AN ANALYSIS OF NATIONAL PARK CONSERVATION & DISEASE PREVENTION

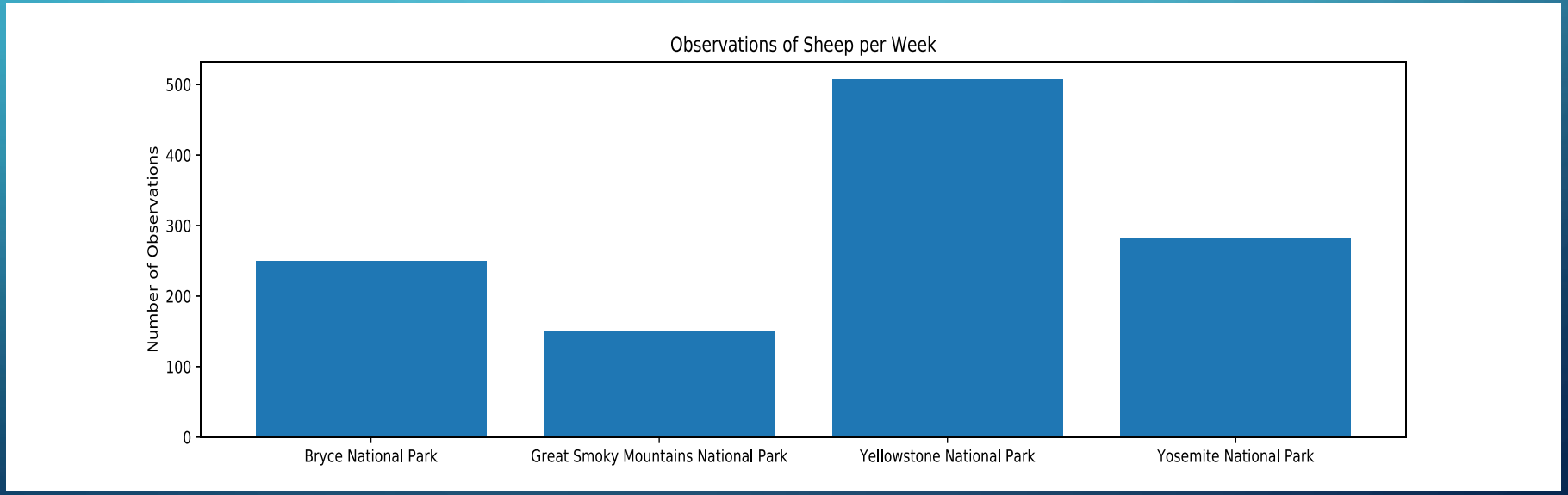
STATISTICAL INSIGHTS ON CONSERVATION EFFORTS IN NATIONAL PARKS

REDUCING FOOT AND MOUTH DISEASE IN SHEEP AT YELLOWSTONE

- As a part of Yellowstone National Park's effort to reduce Foot and Mouth Disease, data collected from Bryce National Park was utilized to determine a sample size that would adequately demonstrate that Yellowstone's program is significantly reducing the number of infections in the park.
- Effectiveness of the program is gauged by a reduction of 5% of infections or more. From the Bryce National Park data, 15% of observed sheep had the disease. Therefore, the program is targeting a minimum detectable effect of 33%.
- Using a 90% level of significance, the appropriate sample size to undertake this study would be 890 observations, but how long would sample collection take?

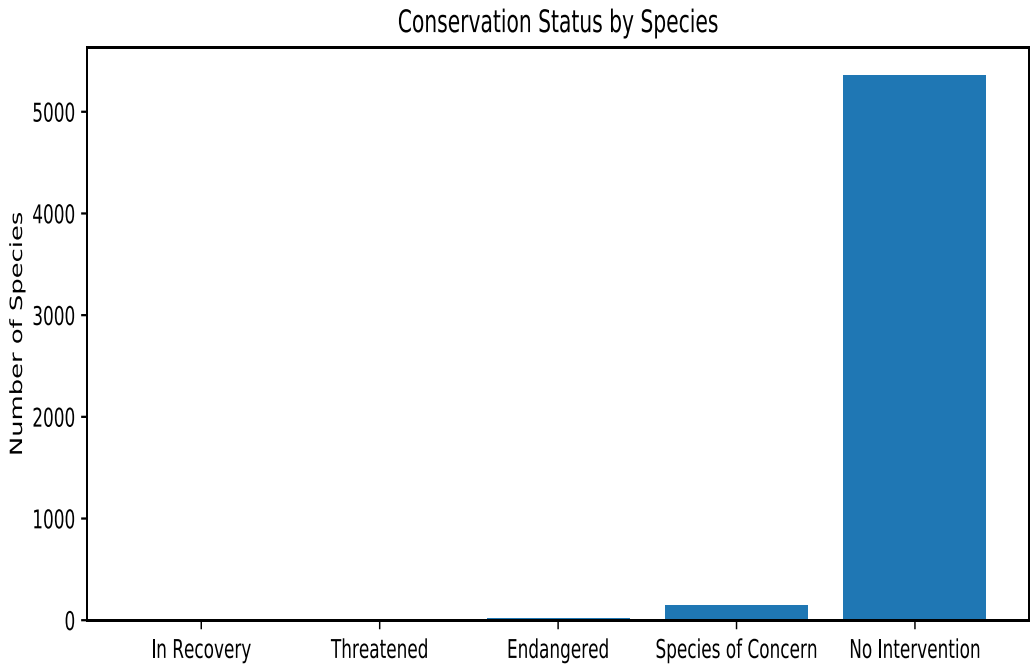
SAMPLE SIZE SELECTION

- Per the graph below, it'd take approximately 2 weeks to collect a sufficient sample size for this study.
- Fortunately, from available data, Yellowstone has the highest amount of sheep observations per week within the National Park Service!



CONSERVATION DESIGNATIONS

- That vast majority of species are not designated to receive protection, less than 5% are protected in some capacity.
- The majority of that 5% of species are designated Species of Concern, the lowest level of initial protection designations.
- 17% of mammals and 15% of birds receive a protected designation, no other species type has more than 8% of its species protected. But were these findings statistically significant?



STATISTICAL INSIGHTS

A chi-squared distribution tests using a 95% confidence level showed a statistically significant difference in the number of protection status designations between several species types:

- Reptiles and Mammals
- Amphibians and Mammals
- Amphibians and Birds
- Vascular Plants and Mammals
- Non-Vascular Plants and Mammals

What recommendations can be made from these findings?

RECOMMENDATIONS FOR CONSERVATIONISTS:

- Working towards conservation of species within the National Park System goes beyond increasing the total number of protected species.
- The discrepancy of protected status between certain species types indicates need for further study.
- Studies should focus on:
  1. If protecting certain species types over others creates population imbalances within an ecosystem.
  2. If the failure to protect certain species has negative externalities on protected species within the same ecosystem.
  3. Why certain species types have a higher propensity to be protected over others.