Codecademy Capstone Project:

Biodiversity for the National Parks

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Terms and Definitions

- Species of Concern: declining population or appears to be in need of conservation
- Threatened: vulnerable to endangerment in the near future
- Endangered: seriously at risk of extinction
- In Recovery: formerly Endangered, but currently not in danger of extinction throughout all or a significant portion of its inhabitable range

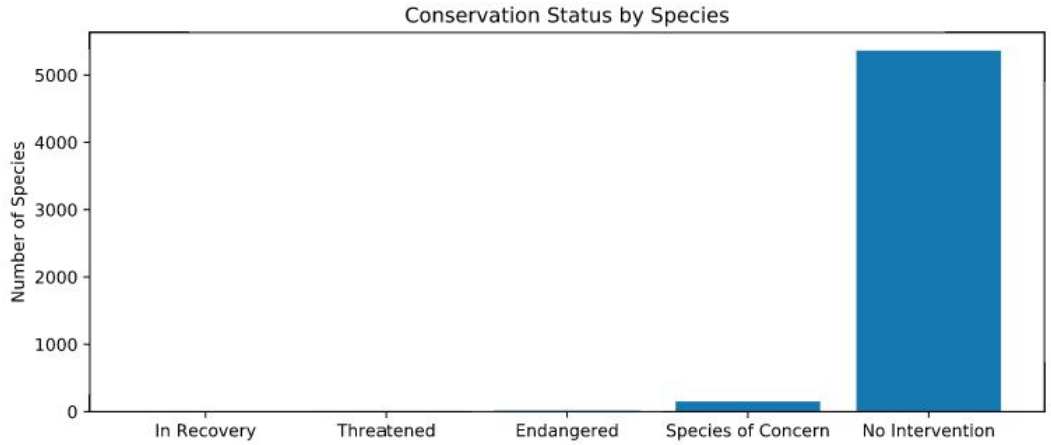
Species of the National Parks

Status	Amphibian	Bird	Fish	Mammal	Non-Vascular Plant	Reptile	Vascular Plant	Total
No Intervention	73	442	116	176	328	74	4,424	5,633
Species of Concern	4	72	4	28	5	5	43	161
Threatened	2	0	4	2	0	0	2	10
Endangered	1	4	3	7	0	0	1	16
In Recovery	0	3	0	1	0	0	0	4
Total	80	521	127	214	333	79	4,470	5,824

*The same species can reside in multiple parks, but have different conservation statuses in each park.

Species of the National Parks (cont.)

- The majority of species (96.7%) currently require no intervention (graph below)
- Species of concern represent 2.7% of the data
- Not including vascular plants, 10.7% of species are either threatened, endangered, or are species of concern



Significance Calculations using Chi-Squared Tests

Is “X” more likely to be protected than “Y” ?

X	Y	Answer	P-value	Significant?
Mammals	Birds	Yes	0.688	No
Vascular Plants	All Other Species	No	1.087e-60	Yes
Animals	Plants	Yes	3.201e-85	Yes
Warm-Blooded	Cold-Blooded	Yes	0.002	Yes
Mammals	Other Animals	Yes	0.163	No
Vascular Plants	Non-Vasc. Plants	No	0.662	No

*A species represented in multiple parks is counted as only one species here
**The term ‘protection’ counts as anything other than ‘No Intervention’

Recommendations

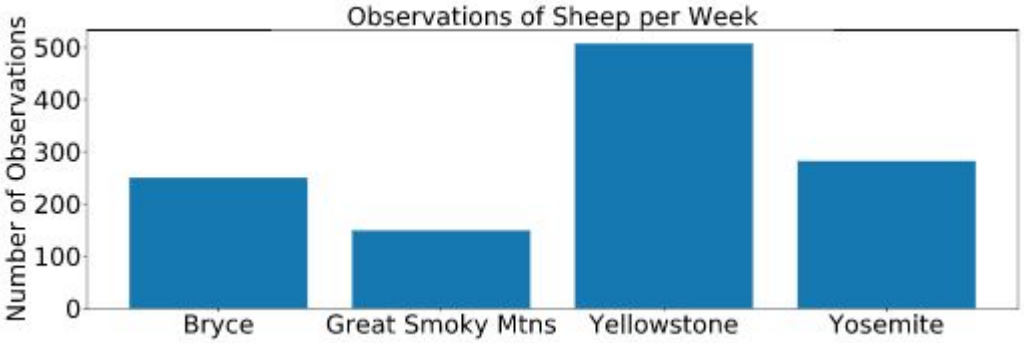
- Although the majority of the data focuses on vascular plants, it is all the other species that are more likely to be in need of care and protection
  - 10.3% of all other species need protection whereas only 1.1% of vascular plants need it
- Conservationists should focus more on animals than plants
  - Animals are 12.2 times as likely to need protection than plants
- Warm-blooded animals (mammals and birds) are more likely to need protection than their cold-blooded counterparts (amphibians, reptiles, and fish)
  - Cold-blooded animals need protection for 8.1% of their species, while warm-blooded animals need protection for 15.8% of their species

Sighting Observations

- Sightings recorded in four parks:
  - Yellowstone Nat'l Park
  - Yosemite Nat'l Park
  - Great Smoky Mountains Nat'l Park
  - Bryce Nat'l Park
- The data only recorded the scientific name of each species, but to focus on sheep, the observations csv was merged with a new DataFrame
- The new DataFrame contained all entries of species_info.csv where the species is a sheep
- The purpose of this is so that we can study the prevalence of Foot and Mouth Disease among sheep in the national parks

The Sheep

- There are three species of sheep in the four national parks:
  - Domestic Sheep, Bighorn Sheep, and Sierra Nevada Bighorn Sheep
- The Domestic Sheep currently require no intervention, but the Bighorn Sheep is a species of concern and the Sierra Nevada Bighorn is endangered



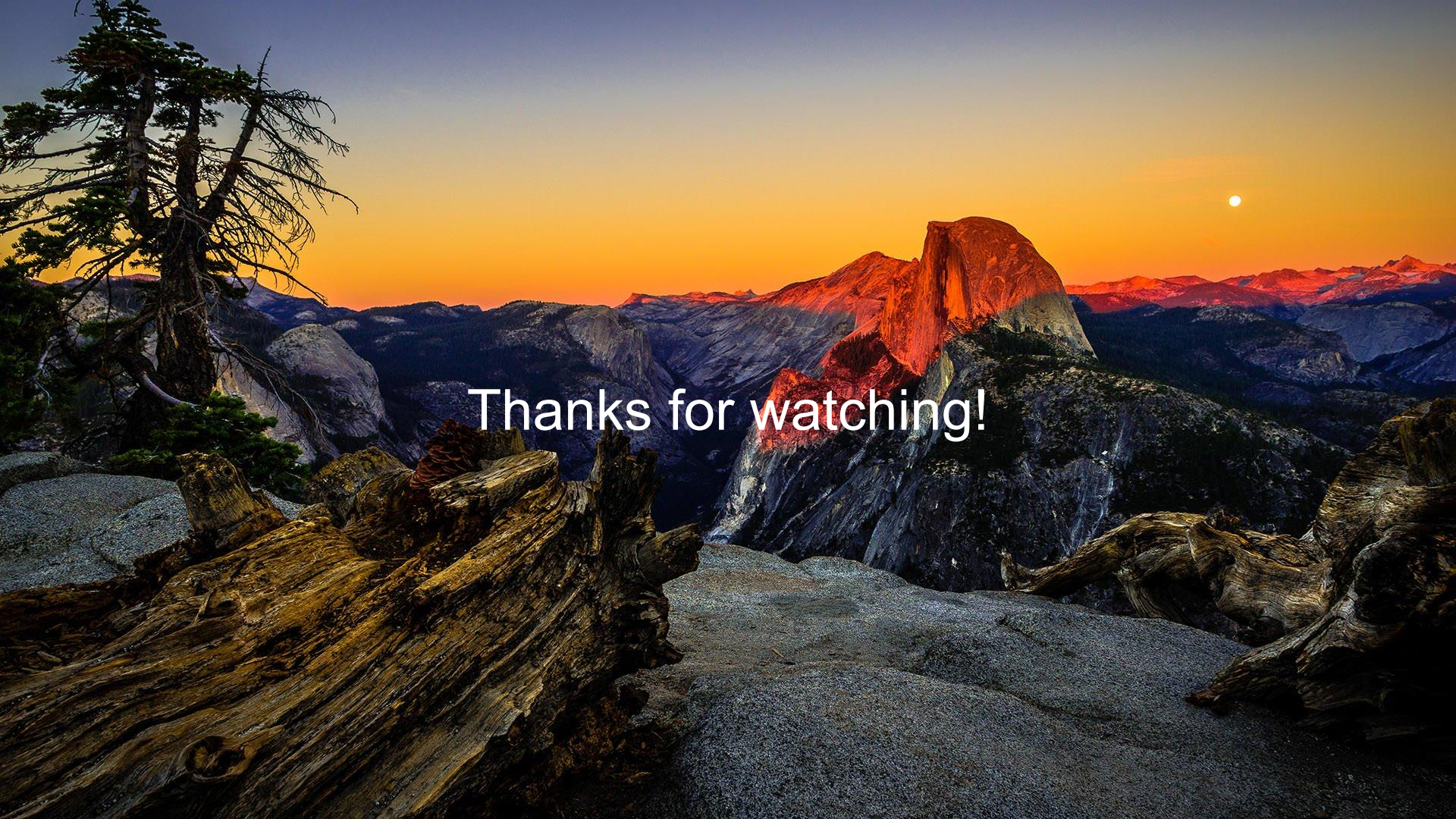
Bryce	Great Smoky Mtns	Yellowstone	Yosemite
250	149	507	282

Foot and Mouth Disease

- Results in ulceration of the hoofs and around the mouth
- 15% of sheep in Bryce Nat'l Park were recorded having the disease last year
- Researchers want to be able to detect reductions of at least 5%
- Researches would need to observe sheep approximately 2 weeks at Bryce National Park and 1 week at Yellowstone National Park

- The baseline conversion rate is the percent of the population already infected
- The minimum detectable effect is what observers want to detect (5%) divided by the baseline (15%), and multiplied by 100 to get a percentage
- 90% is the default level of significance

Baseline Conversion Rate	Minimum Detectable Effect	Statistical Significance	Sample Size per Variation
15%	33.3%	90%	510


Thanks for watching!