Biodiversity Capstone Project

Brad Fels

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Species Analysis Task

- Task: The National Parks Service would like you to perform some 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.

Species Analysis Observations

- Of the species being observed, the overwhelming majority (5363 of 5543, which is 96.8%) fall outside our areas of concern into the “No Intervention” category.
- Of the species being observer that require some form of intervention, the largest group (151 or 5543, which is 2.7%) are in the “Species of Concern” category, which is described as having a “declining population or appears to be in need of conservation.”
- The remaining species (29 or 5543, which is 0.5%) fall into the categories of “Threatened” (10 speices), “Endangered” (15 species), or “In Recovery” (4 species).

Species Analysis Observations (continued)

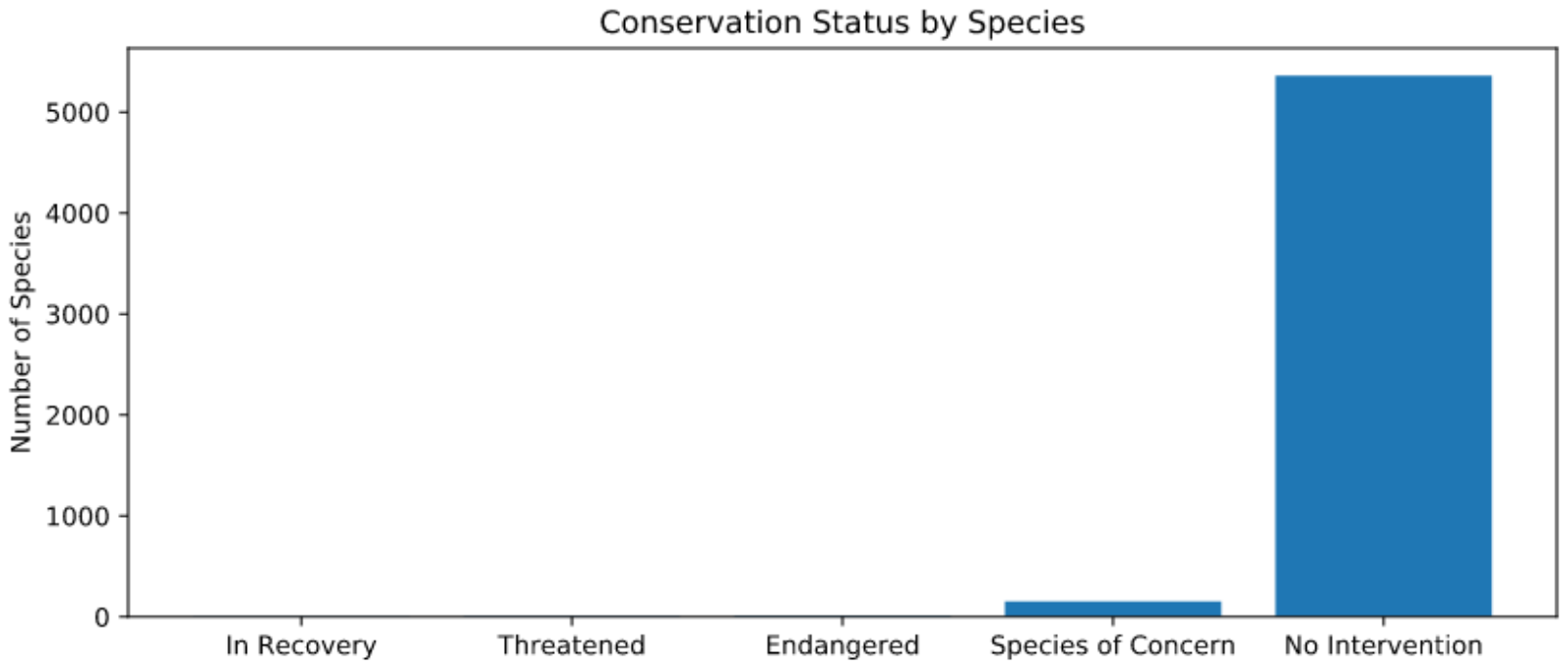
- To obtain the data in the slide before, some manipulation and combination of data was needed. Below are the charts created through this process:

	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
1139	Vascular Plant	Rumex acetosella	Sheep Sorrel, Sheep Sorrell	No Intervention	False	True
2233	Vascular Plant	Festuca filiformis	Fineleaf Sheep Fescue	No Intervention	False	True
3014	Mammal	Ovis canadensis	Bighorn Sheep, Bighorn Sheep	Species of Concern	True	True
3758	Vascular Plant	Rumex acetosella	Common Sheep Sorrel, Field Sorrel, Red Sorrel, Sheep Sorrel	No Intervention	False	True

	category	scientific_name	common_names	conservation_status	is_protected	is_sheep	park_name	observations
0	Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	False	True	Yosemite National Park	126
1	Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	False	True	Great Smoky Mountains National Park	76
2	Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	False	True	Bryce National Park	119
3	Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention	False	True	Yellowstone National Park	221
4	Mammal	Ovis canadensis	Bighorn Sheep, Bighorn Sheep	Species of Concern	True	True	Yellowstone National Park	219

Species Analysis Observations (continued)

- When the numbers of species are placed into a chart, it demonstrates how few numbers fall into the concerning categories.



Species Observations (by animal category)

- When the 5543 species are categories by type (e.g. mammal, bird…), it becomes apparent that the percentage of those which are projected is greatest for mammals (30 of 146, which is 17%) and birds (75 of 413, which is 15.4%).
- The question that emerges from this data is whether mammals are really more likely to become endangered than birds

Species Calculations

- A Chi-Squared test for significance was completed on mammals and birds.
- The result of this test showed a p-value of 0.69 which verifies the null hypothesis that there is no significance to the differences between the number of mammal species needing projection and the number of bird species needing protection.
- To verify that our numbers can have significance, the same chi-squared test was undertaken between mammals and reptiles.
- The p-value in this test was 0.04 which shows that mammals are significantly more likely to need protection than reptiles.

Species Analysis Conclusions

- Focus preservation efforts on both mammals and birds since they are the most likely types to need assistance in comparison to other groups.
- Even though the raw data shows that mammals are more likely to need assistance thatn birds (17% of mammal species and 15.4% of bird species), the chi-quared examination shows that this is not a significant enough difference to favor the mammals over the birds in preservation efforts
- Do not focus efforts on any form of plant. Their level of endangerment is not very high

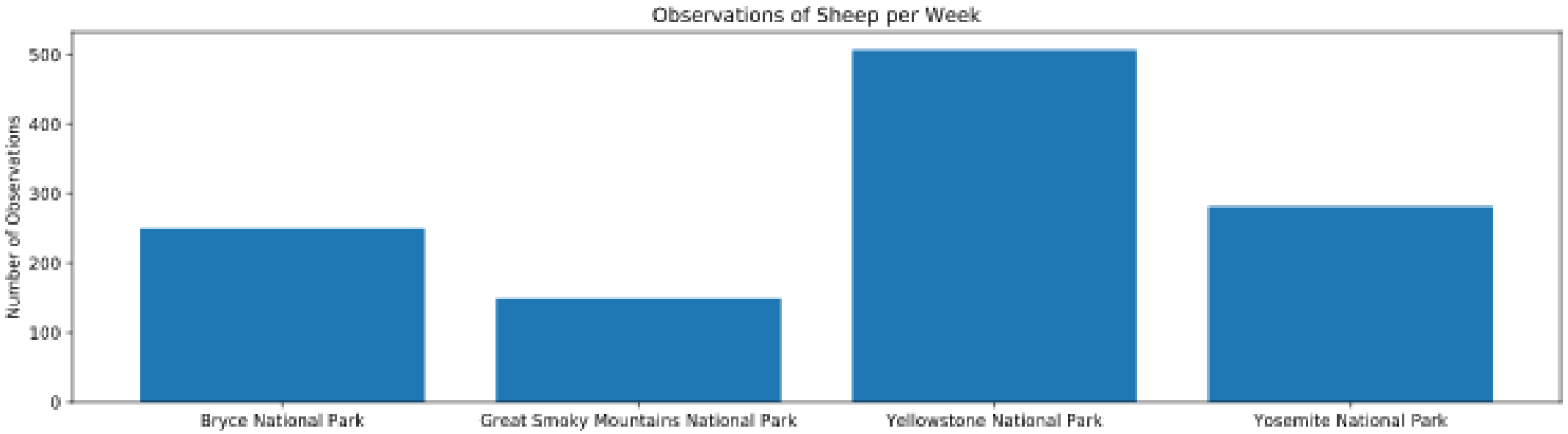
Foot and Mouth Disease Study Findings

- The study was commissioned to examine the sheep population across four national parks.
- The number of sheep sightings are listed below:

	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

Foot and Mouth Disease Findings (continued)

- When placed on a bar graph, the following distribution of sheep observations per week is shown:



Foot and Mouth Disease Findings (continued)

- Park Rangers at Yellowstone National Park have been running a program to reduce the rate of foot and mouth disease at that park.
- Rangers wanted to see if there was (at minimum) a 5% decline in the rate of foot and mouth disease from the observed rate of 15% from last year.
- To accomplish this, I used a provided calculator to determine the number of sheep that we would need to observe at the various parks to prove or disprove the idea that a 5% decline was obtained.

Foot and Mount Disease Information

- The following calculations were used:
  - Baseline: 15%
  - Minimum Detectable Effect: 33%
  - Default Significance Level: 90%
- From these calculations, it was determined that 510 sheep would have to be observed
- An additional calculation was made to determine how long it would take to observer 510 sheep at two parks. It would take 1 week at Yellowstone to reach that total and 2 weeks at Bryce