The Effect of Biodiversity Loss and Climate Change on Tick-borne Disease

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Potential Relationship Between Tick Population and Human Health
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Carbon Dioxide

Methane
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Carbon Dioxide → Methane → Increase in global temperature → Increase in tick population → Impact on human health
Evaluating Herbivory Rates and Prevalence of Zoonotic Diseases
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1. Impact small land mammals are having on the vegetation in the ecosystem
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Evaluating Herbivory Rates and Prevalence of Zoonotic Diseases

1. Impact small land mammals are having on the vegetation in the ecosystem

2. Abundance of ticks as well as the zoonotic diseases they carry
Tejon Ranch Exclosure Experiment
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- 33-178 cm/year rainfall
Tejon Ranch Exclosure Experiment

- 33-178 cm/year rainfall
- 120-2020 meter altitude gradient
Tejon Ranch Exclosure Experiment

North

2800 ft
Tejon Ranch Exclosure Experiment

North: 2800 ft
Central: 51-5400 ft
Tejon Ranch Exclosure Experiment

North: 2800 ft
Central: 51-5400 ft
South: 53-5600 ft
Cafeteria Trials and Small Vertebrate Trapping

Plot

100 m

100 m
Mix 1
Non-Native Mix
Wild Bird Seed
Native Mix

Cafeteria Trials and Small Vertebrate Trapping

Plot

100 m

100 m
Cafeteria Trials and Small Vertebrate Trapping

Plot

Native Mix
Wild Bird Seed
Non-Native Mix

100 m 100 m
Cafeteria Trials and Small Vertebrate Trapping

Plot

100 m

100 m

Native Mix

Wild Bird Seed

Non-Native Mix
Cafeteria Trials and Small Vertebrate Trapping

Plot

100 m

Native Mix

Non-Native Mix

Wild Bird Seed

Mix 1

Non-
Native
Mix

Wild Bird
Seed
Cafeteria Trials and Small Vertebrate Trapping
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Cafeteria Trials and Small Vertebrate Trapping

- Plot
  - 7 traps
  - 100 m
  - 35 m
  - 5 m

- Sherman Trap
Cafeteria Trials and Small Vertebrate Trapping

Plot

Sherman Trap

Hand-caught Western Fence Lizard
Cafeteria Trial Results Express Herbivory Rates

Herbivory Rates Across Climate Gradient

- North
- Central
- South

- Canyon Oak Acorns (Quercus chrysolepis)
- Pine Seeds (Pinus ponderosa)
- Wild Bird Seed
- Non-Native Mix

Percentage Consumed

2800 ft
North
Cafeteria Trial Results Express Herbivory Rates

Herbivory Rates Across Climate Gradient

![Graph showing herbivory rates across climate gradient with data points for North, Central, and South regions, with labels for Canyon Oak Acorns (Quercus chrysolepis), Pine Seeds (Pinus ponderosa), Wild Bird Seed, and Non-Native Mix.]

51-5400 ft

Central
Cafeteria Trial Results Express Herbivory Rates

Herbivory Rates Across Climate Gradient

- North
  - Canyon Oak Acorns (Quercus chrysolepis)
  - Pine Seeds (Pinus ponderosa)
- Central
  - Wild Bird Seed
  - Non-Native Mix
- South

Percentage Consumed

53-5600 ft
Cafeteria Trial Results Express Herbivory Rates

Herbivory Rates Across Climate Gradient

- **North**: 2800 ft
- **Central**: 51-5400 ft
- **South**: 53-5600 ft

- **Canyon Oak Acorns** (Quercus chrysolepis)
- **Pine Seeds** (Pinus ponderosa)
- **Wild Bird Seed**
- **Non-Native Mix**
Low Success Rate of Small Mammal Trapping

Small Mammal Trapping Across Climate Gradient

Number of Small Mammals Trapped

<table>
<thead>
<tr>
<th></th>
<th>North</th>
<th>Central</th>
<th>South</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
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<tr>
<td>1</td>
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Deer mouse (*Peromyscus maniculatus*) being weighed after capture
Tick Abundance on Western Fence Lizards

<table>
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<tbody>
<tr>
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<td>Lizard 2</td>
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**PCR**
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**PCR**
Small Land Mammal Exclosure Plot and Continued Research
Small Land Mammal Exclosure Plot and Continued Research
Small Land Mammal Exclosure Plot and Continued Research

Plot

Tomahawk Trap