Species Conservation

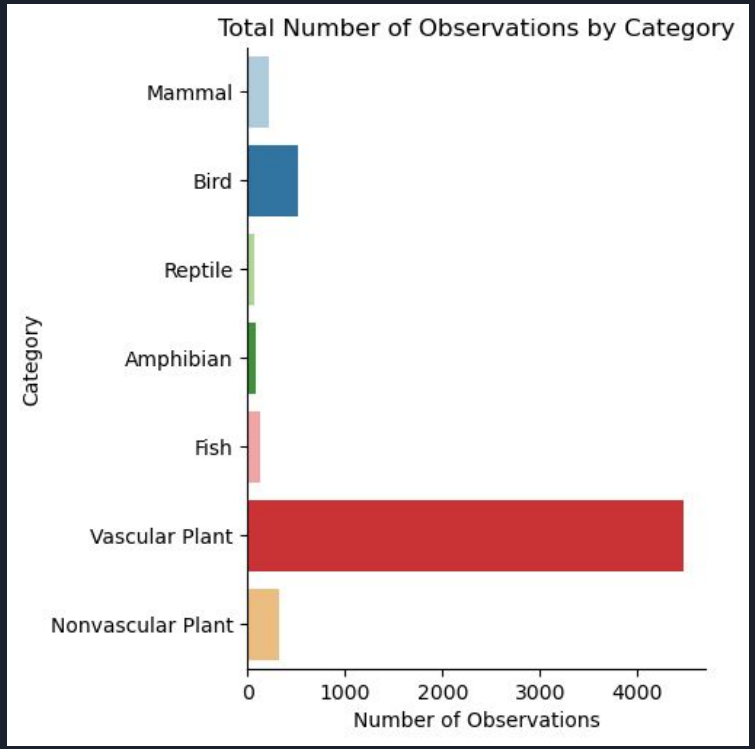
Biodiversity in U.S. National Parks

Biodiversity in National Parks

Our scientists have identified 5541 unique species across our national parks system! This includes 78 unique reptile species, 79 amphibians, 125 fish, 176 mammals, 333 nonvascular plants, 521 birds, and 4262 vascular plants.

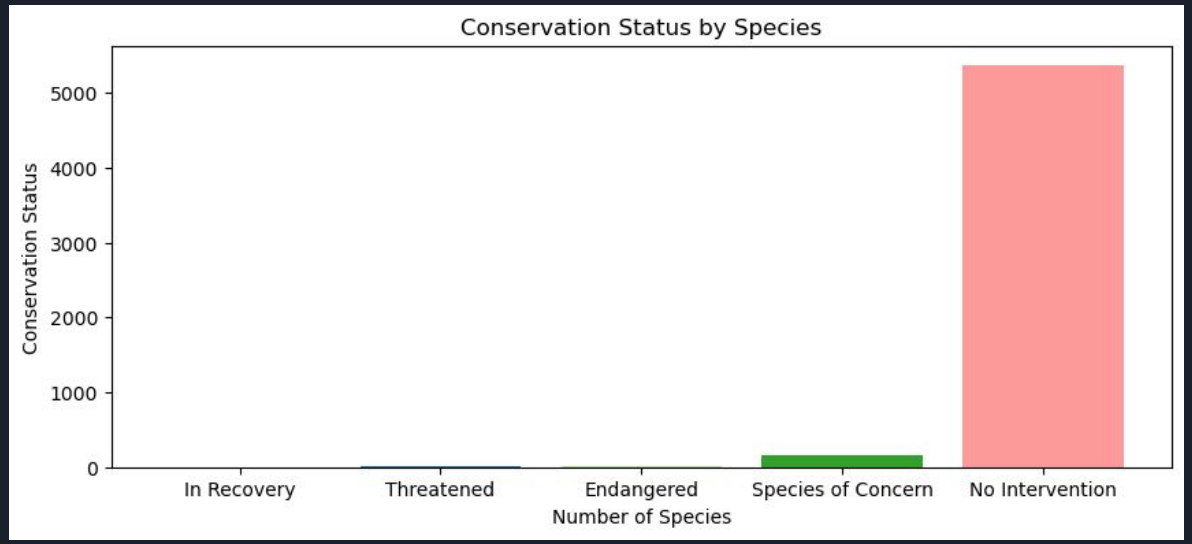
A breakdown of the total observations by category is shown to the right.

Species have been categorized by conservation status as either No Intervention, Species of Concern, Threatened, Endangered, or In Recovery.



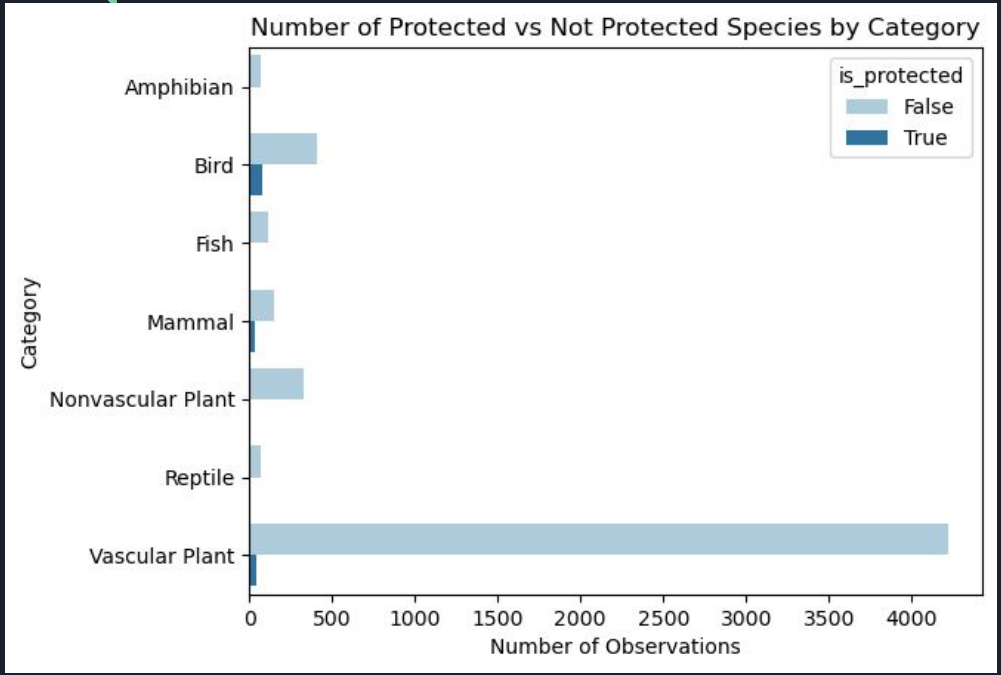
Conservation Status

The majority of species observed require no special intervention. However, there are some Species of Concern and a few that are Endangered, Threatened, or In Recovery.



conservation_status	
Endangered	16
In Recovery	4
No Intervention	5633
Species of Concern	161
Threatened	10

Breakdown of Protected vs Not Protected Species

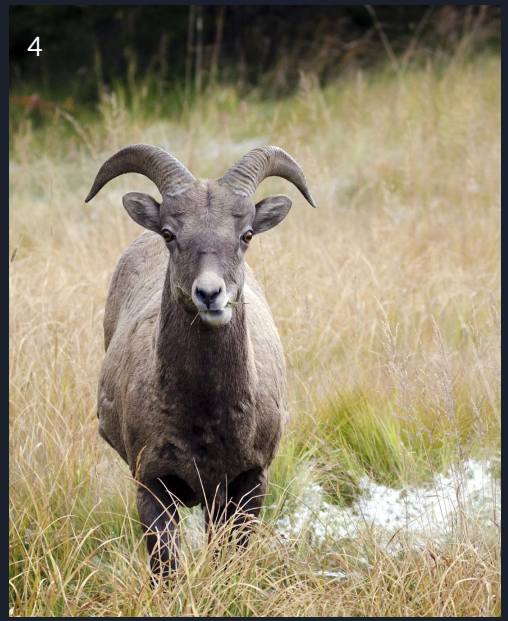


This bar graph shows the number of observations that fall under a protected status compared to observations that are not protected.

The largest contributing group here is the vascular plants which are not protected.

We can see that the highest number of observations with a protected status were birds.

Specific Application: A Program to Reduce occurrence of Foot and Mouth Disease in Sheep



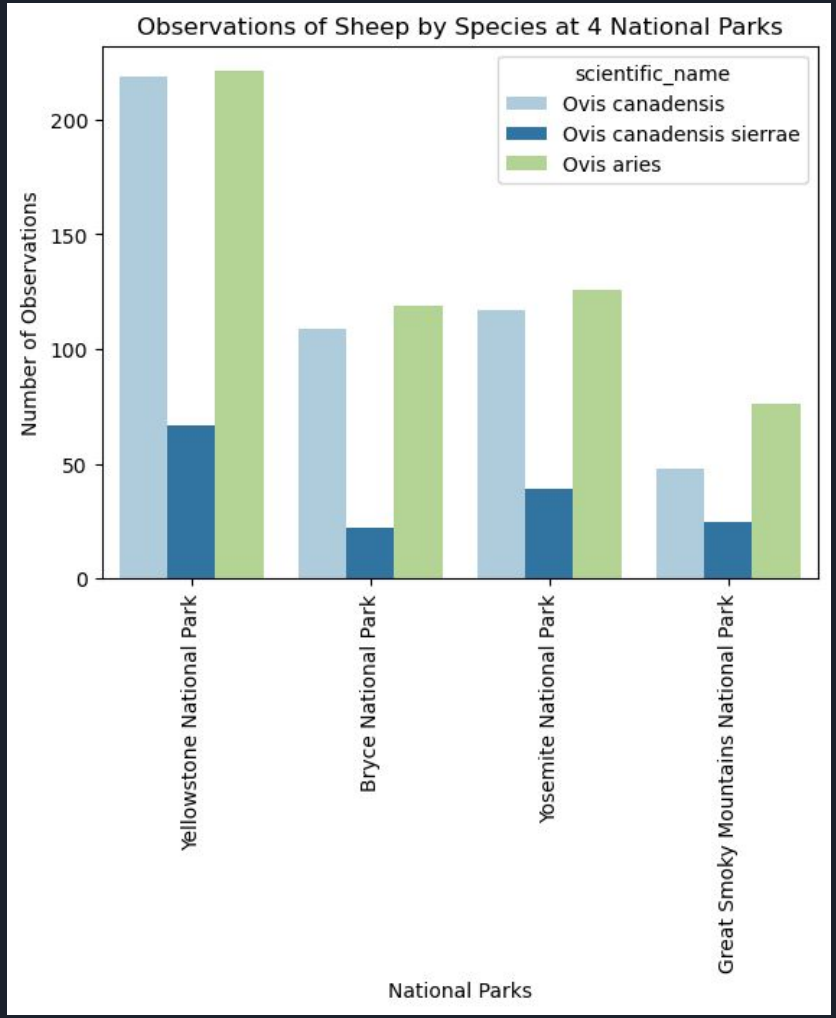
- Let's look at a more specific application of this type of data set.
- Yellowstone National Park runs a program to reduce occurrence of Foot and Mouth Disease among local sheep, which may be of great benefit to other parks programs. The team at Bryce National Park report that 15% of sheep in their park have Foot and Mouth Disease. We hypothesize that the program at Yellowstone would be useful to the team at Bryce National Park.
- To confirm effectiveness of the Yellowstone program before implementation at other National Parks, we want to find out whether the sheep at Yellowstone National Park have at least 5% less occurrences of Foot and Mouth Disease than sheep at our other parks. In the next slides we will determine what sample size is needed to answer our question.

Specific Application: An example with sheep

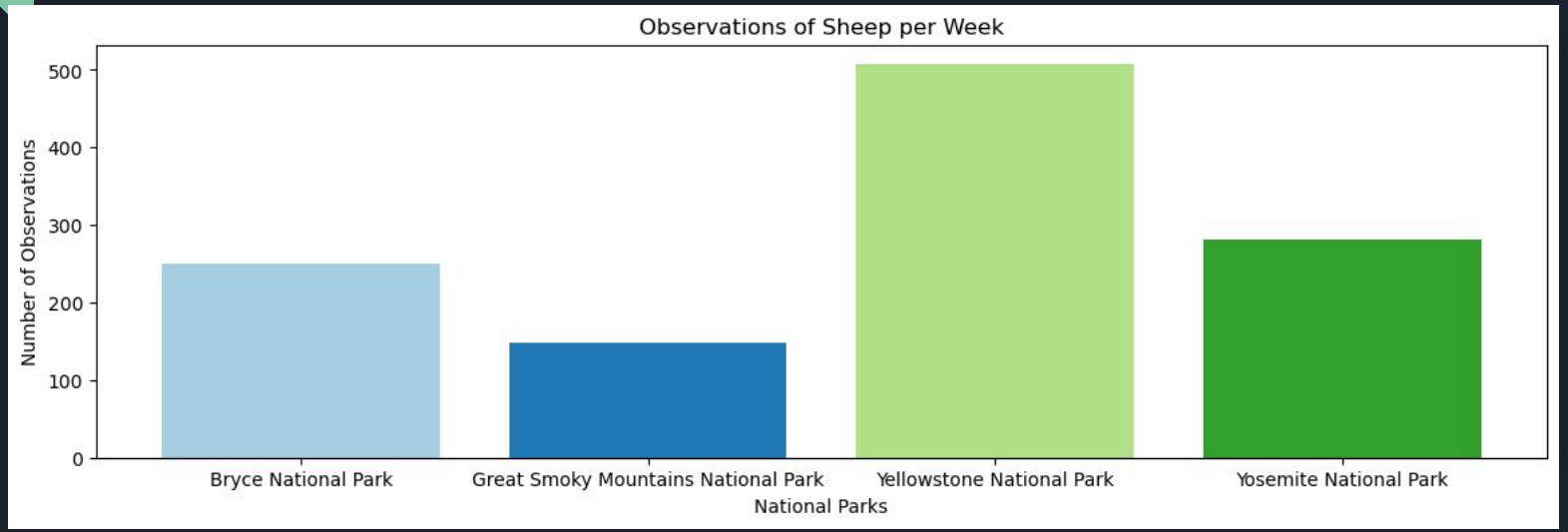
Our scientists have been observing sheep in our national parks for the past 7 days. They have observed three species: *Ovis aries*, *Ovis canadensis*, and *Ovis canadensis sierrae*.

To the right, we can see the number of observations by species at 4 National Parks. We can see that the most observations occurred at Yellowstone National Park.

We can see that *Ovis canadensis sierrae* has less observations across the board. We know that this species, also called the Sierra Nevada Bighorn Sheep, is on the Endangered Species list.



Observations Over 7 Days



Here we can see the total number of observations of sheep logged by our scientists over a 7 day period.

park_name	observations
Bryce National Park	250
Great Smoky Mountains National Park	149
Yellowstone National Park	507
Yosemite National Park	282

Calculate Necessary Sample Size

We know that 15% of sheep observed at Bryce National Park have Foot and Mouth Disease. Therefore, our baseline conversion rate is 15%, or 0.15.

We want to find out whether sheep observed at Yellowstone National Park have at least 5% less occurrences of Foot and Mouth Disease. Our minimum detectable effect will be 5% divided by the baseline conversion rate of 15%. (See below).

```
minimum_detectable_effect = 100 * 0.05 / 0.15
```

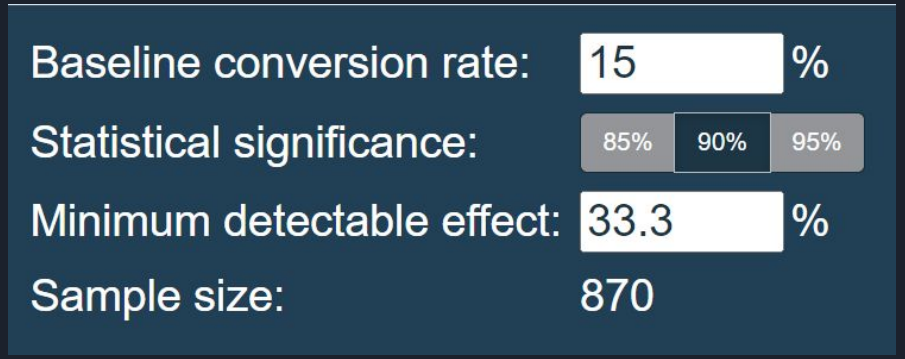
Using the Sample Size Calculator

We use the Codecademy sample size calculator and find that, to get at least 90% level of significance, we will need a sample size of 870 sheep.

We can then divide our needed sample size by the number of sheep observed weekly at each park. This gives us the number of weeks of observation required to obtain the needed sample size:

We should observe the sheep for 3.48 weeks at Bryce National Park.

We should observe the sheep for 1.72 weeks at Yellowstone National Park.




```
sample_size = 870
bryce = sample_size / 250.
yellowstone = sample_size / 507.
```

All content is based on the Biodiversity in National Parks project from Codecademy.com, and its associated data sets. These are not real data sets.

Codecademy Sample Size Calculator:
https://s3.amazonaws.com/codecademy-content/courses/learn-hypothesis-testing/a_b_sample_size/index.html

All photographs used in this project can be found on Wikimedia Commons:

1. By © Francis C. Franklin / CC-BY-SA-3.0, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=31025358
2. By Chris_huh - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=1337184
3. By Lestat (Jan Mehlich) - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=2276470
4. By Jakub Fryš - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=77635528