



Effect of the Camarillo Springs Fire on *Tyto alba* (Barn Owl) Diet and Occupancy Across CSU Channel Islands Campus

ESRM Program



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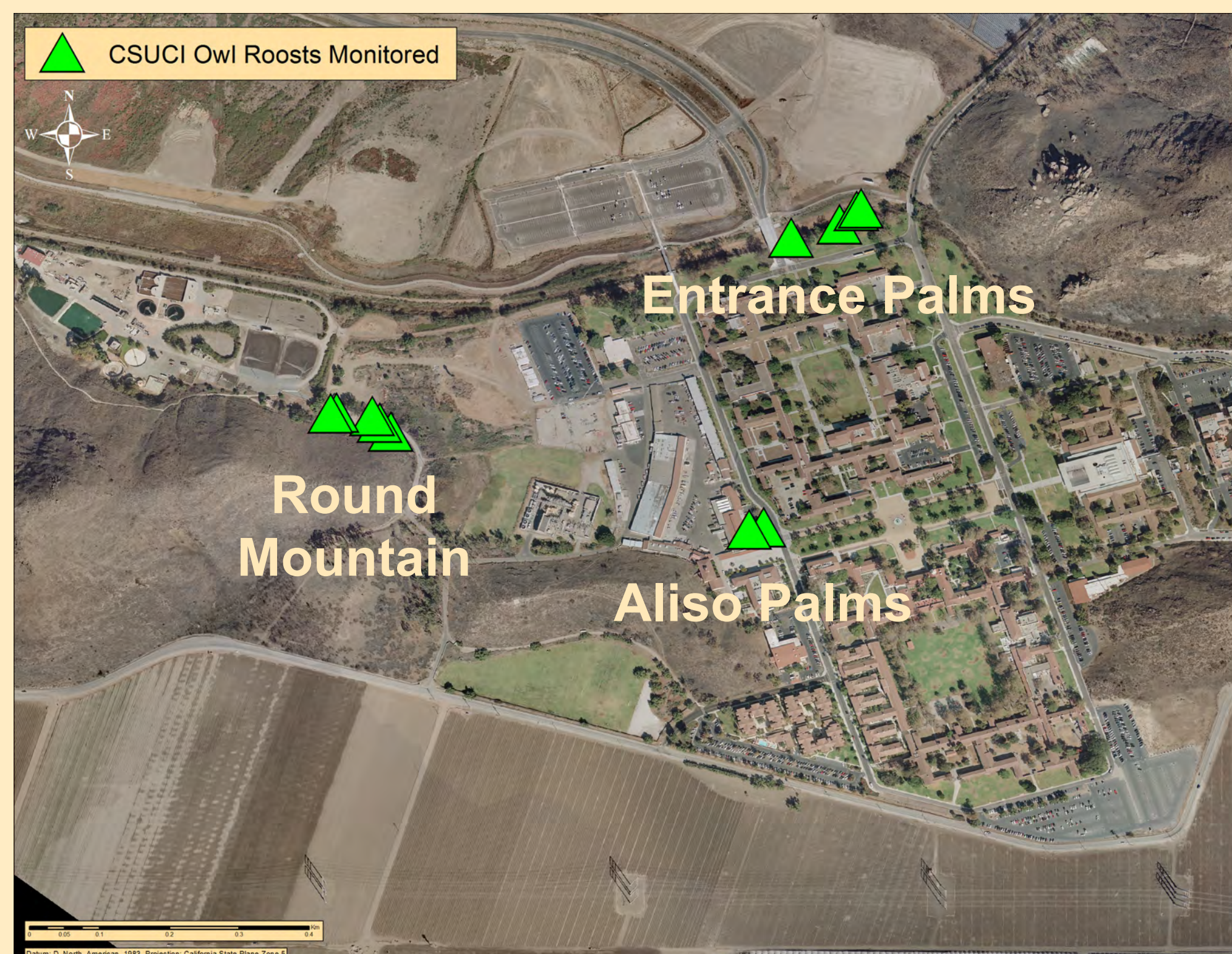
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Introduction

The May 2013 Camarillo Springs Fire consumed 9,809 hectares of the Santa Monica Mountains, engulfing the entirety of both the California State University Channel Islands campus and all our long-term *Tyto alba* (barn owl) population ecology study sites. This fire therefore allowed us the unique opportunity to explore how *Tyto* diet and occupancy changes in the immediate wake of such a burn/disturbance. Over the last three years we have collected pellets from known roosting sites on a bimonthly basis (>1,800 pellets collected to date). Pellets are measured, weighed and disaggregated to evaluate prey content through skull, jaw or other hard structure identification. Prior to the 2013 fire we had already documented variation in prey consumption (richness and abundance) across both seasons and roosting sites. Owl feeding and diet diversity immediately declined in the wake of the Springs Fire, even though nests and roosting sites survived the fire. **Fire impacts upon owl prey availability appear to be hindering the recovery of owl and other raptor populations across campus.** To explore this potential hindrance, we compared overall pellet weight (bones + fur), bone weight alone, prey abundance, and prey richness within pellets collected before and after the fire.

Monitored Roosting Sites



CSUCI *Tyto alba* Population Study

Over 1,800 pellets have been collected from various areas throughout our three-year study (Oct 2011-April 2014), indicating a strong presence of raptors across campus. The majority of our known barn owl roosting sites consist of non-native *Aracaceae* (palm) and *Schinus terebinthifolius* (Brazilian pepper) trees dotted throughout areas with a wide range of anthropogenic traffic and infrastructure. Each of these sites now exhibits a varying degree of burn from the Springs fire from untouched to severely burnt.

Methods

Collection:

- bimonthly sweeps of known roosting areas
- length, width, overall weight, location & condition recorded

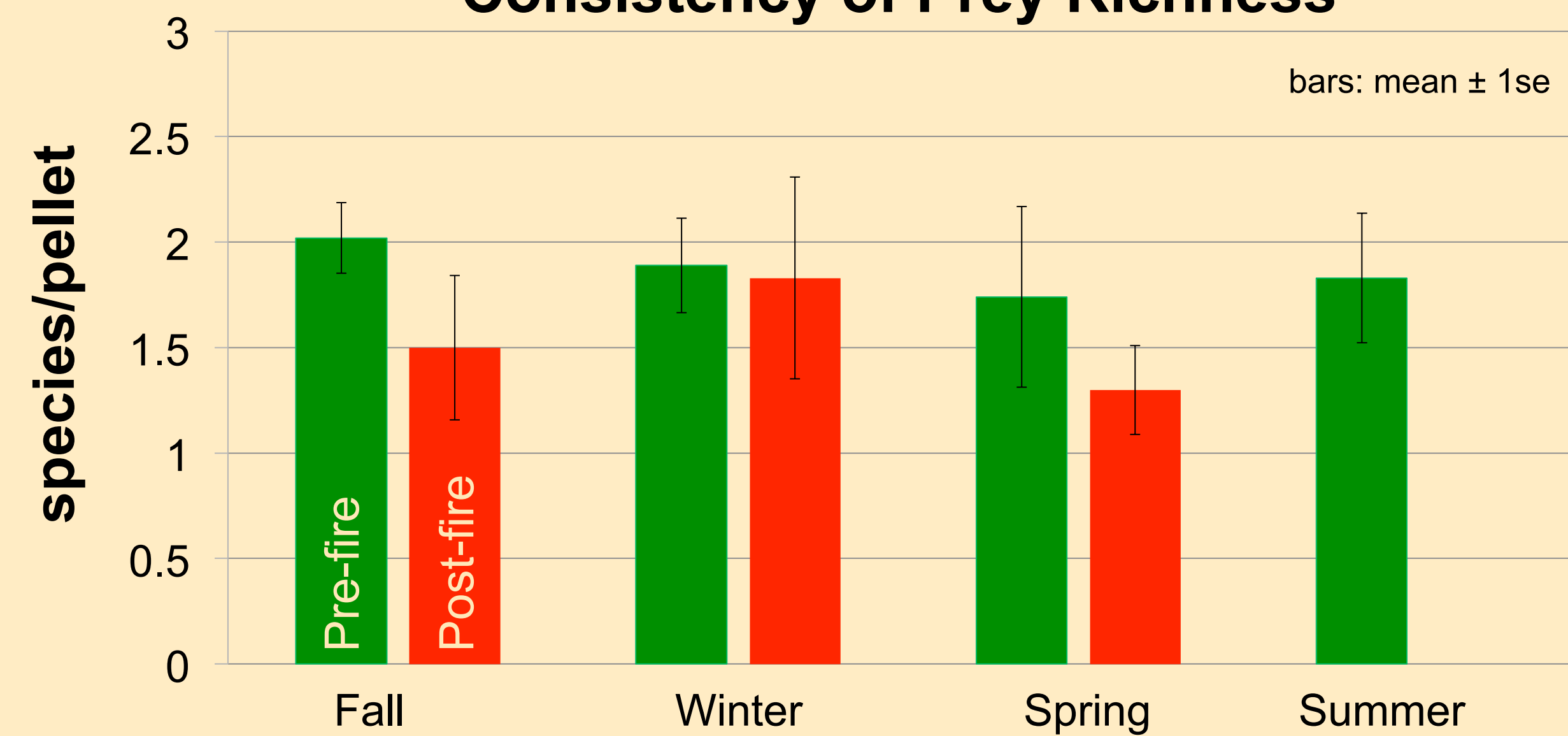
Treatment:

- frozen for 14 days, then baked at 100°C for ≥24 hours
- soaked in 70% EtOH immediately before dissection

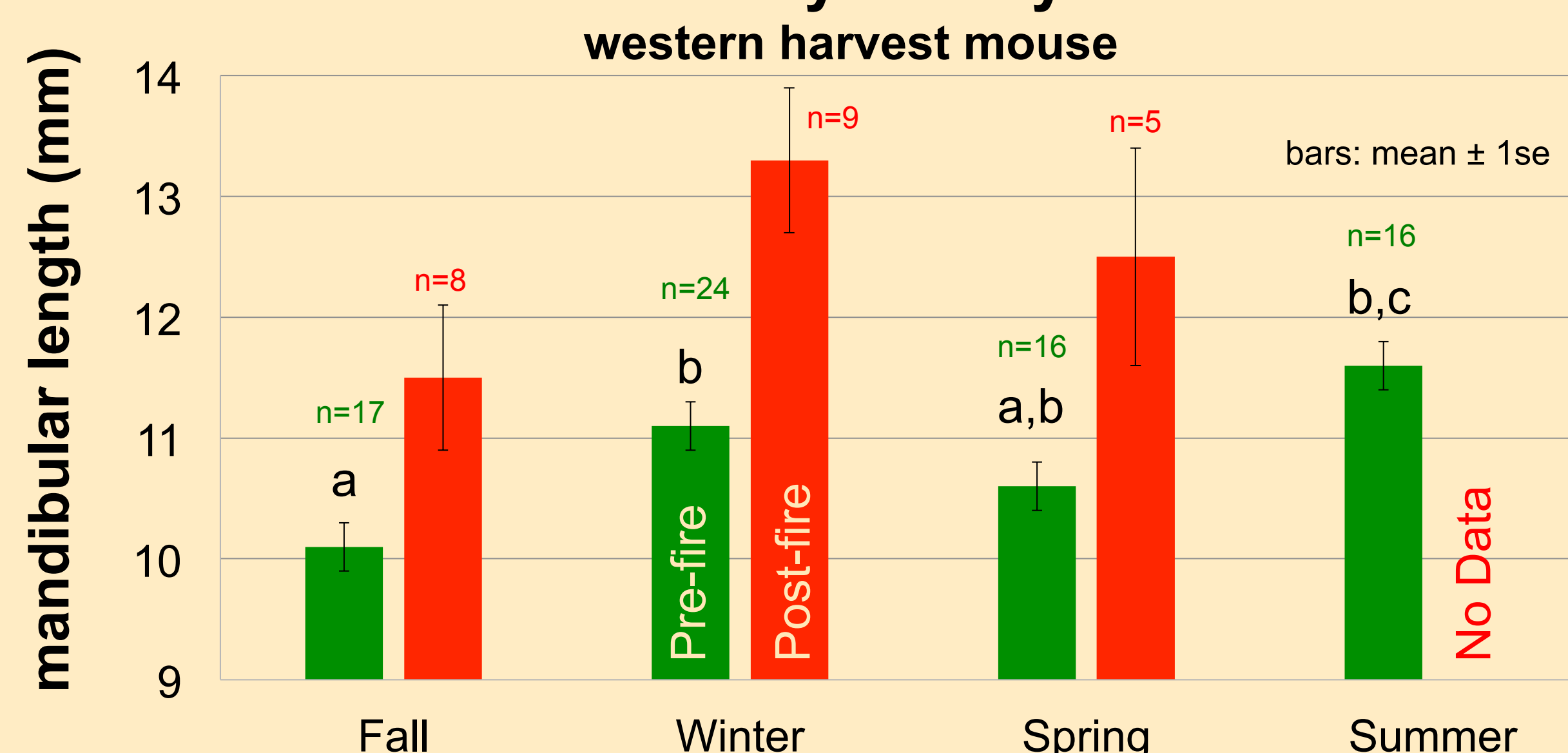
Prey Quantification:

- dissected to isolate all jaws, bones & other hard structures
- enumerated minimum abundance of each species, bone weight & (for mammals) mandibular length

Consistency of Prey Richness



Seasonality of Prey Size



Tyto Apparent Feeding Activity

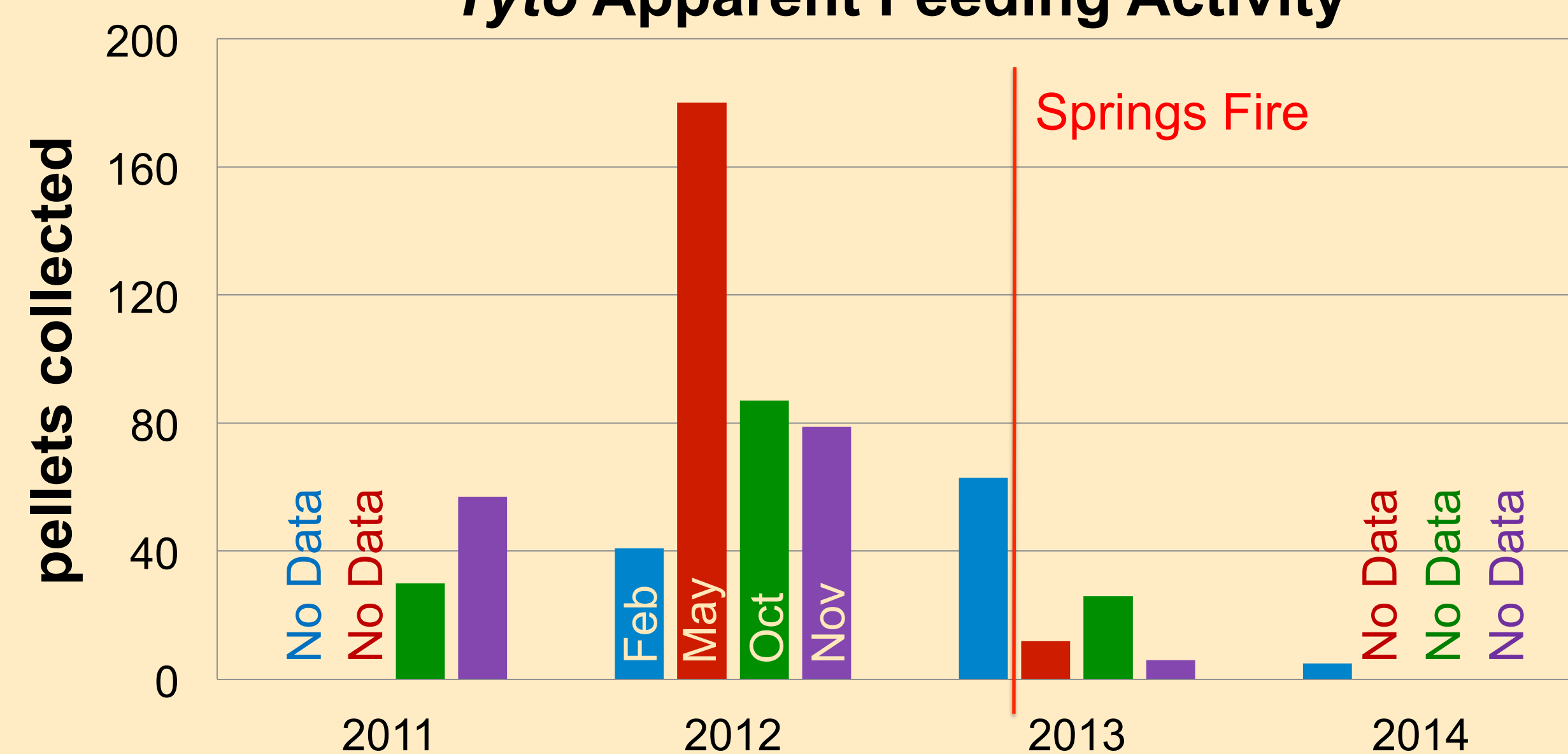


Table 1. Prey Diversity Pre- and Post-Fire

	Fall		Winter		Spring		Summer		All	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Rodentia										
w. harvest mouse	X	X	X	X	X	X	X	X	X	X
deer mouse	X	X	X	X	X	X	X	X	X	X
house mouse	X		X		X		X		X	
CA pocket mouse	X		X		X		X		X	
CA meadow vole	X	X	X	X	X	X	X	X	X	X
Botta's pocket gopher	X	X	X		X	X	X		X	X
big eared woodrat			X		X		X		X	
Bryant's woodrat	X	X	X	X	X	X	X	X	X	X
unknown rodent		X	X		X		X		X	X
Lagomorpha										
cottontail rabbit	X		X						X	
Passeriformes										
White-Crowned Sparrow	X		X						X	
Dark-Eyed Junco	X								X	
Unknown bird	X		X		X		X		X	
Orthoptera										
Jerusalem cricket	X	X	X	X	X	X			X	X
Total Species	11	6	11	5	9	6	7	N/A	12	6

Interim Results

Has the fire affected *Tyto* diet?

No variation in species richness of pellets between pre- and post-fire seasons was observed, however we see a significant change in the diversity of available prey. Prior to the fire, 12 unique species of birds, insects and small mammals were identified in *Tyto* pellets. Post-fire pellets have identified an absence of six of those species. A slight decrease in the weight of bones (11%) was also found, likely due to the loss prey diversity and prey availability overall. Mandibular length increased significantly in western harvest mice in post-fire pellets (1.9mm) in all observed seasons with no significant winter peak as seen in pre-fire prey, however other prey showed a significant decrease.

Has the fire affected *Tyto* occupancy?

We see a precipitous decrease (87%) in pellet production rates across campus roosting sites, indicating a decrease in *Tyto* occupancy rates. One of the three sites is believed to be fully abandoned, however there does not seem to be a significant correlation between the level of burn to a roosting site and post-fire occupancy.

Conclusion

Our study has shown a significant decrease in the prey base and owl frequency on campus, and this data is critical for predicting and preparing the effects of future wildfires. The grand scheme of our population ecology study is an investigation into the use of Barn Owls in lieu of rodenticides on campus. However, our data suggests that this form of alternative pest management is highly susceptible to wildfires, making the use of Barn Owls a more precarious endeavor in a time of more frequently occurring fires.

Acknowledgements

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