The Vegetation Module

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Changes in Forest Condition

- Structure, composition, fire regime
- QLG vision: multi-story, all-age, fire resistant forest approximating pre-settlement conditions
- Pre-settlement forest had more open canopy (lower canopy cover)

Falling a ponderosa pine near Portola. 1919. (from Lawson & Elliot, 2008).

Opening the canopy: microclimate effects

- Agee and Skinner 2005: "…*treatments open the understory so that windspeed will increase and fine fuel moisture will decline*
- Source: Countryman 1955: "*partial cutting can increase the severity of the fireclimate enough to materially increase the number of days when disastrous crown fires can occur"*

Microclimate feedbacks to forest composition

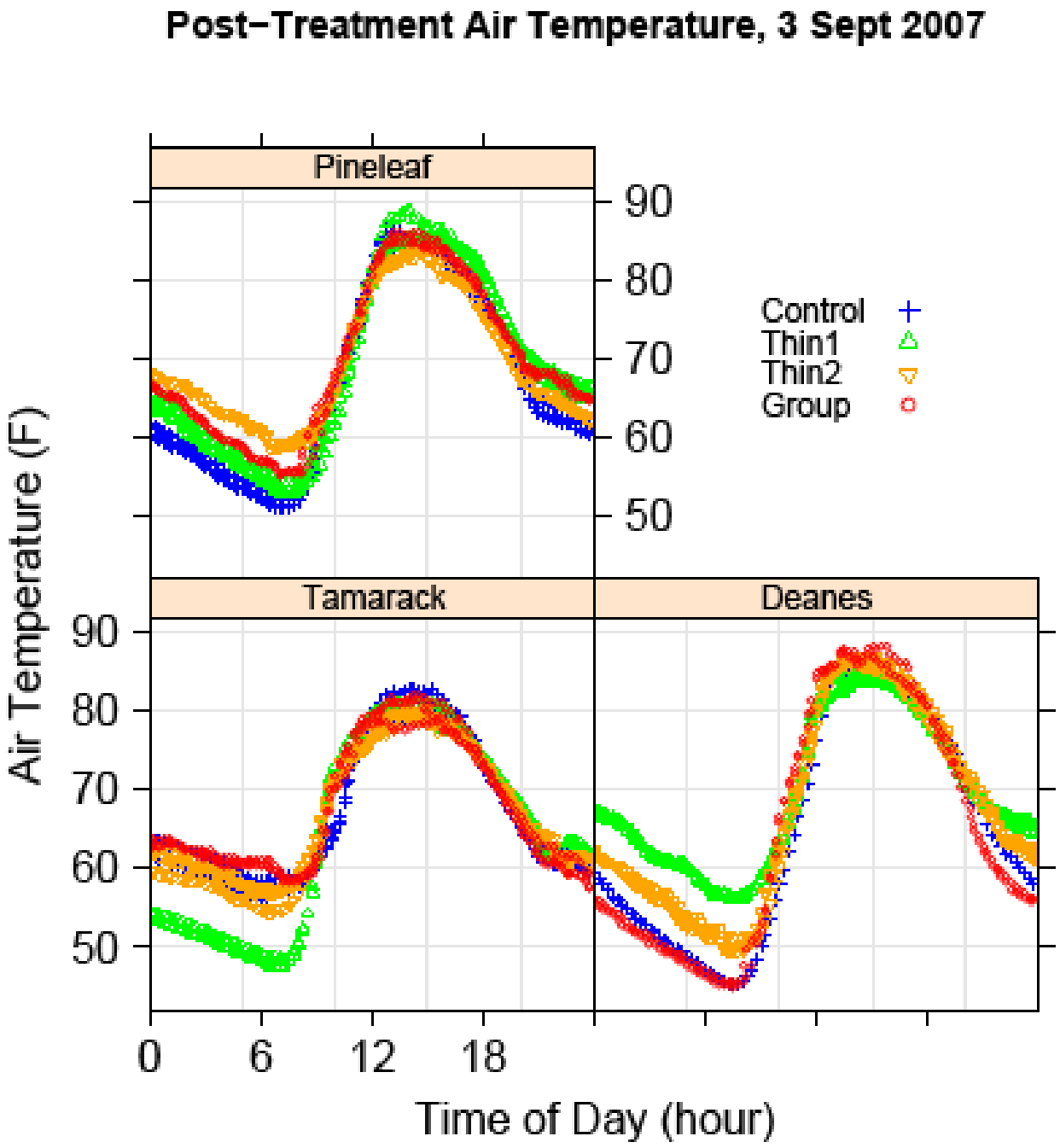
- Microclimate may interact with plant or stand traits to drive succession (or maintain a steady state)
- E.g., light intensity selects shade-tolerant or intolerant species which, as grown trees, affect light intensity.
- Air temperature, humidity, windspeed: different effects from species?

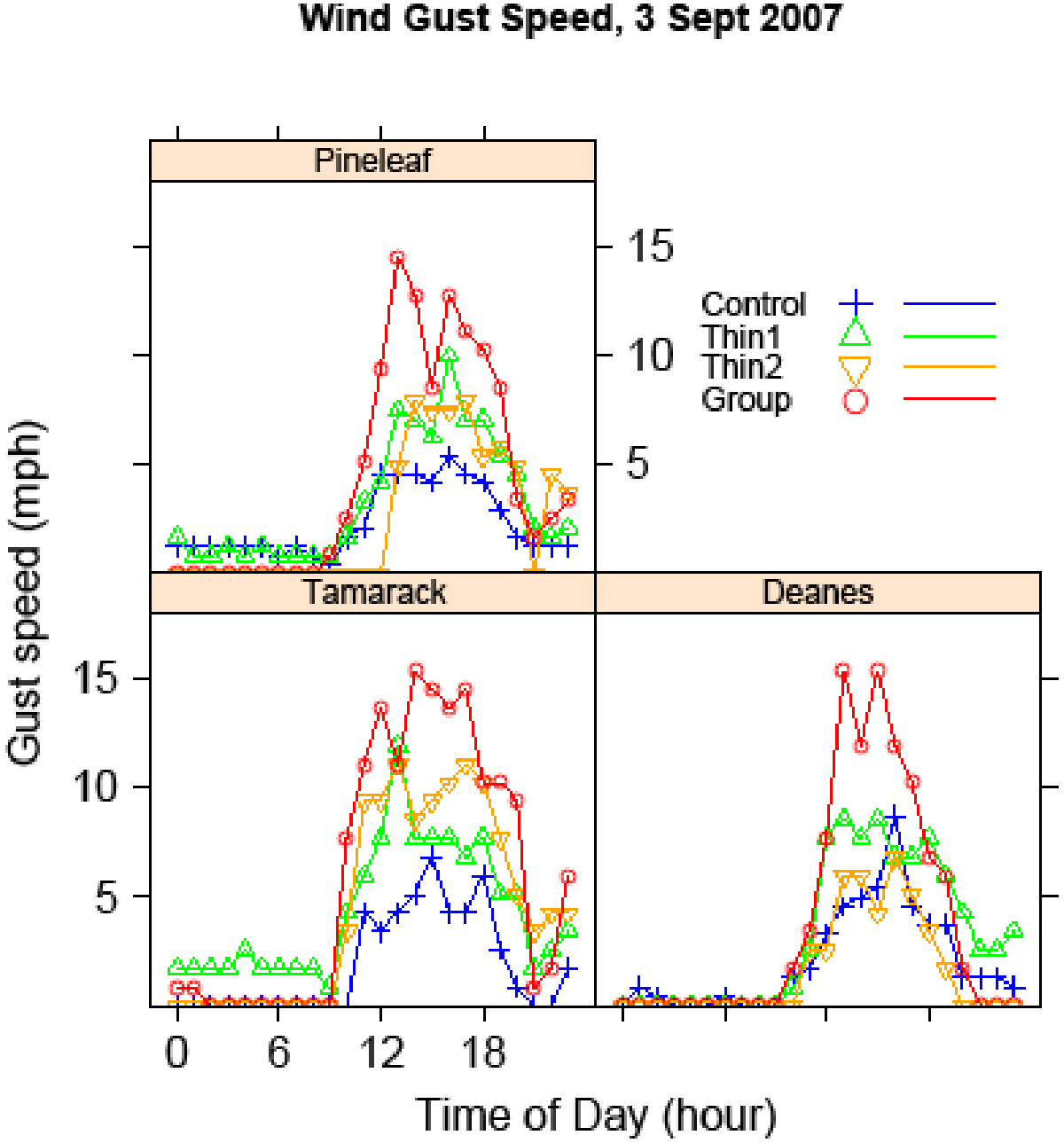
Thinning & Group Selection Experiment

- Meadow Valley area, treated in June, 2007
- 3 blocks: Tamarack, Deane's, Pineleaf

Treatment	Canopy Cover(%)
Controls	77
Thin1	56
Thin2	49
Group	12

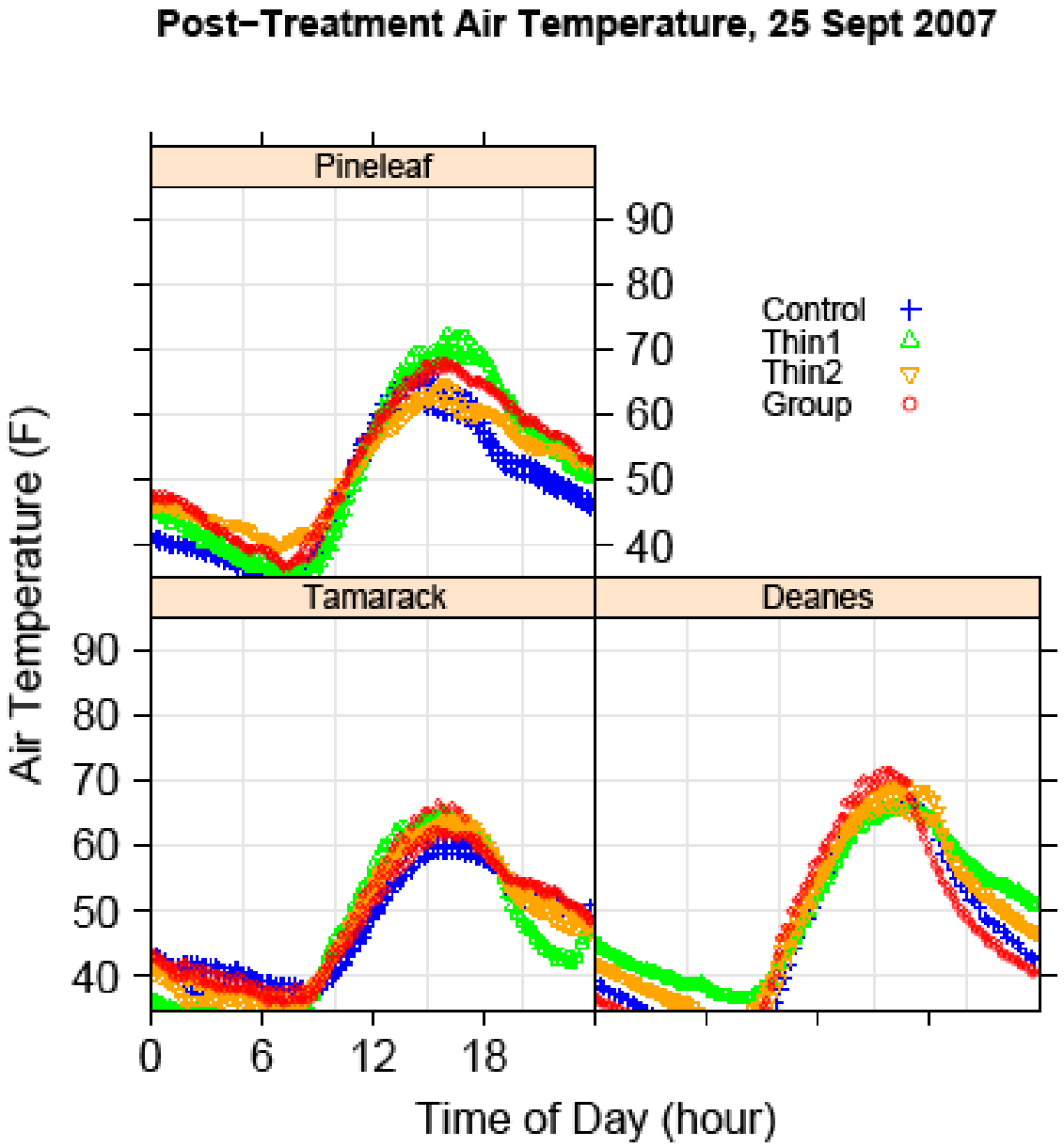
What is microclimate like in treated stands during fire weather?


Post−Treatment Air Temperature, 3 Sept 2007
Pineleaf
Tamarack
Deanes
Control
Thin1
Thin2
Group
Air Temperature (F)
90
80
70
60
50
0
6
12
18
Time of Day (hour)


Wind Gust Speed, 3 Sept 2007
Pineleaf
Tamarack
Deanes
Control
Thin1
Thin2
Group
Gust speed (mph)
Time of Day (hour)
0
6
12
18
5
10
15

Ok, it’s windier, but not hotter (or drier) in thinned / harvested areas, in fire weather

- What about non-fire weather?
- Do fire modelers know about this?
- Is this bad?



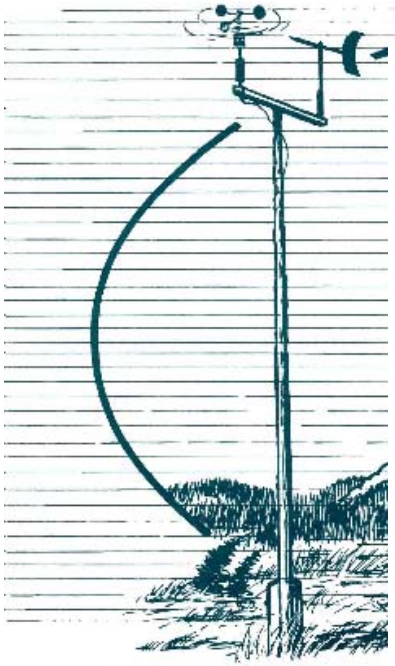
(a still day)

5 -10 degree air temperature difference among treatments

ESTIMATING WINDSPEEDS FOR PREDICTING WILDLAND FIRE BEHAVIOR

F.A. ALBINI AND R. G. BAUGHMAN

Yes, fire modelers can allow altered windspeeds in lower-density stands



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INTERMOUNTAIN FOREST AND RANGE
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Table 9 - Wind Speed Adjustment Factors

Fuel Sheltering	Fuel Model		Adj. Factor
Unsheltered Fuel Fuel exposed directly to the wind, no overstory or sparse overstory; fuel beneath timber that has lost is foliage; fuel beneath timber near clearings; fuel high on ridges where trees offer little shelter from the wind.	4		0.6
	13		0.5
	1,2,3,5,6,7,10,11,12		0.4
	8, 9		0.3
Partially Sheltered Fuel Fuel beneath patchy timber where it is not well sheltered; fuel beneath standing timber at midslope or higher on a mountain with wind blowing directly at the slope.	All Fuel Models		0.3
Fully Sheltered Fuel Fuel sheltered beneath standing timber on flat or gentle slope or near the base of a mountain with steep slopes.	All Fuel Models	Open Stands	0.2
		Dense Stands	0.1

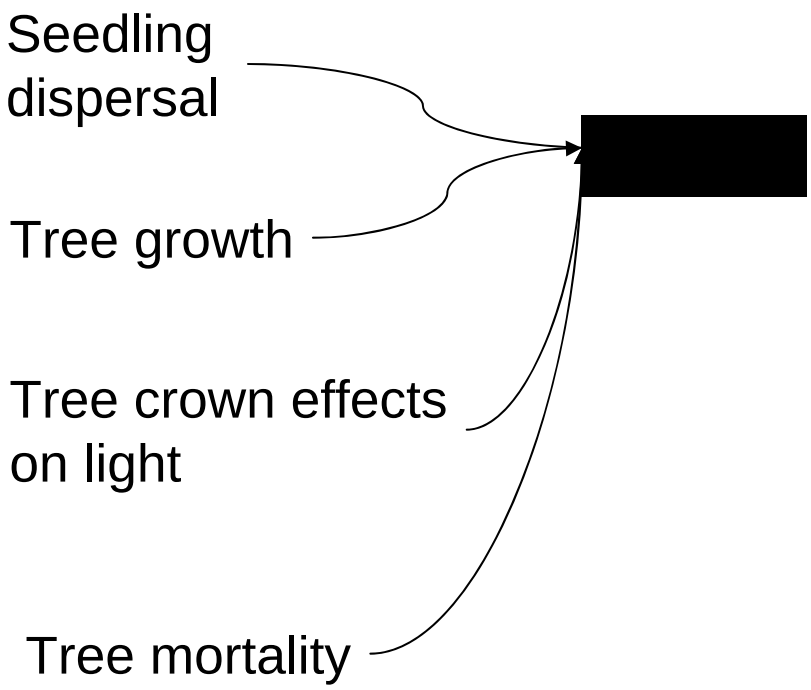
Is this bad?

- How do these measurements match with our mental model of how the forests used to operate?
- Higher windspeeds mean increased rate of spread, increased flame lengths
- Perhaps there were few enough ladders and high lower canopy so that it didn’t matter?
- Is increased understory heat and windspeed a stabilizing or destabilizing feedback?

Vegetation module plans

- follow establishment of trees, shrubs, herbs in understory of experimental plots
- Natural regeneration in salvaged / unsalvaged post-wildfire stands, with parent-tree mapping.
- Revisiting large wildlife trees to estimate growth rate as determined by tree neighborhood

Sortie-ND: individual-based, spatially explicit forest simulation software



- Predictions:
- Tolerant / intolerant competition at varying canopy cover
- Establishment density with distance from edge

Acknowledgments

- Vegetation module field crews and leaders
- Mt. Hough RD personnel (NEPA, stand marking, timber sale administration)
- Support: Quincy Library Group
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Conclusions

- Inevitably, when the canopy is opened up, a more flammable forest results-which is what's desired, as long as the fire stays low
- Drier, breezier understories may help prescribed burning

End

Our veg module role, broadly…

- Understand feedbacks, place some numeric values.
- In past, we've talked about opening the canopy, measured light / growth of sapling community, providing tools for relating opening size to species composition.
- Today: microclimate aspect of feedbacks.