



Biodiversity in National Parks

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Purpose

We were tasked to examine observational data on various species collected from four national parks in order to assess the biodiversity present in those parks. We chose to focus on five questions while studying that data.



Research Questions

- Which species have been observed in which parks?
- What is the distribution of conservation statuses for those species?
- Are certain categories of species more likely to be endangered?
- Are the differences between species and their statuses significant?
- What species are most prevalent and what is their distribution amongst these parks?



Data

We were presented with two files of data. The first, `species_info.csv`, contained category, scientific names, common names, and conservation statuses for various species. The second, `observatons.csv`, contained counts of various species as observed at four national parks. There were 5,541 distinct species noted from seven categories. These were assigned one of five conservation statuses.

The data was cleaned by removing duplicate species entries.

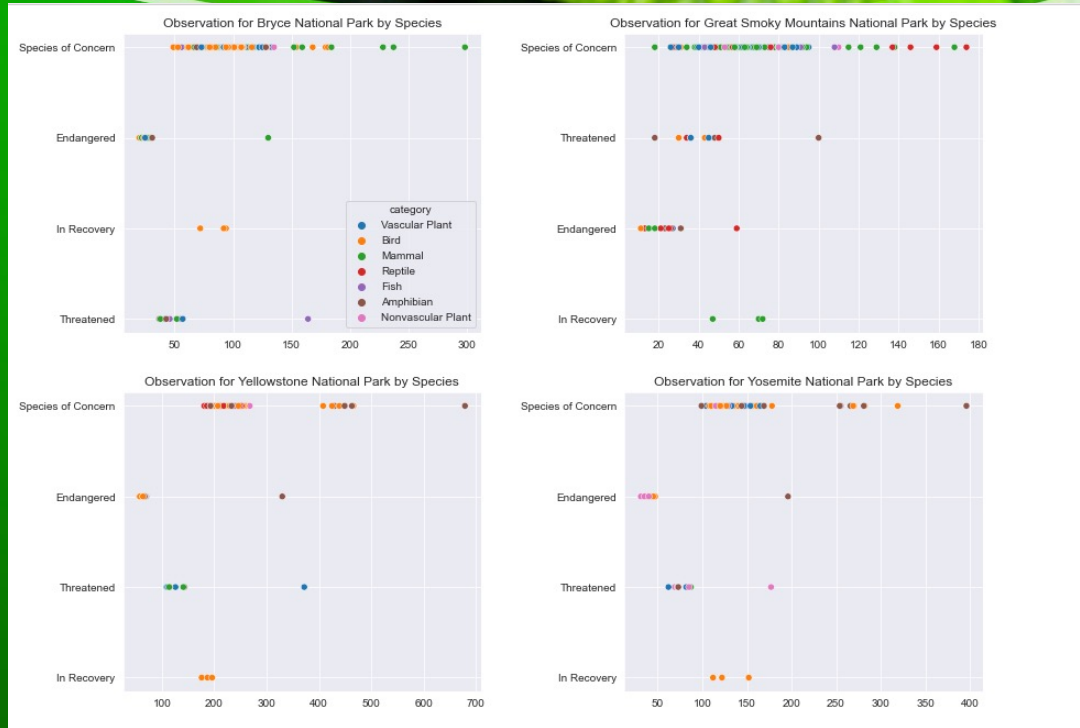
Distribution of Species by Park

There were far more observations in Yellowstone National Park than in the other parks (43%). We don't know if that reflects greater biodiversity there or if there is some other factor in play.

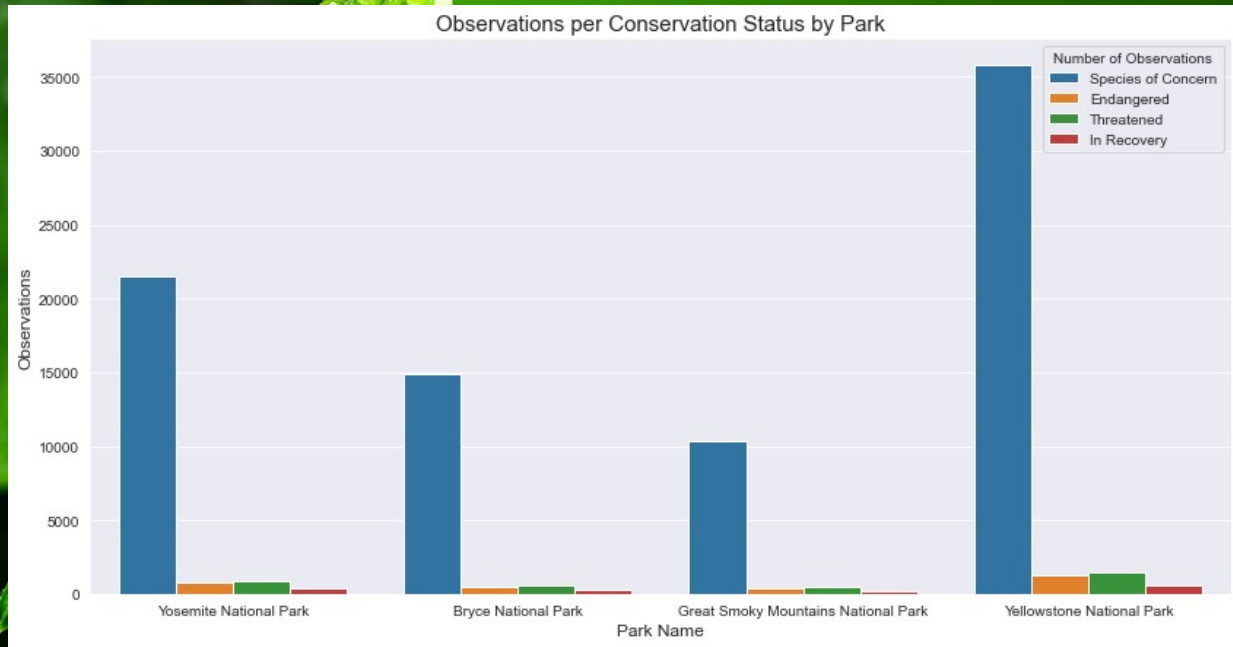
Bryce National Park	Amphibian	498	16263
	Bird	6926	
	Fish	731	
	Mammal	3037	
	Nonvascular Plant	486	
	Reptile	387	
Great Smoky Mountains National Park	Vascular Plant	4198	11277
	Amphibian	333	
	Bird	4741	
	Fish	547	
	Mammal	1968	
	Nonvascular Plant	373	
Yellowstone National Park	Reptile	365	39035
	Vascular Plant	2950	
	Amphibian	1167	
	Bird	16788	
	Fish	1875	
	Mammal	7220	
Yosemite National Park	Nonvascular Plant	1169	23533
	Reptile	1100	
	Vascular Plant	9716	
	Amphibian	754	
	Bird	10153	
	Fish	1056	
	Mammal	4224	
	Nonvascular Plant	677	
	Reptile	684	
	Vascular Plant	5985	

Conservation Statuses by Species and Park

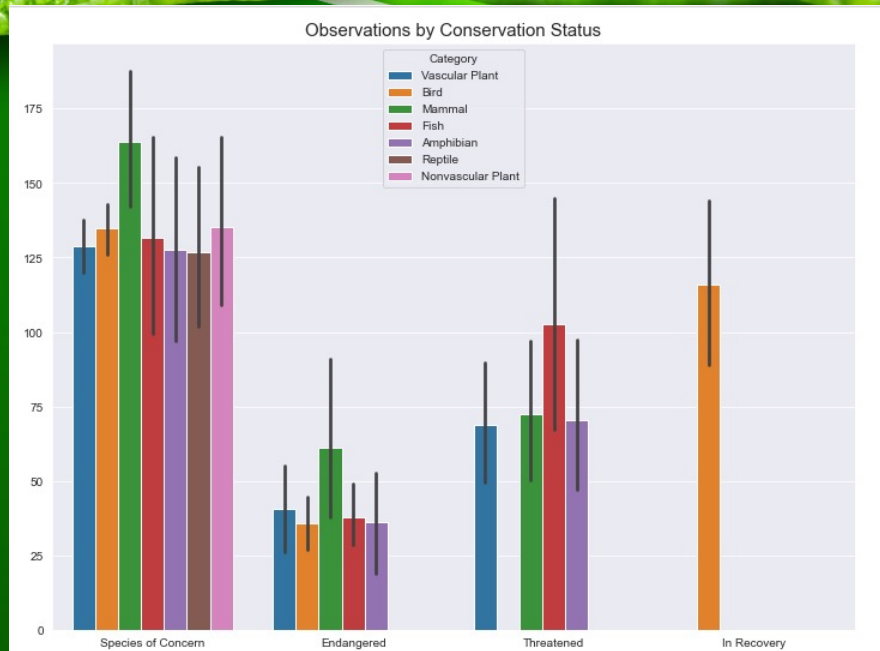
The vast majority of species (97%) are considered to be in Least Concern conservation status.



Species in Each Park



The vast majority of species (97%) are considered to be in Least Concern conservation status. Removing those from the graph makes it a little easier to see the other 3%.



Observations by Conservation Status

Vascular plants, followed by nonvascular plants, then birds, are those most likely to be Species of Concern. Fish lead the Threatened category. The In Recovery status has only one category, birds. Endangered is led by fish.



Conservation Status by Species

There are more mammals considered Endangered than any other category, but does that mean they're more likely to be threatened or they're easier to count?

category	Amphibian	Bird	Fish	Mammal	Nonvascular Plant	Reptile	Vascular Plant
conservation_status							
Endangered	4.0	16.0	12.0	24.0	NaN	NaN	4.0
In Recovery	NaN	12.0	NaN	NaN	NaN	NaN	NaN
Species of Concern	16.0	272.0	16.0	88.0	20.0	20.0	172.0
Threatened	8.0	NaN	16.0	8.0	NaN	NaN	8.0



Significance of Differences

We used a Chi-Square contingency test to determine whether the differences in the animals' conservation statuses were significant. For both the full set of data and the subset without the Least Concern items, there was a strong suggestion of significance.



category	Amphibian	Bird	Fish	Mammal	Nonvascular Plant	Reptile	Vascular Plant
conservation_status							
Endangered	4.0	16.0	12.0	24.0	0.0	0.0	4.0
In Recovery	0.0	12.0	0.0	0.0	0.0	0.0	0.0
Species of Concern	16.0	272.0	16.0	88.0	20.0	20.0	172.0
Threatened	8.0	0.0	16.0	8.0	0.0	0.0	8.0

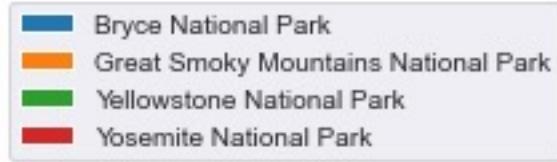
Conservation Status by Species Category

There are more birds considered Species of Concern than any other category.

Most Common Species

The most commonly-observed species was the *Streptopelia decaocto*, or Eurasian collared dove. The majority of them (43%) were in Yellowstone. As it is an invasive species, one wonders what it has displaced.

Eurasian Collared Doves Observed In Each Park



A close-up photograph of green leaves with numerous water droplets on their surfaces, set against a dark background. The leaves are vibrant green and the droplets are clear and reflective.

Conclusions

- Endangered species were least likely to be observed, which makes sense.
- Birds, vascular plants, and mammals were most likely to be Endangered or Threatened.
- Yellowstone National Park showed the greatest biodiversity and Great Smokey Mountain National Park the least. That should be considered when allocating funding.
- Special attention should be given to methodology when gathering information in the future, as the lack of detail prevented the researchers drawing firmer conclusions.