Capstone Project 2:

Biodiversity for the National Parks

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Significance of endangered species

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Foot and mouth disease (sample size)

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Introduction to the data

Two data sets: Species
Observations (7 days)

Unique Species: 5541

Key: “scientific_name”

Species Columns:
category, scientific_name, common_names, conservation_status

Observation Columns:
scientific_name, park_name, observations

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Species

Unique Species: 5541

Unique categories: 7 (Mammal, Bird, Reptile Amphibian, Fish, Vascular Plant Nonvascular Plant)

Conservation status: 5 (NaN, Species of Concern, Endangered, Threatened, In Recovery)

	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), Dom...	NaN
3	Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	NaN
4	Mammal	Cervus elaphus	Wapiti Or Elk	NaN

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Observations

Unique Species: 5541 (“scientific_name”)
Unique Parks: 4 (“park_name”)

observations.head()

	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

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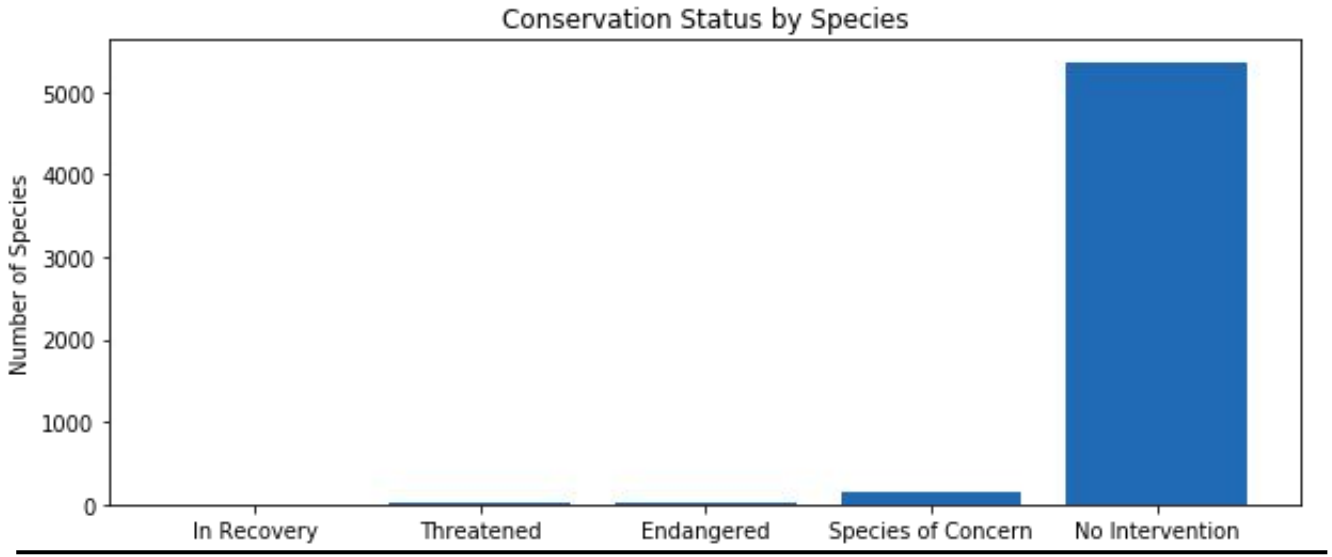
Conservation Status

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



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Conservation Status

In Recovery	4
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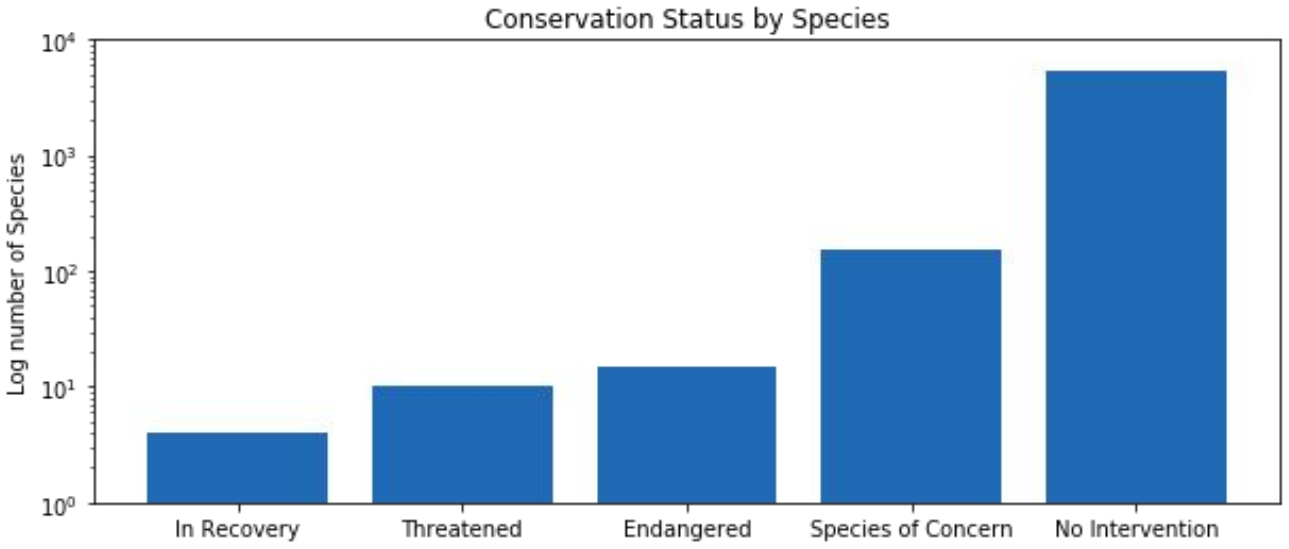
(Watch out logarithmic)



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Protection status by category

	category	not_protected	protected	percent_protected
0	Amphibian	72	7	0.09
1	Bird	413	75	0.15
2	Fish	115	11	0.09
3	Mammal	146	30	0.17
4	Nonvascular Plant	328	5	0.02
5	Reptile	73	5	0.06
6	Vascular Plant	4216	46	0.01

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Birds compared to Mammals

Are Mammals more likely to be Endangered than Birds?

	not protected	protected
Mammal	146	30
Bird	413	75

chi squared test → p=0.69 → Not significant!!!

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Reptiles compared to Mammals

Are Mammals more likely to be Endangered than Reptiles?

	not protected	protected
Mammal	146	30
Reptile	73	5

chi squared test → p=0.04 → Significant!!!

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Focus on the Mammals

Reptiles are less likely to be in need of protection compared to Mammals

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Collect data over time

Collecting a batch of data each year can give insight in:

1. The development of species over time
2. Determine significant changes
3. The dependencies of species on eachother
4. Combining these data sets with weather data and/or other datasets that monitor external parameters, could be used to indicate external influences on the growth of species

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Sample size for FaMD program

Baseline = 15%
Change to detect = 5%
Minimum Detectable Effect = 0.05/ 0.15 x 100 = ~33%
Significance = 90%

=> Sample size* = 520
520/507=> ~1 week in Yellowstone
520/250 => ~2 weeks in Bryce

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

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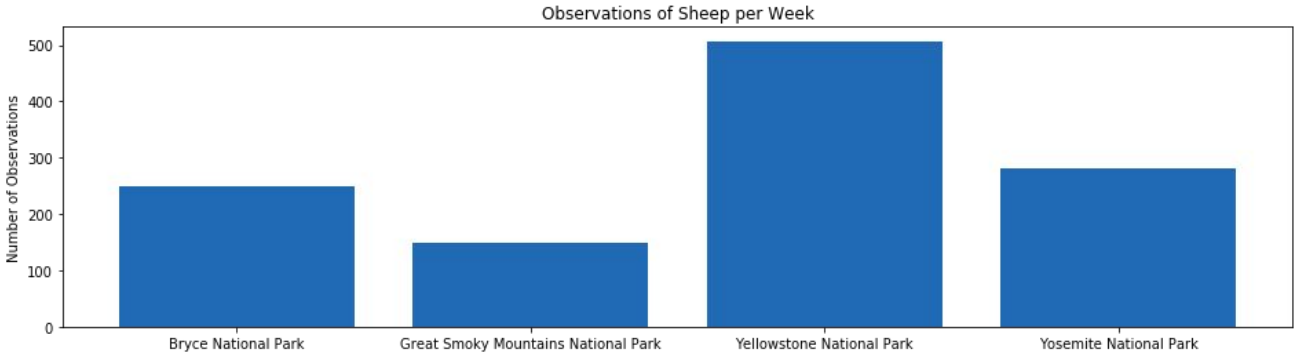
Observations of sheep per week



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List of endangered species

	category	scientific_name	common_names
8	Mammal	Canis lupus	Gray Wolf
9	Mammal	Canis rufus	Red Wolf
34	Mammal	Myotis grisescens	Gray Myotis
39	Mammal	Myotis sodalis	Indiana Bat, Indiana Or Social Myotis
72	Mammal	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel, Northern Fl...
173	Bird	Grus americana	Whooping Crane
276	Bird	Vermivora bachmanii	Bachman's Warbler, Bachman's Wood Warbler
343	Bird	Picoides borealis	Red-Cockaded Woodpecker
540	Fish	Etheostoma percnurum	Duskytail Darter
570	Fish	Noturus baileyi	Smoky Madtom
2497	Vascular Plant	Geum radiatum	Mountain Avens, Spreading Avens
3275	Fish	Chasmistes liorus	June Sucker
4446	Mammal	Ovis canadensis sierrae	Sierra Nevada Bighorn Sheep
4448	Mammal	Canis lupus	Gray Wolf, Wolf
4505	Bird	Gymnogyps californianus	California Condor
4601	Amphibian	Rana sierrae	Sierra Nevada Yellow-Legged Frog