Desert Pocket Mouse Threats Assessment and Population Monitoring

Presented by:

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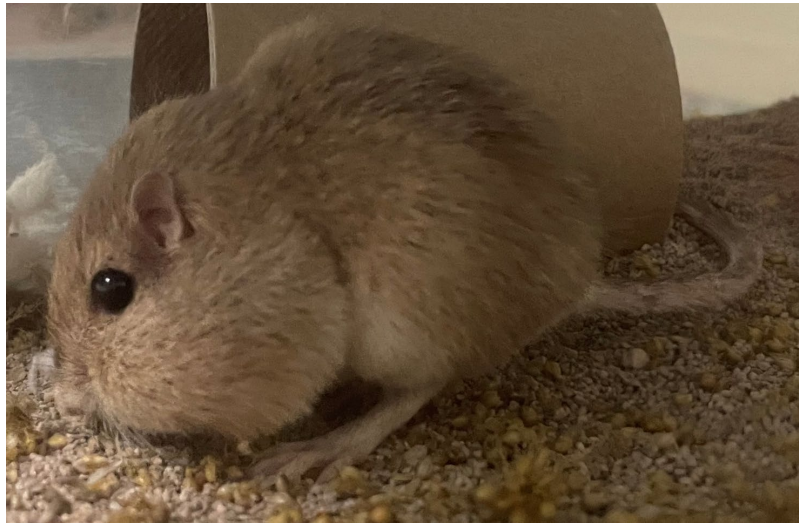
University of Nevada, Las Vegas

and

BEC Environmental



Project Purpose



The desert pocket mouse (*Chaetodipus penicillatus*)

- *C. p. sobrinus*
- conservation concern by Clark County
- Greatest Conservation Need by NDOW.

The species has been proposed for inclusion as a covered species under the MSHCP and Incidental Take Permit.

This project was established to collect information on the species to develop conservation strategies.

Current Project Components

- 2-year project
  - 2024 - 2026
- Collect information on *C. p. sobrinus*
  - Population Demographics
  - Habitat
- Assessment of Potential Threats
  - Combined w/previous research



Demographics and Habitat

Goals/Objectives

- Quantify population demographics of *C. p. sobrinus*
  - Understand natural population density and cycles, longevity, and survival

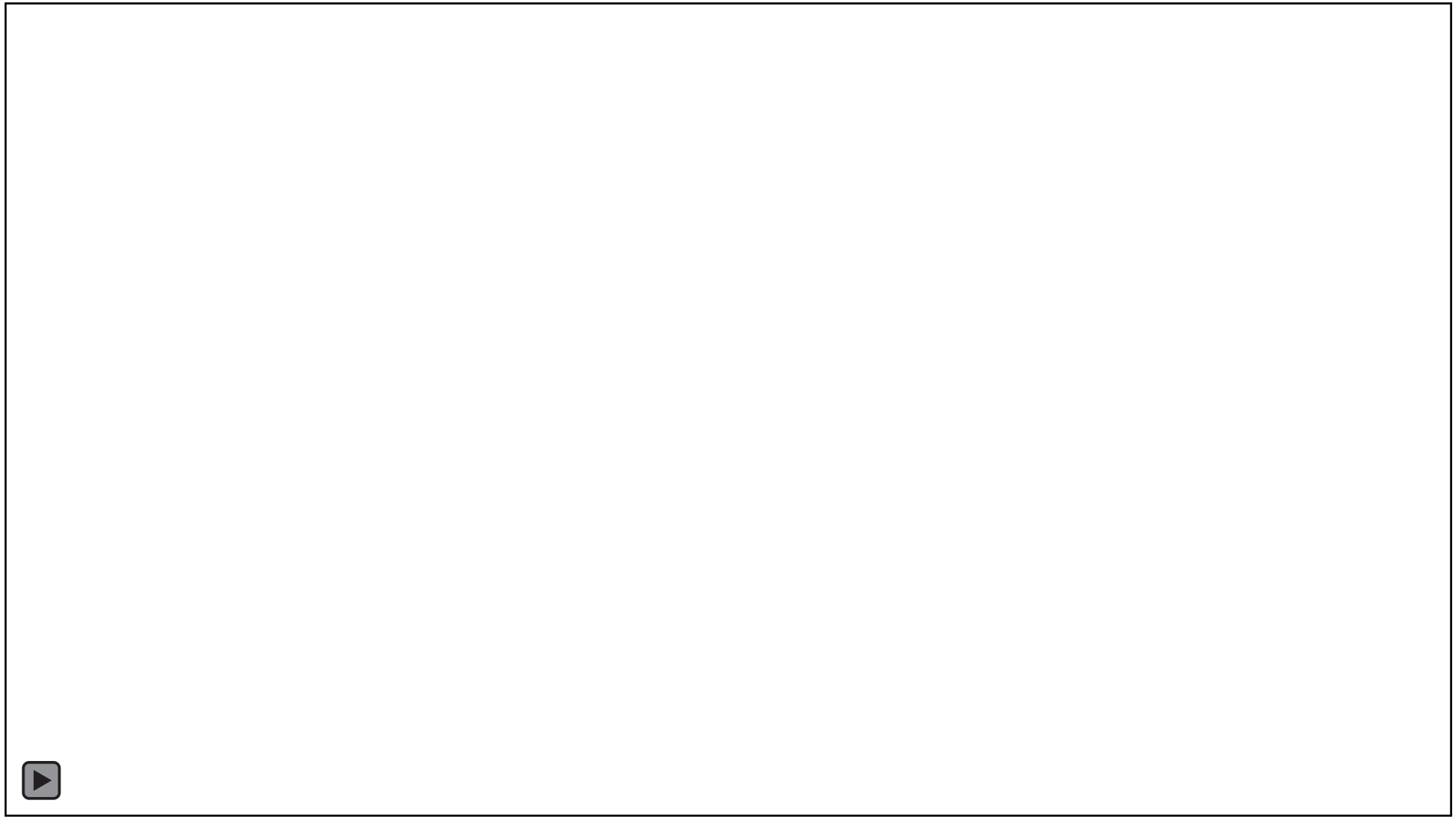
- Quantify habitat variables at two sites
  - Identify key habitat features for managing/restoration
  - Provide additional habitat info for enhancing models/predictive mapping

- Relate demographic parameters to habitat characteristics

Study Area

- The study area includes portions of the Riparian Corridor along the Virgin River.
- Two locations were chosen to conduct both the Population Monitoring and Habitat Assessment Studies.





First site had to be abandoned in Fall 25

New site wasn’t added until Spring 26

Methods - Demographics

- Fall of 2024 – Fall 2025.
- Robust Design Capture-Mark-Recapture method
- Each Site consisted of 200 Sherman-live traps
  - 10 transects,10 stations, 10 meters, 2 traps
  - Effective areas of 1 hectare
- Trap up to 4 consecutive nights

- Target individuals were pit tagged and released
- Data was collected using ArcGIS Survey123.



Methods - Habitat

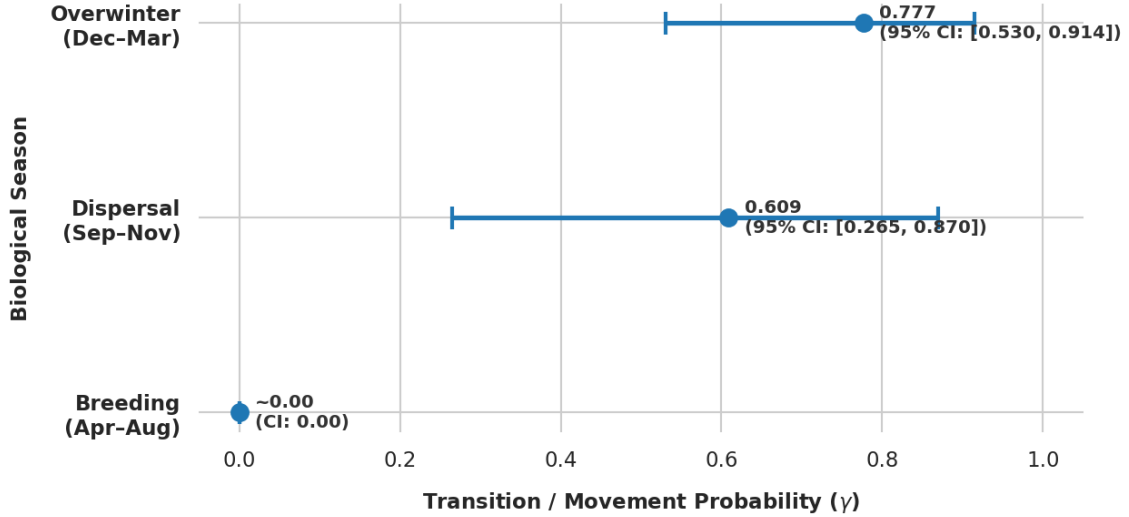
- Spring of 2025
- Measured parameters:
  - Perennial vegetation species composition
  - Vegetative vertical density
  - Canopy coverage
  - Canopy height
  - Soil cover
- Compared sites and use vs. unused stations
  - X^2
  - Binomial logistic regression
    - Odds ratios

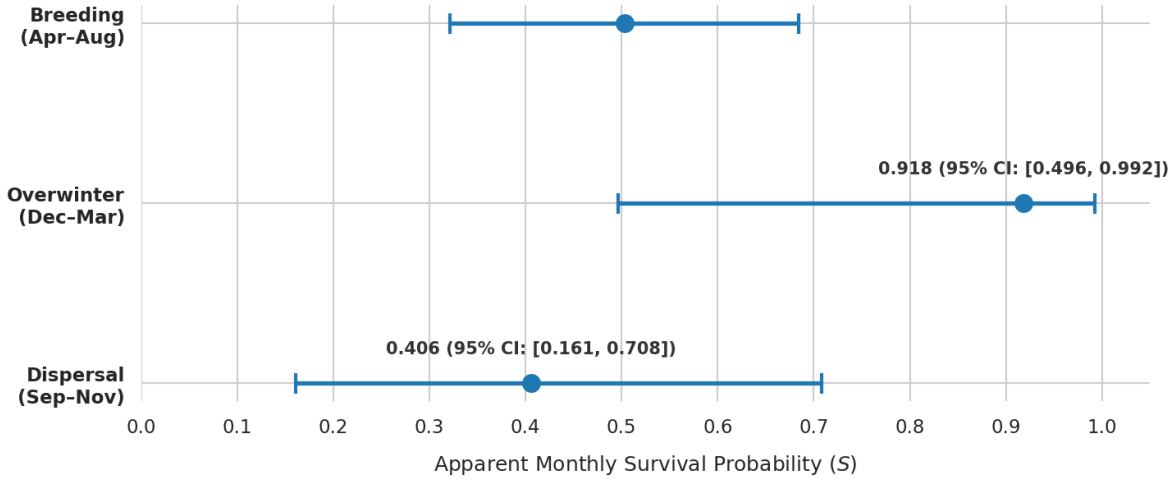


Results - Demographics

- Bunkerville East
  - 7 primary occasions
    - Fall 2024 – Fall 2025
  - Best model included temporal variation
    - p
    - γ
    - S →not sig diff



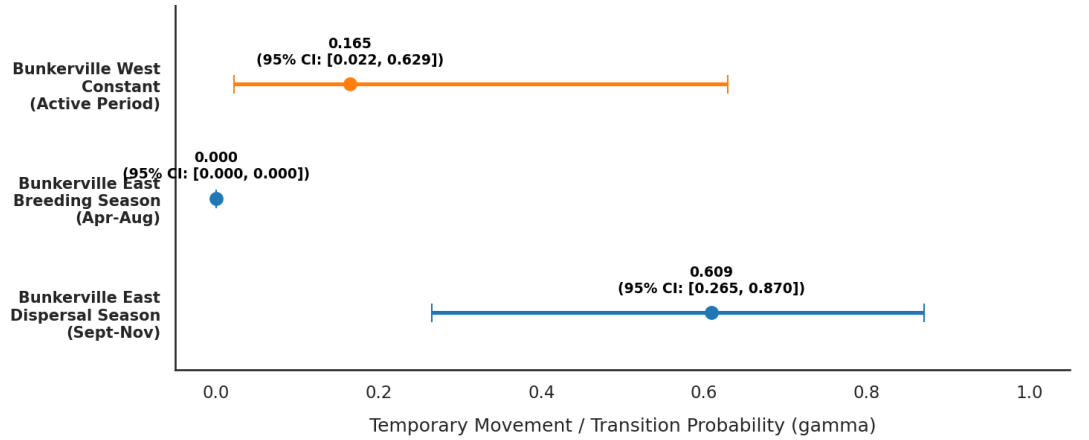


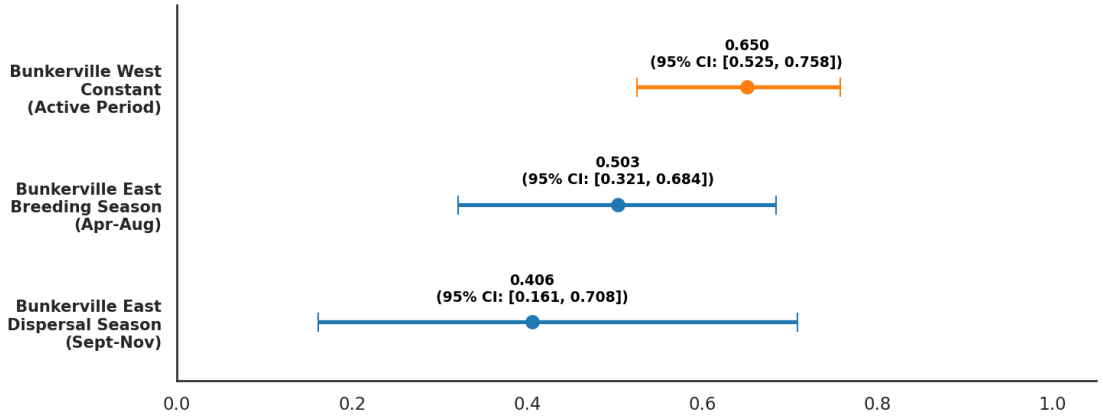


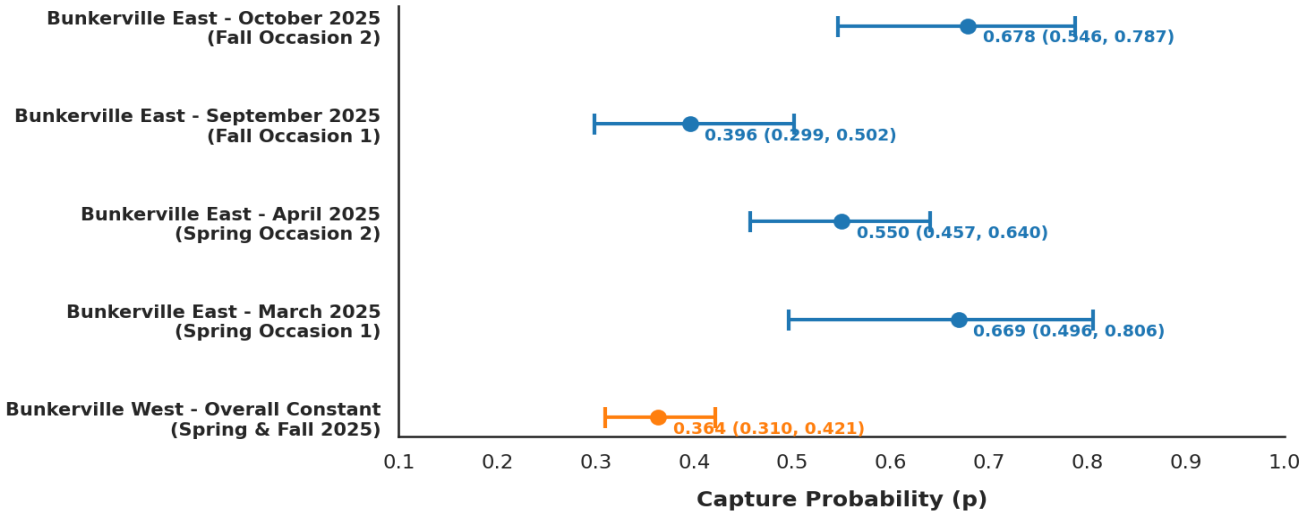
Results - Demographics

- Bunkerville West
  - 4 primary occasions
    - Spring – Fall 2025
  - Constant S, p, γ

- Capture probability lower

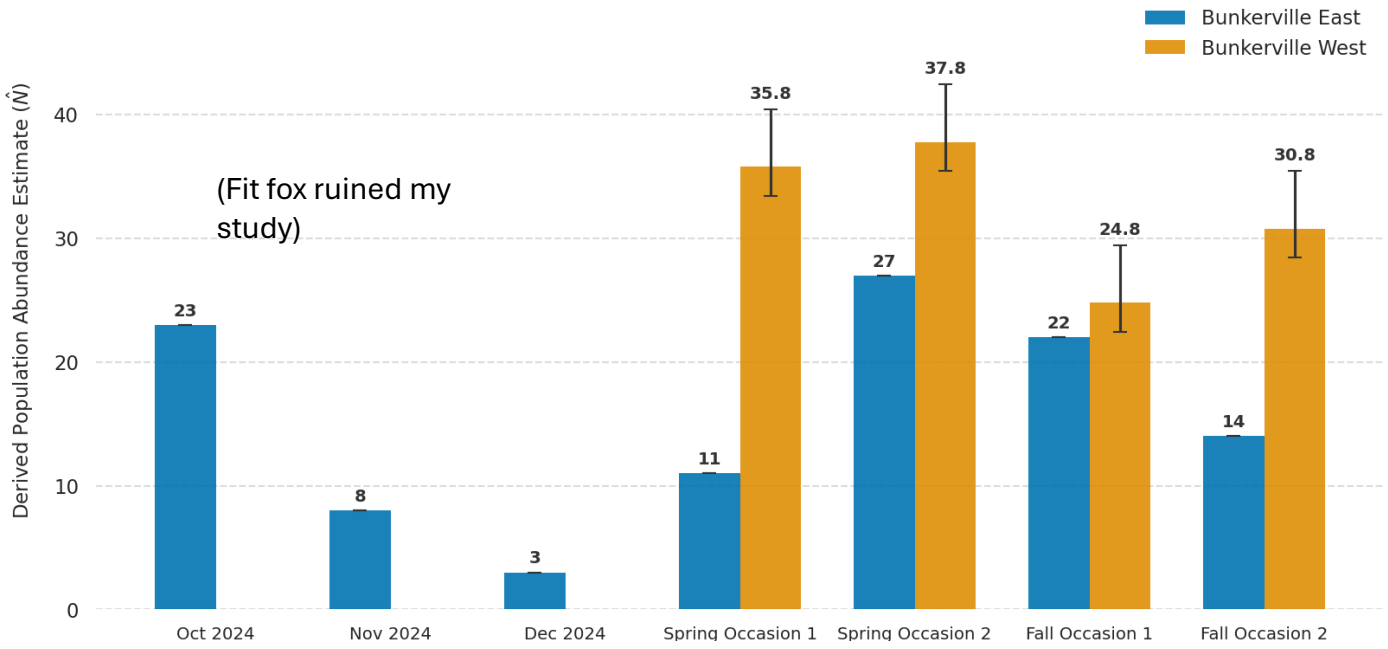






Results - Demographics

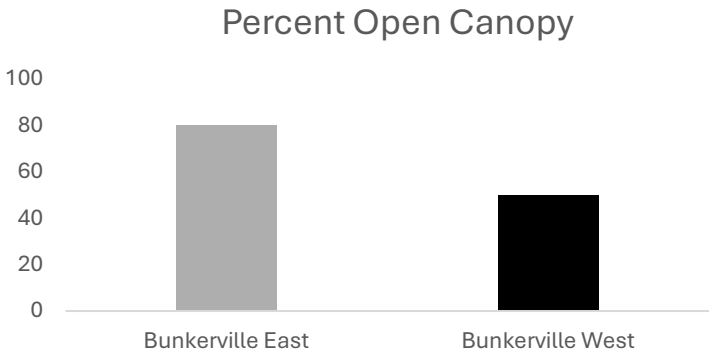
- Population Size Fluctuated more at Bunkerville East:

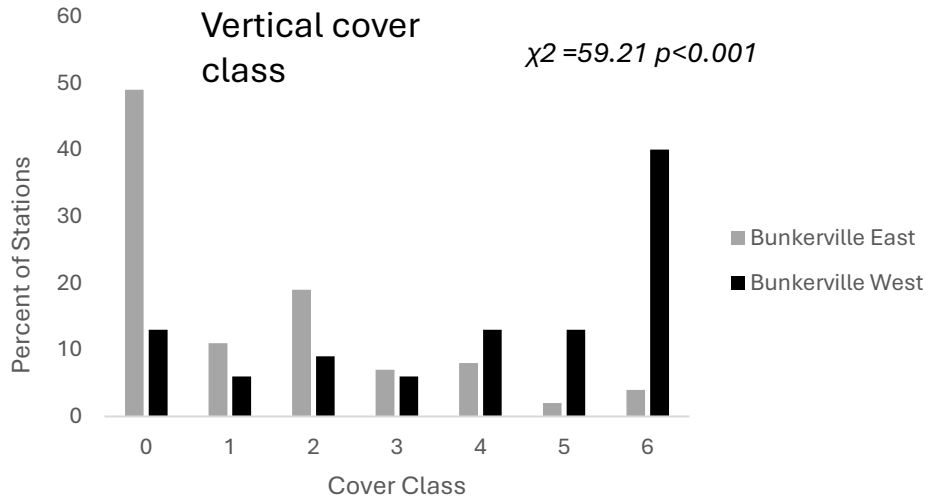


*High movements outside of breeding season

Results - Habitat

- Difference between sites



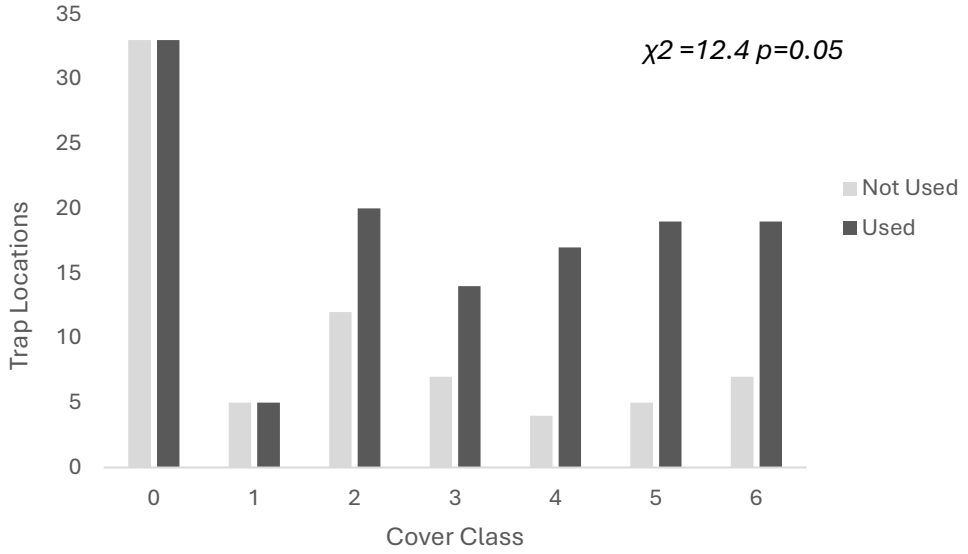


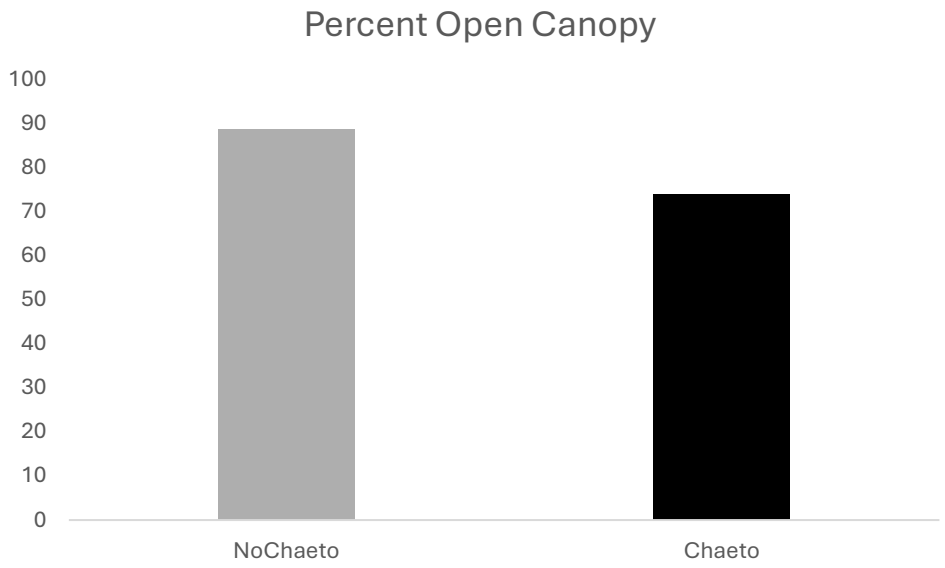




Results - Habitat

- Within the site *sobrinus* uses areas that are denser in vegetation
- Cover class 4 = 6.9x more likely to be used





Summary

- *C. penicillatus* uses higher-density microhabitat disproportionately
- Bunkerville East
  - Less high-density microhabitat
  - Lower and more variable population size
  - Higher capture probability
- Survival and Dispersal did not differ between sites
- Less microhabitat = smaller population



Restoration

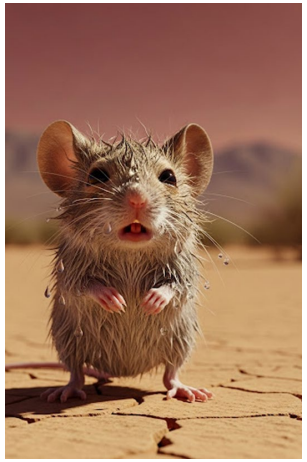
- Mid-story vertical Cover 0.5-1m height
  - Class 4 = 50-75% vertical density
  - Saltbush, arrowweed
  - boxthorn, iodinebush

- Maintain open ground/canopy
  - Sandy interspaces adjacent to dense cover



Threat Assesment

Climate Change – minimal risk







- Strict Thermal Limits
  - 37C begin to see physiological signs of heat stres
  - Nightly elevated temps well within range
  - Will burrow for refuge during day
- Drought and lower relative humidity
  - during foraging probably biggest risk
- Subclinical Physiological Performance declines
  - brain less responsive than muscle and kidney
- Structural shrub loss
  - Shifting hydrological regimes thin out dense old stands of shrubs

Habitat Fragmentation – Moderate risk

- Genetically Isolated Populations
  - Mojave populations are remnants
  - Ne population sizes are low but ok for short-term
    - 50-250
  - Muddy/Virgin River show population growth



- Geographically Isolated Populations
  - Modern Anthropogenic barriers further isolate
  - Private land and dense monoculture of tamarisk could reduce dispersal
  - Las Vegas population is smallest but currently protected

Habitat Loss/Degradation – high risk

- Amount and Quality of habitat
  - Some control over

- Muddy/Virgin River populations
  - Private land conversion
    - little control
  - Tamarisk monoculture

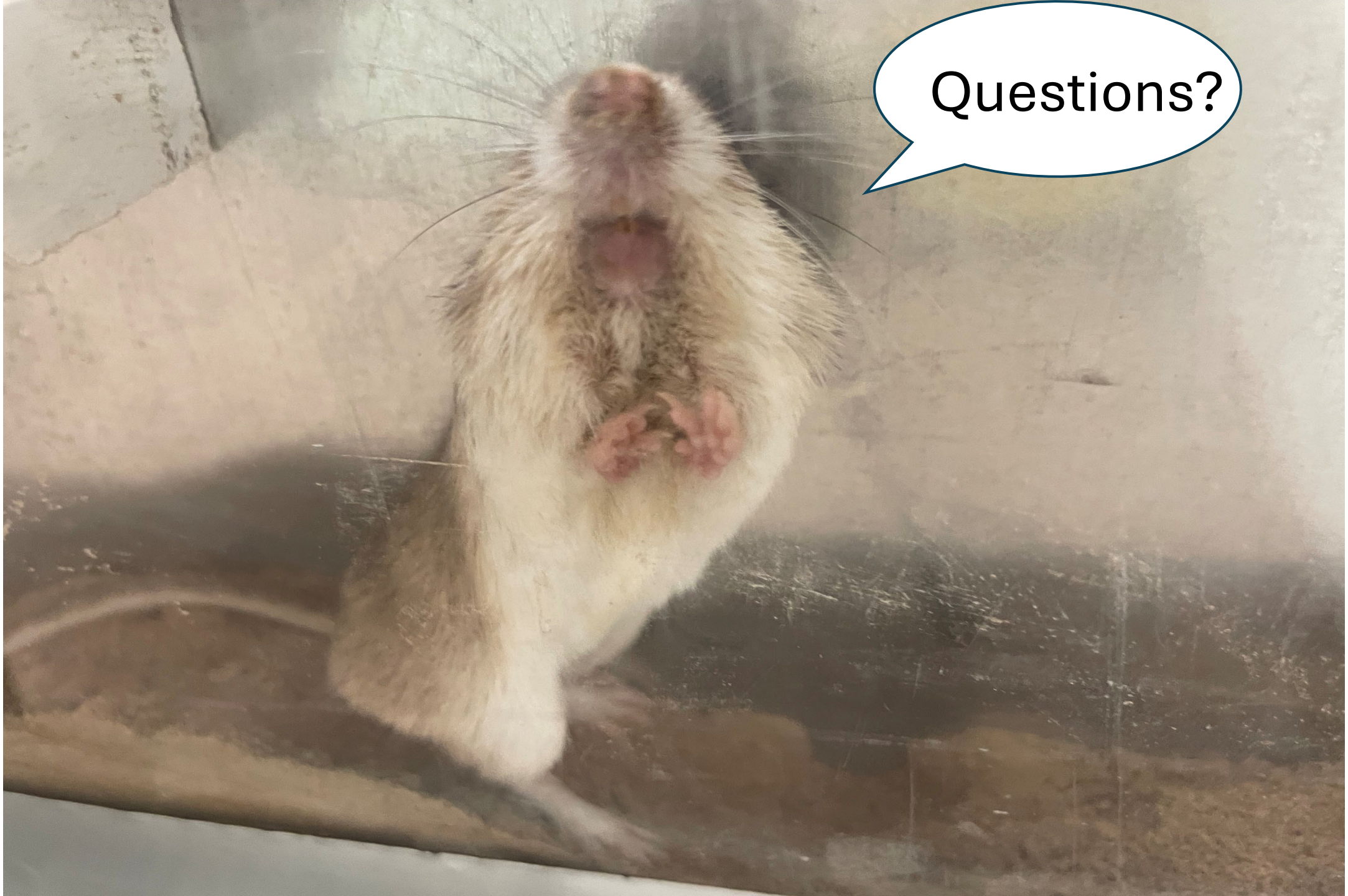
  - Stochastic Risks
    - Small isolated populations
    - Wildfires



Future Directions



- Experimental Restoration
  - Validate habitat quality and pocket mouse abundan
- Transition to cost-effective monitoring
  - Focus on occupancy of suitable and marginal habit
- Refine Habitat modeling
  - Current models are too coarse to capture microhabitat dynamics
- Targeted Land Acquisition
  - Increase connectivity of parcels that could maintain microhabitat


Questions?