

Early effects of fire on rodent communities in sagebrush-juniper habitats of the Mojave Desert

Christopher Moore and Dr. Paul Stapp

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California State University, Fullerton



Photo courtesy of Rob Fulton

Acknowledgements

Thesis committee

Drs. Presch and Schenk

CSUF faculty and staff

Dayna Melton, Ed Read, et al.

DSC staff

Rob Fulton, Marcello Aguirre,
Norma Charest, Jason Wallace

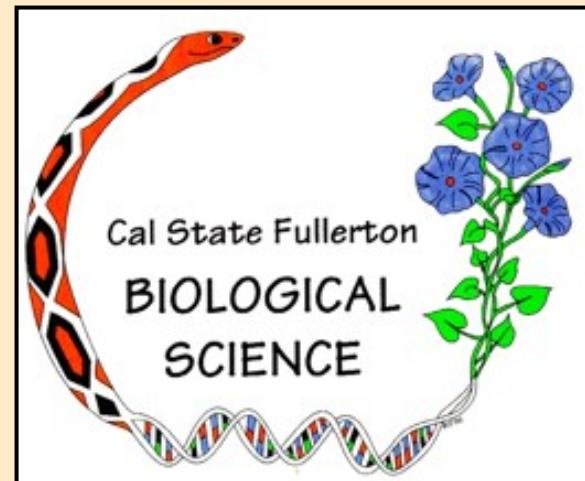
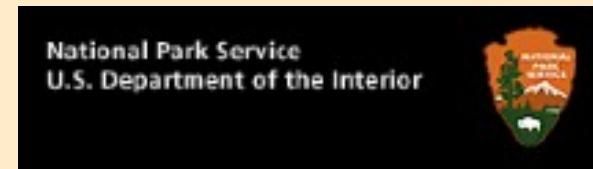
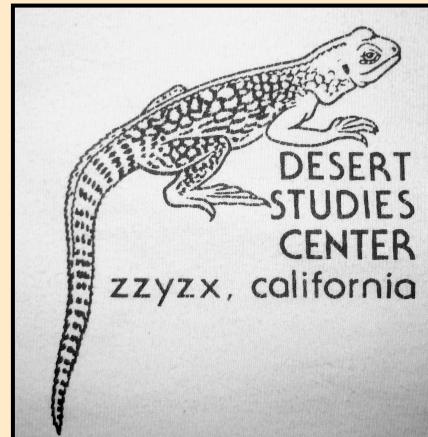
Field assistants

Sarah Millus, Maya Mazon, Jeanette Hendricks,
John Kraft, Angela Wong, Diana Jasz, Youssef
Atallah, Jim Borgeson, Rohit Kattahappali

Stapp lab members

Dave Elliott, Katie Levensailor, Abby Benson,
Darcee Guttilla, Stephanie Cashin, Kim Nelson,
Amanda Boone, Heather Franklin

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Fire in the Mojave Desert

Low and middle elevation desert
shrubland

- Typical desert habitat
- Infrequent and localized
- Developing a regular fire regime from invasive annual grasses, e.g.,
Bromus spp. and
Schismus spp.



Fire in the Mojave Desert

High-elevation desert shrubland

- Higher precipitation and more woody shrubs
- Sagebrush-steppe (Great Basin)
 - Normal fire return interval ≈ 30–100 years
 - With invasive annual grasses fire return interval has been reduced to as short as **five** years (Whisenant 1990)



Morefield 2008

Effects of fire on rodents

- Direct mortality
- Reduces food resources
- Alters habitat and predation risk



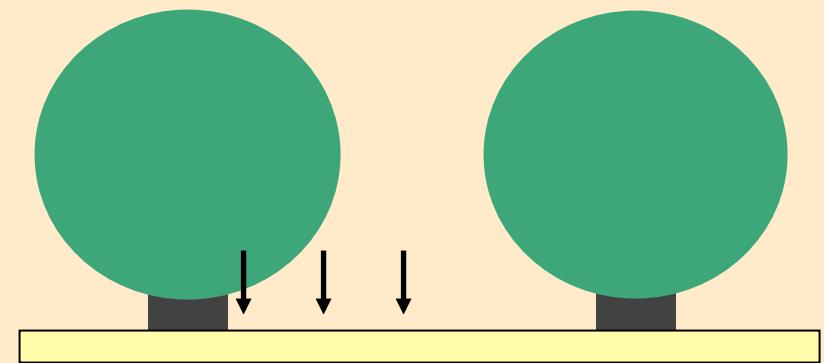
Desert rodents

- Locomotion
- Microhabitat
- Moonlight

Bipedal



Dipodomys



Quadrupedal



Neotoma
lanaida

Objectives

- Determine how rodent abundance and diversity changes following fire
- Determine seed foraging rates in burned and unburned areas during different moon phases

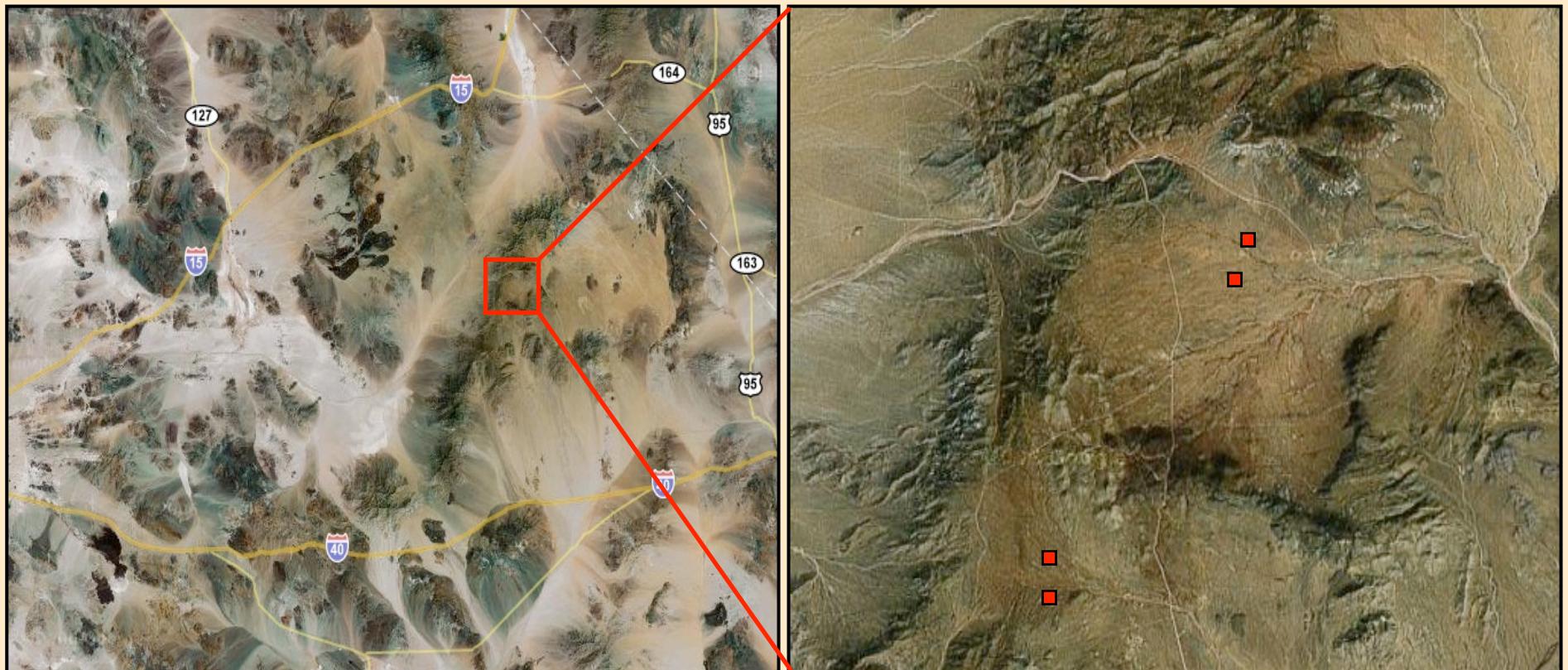


Hypotheses

- Less rodent diversity and lower abundance in burned areas
- Lower seed removal rates with higher predation risk
 - Burned areas
 - Full-moon nights

Study area

Round and Gold Valleys, Mojave National Preserve, CA



GoogleMaps 2007

Study area

- Elevation 1,500–1,600 m
- Mean annual minimum and maximum temperature 11.3 and 22.5°C
- Mean annual precipitation 264 mm
- Dominant vegetation
 - Artemisia tridentata* (big sagebrush)
 - Juniperus osteosperma* (Utah juniper)
- Hackberry Complex Fire of July 2005
28,600 ha

Rodent community response



- Four grids 80 x 200 m along the perimeter of the burnline
- Trapped four consecutive nights
- June–August 2006
- Full and new moon nights
- Recorded number of captures, species, sex, reproductive status, age

Measuring seed removal rates

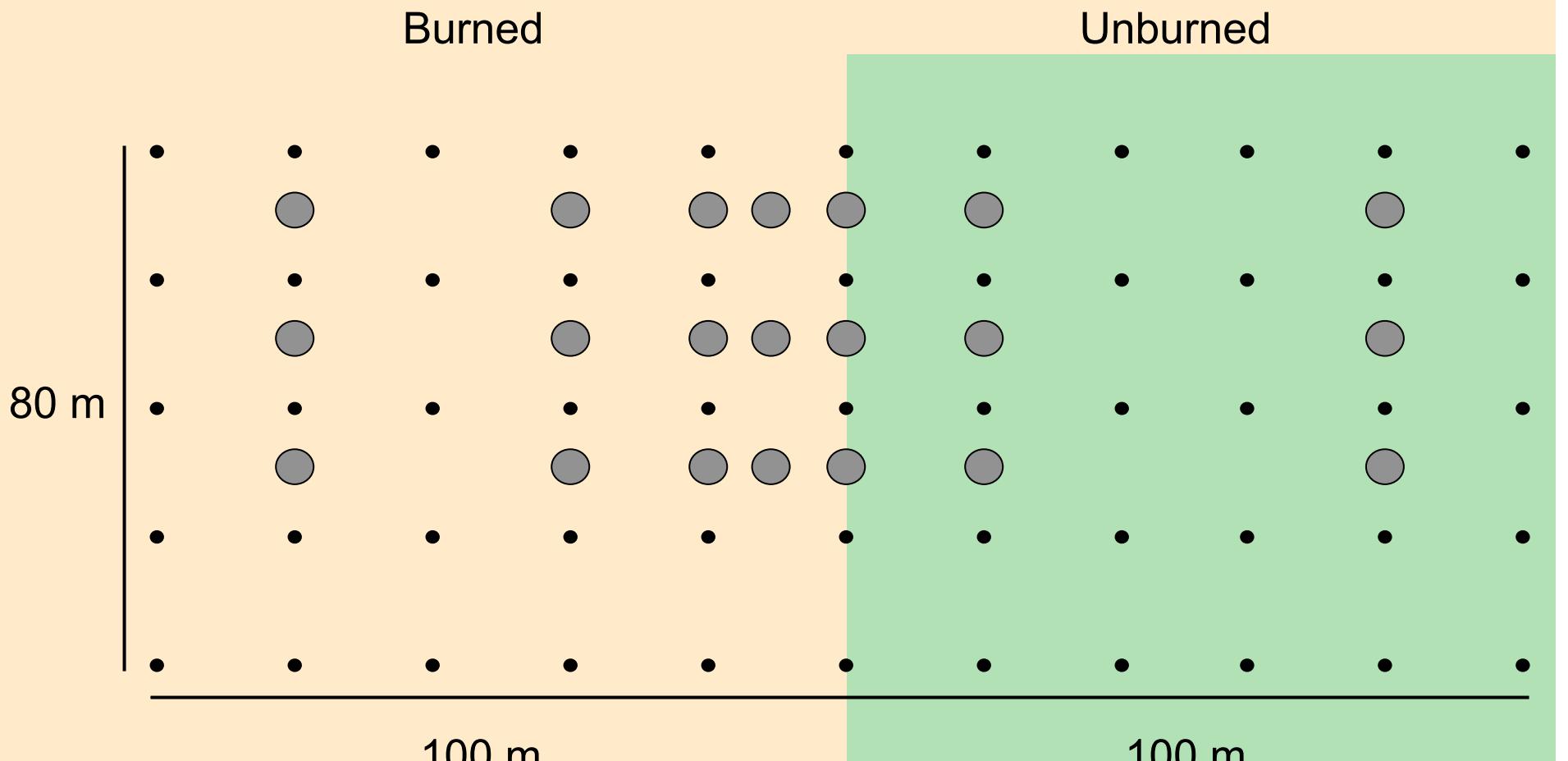
- Artificial seed trays
 - 2.0 L sand
 - 4.0 g millet
- Measure the amount of seed remaining per night
- Recorded during full and new moon nights
- June–August 2006
- 21 trays / site



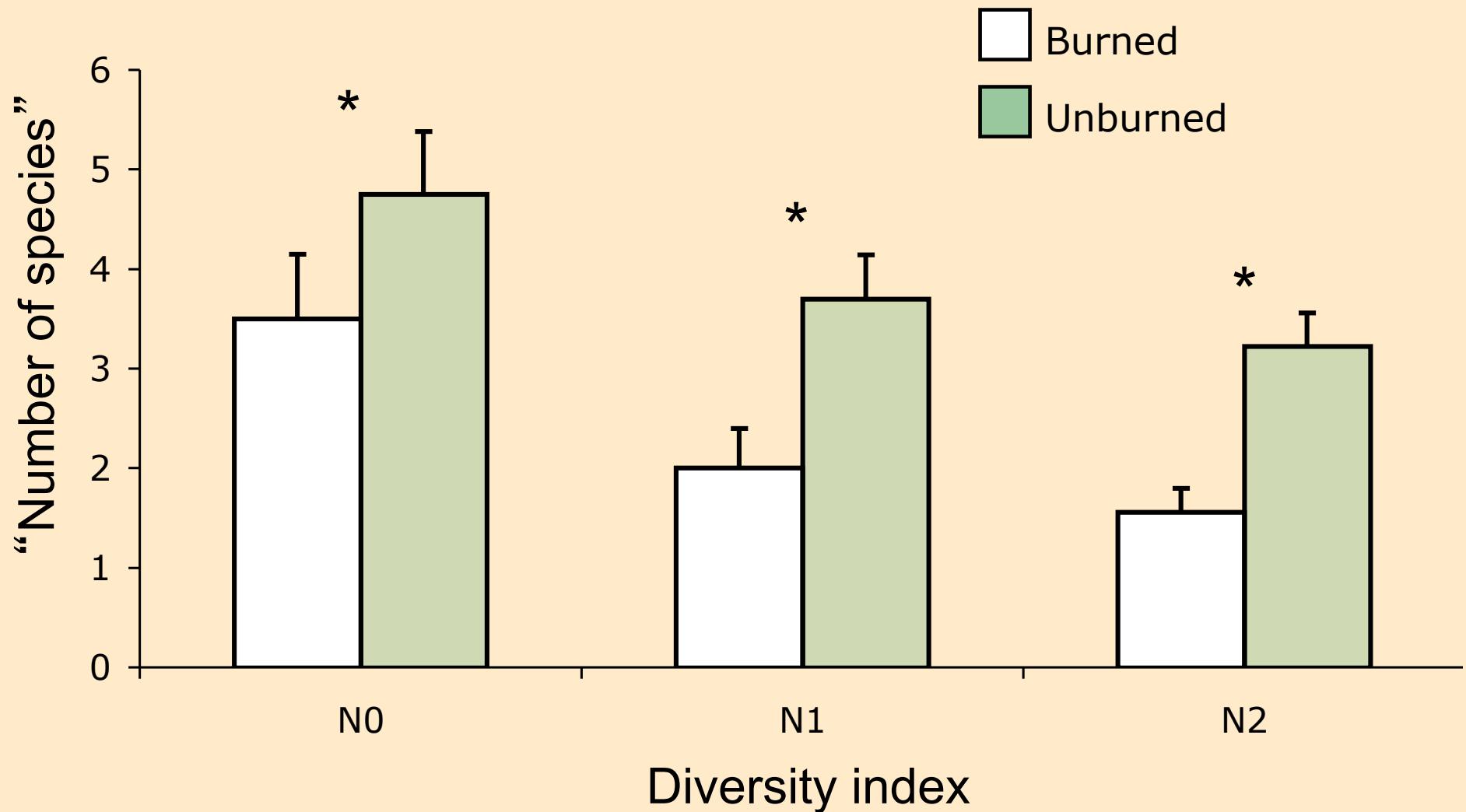
Trapping grid placement



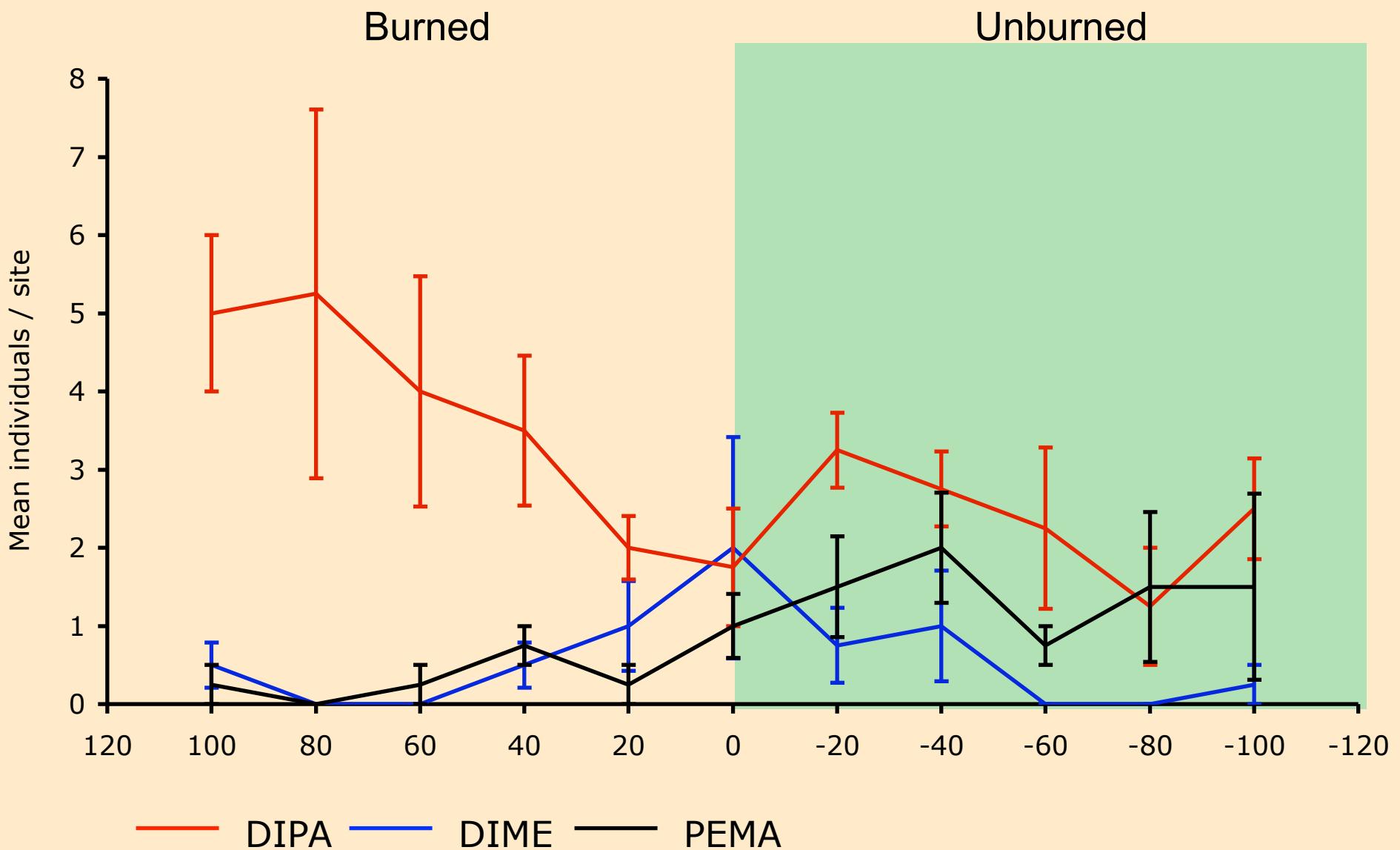
Trapping grid and seed tray placement



Rodent diversity one year post-burn

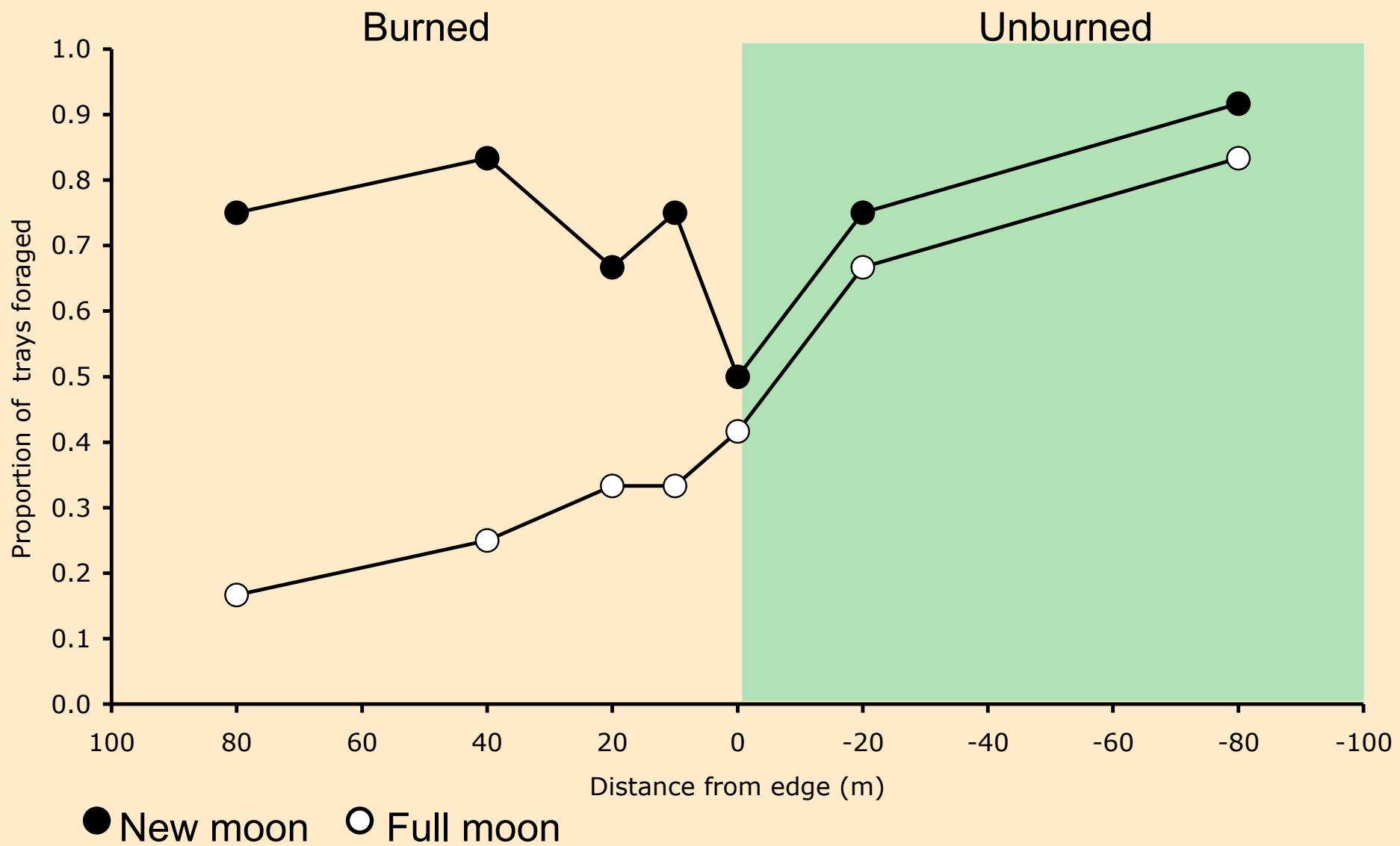


Rodent abundance one year post-burn

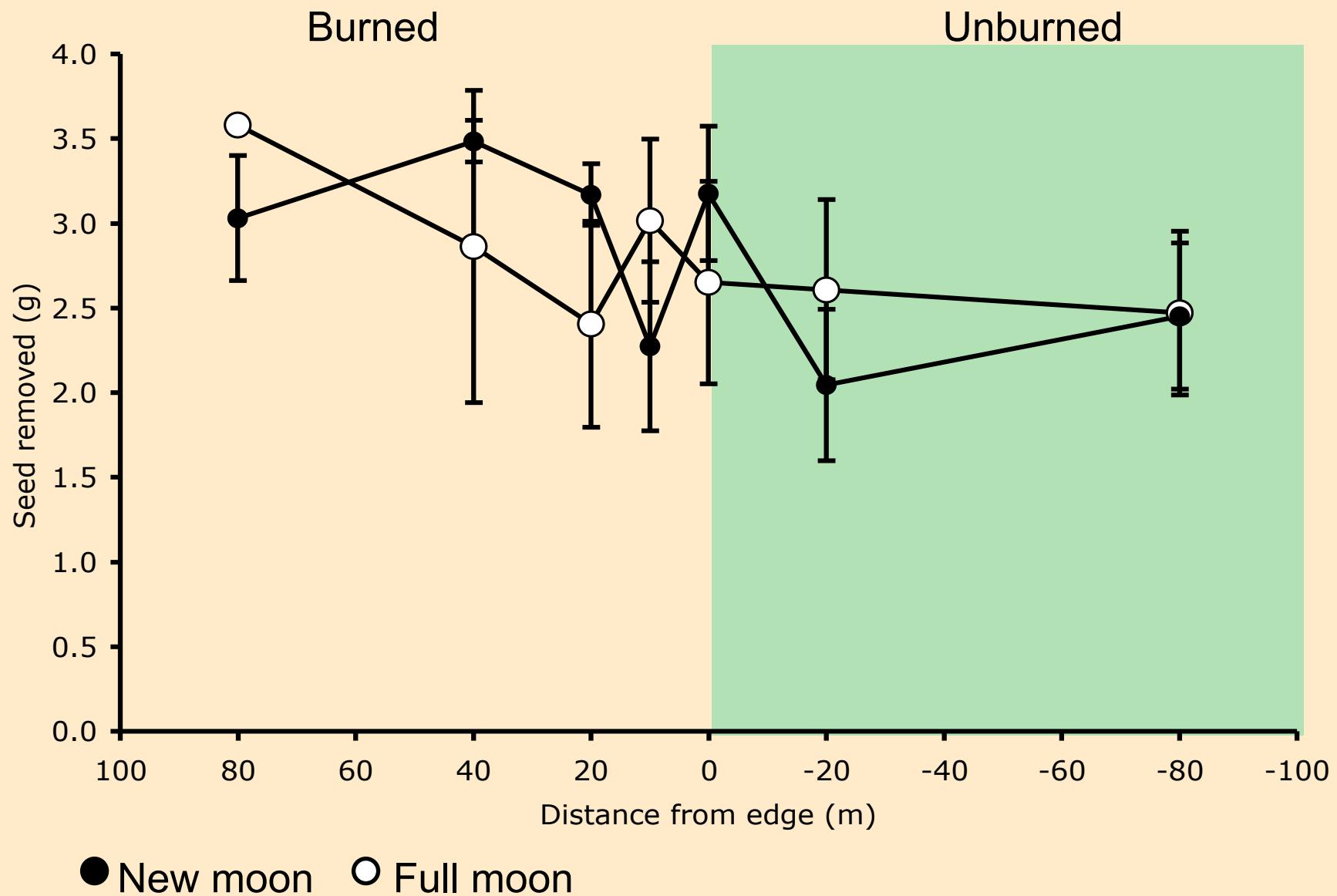




Moonlight effects on foraging activity



Moonlight effects on seed removal



Summary

- Unburned areas have higher rodent diversity, but similar abundance
- Bipedal *D. panamintinus* was abundant in burned areas
- Quadrupedal cricetids were most abundant in unburned areas
- Moonlight affected foraging activity in the burned areas, but not seed removal rates



Granivory by kangaroo rats may influence plant recovery following fire

Further investigations

Exclosures

- No rodent access
- Rodent access

Exclosure locations

- Burned interior
- Burnline



Thank you

Questions / Comments

