Biodiversity for the National Park

A Brief Statistical Analysis

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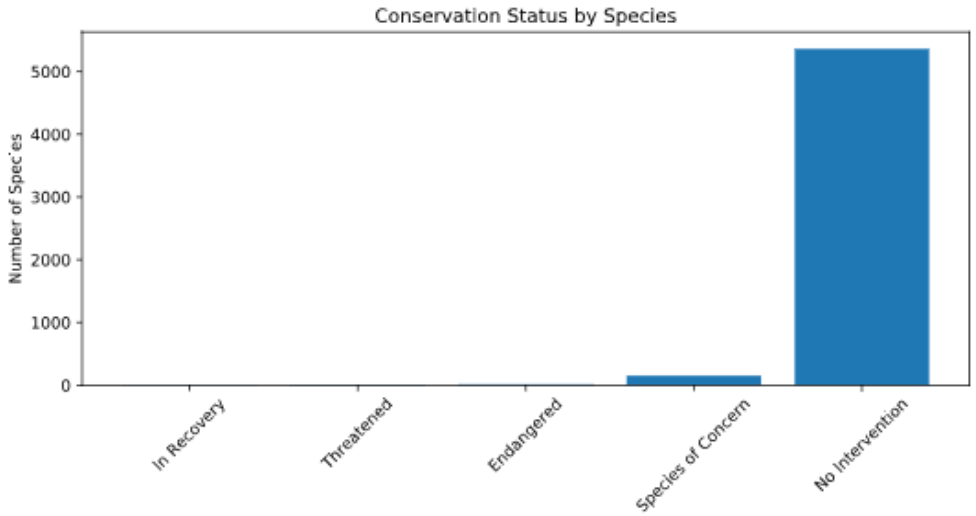
A Look at the Data

- The National Parks Service has compiled data on animal species, with particular emphasis on their conservations statuses.
- The species are listed by category: mammal, bird, reptile, amphibian, fish, vascular plant, or nonvascular plant
  - In total, there are 5824 records, with the majority of the records being in the vascular plant category.
- The species' scientific name, as well as the more common names are listed, along with its conservation status.
  - For example, the Canus rufus, or as we know it, the Red wolf, is endangered.
- Of the 5824 species, 151 are species of concern, 10 are threatened, 15 are endangered, and 4 are in recovery.

Counts of Species by Conservation Status



Category	Protected	Not Protected	Percent Protected
Amphibian	7	73	0.088
Bird	79	442	0.152
Fish	11	116	0.087
Mammal	38	176	0.178
Non Vascular Plant	5	328	0.015
Reptile	5	74	0.063
Vascular Plant	46	4424	0.010

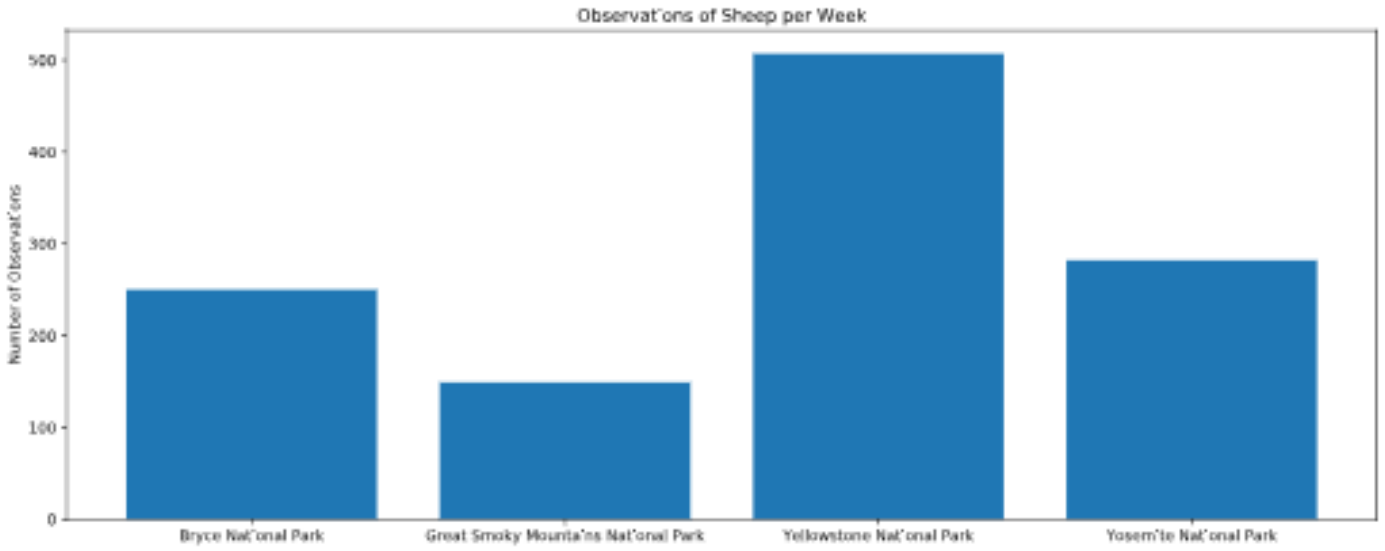
Are certain categories of species more likely to be endangered?

- Chi Squared tests were run to compare sets of two categories of species to test for significance between the data sets.
- Are mammals more likely to be endangered than birds?
  - The chi squared test produced a p-value = 0.6875
  - No significant difference between the datasets, so the difference may be due to chance.
- Are mammals more likely to be endangered than reptiles?
  - The chi squared test produced a p-value = 0.0384
  - At a significance level of 0.05, we can reject the null hypothesis that the difference is due to chance. So the difference is significant!
- Therefore, we can conclude that certain categories of species are more likely to be endangered than others.

Endangered Species Recommendations

- Because certain categories of species are more likely to be endangered than others, perhaps particular attention to conservation should be paid to those categories of species.
- More testing and analysis is needed to fully discern the reasons for the higher likelihood of certain species to be endangered than others.

Number of Sheep Observed per Week by Park



Sample Size Determination

- In order to test for a significant improvement, a greater than 5% reduction in foot and mouth disease amongst the sheep population at Yellowstone, given that 15% of sheep at Bryce National Park had the disease last year, scientists would have to observe 870 sheep.
- 870 sheep was determined using:
  - 15% as a baseline
  - 90% statistical significance level
  - 33% minimum detectable effect
    - 5% / 15% x 100
- Based on the weekly observed counts of sheep, in order to observe 870 sheep at Yellowstone, it would take scientists approximately 12 days.