Perpetuating Variable Density Forest Structure

The path to perpetuating variable density forest structure

Heterogeneity of the Early Sierran Forests

Pre- Europian contact:

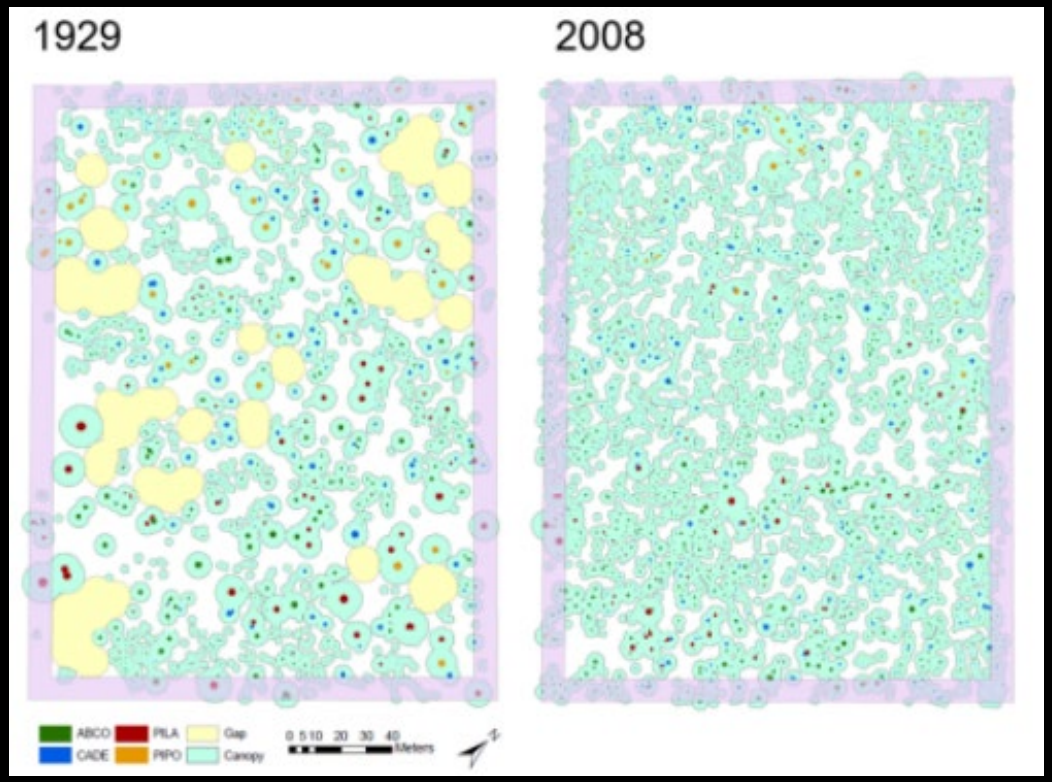
- Evidence of groups of trees, large individuals, small gaps

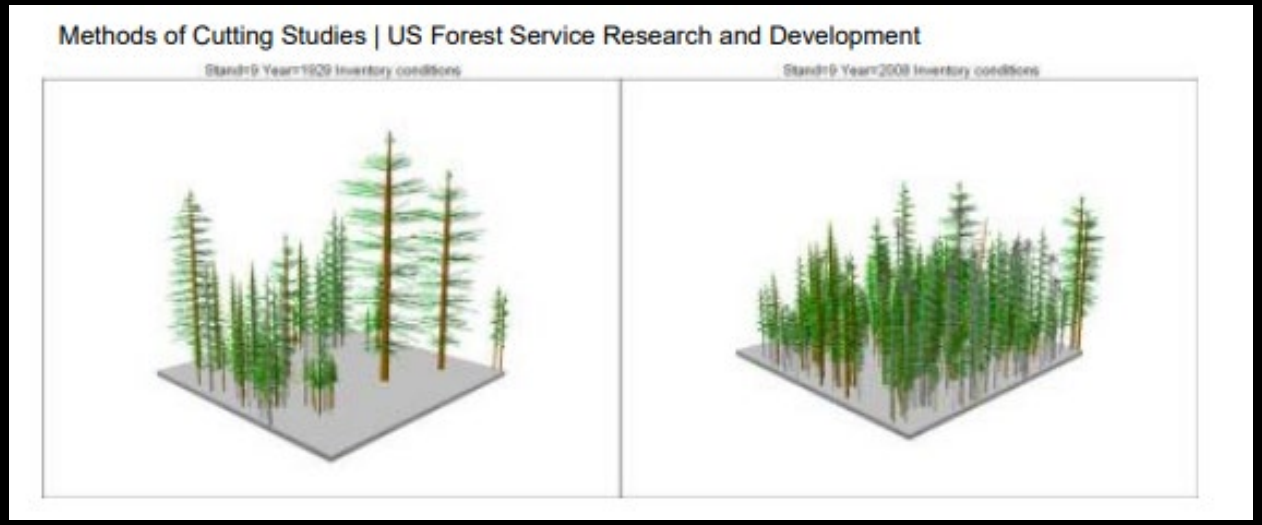
1929 (Duncan Dunning Study)

- Pine trees made up 37% of BA
- Understory covered 25% of forest floor

80 years later

- Tree Density = x2.4 greater
- Pines make up 21% of BA
- Understory shrubs “disappear” (grew into trees)

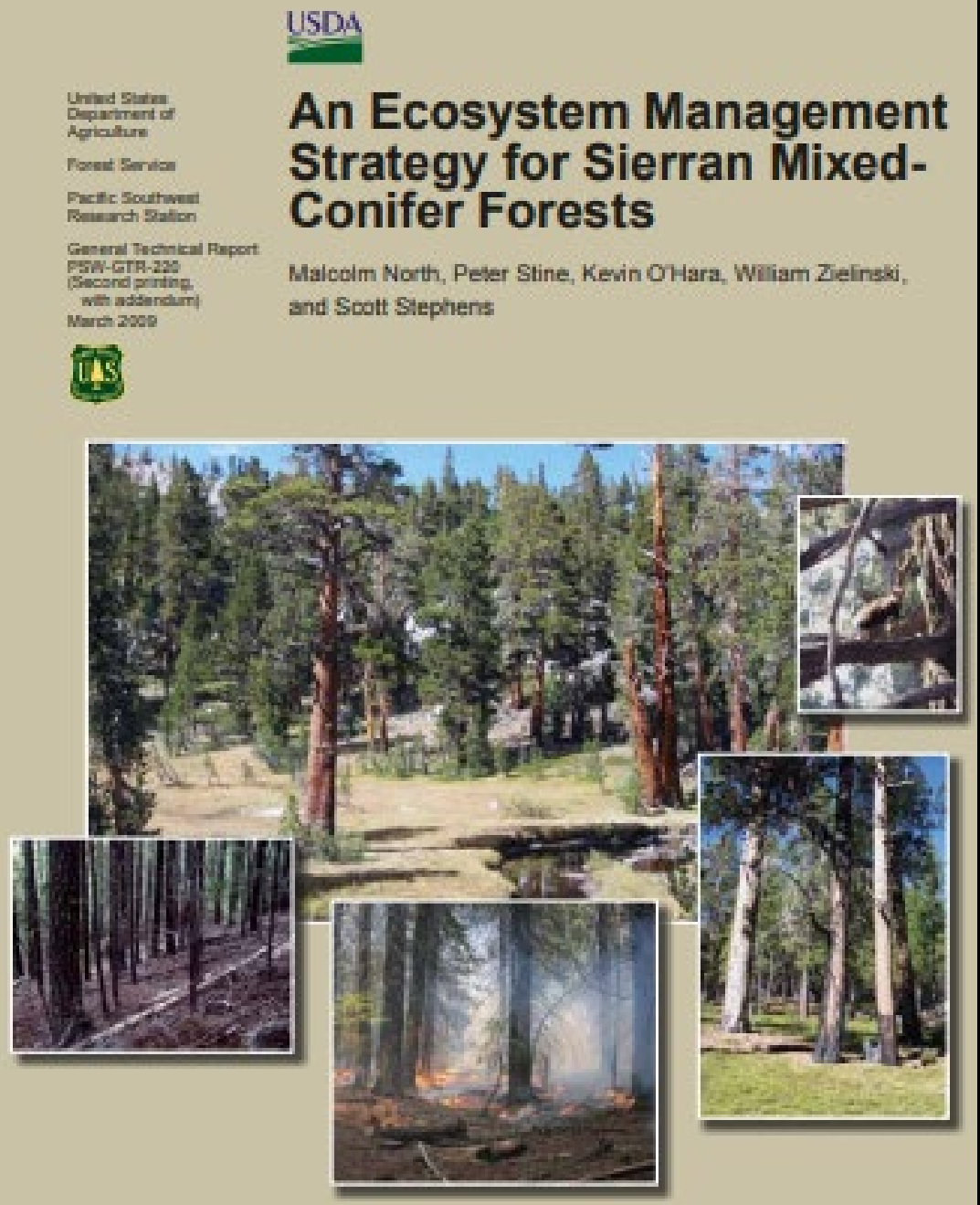




Duncan Dunning and the STEF

"to determine the growth rate and net growth of the residual stand after a heavy Forest Service cutting in an all-aged forest of the sugar pine-white fir [species]" -

"One object of [his] experiment is to determine whether the proportion of sugar pine can be increased in a stand where the natural replacement by white fir is in progress" -



Value of Current Forest Research and Reporting

The Variable Density Thinning Study

Objectives, Reasoning, and Data

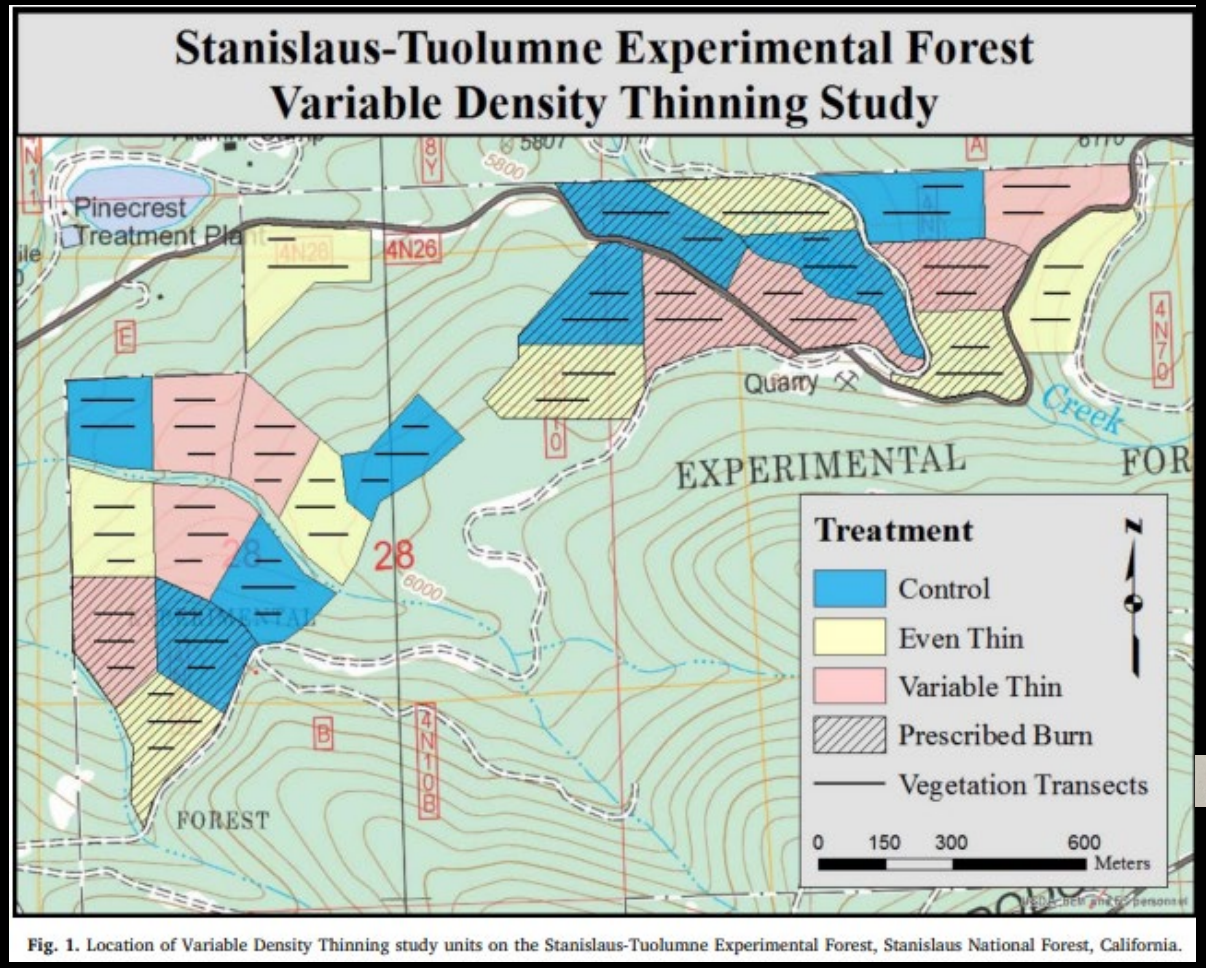
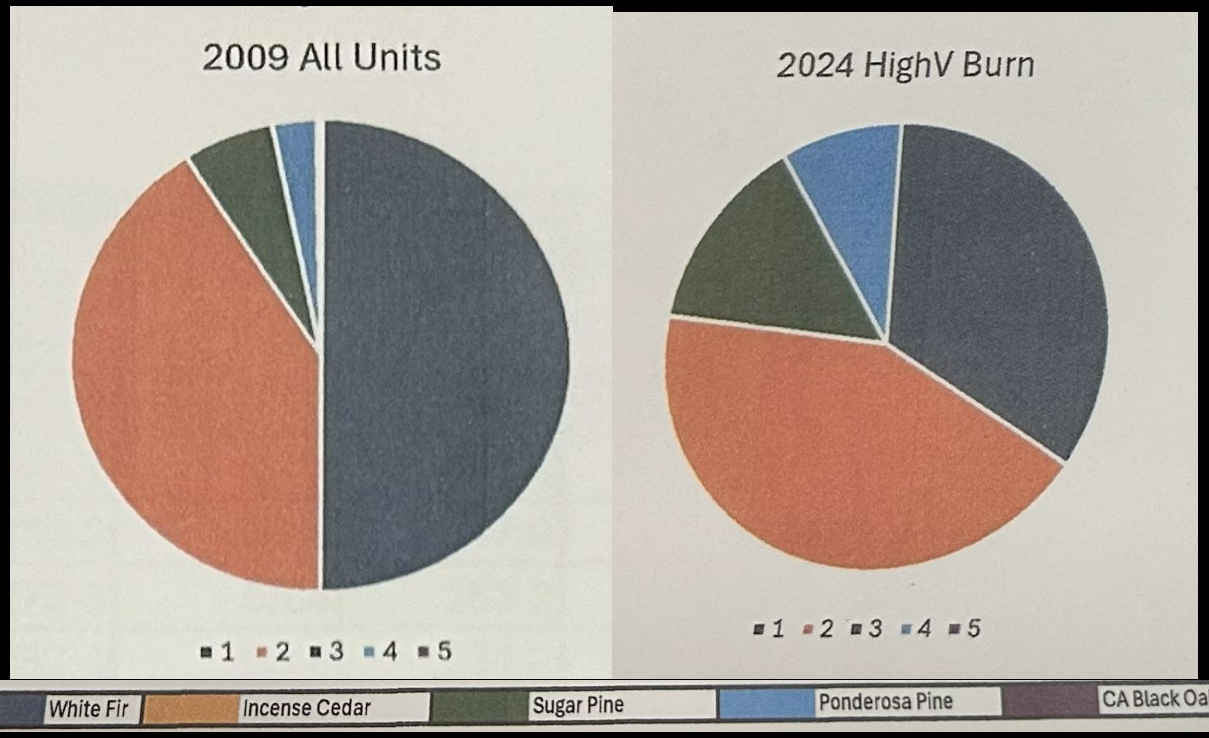


Fig. 1. Location of Variable Density Thinning study units on the Stanislaus-Tuolumne Experimental Forest, Stanislaus National Forest, California.

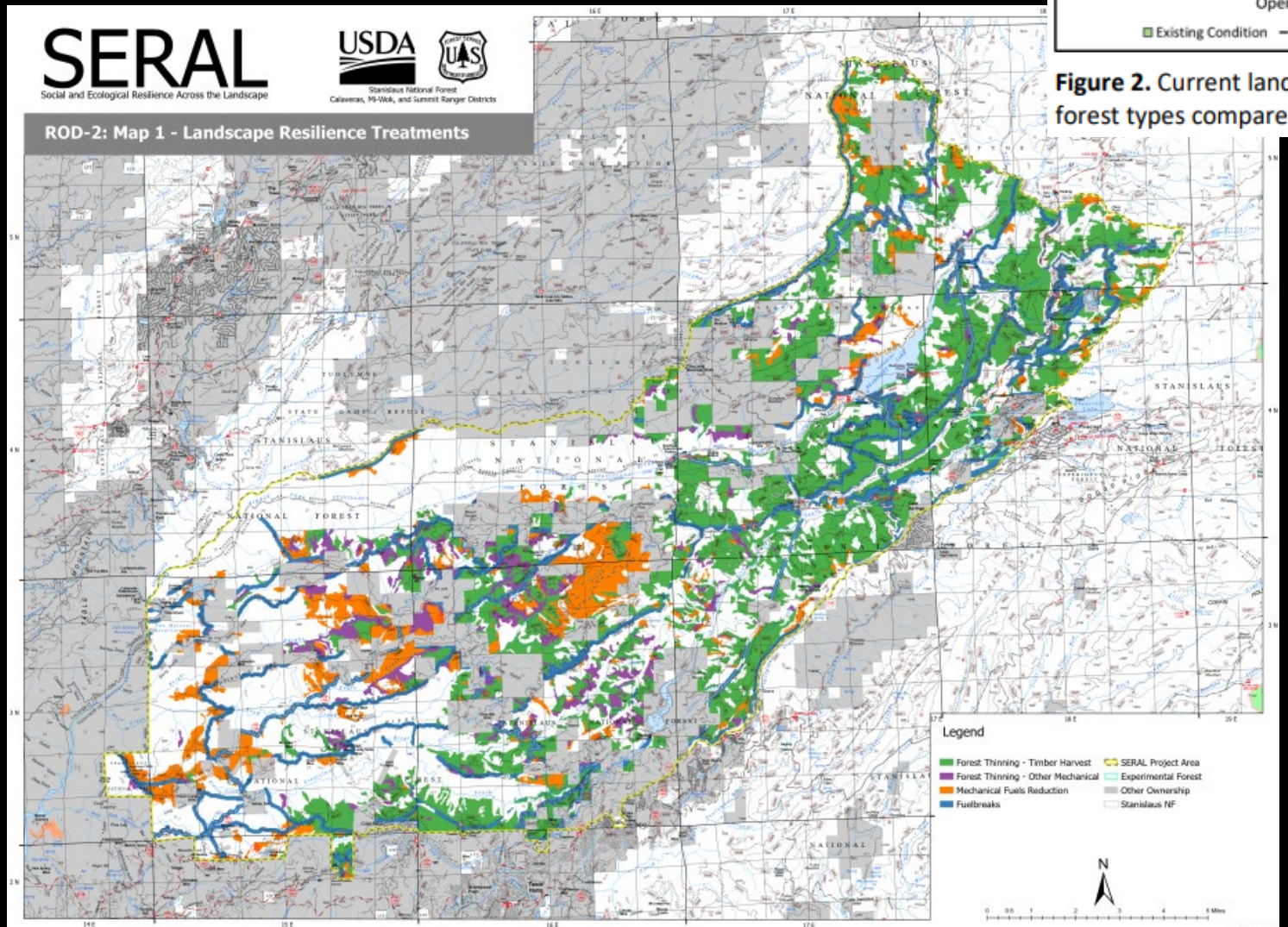


Which treatment would best perpetuate complex forest structure?

Best solution: High Variable Burn

- Positive Response
- Data from the past
- Look towards the future

What is SEREAL?



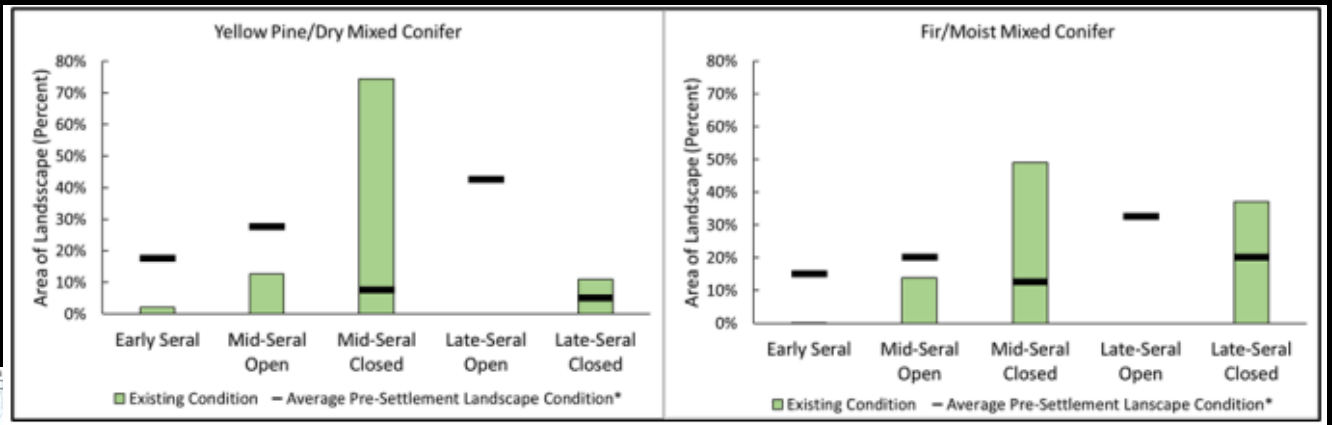


Figure 2. Current landscape structure of Yellow Pine/Dry Mixed Conifer and Fir/Moist Mixed Conifer forest types compared to historic conditions.

I N T E N T I O N S :

To mimic Eric Knapp's experiments in 2009, which put into practice the concepts and ideas proposed by Malcolm North and his GTR in 2007

How was research applied to SEREAL?

How did the past influence the design of variable density treatments?

Malcom North & GTR 220 (2007)	Eric Knapp & STEF (2009)	SERAL in 2020
Kickstarted the concept of increasing heterogeneity and resilience of a forest alongside natural regeneration and species comp	First application of Malcom North's ideas because the concepts thereof had not yet been supported by real-life data	A new project by the USFS to increase forest heterogeneity within and between stands using variable density thinning, prioritizing remaining pines (similar to Knapp's approach to research)
NO data to support claims	As an experiment, data was collected without regard to the 30'' diameter limit rule and proving the relevance of North's conclusions	Work began in 2023 and continues today…

Our plan for perpetuating treated SEREAL units!

What S E R A L accomplished:

- Proved that all experimented strategies had notable benefits
- External factors (like drought) inhibited the full effectiveness of just one solution

Forest Stand Eval every **5 years**

- "Casual" drive-by's
- Find precedent for prescribed fire treatment
- If the area can sustain a low-intensity prescribed burn, "torch it"

High Variable Thinning

- Carry out every **20 years**

Barriers for Implementing the Plan

Future barriers:

- 30” DBH Mandate
- Rules around Prescribed Burns
  - Cost
  - Crews
  - Timing
  - Size

Solutions for implementing plan

Jerry Jensen
"Policies today will change in the future depending on the needs and wants of the public – diameter limits will be changed and adapted."

Future barriers:
- Size
- 30" DBH Mandate
- Rules around Prescribed Burns
  - Cost
  - Crews
  - Timing

Jacob Baker
"You're not going to go out and evaluate 100,000 acres."

Eric Daniels
"Crews are going to need housing, food, transportation."

"How are you going to house in SNF? You're going to need a camp."

Eric Daniels
"I can get a contract crew out for $5,000/day"

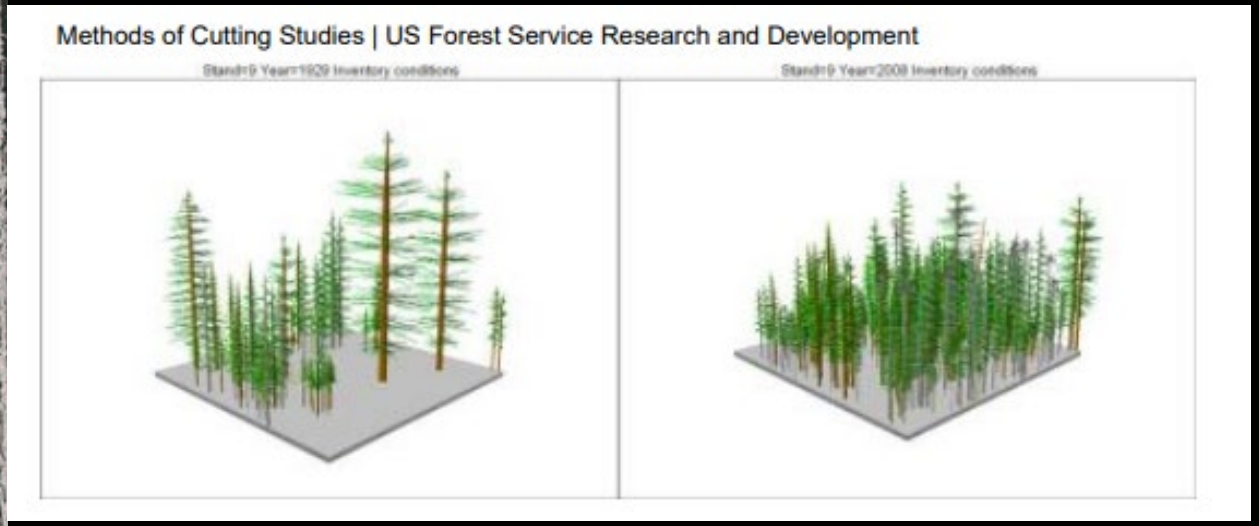
"A local crew will be much less expensive"

Eric Daniels
"Burning green vegetation is not cost effective"

"We're going to have to wait 2-3 years before we can go in and put a torch on the ground"

Conclusion


A


Methods of Cutting Studies | US Forest Service Research and Development
Stand=9 Year=1929 Inventory conditions
Stand=9 Year=2008 Inventory conditions

THANK YOU!!!