

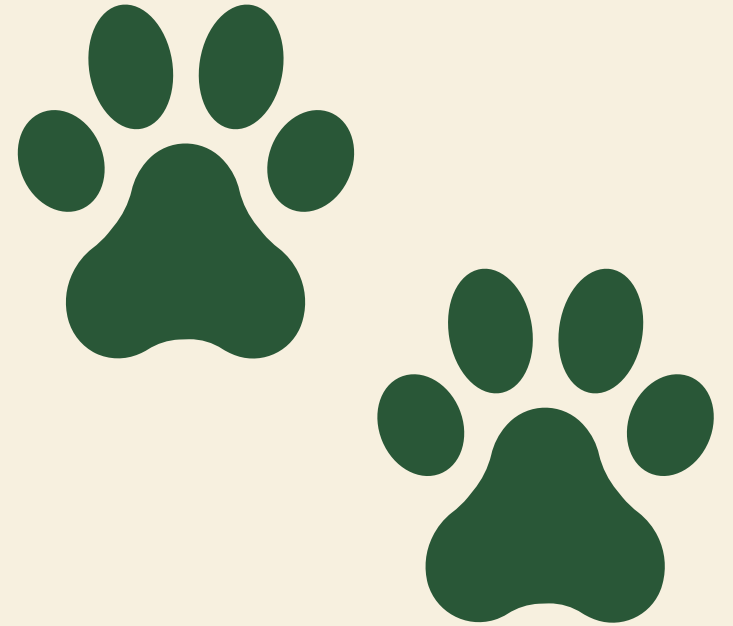
BIODIVERSITY DATA ANALYSIS

THE NATIONAL PARKS SERVICE

**BY JESSICA
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APRIL 23, 2019

National Parks are home to
5,541 different species



ENDANGERED STATUSES

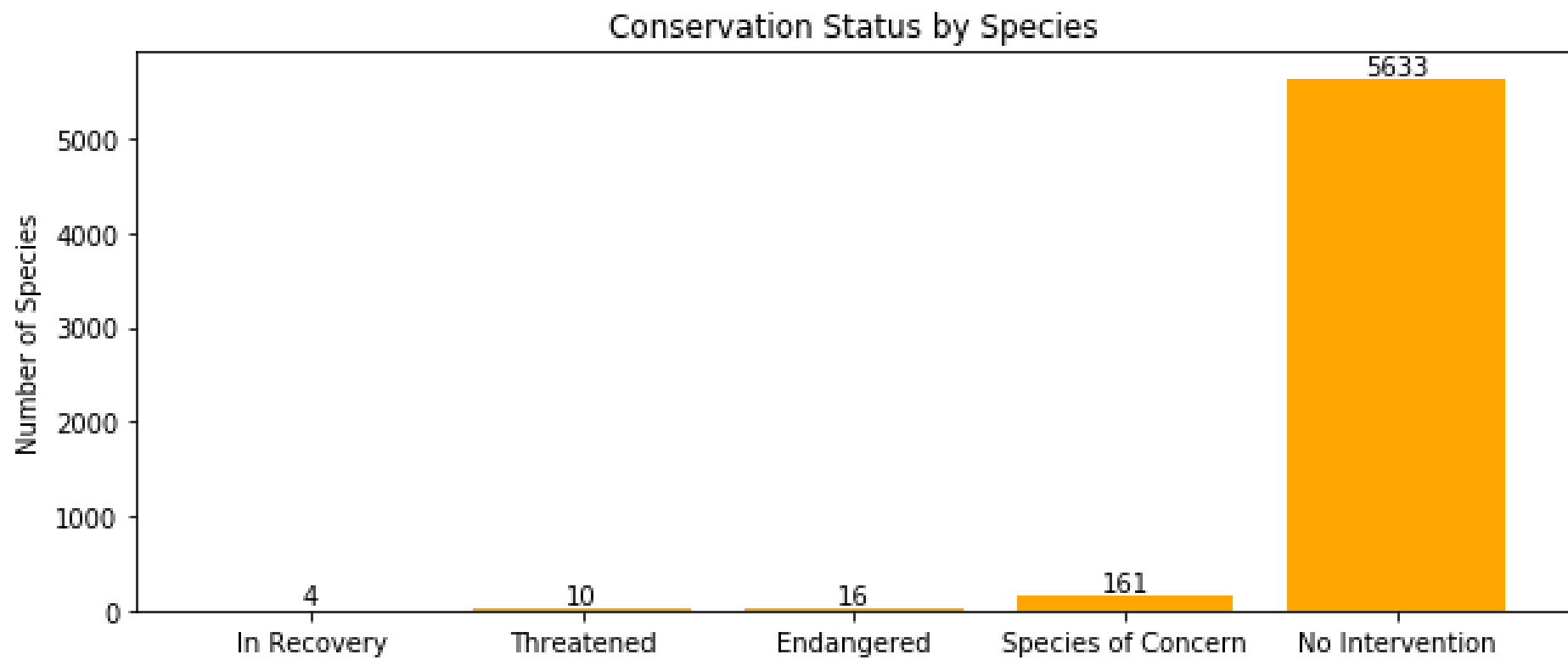
In Recovery

Threatened

Endangered

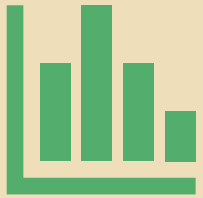
Species of
Concern

No
Intervention



ENDANGERED STATUS FOR CATEGORIES OF SPECIES

Category	Not Protected	Protected	Percent Protected
Amphibian	72	7	8.8
Bird	413	75	15.3
Fish	115	11	8.7
Mammal	146	30	17
Nonvascular Plant	328	5	1.5
Reptile	73	5	6.4
Vascular Plant	4216	46	1



2 pieces of numerical data
→ **Chi Squared Test**



If **p-value** < 0.05 reject null
hypothesis (no difference)

Is one
category of
species
more likely
to be
endangered
than
another?



17%

Mammal Species with Protected Status



15%

Bird Species with Protected Status

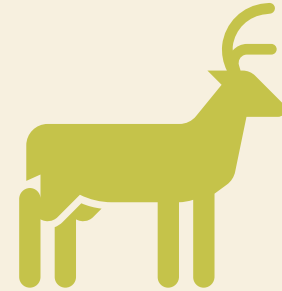
P-value = 0.687

→ Difference in rate is not significant



6.4%

Reptile Species with Protected Status



17%

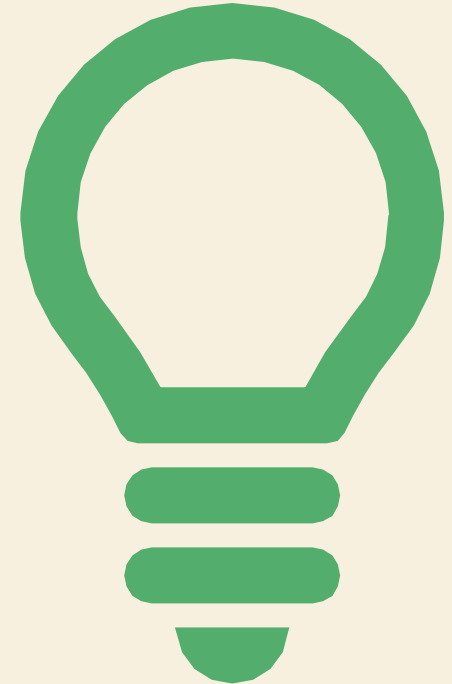
Mammal Species with Protected Status

P-value = 0.038

→ Difference is significant!

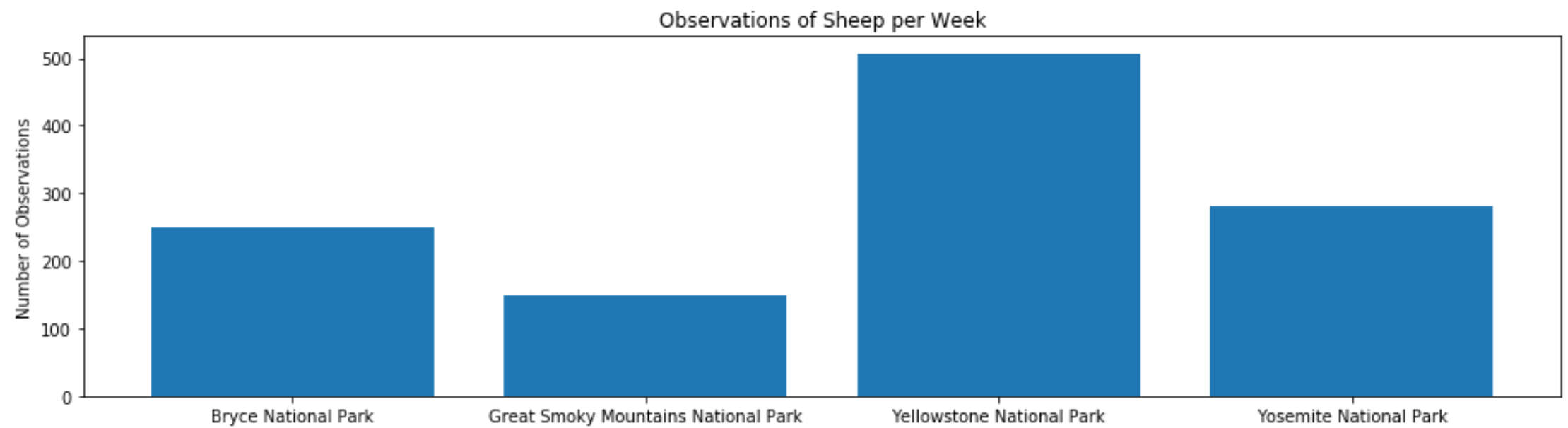
RECOMMENDATIONS

- Based on our calculations using data from the National Parks Service:
 - Mammal species are more likely to be endangered than reptile species
 - Mammal species are **not** more likely to be endangered than bird species
- If these seem surprising, we may need to investigate reassigning protection status for species we believe are more likely to be endangered
 - Re-examine population sizes, etc.
 - Is there a bias against reptiles? For mammals?



DATA ON SHEEP IN NATIONAL PARKS

- 3 species of sheep observed in four parks:
 - Bryce National Park
 - Great Smoky Mountains National Park
 - Yellowstone National Park
 - Yosemite National



SHEEP FOOT AND MOUTH DISEASE STUDY

Question: Is the program to reduce foot and mouth disease working at Yellow Stone National Park?

- 15% of sheep at Bryce National Park have foot and mouth disease
- Want to be able to detect reductions of at least 5 percentage points

SAMPLE SIZE

To calculate the number of sheep needed to be observed from each park we need the following:

- Baseline conversion rate – 15% (percentage observed at Bryce National Park)
- Statistical significance – 90% confidence level
- Minimum detectable effect = $100 \times \text{minimum improvement over baseline (5 percentage points)} / \text{baseline conversion rate}$

$$= 100 \times 5 / 15 = 33.33$$

Using a fancy sample size calculator, we produce a sample size of **870**

BRYCE NATIONAL PARK

250 weekly observations

870 observations needed

$$\rightarrow 870/250 = 3.48$$

It will take around **3 ½ weeks** to observe the needed number of sheep to determine a significant change in hand and foot disease



YELLOWSTONE NATIONAL PARK

507 weekly observations

870 observations needed

$870/507 = 1.71$

It will take around 12 days to observe the needed number of sheep to determine a significant change in hand and foot disease