Biodiversity in National Parks

Introduction to Data Analysis – Capstone Project

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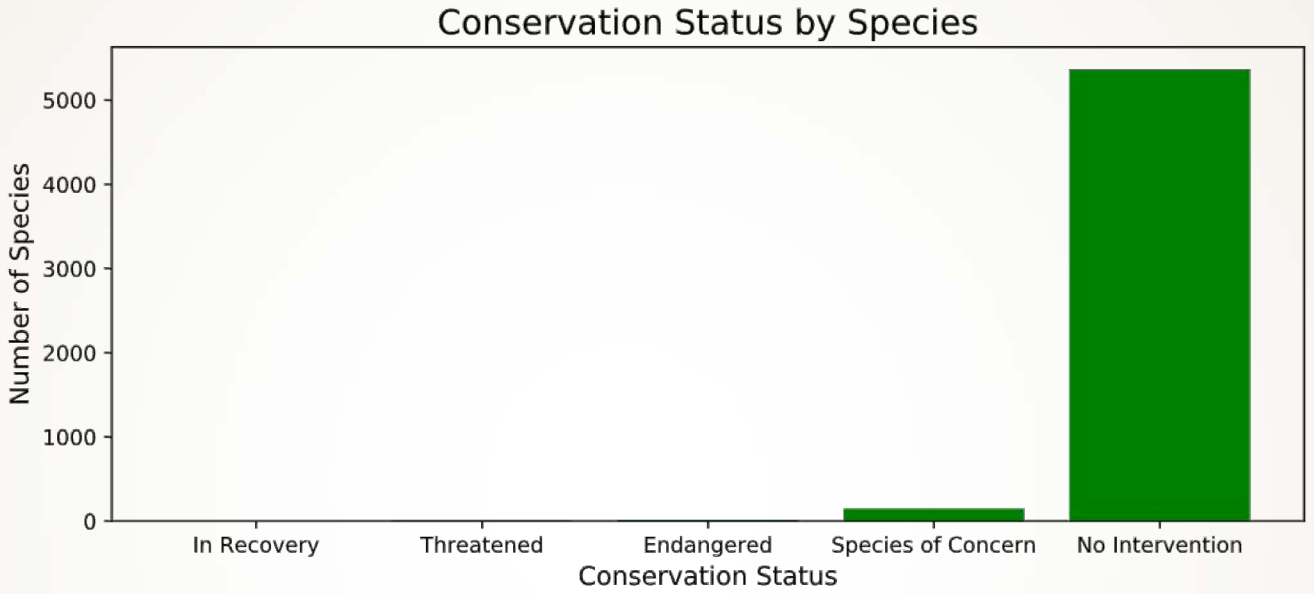
Conservation Status of Species in Various National Parks

- Species are classified into 4 conservation status classes:
  - Endangered: a high risk of extinction in the wild
  - Threatened: high risk to become endangered in the near future
  - Species of Concern: vulnerable, but don't qualify for a higher conservation class
  - In Recovery: Species that have been removed for threated, or endangered list and are no longer in need of protection

Sierra Nevada Yellow-Legged Frog:
Found in Yosemite National Park
95% population decline as of 2014

Florida Panther:
Found in Everglades National Park
20 years ago total global population = 20-30 individuals
Due to recent recovery efforts, population has increased to approximately 100 individuals as of 2018
(National Parks Conservation Association)

For Most Species, In Intervention is Required



Conservation Status	Number of Species
In Recovery	4
Threatened	10
Endangered	15
Species of Concern	151
No Intervention	5363
Total Species	5541

Are certain types of species more susceptible than others?

Species Type	Not Protected	Protected	% Protected
Amphibians	72	7	8.8
Birds	442	79	15.1
Fish	116	11	8.7
Mammals	176	38	17.8
Reptiles	74	5	6.3
Nonvascular Plants	328	5	1.5
Vascular Plants	4424	46	1

- No significant difference in the susceptibility of mammalian species when compared to birds
  - By Chi-squared test, p-value = 0.68759
- Mammalian species are more likely to require protection status than reptilian species.
  - By Chi-squared test, p-value = 0.03836

Conclusions Regarding Conservation Status:

- There are 5541 different species being monitored in the national park
  - Currently, there are approximately 180 species that fall into 1 of four conservation status categories.
- Mammals are significantly more likely to require protective status when compared to reptiles
  - No differences in the frequency of protective status was found between birds and mammals.

Counting Sheep...

- In 1 week, 3 subspecies of *Ovis canadensis* (aka Bighorn Sheep) were observed and counted

Park Name	Observations
Bryce National Park	250
Great Smoky Mountains National Park	149
Yellowstone National Park	507
Yosemite National Park	282

Sample Size determination for Foot and Mouth Disease Observations

- Using baseline data collected from Bryce National Park
  - 15% of sheep observed have Foot and Mouth Disease
- In order to detect at least a 5% reduction in the disease at a 90% confidence interval the sample size needs to be at least 890 observations

- Reaching that sample size will require:
  - 1.76 weeks at Yellowstone National Park*
  - 3.56 weeks at Bryce National Park*

*Assuming previously measured observation rates.

Conclusions Regarding Sheep

- More Bighorn sheep are found in Yellowstone National Park than in other national parks.

- Due to a higher incidence of sheep observations, Yellowstone National Park would be a better choice over Bryce National Park to conduct Foot and Mouth Disease studies
  - Yellowstone National Park requires a little over 1 week to reach the required sample size
  - Bryce National Park requires over 3 weeks to reach a similar number of sheep observations.