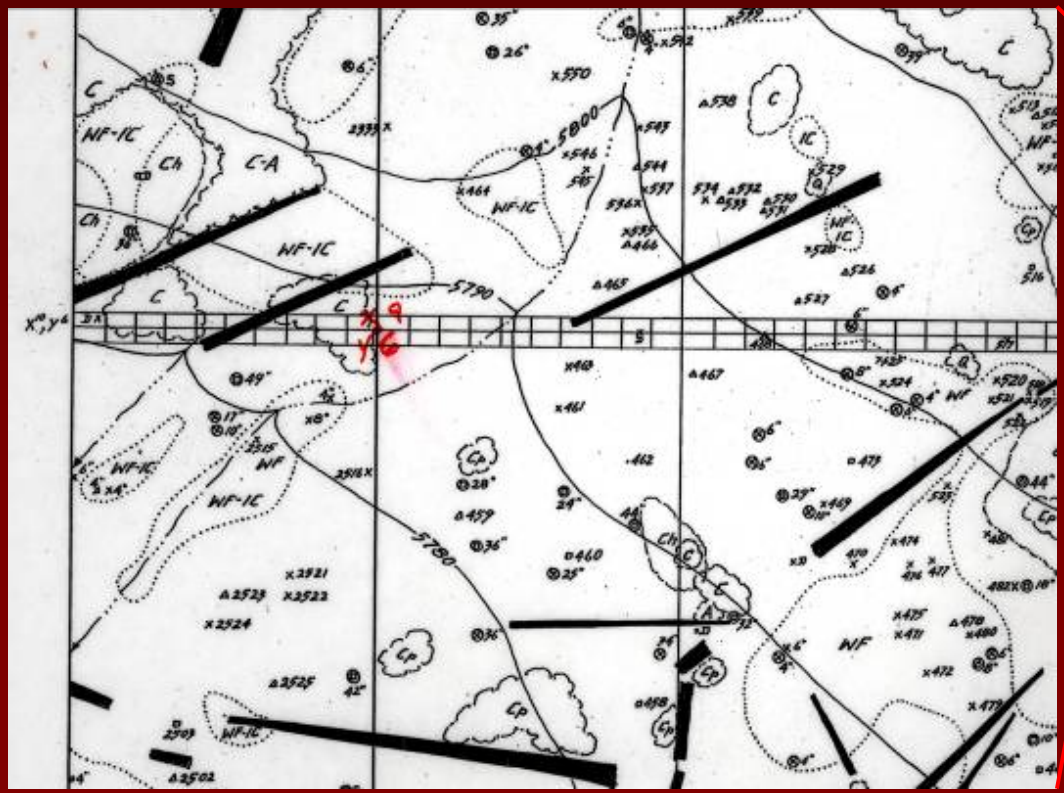
Light economic thin

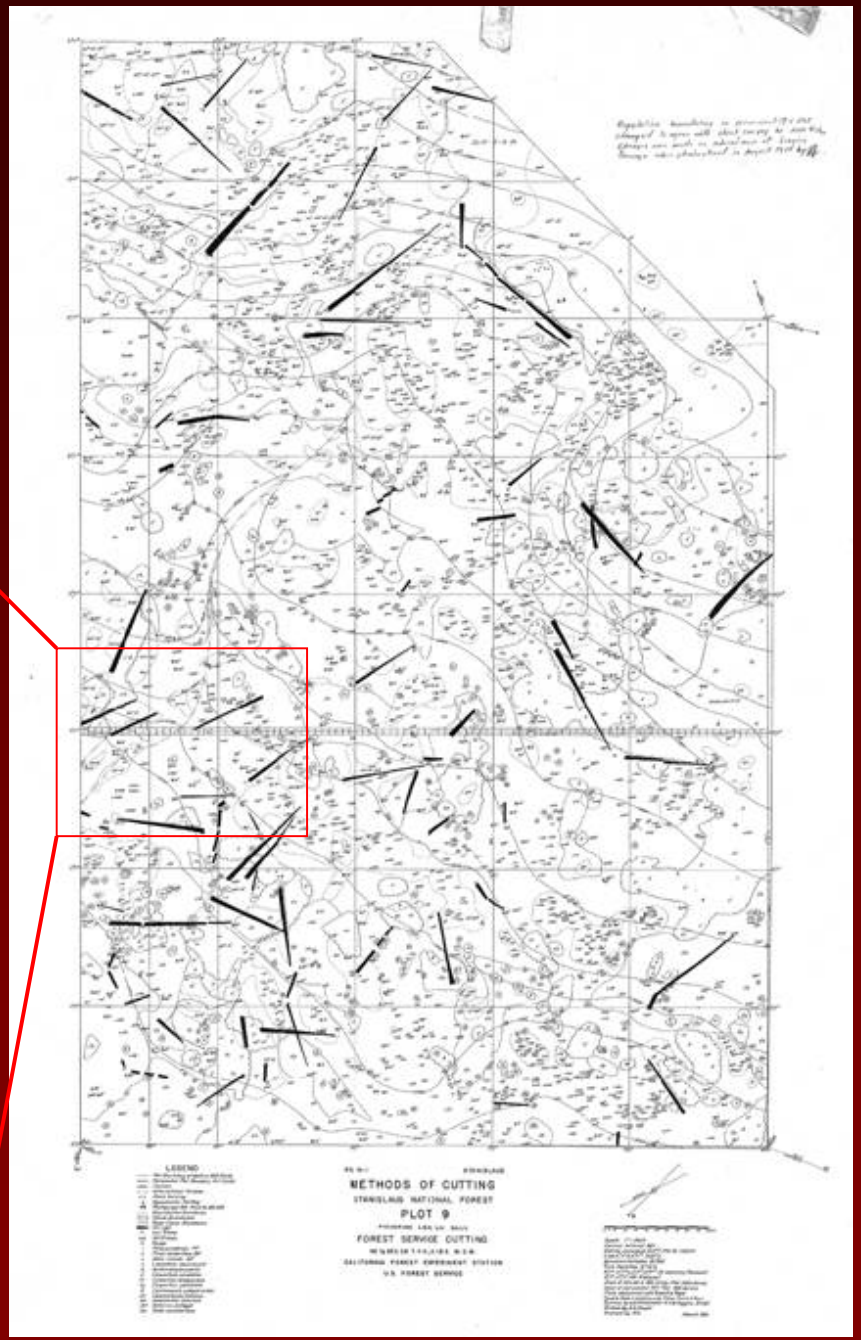
MC9

USFS thin

Stanislaus-Tuolumne Experimental Forest

10 acre stand maps with vegetation transect

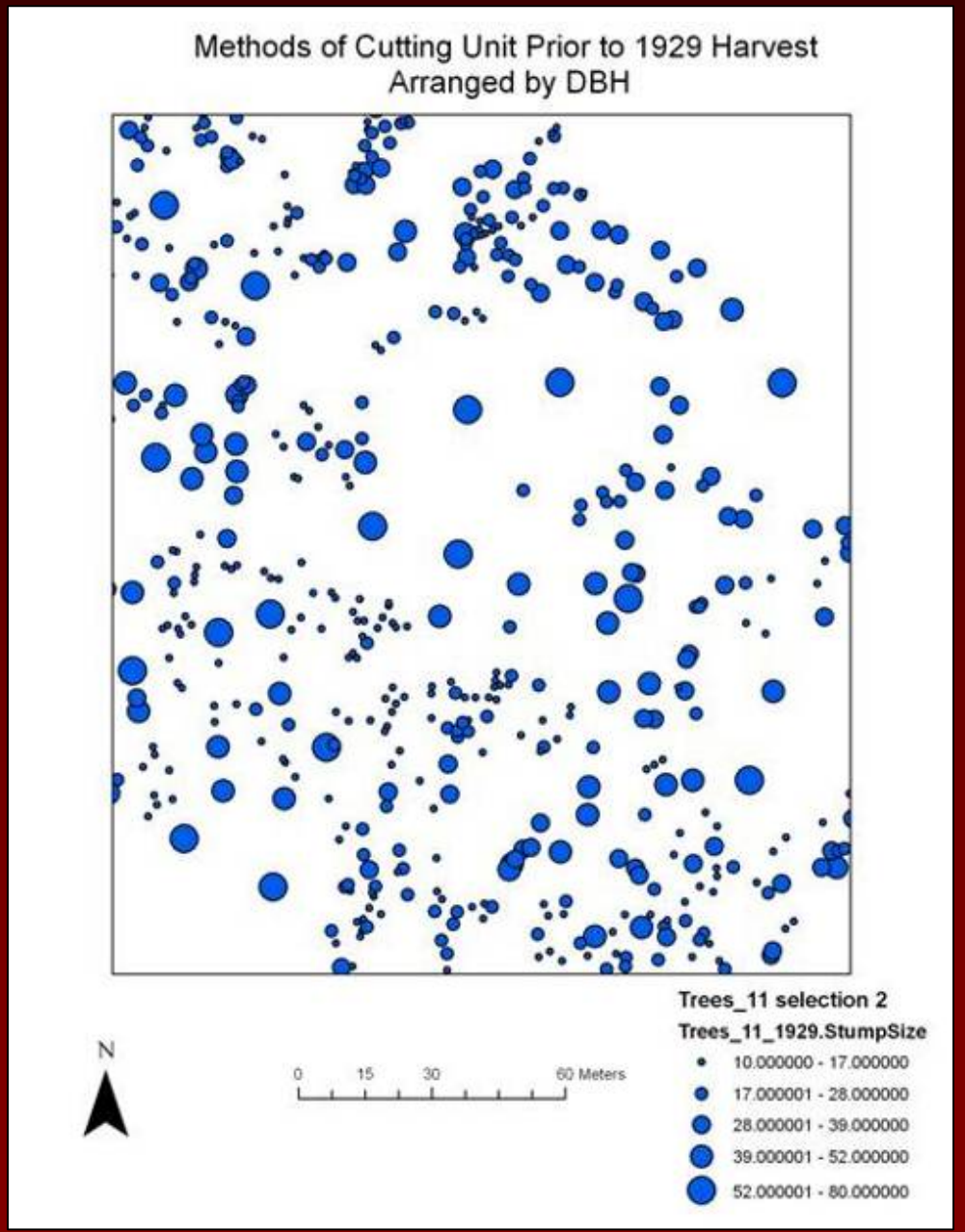




Change in density, basal area, and composition after logging and fire suppression

	1929	2008
Trees/ac *(>11.5 in)*	56	108
Saplings/ac *(4 – 11.5 in)*	86	198
Basal area - ft^2/ac	242	308
% pine	36	20

Change in structural heterogeneity



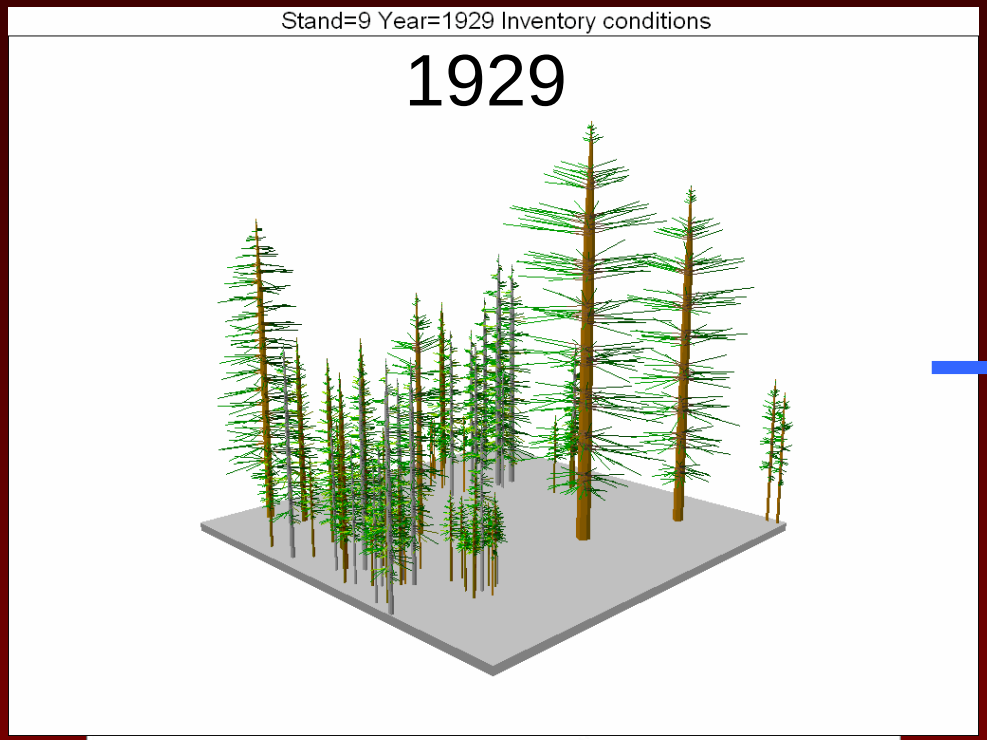
“The virgin forest is uneven-aged, or at best even-aged by small groups, and is patchy and broken; hence it is fairly immune from extensive devastating crown fires.”

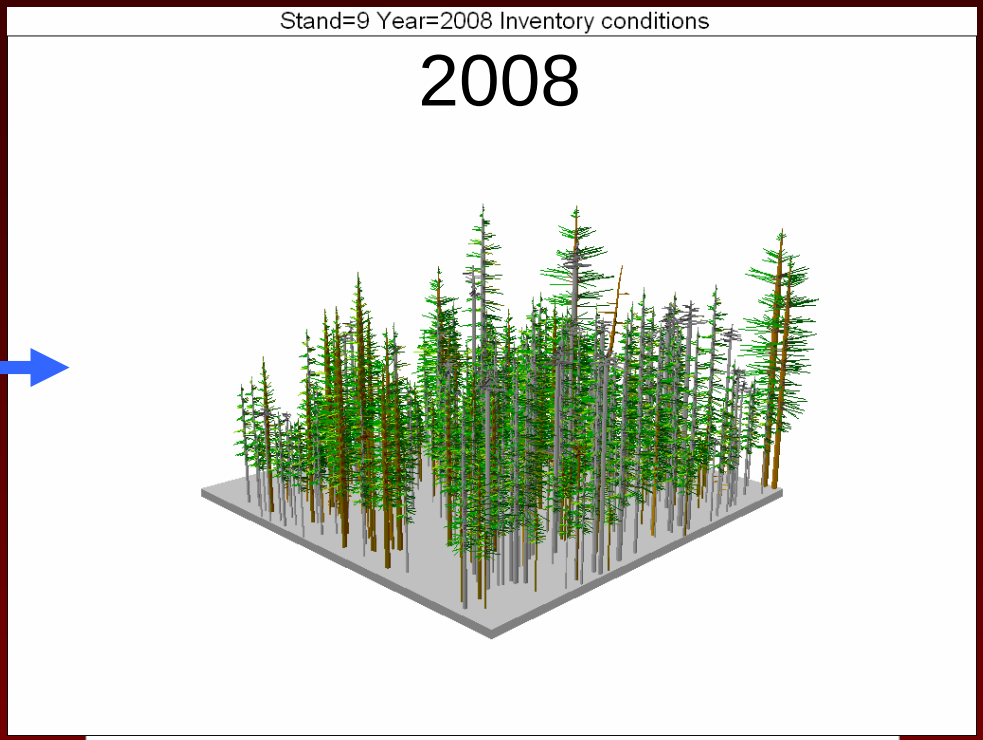
“fire creates a patchy scattered distribution of reproduction”

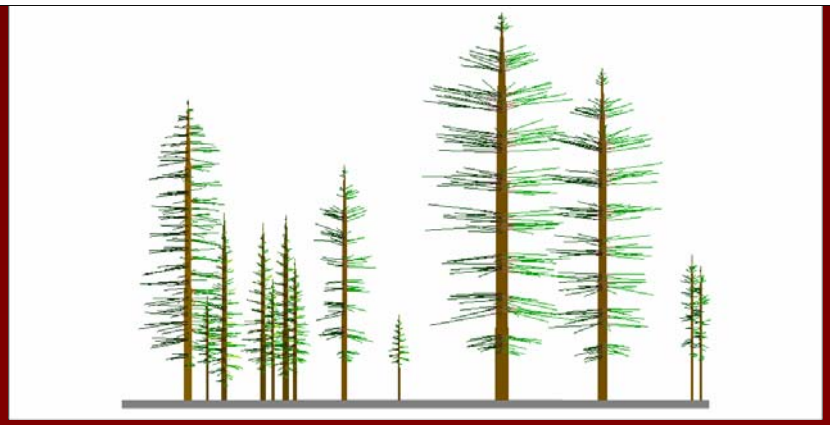
(Show and Kotok 1924)

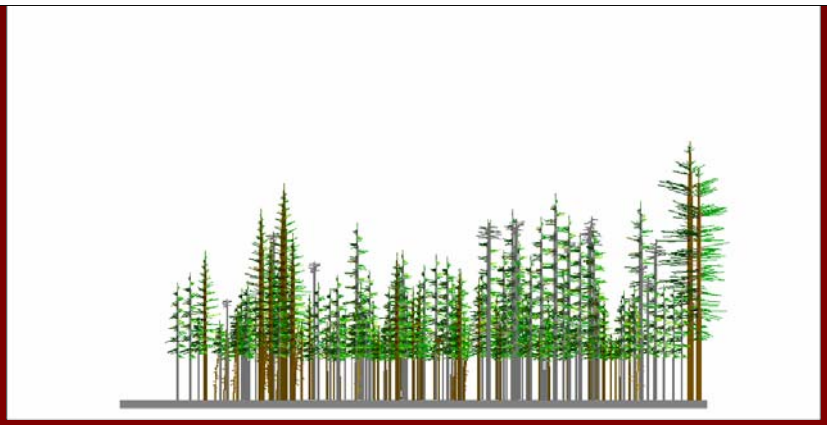
Methods of Cutting Plots, Stanislaus NF - 1929

Spatial structure of stand (trees > 10cm dbh)

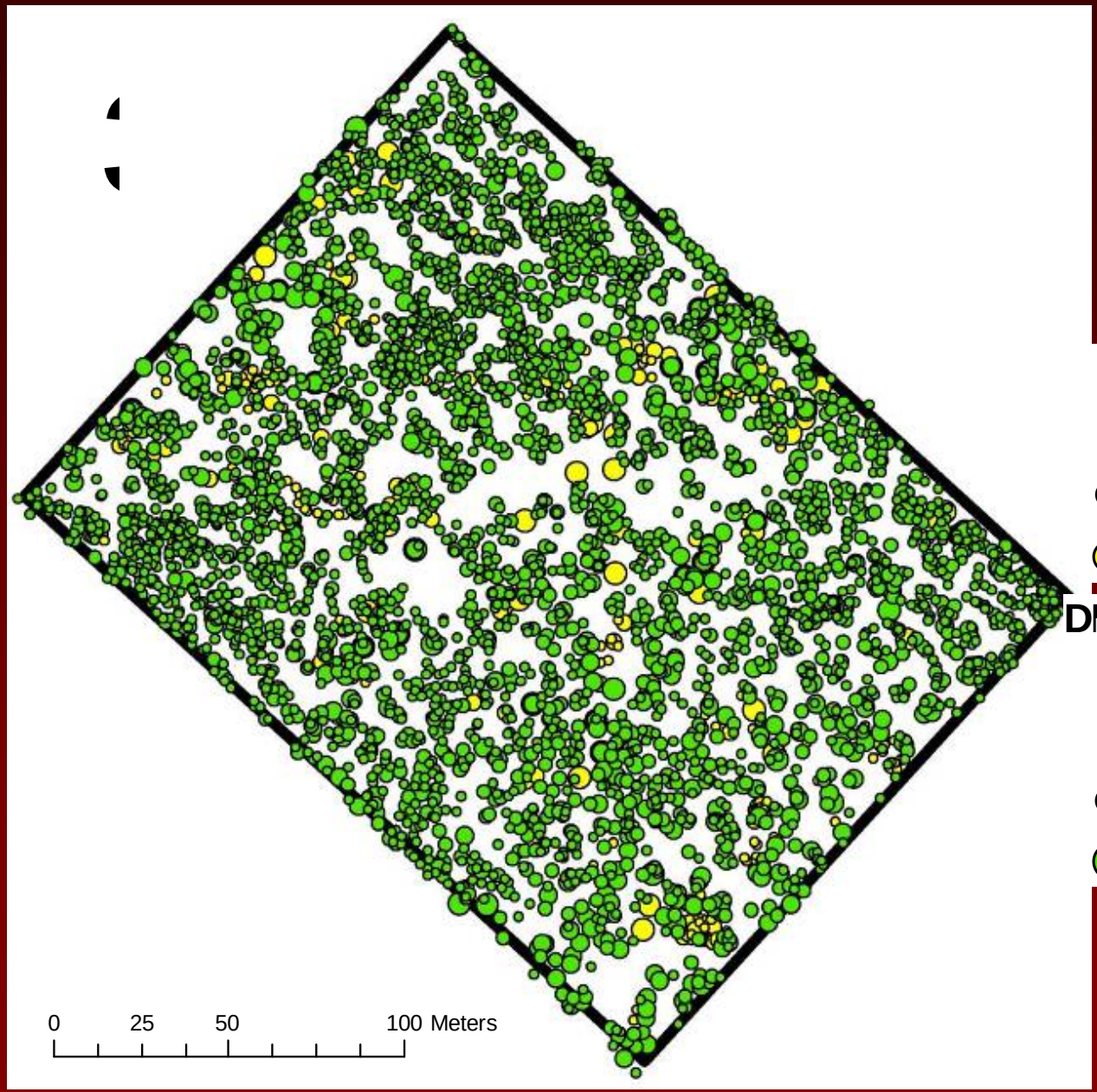








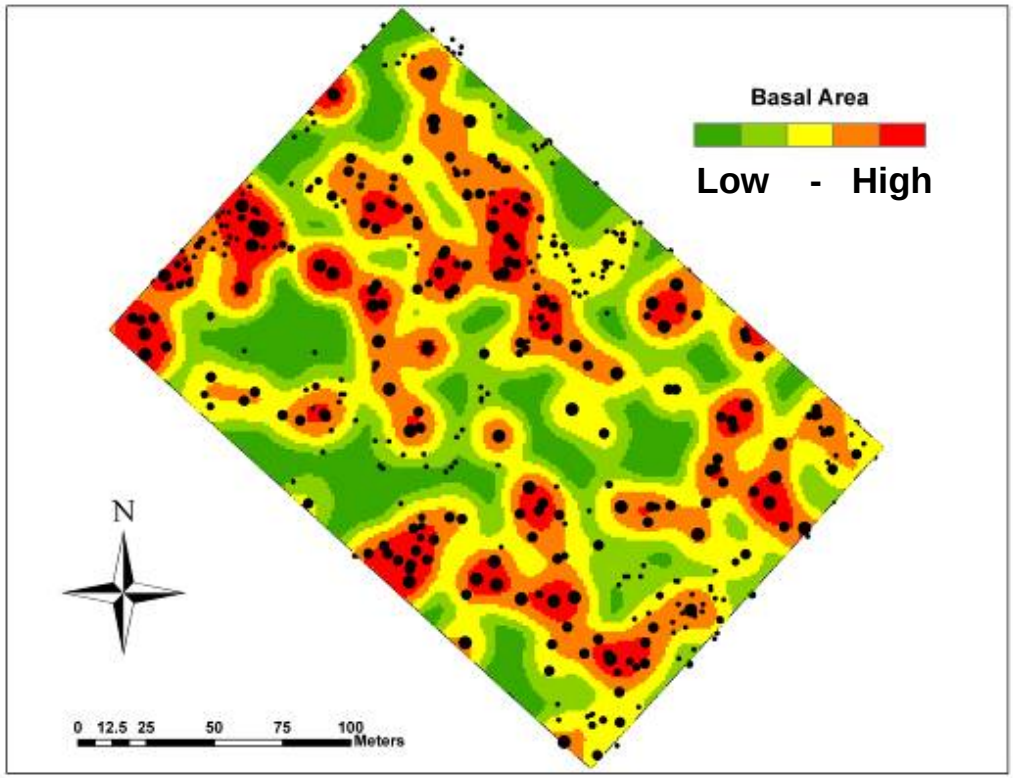
Plot 9 –
USFS thin



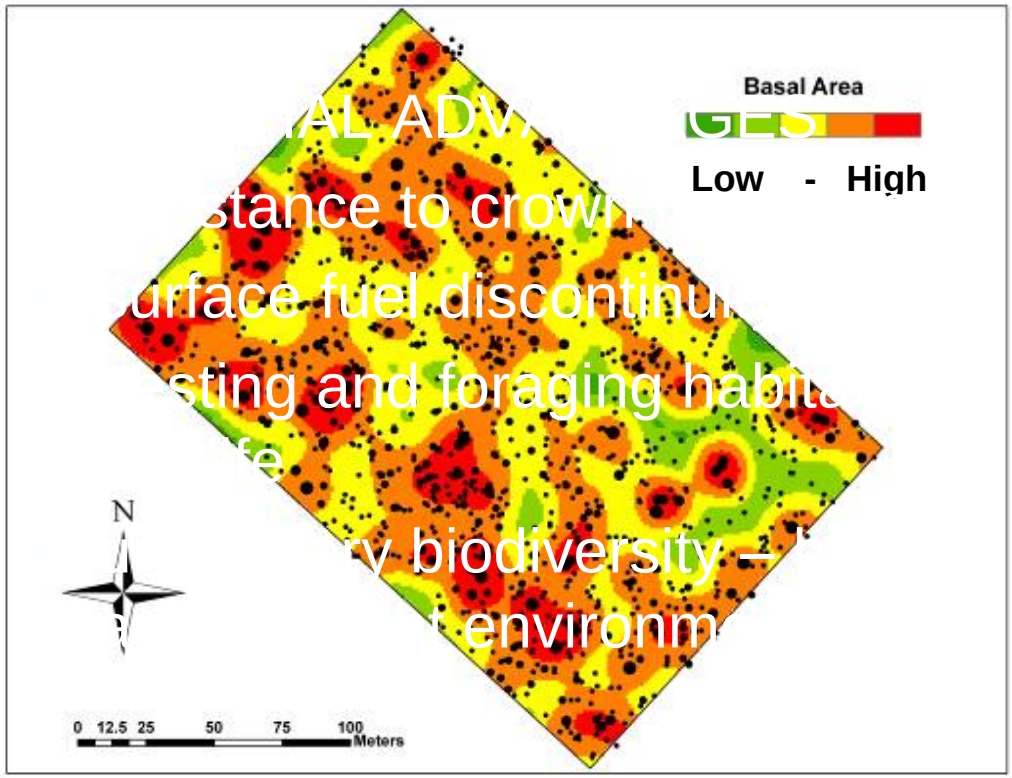
Basal area heterogeneity

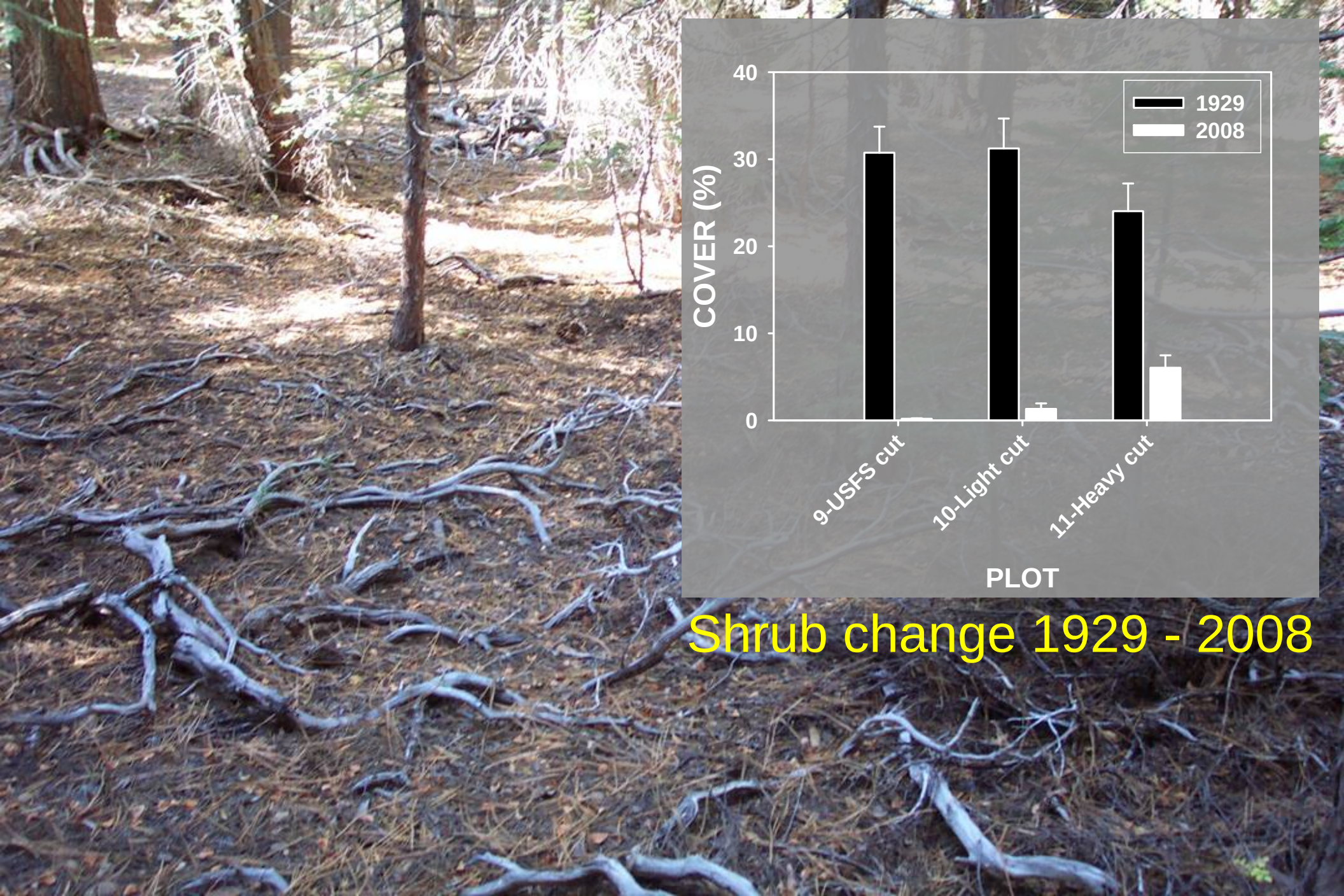
MC Plot 10

1929



2008

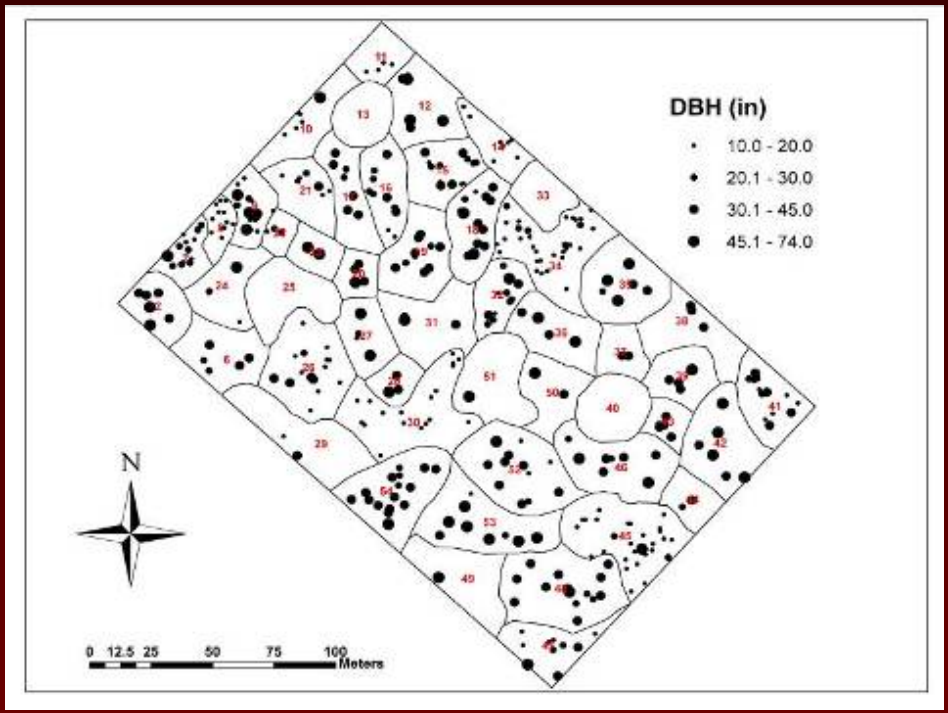


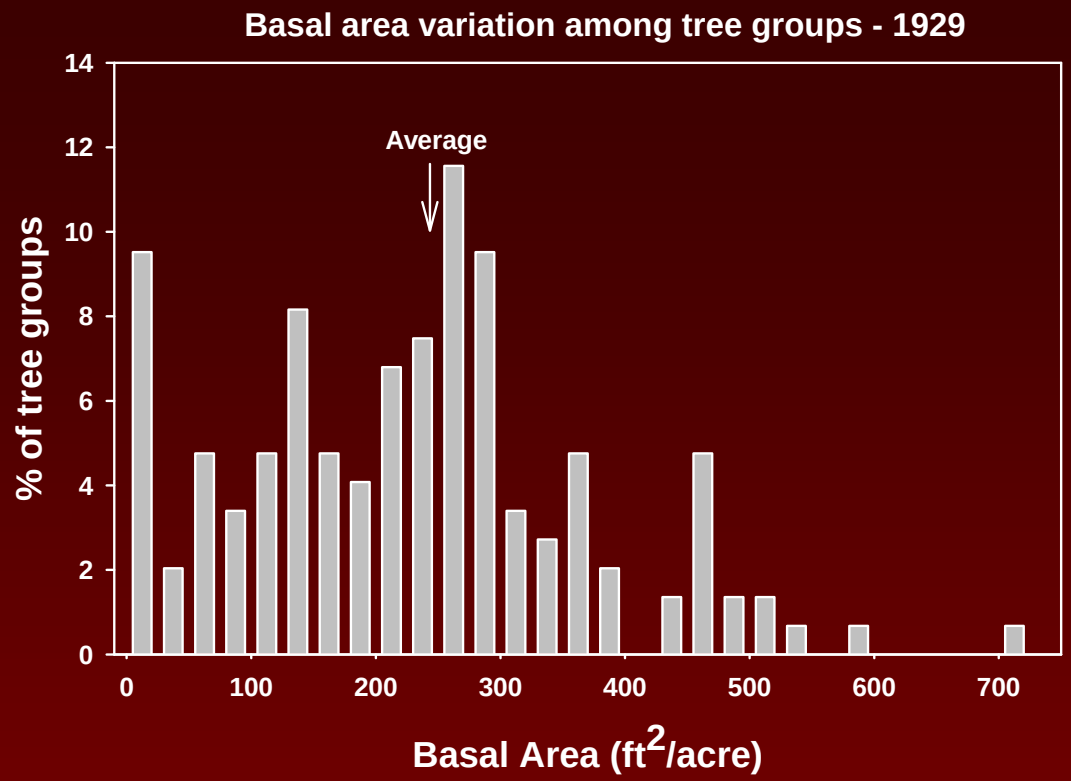


Shrub change 1929 - 2008


Mitigating crown fire hazard:
- Reduce ladder fuels
- Raise height to crown base
- Space crowns of overstory trees
Structure in 1929
242283


Developing prescriptions for restoring complexity





Ideas for generating within stand complexity

- Create gaps & groups
  - Size & number based on historical stand data
- Among group variation
  - Thin to variable basal area/ SDI/ density targets
- Within group variation
  - Retain largest/best trees regardless of crown spacing

Similarities with stand maps for dry forests of the eastern Cascades

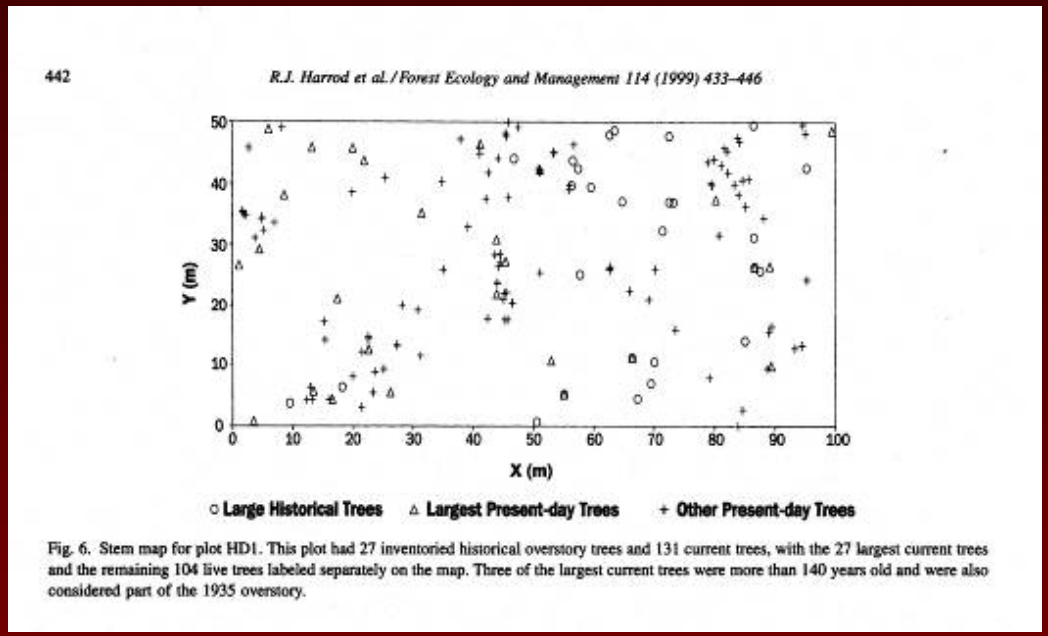
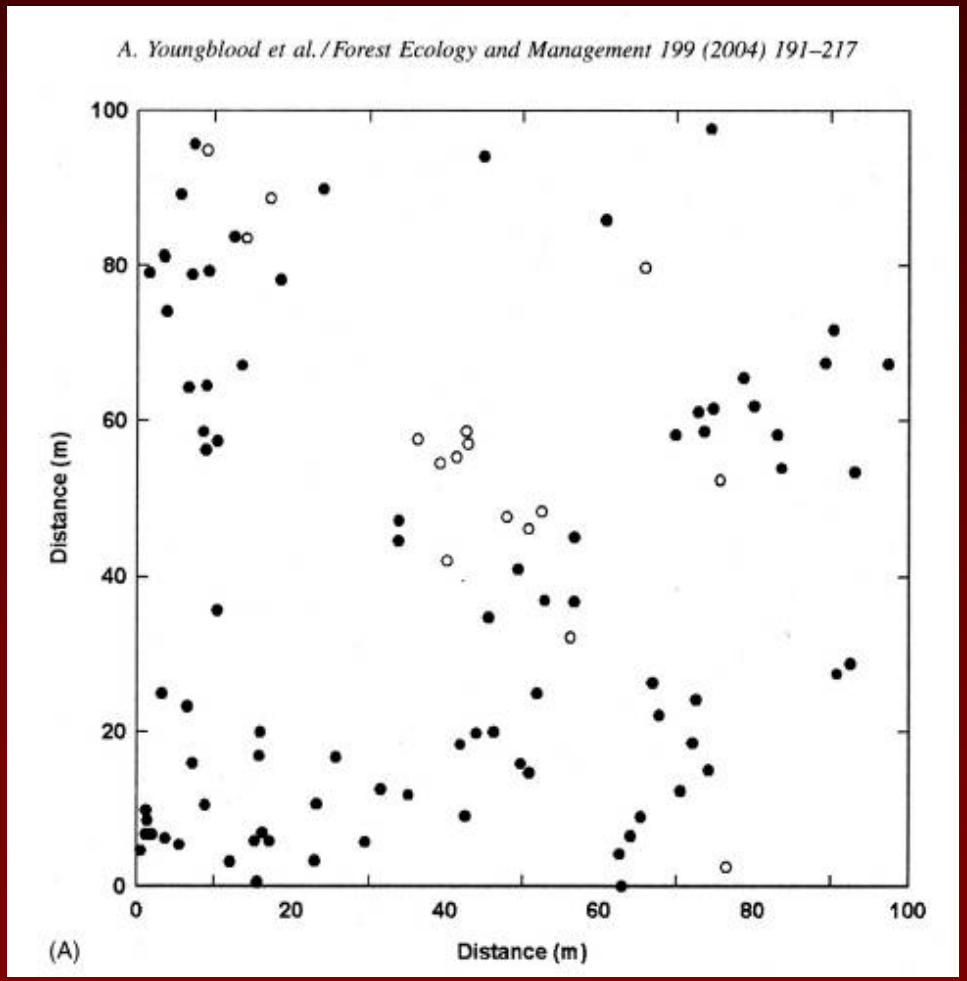


Fig. 6. Stem map for plot HD1. This plot had 27 inventoried historical overstory trees and 131 current trees, with the 27 largest current trees and the remaining 104 live trees labeled separately on the map. Three of the largest current trees were more than 140 years old and were also considered part of the 1935 overstory.

Wenatchee NF, WA
Harrod *et al. 1999*



Metolius Research Natural Area, OR
Youngblood et al. 2004

Group size in historical old-growth forests with history of frequent fire

Group size (acres)				
Low	Ave	High	***Location***	***Author***
0.08	0.22	0.51	Mixed conifer, CA	Stanislaus MC plots – this study
0.012	0.17	0.49	Ponderosa pine, WA	Harrod et al. 1999
	0.11		Ponderosa pine, OR & CA	Youngblood et al. 2004
0.15	0.20	0.32	SW ponderosa pine, AZ	Cooper 1961, 1962
0.05	0.25	0.72	SW ponderosa pine, AZ	White 1985
0.08	0.20	0.40	Sequoia/ mixed conifer, CA	Bonnickson and Stone 1981, 1982

Beaver Creek Pinery, Lassen NF, CA

- burned 5 times since 1900
- last fire in 1994
- highly heterogeneous with group & gap structure