# Biodiversity in National Parks

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Intro to Data Analysis Capstone Project
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Overview of Species Information

- 5541 total unique species monitored by the National Park Service

- 7 categories of classification including Mammals, Birds, Reptiles, Amphibians, Fish, Vascular Plants and Nonvascular Plants

- 5 categories of conservation status including No Intervention, Species of Concern, Endangered, Threatened, and In Recovery

- Over 95% of species require no intervention

Conservation Status by Species
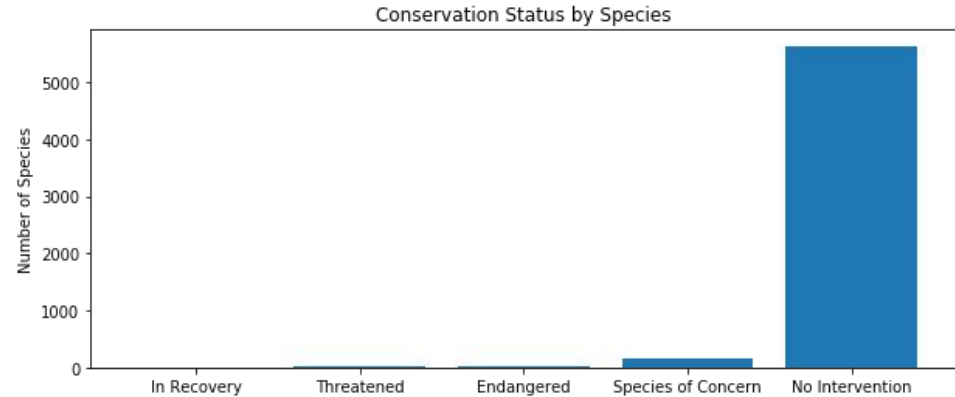
Endangered Statuses by Category of Species

- All species with endangered statuses of "No Intervention" are considered not protected in this study. All other statuses are deemed protected.

- Mammals and Birds have the highest percentage of protected species at 17.04% and 15.36% respectively.

- A chi squared test was conducted to test for significance between percentage of protected species in Mammals and Birds.

- Using the values highlighted in this chart, the p-value was calculated to be 0.68. As the p-value was not less than or equal to 0.05, the difference is not significant.

| Category	Not Protected	Protected	Percent Protected
Amphibian	72	7	8.86%
Bird	413	75	15.36%
Fish	115	11	8.73%
Mammal	146	30	17.04%
Nonvascular Plant	328	5	1.50%
Reptile	73	5	6.41%
Vascular Plant	4216	46	1.07%

Endangered Statuses by Category of Species

- A chi squared test was conducted to test for significance between percentage of protected species in Mammals and Reptiles.

- Using the values highlighted in the chart, the p-value was calculated to be 0.03. As the p-value was less than or equal to 0.05, it can be concluded that there is a significant difference between the percentage of protected species between Mammals and Reptiles.

- After analysis of the data provided, it can be concluded that Mammals and Birds have a similar percentage of species at risk while there is a significant difference between Mammals and Reptiles. Therefore, efforts made by conservationists should be focused on Mammal and Bird species.

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Tracking Disease in Sheep Species

- Three different species of sheep, Domestic Sheep, Bighorn Sheep and Sierra Nevada Bighorn Sheep, are tracked over four national parks.

- The chart below illustrates the total number of sheep observed in each park over the past week.

Observations of Sheep per Week
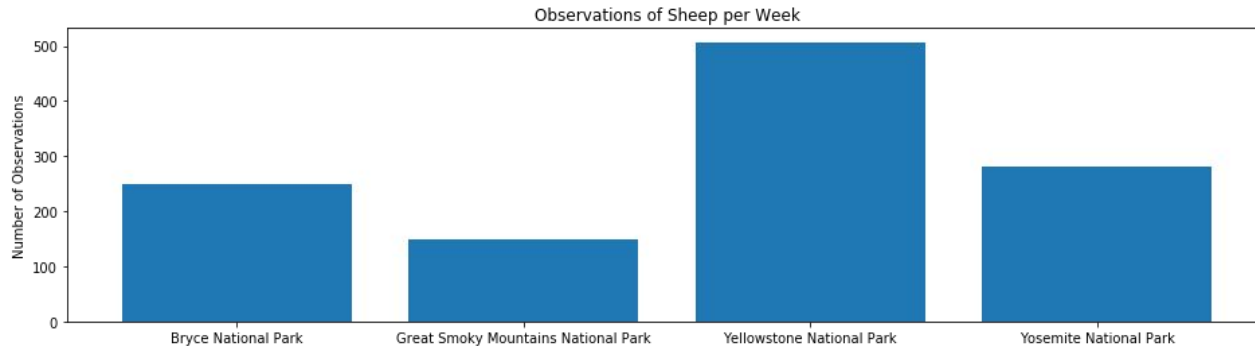
Tracking Disease in Sheep Species

- Yellowstone National Park is running a program to reduce the rate of foot and mouth disease in sheep species. To test the efficacy of the program, a sample size is necessary to make a meaningful statistical statement on the program results.

- 15% of sheep at Bryce National Park have foot and mouth disease.

- The scientists would like to detect at least a 5% reduction, therefore the minimum detectable effect is the proportion of the reduction rate to the current baseline conversion rate.

  - Baseline conversion rate = 15%

  - Minimum detectable effect = 5/15 = 33%

  - Significance = 90%

- Based on these values, the sample size required for each sheep species is 520 samples.