Conservation Across National Parks: An Insight into the Conservational Efforts of Four U.S. National Parks

# Overview

# Organizations worldwide serve to bring awareness and protect the endangered species on our planet. The United States tackles the same problem by dedicating national parks to protecting wildlife. A group of individuals collected information on multiple species across four national parks: Great Smoky Mountains National Park, Yosemite National Park, Yellowstone National Park, and Bryce National Park. Their data collection consisted of species’ names, chordate category, number of observations in each park, common names people refer to them as, and their conservation status.

# Observations and Data Analysis

## Species

The four parks have identified 5543 identical species. However, the number of observations for each species differs between parks. While looking at an overview of the total observations per park, Yellowstone reigned as the one with the highest number of observations, followed by Yosemite, Bryce, and then the Great Smoky Mountains (see Figure 1). The difference in total observations could be attributed to the size of the national park. However, Bryce National Park is more extensive than Yellowstone National Park. Their difference could exist in the acres of habitable area for the species the group looked at. Yellowstone may be a more suitable environment for the different species than Bryce.

Most of the data set was made up of vascular plants, followed by birds, nonvascular plants, mammals, fish, amphibians, and reptiles (see Figure 2). The total observations of each species were greatest at Yellowstone, then Yosemite, Bryce, and Great Smoky Mountains (see Figure 3). This finding supports the trends seen in the total observations per park.

Figure 1: The figure displays the total number of observations per park among the four national parks.


Figure . The total number of observations (in millions) per park among the four national parks.

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Figure . The total number of species per chordate category.

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Figure . The total number of observations for each chordate category by park.

## Conservation Status

Most species have no form of conservation (96.8%, average = 150 observations). But 2% (average = 136) are species of concern, 0.3% (average = 46) are endangered, 0.2% (average = 83) are threatened, and less than 1% (average = 131) are in recovery (see Figure 4). There may be a certain threshold or number of observations that conservationists use to determine if species require conservation (p-value = 2.25 \* 10-29). There’s a significant difference in observations between endangered species and other conservation categories, but not threatened animals (alpha = 0.05). There is also a significant difference between no conservation and species of concern and threatened. The finding signifies a significant threshold that observations need to surpass to qualify for no conservation status. There is also a significant threshold between species of concern and threatened, which signifies that species observation levels must drop significantly to increase the warning level. These values should be re-evaluated with the information collected by this group or with further analysis as the threshold between endangered and threatened does not seem to be significantly different.

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Figure . The total number of species in each conservation category.

It appears that most of the species of concern fall into birds, even though there are significantly less than birds than vascular plants. Fish makes up 2.3% of the total data set, but have more threatened species than other categories. Most of the endangered species fall into birds, mammals, and fish. The only species in recovery are birds. Further analysis could look at the data over the past few years to observe if there are upward or downward trends in each category for conservation status.

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Figure . The total number of observations per chordate category for each conservation status.

## Genus

Certain species within the data set are in the same genus. There are a total of 1595 genera and 803 of them have multiple species. When animals are in the same genus, they may look the same and require the same habitat and resources. Therefore, when habitats are endangered, this could affect animals of the same genus compared to not (p-value = 9.37 \* 10-243). Additionally, animals that have the same genus may have similar common names due to the feature similarities (see Figure 6). However, the it appears common names does not impact conservation status.

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Figure . The distribution of proportion similarity between common names within the same genus.

# Future Directions

It is important to continue the conservation efforts. But some areas to keep in mind for the future is to observe trends throughout multiple years. The current data set only allows me to view in 2-dimensional regarding the state of the conservation status. But the uptrends and downtrends depend on if there are increases in higher importance conservation efforts. Additionally, thresholds in conservation status needs to be re-evaluated as there does not appear to be a significant difference between each step. Further analysis, looking deeper into each of the three characteristics: species, conservation status, and genus could be completed depending the specific question that requires to be answered.