Forest Simulation
Angora Fire: What will the Future Forest Be?

Lake Tahoe Community College
November 3, 2007

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Presentation Goals

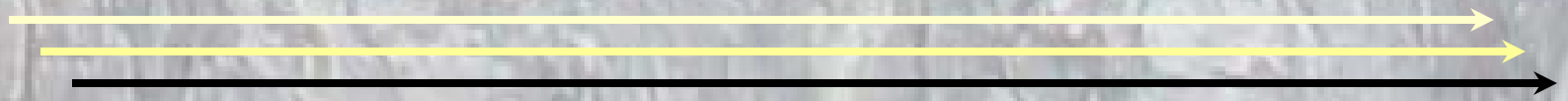
- Present Forest Modeling and Simulation
- Develop basic understanding of Forest Modeling and Simulation
- Present 2 modeled management scenarios

Granite Burn Area, Stanislaus NF, Groveland RD ca. 1974

Granite Burn Area, Stanislaus NF, Groveland RD ca. 2007

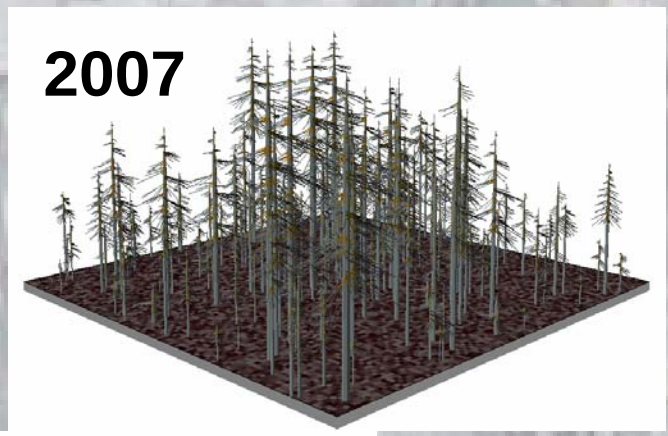
Dynamic Forests

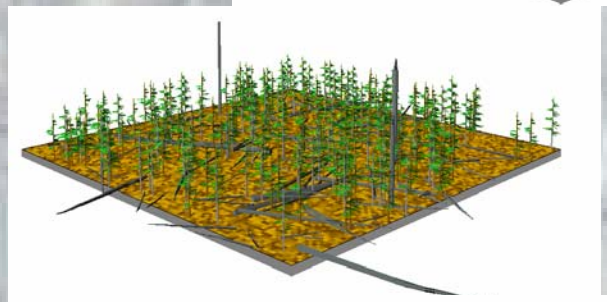
To understand Forest Change: A Mathematical Model

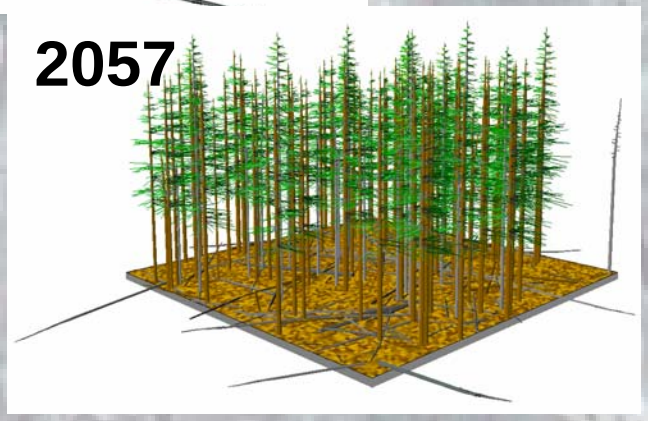


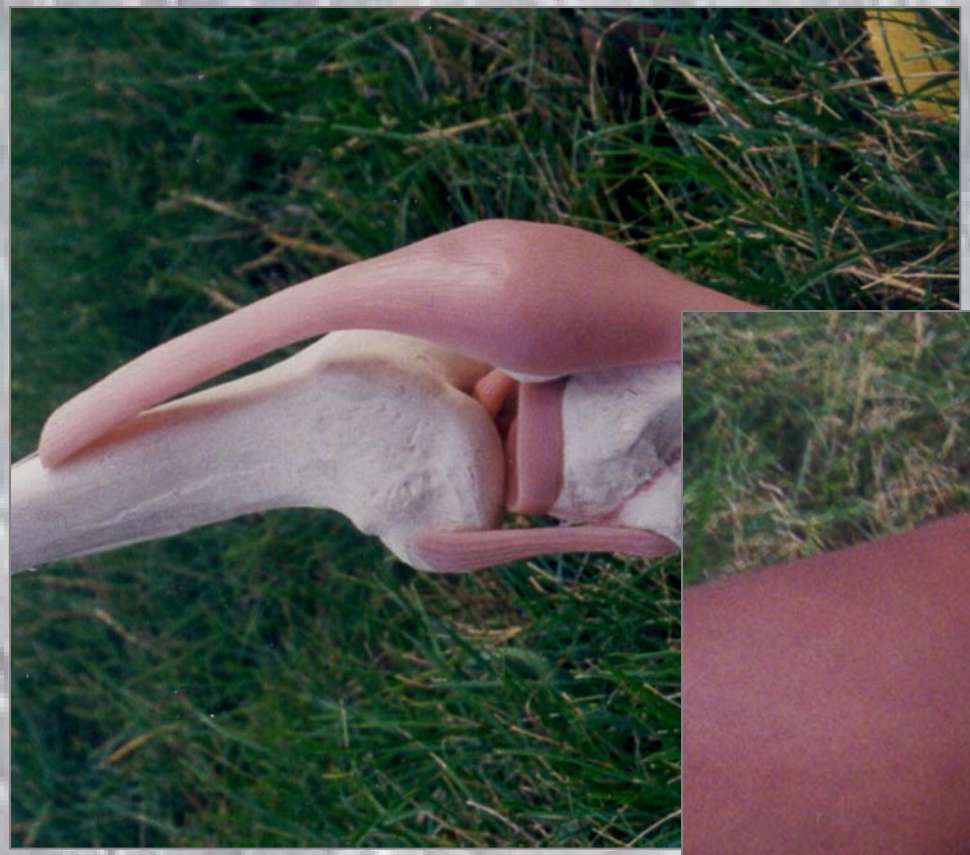
"Forest Vegetation Simulator" Forest succession, restoration, regeneration

Modeling & Visualization







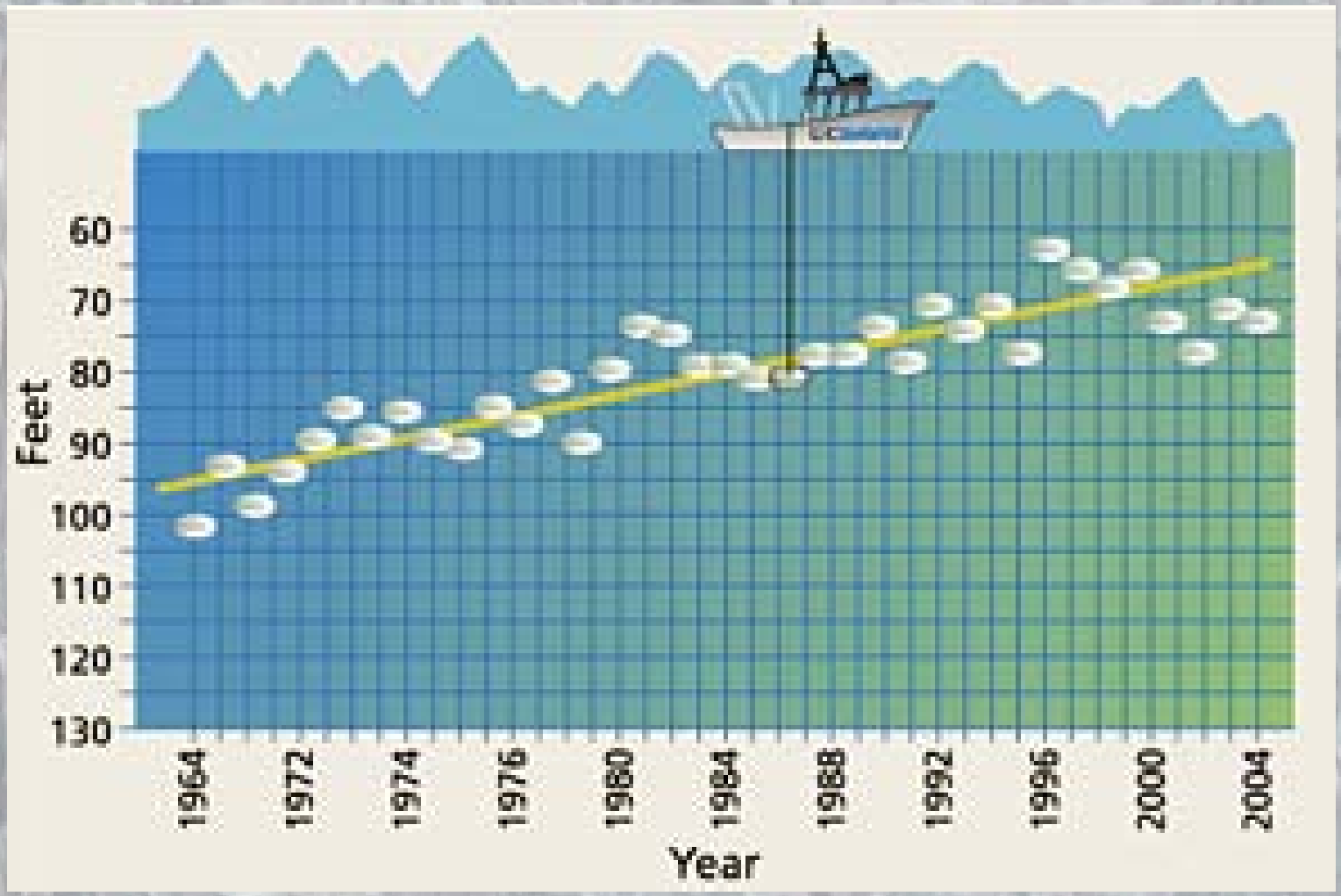


Models help us understand… and forecast

Mathematical model:

- Use data to find patterns from the past
- Understand the present
- Predict the future

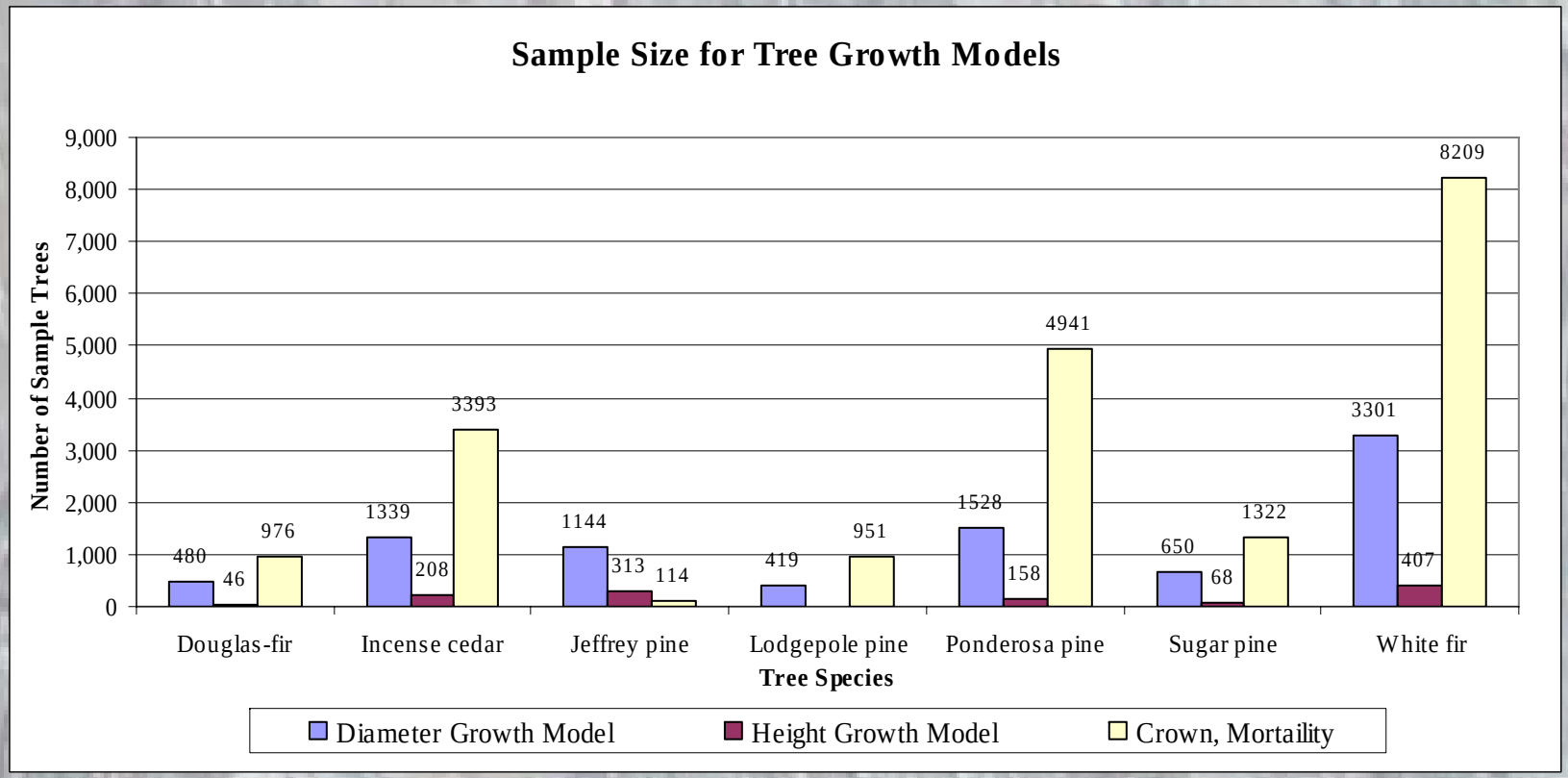
Lake Tahoe


Feet
60
70
80
90
100
110
120
130
1964
1972
1974
1976
1980
1984
1988
1992
1996
2000
2004
Year

Forest Vegetation Simulator (FVS)

- Model used to predict forest stand dynamics
- Individual tree, distance independent growth and yield model
- Standard model used by USFS, BLM, BIA, state agencies and others
- FVS used to summarize current forest conditions and to predict future forest conditions under various management alternatives
- Used for timber management as well as wildlife habitat suitability assessment and prediction, fire hazard and loss modeling.

Sample Trees for Model Equations

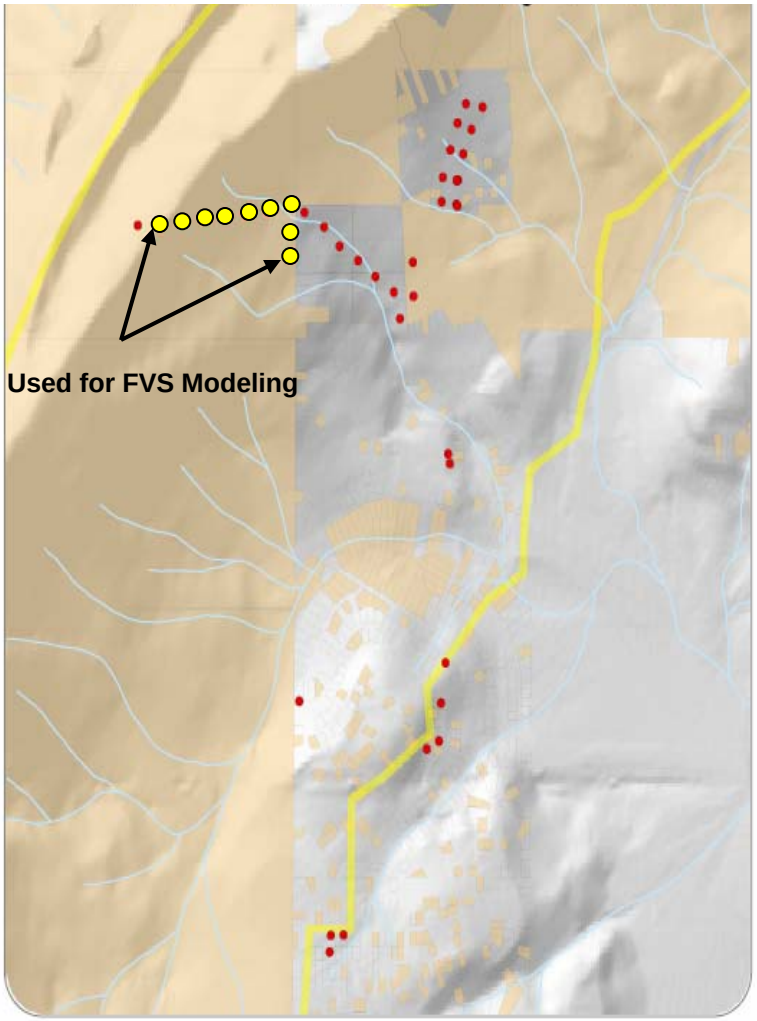


Scenarios

Stanislaus NF, Groveland RD, Cherry Lake

It’s a matter of choice, resources & time

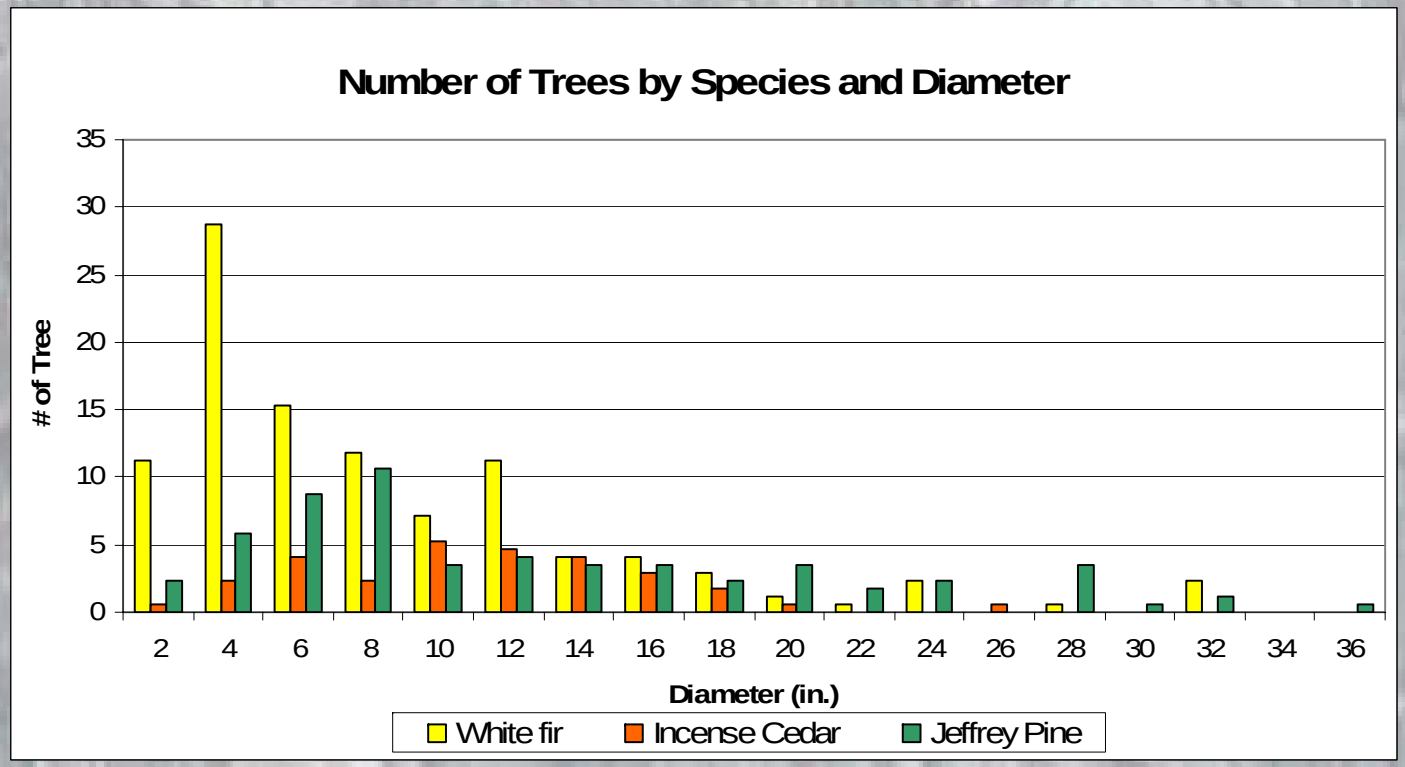
Apply FVS to Monitoring Plots



Stand Description

9 – 1/10 acre plots

YEAR	Trees per acre	Basal Area per acre	Crown Competition Factor	Top Ht. (ft)	Quadratic Mean Dia. (in.)	Total Volume (cf)	Merch. Volume (cf)	Merch. Volume (bf)
2007	191	158	57	75	12.3	3,779	3,259	17,647



Modeled Scenarios

No salvage with regeneration (artificial & natural) and control of shrub competition

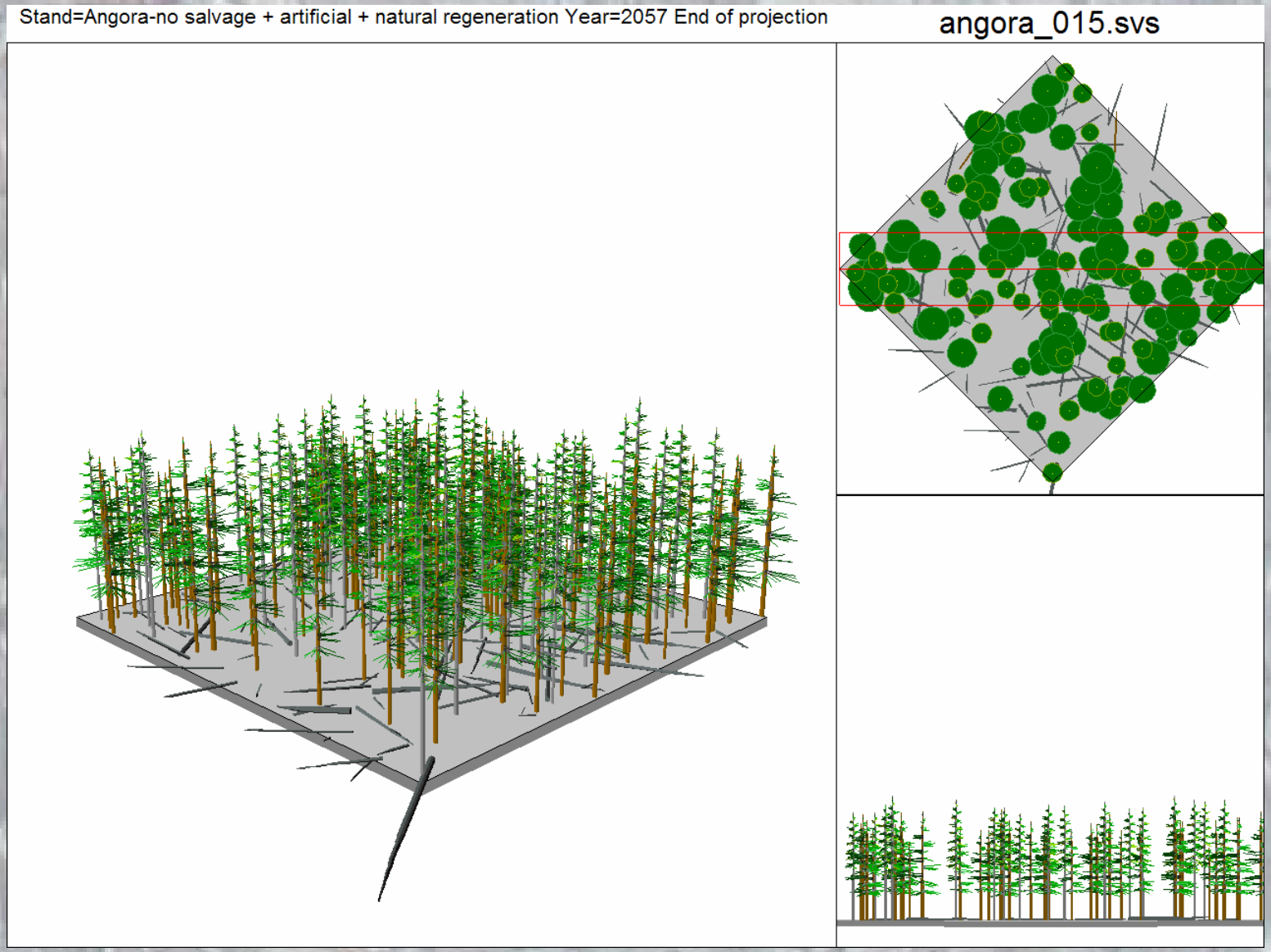
Salvage with regeneration (artificial & natural) and control of shrub competition

Model Parameters

No salvage with artificial & natural regeneration

- Fire Conditions
  - Very dry, 82 deg. F, 100% of stand burned
  - Fuel model- 10 (timber and litter)
  - Flame length = 50 ft.
  - Percent crowning = 100
  - Scorch height = 25
- Regeneration
  - Plant Jeffrey pine 135 trees per acre (18 ft. spacing)
  - Survival = 80%
  - Natural Regeneration
    - White fir 100 per acre, 50 survival
  - Regeneration is free to grow (no brush competition)

No Salvage Harvest + Regeneration (artificial & natural)



Model Parameters

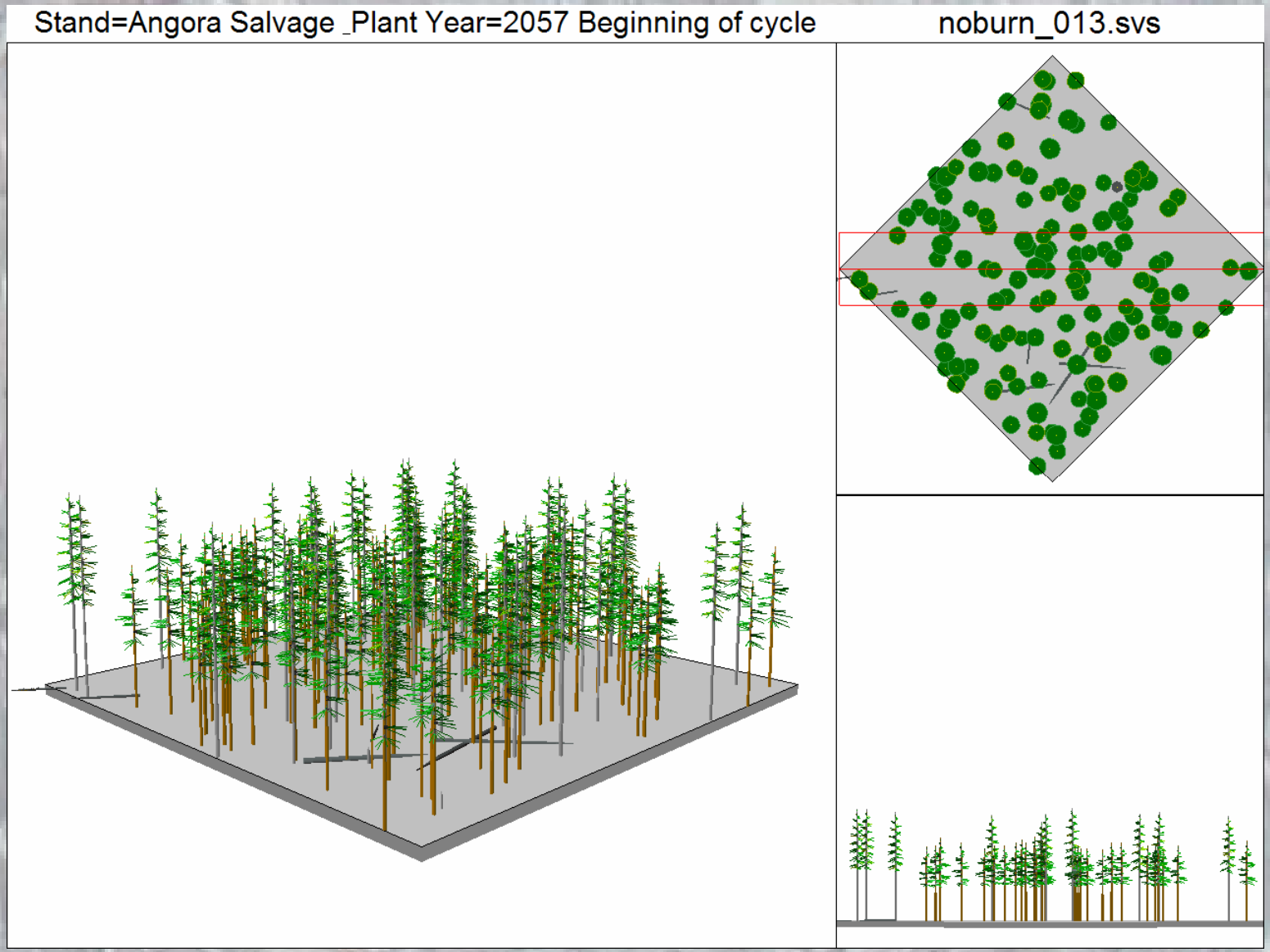
Salvage harvest with artificial & natural regeneration

- Harvest
  - Remove
- Regeneration
  - Plant Jeffrey pine 135 trees per acre (18 ft. spacing)
  - Survival = 80%
  - Natural Regeneration
    - White fir 100 per acre, 50 survival
  - Regeneration is free to grow (no brush competition)

Model Limitations

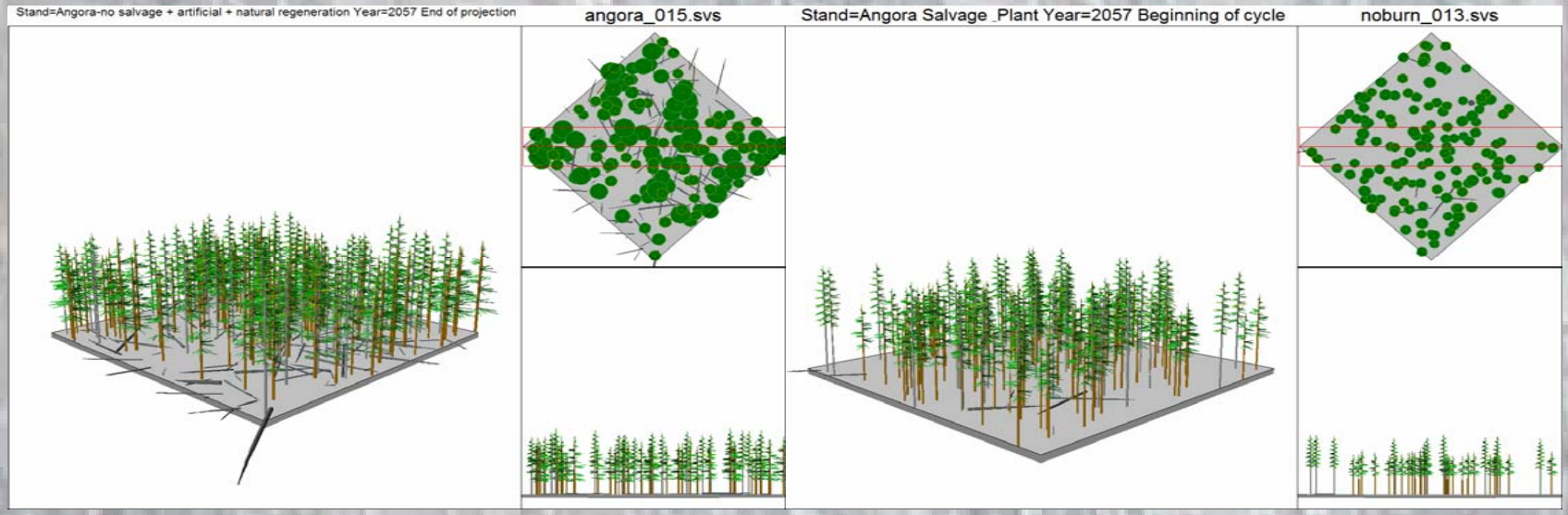
- Not able to conduct salvage harvest of burned trees

Salvage Harvest + Regeneration (artificial & natural)



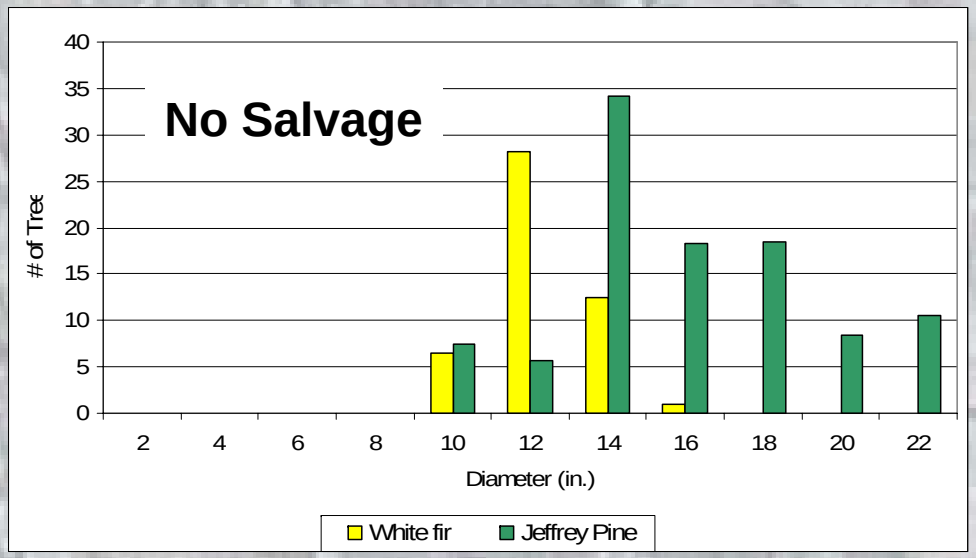
No Salvage

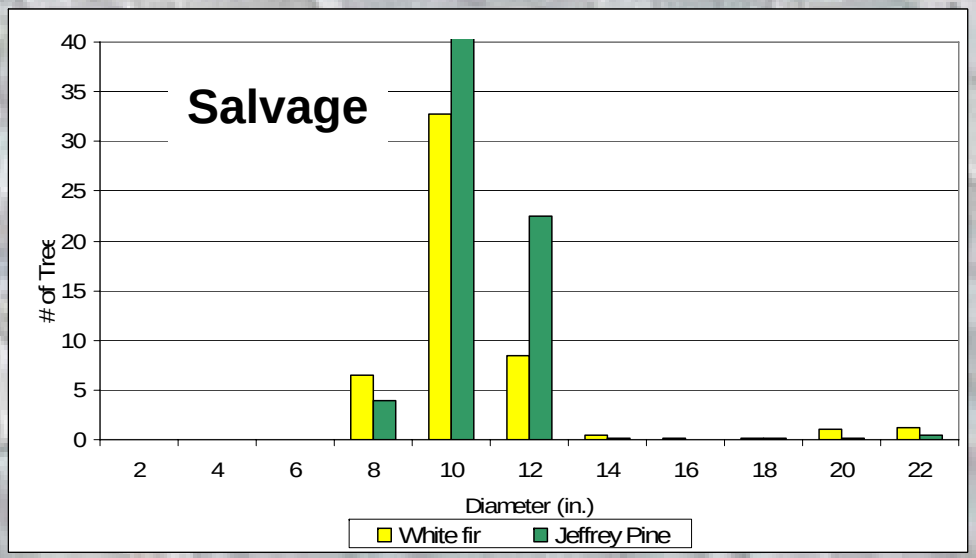
Salvage



Scenario	Year	Years Since Fire	Trees per Acre	Basal Area	Crown Competition Factor	Total Height	Quadratic Mean Diameter	Total Volume (cf)	Merch. Volume (cf)	Merch Volume (bf)
No Salvage	2057	50	151	188	67	71	15.1	4,628	4,074	20,026
Salvage	2057	50	165	148	52	81	12.8	4,379	3,889	19,629

Tree distribution by Species & Diameter





Summary

- Presented FVS as a tool to help evaluate alternatives.
- Foresters, wildlife biologists and fire/fuel management professionals are using FVS to evaluate forest management.
- Research has found that FVS can be a useful tool when discussing forest management alternatives with laypersons.

THANK YOU!!