

Rabbit Populations and Climate Change In Rhode Island

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Introduction

Background - Ecology

Rabbit Populations in Rhode Island have noticed significant increases over the last few years. Notably the Eastern Cottontail has been linked to an overall population increase as of recently. Even personally, I have noticed a much larger presence of rabbits in the yard. Some attribute this spike in numbers to a ten-year cycle that the species often abides by that results in larger cottontail numbers, but it might actually be worth a further investigation as to why the numbers are higher than normal.

Eastern Cottontails in New England often begin their breeding season in February or March, but have been reported to begin breeding as early as January when the weather is less severe. Possible reasoning for the increase in local populations would be that the earlier breeding months of January and February are becoming consistently less severe so much so that the rabbits now frequently breed earlier in the year. These rabbits often prefer to breed on slightly dense, grassy areas which would be hard to find with the normal snow coverings of the winter months.¹ Less severe weather would also result in more vegetation in the area which would be food for the offspring. Eastern Cottontail females can breed 3 to 4 times a year, but with the addition of an extra early gestation, a female could have up to 5 or 6 litters a year.²

The findings of this study will be important to realize the effects that climate change will have on small mammal populations in the region in the coming years. This study could provide insight into the future trends of the Eastern Coyote and the New England Cottontail, which are the Eastern Cottontail's largest predator and competition.



Fig. 1. (news-leader.com)

METHODS

Experimental Design:

- **Determining the Weather in January and February**
 - The weather over the months of January and February would be recorded in detail for the next 5 years. (average temperature per month, total precipitation per month)
- **Determining that more Rabbit offspring are surviving**

In the fall, 50 rabbits around the state will be trapped and tagged. Beginning in January, we would locate our tagged rabbits in their nests and investigate which have already had a litter of rabbits. Outside of these nests, cameras will be placed in order to monitor the status of the offspring. The litter would be counted initially and periodically until the offspring leave the nest. This would display how many offspring are surviving the entirety of their time in their nest. This process would be repeated every year for the next 5 years. To prove the hypothesis, the number of surviving offspring would have to increase every season.³
- **Determine the total Rabbit population in the State**

Resources from the local environmental agencies would help to determine the rabbit populations over the next five years.

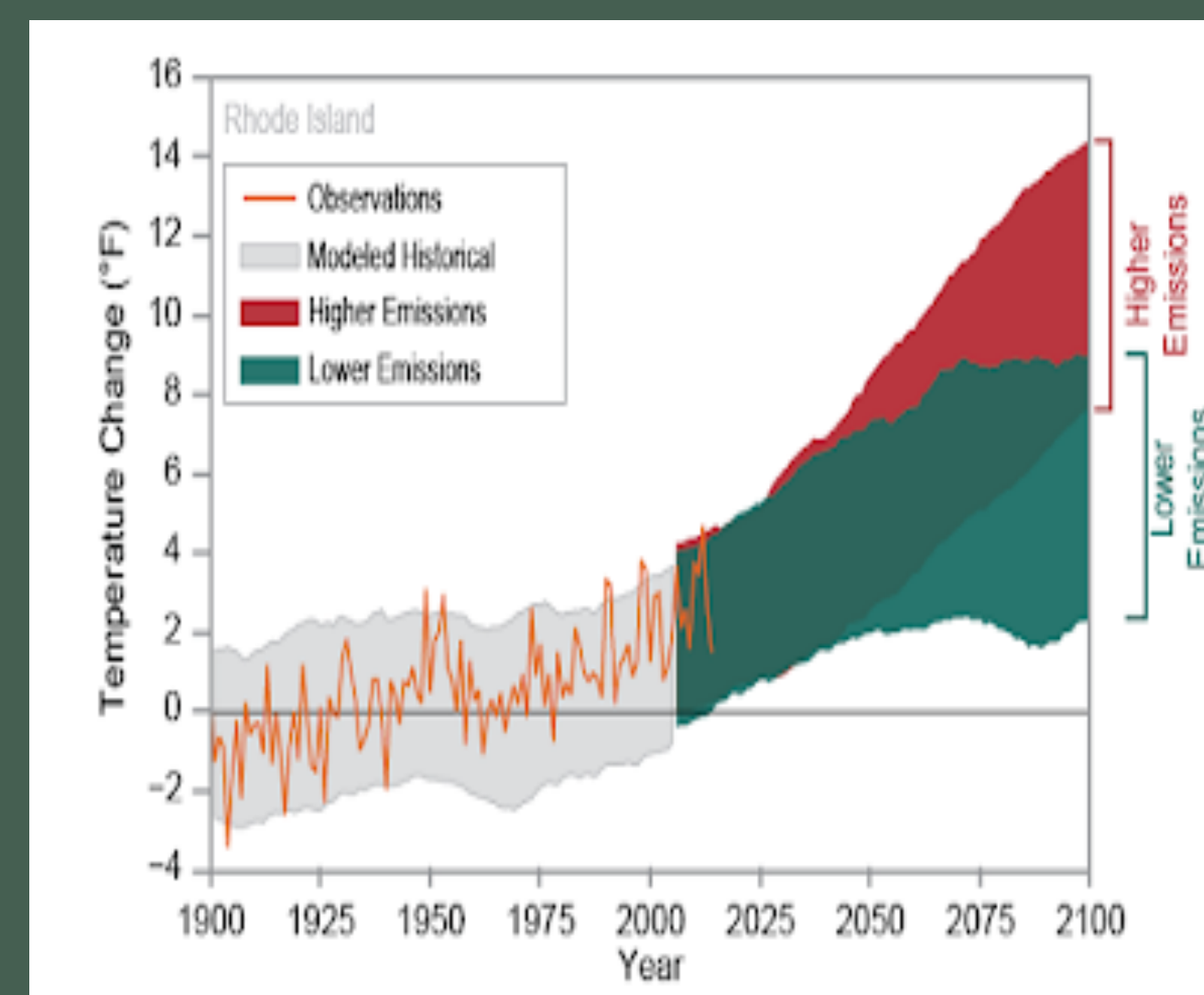


Fig. 3.
This graph shows the observed and predicted temperatures in Rhode Island from the year 1900 through the year 2100 (dem.ri.gov)



Fig. 2.
A rabbit nest containing a litter of offspring is tucked away. The image depicts the most optimal of nesting sites, a grassy area which can be modified to provide cover for the young. (Chesapeakebay.net)

Hypothesis

Hypotheses:

Climate change has a direct effect on the increase in rabbit populations. Due to increase of temperatures in the winter months, more offspring will be born and will be capable of surviving into adolescence which will raise the total rabbit populations.

In order to prove this hypothesis, three things must be proven

1. Weather in the early months of breeding season are less severe, (higher temperatures, less snowfall) which results in an increase vegetation.
2. More rabbit offspring are surviving per gestation.
3. The total rabbit population in Rhode Island is increasing.

Intended Analysis

Following my designed study, I would take my data and conduct a t-test in order to determine if there is any significant correlation to either support or refute my hypothesis. The response variable would be the growth in rabbit populations and the predictor variable would be temperature.

The information that I would attain from this study would be an indication of the effects that climate change is having on local, small, and abundant species. The data could be used to predict or give indications of what other species could either benefit or be harmed by climate change. Although this study would be confined to a single state, the information could be applied to any other region in the northeast or the country.⁴

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3. Tablado, Z., & Revilla, E. (2012). Contrasting Effects of Climate Change on Rabbit Populations through Reproduction. *PLoS ONE*, 7(11), 1–13. <https://doi-org.ezproxy.uvm.edu/10.1371/journal.pone.0048988>
4. DEM, R. (n.d.). State of Rhode Island: Department of Environmental Management. Retrieved November 29, 2020, from <http://www.dem.ri.gov/programs/fish-wildlife/>
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