
Biodiversity in National Parks

— By Nicole Currens —

Goals

- Analyze raw information about the conservation status of each species and investigate patterns of endangered species
- Help scientists perform analysis of their sheep disease reduction study

Conservation Status Data

Data in Species Info

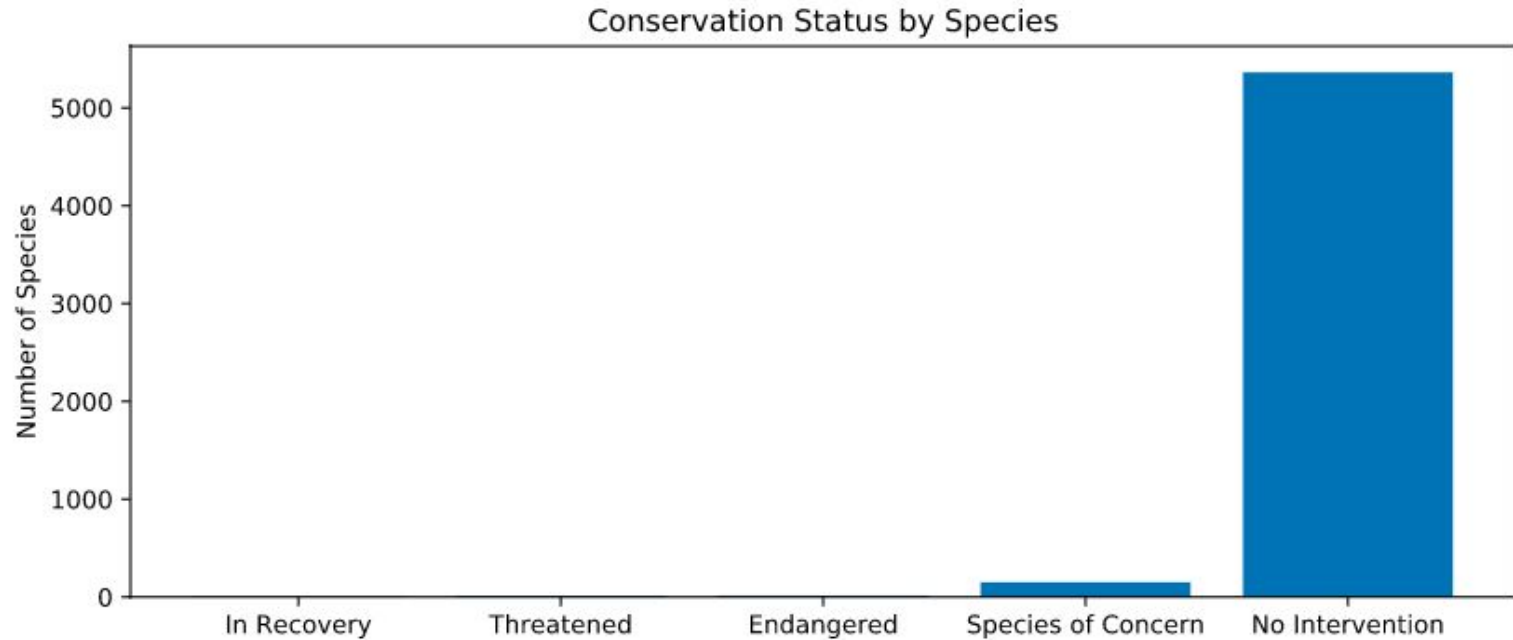
- There were 5,541 species represented in the raw data
- The categories of species represented were: mammal, bird, reptile, amphibian, fish, vascular plant, nonvascular plant
- There were several types of conservation: species of concern (may be at risk), endangered, threatened, in recovery (formerly endangered), or no intervention

How Many Animals in Each Category?

- Only 15 species are truly endangered
- 5,363 animals are not at risk at all
- This means only 3.25 percent of the species in this data are at risk (180 species)

	conservation_status	scientific_name
0	Endangered	15
1	In Recovery	4
2	No Intervention	5363
3	Species of Concern	151
4	Threatened	10

Conservation Status of All Species



How Many Species of Each Type Are Endangered?

Percent protected:

- 17% of mammals
- 15.4% of birds
- 8.9% of amphibians
- 8.7% of fish
- 6.4% of reptiles
- 1.5% of vascular plants
- 1.1% of non vascular plants

	category	not_protected	protected
0	Amphibian	72	7
1	Bird	413	75
2	Fish	115	11
3	Mammal	146	30
4	Nonvascular Plant	328	5
5	Reptile	73	5
6	Vascular Plant	4216	46

Significance?

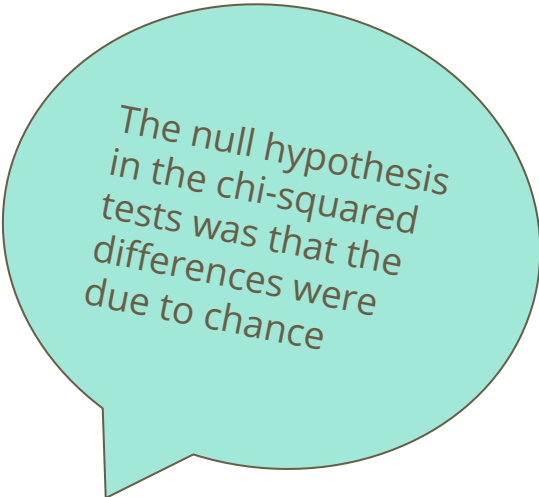
- At first glance, it seems that mammals are the most likely to be in need of conservation
- However, this is not necessarily true- perhaps we simply have fewer mammalian species recorded in our data, so a greater proportion of the ones we do have data about are in need of conservation
- To determine significance, I ran a chi-squared test to determine if there is a significant relationship between 2 variables

Chi-Squared Test

I ran tests to determine if the difference in percent conservation status between 2 categories of species was significant.

The categories I compared were:

- Mammal v. bird
- Reptile v. mammal
- Amphibian v. fish
- Non-vascular plant v. vascular plant
- Reptile v. amphibian



The null hypothesis in the chi-squared tests was that the differences were due to chance

Results

The p-values and results of the chi-squared tests are as follows:

- Mammal v. bird, pval = 0.688, not significant
- Reptile v. mammal, pval = 0.038, SIGNIFICANT
- Amphibian v. Fish, pval = 0.825, not significant
- Non-vascular plant v. vascular plant, pval = 0.662, not significant
- Reptile v. Amphibian, pval = 0.781, not significant

Therefore, certain types of species are more likely to be endangered than others

Recommendations

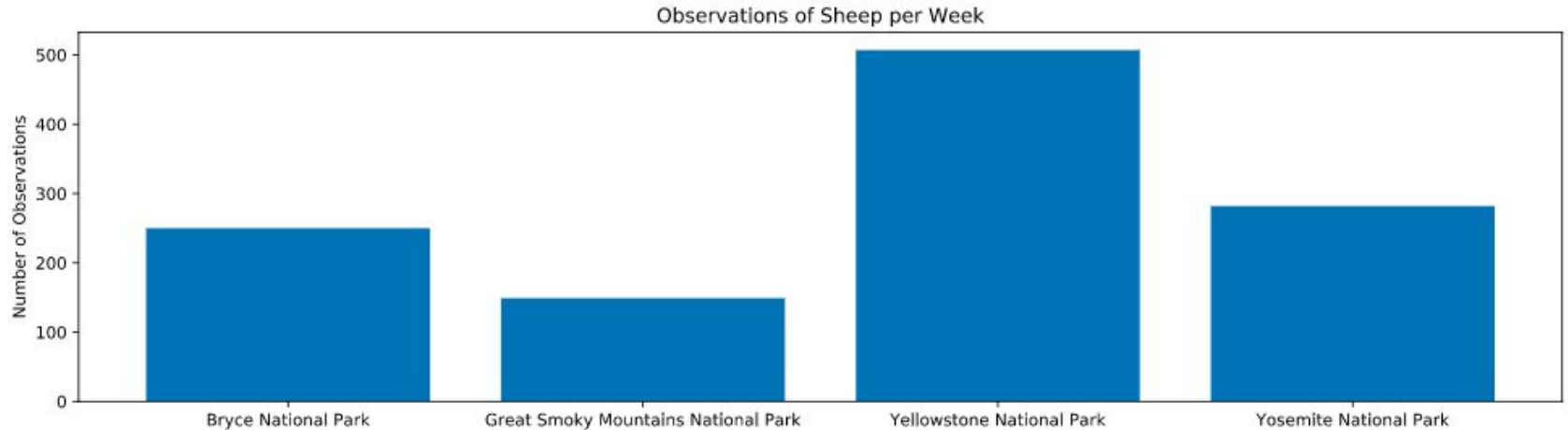
- Since some types of species are more likely than others to be endangered, special attention should be paid to those species' conservation

Sheep Observations Data

Data in observations

- Observations have been collected over one week about the species, number and location of sheep in different national parks
- The parks are: Bryce National Park, Great Smoky Mountains National Park, Yellowstone National Park, and Yosemite National Park
- There are three species of sheep in the species data, however only two of these species have been spotted in national parks

Sheep Observation Data by Park



Reducing Foot and Mouth Disease in Sheep

- In order to determine whether their efforts at reducing foot and mouth disease in the sheep populations are working, scientists needed information about how many observations they should take to be sure there was a reduction in the disease not simply due to chance.

Information for tests

Baseline value = 15% (15% of the sheep were diseased at the time of the last observations)

Statistical significant = 90% (the scientists would like to be 90% sure of their answer)

Minimum detectable effect = 33%

Therefore, the necessary sample size is 510

Conclusions

In order to observe 510 sheep, scientists would need to spend:

- 1 week in Yellowstone National Park
- 2 weeks in Bryce National Park