Capstone Project:
Biodiversity

By John Dillenburg

Abstract

I, as your data analyst, have received the information regarding the ‘observations’ of individual species residing at national parks, as well as their individual information in ‘species_info.’

I have also answers to your questions regarding:

1. Conservation Status
2. Foot and Mouth Disease of Sheep

Species_info.csv

The species_info.csv contains the following on individual species:

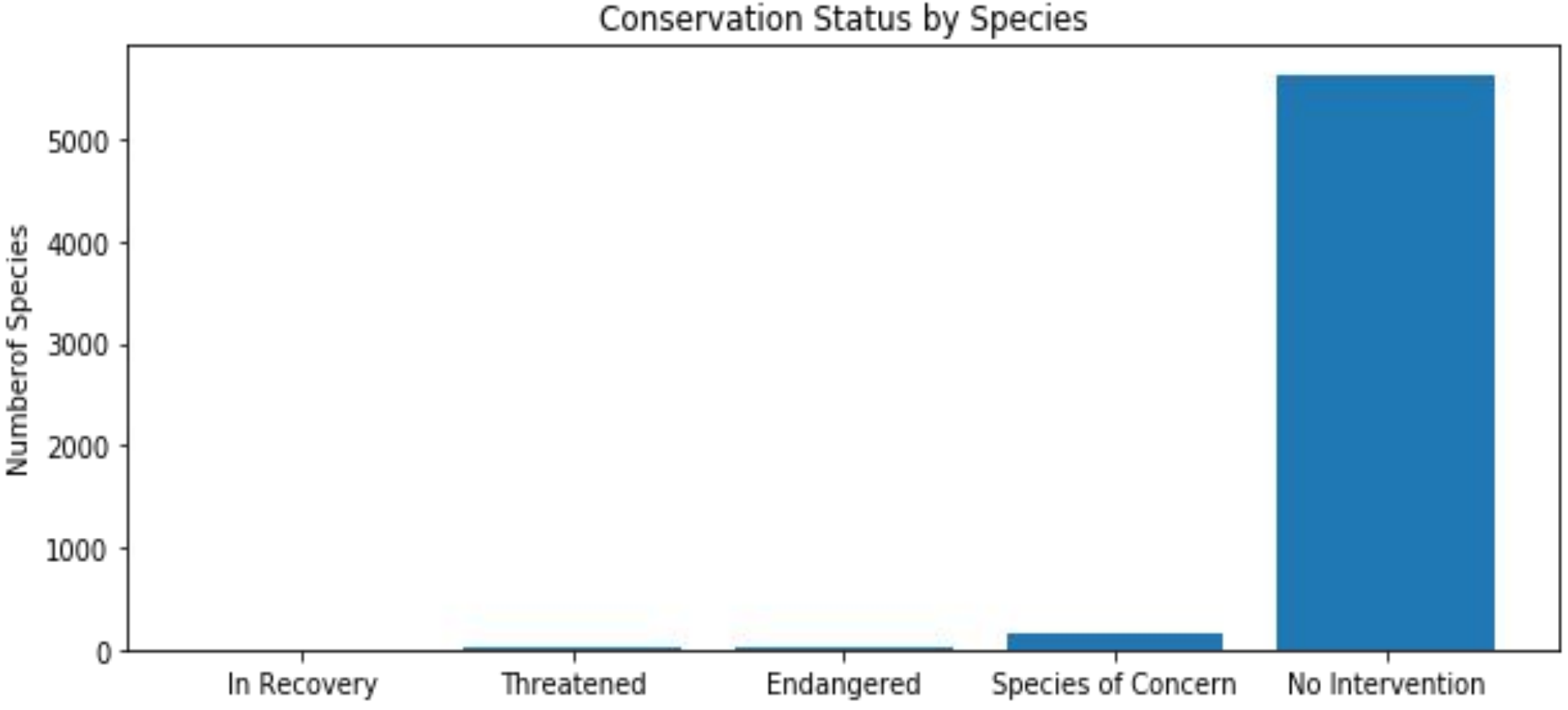
- Category (Mammal, Bird, Reptile, Amphibian, Fish, Vascular Plant, and Nonvascular plant)
- Scientific Name (5824 recorded names)
- Common Names
- Conservation Status (Species of Concern, Endangered, Threatened, In Recovery, and Null values)

Observations.csv

The observations.csv contains the number of sightings of specific species, listed by their scientific names, and in exactly which parks they have been sighted that number of times.

Conservation Status (current)

	conservation_status	scientific_name
1	In Recovery	4
4	Threatened	10
0	Endangered	16
3	Species of Concern	161
2	No Intervention	5633


Conservation Status by Species
Numberof Species
5000
4000
3000
2000
1000
0
In Recovery
Threatened
Endangered
Species of Concern
No Intervention

Category Pivot Table

	category	not_protected	protected	percent_protected
0	Amphibian	72	7	0.088608
1	Bird	413	75	0.153689
2	Fish	115	11	0.087302
3	Mammal	146	30	0.170455
4	Nonvascular Plant	328	5	0.015015
5	Reptile	73	5	0.064103
6	Vascular Plant	4216	46	0.010793

Chi Square Test

A Chi Square Test was performed multiple times on the previous slide's information. I have noticed that there is a significant difference between the protection rates, or at least the need to be protected rates, of Mammals and Reptiles.

Mammals are more likely to need protection when compared to Reptiles.

As well as All animal groups compared to all plant groups.

Proposal

I would like to advise the parks to hone in their focus, on protecting species, more towards animals, with a closer eye on Mammals than Reptiles.

This would oppose the utilitarian point of view that would place Vascular Plants higher than most animal groups due to the larger number of Vascular Plants in need of protection rather than Amphibians, Fish, Mammals, and Reptiles.

Sheep Concerns

The Foot and Mouth Disease is present amongst the Mammal species of sheep.

While we do not know exactly how many sheep there may be at each park, we do not necessarily need to know in order to calculate a sample size needed to confident in the percent of sheep sick within the different parks that they may live in.

Sheep Specifics

The following helps us define our sample size number:

- Given: 15% of sheep at Bryce National Park is estimated to have the disease.
- We want to be able to narrow our results to be no more than 5% away of the real percentage of sheep with the disease.
- Or a 33.33% Minimum Detectable Effect.
- We want to be 90% confident in our findings.

Using these facts and the Optimizely sample size calculator, we have determined that **510** sheep would need to be examined from each park before estimating the percentage of sheep with this disease.


Sheep Sightings Per Park
500
400
300
200
100
0
Bryce National Park
Great Smoky Mountains National Park
Yellowstone National Park
Yosemite National Park

Time required

By dividing the number of samples needed by the number of observations given in a week, and rounding those numbers up to the next integer, we have found the following number of weeks required for each park there is sheep:

- Bryce National Park: 3
- Great Smoky Mountains National Park: 2
- Yellowstone National Park: 4
- Yosemite National Park: 2

End Results

1. Animal groups are more likely to need protection rather than plant groups.
2. Mammals are more likely to need protection rather than reptiles.
3. Proposal: Focus protection efforts towards those Animal group.
4. Between two and four weeks of examinations will be required before determining the percentage of sheep with the Foot and Mouth Disease from any given national park.

Thank you

Regards,

John Henry Dillenburg