

# Pygmy Rabbit Studies in Rich County, UT



Tammy L. Wilson

Department of Wildland Resources

Ecology Center

Utah State University

# Acknowledgements



## Project Support:

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## Technicians:

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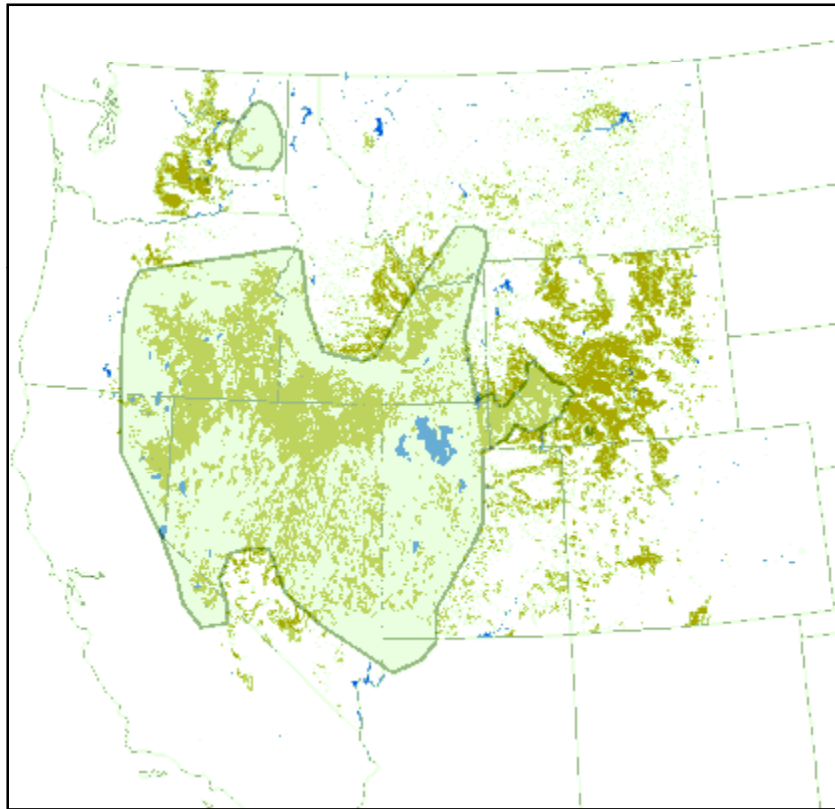
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# General Introduction

## Pygmy rabbits



-  Pygmy Rabbit Range
-  Sagebrush



# General Introduction

## Introduction

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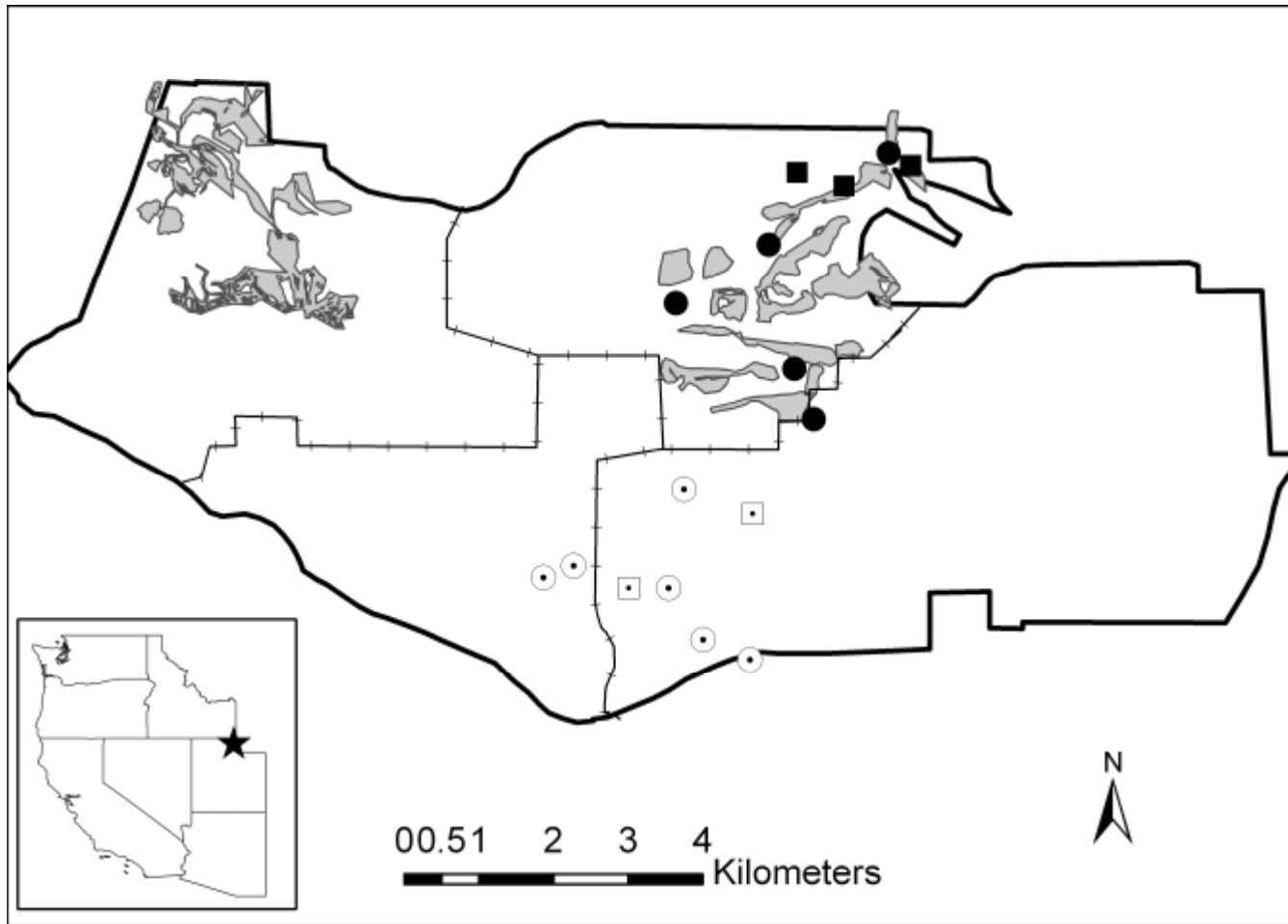
- ❑ Sagebrush rangelands are degraded.
- ❑ Ambitious restoration is planned for large areas.
  - Mechanical treatment
  - Controlled fire
  - Herbicide
- ❑ Effects of treatments on pygmy rabbits unknown.



# General Introduction

## Study Area

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# Chapter 2

## Methods

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- Monte Carlo simulations of habitat selection.
  - Movement null models
  - Assumes central-place behavior
- 2 levels of resolution.
  - Between home range
  - Within home range
- Snow tracking used to detect behavioral effects of the edge.

# Chapter 2

## Objectives

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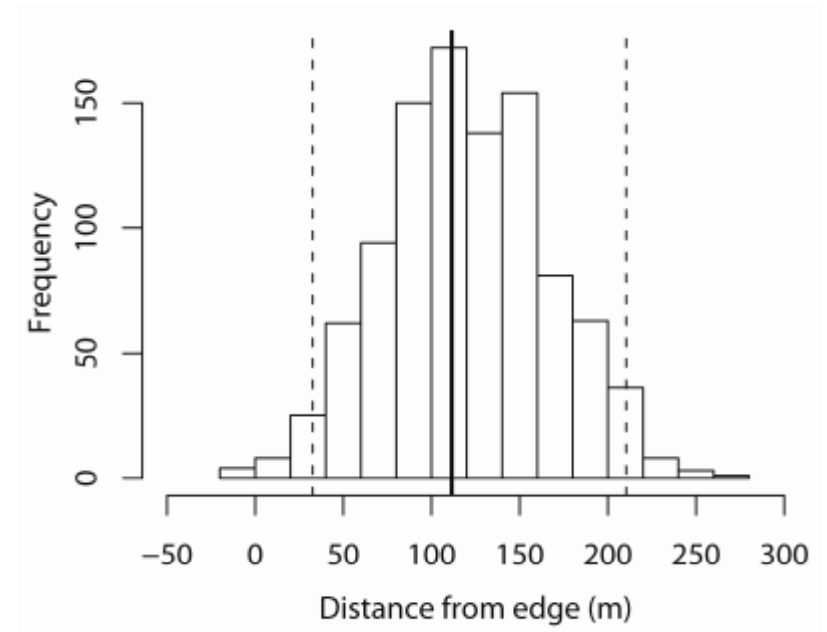
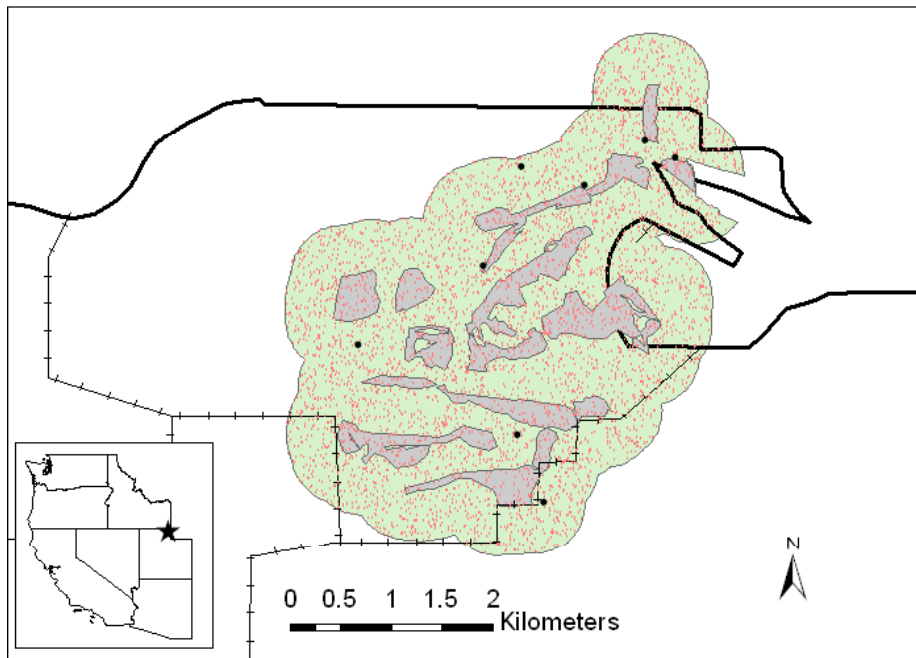
- ❑ Question: Are home ranges and animal locations farther from treatments than expected based on the null model?



# Chapter 2

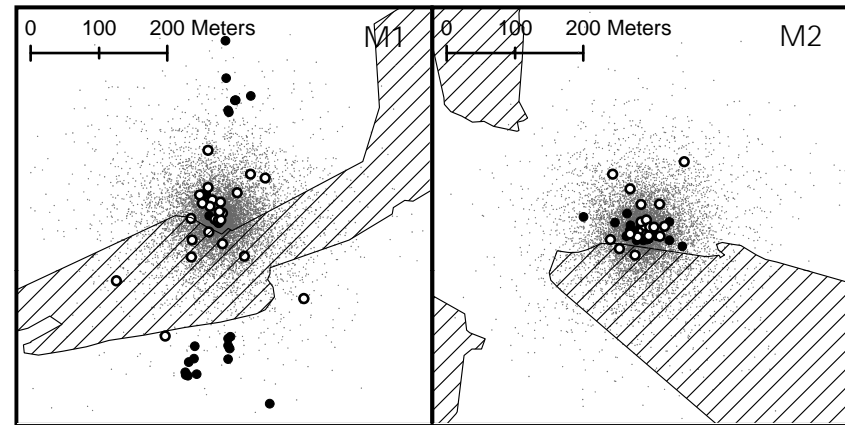
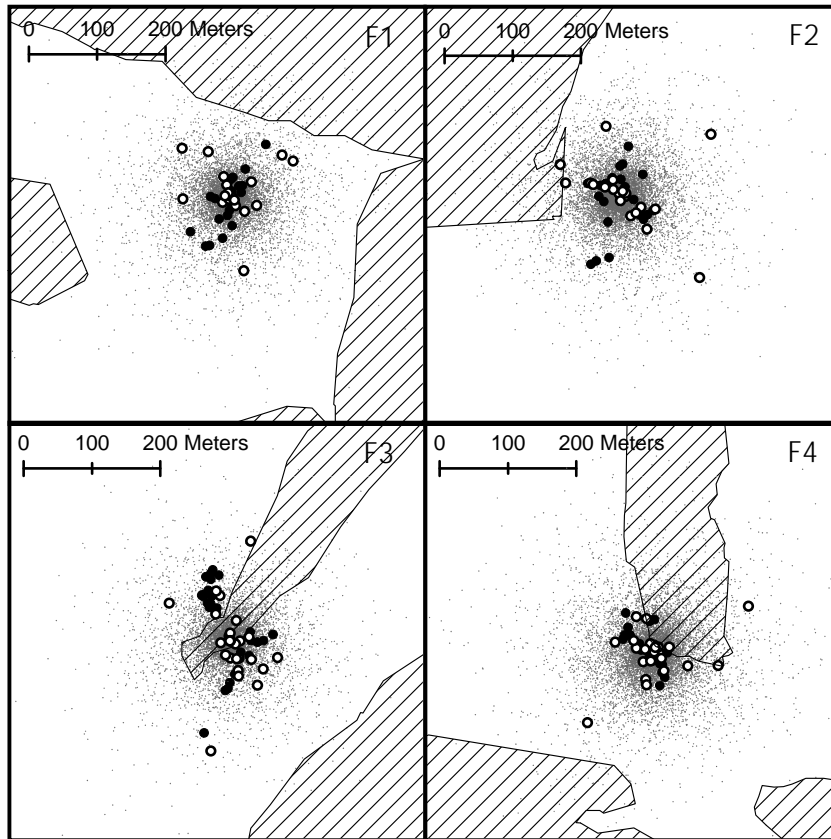
## CSR Null Model

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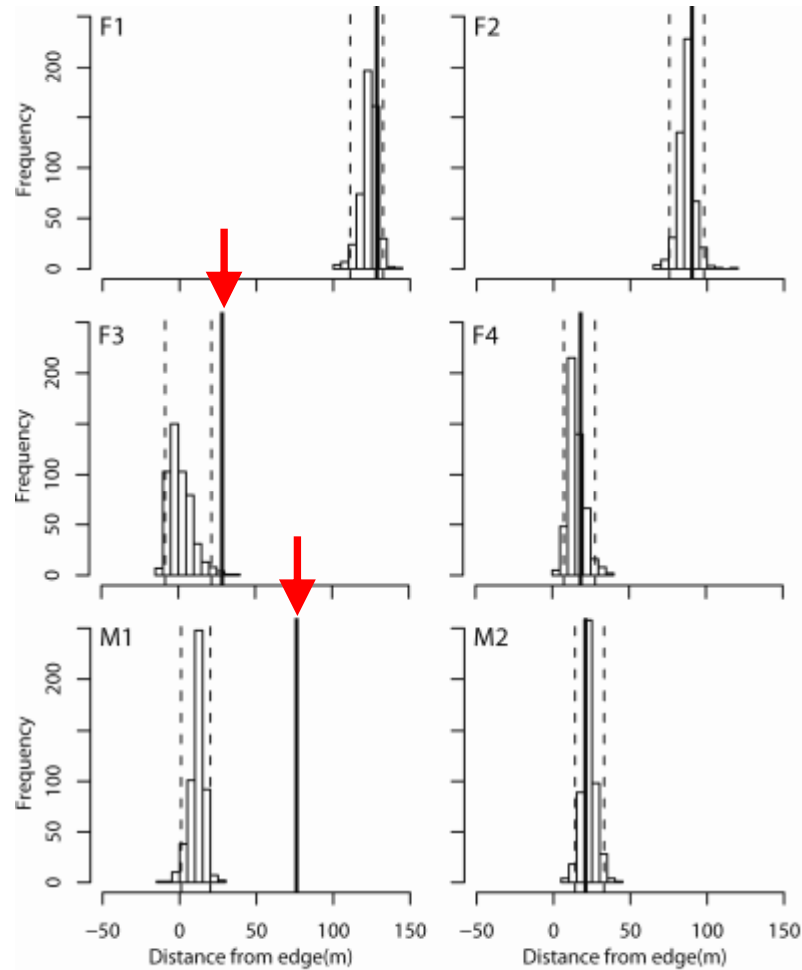
# Chapter 2

## Exponential Null Model



# Chapter 2

## Exponential Null Model



# Chapter 2

## Discussion

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- ❑ Rabbits not extirpated from treated plot.
- ❑ Home range placement not affected by treatments.
- ❑ Treatment effects on within home range habitat use was only evident for 2 rabbits.
  - Lived closest to treatments
- ❑ Snow tracking results show that rabbits enter treatments less often than expected.

# Pygmy rabbits in the news



Rare pygmy rabbits are "secretive" and tricky to study. But a team led by Tammy Wilson, a researcher from Utah State University, US, has developed a model to estimate their numbers. The scientists describe their approach to studying the tiny North American rabbits in the *Journal of Applied Ecology*.



Editors: Jane Memmott, E. J. Milner-Gulland, Phil Hone, Marc Cadotte

- Priority contribution: The ecological research needs of business
- Predator-prey interactions
- Restoration and regeneration
- Modelling distributions
- Non-target effects

  
British Ecological Society

# Chapter 1

## Introduction

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- Counting Rabbits is Hard.
- State variable of interest (# of Rabbits) is not observable.
  - Rabbits hide well.
- Using indirect sign can help.
  - Burrows.
  - Scats.



# Chapter 1

## Introduction- indirect detection



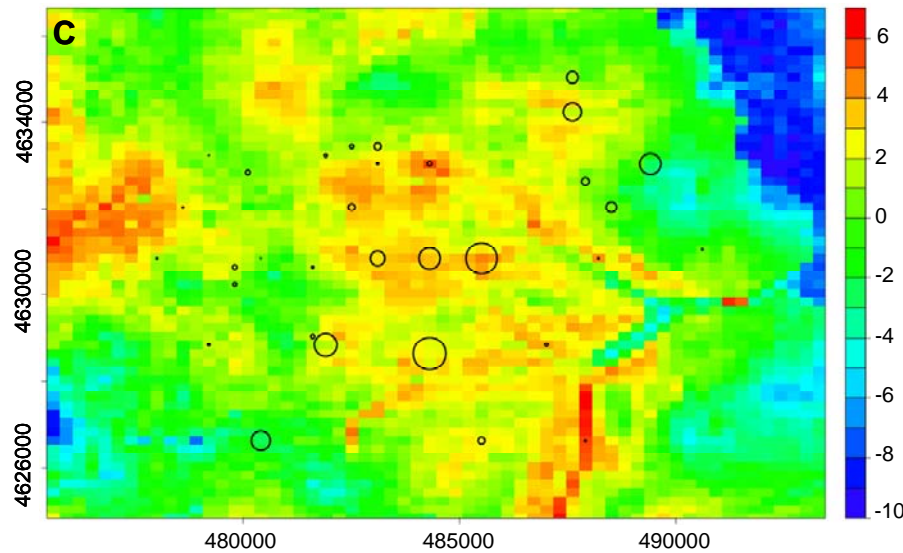
Wilson et al. 2010. Journal of Applied Ecology 47: 401-409

# Chapter 1

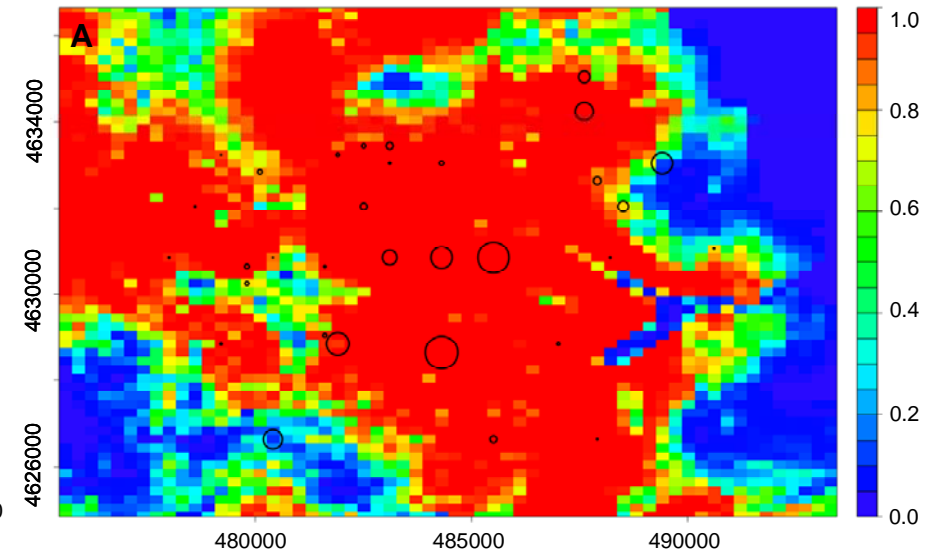
## Results- Latent state variables



Posterior predictive distribution of rabbit burrow abundance



Posterior probability of finding one burrow with scat



# Chapter 3

## Introduction

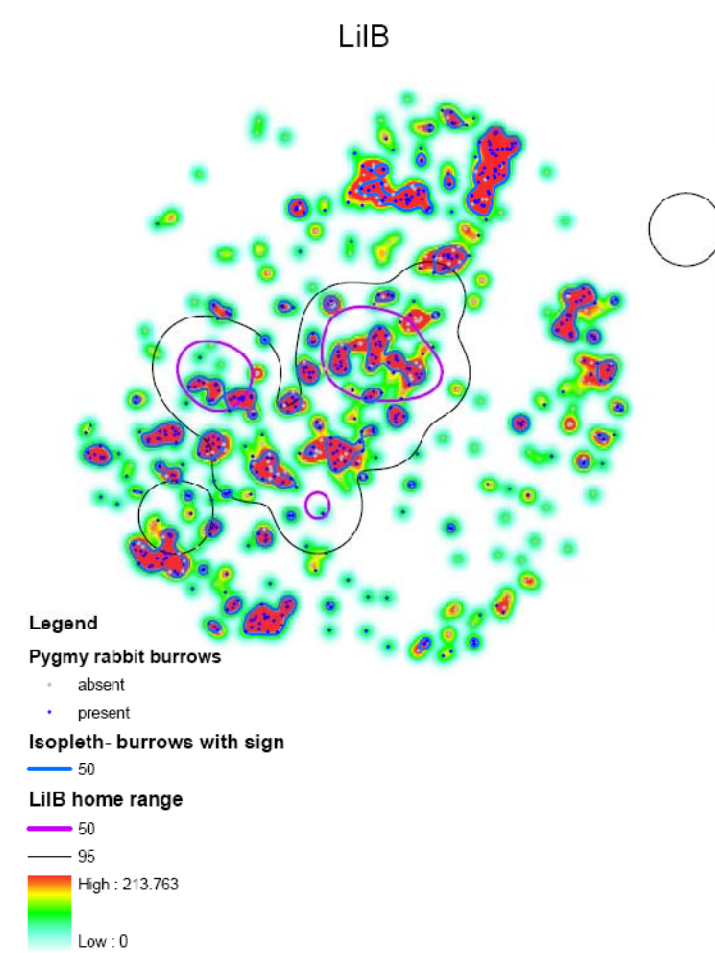
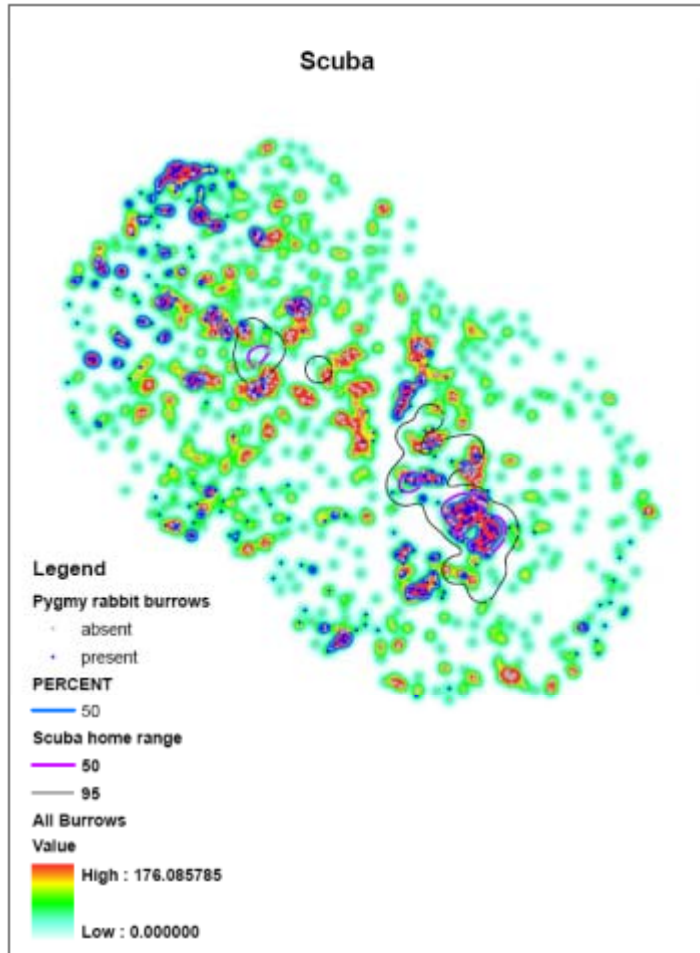
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- Pygmy rabbits are closely tied to burrows.
- Burrow use not well understood.
- Objectives:
  - Better understand the spatial ecology of burrow use in pygmy rabbits.

# Chapter 3

## Methods- Burrow Survey



# Chapter 3

## Results- Spatial Clustering



- Burrows are clustered
  - Column 1
- Rabbit use is clustered within burrow clusters
  - Column 2

