

Biodiversity for the

National Parks



Amy Du Pont



Are certain types of species more likely to be endangered?



5,541

The total number of species recorded by the National Park Service

5,363

The number of species that require no intervention

180

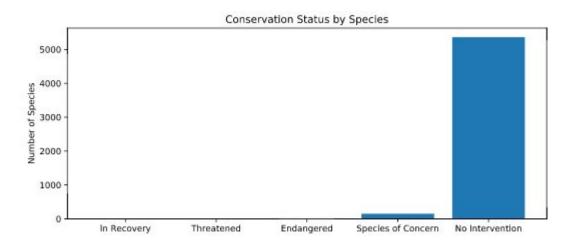
The number of species that are endangered, threatened, in recovery, or a species of concern

Working with the National Parks Service Data (species_info.csv)

- The National Park Service has recorded a total of 5,541 different species in their parks
- + Of these species, **5,363** are not threatened
- However, 180 species are either endangered, threatened, a species of concern, or in recovery



Conservation Status by Species





Conservation by Species - Explained

- As seen in the previous bar graph, the vast majority of species are not endangered.
- However, the remaining at-risk species pose an important question:
- + Are certain types of species more likely to be endangered than others?



Protected v. Non-Protected by Category

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



Protected v. Non-Protected by Category - Explained

- This table extracted from the data shows that some species have a higher at-risk population than others.
- Our null hypothesis is that these variances are due to chance, and that no species is more likely to be endangered than another. Does this hold true?

Testing Statistical Significance of the Data

Mammals v. Birds

- When using a chi-squared test, the resulting p-value of mammals v. birds was **0.668**.
- The results were not significant, meaning that birds are not more likely to be endangered than mammals and vice versa.

Reptiles v. Mammals

- When using a the same test, the p-value of mammals v. reptiles was **0.038**.
- These results are significant, proving that reptiles are more likely to be endangered than mammals!

Nonvascular Plants v. Reptiles

- When again using the chi-squared test, the p-value of reptiles v. nonvascular plants was **0.034**.
- These results are also significant.



"What Do These Results Tell Us?

Certain types of species **are more likely** than others to be endangered!



Recommendations for Conservationists

Based on these significance calculations that show that certain species are more likely to be endangered than others, conservationists should focus their efforts on solving the issues that are most rapidly negatively affecting species' populations.

Reptiles are statistically more likely to be endangered than mammals. Why? Is it because of rapid climate change, and the fact that reptiles rely on stable temperatures to survive? Conservationists should be asking these types of <u>informed questions</u> when forming the best course of action.





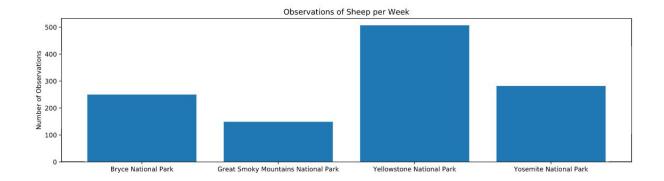
Where is the best place to observe sheep who may have Foot and Mouth Disease?

Working with the National Parks Service Data (species_info.csv)

- The National Park Service has observed a total of **1,188** sheep in **4** different parks over the course of **1** week
- There were 3 different species of sheep observed: Domestic Sheep, Bighorn Sheep, and Sierra Nevada Bighorn Sheep



Sheep Observations per Week





Sheep Observations per Week - Explained

- As seen in the previous bar graph, the greatest volume of sheep being observed occurs at Yellowstone National Park.
- Does this mean that Yellowstone is the best place to observe sheep? If so, how many sheep should we test for Foot and Mouth Disease to get an accurate percentage of diseased sheep?
- To determine these answers, we must run a sample size determination test.





33%

Minimum detectable effect

890

Sample size needed to test disease rates among sheep with 90% statistical significance

Recommendations for Observationalists

- Based on the sample size determination test, we need to test **890** sheep in order to get an accurate percentage of sheep with Foot and Mouth Disease (with **90%** statistical significance).
- Sheep observationalists should choose to observe sheep at Yellowstone National Park, because it would only take less than 2 weeks to gather enough samples--the least amount of time among the 4 National Parks.

