
BIODIVERSITY
FOR THE
NATIONAL PARKS

# DATA DESCRIPTIONS

- The data from 'species_info.csv' stores the category, scientific name, common names and conversation status for each species at the national parks. The data contains 5541 types of species of flora and fauna recorded by the National Parks.
- The species can be categories into mammal, bird, reptile, amphibian, fish, vascular plant and nonvascular plant.
- The species were grouped into five conservation statuses: endangered, in recovery, threatened, 'species of concern' and 'no intervention' as shown in Figure 1.

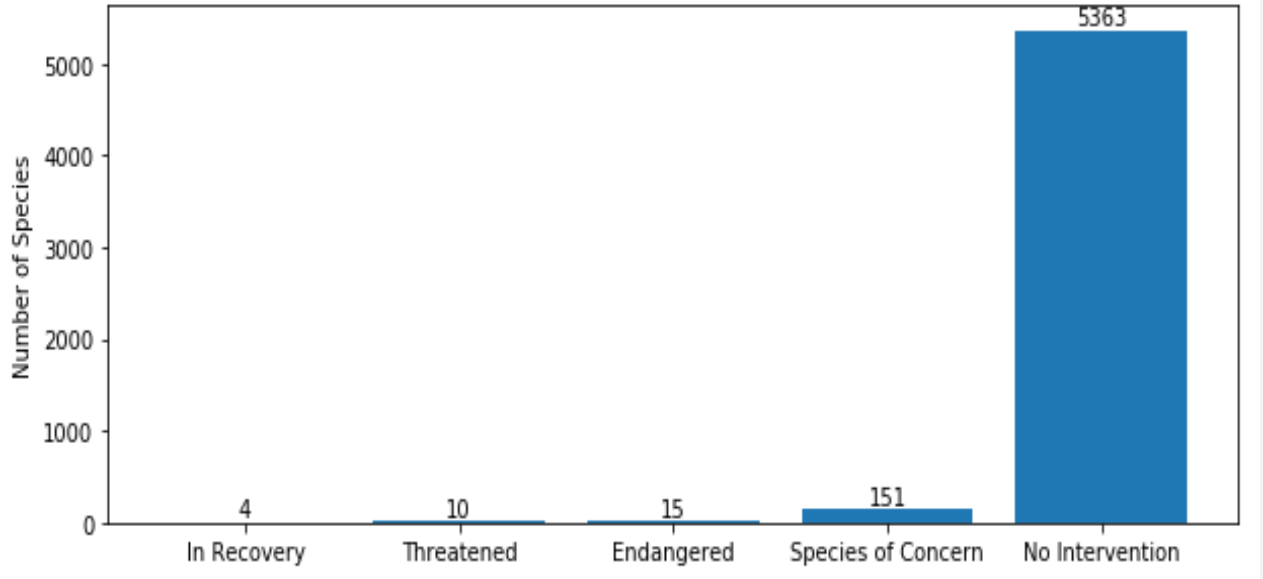


Figure 1: Conversation status by species.

- In total, there are 5543 conversation status, meaning that there are two species with more than one conversation status. The different conversation statuses indicate that the species are at different threat levels at different national parks. The species are Canis lupus is endangered in two parks and in recovery in another park. Oncorhynchus mykiss requires no intervention at one park but may require protection in another one as it is under threat.

# PROTECTED SPECIES

- All species that require intervention are considered as protected species. The percentage ratio of protected species by category is presented in Table 1.
- Chi-test on two categories is presented as presented in Table 2.
- Based on Table 2, there are small differences among mammal, bird, amphibian and fish.
- Reptile is significantly different from mammal but not with bird, amphibian and fish. Instead of testing between two categories, a further was conducted using a range of categories as presented in Table 3.
- Both vascular and nonvascular plants are significantly different from others.
- Based on the tables, the species belonging to the categories of mammal, bird and amphibian and fish are under the same level of threat of extinction. Reptiles receive a lower level of threat whereas vascular and nonvascular plants receive the least level of threat.
- This trend indicates that it is important to pay more attention to conserve the animal species in the national parks. However, more information is required to find the causes of the factors causing threats to the animal species.

Table 1: The percentage of species being protected for each category of species

| Category | Not Protected | Protected | Protected Ratio (%) |
|---|---|---|---|
| Mammal | 146 | 30 | 17 |
| Bird | 413 | 75 | 15.4 |
| Amphibian | 72 | 7 | 8.9 |
| Fish | 115 | 11 | 8.7 |
| Reptile | 73 | 5 | 6.4 |
| Nonvascular Plant | 328 | 5 | 1.5 |
| Vascular Plant | 4216 | 46 | 1.1 |

Table 2: The p-values between two categories.

| | Mammal | Bird | Amphibian | Fish | Reptile | Nonvascular Plant |
|---|---|---|---|---|---|---|
| Bird | 0.688 | | | | | |
| Amphibian | 0.128 | 0.176 | | | | |
| Fish | 0.056 | 0.077 | 0.825 | | | |
| Reptile | 0.038 | 0.053 | 0.781 | 0.741 | | |
| Nonvascular Plant | 0.000 | 0.000 | 0.002 | 0.000 | 0.034 | |
| Vascular Plant | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.662 |

Table 3: The p-values for a range of categories.

| Test Range | p-value |
|---|---|
| Mammal-Reptile | 0.031 |
| Mammal-Fish | 0.083 |

# FOOT AND MOUTH DISEASE STUDY

- Sheep are one of the animals susceptible to foot and mouth disease. To determine the effectiveness of a program which has been conducted, the sample size of the sheep in each national park needs to be determined.
- The sample size required for the study was determined using the sample calculator from optimizely.com.
- The baseline conversion rate, minimum detectable effect and statistical significance were set to 15%, 33.33% and 90% respectively.
- It was found that the sample size per variant for the study 510 samples. However, as shown in Figure 2, the sample size is too large for some national parks.
- Table 4 presents the duration of the observation required to collect the determined sample size for each national park.

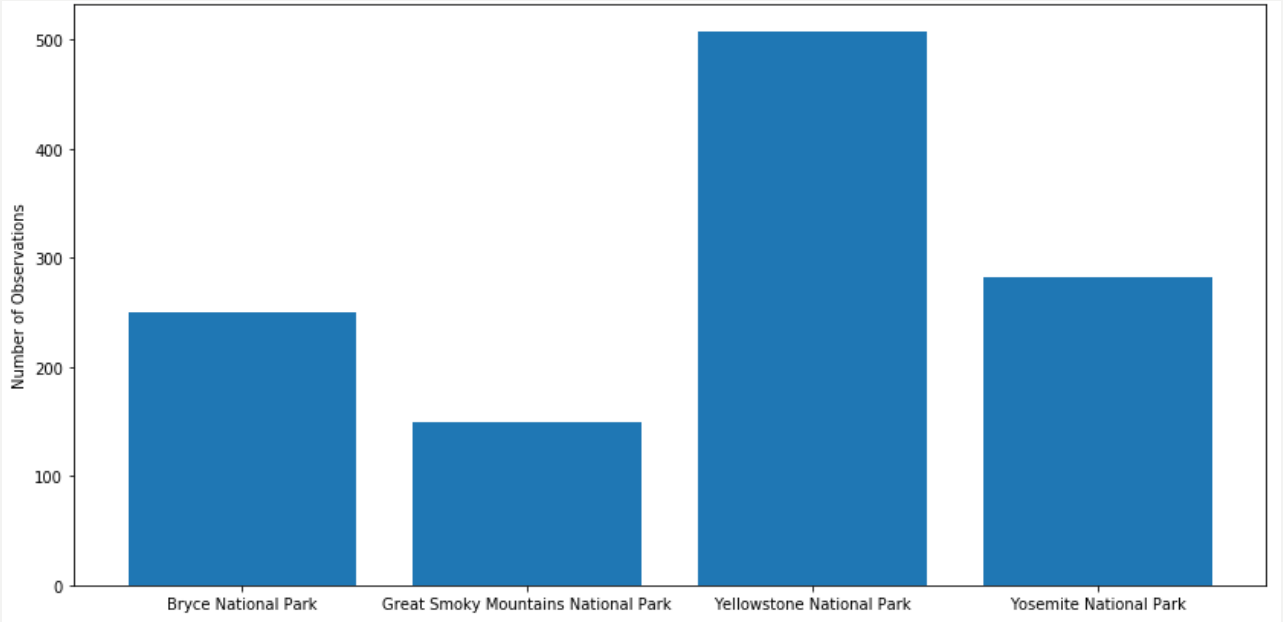


Figure 2: Observations of Sheep per week.

Table 4: Duration taken to obtain the required sample size

| National Park Name | Observation Duration (week) |
|---|---|
| Bryce | 2.04 |
| Great Smoky Mountains | 3.42 |
| Yellowstone | 1.01 |
| Yosemite | 1.81 |