

# National Parks Species Analysis and Recommendations



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# Unpacking Species Information Data

Our species data records included four types of information.

1. Category of organism
  - a. Mammal, bird, reptile, amphibian, fish, vascular plant, or nonvascular plant
2. Scientific name of species
3. Common name of species
4. Conservation status of species
  - a. Endangered, In Recovery, Species of Concern, Threatened, or No Intervention

We have this data on a total of 5541 different species.



# Analysis of Conservation Status

Upon looking at the data set as a whole, we can see that the great majority of species are in no need of special protection.

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



## Analysis of Conservation Status cont.

Grouping the species by category and then counting the number of species in that category that are under a protected status (any species not categorized as No Intervention) gives us a better insight into our data.

Category	Protected	Not Protected
Amphibian	7	72
Bird	75	413
Mammal	30	146
Fish	11	115
Reptile	5	73
Vascular Plant	46	4216
Nonvascular Plant	5	328

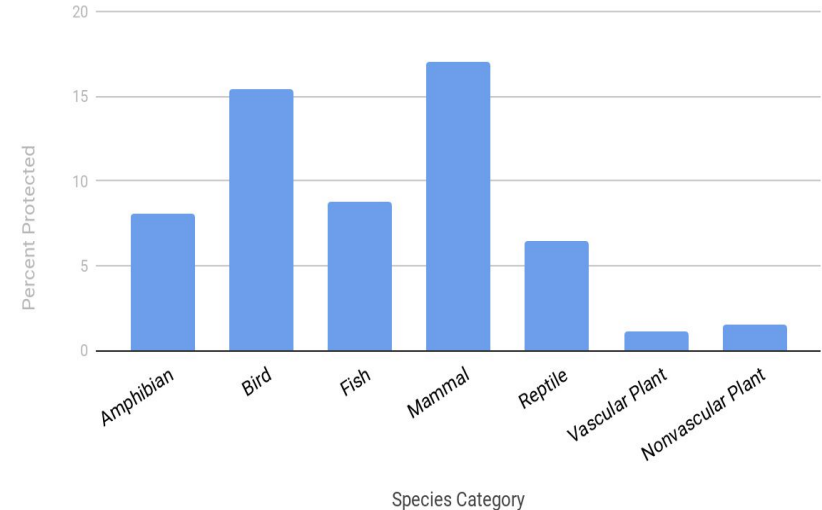


# Analysis of Conservation Status cont.

Though raw numbers can sometimes be useful, in this instance it is beneficial for us to see the percentages of each category of species that are considered protected status. This bar graph displays that data visually.

Through statistical testing it was determined that these differences in percentages are significant.

Percent Protected by Species Category





## Conservation Recommendations

As one can see from the previous graph, **mammals** and **birds** have the highest population percentages in danger. Both these species contain relatively larger animals, so they may be more sensitive to encroachment of habitat. Conservationists may want to establish habitat rehabilitation zones for those species affected.

The second highest two groups are **amphibians** and **fish**. Both of these species categories are very sensitive to water quality, so conservationists may want to review the water quality of streams and lakes in the park as well as establish upstream cleanup practices.



## Further Analysis of Species Info

With some additional data, even better practices to mitigate species loss could be determined. For example, the same dataset from previous years could allow us to see how the conservation status of species has changed over time.

Additionally, if some rehabilitation practices were already put in place, it would be beneficial to consult the data to see if those practices are having any effect. One could perhaps even determine if the decline of one species affects another.

Another great resource would be the habitats and other behavioral information of each species. This could be cross referenced with the protection status info to determine what factors may be leading to the decline of various species.



# Sheep Sample Size Determination

Park Rangers at Yellowstone have requested our help in determining a sample size estimate for evaluating their efforts in reducing foot and mouth disease among sheep in their park.

Specifically they request a confidence level of 90% and to be able to detect a decrease of at least 5%.





## Sheep Sample Size Determination cont.

With the parameters requested by the Park Rangers, as well as the provided knowledge that the estimated proportion of sheep with foot and mouth disease in the previous year was 15%, we determined the appropriate sample size.

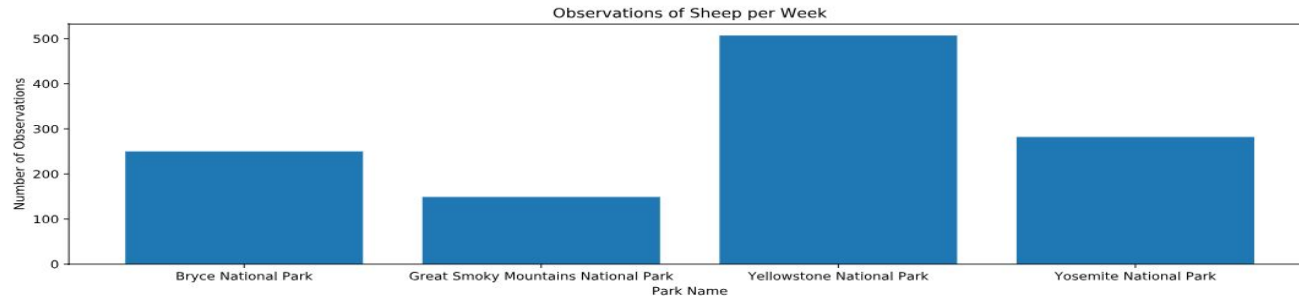
- Baseline Conversion Rate = 15
- Statistical Significance = 90
- Minimum Detectable Effect =  $(5/15) \times 100 = 33.333$

These parameters lead to a sample size of **870**.



## Sheep Sample Size Determination cont.

Information about how many sheep are typically observed in individual parks per week was also provided.



Using this data we can determine how long it will take for researchers to obtain the proper sample size of observations. For Yellowstone this number is approximately two weeks.



## Report Summary

- Mammals and birds are the most at risk groups in the national park system, with amphibians and fish a distant second.
- Conservationists may want to focus on habitat rehabilitation for affected species as well as park water quality assessments.
- Yellowstone National Park's requested parameters for determining levels of foot and mouth lead to a suggested sample size of 870.
- Collecting data on this sample size would take approximately 1.75 weeks at the current rate of sheep observations in the park.