BIODIVERSITY ANALYSIS

On NPS Conservation Status of Species

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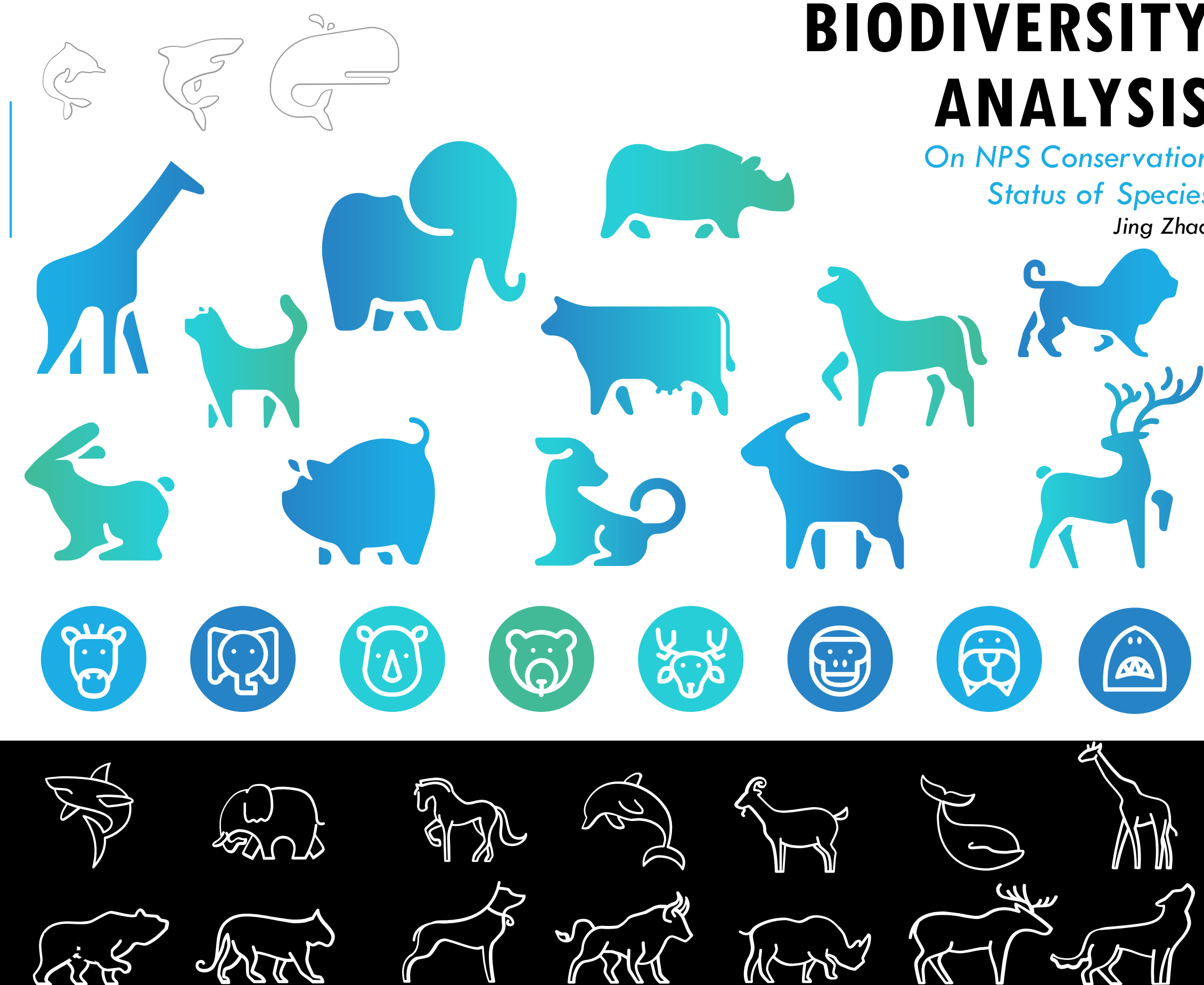


SPECIES_INFO.CSV

About the Data

The data we need to conduct the analysis are stored in a csv file called species_info.csv. It has four columns: ‘category’, ‘scientific_name’, ‘common_names’, and ‘conservation_status’.

	category	scientific_name	common_names	conservation_status
0	Mammal	Clethrionomys gapperi gapperi	Gapper's Red-Backed Vole	nan
1	Mammal	Bos bison	American Bison, Bison	nan
2	Mammal	Bos taurus	Aurochs, Aurochs, Domestic Cattle (Feral), Domesticated Cattle	nan
3	Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	nan
4	Mammal	Cervus elaphus	Wapiti Or Elk	nan

The database recorded 7 species (in the ‘category’ column) and 5541 different scientific names (in the ‘scientific_name’ column). Under the ‘conservation_status’ column, we notice that some records have ‘NaN’ as values. By grouping the ‘scientific_name’ and counting the number of records under each ‘conversation_status’, we can see all the conversation status categories and the number of records in each category.

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

Findings:

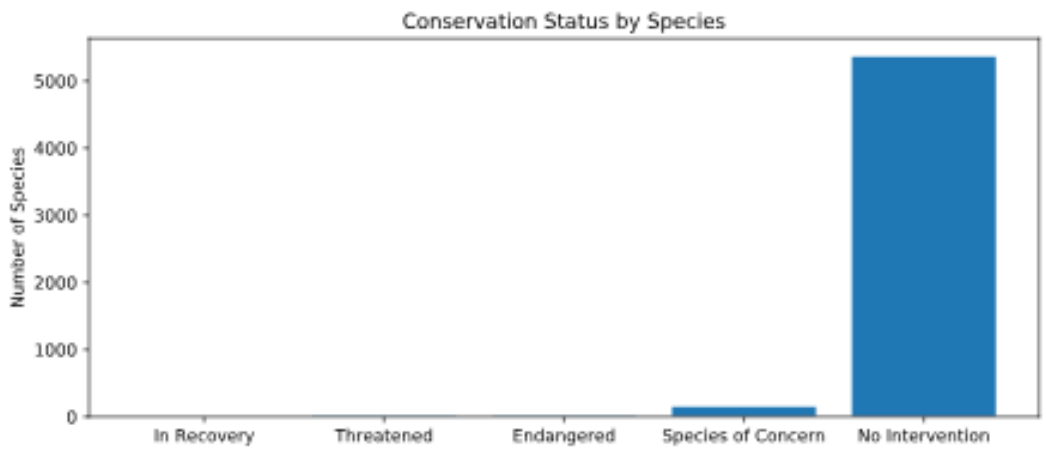
- There are five categories of conversation status in the database – ‘endangered’, ‘in recovery’, ‘no intervention’, ‘species of concern’, and ‘threatened’.

ENDANGERED STATUS

Across all species

Question –

"Are certain types of species more likely to be endangered?"



- *Species of Concern: declining population or appears to be in need of conservation. – 'protected'*
- *Threatened: vulnerable to endangerment in the near future.*
- *Endangered: seriously at risk of extinction. – 'protected'*
- *In Recovery: formerly Endangered, but currently not in danger of extinction throughout all or a significant portion of its inhabitable range. – 'protected'*
- *No Intervention: not in any of the above categories, and is 'not protected'*

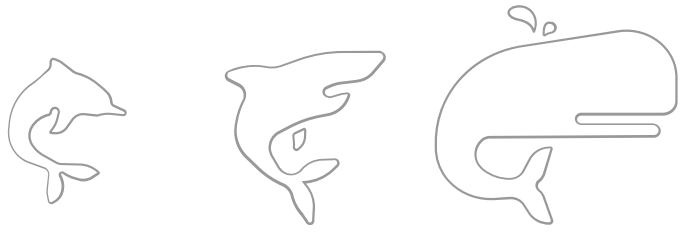
From the pivoted table on the right, it looks like Mammals are more likely to be endangered than Birds.

Is this due to a result of chance?

	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

Findings:

- There was a slight difference in the percentages of birds and mammals that fall into a protected category.
- Further investigation is needed to find out if the difference is due to a result of chance.



ENDANGERED SPECIES

Significance tests

Question 1 –

"Was the slight difference in the percentages of birds and mammals that fall into a protected category a result of chance?"

Contingency table 1.

	protected	not-protected
Mammal	30	146
Bird	75	413

Chi-Squared Test 1

Significance result: 0.687594809666
pval > 0.05
NO SIGNIFICANT DIFFERENCE!

Question 2 –

"Was the slight difference in the percentages of reptiles and mammals that fall into a protected category a result of chance?"

Contingency table 2.

	protected	not-protected
Mammal	30	146
Reptile	75	413

Chi-Squared Test 2

Significance result: 0.0383555902297
pval < 0.05
SIGNIFICANT DIFFERENCE!

Findings:

- Certain types of species *are* more likely to be endangered than others.

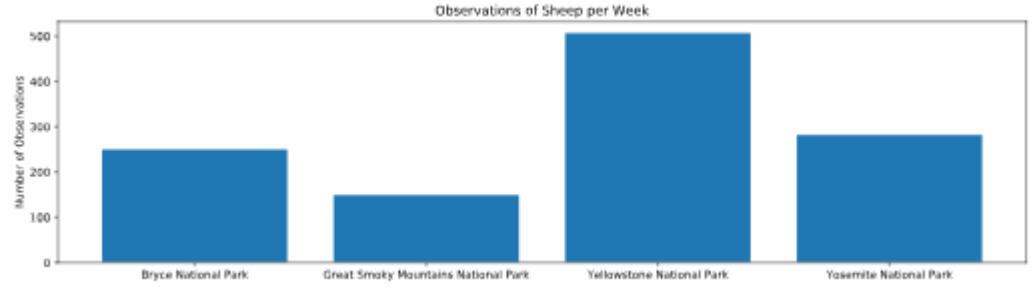
SAMPLE SIZE DETERMINATION

For the foot and mouth disease study

Table: Observations by Parks

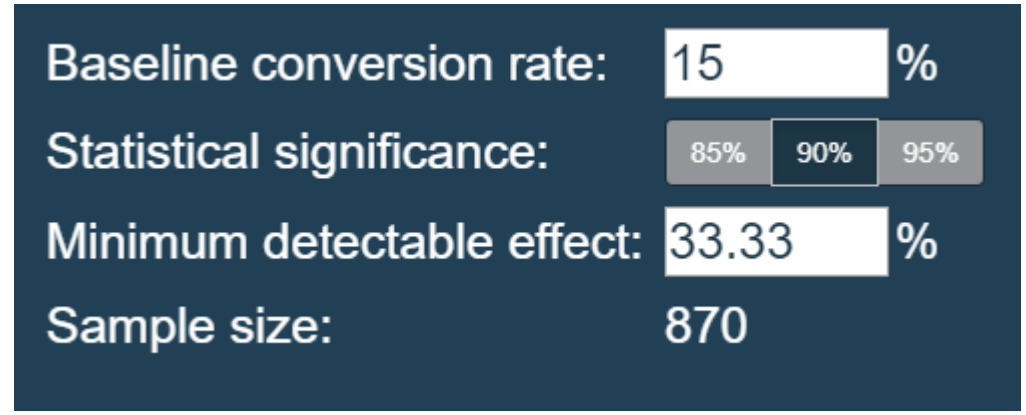
	Park Name	Observations per Week
0	Bryce National Park	250
1	Great Smoky Mountains National Park	149
2	Yellowstone National Park	507
3	Yosemite National Park	282

Graph: Observations of Sheep per Week



Facts:

- Last year it was recorded that 15% of sheep at Bryce National Park have foot and mouth disease.
- The scientists want to be able to detect reductions of at least 5 percentage points.
- Use the default level of significance (90%).



Findings:

- Given a baseline of 15% occurrence of foot and mouth disease in sheep at Bryce National Park, 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 have to observe at least 870 sheep.
- Using the observation data, 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.