

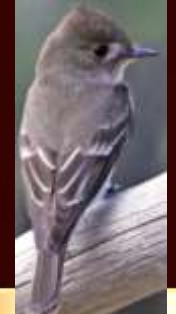
# Of birds and bees, shrubs and burned trees

Angela M. White<sup>1</sup>  
Gina L. Tarbill<sup>1,2,3</sup>  
Patricia N. Manley<sup>1</sup>



1. USDA Forest Service, Pacific Southwest Research Station
2. Oak Ridge Institute for Science and Education
3. UC Davis, Wildlife, Fish and Conservation Biology

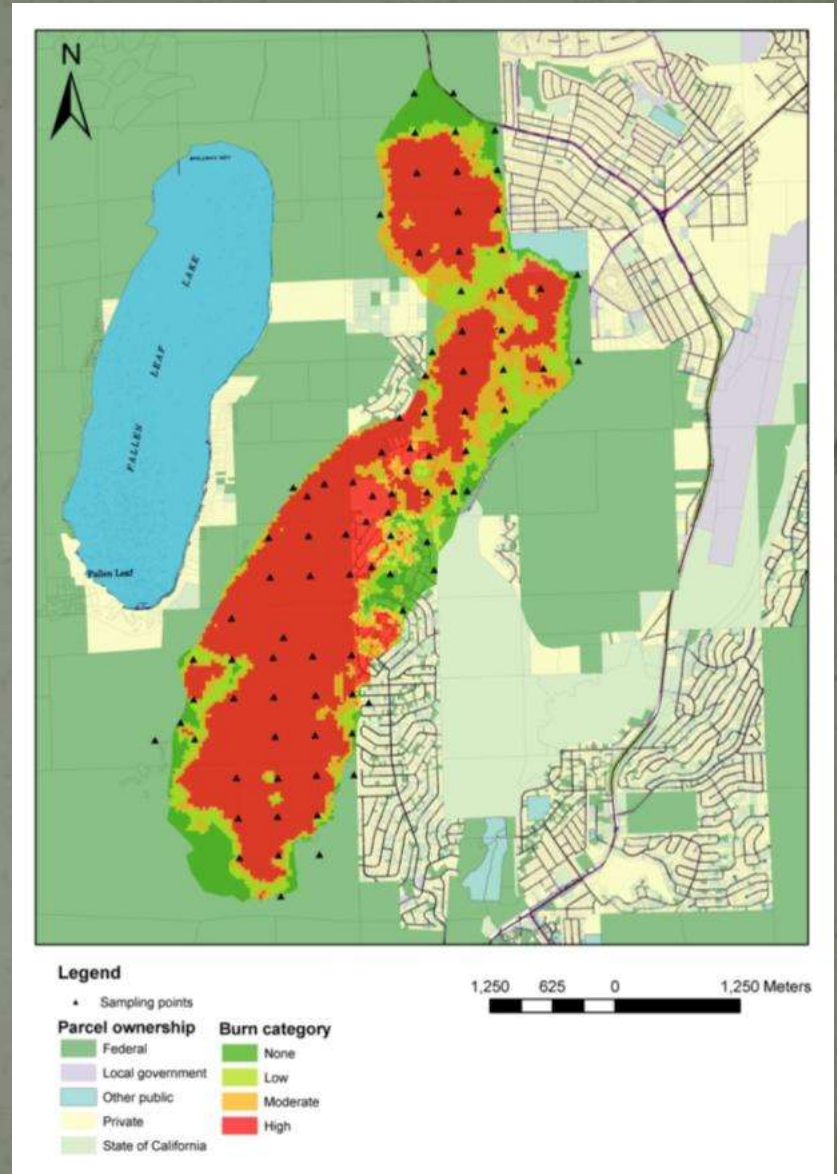
# Pyrodiversity Begets Biodiversity





# Questions

- How do bird and small mammal communities differ by burn severity?
- How does time since fire, urbanization, and post-fire harvest affect this response?



# Summary of findings

- Majority of birds and small mammals responded positively or neutrally to increasing burn severity
- Fire specialists did not exhibit a decreasing year effect
- Most species increased over time
- Species that rely on live trees for foraging or nesting sites likely to decline with increasing burn severity



# Summary of findings

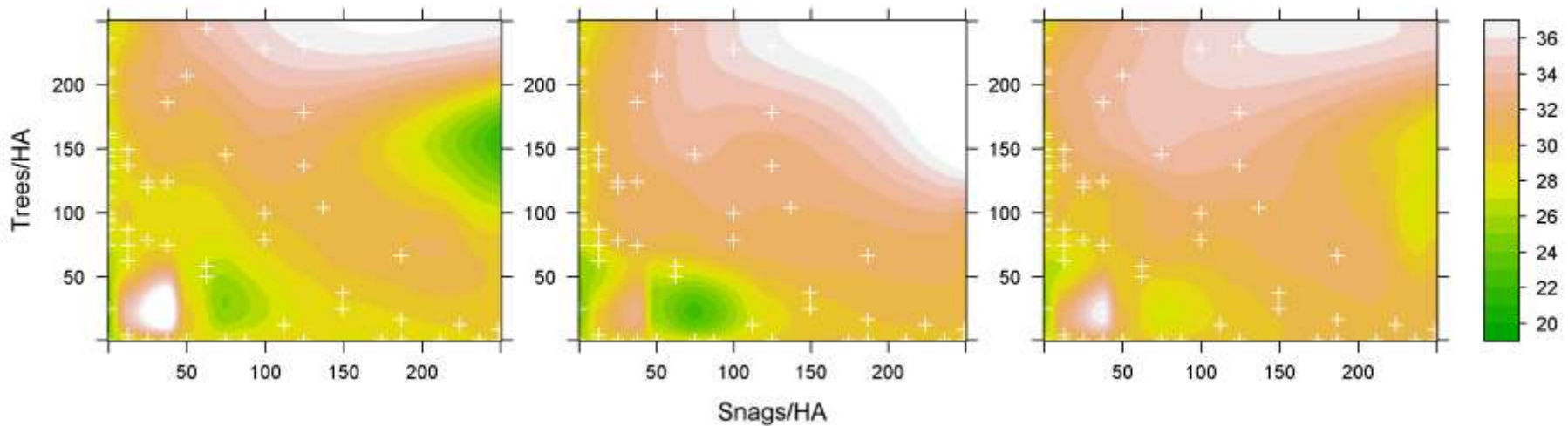
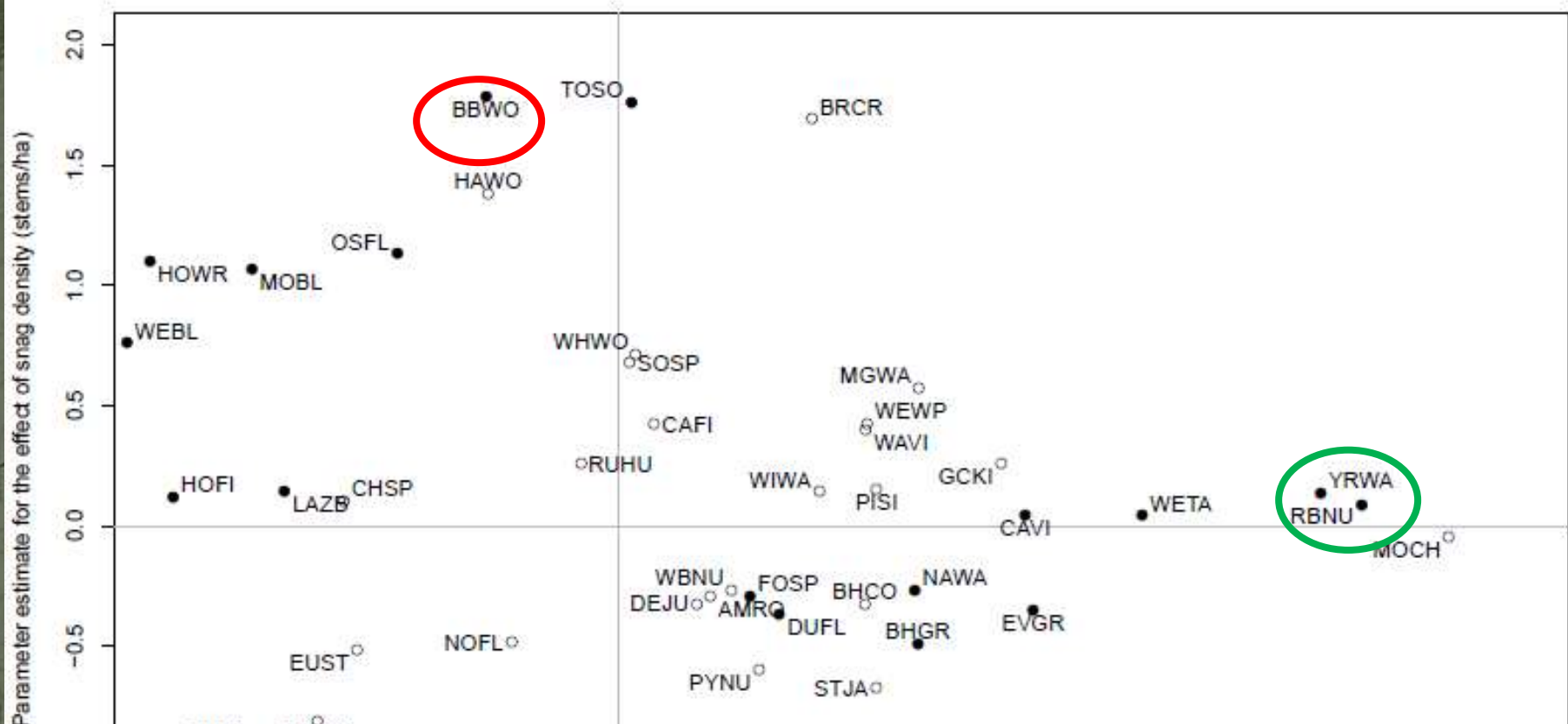
- Species richness of birds was highest in sites that burned at high severity
- Species richness of small mammals was highest in low burned sites
- Richness of small mammals equal in year three for high and unburned



# Challenges to predicting wildlife responses to fire



- Fire treated as a binary/categorical variable
  - Disconnect with management goals
- Dependent on time since fire
- Dependent on pre-fire conditions







# Home is where the SNAG is

About one-third of bird and mammal species in the Sierra Nevada use snags for denning, nesting, roosting, foraging or resting.



45 species of birds and 10 species of mammals nest in cavities in snags.



How many of these snag-users can you identify?



# Secondary cavity users

- Depend on woodpeckers for cavities
- Diverse
  - Seed dispersers
  - Insectivores
  - Prey base
  - Raptors and small carnivores
  - Species of concern





Black-backed woodpecker

*Picoides arcticus*



Hairy woodpecker

*P. villosus*



White-headed woodpecker

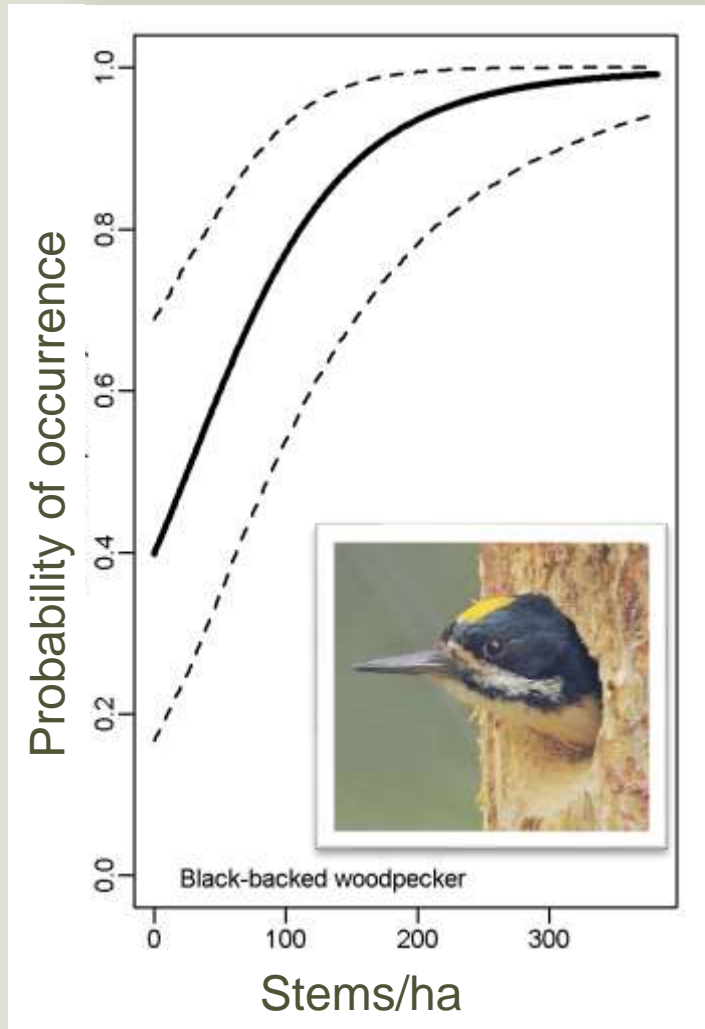
*P. albolarvatus*

Excavator	Cavities discovered	Cavities monitored	Cavities with detections
Black-backed Woodpecker	39	18	89%
Hairy Woodpecker	80	26	73%
White-headed Woodpecker	50	32	94%
Totals	169	76	86%





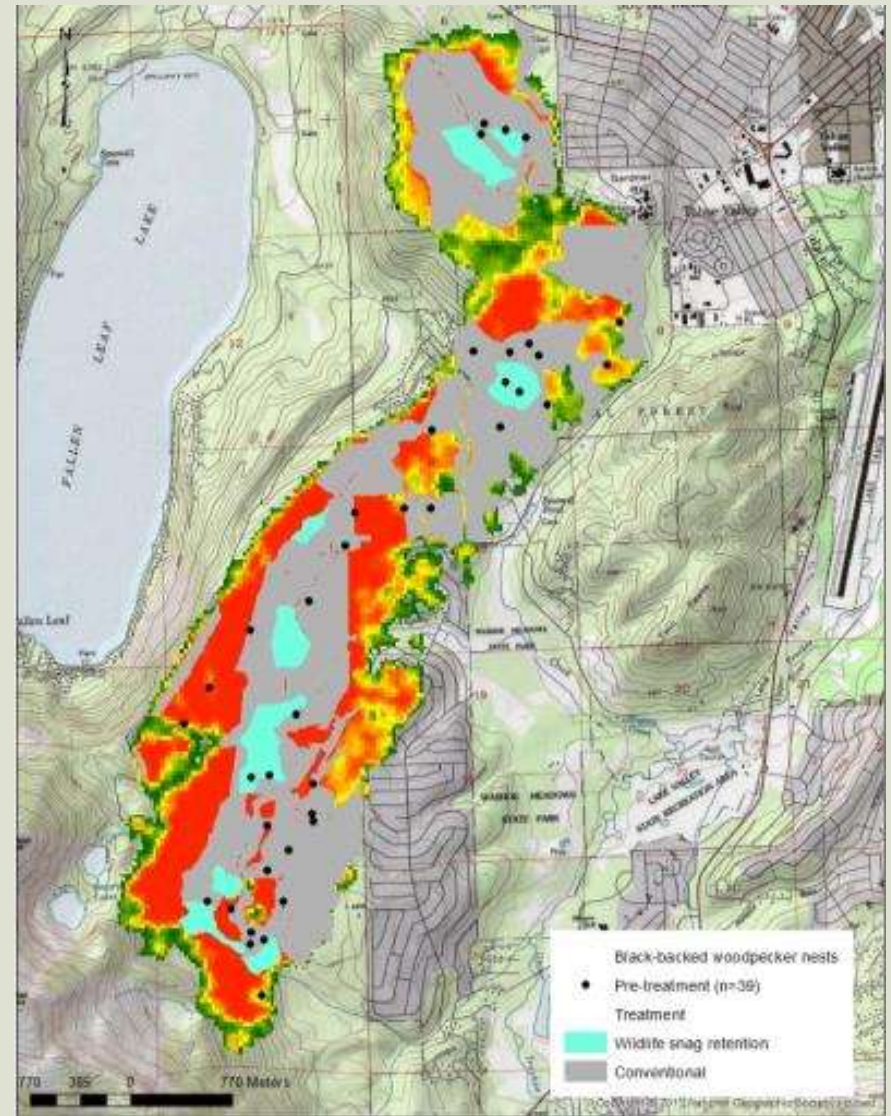
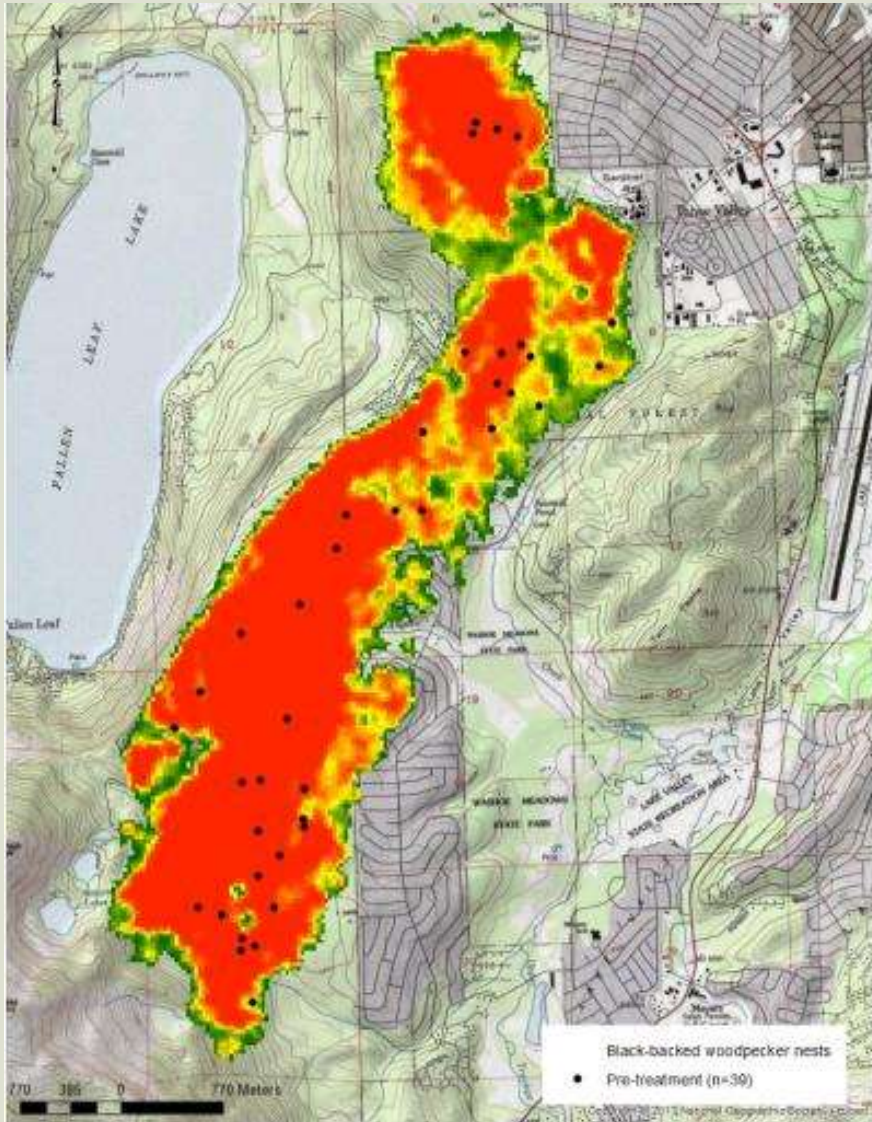
# Black-backed Woodpecker: *THE* Post-fire Specialist



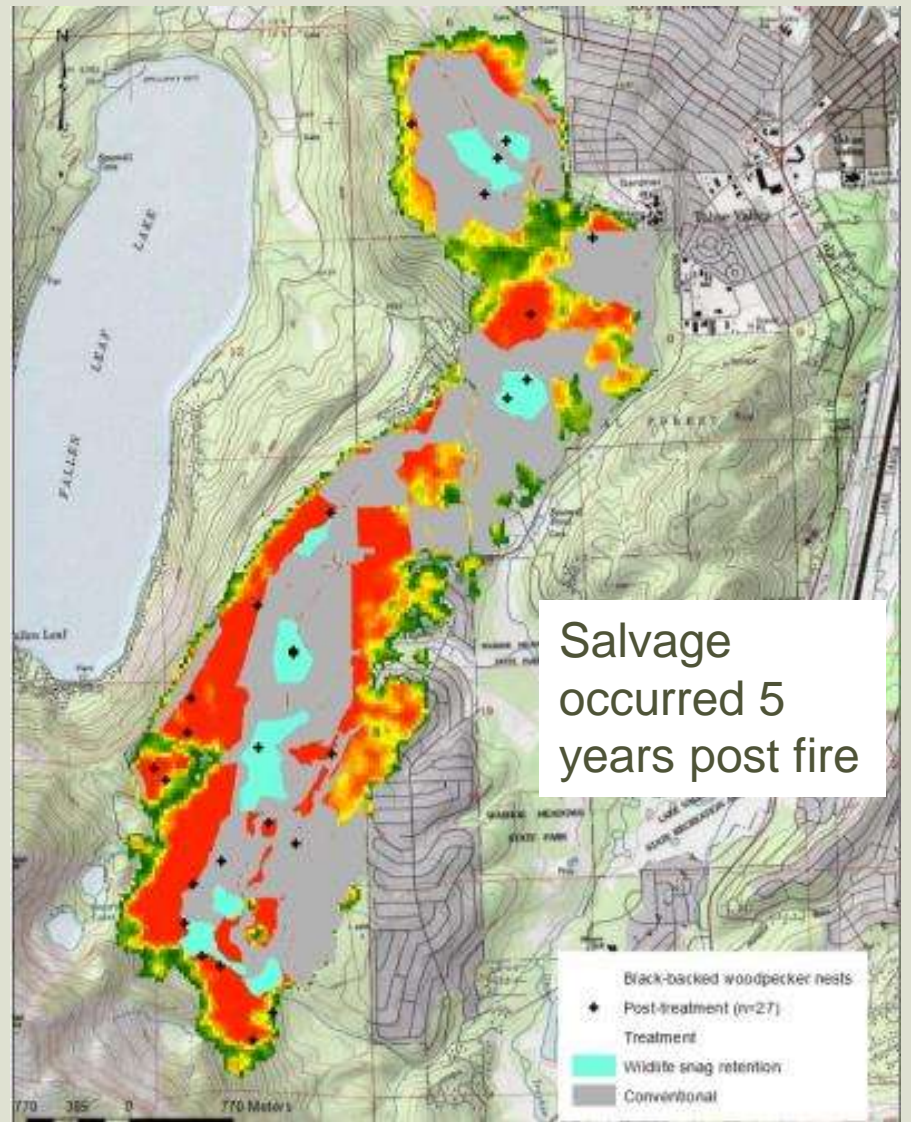
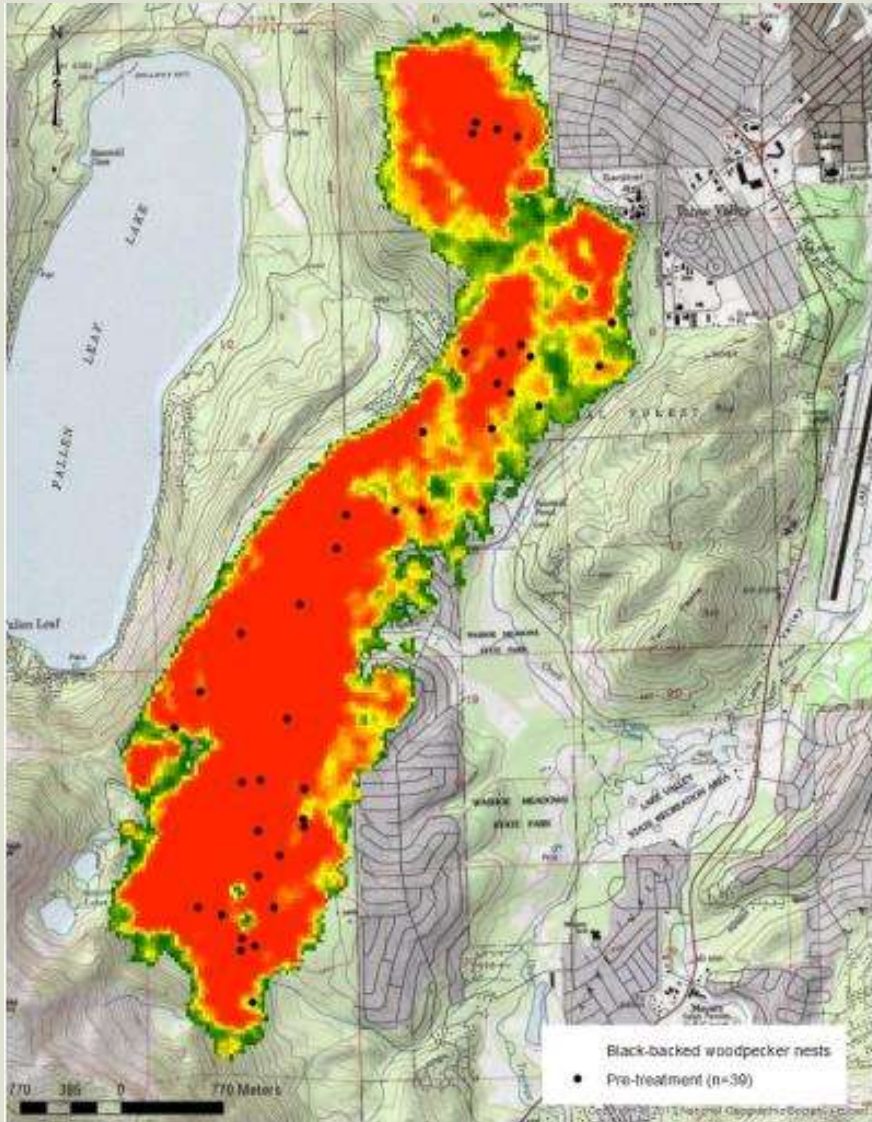


5-10 years  
post- fire





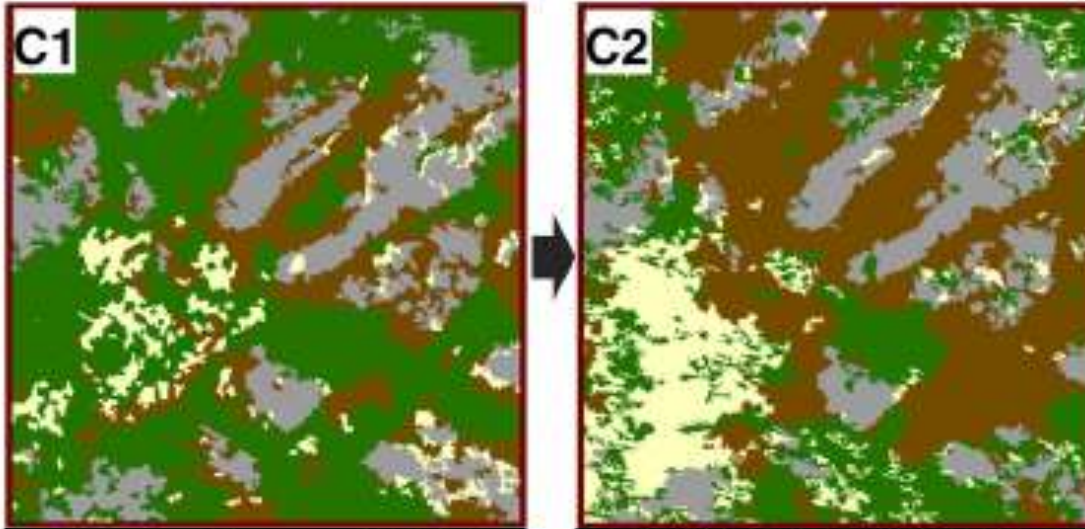




Salvage occurred 5 years post fire

1969

2012



### Legend

Watershed

#### Land Cover

Mixed Conifers

Shrub

Sparse Meadow

Dense Meadow

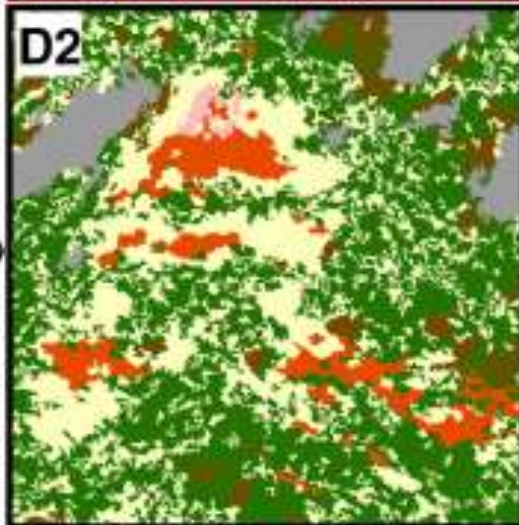
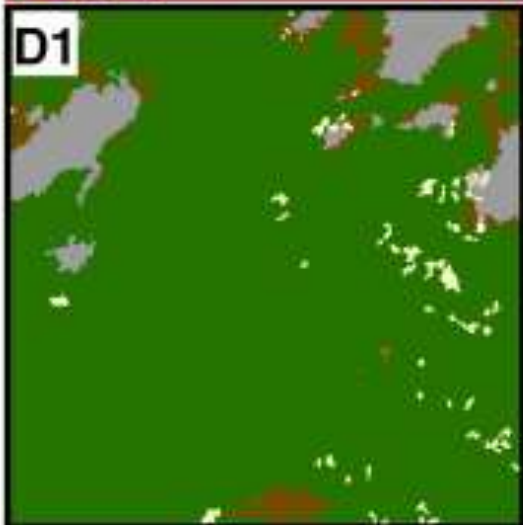
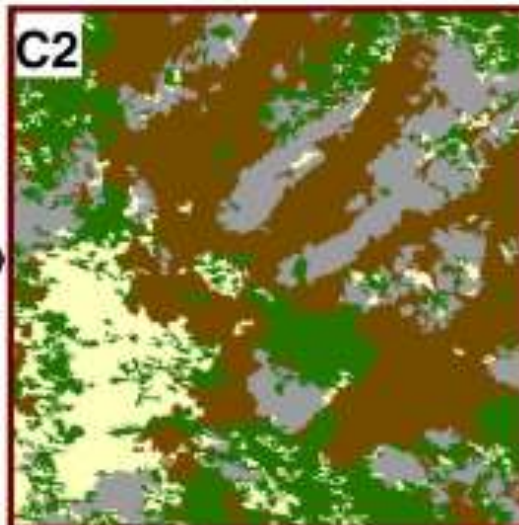
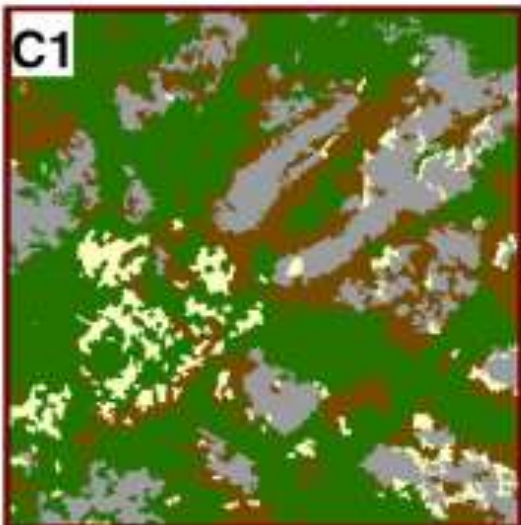
Aspen

Granite

Water

1969

2012



### Legend

Watershed

#### Land Cover

Mixed Conifers

Shrub

Sparse Meadow

Dense Meadow

Aspen

Granite

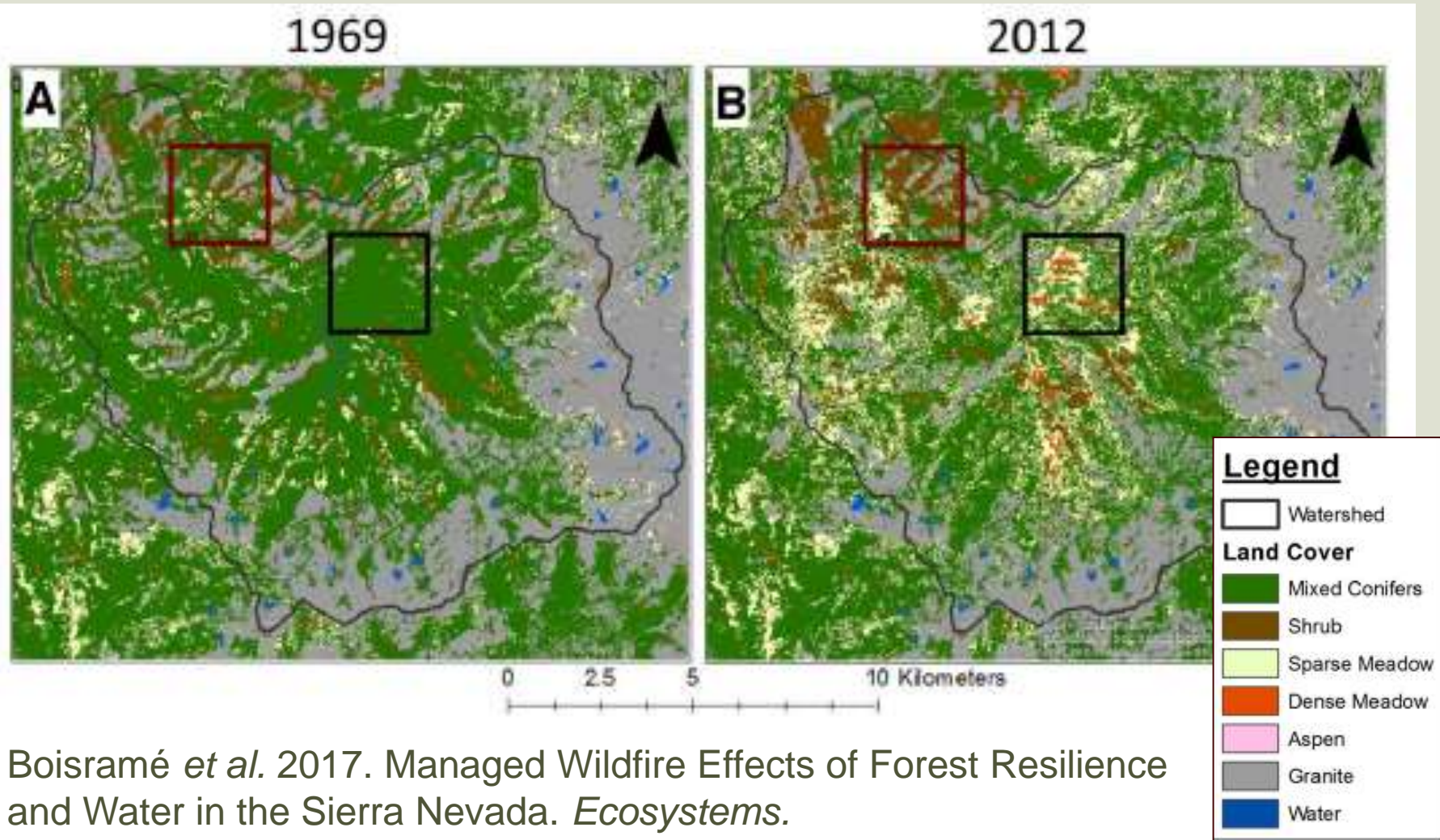
Water

0 0.375 0.75 1.5 Kilometers



Pacific Southwest Research Station

# Sierra Nevada Forest Ecosystems



# Importance of Scale

## Site-specific impacts

- Which species could be impacted at the site?
- How does forest structure change?
- How is this change predicted to impact this species?
- Are there revisions that could ameliorate negative impacts?

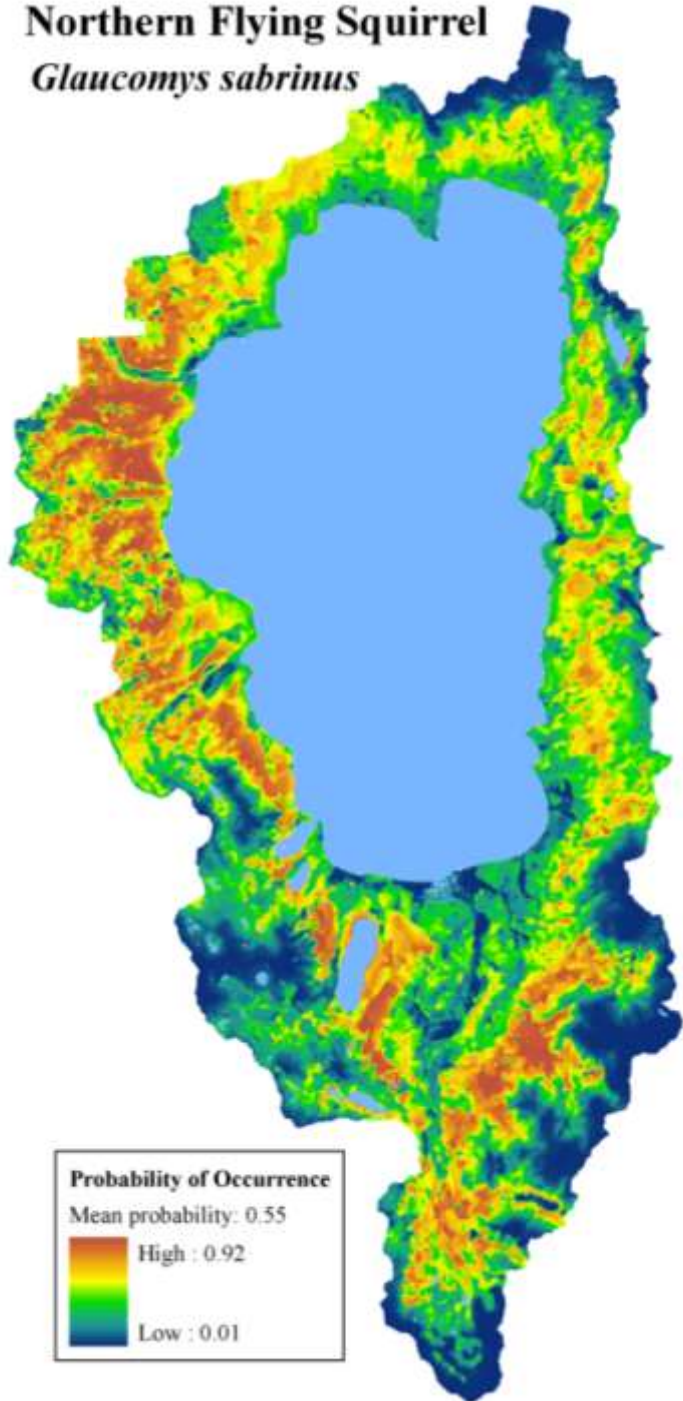
## Larger-scale impacts

- What is the spatial scope of the impact?
- Is the area in an ecologically significant area for the species or for biodiversity?
- Is habitat connectivity altered?



## Northern Flying Squirrel

*Glaucomys sabrinus*



## Habitat suitability

Where is there suitable habitat?

## Habitat variability

How variable is the habitat in suitability?

## Habitat connectivity

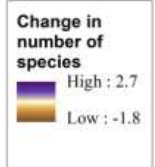
How is suitable habitat connected?

# Biodiversity Outcomes

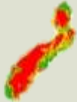
WUI Scenario

Fuel Hazard Reduction Scenario

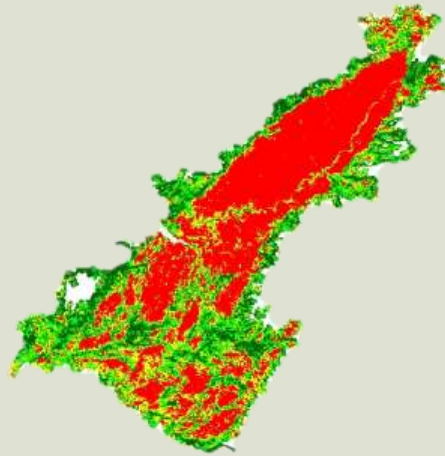
Restoration Scenario



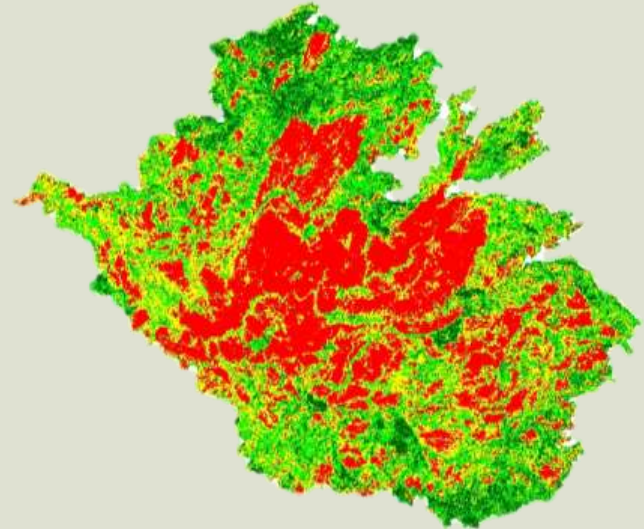
Angora fire: 1,250 ha burned.  
15 BBWO nests found.



King fire: 39,000 ha burned.  
3 BBWO nests found.



Rim fire: 104,000 ha burned.  
8 BBWO nests found.



**Bigger is not better?**





**Thank You!**

**Let nature be your classroom!!**

# Acknowledgements

- **Southern Nevada Public Lands Management Act**
- **California Tahoe Conservancy**
- **Tahoe Institute for Natural Science**
- **Lake Tahoe Basin Management Unit, USFS**
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- **University of Montana**

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