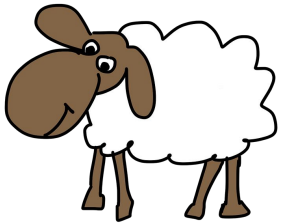
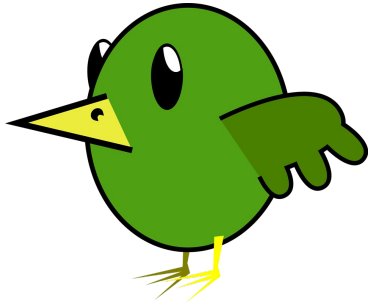
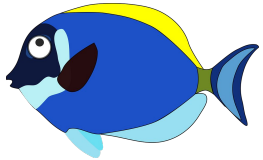
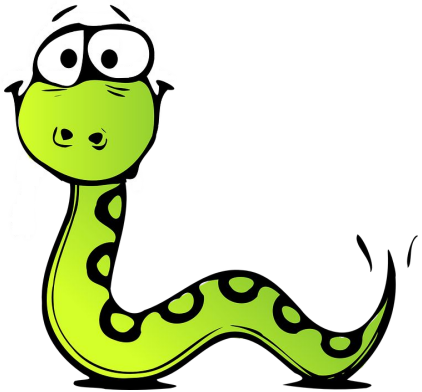


Biodiversity in US National Parks

Submitted by Natalie Blumen







Introduction

Park Ranger, John here and I would like to welcome you to our National Parks!

We here at the parks do a lot of data mining to keep track of our wonderful species and to pay extra attention to those that are At-Risk or Endangered and those that have diseases.

Biodiversity Data

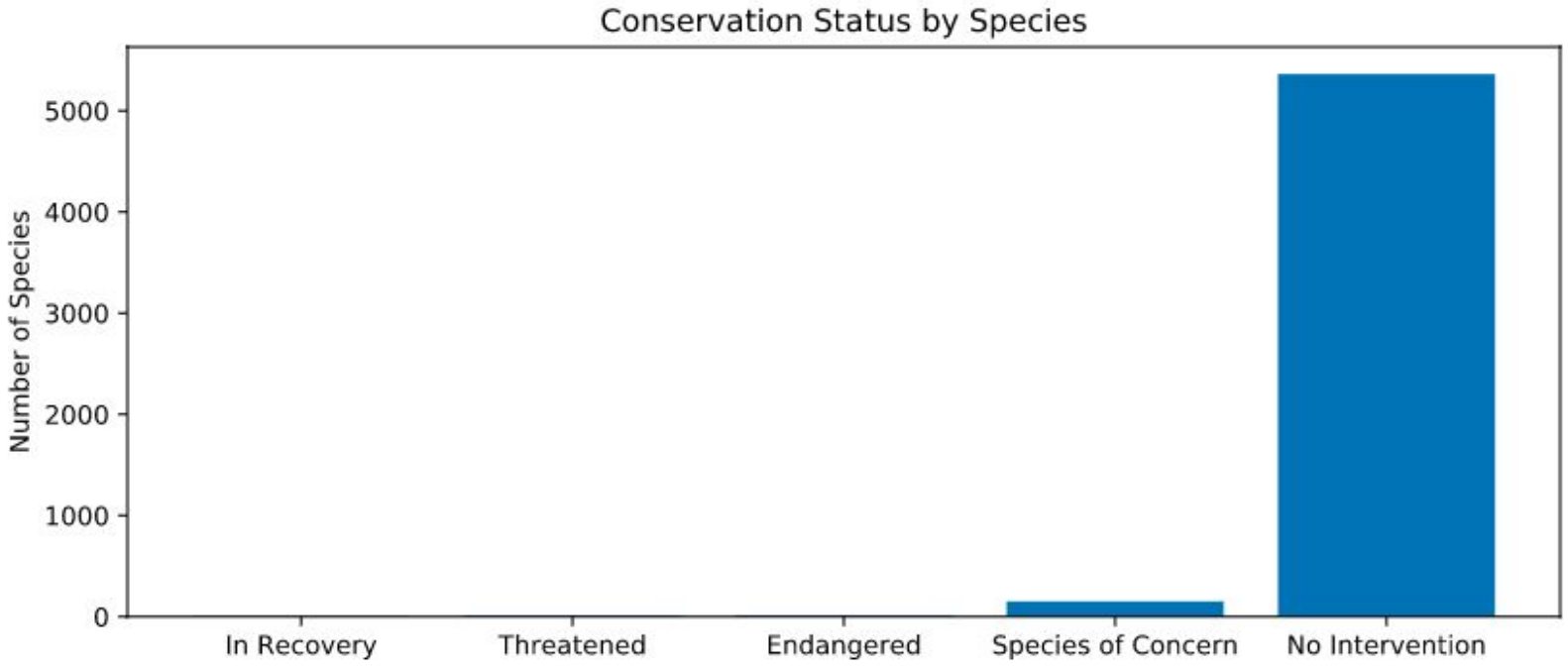
One very important data set we manage includes all of the different species in our National Parks. We manage Conservation Status information for each of our species. This lets us know which ones at risk and are Protected or thriving and Not Protected.

Conservation Status

Luckily, the most recent view of the data shows that the majority of the species require No Intervention, but as Park Rangers and conservationists, we need to dig deeper on the ones that do require intervention!

STATUS	# of SPECIES
Endangered	15
In Recovery	4
No Intervention	5363
Species of Concern	151
Threatened	10

Conservation Status



Percentage of Protect Species by Category

Park Ranger John, it appears that many of the categories of species have high percentage of Protected species. Are different categories of species more at risk? Like Mammals, Birds, or Reptiles?

CATEGORY	NOT PROTECTED	PROTECTED	% PROTECTED
Amphibian	72	7	8.8
Bird	413	75	15.3
Fish	115	11	8.7
Mammal	146	30	17.0
Nonvascular Plant	328	5	1.5
Reptile	73	5	6.4
Vascular Plant	4216	46	1.0

Is there a significant difference between categories?

Great question!
Not only do we collect data but we also perform Hypothesis Tests on the data. Using a Chi-Square test, we can determine whether there is a significant difference between the categories.

Using a Chi-Square test, if the p-value is less than 0.05, we can stay that there is a significant difference between the categories.

Comparing Mammals with Birds resulted in a **p-value of 0.687**, so we can conclude that the difference is only by chance.
Comparing Mammals with Reptiles resulted in a **p-value of 0.038,** so we can conclude that the difference is significantly different.

Recommendation for Conservationists

Our recommendation for other Park Rangers and Conservationists is that certain categories of species are MORE likely to be at risk of having protected species than other categories of species. Let's focus on these protected species and get them recovered!

Foot & Mouth Disease in the National Parks

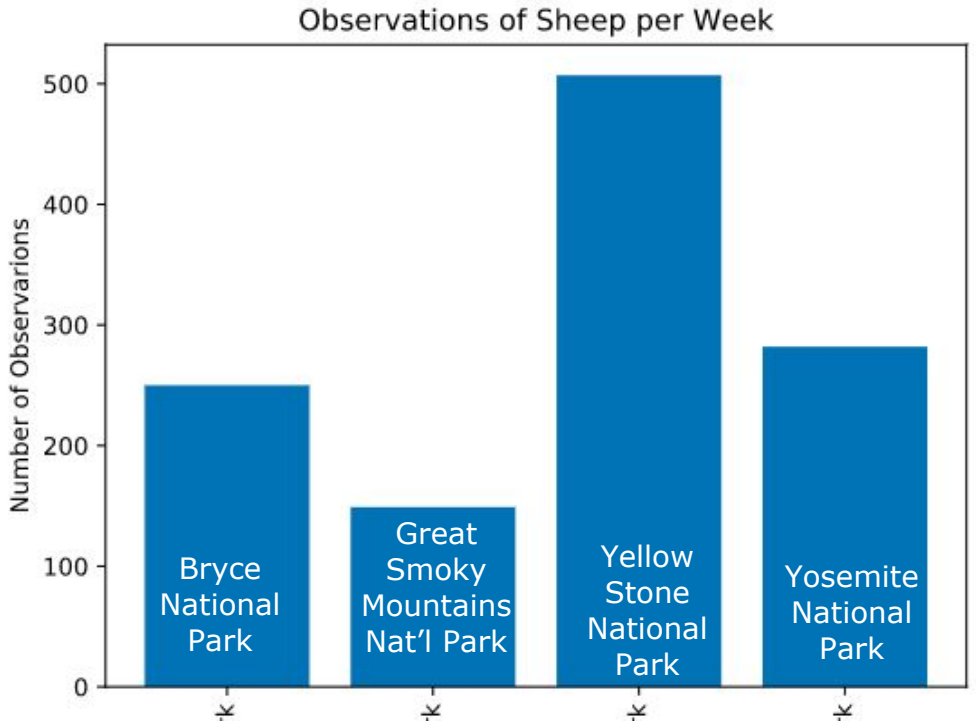
Is it true that 15% of the Sheep at Bryce National Park have Foot and Mouth Disease. How are you trying to reduce this at Bryce National Park and some of the other parks?

Foot & Mouth Disease in the National Parks

Yes, 15% of the Sheep at Bryce National Park have Foot and Mouth Disease. We at the Parks Department have been observing the Ovis aries, Ovis canadensis, and Ovis canadensis sierrae (Sheep) at four National Parks (Bryce National Park, Great Smoky Mountains National Park, Yellowstone National Park and Yosemite National Park). Our goal is to reduce the overall number of cases by 5%

Observations of Sheep by Nat'l Park

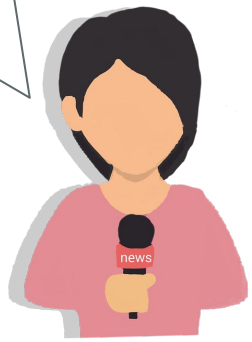
The Park Rangers at the four National Parks have started by observing sheep weekly at each park. The following graph shows the total number of observations each week.



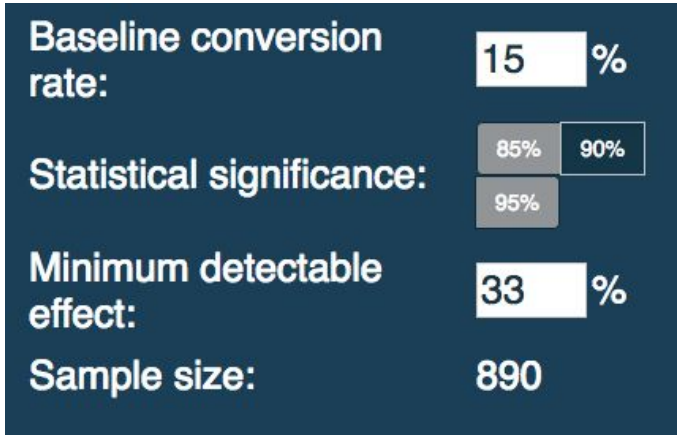
Observations of Sheep by Nat'l Park

How many observations do you need in order to determine whether your testing accurately portrays the population size?

Have you studied Statistics? Great question!



Sample Size Determination



PARK NAME	WEEKLY OBSERVATIONS	WEEKS TO COLLECT DATA
Yellowstone National Park	250	1.75
Bryce National Park	149	3.56
Great Smoky Mountains National Park	507	5.97
Yosemite National Park	282	3.15

Based on the Sample Size Calculator where the baseline conversion rate is 15% and the minimum detectable effect is 33%, we need to observe 890 sheep at each park.

Conclusion

Based on the current observation rates, this will take between 1-6 weeks to complete at the 4 National Parks. After that time we will have a clear understanding to how many Sheep are affected by the Foot and Mouth Disease, and we will be able to start treatments to make 5% reductions of the disease among the population of Sheet. Thank you for your time and your support of the National Parks!