Plumas-Lassen Administrative Study

Small Mammal Module

Project Leader

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Outline

- Module objectives
- Methods and results
  - Long-term grids
  - Landscape transects
  - Focal species biology
    - Dusky-footed woodrat
    - Northern flying squirrel

Module Objectives

- Habitat associations
- Demography
- Develop and test models
- Assess impacts of treatments
- Evaluate trends
- Methods: Live-trapping, vegetation sampling
  - Long-term grids
  - Landscape transects
- Evaluate focal species biology
- Methods: Live-trapping, vegetation sampling, radiotelemetry
  - Dusky-footed woodrat
  - Northern flying squirrel

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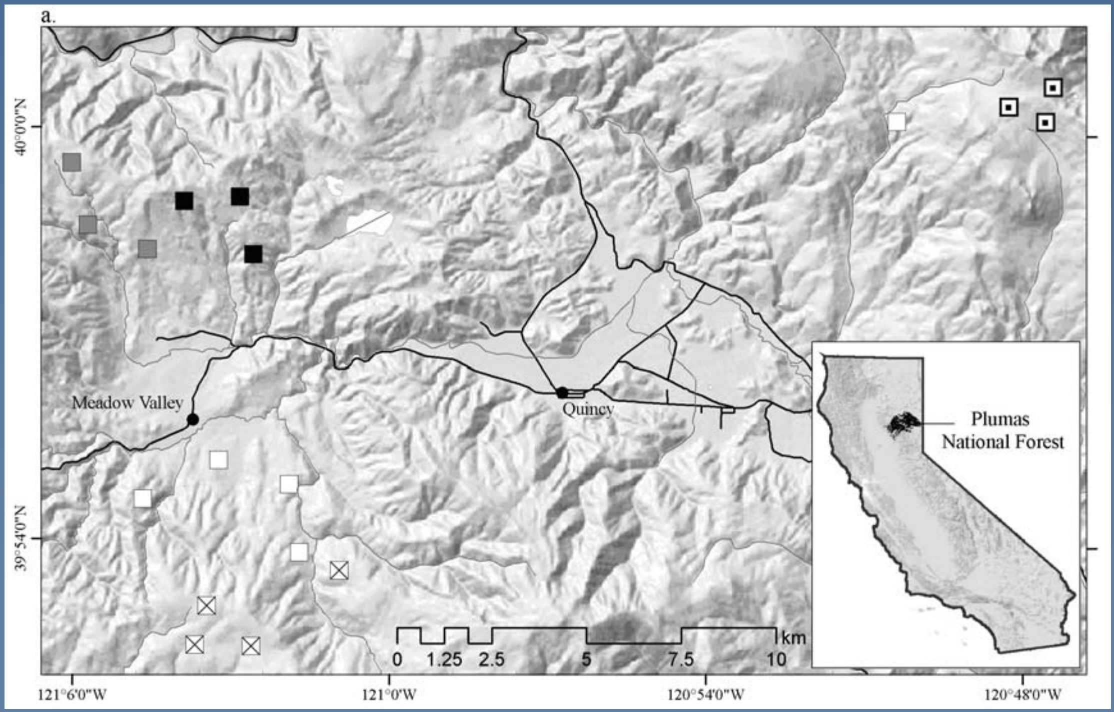
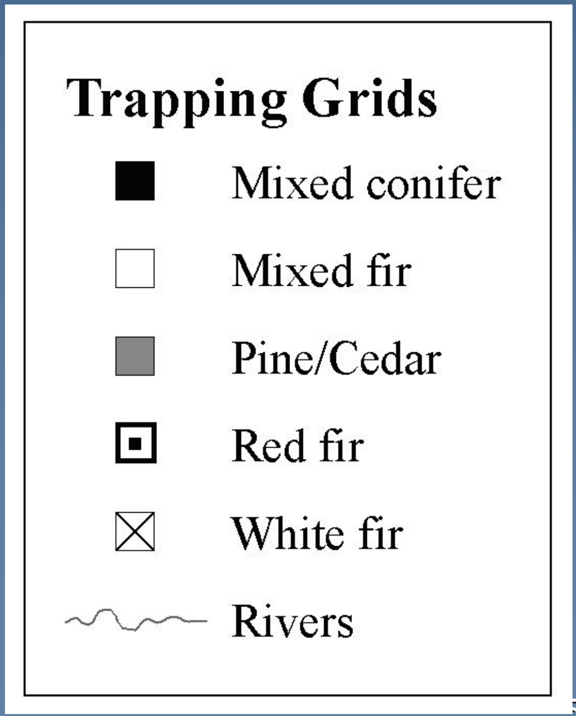
Methods: Long-term Grids

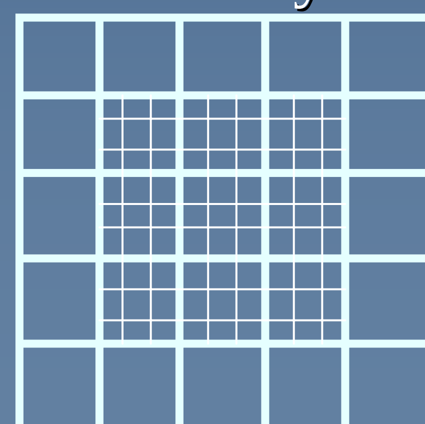
- 21 grids in 5 forest types, 12 placed in experimental plots
  - 3 groups of 4 plots
    - Control
    - Group selection
    - Light thin (50% canopy cover)
    - Heavy thin (30% canopy cover)





Methods: Long-term Grids

- Trapping array
  - 100 Sherman traps, 10-m spacing
  - 72 Tomahawk traps, 30-m spacing
  - 2.25 ha
- 1 session, 4 nights
- Sampled biannually



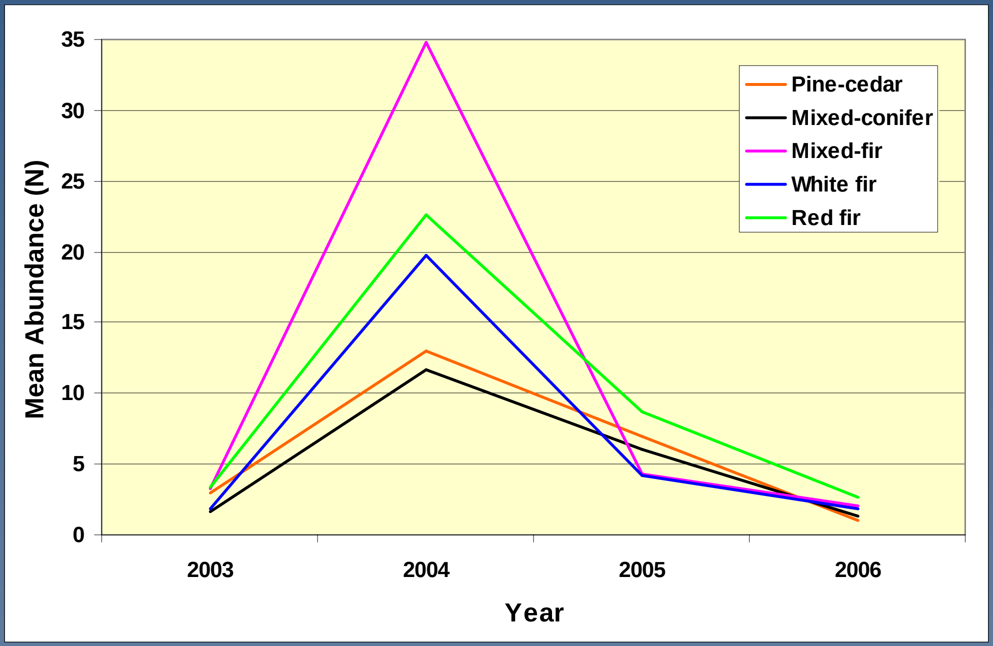
Results: Long-term Grids

- 2006 marked 4th year of pre-treatment data collection
- Several recent and upcoming publications
  - Habitat associations (Stephanie Coppeto)
  - Population dynamics and demographics (James Wilson)
- Captured 451 individuals of 11 species
  - Deer mice (*Peromyscus sp.*) and Chipmunks (*Tamias sp.*) most common

Results: Trends in Deer Mouse Abundance

Deer mouse
Peromyscus maniculatus

Brush mouse
Peromyscus boyleii

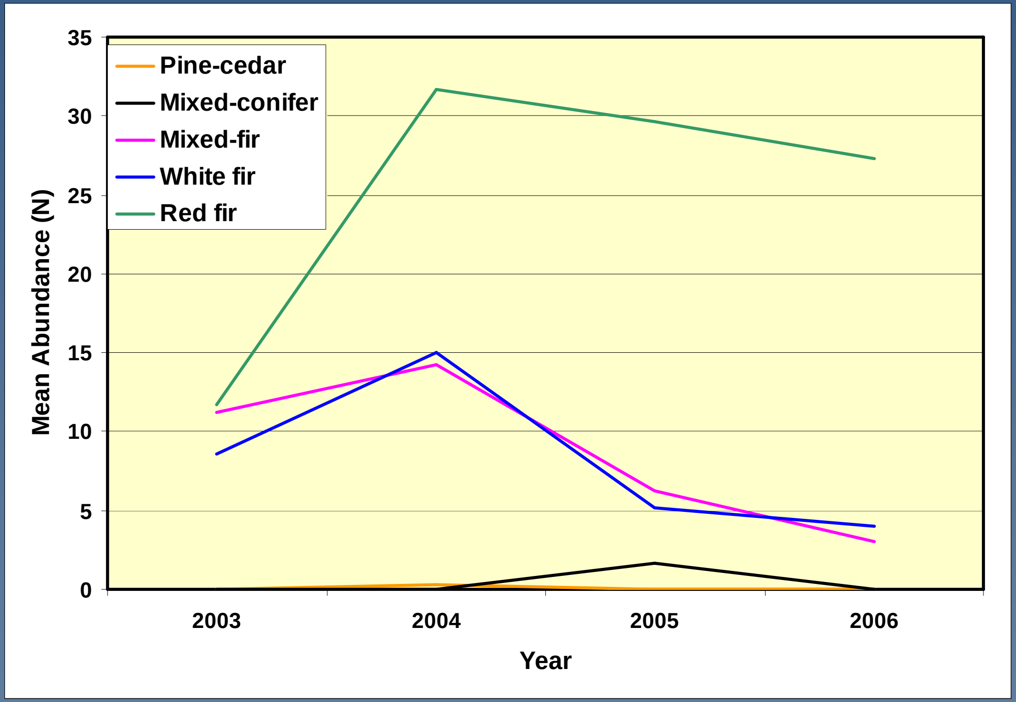


- Macrohabitat and year explained 93% of variation (Coppeto et al., 2005)
- Microhabitat and year explained 69% of variation (Coppeto et al., 2005)
- Survival affected by <u>winter severity</u> and <u>fall cone production</u> (Wilson et al., submitted)

Results: Trends in Chipmunk Abundance

Long-eared Chipmunk
Tamias quadrimaculatus

Shadow Chipmunk
Tamias senex



- Macrohabitat and year explained 67% of variation (Coppeto et al., 2005)
- Microhabitat and year explained 70% of variation (Coppeto et al., 2005)
- Survival affected by winter severity (Wilson et al., submitted)

Future Trajectories: Long-term Grids

- Treatments are scheduled for 2007
  - Need to continue trapping for 2-5 yrs post-treatment to measure effects
- Several future publications
  - Impacts of treatments on small mammals
    - Vegetation
    - Microclimate
    - Fuel loads

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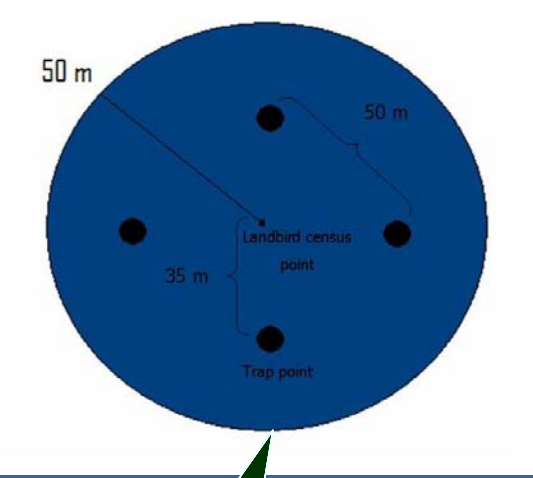
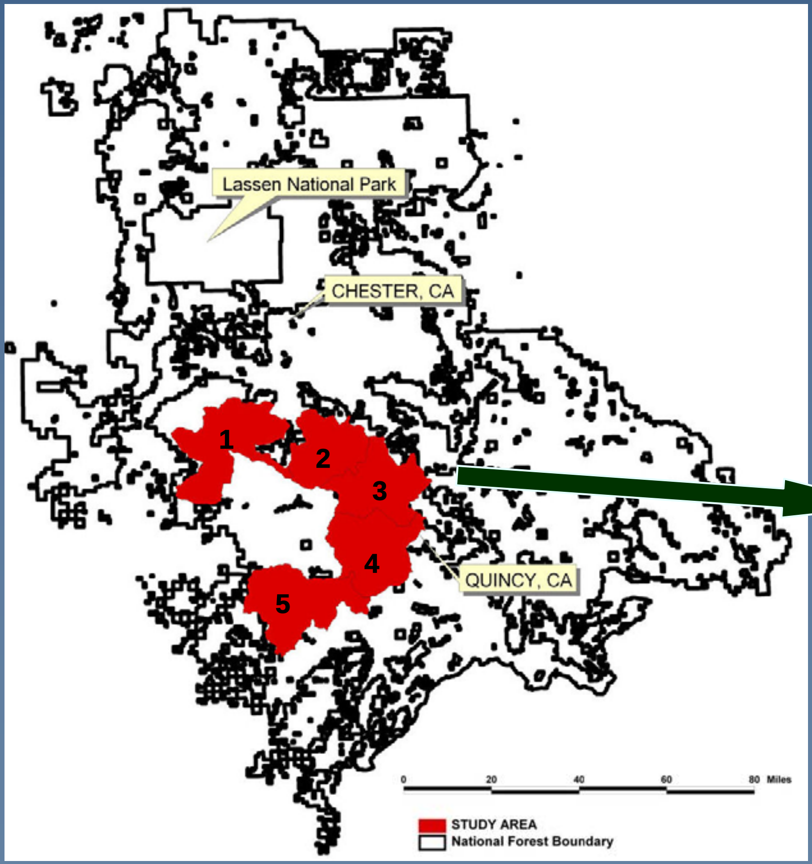
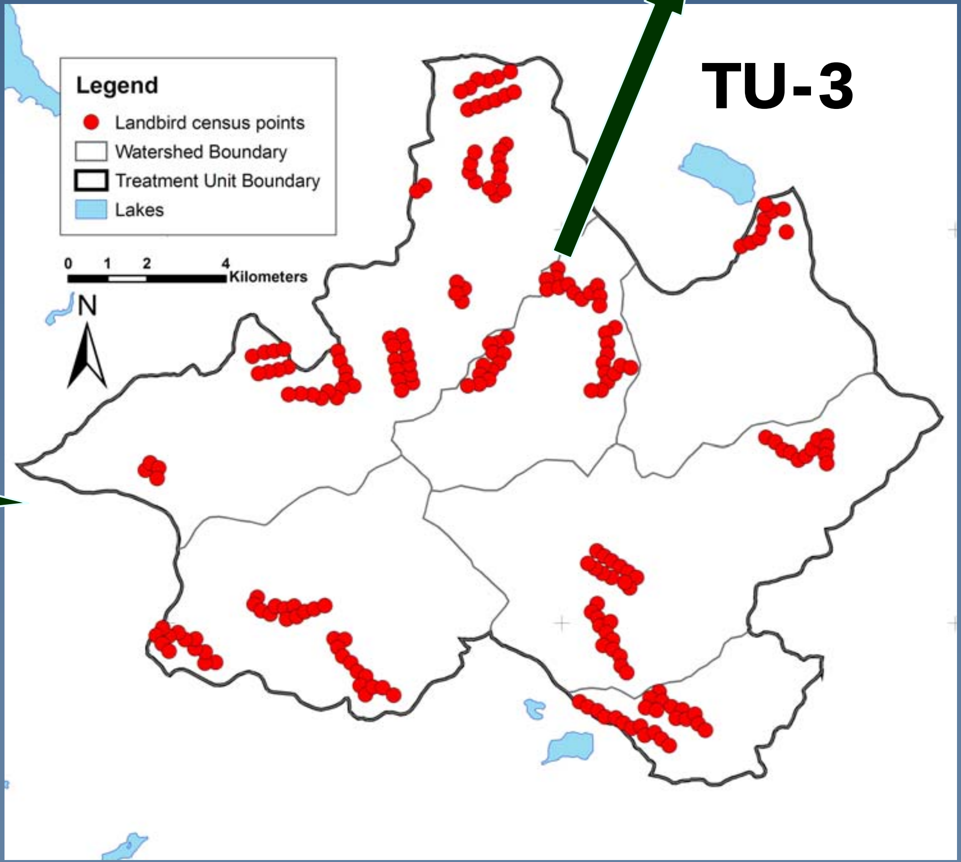
Methods: Landscape Transects

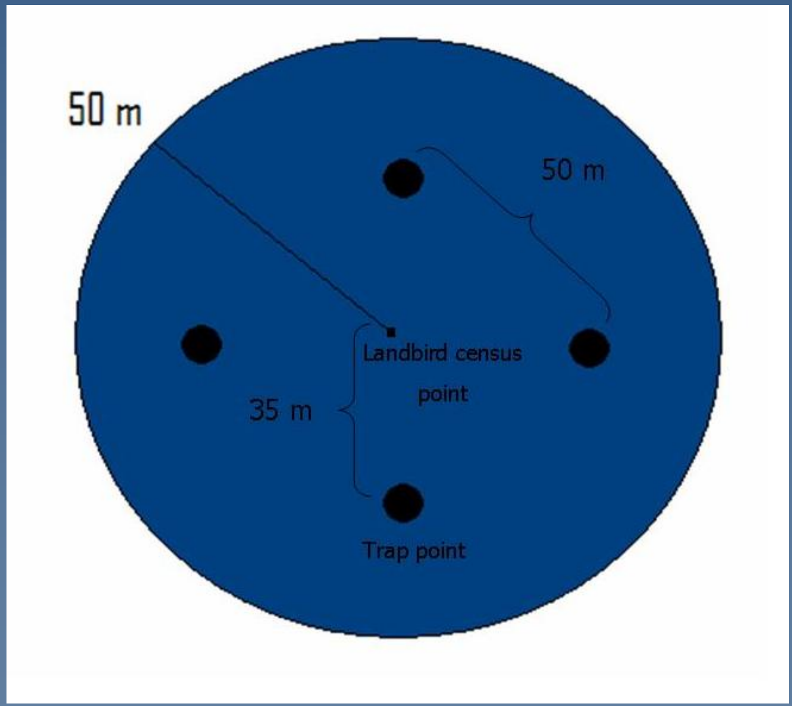






Methods: Landscape Transects

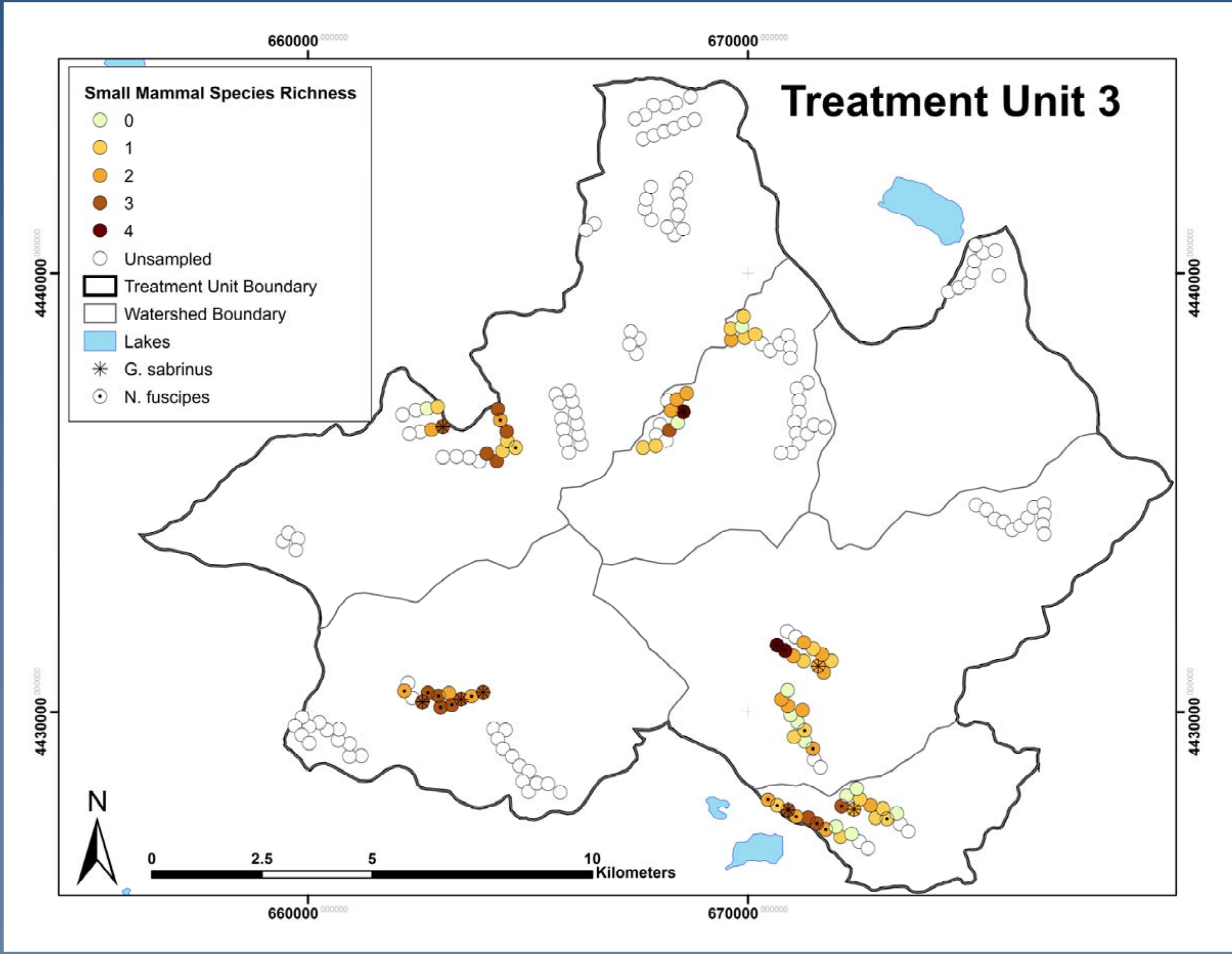
- All grids centered at Landbird Module census points
  - Various forest types
- Trap design
  - 4 Sherman traps, 50-m spacing
  - 8 Tomahawk traps, 50-m spacing
  - 0.25 ha
- 2 sessions, 4 nights



Results: Landscape Transects

- 2006 marked 1st year of data collection
- Captured 909 individuals of 11 species at 176 census points across 4 TUs
  - Average number of species varied across census points, transects, and TUs
    - TU-5 and TU-4 > TU-3 and TU-2

Results: Landscape Transects



Future Trajectories: Landscape Transects

- Increase sample size
- Future publications
  - Integrate mammal abundance, species richness, and habitat association data with that of other modules

Outline

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  - Focal species biology
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Focal Species:

Dusky-footed woodrats
Neotoma fuscipes

Habitat Associations and Home Range


Natural History

- Arboreal, nocturnal rodent
- Solitary, territorial
- 215 grams
- Varied habitats
- Oak specialist
- Build “houses”


Woodrat Stick Houses

- Houses important for all life stages
  - Adults, subadults
  - Males, females
- Food storage
- Nurseries
- Protection
- Social communication

Objectives

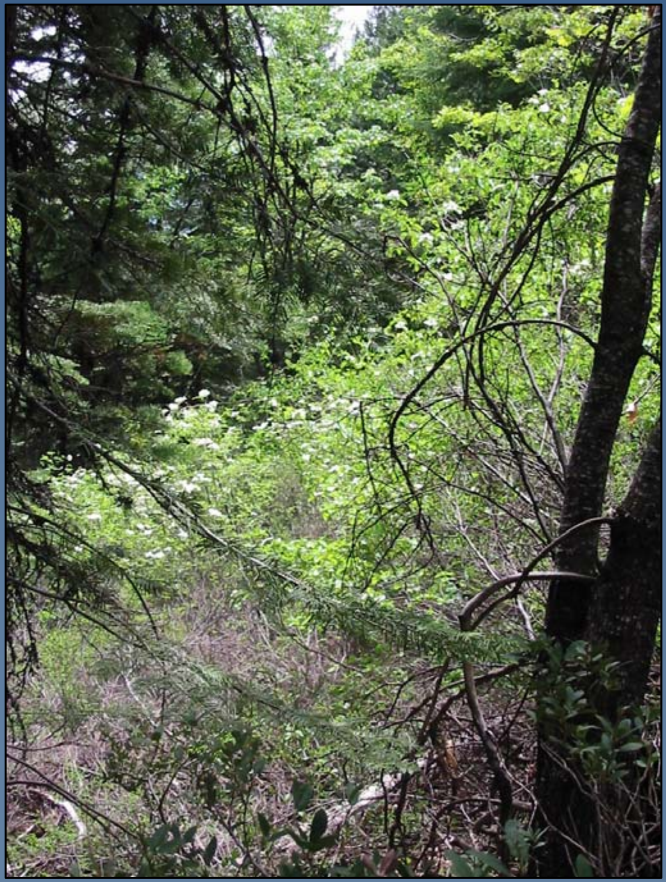
To determine habitat associations

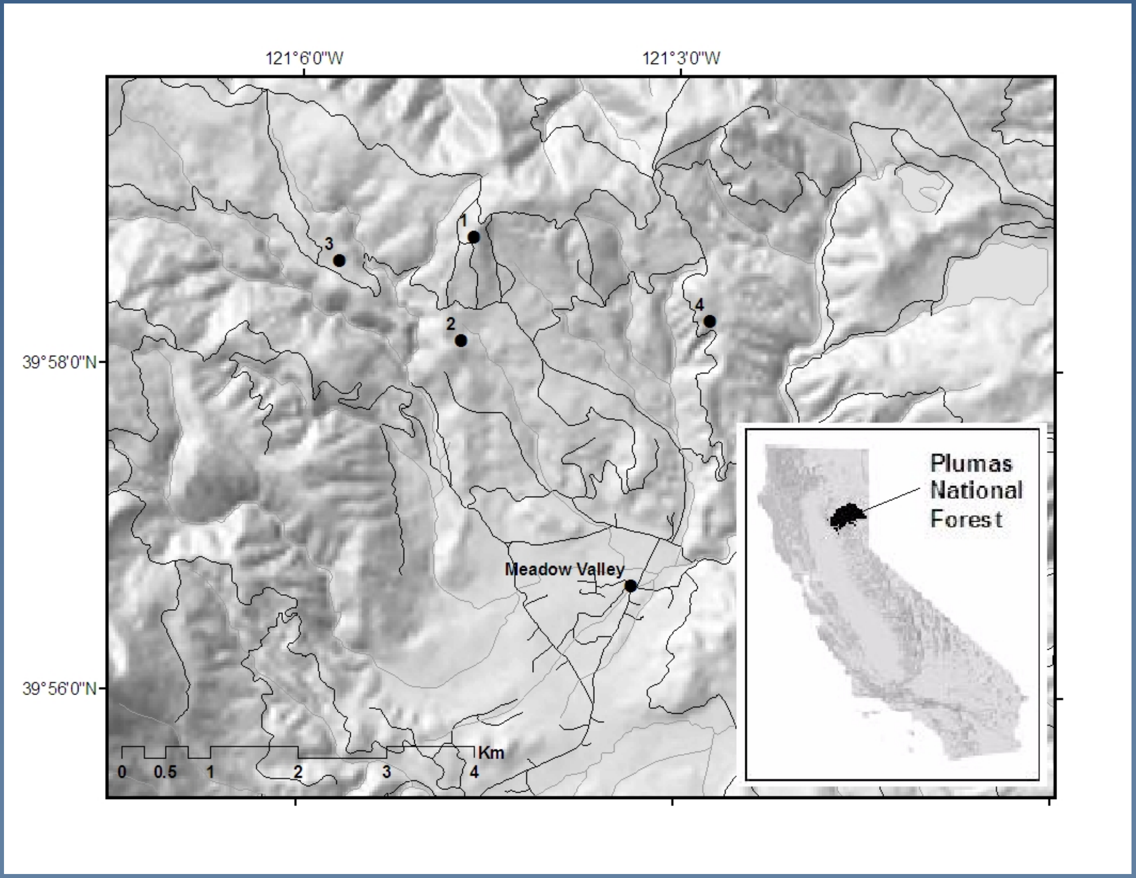
- Macrohabitat
  - Relationship with California black oak
- Microhabitat
  - House-site selection

To determine space use, movement patterns, and social organization

- Home range/Core range
- Overlap

Study Area




121°6'0"W
121°3'0"W
39°58'0"N
39°56'0"N
1
2
3
4
Meadow Valley
0
0.5
1
2
3
4
Km
Plumas
National
Forest

Methods

Live-trapping

- 4 traps placed at each house

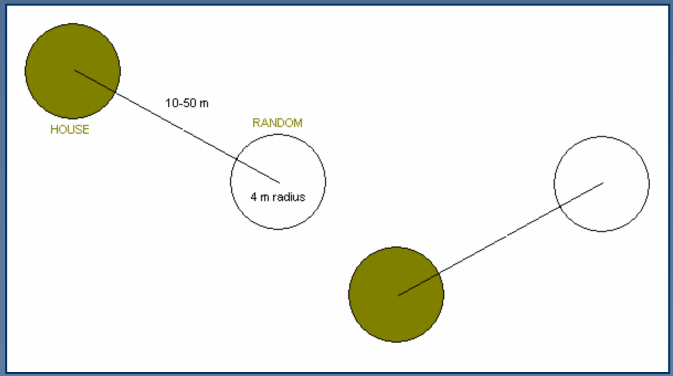
Radiotelemetry

- Diurnal and nocturnal locations

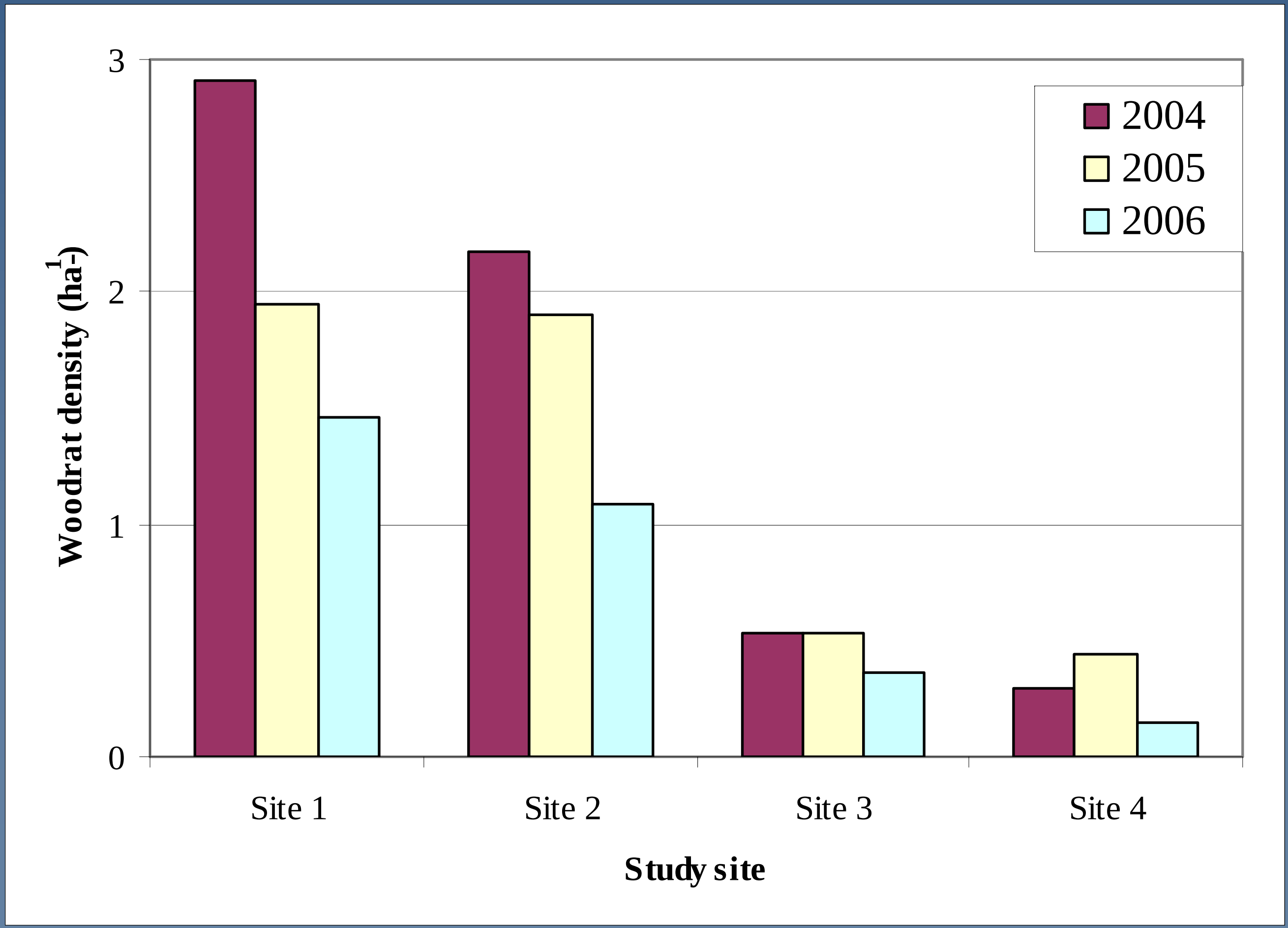
Vegetation sampling

- Macrohabitat
  - Density of large oaks
- Microhabitat
  - 4 m radius plots centered at houses and random plots
  - 22 habitat variables

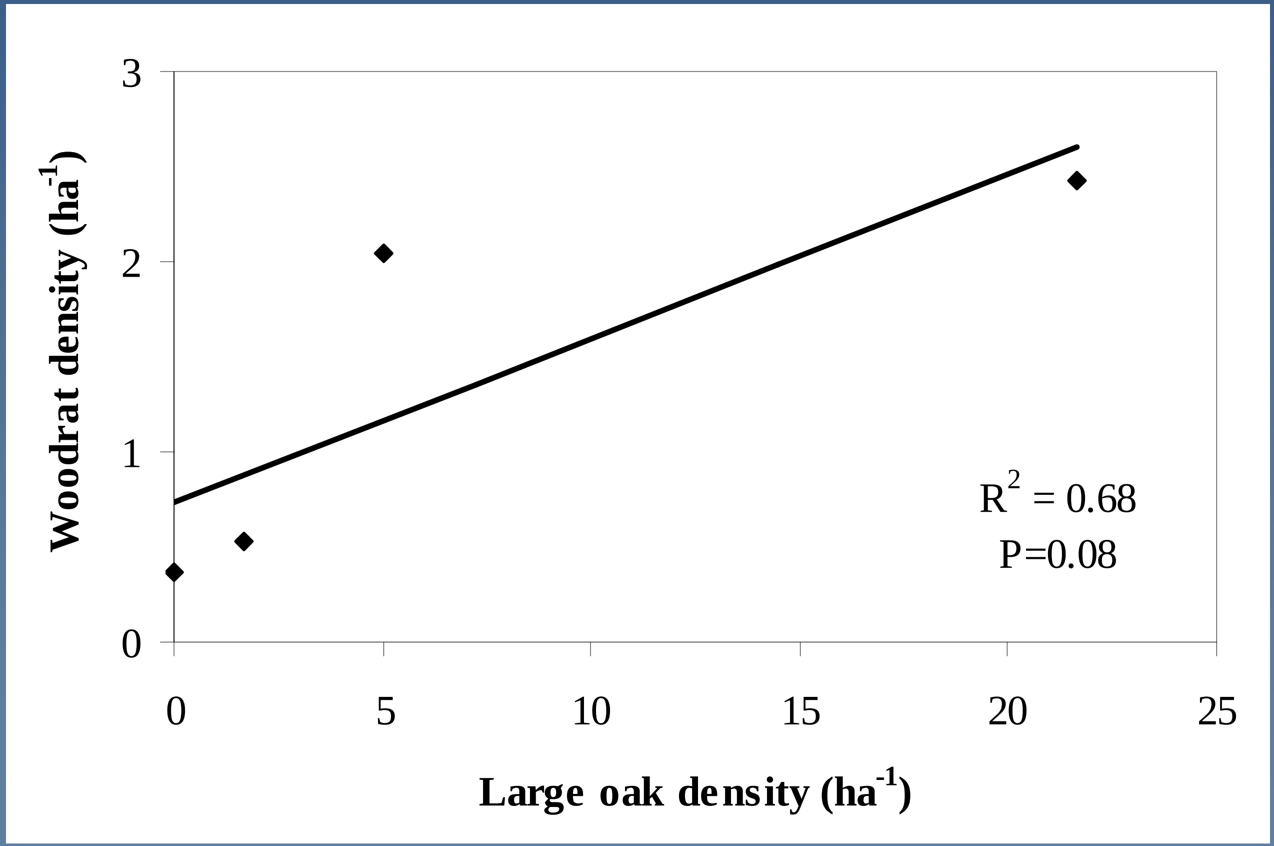
Microhabitat



Results: Woodrat Density



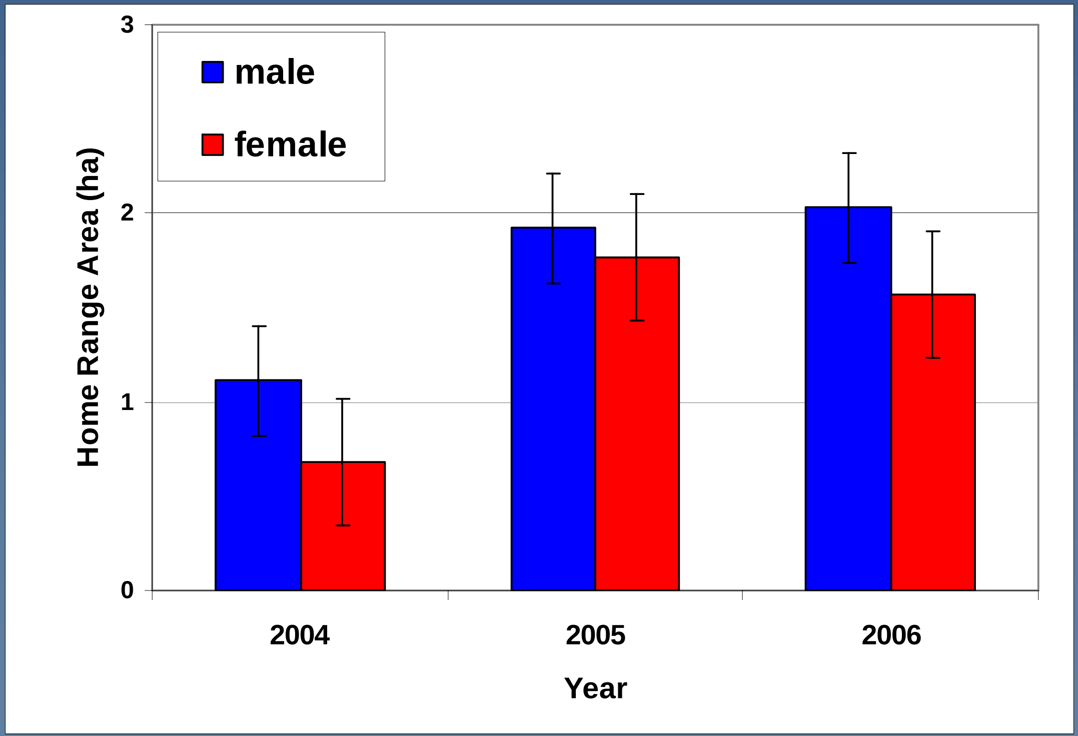
Results: Macrohabitat Associations



Results: Microhabitat Associations

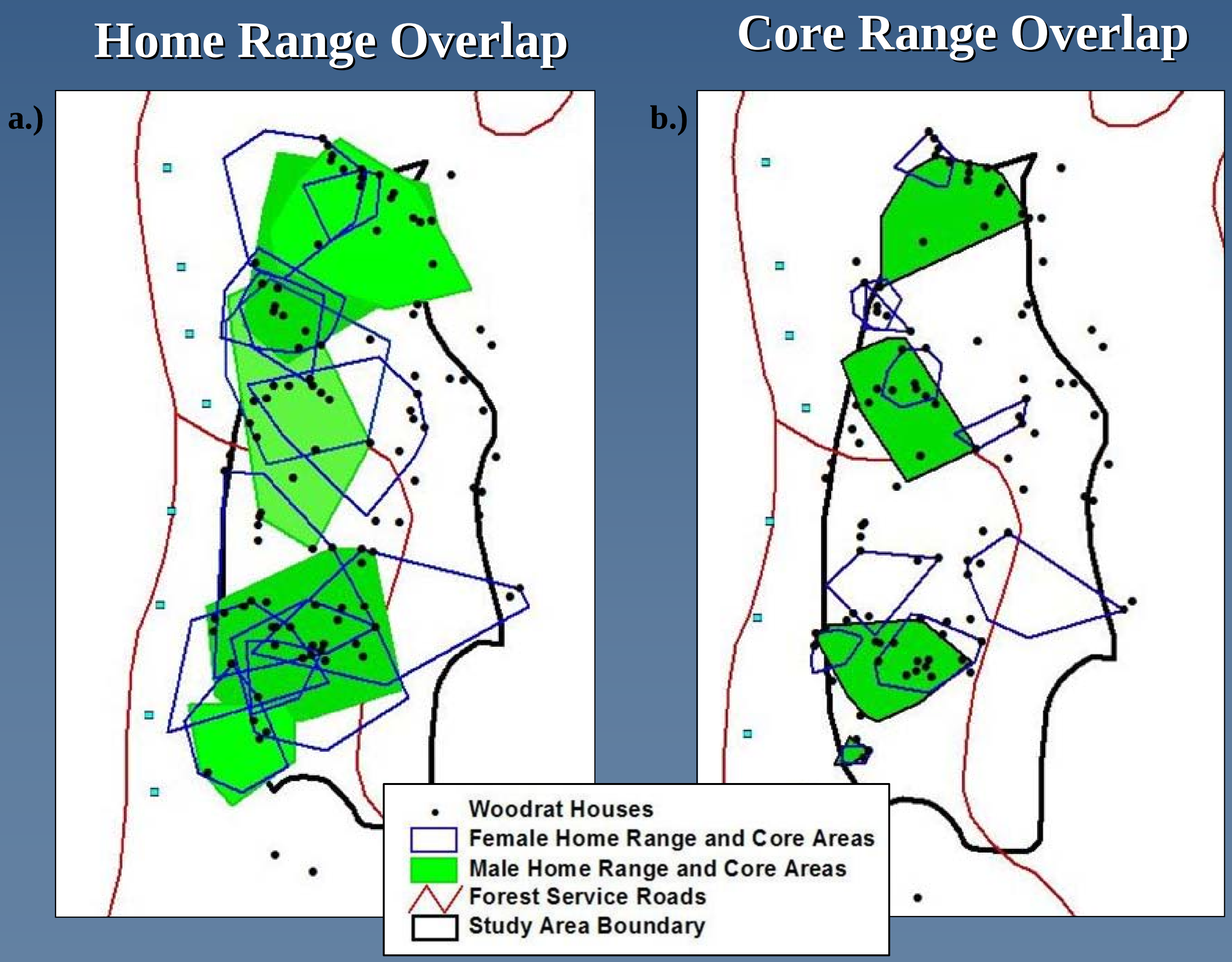
- Large logs (+)
- Large stumps (+)
- Slope steepness (+)
- Mat-forming shrubs (-)
- Bare ground (-)

Results: Home Range



- Larger than other populations
- Yearly differences
- Males > females

Results: Overlap



Focal Species:

Northern Flying Squirrels
Glaucomys sabrinus

Habitat Use and Home Range

Objectives

1. Quantify Den Trees
2. Home Range Estimates
3. Habitat Preference

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Vegetation Surveys

- Characterize and Measure Den Trees
- Habitat Characteristics
- Comparison Plots

Vegetation Surveys

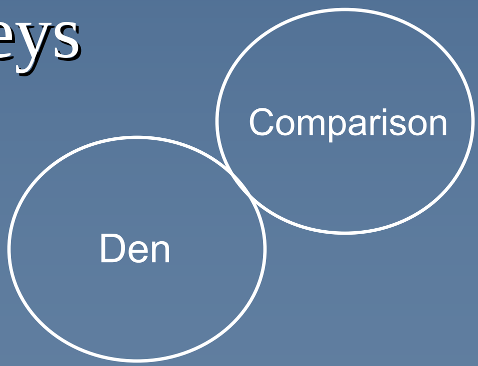
- Characterize and Measure Den Trees
  - Species identification
  - Measurement
  - Identify den type
- Habitat Characteristics
- Comparison Plots

Vegetation Surveys

- Characterize and Measure Den Trees
- Habitat Characteristics
  - Measure all trees within 18m radius (0.1 hectare)
  - Identify five most common shrubs
  - Canopy readings
- Comparison Plots

Vegetation Surveys

- Characterize and Measure Den Trees
- Habitat Characteristics
- Comparison plots
  - Paired with den habitat surveys
  - Same measurements



Den Trees

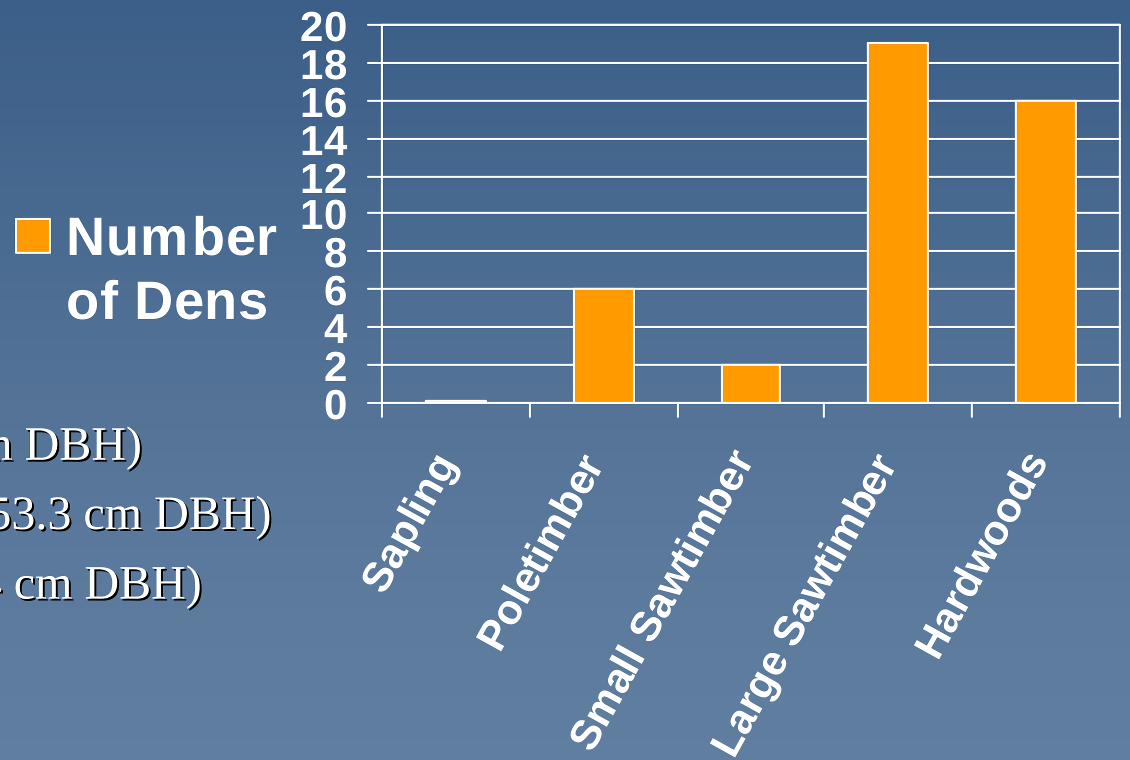
Common name	Average DBH (cm)	n
California Black Oak	29.5	12
White Fir	56.9	10
Douglas Fir	86.1	8
Red Fir	58.3	4
Big-leaf Maple	19	4
Incense Cedar	77	4
Jeffrey Pine	152	1
Ponderosa Pine	109	1

Dens

- 49% were in cavities
- 12% were external stick nests
- 39% were unidentified

Den Trees

- Tree classes
  - Sapling (<10 cm DBH)
  - Poletimber (10 - 27.9 cm DBH)
  - Small Sawtimber (28 – 53.3 cm DBH)
  - Large Sawtimber (≥53.4 cm DBH)
  - Hardwoods (any size)



Black Oak Dens

- 29.5 cm (11.6 inch) DBH
- N = 12
- Five were snags
- All identified dens were in cavities

White Fir Den Trees

- 59.6 cm (22.4 inch) DBH
- N = 10
- Smallest 14 cm (5.5 inch) DBH!
  - Three smallest dens were external, not cavity
- Largest 102 cm (40 inch) DBH

Other Studies?

- Bakker and Hastings (2002, Alaska)
  - 29 to 173 cm DBH
- Carey (2000, Pacific Northwest)
  - As small as 10 cm DBH
- This study
  - 13 to 152 cm DBH

Two Main Site Types

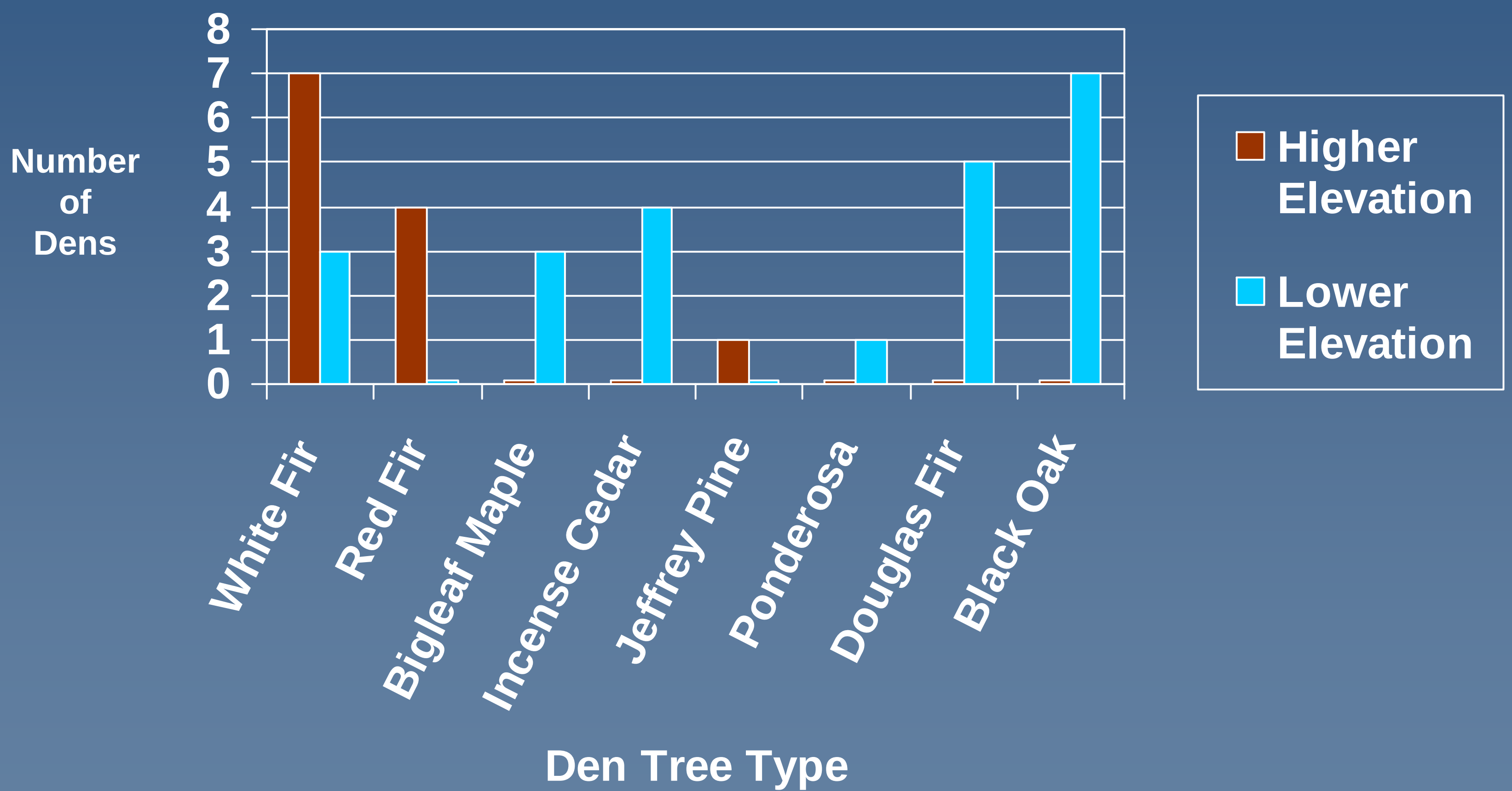
Higher Elevation

- Red and White Fir
- No Douglas Fir, Black Oak, Maple

Lower Elevation

- White Fir, Douglas Fir, Black Oak, Maple
- No Red Fir

Higher Elevation Sites and Lower Elevation Sites



Comparison Between Higher Elevation and Lower Elevation Sites

- Number of dens:
  - Higher Elevation = 12
  - Lower Elevation = 30

Comparison Between Higher Elevation and Lower Elevation Sites

- Number of dens:
  - Higher Elevation = 12
  - Lower Elevation = 30

- Focus:
  - More Data from Higher Elevation Sites

Objectives

1. Quantify Den Trees
2. Home Range Estimates
3. Habitat preference

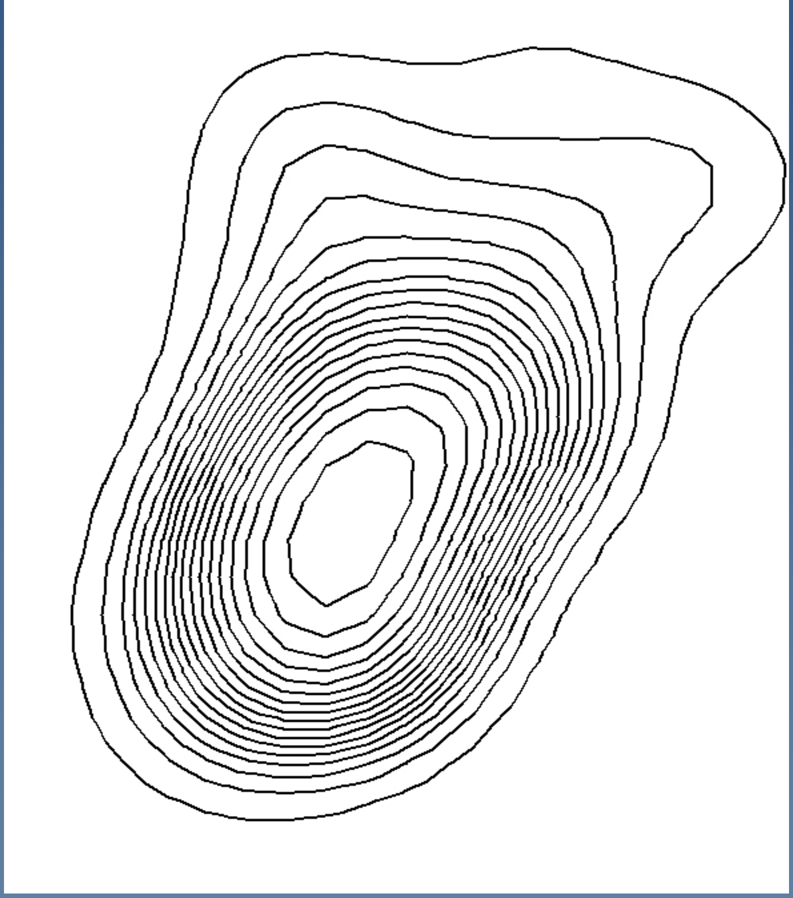
Home Range Estimators

- Average home range size
  - 17.56 hectares from Kernel Estimator
  - 12.55 hectares from Minimum Convex Polygon Estimator

Objectives

1. Quantify Den Trees
2. Home Range Estimates
3. Habitat preference

Kernel Estimator



- Estimates animal's home range area
- Helps Identify:
- **CORE USE AREAS**, which are areas that an animal uses more frequently than other areas within its home range.

What Is Next?

To Identify Habitat Preference We Will Compare:

1. Core Use Areas with other areas in home range
2. Areas within and areas without the home range

Informed Management


Thank you!
Any questions?