Biodiversity Solutions for National Parks

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Species Info Datasheet

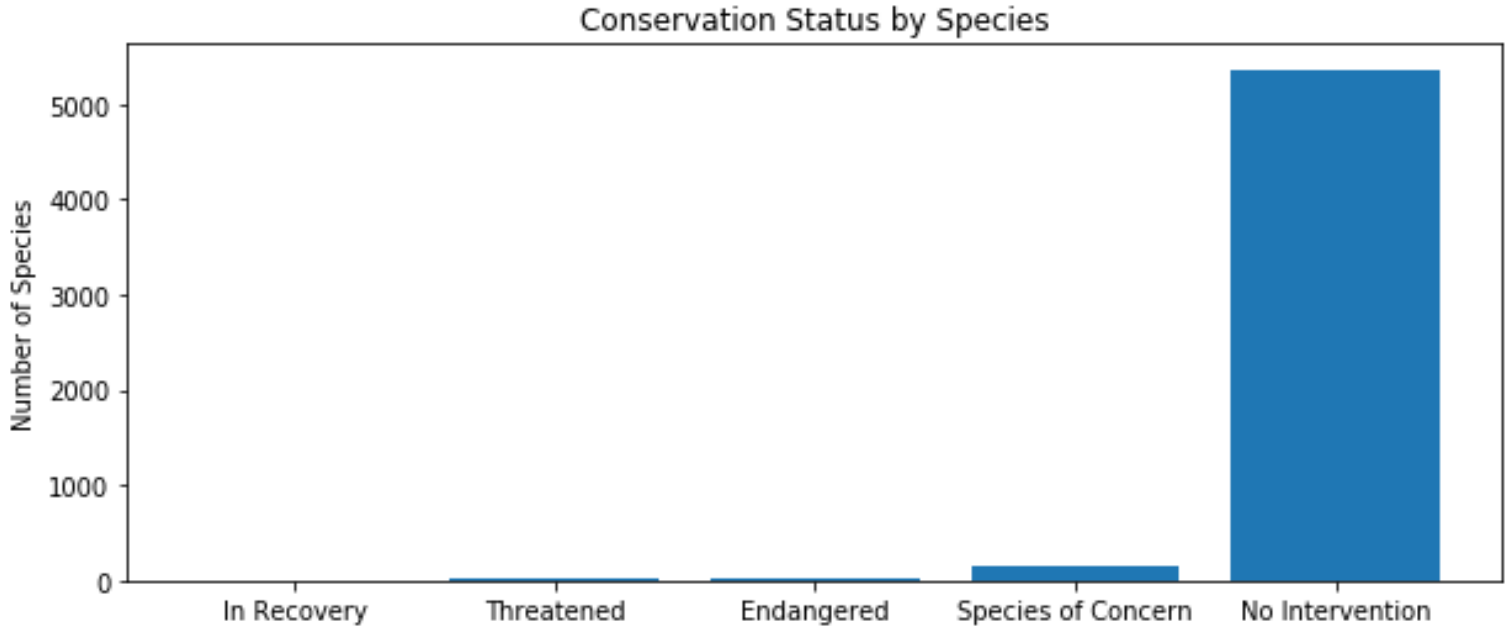
- Working with a large dataset seamlessly within a python environment helps to highlight the power and capabilities of using python over some software applications that would struggle to handle large datasets. There is over 5500 species of varying wildlife with various categories and conservation status coupled with the 23,000+ observations logged in the observations excel.
- There is 7 distinct category values within the dataset along with 5 values for conservation status.
- Analysis of the species showed that just over 3% of the species were listed as ‘species of concern’. However under step 4 it was noted that anomaly may exist were 2 species were listed as ‘no intervention’.
- After generating the pivot table in Step 4 it was noted in terms of percentage that more mammals were valued as is protected but in terms of raw data birds were the highest value. This highlighted the importance of analysing data closely as the raw data may be misleading at times. The difference between the two categories was minimal as highlighted by the chi square test that was carried out.

Species Info Datasheet cont.

- Sheep sightings were the focus in Step 6. Findings indicated the sightings of sheep over the course of 7 days at the various National Parks. Comparisons were done between protected species and non-protected species of sheep. Yellowstone had the highest amount of sightings with all three sheep species being sighted at all parks.
- The last exercise was to help the park rangers in the efforts to decrease the risk/spread of foot and mouth disease within the sheep population. The minimum detectable effect calculation was carried out. The calculation helps predict how much observation is needed on the sheep to help track foot and mouth at the parks .

Significant Calculations

- The graph image here shows that most species do not need any intervention at present.



Significant Calculations cont.

- Whilst the overall percentage values of protected species is quite small each category type has some protected species within them thus highlighting that the parks have considerable work ahead to protect the species. The chi square test highlighted that there is significance between only the reptils and mammals as such.

	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

Conservations Recommendations

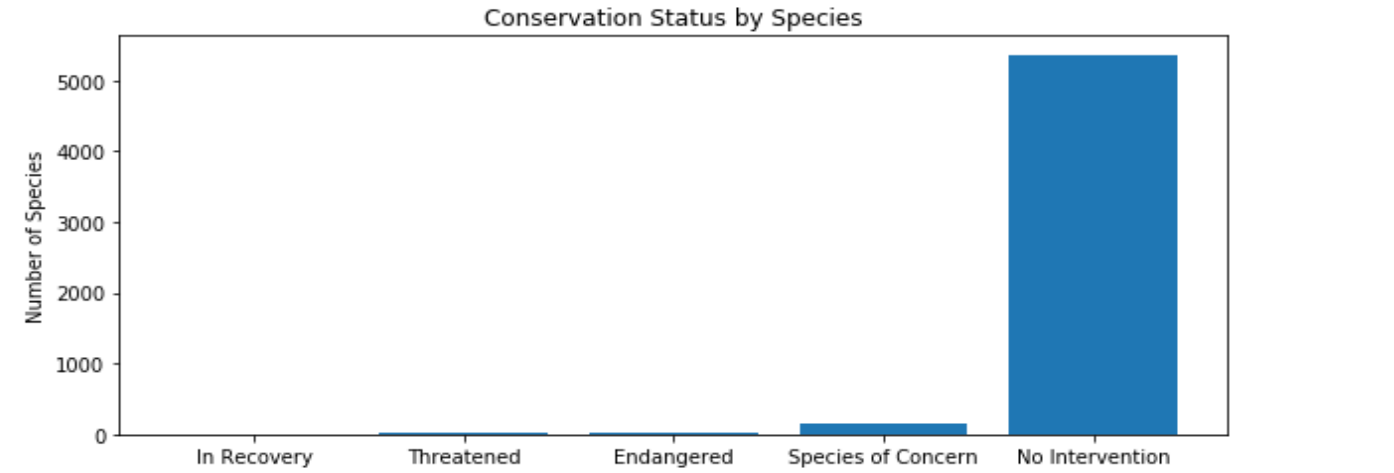
- Based on the tests for significance mammals and birds are the categories to be highlighted. They both stress the need for protection in terms of raw data and also in percentages. The chi square test does indicate not much difference between them.
- Whilst all the categories within the raw data show that there is some species that need protection reptiles have been highlighted as not needing much if any conservation based on the criteria mentioned above.

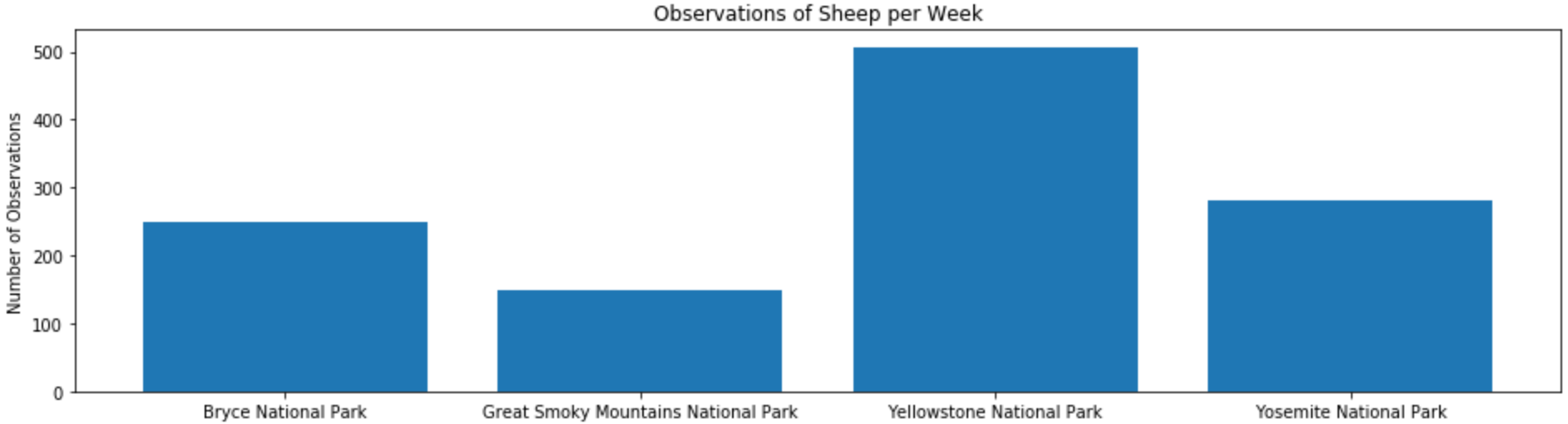
Sample Size Determination Study

A Sample Size determination test was carried on sightings across the National Parks to assist the park rangers in combatting foot and mouth disease.

1. Step 1 was to extract from the data which species were sheep and mammals not just having sheep in their common name value. A lambda function was created that removed any data rows from the data frame that not satisfy the conditions of name including sheep and category – mammal.
2. A group by function was used to break down the sightings by National Park and also by species of sheep.
3. A bar graph was used to help visualize the data better for the park rangers.
4. Finally the amount of time required to observe foot and mouth affected sheep in Yellowstone National Park was calculated using the Minimum Detectable Effect, this indicated that 1 week is needed.

Graphs


Conservation Status by Species
Number of Species
5000
4000
3000
2000
1000
0
In Recovery
Threatened
Endangered
Species of Concern
No Intervention


Observations of Sheep per Week
Number of Observations
500
400
300
200
100
0
Bryce National Park
Great Smoky Mountains National Park
Yellowstone National Park
Yosemite National Park