BIODIVERISTY CAPSTONE PROJECT

INVESTIGATING PROTECTED SPECIES

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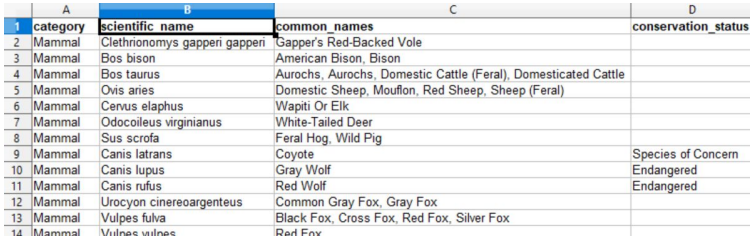
Data supplied [**species_info.csv**]
source and action

The National Parks Service supplied data about different species in our National Parks, including:

- The scientific name of each species
- The common names of each species
- The species conservation status

for data analysis on the conservation statuses of these species and to investigate if there are any patterns or themes to the types of species that become endangered.



	A	B	C	D
1	category	scientific_name	common_names	conservation_status
2	Mammal	Clethrionomys gapperi gapperi	Gapper's Red-Backed Vole	
3	Mammal	Bos bison	American Bison, Bison	
4	Mammal	Bos taurus	Aurochs, Aurochs, Domestic Cattle (Feral), Domesticated Cattle	
5	Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	
6	Mammal	Cervus elaphus	Wapiti Or Elk	
7	Mammal	Odocoileus virginianus	White-Tailed Deer	
8	Mammal	Sus scrofa	Feral Hog, Wild Pig	
9	Mammal	Canis latrans	Coyote	Species of Concern
10	Mammal	Canis lupus	Gray Wolf	Endangered
11	Mammal	Canis rufus	Red Wolf	Endangered
12	Mammal	Urocyon cinereoargenteus	Common Gray Fox, Gray Fox	
13	Mammal	Vulpes fulva	Black Fox, Cross Fox, Red Fox, Silver Fox	
14	Mammal	Vulpes vulpes	Red Fox	

Data supplied [**species_info.csv]**
data preparation

The data representing the status and research issue of interest is mainly represented in the column conservation status, with the following entries:

- `Species of Concern`: declining population or appears 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 not in danger of extinction throughout all or a significant portion of its inhabitable range.

The first task was the introduction of a new entry named “No Intervention” to fill up empty cells and make the data accessible for further evaluations.

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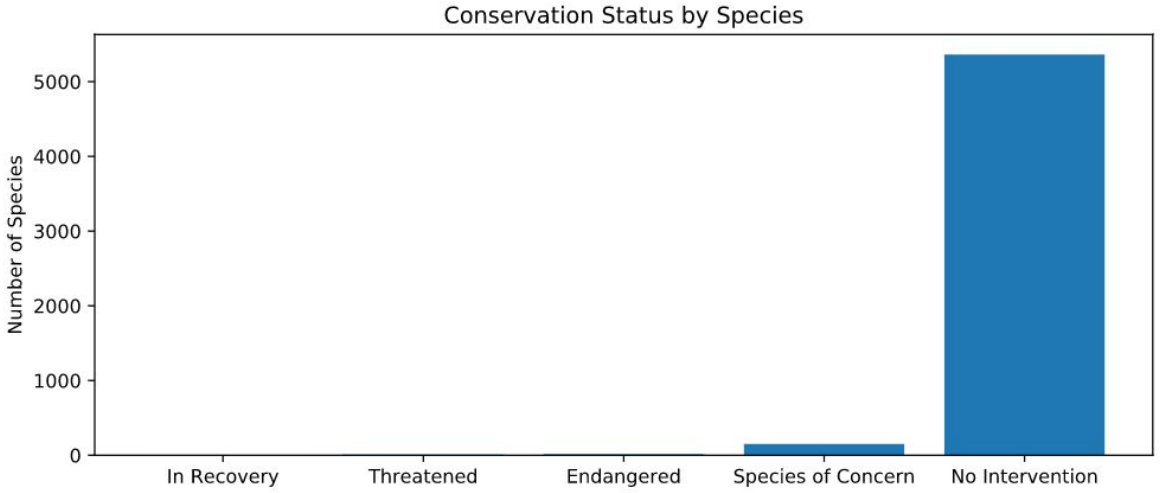
Calculations performed
endangered status

The data shows a relatively low fraction of stati other than “No Intervention”.

A first gross assessment showed:



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

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Calculations performed
endangered status

To test the stati by species categories, percentage of “protected” was investigated and delivered:

- Amphibian 8.86 %
- Bird 15.37 %
- Fish 8.73 %
- Mammal 17.05 %
- Nonvascular Plant 1.50 %
- Reptile 6.41 %
- Vascular Plant 1.07 %

Significance of results and recommendations
endangered status - significance tests

The percentages vary strongly.

We investigated these differences based on chi-squared testing. Our **null hypothesis** here wass that this difference was a result of chance.

Results indicated significant variations between different species.

Therefore, we can conclude that certain types of species *are* more likely to be endangered than others.

Precautions are to be taken.

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Data supplied [**observations.csv**]
source and action

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. The question is whether the programme works.

They scientist want to be able to detect reductions of at least 5 percentage point, based on last year records of 15% of the sheep with the disease at Bryce National Park. have .

	A	B	C
1	**scientific_name**	**park_name**	**observations**
2	Vicia benghalensis	Great Smoky Mountains National Park	68
3	Neovison vison	Great Smoky Mountains National Park	77
4	Prunus subcordata	Yosemite National Park	138
5	Abutilon theophrasti	Bryce National Park	84
6	Githopsis specularioides	Great Smoky Mountains National Park	85
7	Elymus virginicus var. virginicus	Yosemite National Park	112
8	Spizella pusilla	Yellowstone National Park	228
9	Elymus multisetus	Great Smoky Mountains National Park	39
10	Lysimachia quadrifolia	Yosemite National Park	168
11	Diphyscium cumberlandianum	Yellowstone National Park	250
12	Ludwigia peploides ssp. glabrescens	Bryce National Park	103

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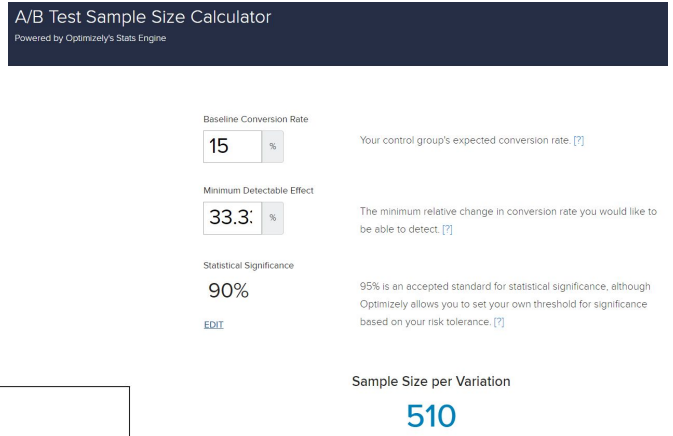
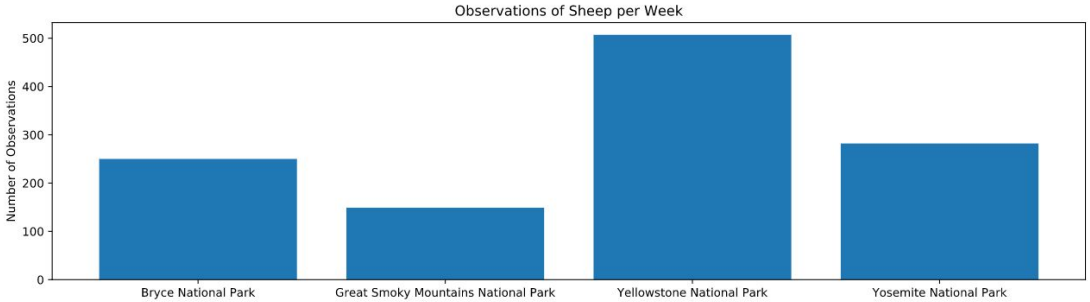
Calculations performed
sample sizing

Using a state-of-the art sample size calculator from https://www.optimizely.com/sample-size-calculator/ , and an acceptable level of significance with 90%, the perfect sample size could be applied to the two parks of interest, based on sheep observations.





Foot and Mouth Reduction Effort

What do the results tell us?

Using the observation data, and the sample size of 510, it would take approximately one week of observing in Yellowstone or approximately two weeks in Bryce to inspect the sheep population to deliver a scientific statement.