

Biodiversity for the National Parks

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Part 1: Conservation Status of Species in the National Parks



Species Info

This data listed the scientific name, common names, category, and conservation status of species within our National Parks.

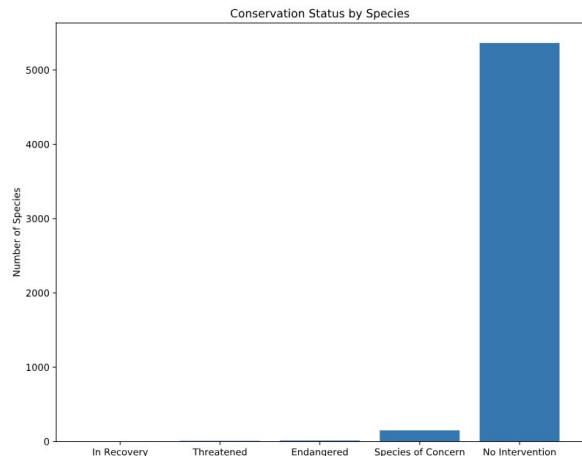
Categories (or species type) included Mammal, Bird, Reptile, Amphibian, Fish, Vascular Plant, and Nonvascular Plant.

Conservation statuses were Endangered, In Recovery, Species of Concern, Threatened, or none (No Intervention).

Conservation Status

When looking at the conservation statuses for all species within the data, this is what we see:

Conservation Status	Total Number of Species
Species of Concern	151
Threatened	10
Endangered	15
In Recovery	4
No Intervention	5363



While this is interesting, it is more useful to look at this data in other ways.



Conservation Status by Species Type

As seen on the last slide, “No Intervention” had the largest total by far. For purposes of further analysis, we will group all the other conversation statuses (Species of Concern, Threatened, Endangered, In Recovery) into one group, titled “Protected”. All others (“No Intervention”) will be labeled as “Not Protected”.

When we look at “Protected” and “Not Protected” by Species Type, this is what we see:



Conservation Status by Species Type

Species Type	Number Protected	Number Not Protected
Amphibian	7	72
Bird	75	413
Fish	11	115
Mammal	30	146
Reptile	5	73
Vascular Plant	46	4216
Nonvascular Plant	5	328



Conservation Status by Species Type

This information is interesting and valuable, but hard to compare due to vastly different numbers of species for each species type. Therefore, it helps to create percentages for each species type based on the number currently being protected.



Conservation Status by Species Type

Species Type	Number Protected	Number Not Protected	Percent Being Protected
Amphibian	7	72	8.86
Bird	75	413	15.37
Fish	11	115	8.73
Mammal	30	146	17.05
Reptile	5	73	6.41
Vascular Plant	46	4216	1.08
Nonvascular Plant	5	328	1.50



Conservation Status by Species Type

Based on the percentages, we can see there is a difference between certain species types and how many of that type are protected. But are these differences statistically significant?

First, we looked at mammals and birds, which have the largest percentages protected (17% and 15%, respectively). Is the higher percentage of mammals statistically significant compared to birds?

After conducting a chi-squared test, our p-value was ~ 0.688 , which shows the differences between protection rates of mammals and birds to be *insignificant*. Therefore, **there is no statistical difference between the protection rates of these species types.**



Conservation Status by Species Type

However, if we remember looking at all species types, mammals and birds had a higher protection rate than the others. Is that statistically significant, though?

We decided to compare the difference between reptile and mammal protection rates (6% and 17%, respectively). Using the chi-squared test for significance, we obtained a p-value of ~ 0.038 , which shows that these rates *are* statistically significant.

Therefore, there **is a statistical difference between the conservation status rates of mammals and reptiles**. Mammals are more likely to need to be protected than reptiles.

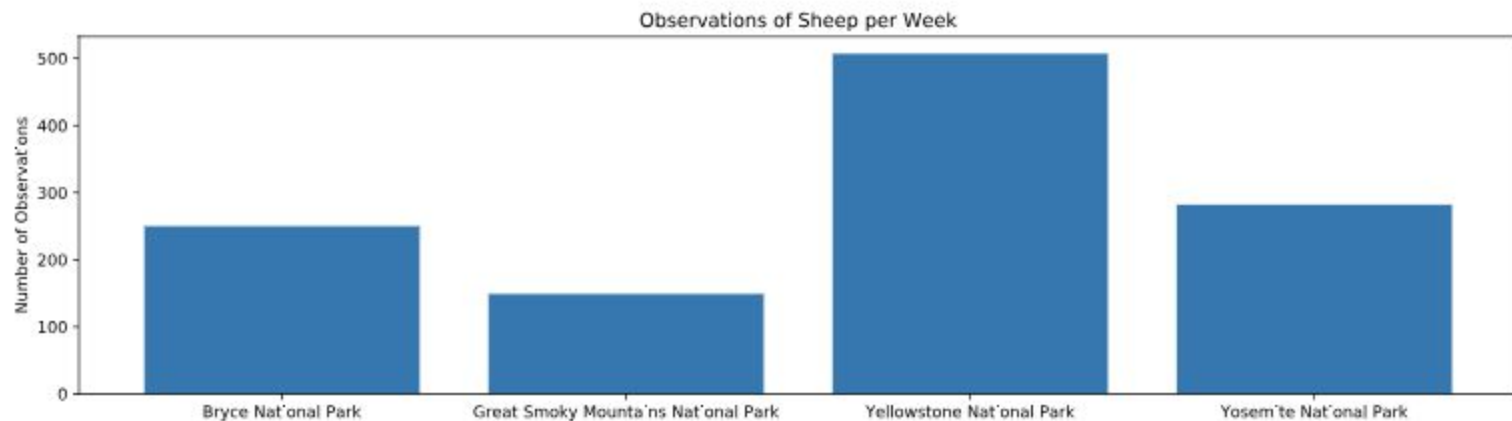
Part 2: Foot and Mouth Reduction Effort



Sheep Observations by National Park

Given data of species observations in various national parks, we were able to compile the amount of sheep (of various species) sighted within each national park over one week:

National Park	Number of Sheep Sightings
Bryce NP	250
Great Smoky Mountains NP	149
Yellowstone NP	507
Yosemite NP	282





Foot and Mouth Reduction Effort - Sample Size Determination

Given the following data, we were able to determine the sample sizes needed to make sure the foot and mouth percentages are significant.

Baseline: 15% (sheep recorded to have the disease in Bryce National Park last year)

Minimum Detectable Effect: 33% (we would like to detect reductions of at least 5% from the 15%)

Statistical Significance: 90% (default)

Sample size needed per park: 870

Yellowstone NP: 870 samples needed/507 sightings per week = 1.7 or about **two weeks** of observations

Bryce NP: 870 samples needed/250 sightings per week = 3.48 or about **four weeks** of observations