Evaluating Alternative Structural Retention Practices

A Pacific Northwest focused experimental forestry study to address the question:

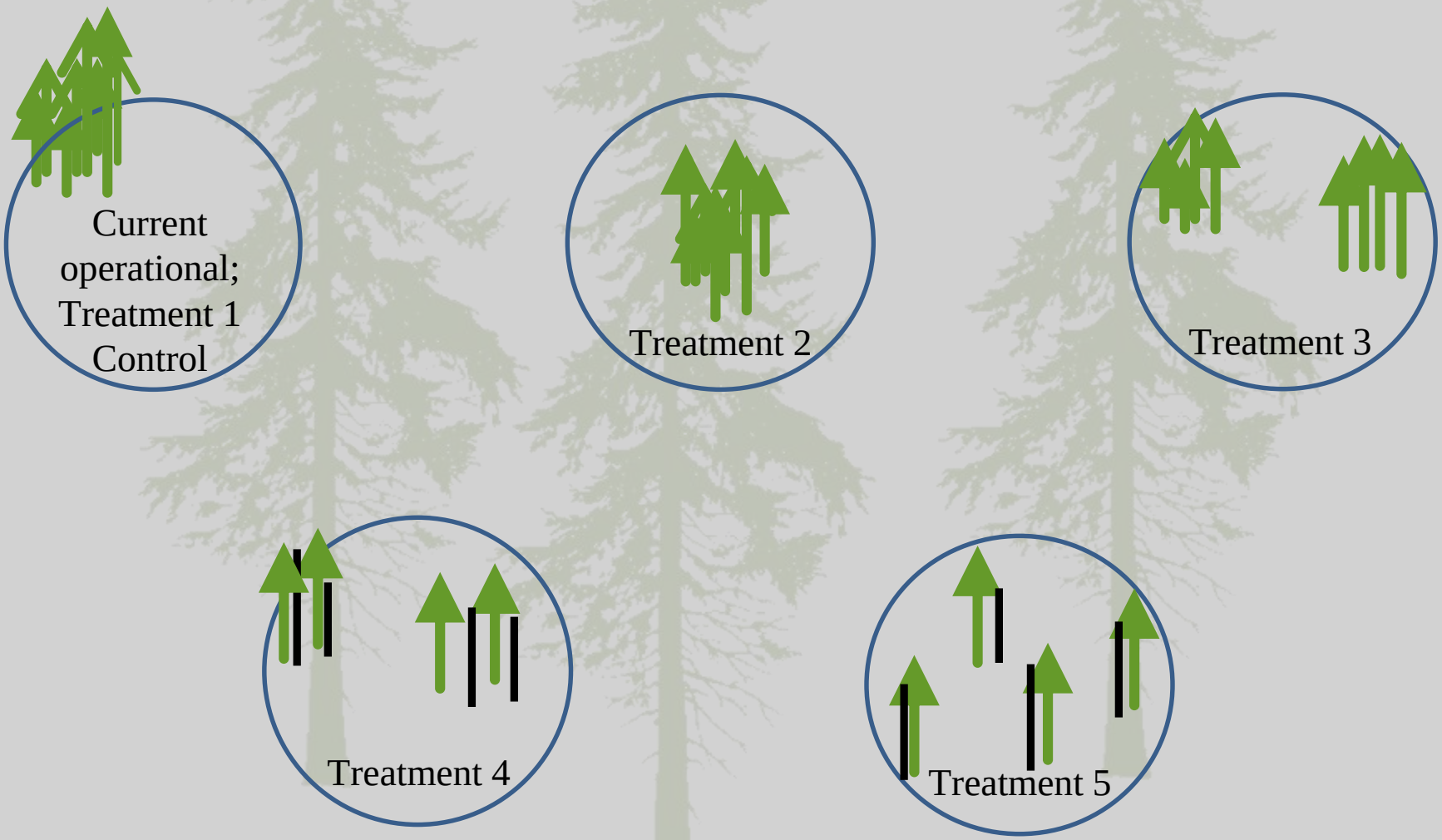
"What do you get for what you leave behind?"

Structural Retention

Differences from prior research

- Total retention/ac constant across treatments
- Operational harvest unit sizes and arrangements
- Incorporate operationally feasible structural enrichment

Experimental Design



Study Locations

- 10 blocks
- 5 treatments/block
- Harvest was complete for all stands in early 2015
- Over 4000 structures

In Collaborative Partnership

- Sean Sultaire
- Dr. Gary Roloff

Structural Retention

Study Taxa

Implications for Forest Carnivores

Are there retention arrangements that provide better support for the prey species of forest carnivores?

How does the arrangement of required structural retention affect:

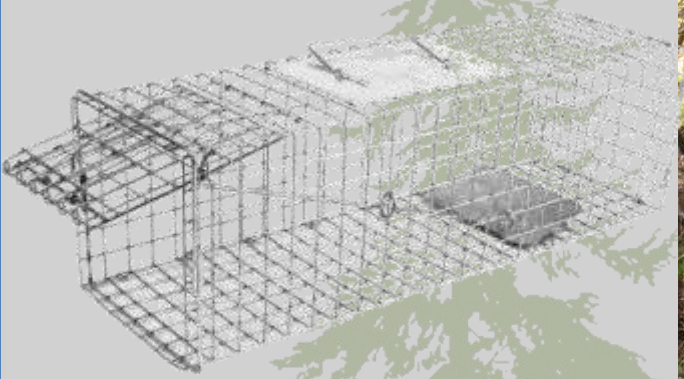
- Plant communities
- Small mammal prey density at the stand scale
- Prey species diversity

Structure Longevity and Plant Community

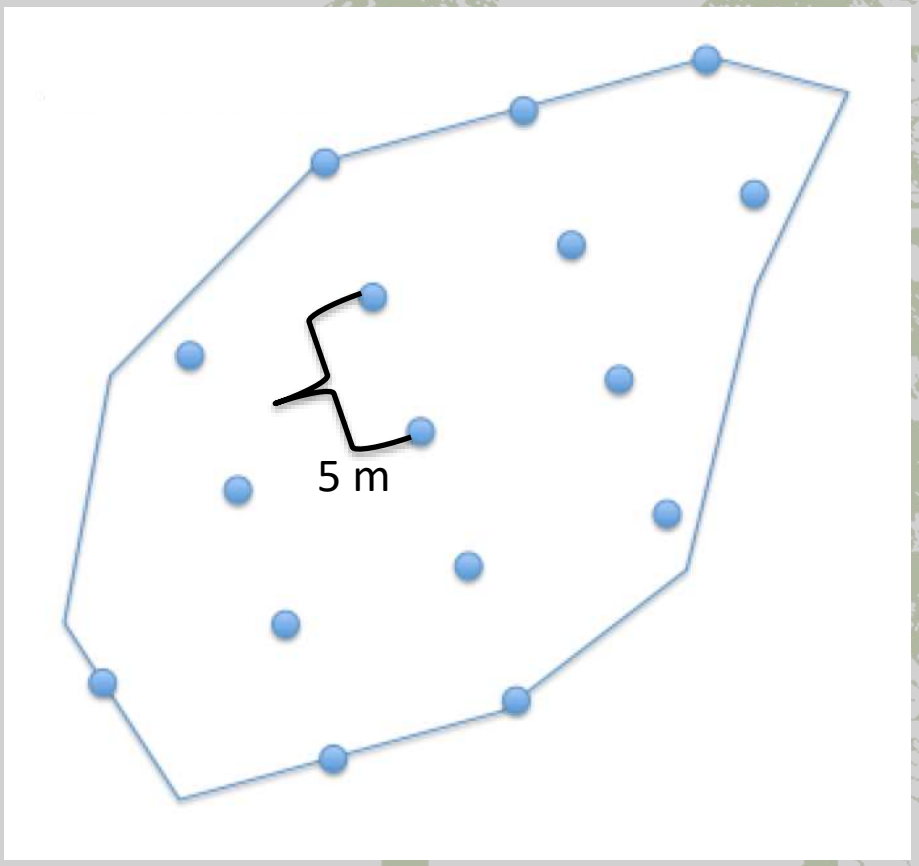
Study Objectives

- **Estimate how density of common small mammal species varies with retention treatment**
  - ***How much biomass of prey is on the landscape?***
- **Estimate how species diversity of small mammal species varies with retention species.**
  - ***What is the range of prey items available to forest carnivores?***

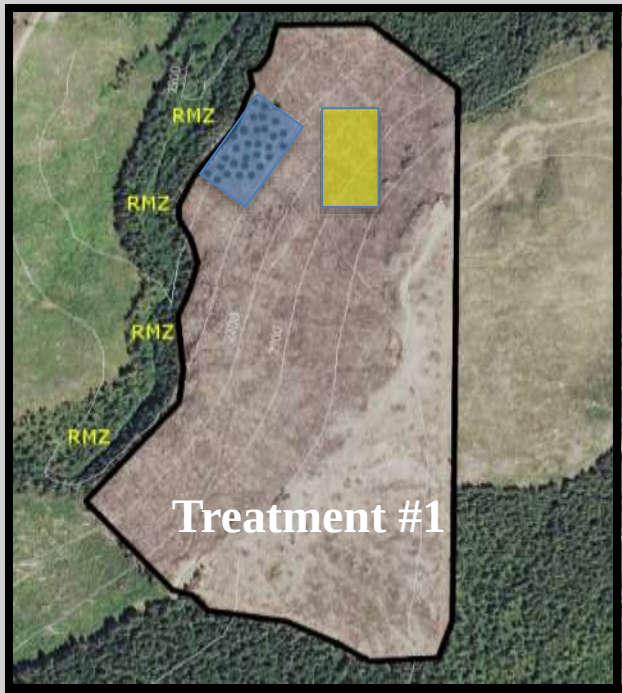
Small Mammal Sampling

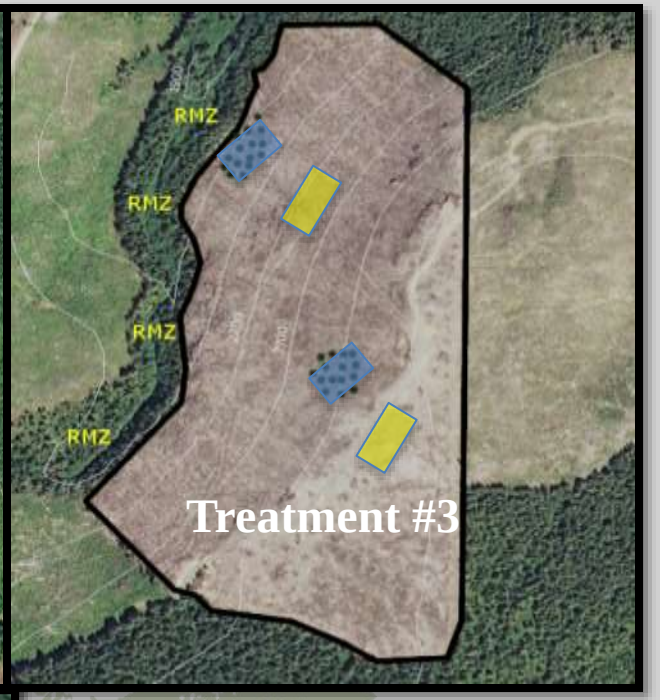


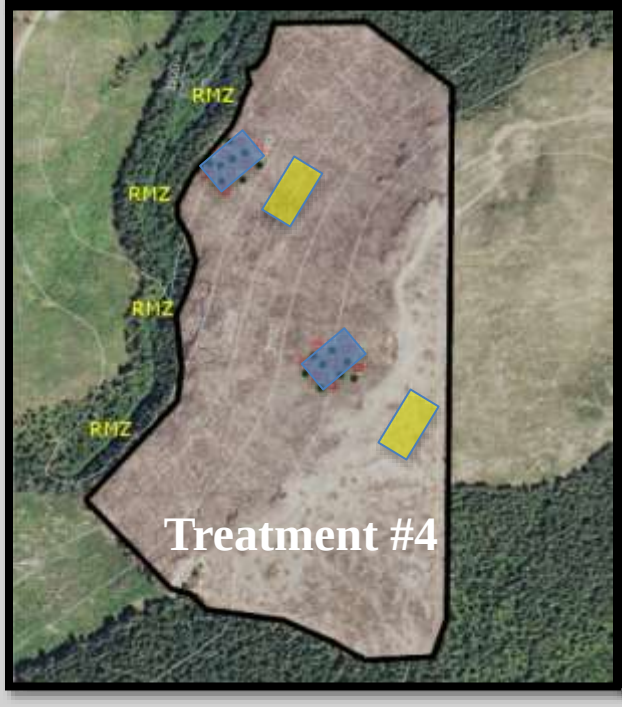
Small Mammal Sampling

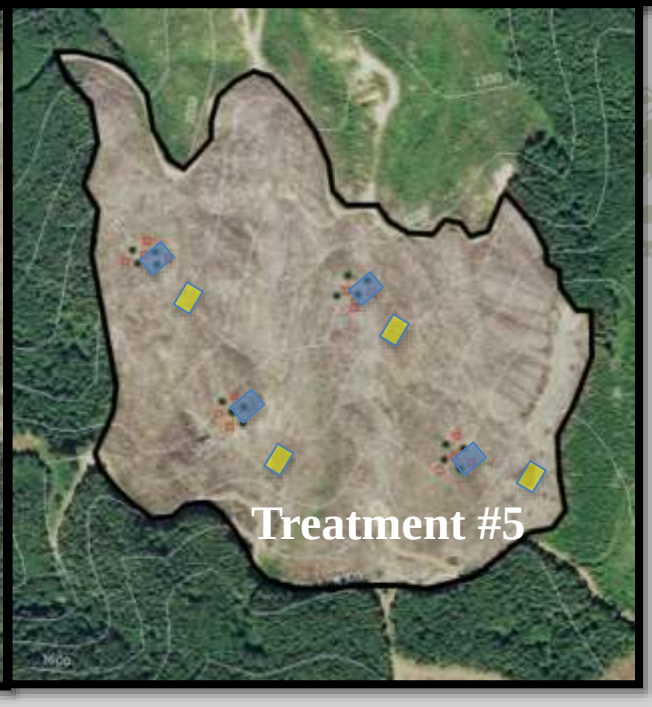


144 traps/stand, 96 Sherman, 48 Tomahawk









Retained Structures

- Green Tree
- Created Snag

- Small mammal patch grid
- Small mammal harvest grid


WONDER GRIP
NITRILE


675

Results

Summer 2017: 30,680 trap nights, 3,690 Captures, 1844 individuals, 26 species total

Deer mice, Townsend's Chipmunk, Creeping Vole, & Trowbridge's Shrew > 90 % of captures

Study Objectives

- **Estimate how density of common small mammal species varies with retention treatment**
  - ***How much biomass of prey is on the landscape?***
- Estimate how species diversity of small mammal species varies with retention species.
  - *What is the range of prey items available to forest carnivores?*

Peromyscus maniculatus

Deer mice

N=1082 animals,
2101 detections

Density (animals/ha)

20
15
10
5
0

1
2
3
4
5

Treatment

Patch
Cut

Townsend's Chipmunk

N= 304 animals,
472 detections

Density (animals/ha)

20
15
10
5
0

1
2
3
4
5

Treatment

Patch
Cut

Bushy−Tailed Woodrat

N=28 animals, 42 detections

Study Objectives

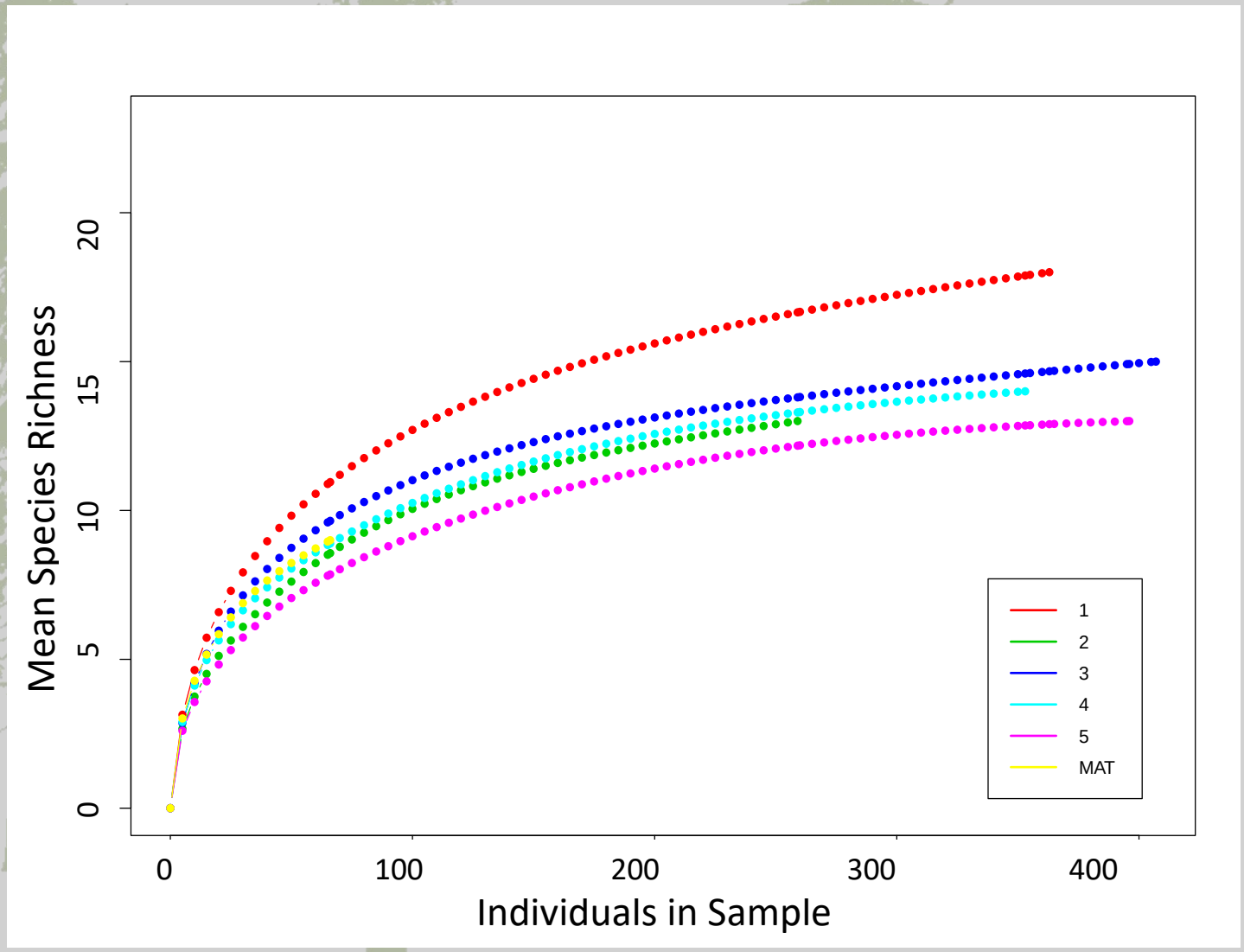
- Estimate how density of common small mammal species varies with retention treatment

  - How much biomass of prey is on the landscape?

- **Estimate how species diversity of small mammal species varies with retention species.**

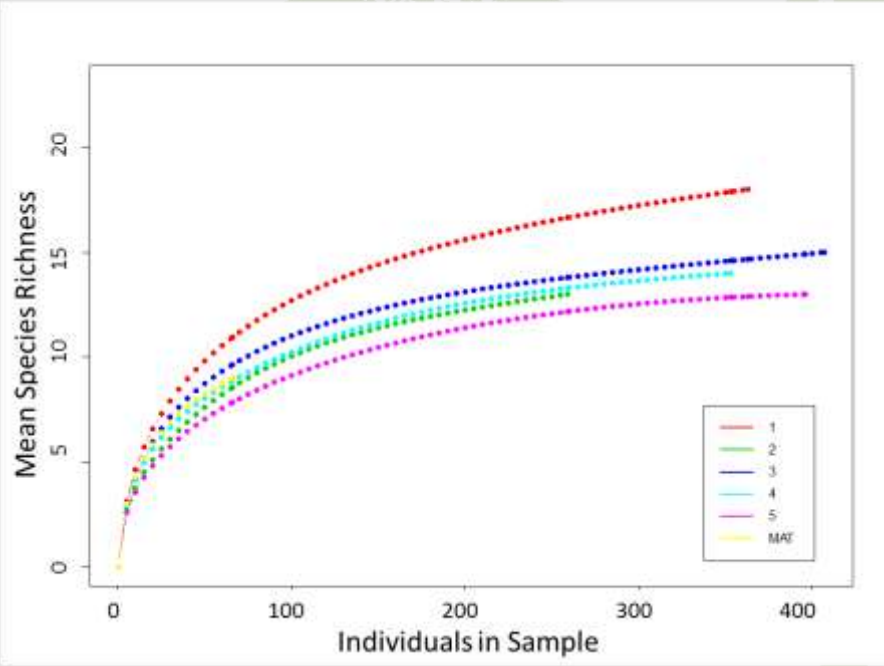
  - What is the range of prey items available to forest carnivores?

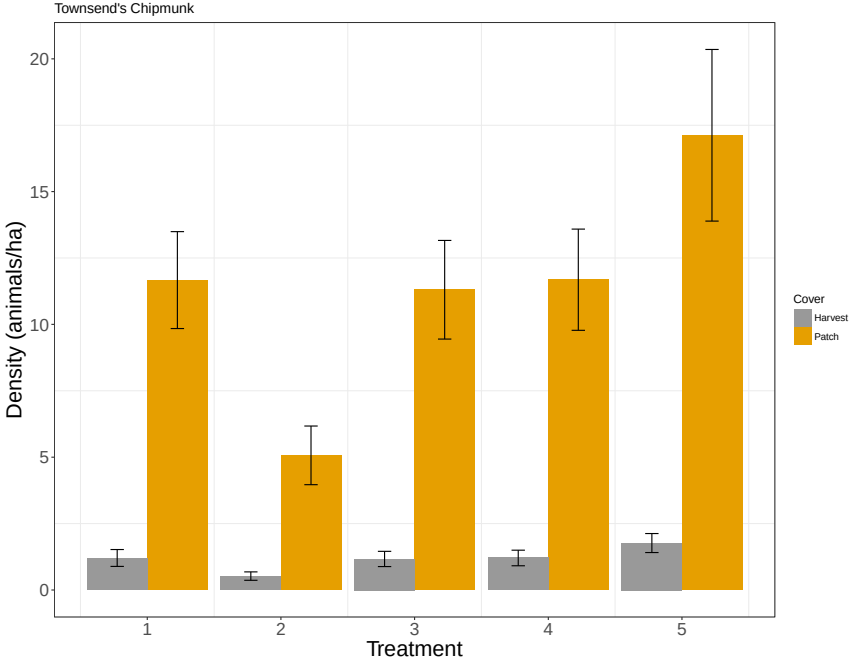
Species Diversity



Density-Diversity Tradeoff?

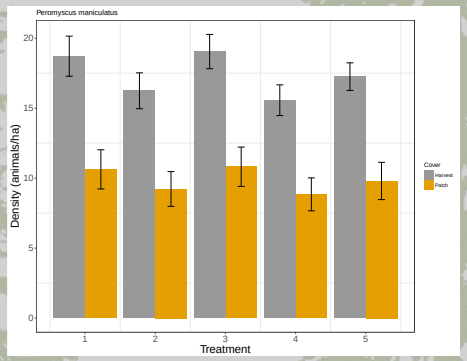
May not be able to maximize both diversity and biomass of prey.

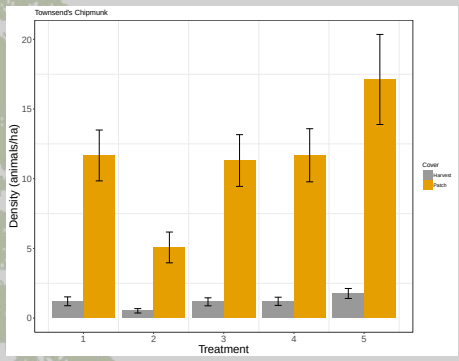




Implications for Forest Carnivore Conservation

- Prey most abundant in open or fragmented habitat



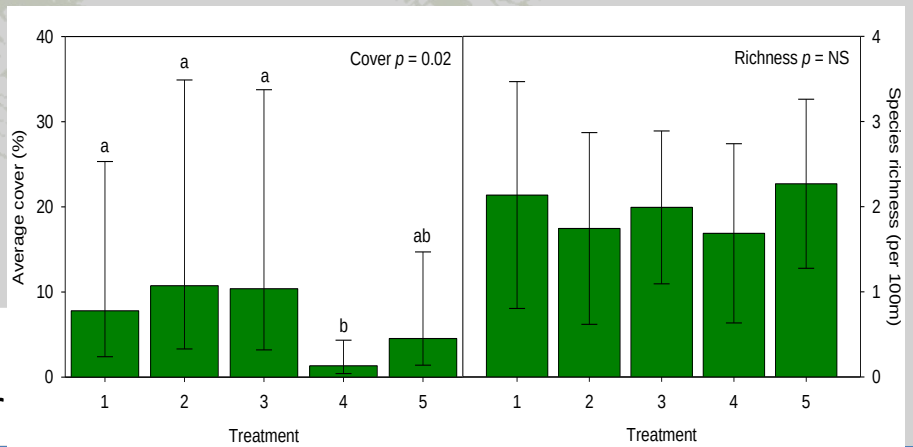


- Preferred prey items appear rare

- Aggregated upland retention support lowest prey base

Future Directions

- Understand how landscape context impacts efficacy of treatments
- Factors that determine rare species occurrence
- Relationship between vegetation and small mammal community



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Weyerhaeuser


Questions?