Capstone Project: Biodiversity in National Parks

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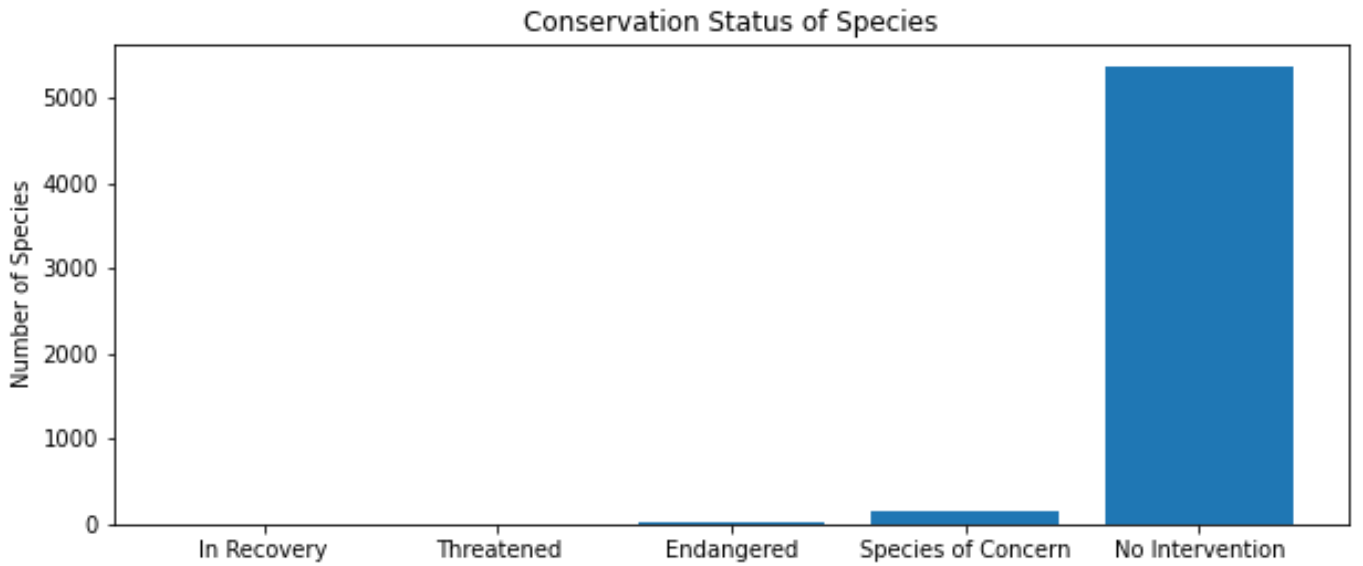
Endangered Species in US National Parks

Species Protection by the Numbers

Across national parks, there are 5824 species listed. This list includes:

- The scientific name of each species
- The common names of each species
- The species conservation status

- 5633 of the species do not receive any protection under a conservation status



A breakdown by conservation status indicates the level of legal protection for the species.

Percentage Level of Protection by Species Category

Category	Not Protected	Protected	% Protected
Amphibian	73	7	9.5
Bird	442	79	17.9
Fish	116	11	9.5
Mammal	176	38	21.6
Nonvascular Plant	328	5	1.5
Reptile	74	5	6.8
Vascular Plant	4424	46	1

Is there more protection for mammals than reptiles or birds?

Code snippet from Chi Square test between mammals and birds

```
contingency = [[38, 176],
               [79, 442]]
_,pval,_,_ = chi2_contingency(contingency)
print(pval)
```

```
0.445901703047197
```

Code snippet from Chi Square test between mammals and reptiles

```
contingency2 = [[38, 176],
                [5, 74]]
_,pval,_,_ = chi2_contingency(contingency2)
print(pval)
```

```
0.02338465214871547
```

When the p-value on the significance test is greater than 0.05, there is no significant difference in protection between the species categories.

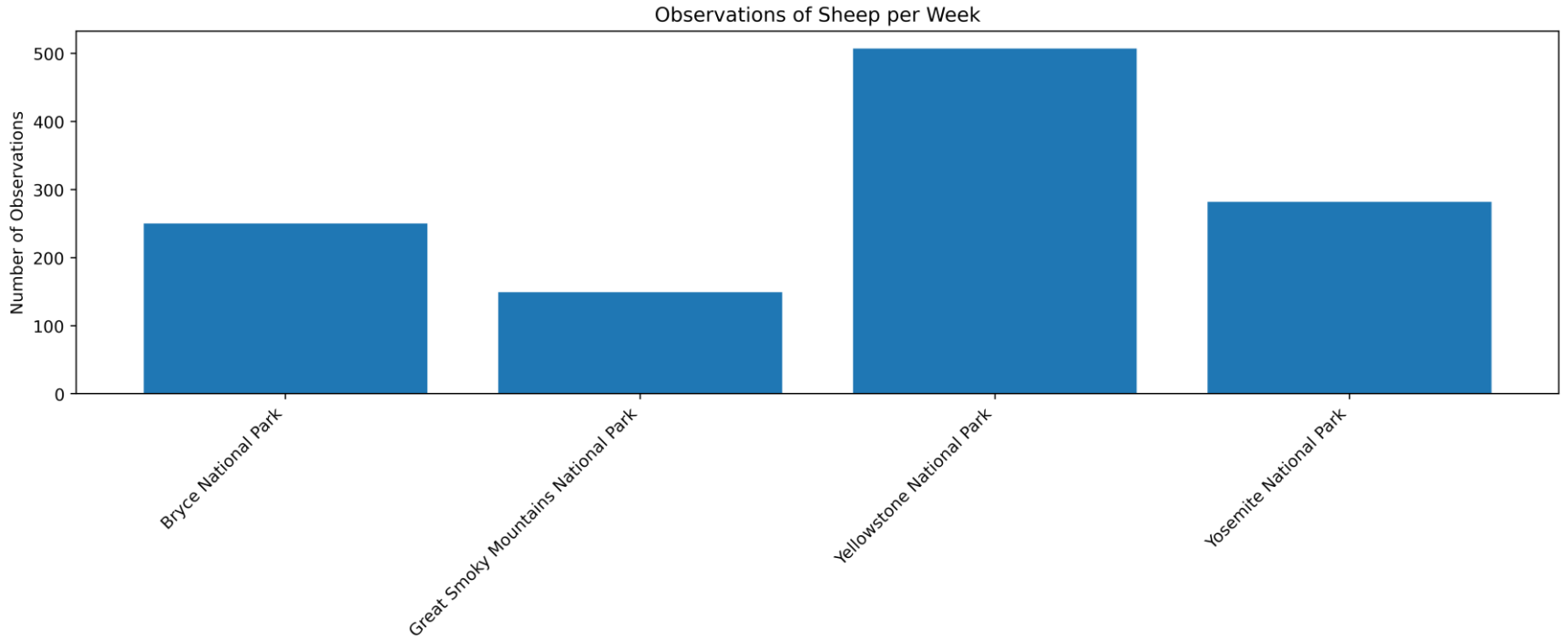
There is no significant difference between mammal and bird protection.

There is a significant difference between mammal and reptile protection.

Tracking Sheep Across 4 US National Parks

Tracking Significant Changes in Sheep-borne Disease

- Park rangers record observations of sheep sightings across 4 national parks during a seven day period. From those observations, the data scientist can track foot and mouth disease prevalence.



Determining how long the observations must take place

Value Category	Bryce National Park	Yellowstone National Park
Minimum Detectable Effect	33.33%	50%
Baseline Infection	15%	10%
Statistical Significance	90%	90%
Sample Size	870	610
Weeks of Observations	4.24 Weeks	1.20 Weeks

Yellowstone National Park has significantly more observations of the sheep over any given week than other National Parks. Bryce National Park had only 205 sheep observations over the week while Yellowstone National Park had 507. Therefore, collection of data will take longer in Bryce National Park.

Summary and Recommendations

- There is a disparity in the number of species with legal conservation status under the law.
- Legal protection also seems to favor some categories of species, such as mammals, over others, such as reptiles.
- Conservation of charismatic species like sheep is easier in some National Parks than others.
- Detecting disease and its significance across populations of sheep is far faster in Yellowstone National Park than Bryce National Park because the number of observations are much greater in Yellowstone.