BIODIVERSITY IN OUR NATIONAL PARKS

Species – Raw data

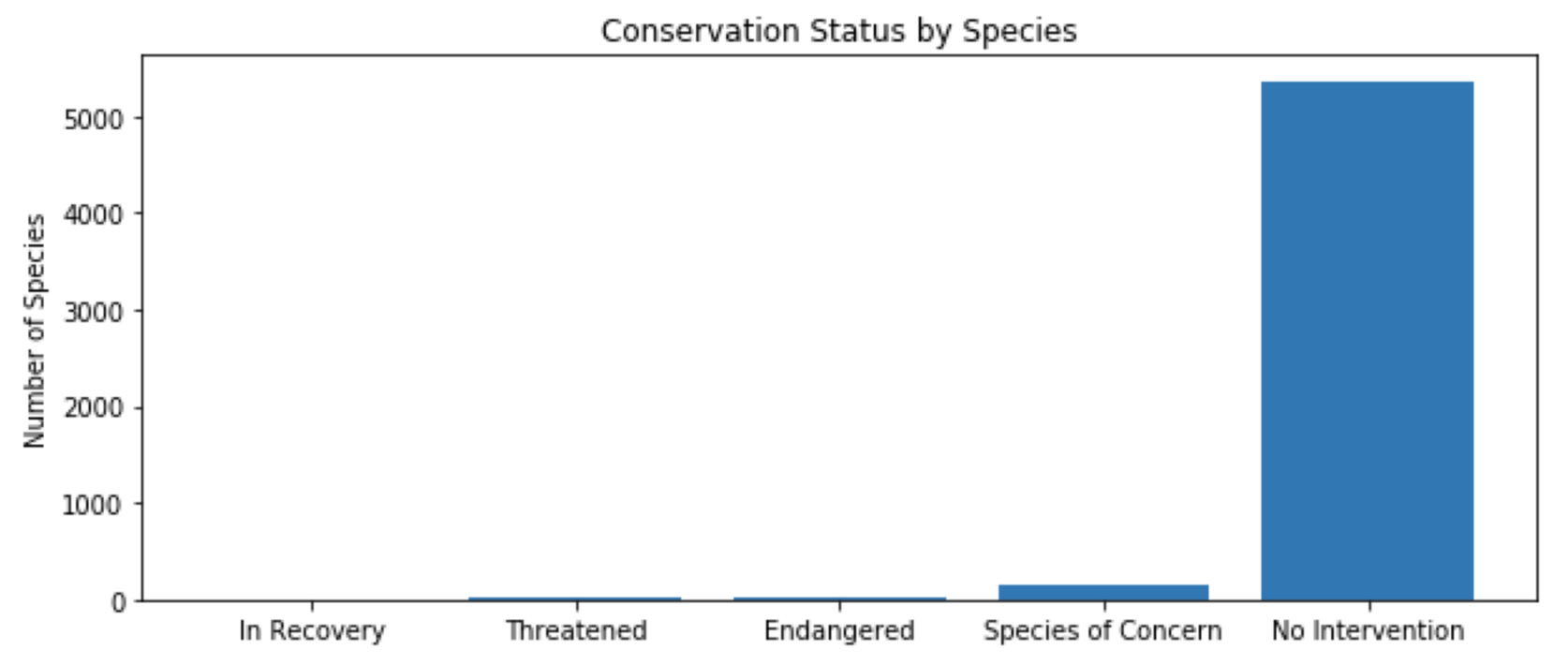
- The National Parks included in our data sample had a total of 5541 different species.
- There were 7 different categories of species – Mammal, Bird, Reptile, Amphibian, Fish, Vascular Plant and Nonvascular Plant
- Also Included within the species document is the scientific name and common name of the species
- Finally, the conservation status of the species is stated. These are listed below:
  - *N/A: species at no risk of extinction*
  - *Species of Concern: declining or appear to be in need of conservation*
  - *Threatened: vulnerable to endangerment in the near future*
  - *Endangered: seriously at risk of extinction*
  - *In Recovery: formerly Endangered, but currently neither in danger of extinction throughout all or a significant portion of its range*

Breakdown of conservation status

	conservation_status	scientific_name
0	Endangered	15
1	In Recovery	4
2	No Intervention	5363
3	Species of Concern	151
4	Threatened	10

Clearly the vast majority of species (5363) do not require any protection.

Breakdown of conservation status (cont.)



Are certain types of species more likely to be endangered?

	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

As seen in the table above, it appears that Mammals appear to be the most at risk of being endangered, with 17% protected. Conversely Vascular Plants are the least at risk, with roughly 1% being endangered.

Significance test: Mammals vs. Birds

Mammal	146	30	0.170455
Bird	413	75	0.153689

As Mammals and Birds are the two categories of species most at risk of being endangered, we want to test if mammals are more likely to be endangered than Birds.
Ho: Mammals are not more likely to be endangered than Birds
H1: Mammals are more likely to be endangered than Birds

As the data is categorical and we're comparing two pieces of data, we will perform a chi squared test.

From our calculations we obtained a pvalue of 0.687594809666

As 0.687594809666 > 0.05, we cannot reject the null hypothesis and thus, the difference isn't significant and Mammals are not more likely to be endangered than Birds.

Significance test: Mammals vs. Reptiles

Mammal	146	30	0.170455
Reptile	73	5	0.064103

Ho: Mammals are not more likely to be endangered than Reptiles
H1: Mammals are more likely to be endangered than Reptiles

As the data is categorical and we're comparing two pieces of data, we will perform a chi squared test.

From our calculations we obtained a pvalue of 0.0383555902297

As 0.0383555902297 < 0.05, we reject the null hypothesis and thus, the difference is significant and Mammals are more likely to be endangered than Reptiles.

Recommendations

- Mammals and Birds are of the most concern, they have the highest percentage of endangered species. Possible action to be taken.
- Amphibians and Fish could possibly be of concern with the 3rd and 4th most endangered category of species respectively. Recommend keeping a close eye on them.
- Nonvascular Plant, Vascular Plant and Reptile are of the least concern and are significantly different to Mammals and Birds. No action necessary.

Study: Foot and Mouth Disease

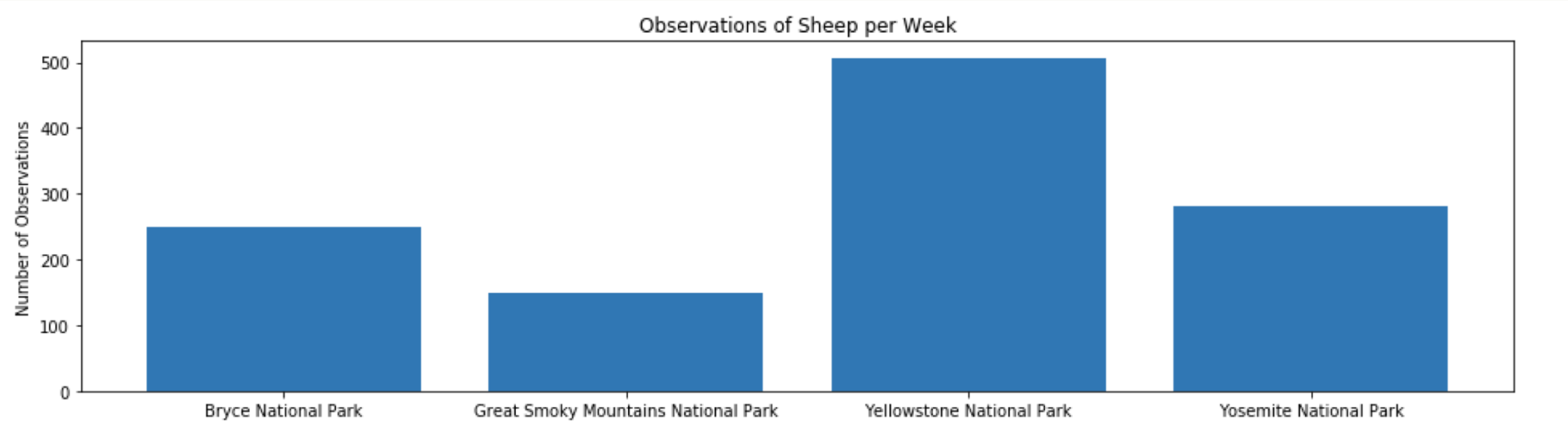
- Our scientists know that 15% of sheep at Bryce National Park have foot and mouth disease. Park rangers at Yellowstone National Park have been running a program to reduce the rate of foot and mouth disease at that park. The scientists want to test whether or not this program is working. They want to be able to detect reductions of at least 5 percentage point.

Study: Foot and Mouth Disease

- Total number of sheep observed in each park over the past 7 days:

	park_name	observations
0	Bryce National Park	250
1	Great Smoky Mountains National Park	149
2	Yellowstone National Park	507
3	Yosemite National Park	282

Study: Foot and Mouth Disease



Study: Foot and Mouth Disease

- We will use the sample size calculator to calculate the number of sheep that we would need to observe from each park. Using the default level of significance (90%).
- From our calculations we found the minimum detectable effect to be 33.3% and the baseline percent to be 15%
- This resulted in a sample size of 520.

Study: Foot and Mouth Disease- Example

Applying these results to Yellowstone and Bryce National Parks:

Bryce = 510 / 250 = 2.04

Yellowstone = 510 / 507 = 1.00591715976

Thus, you would need to observe sheep for approximately 2 weeks at Bryce and 1 week at Yellowstone in order to observe enough sheep.