


BIODIVERSITY FOR THE NATIONAL PARKS

Capstone Project 2

04/11/18

OBJECTIVES

- ▶ Perform data analysis on the conservation status of species found in a number of different national parks.
 - ▶ Identify whether or not certain species are more likely to become endangered.
 - ▶ Provide a sample size determination for scientists studying foot and mouth disease in different national parks.
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- A series of three parallel white lines of varying lengths, slanted upwards from left to right, located in the bottom right corner of the slide.

OBSERVATIONS FROM DATA

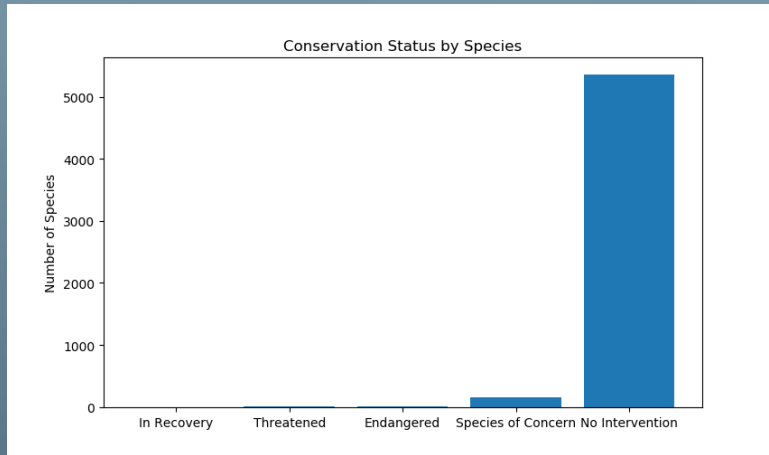


Fig. 1

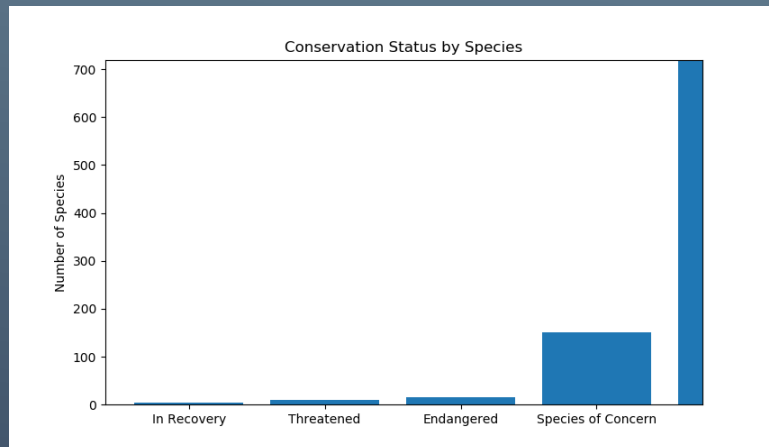


Fig. 2

- ▶ The species_info.csv file contains information on 5,541 different species.
- ▶ The different categories of species are: Amphibians, Birds, Fish, Mammals, Nonvascular Plants, Reptiles and Vascular Plants.
- ▶ Each species falls into one conservation category which is either: No Intervention, Species of Concern, Endangered, Threatened, or In Recovery.
- ▶ Fig. 1 and Fig. 2 are bar charts showing the total number of species that fall into each conservation category.

RESULTS FROM STATISTICAL ANALYSIS

	category	not_protected	protected	percent_protected
0	Amphibian	72	7	0.088608
1	Bird	413	75	0.153689
2	Fish	115	11	0.087302
3	Mammal	146	30	0.170455
4	Nonvascular Plant	328	5	0.015015
5	Reptile	73	5	0.064103
6	Vascular Plant	4216	46	0.010793

Fig. 3

- ▶ Fig. 3 shows the breakdown of the protected status of all the different species, grouped by category.
- ▶ χ^2 is appropriate here as each category contains multiple sets of categorical data.
- ▶ Performing a χ^2 test on Mammal and Bird results in a p-value of 0.69 – insignificant (a result of chance).
- ▶ Performing a χ^2 test on Mammal and Reptile gives a p-value of 0.04 – this is a significant result!

RECOMMENDATIONS

- ▶ A p-value of 0.04 means that there is a significant difference in the endangered status between reptiles and mammals. This means that some species are more likely to be endangered than others.
- ▶ Since Mammals have been shown to be at greater risk than other species groups action should be taken to ensure their conservation.
- ▶ As the difference in protected status between Birds and Mammals is statistically insignificant, Birds are at as much risk of being endangered as Mammals and action should be taken to protect them as well.

SAMPLE SIZE DETERMINATION

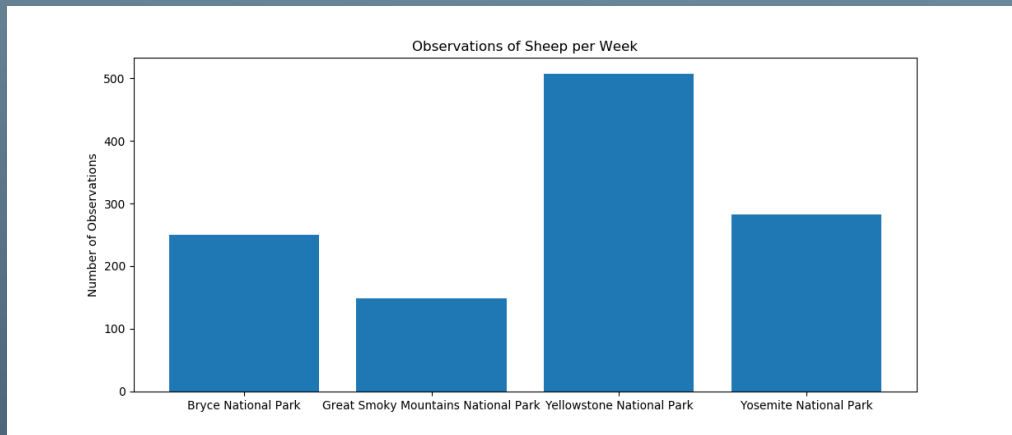


Fig. 4

- ▶ Fig. 4 is a bar plot of 'Observations of Sheep per Week' for a number of different national parks.
- ▶ Given that the Baseline Conversion Rate is 15% and that scientists want to be able to detect a 5% reduction in Foot & Mouth, the Minimum Detectable Difference is: $100 * (5 / 15) = 33.33\%$
- ▶ With a 90% level of Statistical Significance the minimum number of sheep that need to be observed is 510.
- ▶ This means that the required observation period is 1 week for Bryce National Park and 2 weeks for Yellowstone.

**THANK
YOU**