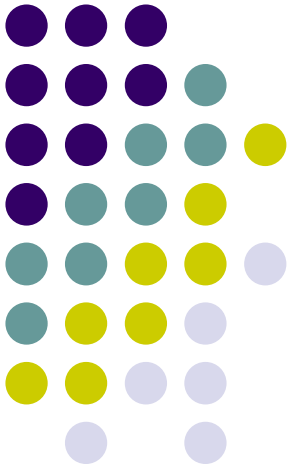
# Biodiversity for the National Parks

Presented by Joseph Kannookaden



# Description of Data

The National Parks Service has provided 2 sets of data.

The 1st includes information about what category the species is, its scientific name, common names, and its conservation status.

The 2nd set includes information about observations of these species according to their scientific name, and at what park they were observed in.

# Description of Data(cont.)

There are a total of 5541 different species.

They include mammals, birds, reptiles, amphibians, fish, vascular plants, and nonvascular plants.

These different categories have then been tagged as either “Species of Concern”, “Endangered”, “Threatened”, or “In Recovery”.

# Description of Data(cont.)

When referring to the bar chart and legend in diagrams 2 and 1 respectively, we can see that of the 5541 species, 5363 need no intervention.

When looking at diagram 3, we can see that 82.95% of mammals are not protected, and therefore, are more likely to be endangered than birds. In addition, they are most likely to be endangered.

# Significance Calculations

To test if the previous statement is significant, we conduct a chi squared test.

In this test, our null hypothesis is that this difference is due to chance.

# Significance Calculations(cont.)

After performing the chi square test, we get a critical value of 0.162, with a p-value of 0.688.

Therefore, this difference is not significant.

We test again to see if the difference between reptiles and mammals are significant.

After performing the chi square test, we get a critical value of 4.289, with a p-value of 0.038.

There is a significant difference between reptiles and mammals, and certain types of species are more likely to be endangered than others.

# Recommendations

We can conclude that the difference between the percentages of protected birds and mammals is not significant and is a result of chance.

When comparing the percentages of protected reptiles and mammals, we can conclude that certain types of species are more likely to be endangered than others.

# Sample Size Determination

We calculated the sample size necessary for confident measurements in foot and mouth disease amongst sheep at Bryce National Park.

Park Rangers at Yellowstone National Park have been running a program to reduce the rate of foot and mouth disease at that park. Based on this information, the scientists want to test whether or not this program is working. They want to be able to detect reductions of at least 5%.

The only information that the scientists currently have is that last year it was recorded that 15% of sheep at Bryce National Park have foot and mouth disease.

We calculated the number of sheep that they would need to observe from each park to make sure their foot and mouth percentages are significant using a 90% significance.

# Sample Size Determination(cont.)

Given a baseline of 15% occurrence of foot and mouth disease in sheep at Bryce National Park, we found that if the scientists wanted to be sure that a >5% drop in observed cases of foot and mouth disease in the sheep at Yellowstone was significant they would have to observe at least 510 sheep.

Then, using the observation data we analyzed earlier, we found that this would take approximately one week of observing in Yellowstone to see that many sheep, or approximately two weeks in Bryce to see that many sheep.

# Graphs

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

*diagram 1*

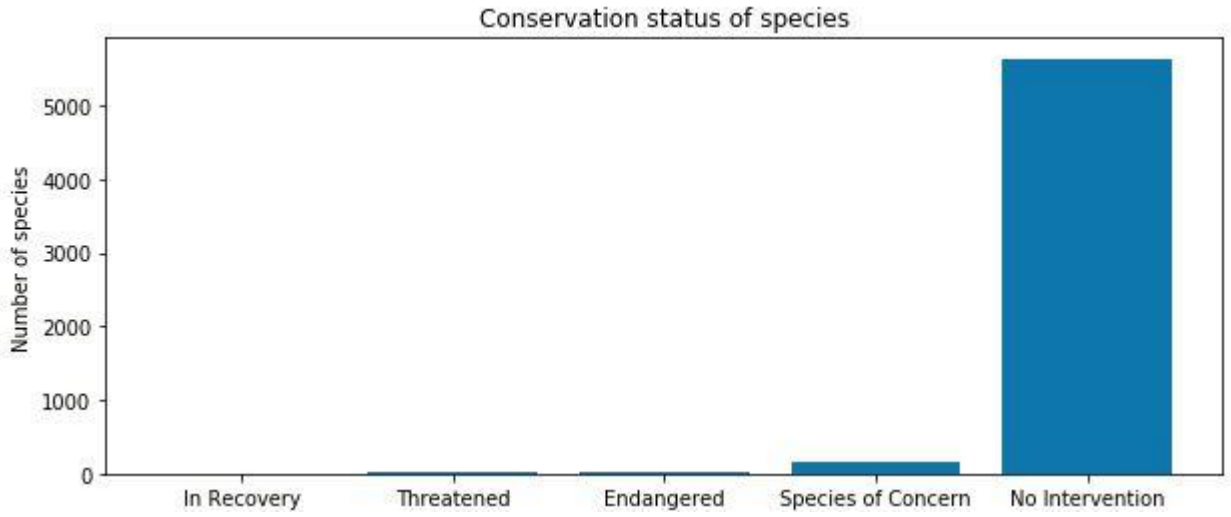



*diagram 2*

# Graphs

| | category | not_protected | protected | percent_protected |
|---|---|---|---|---|
| 0 | Amphibian | 7 | 72 | 91.139241 |
| 1 | Bird | 75 | 413 | 84.631148 |
| 2 | Fish | 11 | 115 | 91.269841 |
| 3 | Mammal | 30 | 146 | 82.954545 |
| 4 | Nonvascular Plant | 5 | 328 | 98.498498 |
| 5 | Reptile | 5 | 73 | 93.589744 |
| 6 | Vascular Plant | 46 | 4216 | 98.920695 |

*diagram 3*

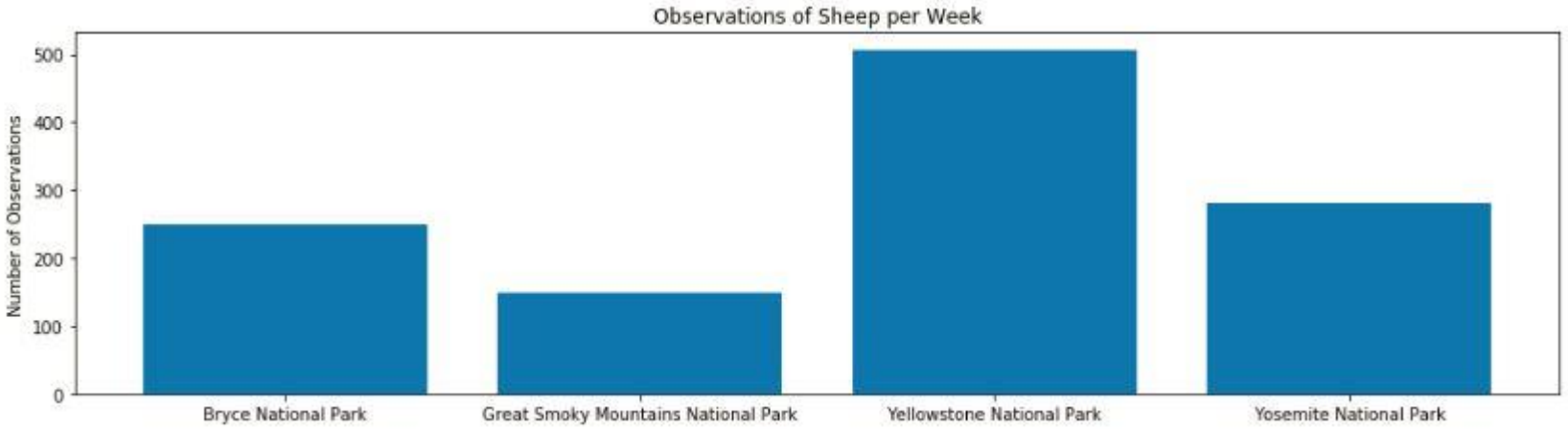



*diagram 4*