BIODIVERSITY FOR THE NATIONAL PARKS

CODECADEMY

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DATA IN SPECIES_INFO.CSV

The species file contains the following data:
- The category of each species, e.g. Mammal.
- The scientific name of each species, e.g. Ovis aries.
- The common names of each species, e.g. Domestic Sheep, Mouflon, Red Sheep.
- The species conservation status, e.g. Threatened.

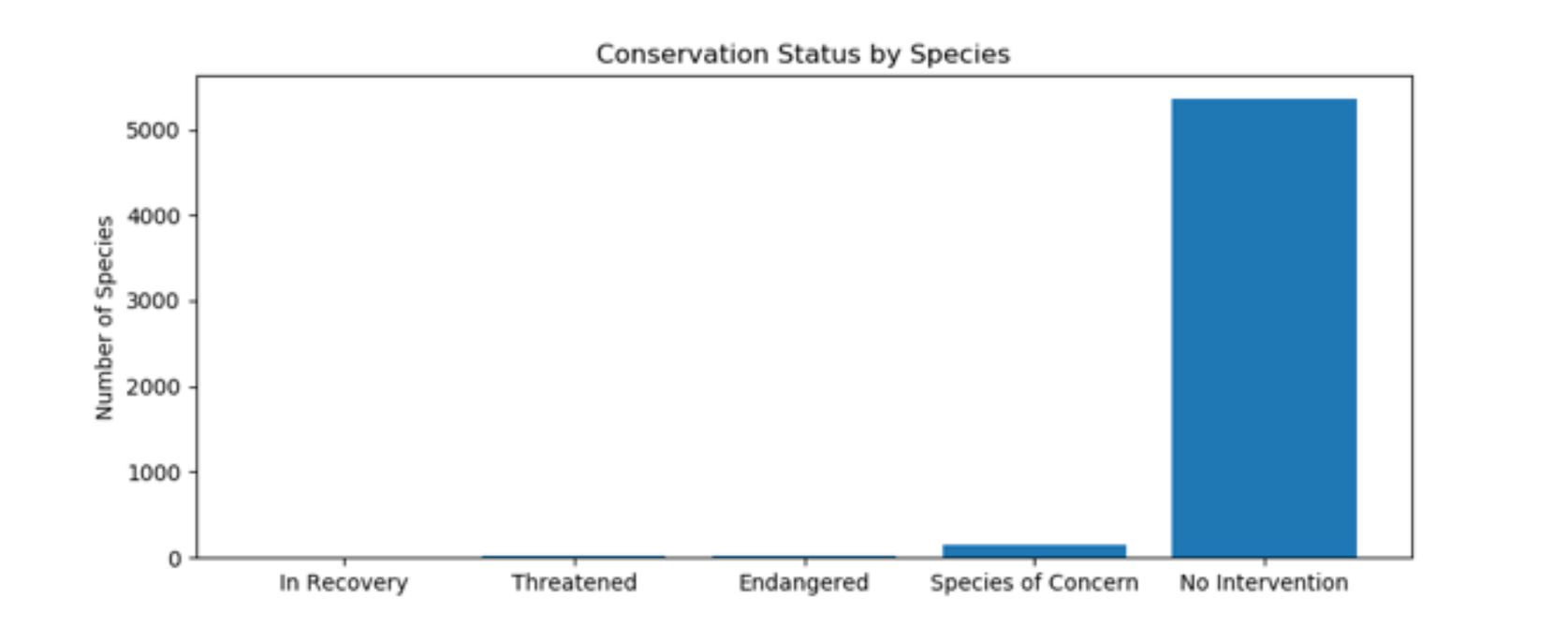
- There are 5541 different species in the species DataFrame.

- There are the following categories: Mammal, Bird, Reptile, Amphibian, Fish, Vascular Plant and Nonvascular Plant.

- There are the following conservation statuses: Species of Concern, Endangered,Threatened, In Recovery and No intervention.

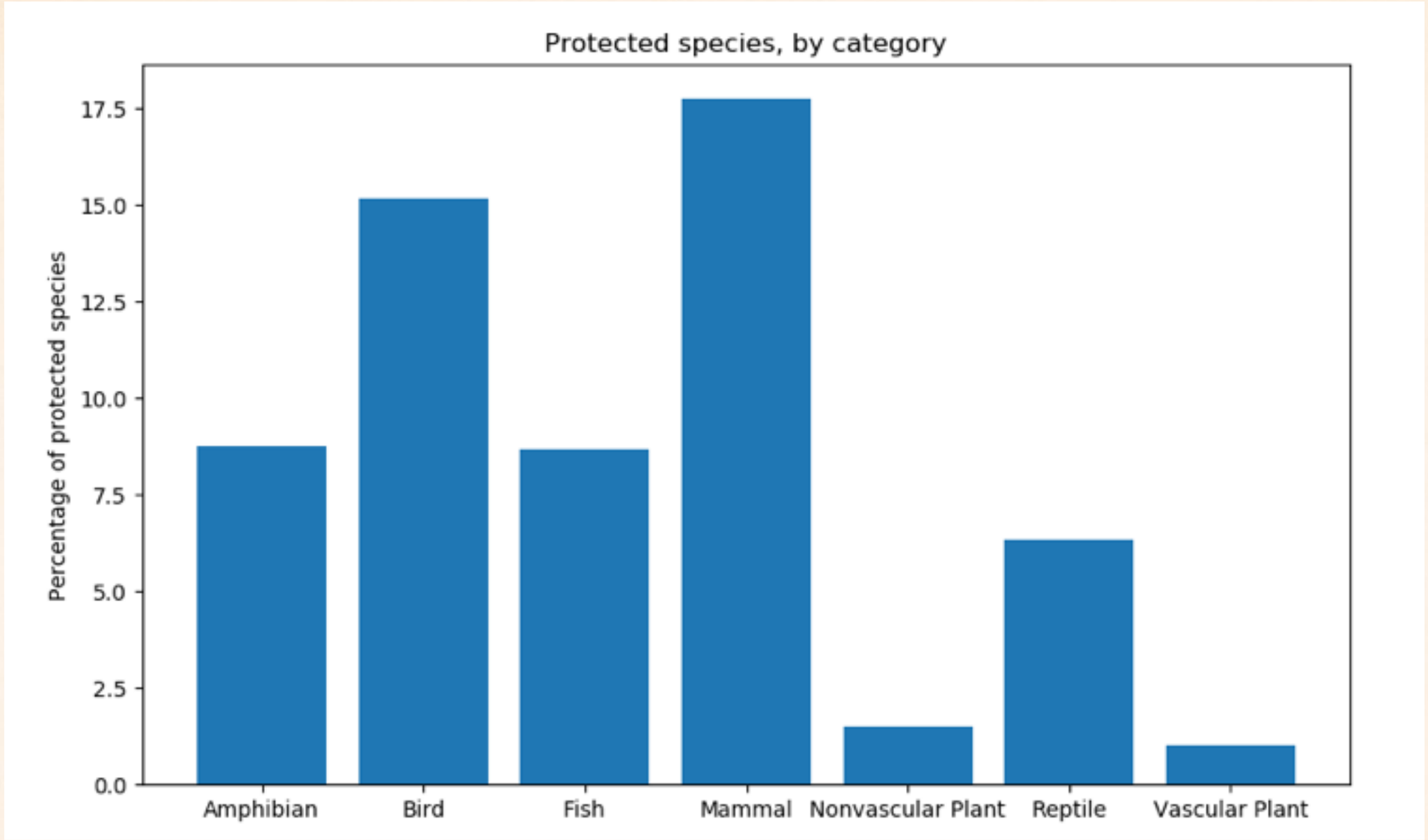
Conservation status	Scientific name	Percentage
In Recovery	4	0.07
Threatened	10	0.18
Endangered	15	0.27
Species of Concern	151	2.72
No Intervention	5363	96.75

According to the data shown, most species (5363) are currently under 'No intervention' (96.75%). A very small amount of species (4) is 'In Recovery (0.07%). Approximately 0.18% of the species (10) are 'Threatened'.



Considering the conservation status 'No intervention' equal to 'not protected', we assume that the remaining conservation statuses are equal to 'protected'.

Category	Not protected	Protected	Percent protected
Amphibian	72	7	8.860759
Bird	413	75	15.368852
Fish	115	11	8.730159
Mammal	146	30	17.045455
Nonvascular Plant	328	5	1.501502
Reptile	73	5	6.410256
Vascular Plant	4216	46	1.079305



According to the data shown, the categories 'Bird' and 'Mammal' have the highest percentage of protected species. 'Vascular Plant' and 'Nonvascular plant' have the lowest percentages of protected species. 'Amphibian' and 'Fish' appear to have very similar percentages of protected species. 'Reptile' shows a slightly lower percentage of protected species than the previous mentioned.

After running a chi-square test, the result indicated that the difference noted on the percentage of protected species between Mammals and Birds was not significant (p value = 0.687594809666). Therefore, the difference noted was a result of chance.

Further tests reveal that there is a **significant difference** between the following:

- Reptiles and Mammals (p value = 0.0383555902297)
- Nonvascular plants and Birds (p value = 1.0546306905e-10)
- Vascular plants and Birds (p value = 4.61226803169e-79)
- Reptiles and Vascular plants (p value = 0.000145052154947)
- Mammals and Nonvascular plants (p value = 1.48186891576e-10)
- Reptiles and Nonvascular plants (p value = 0.0336269831073)

There is **no significant difference** between the following:

- Mammals and Birds (p value = 0.687594809666)
- Amphibians and Birds (p value = 0.175936132496)
- Amphibians and Mammals (p value = 0.127576696932)
- Fishes and Amphibians (p value = 0.817111805783)
- Fishes and Reptiles (p value = 0.740652461591)
- Nonvascular plants and Vascular plants (p value = 0.662341949138)

On the border of being significantly different:

- Reptiles and Birds (p value = 0.0531354223215)
- Fishes and Birds (p value = 0.0766819956906)
- Fishes and Mammals (p value = 0.0561483484489)

Recommendations for conservationists:

- Reptiles are more likely to be endangered than Mammals;
- Nonvascular plants are more likely to be endangered than Mammals;
- Nonvascular plants are more likely to be endangered than Birds;
- Vascular plants are more likely to be endangered than Birds;
- Vascular plants are more likely to be endangered than Reptiles;
- Nonvascular plants are more likely to be endangered than Reptiles.

Although the difference was not significant between the following categories, it was on the border of being significantly different, as follows:

- Reptiles may be more likely to be endangered than Birds;
- Fishes may be more likely to be endangered than Birds;
- Fishes may be more likely to be endangered than Mammals.

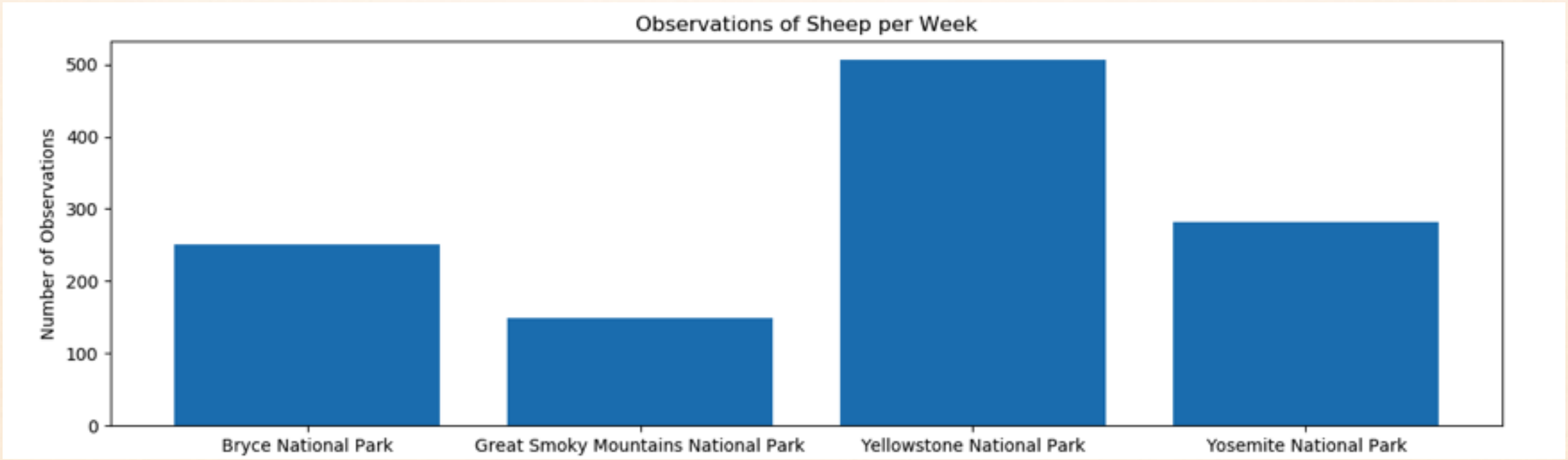
DATA IN OBSERVATIONS.CSV

There are 3 species of sheep sighted across different national parks, as follows:

Category	Scientific name	Common names
Mammal	Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)
Mammal	Ovis canadensis	Bighorn Sheep, Bighorn Sheep
Mammal	Ovis canadensis sierrae	Sierra Nevada Bighorn Sheep

The total number of sheep sightings (across all three species) made at each national park, for a period of 7 days, is the following:

Park name	Observations
Bryce National Park	250
Great Smoky Mountains National Park	149
Yellowstone National Park	507
Yosemite National Park	282



Foot and Mouth Reduction Effort - Sample Size Determination

Given that:

- 15% of sheep at Bryce National Park had foot and mouth disease the previous year,
- Scientists want to test whether or not the program to reduce the rate of foot and mouth disease at Yellowstone National Park is working,
- They want to be able to detect reductions of at least 5 percentage points,
- The default level of significance (90%);

Calculations show that scientists would need to observe a sample of **890 sheep.**

- At Yellowstone National Park, this would take 1.76 weeks (≈12 days),
- At Bryce National Park, this would take 3.56 weeks (≈ 25 days),
- At Yosemite National Park, this would take 3.16 weeks (≈ 22 days),
- At Great Smoky Mountains National Park, this would take 5.97 weeks (≈ 42 days).

Eva Lopes - June 2018