



The health and future of wildlife on our parks

Biodiversity

A project by Obi Ozumba – Sponsored by The National Park Service – May 2019

Introduction

- The National Parks Service wanted a more accurate picture of...
- the conservation of various species found in the parks;
- if any species is more likely to be endangered than others;
- to easily detect an identified disease once it occurs to a small number of species.

Introduction

- Two data sets were used
 - conservation, and observations of foot and mouth disease (FMD).
- The project involved analysis, cleaning up and plotting of data, asking questions which give meaningful insight.

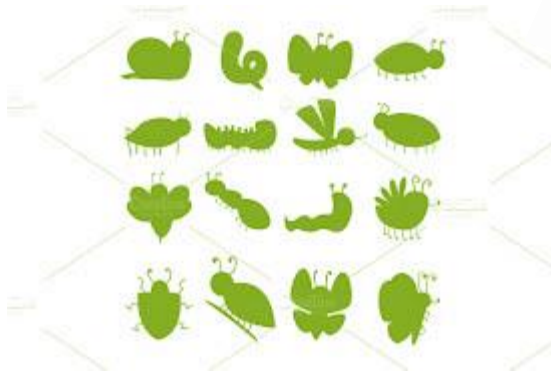


the species out there

- There are various types of species recorded in the data set, including plants, mammals and birds.
- Other information include their scientific names, common names, categories and conservation status

...on the species

Number of species = **5541**



...on the species

- Types of species =



Mammals



Birds



Fish



Reptile



Amphibian



Vascular plant



Nonvascular plant

...on the species

- Conservation status



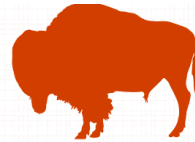
**No
intervention**



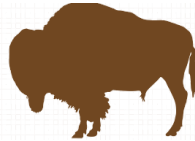
**Species of
concern**



Endangered



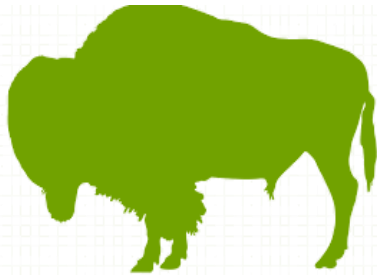
Threatened



In Recovery

how endangered they are

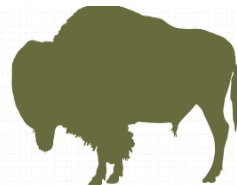
- Conservation statuses for parks



No
Intervention
5363 species



Species of
Concern
= 151



Endangered
= 15



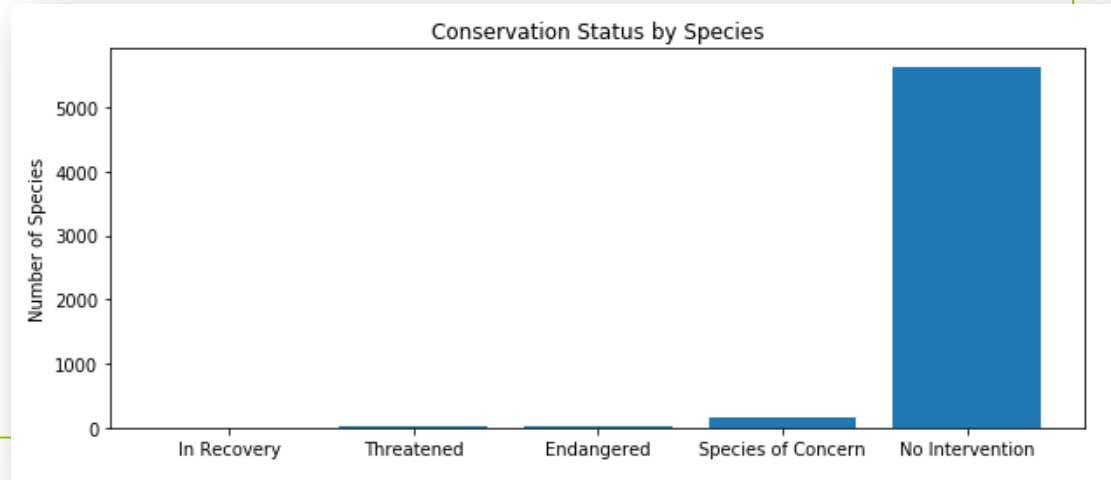
Threatened
= 10



In Recovery
= 4

Protected vs. non-protected

- No intervention vs. other groups



Likelihood of being endangered

- We answered the question:
 - Are certain types of species more likely to be endangered?
- We used **Pivot tables**
and **Chi-squared test**

Likelihood of being endangered

- From the charts, tables, and pivot table:
 - 8 and 9 Mammals seem more likely to become endangered but the difference is not significant
- P-values > 0.05



Likelihood of being endangered

- Using pivot table and Chi squared test:
 - Mammals had a *significantly higher likelihood of becoming endangered*.
- P-values < 0.05**



Likelihood of being endangered

- We answered the question:
 - Are certain types of species more likely to be endangered?
- We used **Pivot tables**
and **Chi-squared test**

Early detection of diseases

- Scientists observing animals, identified a 15% occurrence of Foot & Mouth disease among sheep at Bryce National Park.
- An intervention has been instituted Yellowstone National Park, whose effectiveness is to be investigated.
- Scientists need to know the requirements for early detection of reductions of at least 5% among small groups

Early detection of diseases

- Using the sample size calculator and the formula for: Minimum Detectable Effect, I calculated:
 - Minimum Detectable Effect = 33**
 - Sample size**

Early detection of diseases

- Using the sample size calculator and the formula for: Minimum Detectable Effect, I calculated:
 - Minimum Detectable Effect = 33**
 - Sample size**

Early detection of diseases

- Following the number of observations per park
- The number of observation weeks required is calculated:
 - $\text{Park observation weeks} = \text{required_sample_size} / \text{obs_at_park}$
- An intervention has been instituted whose effectiveness is to be investigated.
- Scientists need to know the requirements for early detection of reductions of at least 5% among small groups

A way forward

- Conservationists concerned about endangered species, should focus more on mammals.

A way forward

- For a baseline of 15% occurrence of foot and mouth disease in sheep:
- observe about 890 sheep
- factor in 1 to 2 weeks of observation for significant observation of less than 5% reduction.

Lessons

- Thank you.
- Remember that biodiversity **is the bedrock** of life as we know it.

