Biodiversity
U.S. National Parks

Species Overview

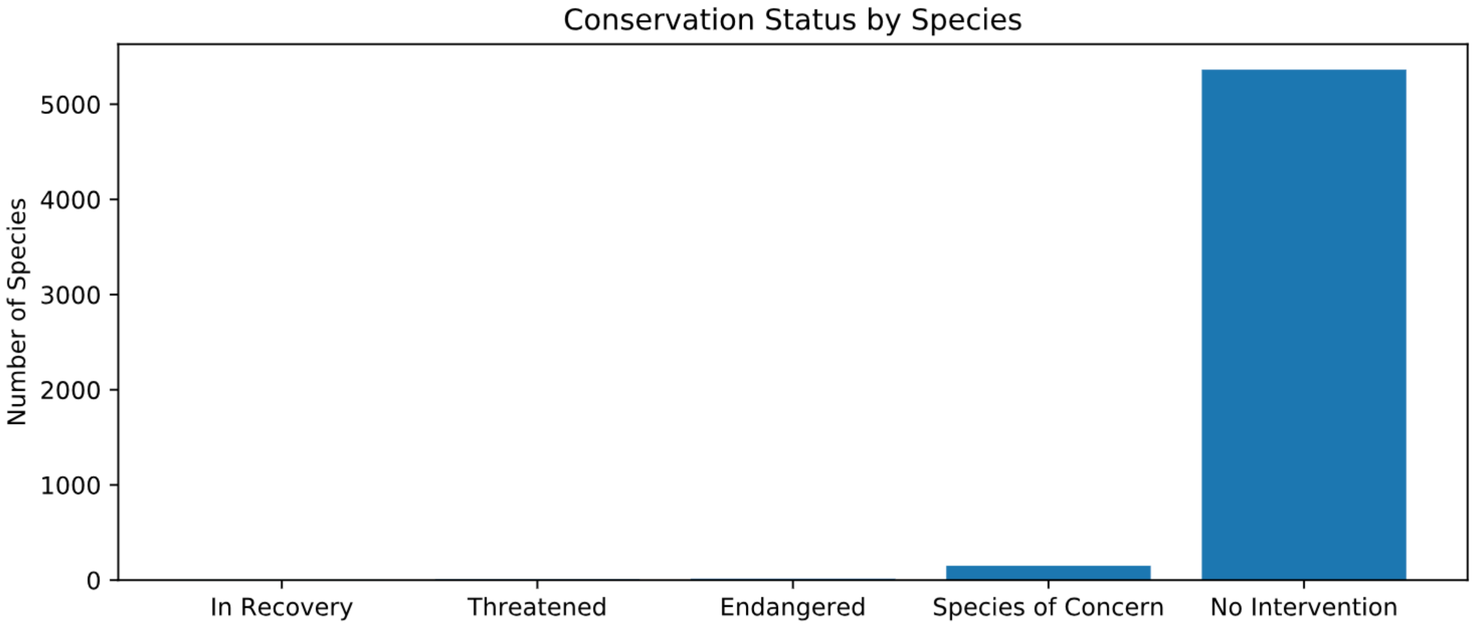
- There are 5541 different species!
- The variety of species consists of
  - Mammals
  - Birds
  - Reptiles
  - Amphibians
  - Fish
  - Vascular plants (greatest variety)
  - Nonvascular Plants

Category	Count
Reptile	79
Amphibian	80
Fish	127
Mammal	214
Nonvascular Plant	333
Bird	521
Vascular Plant	4470

Endangered Status Comparison

- Thankfully, the vast majority of species do not require conservation intervention!
- However, 3% of species *are* in danger
- Over 2% are rated as Species of Concern — of these, birds, vascular plants, and mammals make up the largest volume
- And several bird and mammal species also listed as endangered or threatened

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



Results Significance

Findings

- The two species types most at risk of becoming endangered are
  - mammals with 17% of the population at risk
  - birds with 15% of the population at risk
- Certain types of species are more likely to become endangered than others
  - our null hypothesis is that there is no significant difference between the species groups
  - if we get a p-value < 0.05, we reject that hypothesis and state that there *is* a significant difference between groups
  - we calculate this using Chi-Squared Tests which compare two species groups at a time
  - and derive risk significance calculation by the p-value returned
- Types of species with significant difference in susceptibility include, but are not limited to

More likely	Less likely	P-val
mammals	reptiles	0.038 = 3.8%
mammals	fish	0.056 = 5.6%
birds	fish	0.076 = 7.6%
mammals	birds	0.687 = 68.7%

- On analysis of mammals and birds, although both show a significant risk of becoming endangered, the p-value of 0.687 tells us there isn't a significant difference in risk between these two groups
- However, there *is* a significant difference in risk between mammals and reptiles

Recommendation

- Focus conservation efforts on those species which are the most likely to become endangered, such as mammals and birds
- Perform regular analysis of all populations to assess risk over time

Foot and Mouth Disease Analysis

Findings

- Last year it was recorded that 15% of sheep at Bryce National Park have foot and mouth disease
  - The goal is to detect reductions of at least 5 percentage points

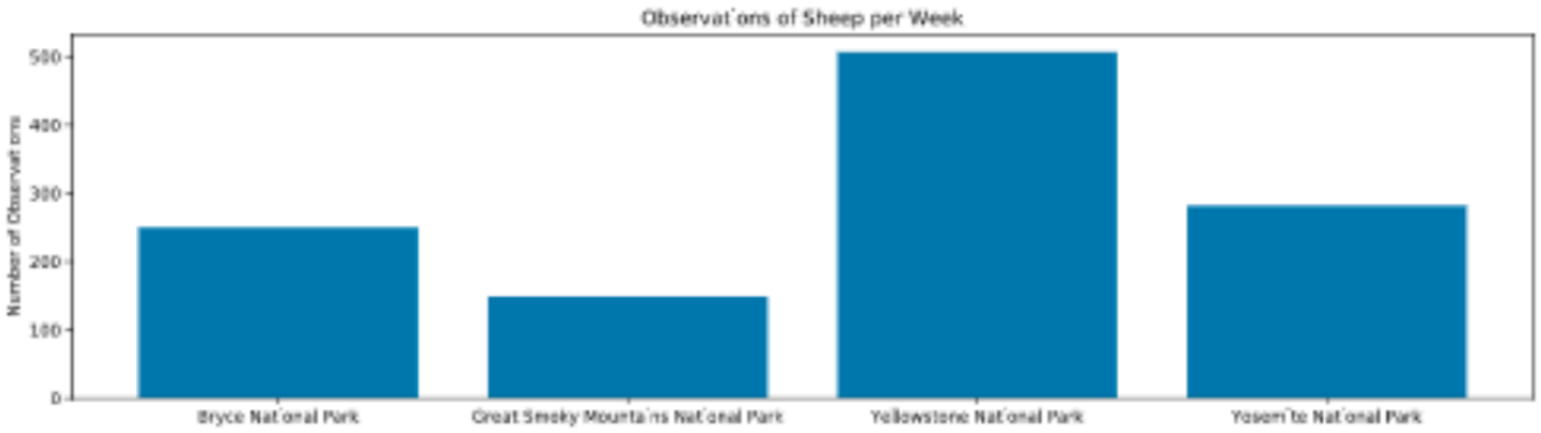
Recommendation

- At Yellowstone, scientists would need to observe 870 sheep to ensure foot and mouth percentages are significant
  - which would take ~1 week, given the high number of sightings
  - due to the lower number of sightings at Bryce, 2+ weeks would be required to observe a significant change

Conservationists observed sheep species for a week in each of four parks

	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

As you can see Yellowstone is sheep party central!



Thank you!