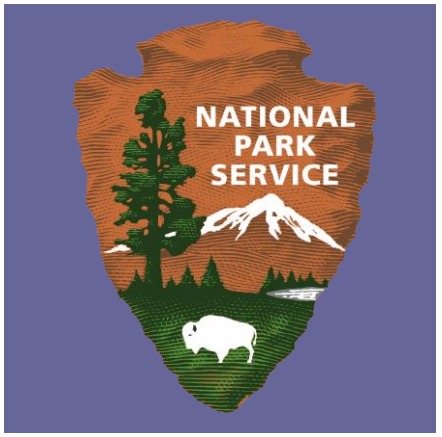


Biodiversity in the US National Parks

A data analysis project by
Samantha Kearley

Species within the US National Parks

- The following study was undertaken to capture data regarding species-variance and protection-status of flora and fauna across the US National Parks.
- The data captured comprised a list of 5824 distinct species, within the specie-categories of 'Mammal', 'Bird', 'Reptile', 'Amphibian', 'Fish', 'Vascular Plant' and 'Non-vascular plant'.
- The data also displayed the distinct conservation-status of 'No Intervention', 'Endangered', 'In Recovery', Species of Concern' and 'Threatened'

Significance testing

- Beneath is a pivot table demonstrating the percentage of a species-category that have a protected status:

	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

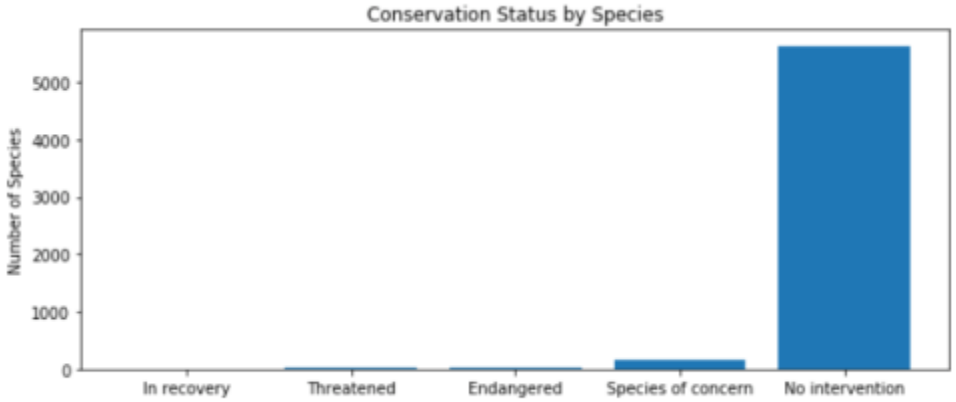
- Undertaking significance testing on the table above, using a chi square test, it became apparent that Mammals were statistically more likely to have a protected status than Reptiles. However Mammals were not significantly more likely to have a protected status than Birds (the two categories with the highest percentage of protected species).

- Based on this analysis, I would recommend that conservation focus is placed equally on protected animals within the 'Bird' and 'Mammal' categories.

Instances of Foot & Mouth disease amongst sheep within the National Parks

- The rate of Foot & Mouth disease amongst the sheep within the National Parks is 15%. There is currently a reduction program being undertaken
- It is necessary to assess the current reduction program. In order to undertake this assessment, it was necessary to determine an appropriate sample size.
- Using a baseline conversion rate of 15%, a minimum detectable effect of 33.3% and a statistical significance of 90%, the sample size was determined to be 510 sheep reviewed per park.
- Using the current rate of sheep observation, observing 510 sheep in each park will take the following amount of time:
  - Bryce – 2.04 weeks
  - Great Smoky Mountains – 3.42 weeks
  - Yellowstone – 1.01 weeks
  - Yosemite – 1.80 weeks

Conservation status by Species



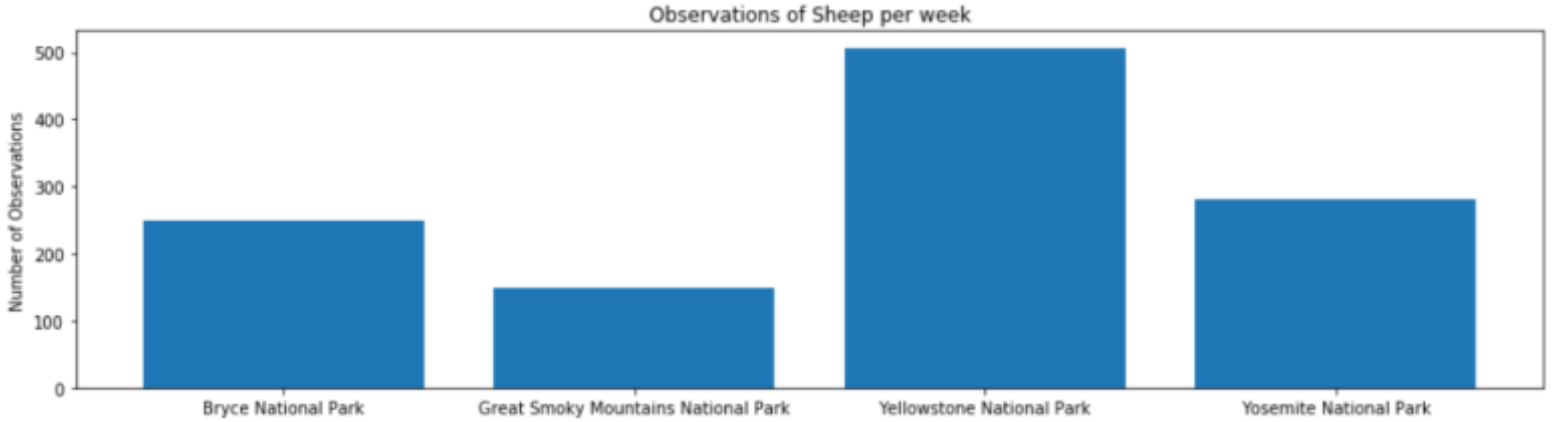
- Each specie within the dataframe had a value based on their conservation status. These were defined as the following:
  - Endangered – seriously at risk of extinction
  - Threatened – vulnerable to endangerment in the near future
  - Species of concern – declining, or appear to be in need of conservation
  - In recovery – formerly Endangered, but currently neither in danger of extinction throughout all or a significant portion of its range
  - No intervention – No conservation required

- The bar chart above demonstrates that the majority of species (5363 out of 5824 – 92%) are classed as 'No intervention'.

- The remaining category percentage distributions were as follows:
  - Endangered – (15 out of 5824) – 0.25%
  - Threatened – (10 out of 5824) – 0.17%
  - Species of concern – (151 out of 5824) – 2.5%
  - In recovery – (4 out of 5824) – 0.06%

- This shows that the majority of species do not require focused conservation.

Observations of sheep within the National Parks



- Conservationists observed the number of sightings of different species throughout four National Parks (Yellowstone, Yosemite, Bryce and Great Smoky Mountains).
- For the purpose of the study into Foot & Mouth disease, the observation data was filtered to include sheep only.
- Above is a bar chart detailing number of sheep observations in each National Park over the period of a week.

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