Biodiversity for the National Parks System

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Capstone Project

Code Academy Pro Intensive

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https://diimension.com/national-parks-logo/

Species Information

- *Data: Information provided in a csv file (species_info.csv)*
  - **Category** ('Mammal' 'Bird' 'Reptile' 'Amphibian' 'Fish' 'Vascular Plant' 'Nonvascular Plant')
  - **Scientific Name** (i.e. Bos Taurus, etc.)
  - **Common Name** (i.e. Bison, Cattle, Sheep)
  - **Conservation Status** ('Species of Concern' 'Endangered' 'Threatened' 'In Recovery')

There are 5541 unique species and there are 5824 total species

Summary of Conservation Status

conservation_status	scientific_name
Endangered	16
In Recovery	4
No Intervention	5633
Species of Concern	161
Threatened	10

The vast majority of species do not require any intervention

Plotting on a log10 scale shows that there are protected species in each category (191 altogether)

Let's look at protective status by category:

Category	not_protected	protected	percent_protected
Amphibian	*73*	*7*	*0.0875*
Bird	*442*	*79*	*0.151631*
Fish	*116*	*11*	*0.086614*
Mammal	*176*	*38*	*0.17757*
Nonvascular Plant	*328*	*5*	*0.015015*
Reptile	*74*	*5*	*0.063291*
Vascular Plant	*4424*	*46*	*0.010291*

*It seems like Mammals are more likely to be endangered than Birds. Is this true?

*It seems like Mammals are more likely to be endangered than Reptiles. Is this true?

Question: Is the difference between birds and mammals significant?

Approach: Chi Square Contingency Test

Result: Mammals and Birds do not show statistically significant differences in their percent protective status

pval=0.445901703047

Question: Is the difference between reptiles and mammals significant?

Approach: Chi Square Contingency Test

Result: Mammals and Reptiles do show statistically significant differences in their percent protective status

pval=0.0233846521487

Based on statistical calculations, more resources should be directed at protecting mammals and birds relative to reptiles– since reptiles are less likely to be endangered.

Observations

- *Data: Recorded sightings of different species at national parks (observations.csv)*
  - **Scientific Name** (i.e. Bos Taurus, etc.)
  - **Park Name** (i.e. Yosemite, Bryce)
  - **Observations** (count)

There are 3 species of Sheep:

-Ovis aries

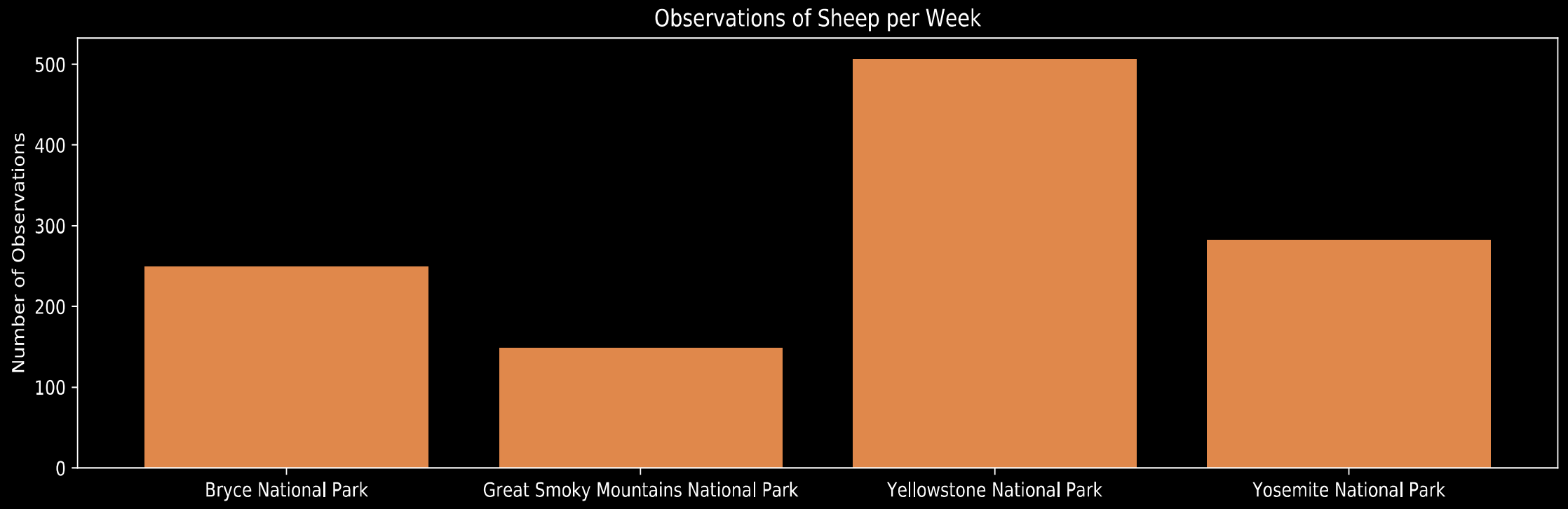
-Ovis canadensis

-Ovis canadensis sierra)

Summary of ALL Sheep

park_name	observations
Bryce National Park	250
Great Smokey Mountains National Park	149
Yellowstone National Park	507
Yosemite National Park	282

The most Sheep (per week) were observed in Yellowstone National Park



Foot and Mouth Disease in the Sheep Population

- 15% of Sheep in Bryce National Park have foot and mouth disease
- Yellowstone rangers have been running a program to reduce the disease rate in this park

Question: Is this program working? How many sheep would need to be observed to know with a high level of confidence?

Sample Size Determination for A/B testing of Foot and Mouth Disease in Sheep

- *Approach: Calculate desired sample size based on :*
  - *Baseline = 15*
  - *Minimum detectable effect = 33.3% (this is derived from 100*((10-15)/15)*
  - *Statistical significance 90*
- *Answer: 510 animals are needed for each test condition*

Recommendations (need 510 animals):

- *Bryce*- observe for 2.04 weeks (per test condition)
- *Yellowstone*- observe for 1.01 weeks (per test condition)