Biodiversity Project

Dave Melillo

data in **species_info.csv**.

- The species_info.csv had 4 fields
  - Category
  - Scientific name
  - Common_names
  - Conservation_status
- Observations
  - ~92% of the species had a blank value in the coservation_status field, meaning that no intervention was recommended
  - Birds and Mammals were the most likely species to be endangered when compared to the rest of the categories in the sample.

significance calculations for endangered status between different categories of species

- To understand how the endangered status fluctuates between specie is we created a pivot table with three measures
    - # not protected
    - # protected
    - Percent protected
- From this pivot table we were able run a chi squared test
    - The purpose of the test is to evaluate how likely it is that the null hypothesis is true, given the observations
    - Using the chi squared test, we found that there is no significant difference between the endangered status between mammals and birds, while there was a significant difference between mammals and reptiles

Recommendation

- Based on our significance calculations, more time should be invested in conserving birds and mammals, as they are much more likely to be endangered when compared to reptiles, fish, amphibians and various plant categories.

sample size determination for the foot and mouth disease study

- First we had to determine the "Minimum Detectable Effect" expressed as
  - minimum_detectable_effect = 100 * 0.05 / 0.15
- Then we used the result of the minimum detectable effect (~33%) at www.optimizely.com with a 15% baseline conversion rate to get 520
- How many weeks would you need to observe sheep at Bryce National Park in order to observe enough sheep? How many weeks would you need to observe at Yellowstone National Park to observe enough sheep?
  Approximately 2 weeks at Bryce and 1 week at Yellowstone.

Graphs Appendix

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

	conservation_status	scientific_name
0	Endangered	15
1	In Recovery	4
2	Species of Concern	151
3	Threatened	10

	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

is_protected	category	False	True
0	Amphibian	72	7
1	Bird	413	75
2	Fish	115	11
3	Mammal	146	30
4	Nonvascular Plant	328	5
5	Reptile	73	5
6	Vascular Plant	4216	46

	category	is_protected	scientific_name
0	Amphibian	False	72
1	Amphibian	True	7
2	Bird	False	413
3	Bird	True	75
4	Fish	False	115

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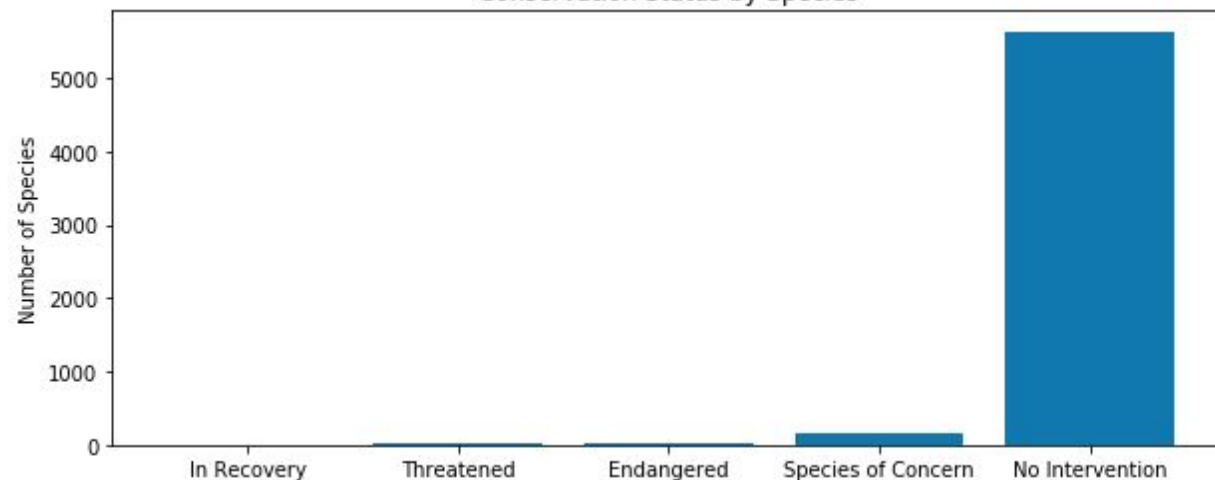
|	category	scientific_name	common_names	conservation_status	is_protected	is_sheep
0	Mammal	Clethrionomys gapperi gapperi	Gapper's Red-Backed Vole	No Intervention	False	False
1	Mammal	Bos bison	American Bison, Bison	No Intervention	False	False
2	Mammal	Bos taurus	Aurochs, Aurochs, Domestic Cattle (Feral),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

	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

	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

	scientific_name	park_name	observations	category	common_names	conservation_status	is_protected	is_sheep
0	Ovis canadensis	Yellowstone National Park	219	Mammal	Bighorn Sheep, Bighorn Sheep	Species of Concern	True	True
1	Ovis canadensis	Bryce National Park	109	Mammal	Bighorn Sheep, Bighorn Sheep	Species of Concern	True	True
2	Ovis canadensis	Yosemite National Park	117	Mammal	Bighorn Sheep, Bighorn Sheep	Species of Concern	True	True
3	Ovis canadensis	Great Smoky Mountains National Park	48	Mammal	Bighorn Sheep, Bighorn Sheep	Species of Concern	True	True
4	Ovis canadensis sierrae	Yellowstone National Park	67	Mammal	Sierra Nevada Bighorn Sheep	Endangered	True	True
5	Ovis canadensis sierrae	Yosemite National Park	39	Mammal	Sierra Nevada Bighorn Sheep	Endangered	True	True
6	Ovis canadensis sierrae	Bryce National Park	22	Mammal	Sierra Nevada Bighorn Sheep	Endangered	True	True
7	Ovis canadensis sierrae	Great Smoky Mountains National Park	25	Mammal	Sierra Nevada Bighorn Sheep	Endangered	True	True
8	Ovis aries	Yosemite National Park	126	Mammal	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	False	True
9	Ovis aries	Great Smoky Mountains National Park	76	Mammal	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	False	True
10	Ovis aries	Bryce National Park	119	Mammal	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	False	True
11	Ovis aries	Yellowstone National Park	221	Mammal	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	False	True

	category	scientific_name	common_names	conservation_status	is_protected	is_sheep
3	Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	False	True
3014	Mammal	Ovis canadensis	Bighorn Sheep, Bighorn Sheep	Species of Concern	True	True
4446	Mammal	Ovis canadensis sierrae	Sierra Nevada Bighorn Sheep	Endangered	True	True

Observations of Sheep per Week
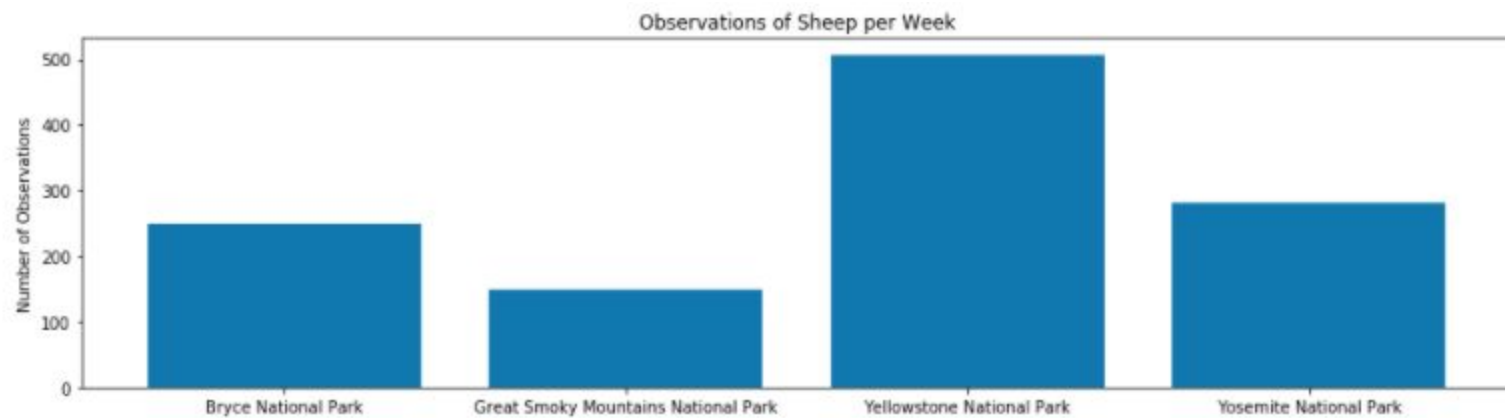
	park_name	observations
0	Bryce National Park	250
1	Great Smoky Mountains National Park	149
2	Yellowstone National Park	507
3	Yosemite National Park	282