Vegetation Module

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Policy Directives

- *all-age, multi-story, fire-resistant forest* (HFQLG Act 1998)
- *Modify fire behavior…promote shade-intolerant pines…enhance connectivity of habitat* (Sierra Nevada Forest Plan Amendment 2004)

Vegetation Module Research Projects

- Predictive models of tree response to light
- Experimental thinning and group selection
- Group selection in East-Side forests

Experimental Thinning and GS: Canopy Cover Targets

Treatment
Control
50% CC
30% CC
Group with reserves

KEEP AWAY
DANGER

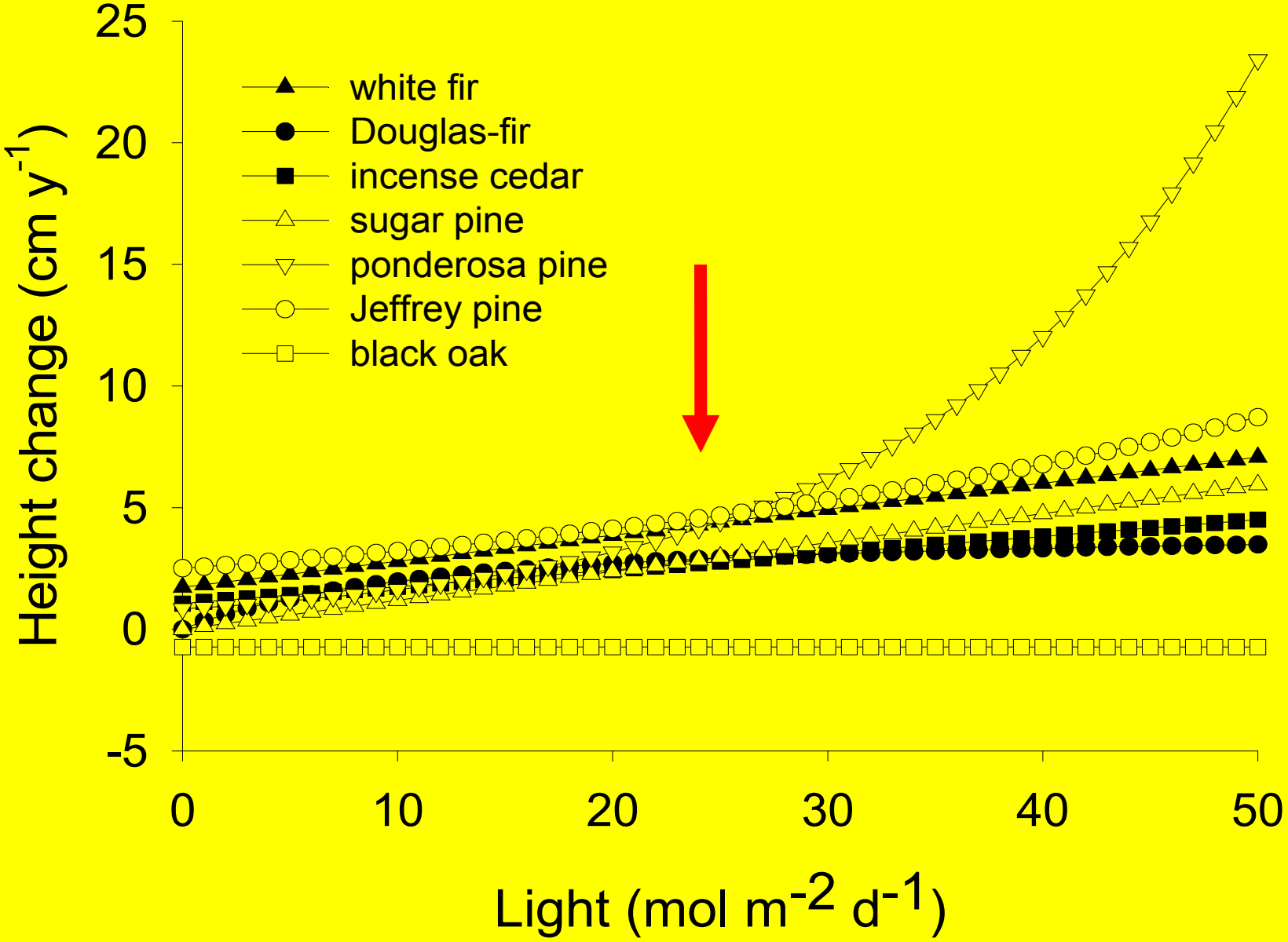
Experimental Thinning and GS: Canopy Cover Targets

Treatment	Canopy cover Before(%)
Control	78
50% CC	69
30% CC	68
Group with reserves	70

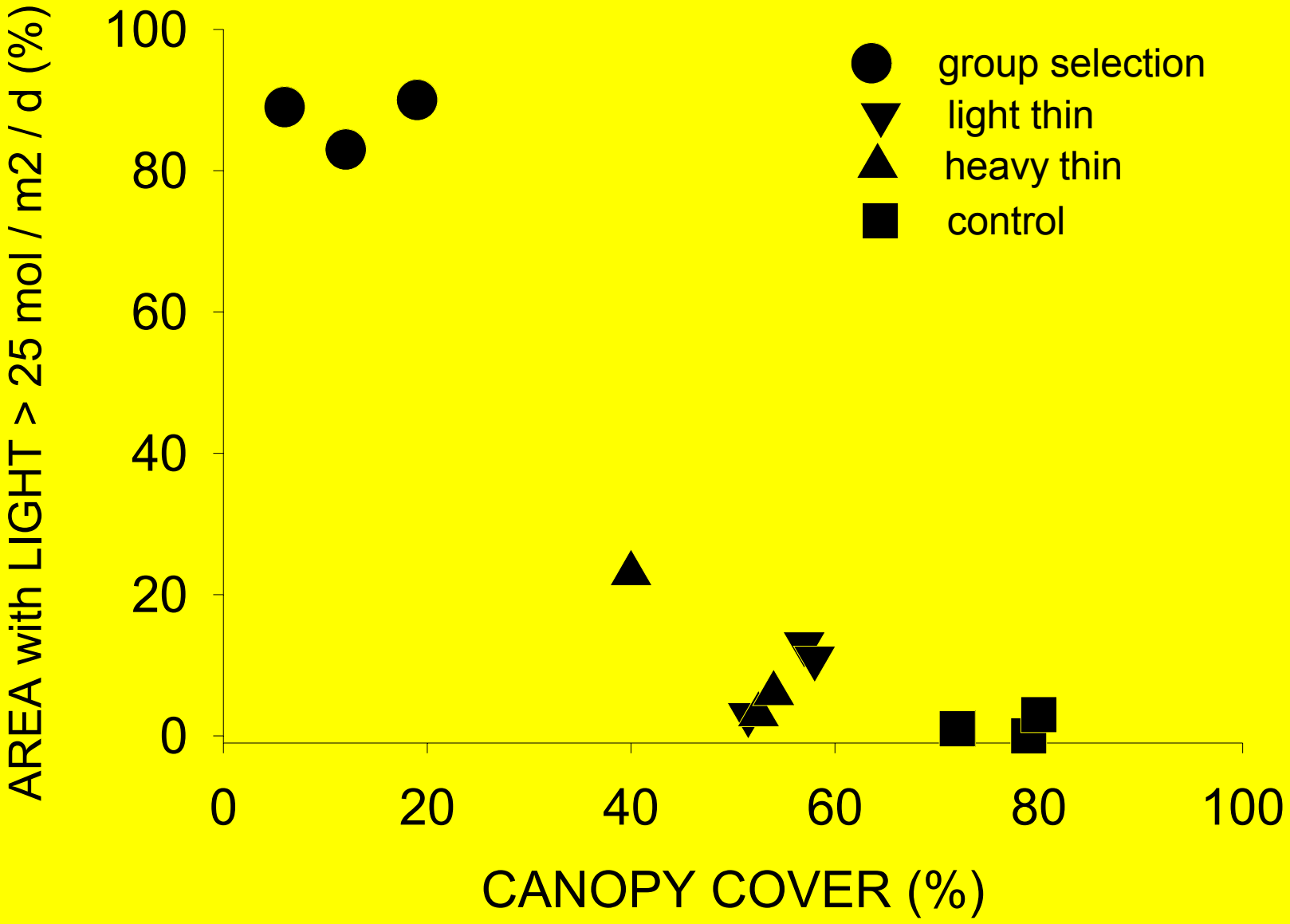
Experimental Thinning and GS: Canopy Cover Targets

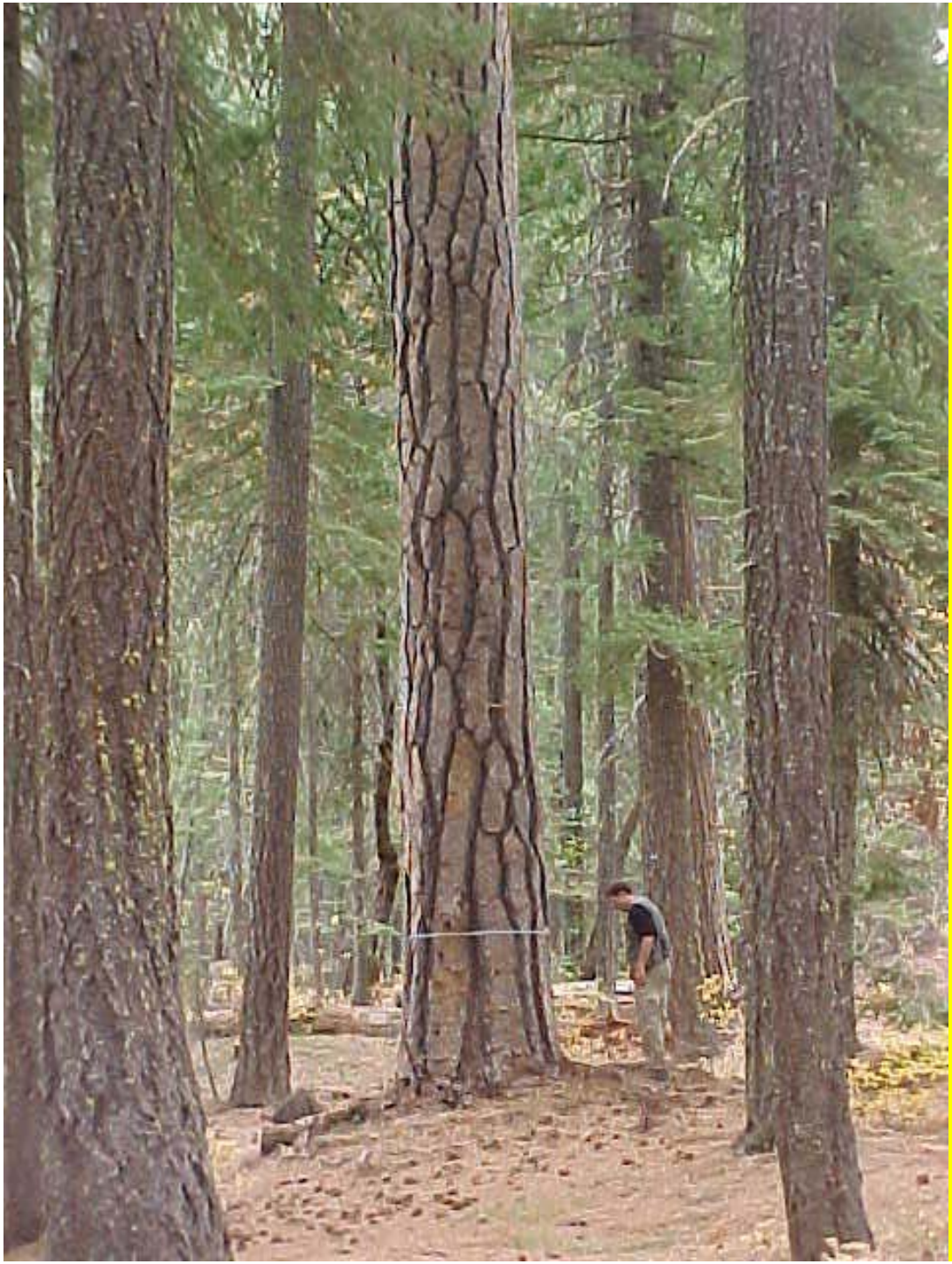
Treatment	Canopy cover Before (%)	Canopy cover After (%)
Control	78	77
50% CC	69	56
30% CC	68	49
Group with reserves	70	12

Models of seedling height growth



Area Available for Pine after Treatment





Observations & Suggestions

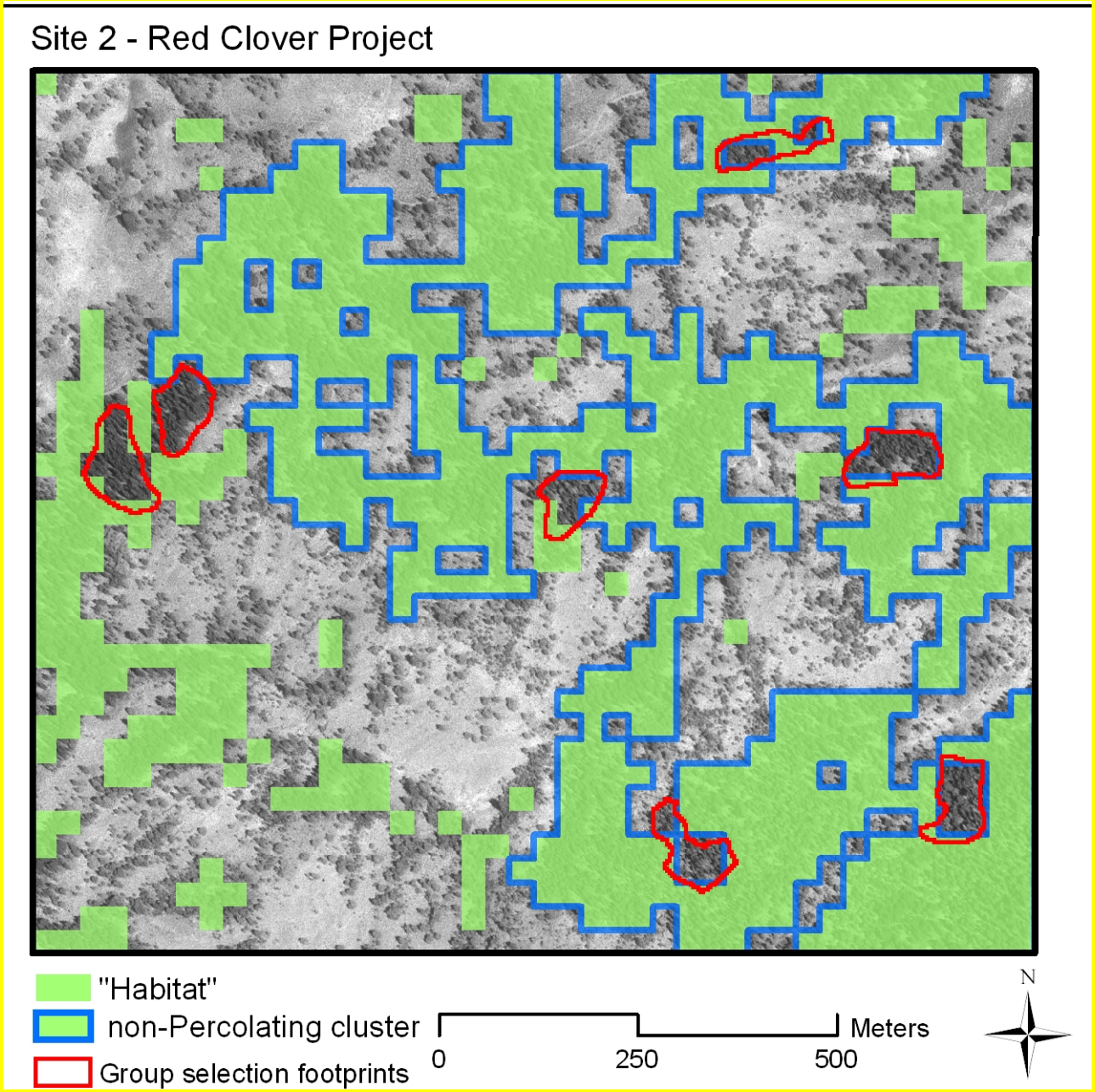
- Fuels treatments can create pine regeneration space

- Foresters & marking crews: if there's a worthy seed source, open up growing space in the seed shadow

Group Selection Impacts in Patchy East-Side Forests (with Sean Parks)

- Stand-level impacts on soil water and microclimate
- Landscape level impacts on habitat connectivity

Maintenance of connectivity an overarching "principle for managing forest biodiversity"
Lindenmayer, Franklin & Fischer 2006



We analyzed landscapes where groups were put in, and tested for changes in percolation status

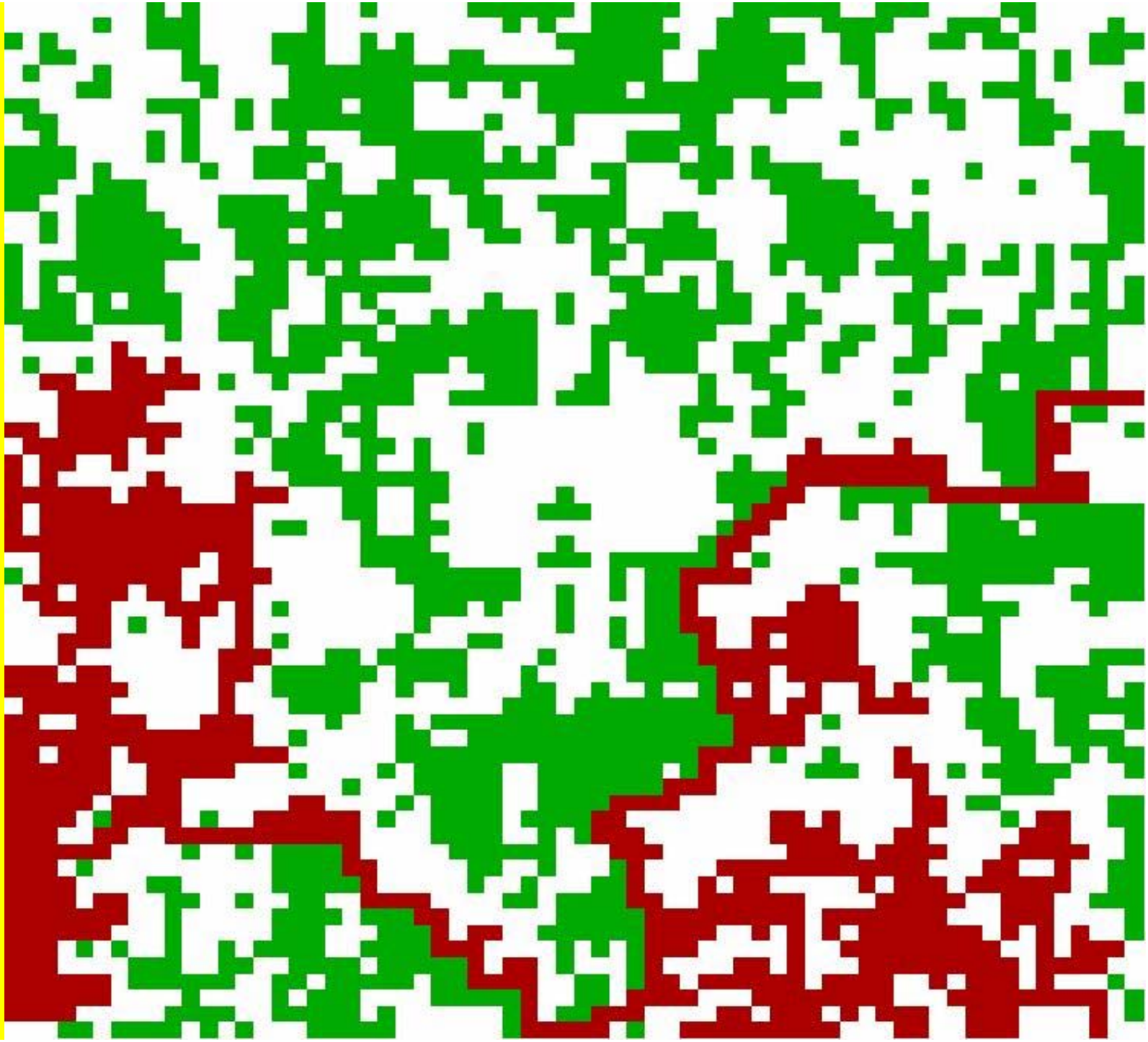
One landscape became increasingly fragmented after groups went in

Can we develop a method to predict risk of increased fragmentation?

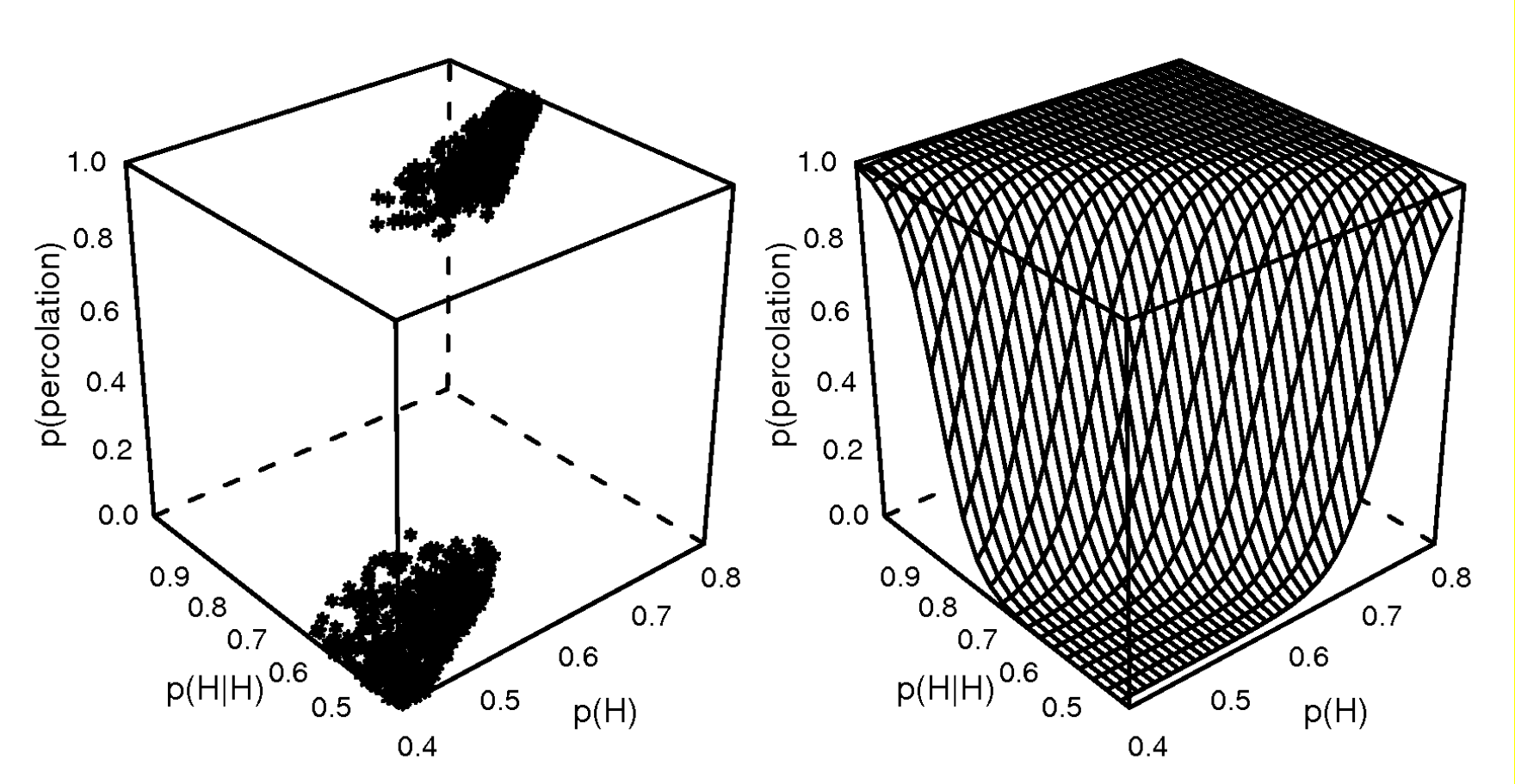
Estimating probability of landscape becoming fragmented…

- Intuitively, the probability a landscape is not fragmented is related to the proportion of the landscape consisting of habitat, p(H)…
- …and the probability that units of habitat are adjacent to one another, p(H|H)
- We made simulated landscapes with varying p(H) and p(H|H), and tested for percolation (i.e., lack of fragmentation)

Percolation test:
a cellular automaton (Rocky the Flying Squirrel) explores landscape to find a way across.

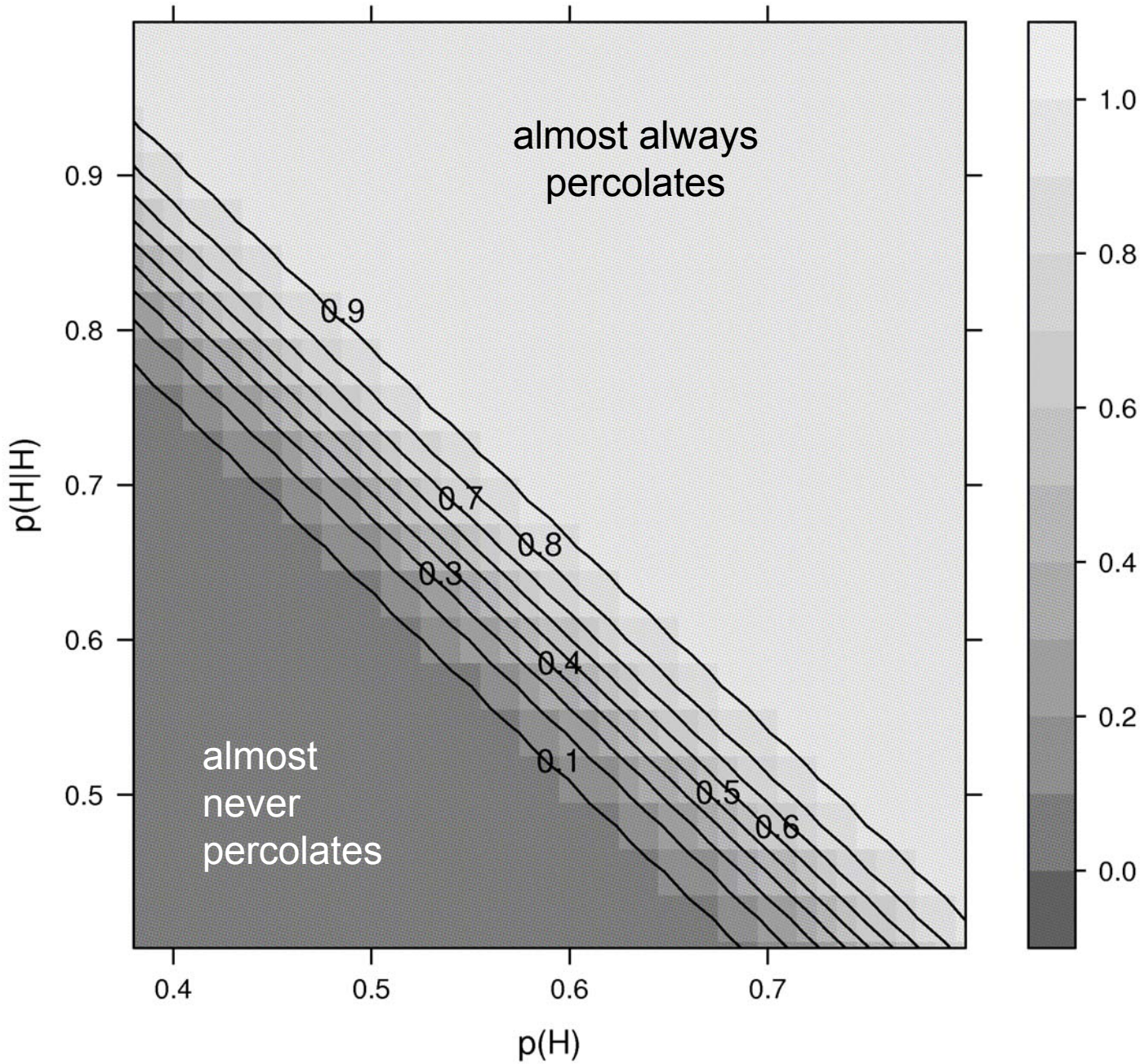


Outcome of 750 simulation runs…



…a strong mathematical relationship between habitat amount, probability of habitat self-adjacency, and probability of percolation

Contour plot of percolation probability



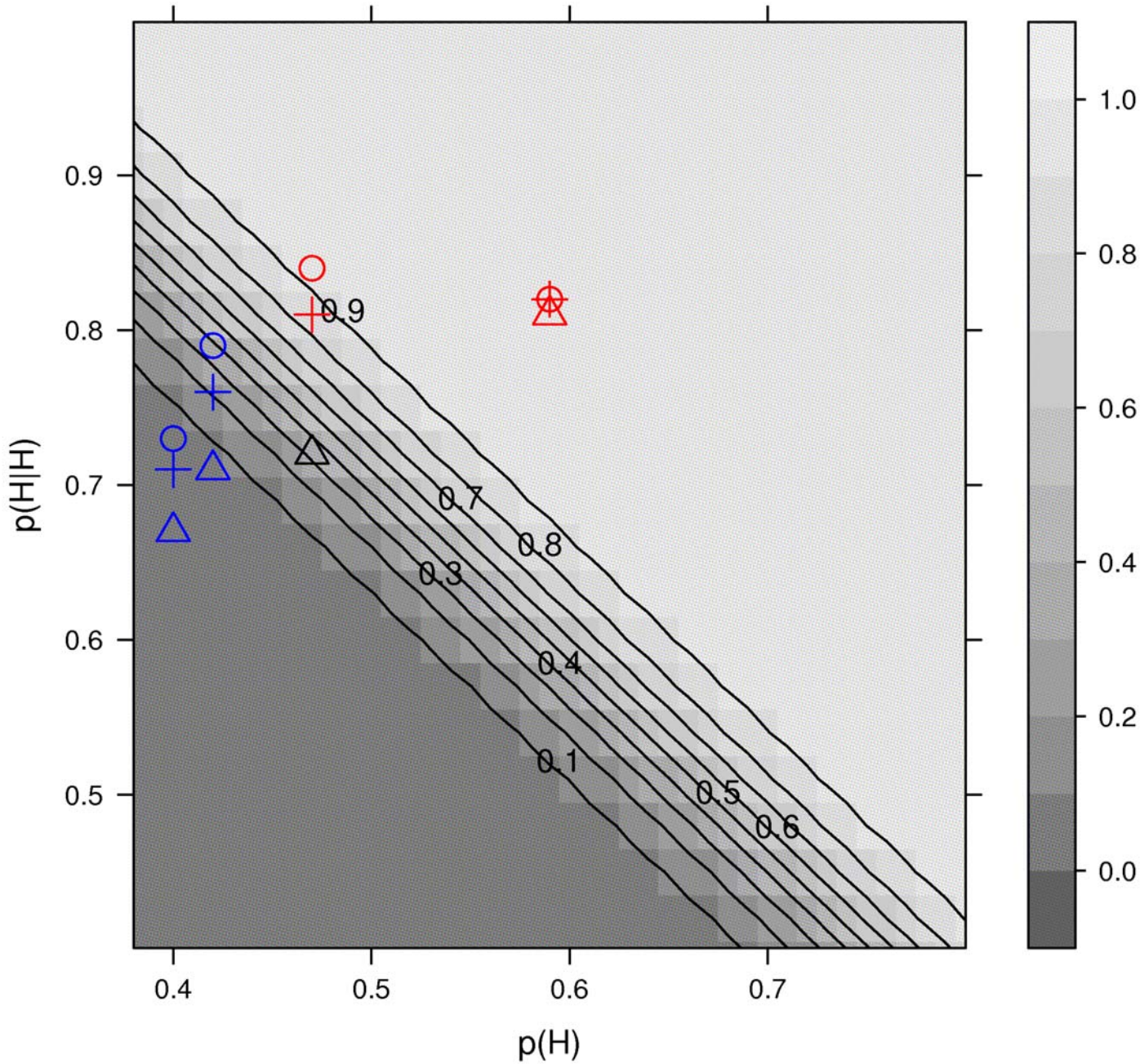
Contour plot of percolation probability

With data from 4 east-side landscapes analyzed at 3, 10, & 30 m scale

RED percolated before and after group selection

BLUE never percolated

BLACK percolated before but not after.



Landscape level impacts on habitat connectivity: Conclusions

- Structural connectivity of patchy east-side landscapes can sometimes be altered by group selection openings
- We have developed a method that helps to predict the probability of this occurring
- Use to screen for at-risk landscapes prior to group selection silviculture?

Generally…

- Hitting canopy-cover targets is hard.
- Potential to achieve multiple objectives with fuels treatments—think *inside* the polygon!
- East-side groups: modest landscape impacts
- Yet to come: fuels treatment effects on fire climate, and understory plants.

Acknowledgments

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