Biodiversity Capstone Project

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Intro to Data Analytics

ProIntensive

CodeAcademy

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Different Species at the National Park
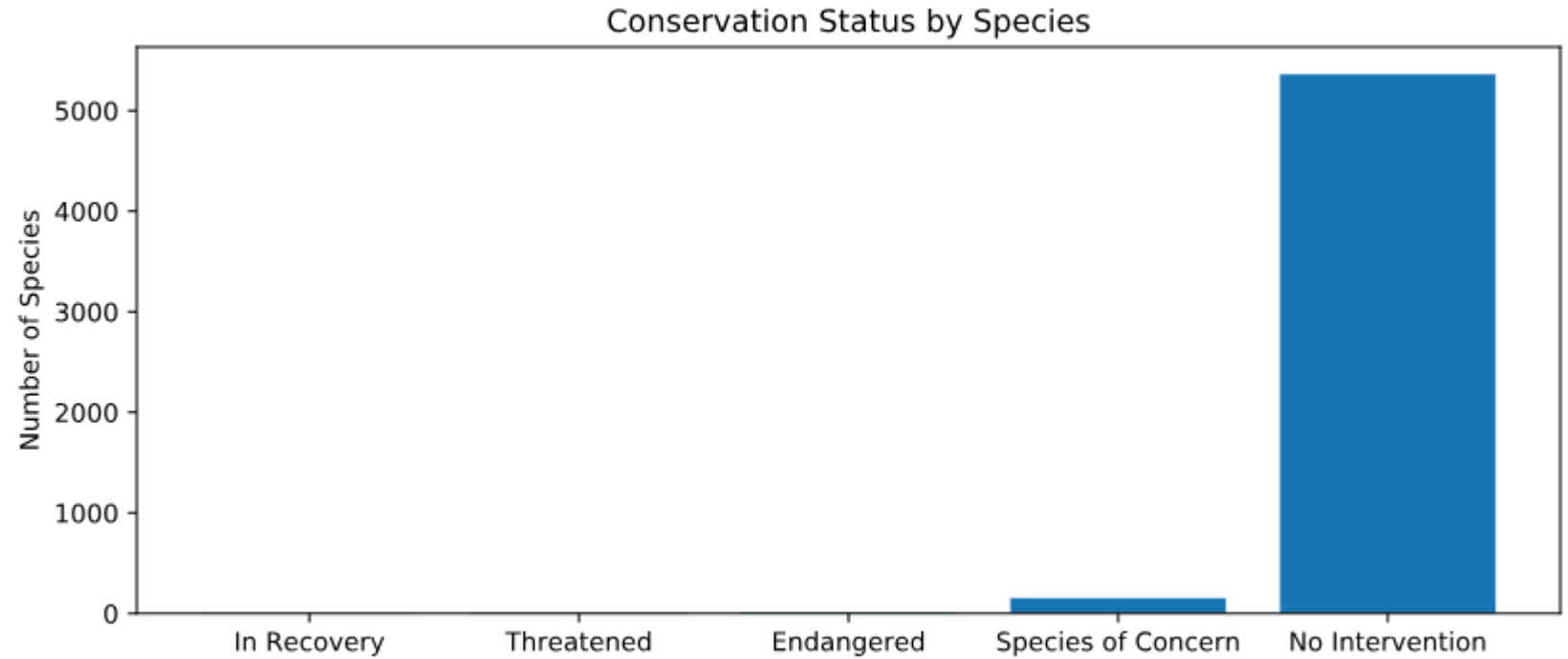
category	scientific_name	common_names	conservation_status
Mammal	Clethrionomys gapperi gapperi	Gapper's Red-Backed Vole	nan
Mammal	Bos bison	American Bison, Bison	nan
Mammal	Bos taurus	Aurochs, Aurochs, Domestic Cattle (Feral), Domesticated Cattle	nan
Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	nan
Mammal	Cervus elaphus	Wapiti Or Elk	nan
Mammal	Odocoileus virginianus	White-Tailed Deer	nan
Mammal	Sus scrofa	Feral Hog, Wild Pig	nan
Mammal	Canis latrans	Coyote	Species of Concern
Mammal	Canis lupus	Gray Wolf	Endangered
Mammal	Canis rufus	Red Wolf	Endangered

Using species = pd.read_csv('species_info.csv') and print(species.head(10)), I loaded the data from the National Parks Service to investigate if there are any patterns or themes to the types of species that become endangered.

Dataset Observations

- There are **5541** different species in the dataset.

- Unique categories include: **Mammals, Bird, Reptile, Amphibian, Fish, Vascular Plant, Nonvascular Plant**.

- Unique Conservation statuses consisted either:
  - **Species of Concern**: declining population or appears to be in need of conservation.
  - **Endangered**: vulnerable to endangerment in the near future.
  - **Threatened**: seriously at risk of extinction.
  - **In Recovery**: formerly Endangered, but currently not in danger of extinction throughout all or a significant portion of its inhabitable range.

Notable Observations

Conservation Status by Species

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

Are certain types of species more likely to be endangered?

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

The table above was obtained to help us see if there are certain types of species that are more likely to be endangered by others.

Analyzing the data, it looks like Mammals are more likely to be endangered than Birds. To test if this statement is true, I used the **Chi-Squared Test**.

Are certain types of species more likely to be endangered?

Results:

Using the chi-squared test, I found a p-value of **~0.688**, so I can conclude that **the difference between the percentages of protected birds and mammals is not significant and is a result of chance.**

But, when comparing the percentages of protected reptiles and mammals and ran the same chi-squared test, the p-value was **~0.038**, which **is** significant.

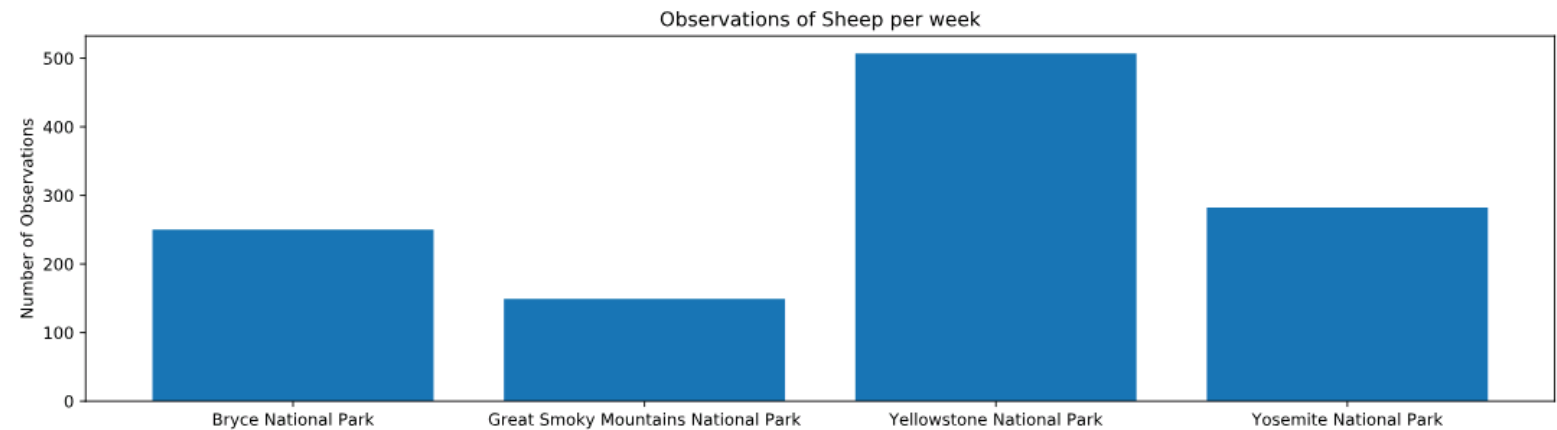Therefore, **certain types of species _are_ more likely to be endangered than others**.

Tracking Sheep

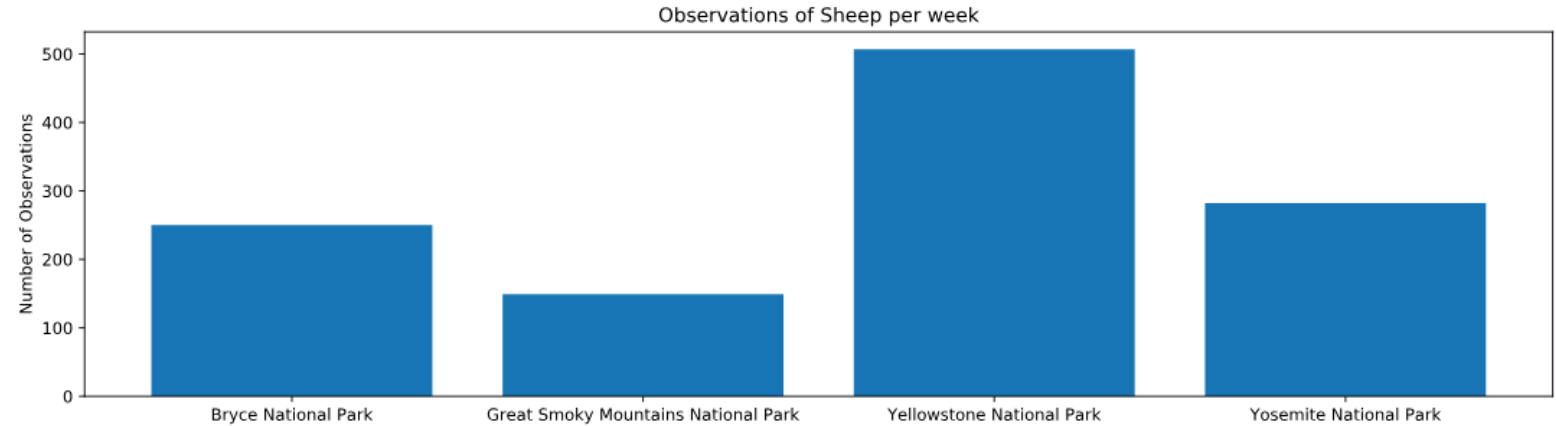| category	scientific_name	common_names	conservation_status	is_protected	is_sheep	park_name	observations
Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	FALSE	TRUE	Yosemite National Park	126
Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	FALSE	TRUE	Great Smoky Mountains National Park	76
Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	FALSE	TRUE	Bryce National Park	119
Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	FALSE	TRUE	Yellowstone National Park	221
Mammal	Ovis canadensis	Bighorn Sheep, Bighorn Sheep	Species of Concern	TRUE	TRUE	Yellowstone National Park	219
Mammal	Ovis canadensis	Bighorn Sheep, Bighorn Sheep	Species of Concern	TRUE	TRUE	Bryce National Park	109
Mammal	Ovis canadensis	Bighorn Sheep, Bighorn Sheep	Species of Concern	TRUE	TRUE	Yosemite National Park	117
Mammal	Ovis canadensis	Bighorn Sheep, Bighorn Sheep	Species of Concern	TRUE	TRUE	Great Smoky Mountains National Park	48
Mammal	Ovis canadensis sierrae	Sierra Nevada Bighorn Sheep	Endangered	TRUE	TRUE	Yellowstone National Park	67
Mammal	Ovis canadensis sierrae	Sierra Nevada Bighorn Sheep	Endangered	TRUE	TRUE	Yosemite National Park	39
Mammal	Ovis canadensis sierrae	Sierra Nevada Bighorn Sheep	Endangered	TRUE	TRUE	Bryce National Park	22
Mammal	Ovis canadensis sierrae	Sierra Nevada Bighorn Sheep	Endangered	TRUE	TRUE	Great Smoky Mountains National Park	25

The table above shows the different species of sheep sighted at different parks. One thing to take note of are the conservation statuses of the different types of sheep.

Total Number of Sheep Observations By Park

park_name	observations
Bryce National Park	250
Great Smoky Mountains National Park	149
Yellowstone National Park	507
Yosemite National Park	282

Observations of Sheep per week

Recommendation for Conservationists

Observations of Sheep per week

Based on the findings, I my recommendation to conservationists is to prioritize conservation efforts with the Sierra Nevada Bighorn Sheep particularly at Yellowstone and Yosemite National Parks. This type of sheep is endangered and the number of observation is the highest at those locations.

Moderate observations have also occurred at Bryce National Park and the least at Great Smoky Mountains National Park for the Sierra Nevada Bighorn Sheep.

Foot and Mouth Reduction Effort

Park Rangers at Yellowstone National Park have been running a program to reduce the rate of foot and mouth disease at that park.

To test whether or not this program is working and given a baseline of 15% occurrence of foot and mouth disease in sheep at Bryce National Park, I found that:

- If the scientists wanted to be sure that a >5% drop in observed cases of foot and mouth disease in the sheep at Yellowstone was significant they would need a sample size of least **870** sheep to observe.

- Then, using the observation data analyzed earlier, I found that this would take approximately **one week of observing in Yellowstone** to see that many sheep, **or approximately two weeks in Bryce** to see that many sheep.

Thank You!

By Jozelle Toloza

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