Biodiversity in National Parks

Bryce National Park,Great Smoky Mountains National Park,
Yellowstone National Park,Yosemite National Park

Outline

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Introduction: Goals

- Knowing the constitution of protected species and how they are protected in national parks inform conservation planning.
- This can be done by taking stock of the species in need of protection in these parks.Outline

Introduction: Questions

We raise the following questions:

1. What are the conservation status of the species in the four national parks?
2. Is there a significant difference between the conservation status of the species?
3. Which animals are most often sighted in each park?
4. Are there animals that need conservation the most? In which park are they conserved better/worst?

Data

Data I: observations.csv

	scientific_name	park_name	observations
0	Vicia benghalensis	Great Smoky Mountains National Park	68
1	Neovison vison	Great Smoky Mountains National Park	77
2	Prunus subcordata	Yosemite National Park	138
3	Abutilon theophrasti	Bryce National Park	84
4	Githopsis specularioides	Great Smoky Mountains National Park	85

Column	Count
scientific_name	23296
park_name	23296
observations	23296

Data II:species_info.csv

	category	scientific_name	common_names	conservation_status	Is_Protected
0	Mammal	Clethrionomys gapperi gapperi	Gapper's Red-Backed Vole	No Interventions	False
1	Mammal	Bos bison	American Bison, Bison	No Interventions	False
2	Mammal	Bos taurus	Aurochs, Aurochs, Domestic Cattle (Feral), Dom...	No Interventions	False
3	Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Interventions	False
4	Mammal	Cervus elaphus	Wapiti Or Elk	No Interventions	False

Column	Count
category	5824
scientific_name	5824
common_names	5824
conservation_status	191

Missing data

Methods

Methods

To answer the questions, methods such as the below will be employed:

1. Description statistics like counts and distributions

3. Chi-square to determine whether there is statistical significance in variables.

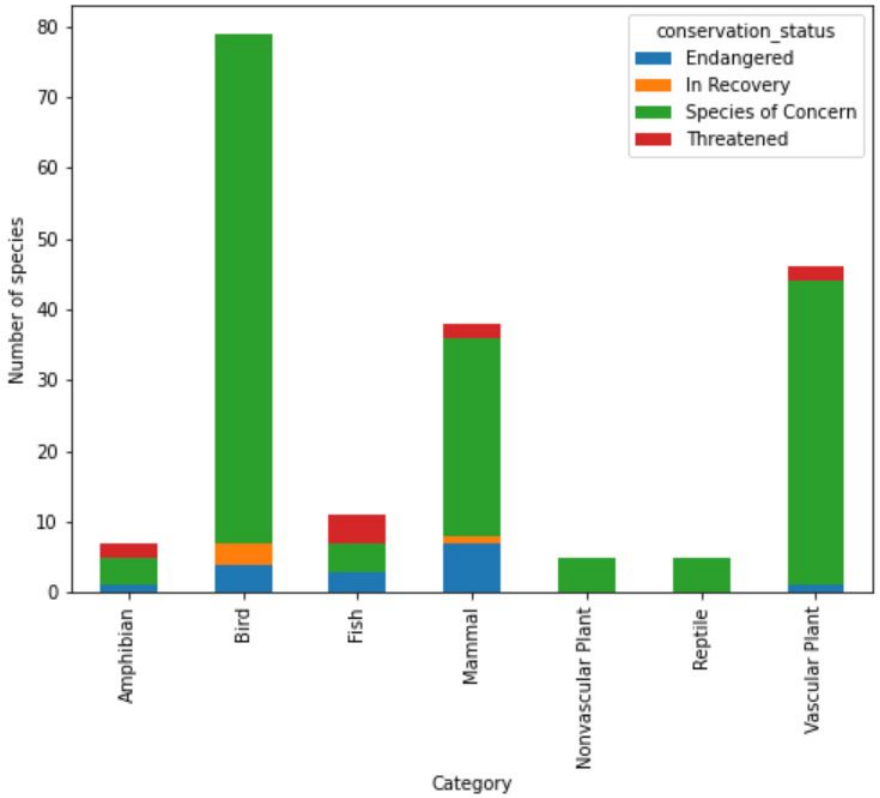
Analysis

Metritcs

Some of the key metrics that will be computed include:

1. counts and distributions
2. relationship between species
3. conservation status of species
4. observations of species in parks.

Degree of conservation necesscity among categories



Proportions of protection necessity among categories

	Category	Not Protected	Is Protected	percent_protected
0	Amphibian	72	7	8.860759
1	Bird	413	75	15.368852
2	Fish	115	11	8.730159
3	Mammal	146	30	17.045455
4	Nonvascular Plant	328	5	1.501502
5	Reptile	73	5	6.410256
6	Vascular Plant	4216	46	1.079305

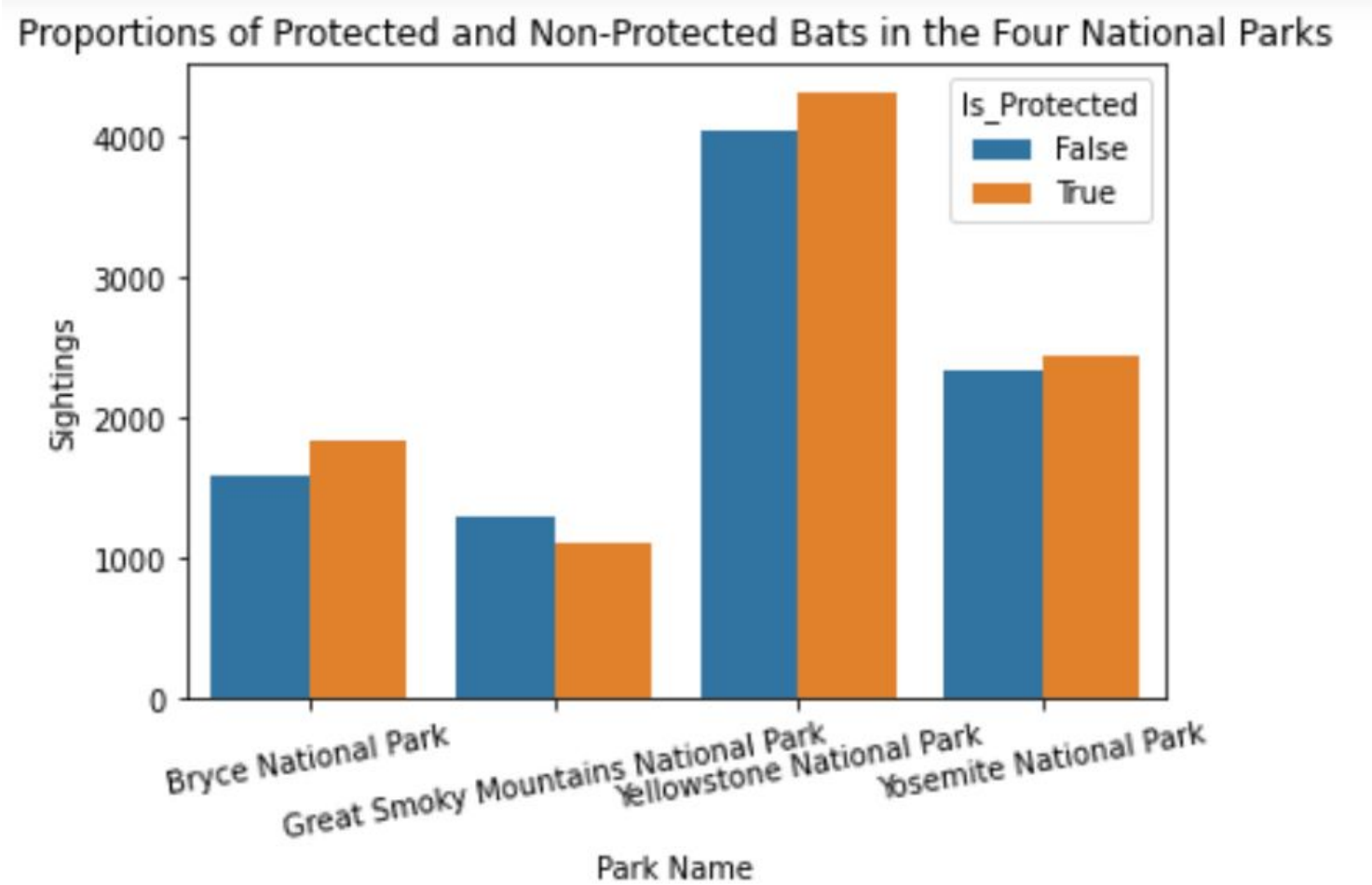
Chi-Square tests to determine whether the differences are statistically significant

Category	Not Protected	Is Protected	percent_protected
Amphibian	73	7	8.750000
Bird	442	79	15.163148
Fish	116	11	8.661417
Mammal	176	38	17.757009
Nonvascular Plant	328	5	1.501502
Reptile	74	5	6.329114
Vascular Plant	4424	46	1.029083

	P	significant?
amphibians vs birds	0.18	No
mammals vs nonvascular	1.68e-11	Yes
mammals vs reptiles	8.82e-32	Yes

Percent of protected bat species

Park Name	Not-Protected	Protected	Percent Protected
Bryce National Park	1596	1837	53.5%
Great Smoky Mountains National Park	1299	1112	46.1%
Yellowstone National Park	4044	4318	51.6%
Yosemite National Park	2345	2441	51.0%


Proportions of Protected and Non-Protected Bats in the Four National Parks
Is_Protected
False
True
Sightings
0
1000
2000
3000
4000
Bryce National Park
Great Smoky Mountains National Park
Yellowstone National Park
Yosemite National Park
Park Name

Answers to the Questions

1. What are the conservation status of the species in the four national parks?

A majority of 96.7% of the species receive no conservation interventions. Among those deemed in need of protection, mammals make up the largest category.

Answers to the Questions (cont.)

2. Is there a significant difference between the conservation status of the species?

Regarding animal species, mammals are better protected than reptiles to a significant degree. Animals and plants combined, mammals are better protected than vascular plants are.

Answers to the Questions (cont.)

3. Which animals are most often sighted in each park?

Bats are the most various animal in the parks, with 23 kinds recorded (in terms of common names, not scientific names).

Answers to the Questions (cont.)

4. Are there animals that need to be conserved most? In which park are they conserved best/worst?

Bryce National Park has the highest percent of protected bat species, at 54% , while over half of bat species in the Great Smoky Mountains National Park do not need conservation interventions.

Conclusion

1. The proportions of species deemed in need of protection vary across species, and the discrepancies between some reach statistic significance.

   Recommendation: The authority concerned may consider whether such proportions really reflect the proportions of species needing protection.

2. Of the bats that can be seen in the national parks, Bryce National Park has higher percent of protected species than the other national parks.

   Recommendation: All circumstances being equal, the Bryce National Park seems to have fulfilled its role well by sheltering threatened species.