Endangered Species and Sheep in National Parks

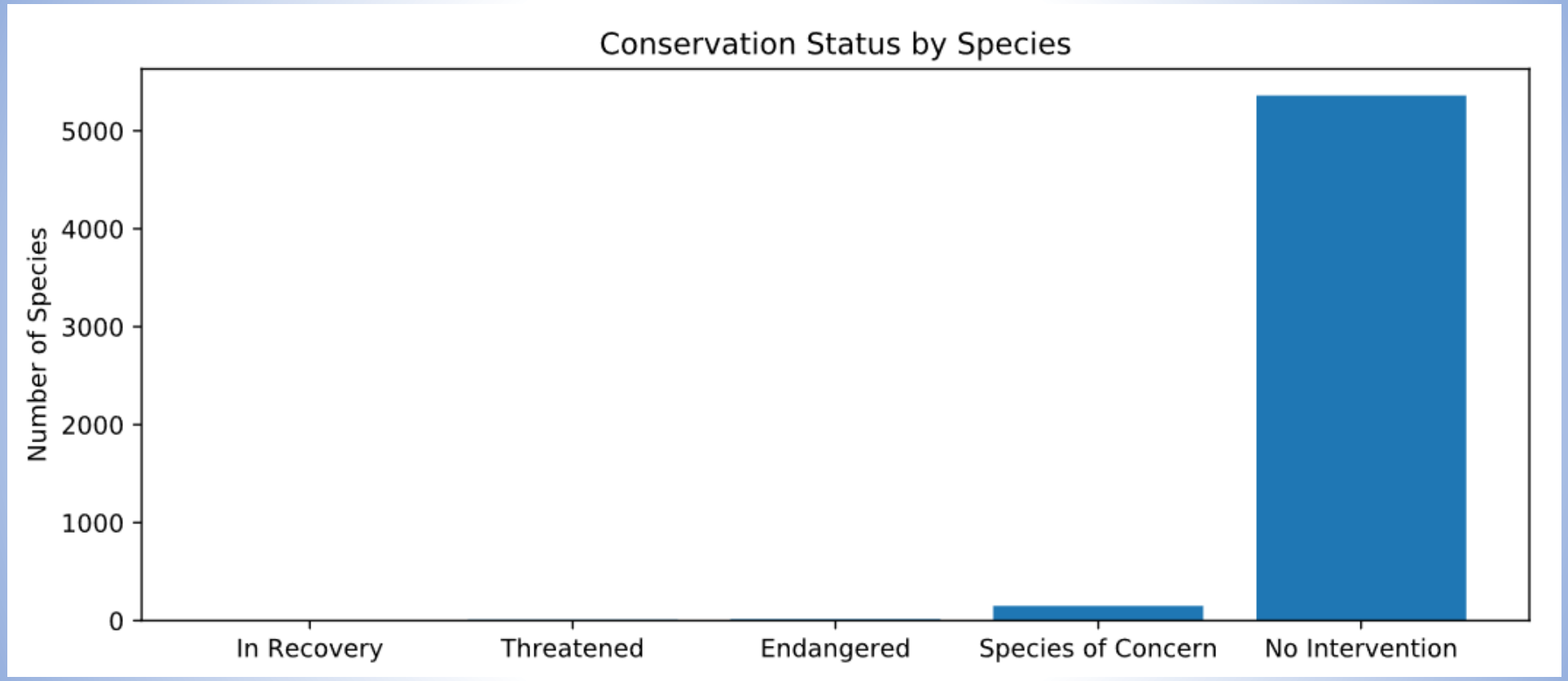
Can we reduce the rate of foot and mouth disease in our parks?

By Greg Goren

Conservation Status

- While reviewing the data provided from the National Parks Service, we discovered that out of 5,543 different species in the parks, there are currently 15 endangered species. Furthermore, there are 151 species with “species of concern” status, 10 with “threatened” status, and 4 with “in recovery” status.
  - Endangered indicates the species is seriously at risk of extinction.
  - Species of concern indicates the species has a declining population or appears to be in need of conservation.
  - Threatened indicates the species is vulnerable to endangerment in the near future.
  - In recovery indicates the species was formerly Endangered, however is not currently in danger of extinction.

Let’s Visualize The Data!



Which Types Of Species Are More Likely To Be Endangered?

- The data consisted of 7 different types of species: amphibians, birds, fish, mammals, reptiles, vascular plants, and nonvascular plants.
- The data was used to compare the protected and non-protected portions of each species and assign percentages of being protected.
- Overall, birds and mammals were approximately 15.37% and 17.05% protected, respectively.
- However, it is possible that the difference between birds and mammals was due to chance. This is our null hypothesis.

Are Certain Types of Species More Likely To Be Endangered?

- Running a chi-squared test between mammals and birds determined a p-value of 0.688, or 68.8%.
- This indicates that the difference between mammals and birds is not significant. Mammals are not more likely to be endangered than birds.
- To run a comparison, a chi-squared test between mammals and reptiles determined a p-value of 0.038, or 3.8%.
- This indicates that the difference between mammals and reptiles is significant. Mammals are more likely to be endangered than reptiles.

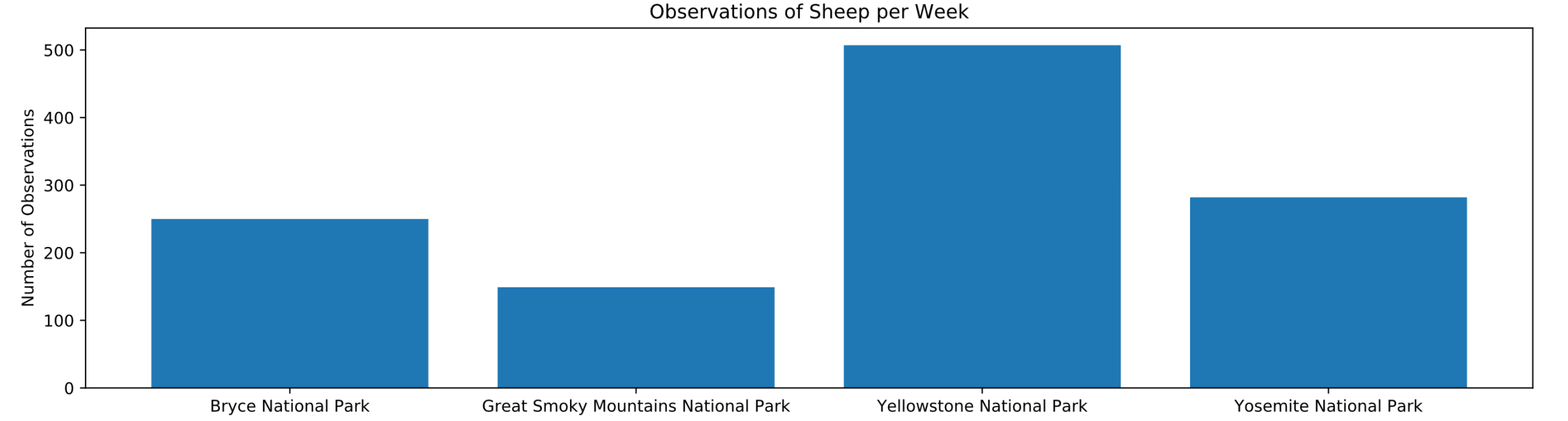
Thoughts On Endangered Species

- We have determined that certain types of species are more likely to be endangered than other types.
- While all species are important to maintain the National Parks, mammals and birds are suffering the most.
- I recommend that conservationists focus on improving conditions in the parks suitable for these species.
- Furthermore, they should monitor status of the species to confirm improvements are helping to reduce the endangered status.

Sheep In National Parks

- We were provided 7 days worth of data that recorded sightings of different species at several National Parks.
- While reviewing the data, we concluded there are 3 species of sheep mammals (Ovis Aries, Ovis Canadensis, and Ovis Canadensis Sierrae) in 4 of the National Parks.
- The Ovis Aries was determined to not be a protected species of sheep (no intervention in conservation), however the Ovis Canadensis (species of concern) and Ovis Canadensis Sierrae (endangered) are protected species.
- Bryce National Park had 250 sheep observations, Great Smoky Mountains National Park had 149 sheep observations, Yellowstone National Park had 507 sheep observations, and Yosemite National Park had 282 sheep observations.

Let’s Visualize The Data!



Foot And Mouth Disease In Sheep

- Rangers in the National Parks are running programs to reduce the rate of foot and mouth disease among sheep.
- Scientists wanting to test if the program is working, would like to be able to detect reductions of 5%.
- Last year, Bryce National Park has a recording of 15% sheep had foot and mouth disease. We'll use 15% as our baseline.
- A 5% reduction is one-third of the 15% baseline, therefore out minimum detectable effect is 33.33%.
- Ideally the calculation will have a 90% level of significance.

Foot And Mouth Disease In Sheep (pt 2)

- By entering the baseline, minimum detectable effect, and level of significance into a sample size calculator, we determine that the appropriate sample size is 510 observations of sheep.
- The recorded observations for Yellowstone National Park in the last week was 507. Therefore it would take just over 1 week to obtain the proper sample.
- The recorded observations for Bryce National Park in the last week was 250. Therefore it would take just over 2 weeks to obtain the proper sample.

Fin!