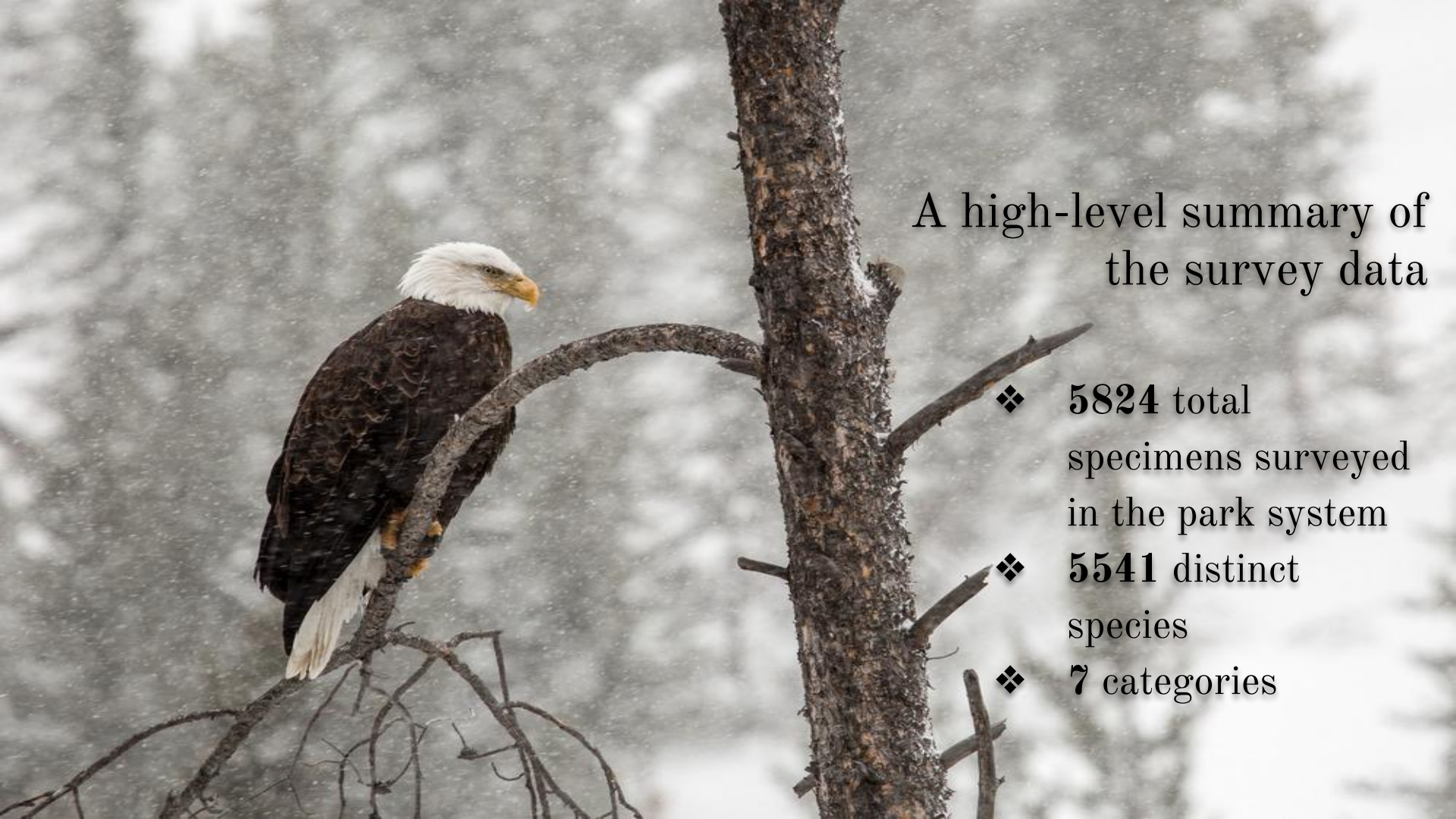
codecademy

National Park Service

Conservation Studies

Given the survey data, are there any indications to the likelihood of a species entering protected status over another?



A high-level summary of the survey data

- **5824** total specimens surveyed in the park system
- **5541** distinct species
- **7** categories

A look at conservation status indicates roughly 3% of surveyed species are protected. (see Fig 1)

Endangered: **15**

Threatened: **10**

Species of Concern: **151**

In Recovery: **4**

No Intervention: **5363**

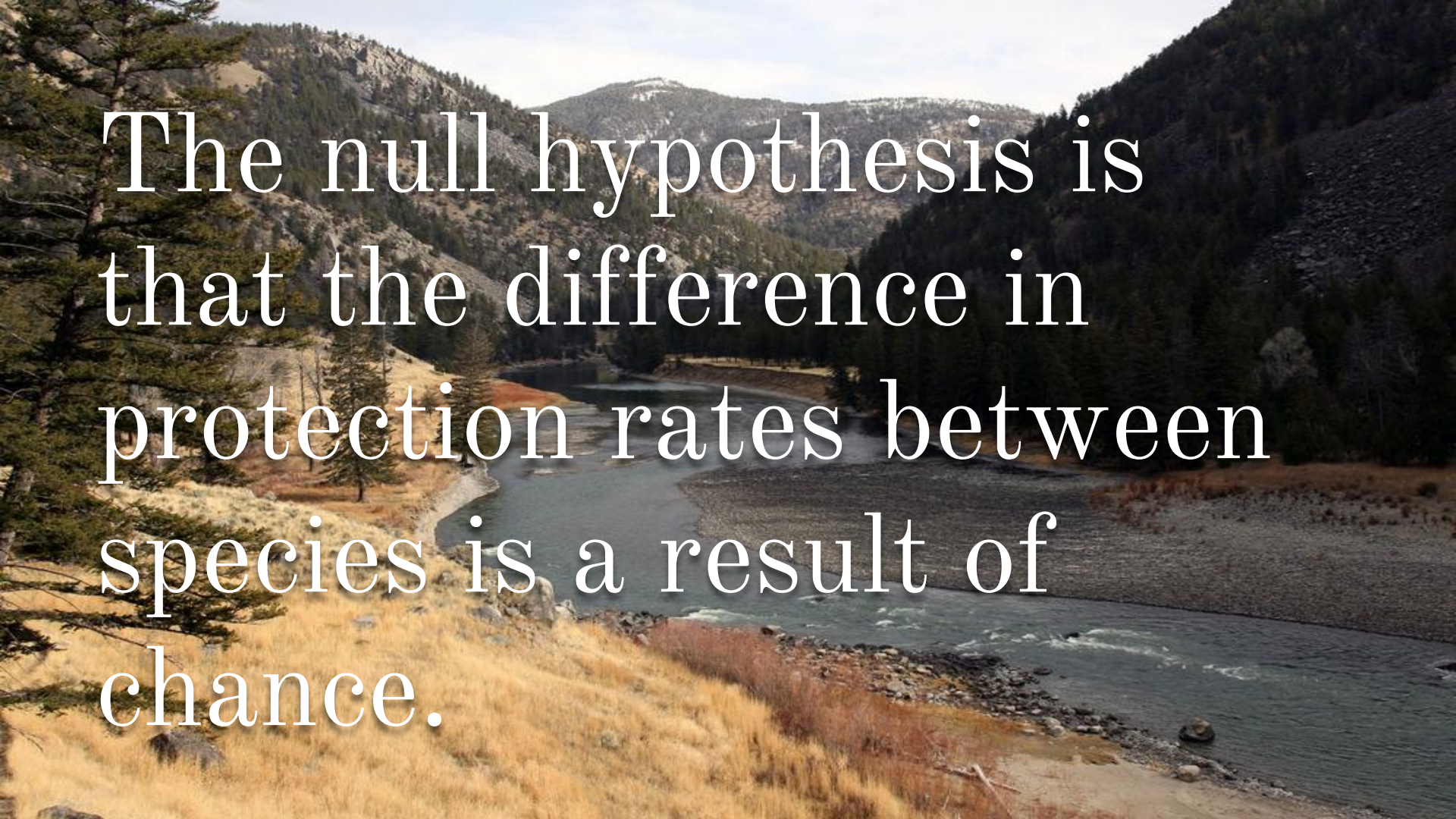
The breakdown of Protected rates by Category raises some questions.

Is there a reason mammals are more likely to be protected than reptiles?

How about birds versus reptiles?

Is there significance or is it chance?

	Not Protected	Protected	% Protected
Amphibian	72	7	8.86%
Bird	413	75	15.37%
Fish	115	11	8.73%
Mammal	146	30	17.05%
Reptile	73	5	6.41%
Vascular Plant	4216	46	1.08%
Nonvascular Plant	328	5	1.50%


The null hypothesis is that the difference in protection rates between species is a result of chance.

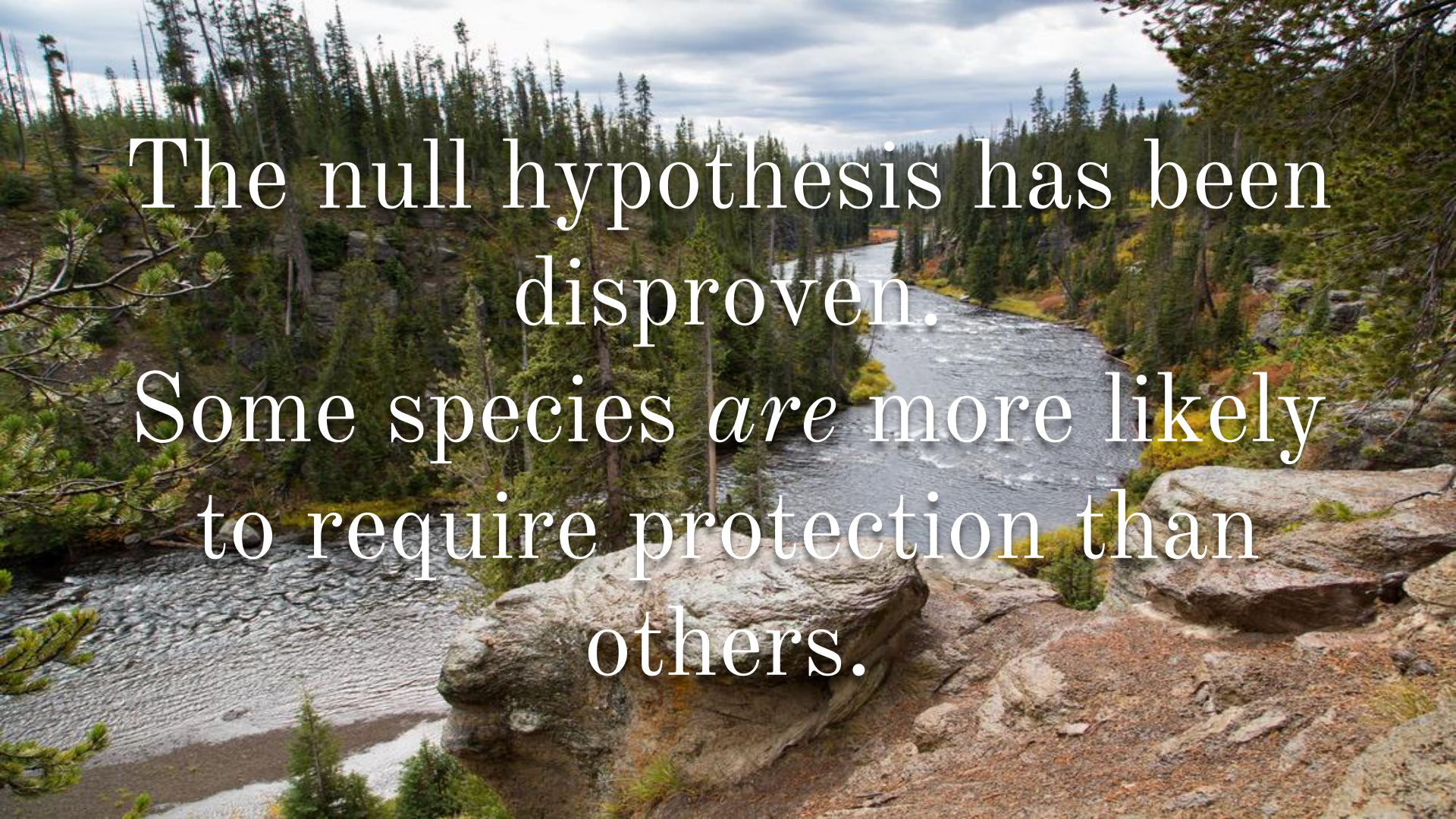
Is there significance?

pvalues
Mammal v Bird ~ 0.688
Reptile v Mammal ~ 0.038
Amphibian v Bird ~ 0.176
Bird v Fish ~ 0.077
Fish v Mammal ~ 0.056
Nonvascular v Vascular Plants ~ 0.662

Running a chi-squared test reveals that there is not significance between the protection rates of Mammals & Birds, proving the Null Hypothesis that the difference is a result of chance in nature.

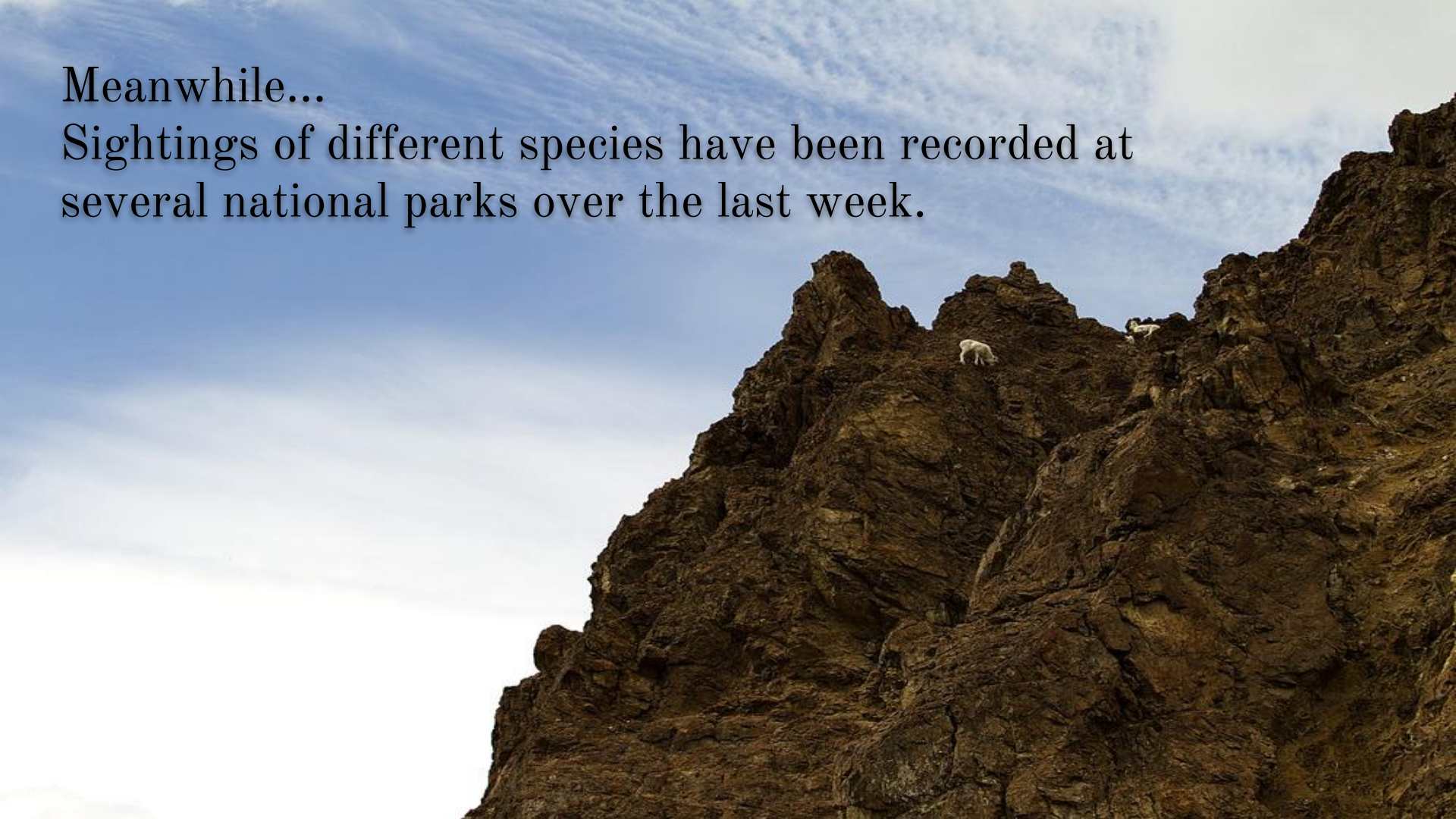
Further testing shows that there is also not significance between Amphibians & Birds, Birds & Fish, Fish & Mammals, or Nonvascular Plants & Vascular Plants.

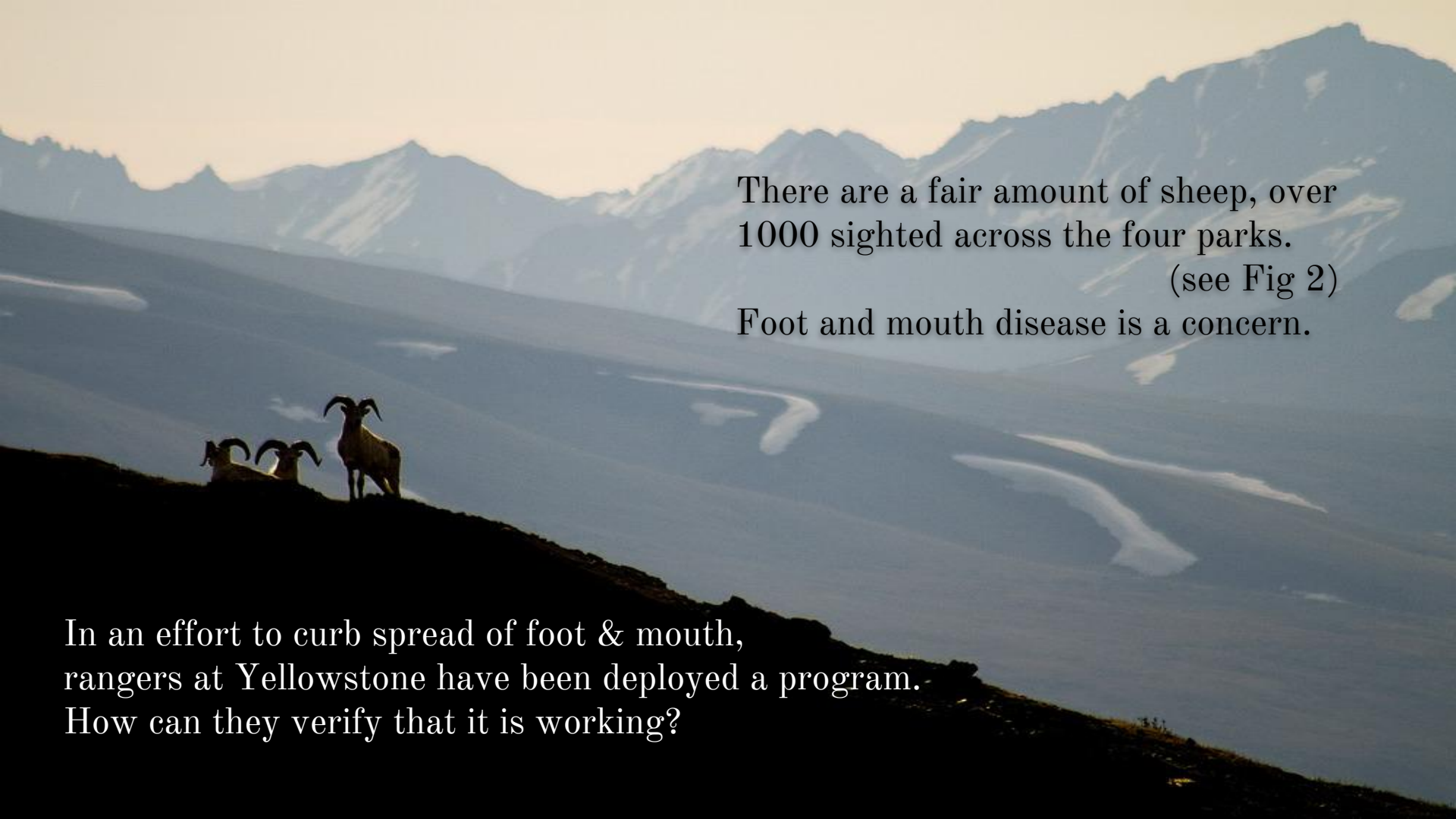
However, a further test reveals that there *is* significance between Reptiles & Mammals, which **rejects** the Null Hypothesis.


The null hypothesis has been disproven.
Some species *are* more likely to require protection than others.


As some species
are more likely to
require protection,
it would be
recommended to
keep an eye on the
mammal
population.

Meanwhile...
Sightings of different species have been recorded at several national parks over the last week.

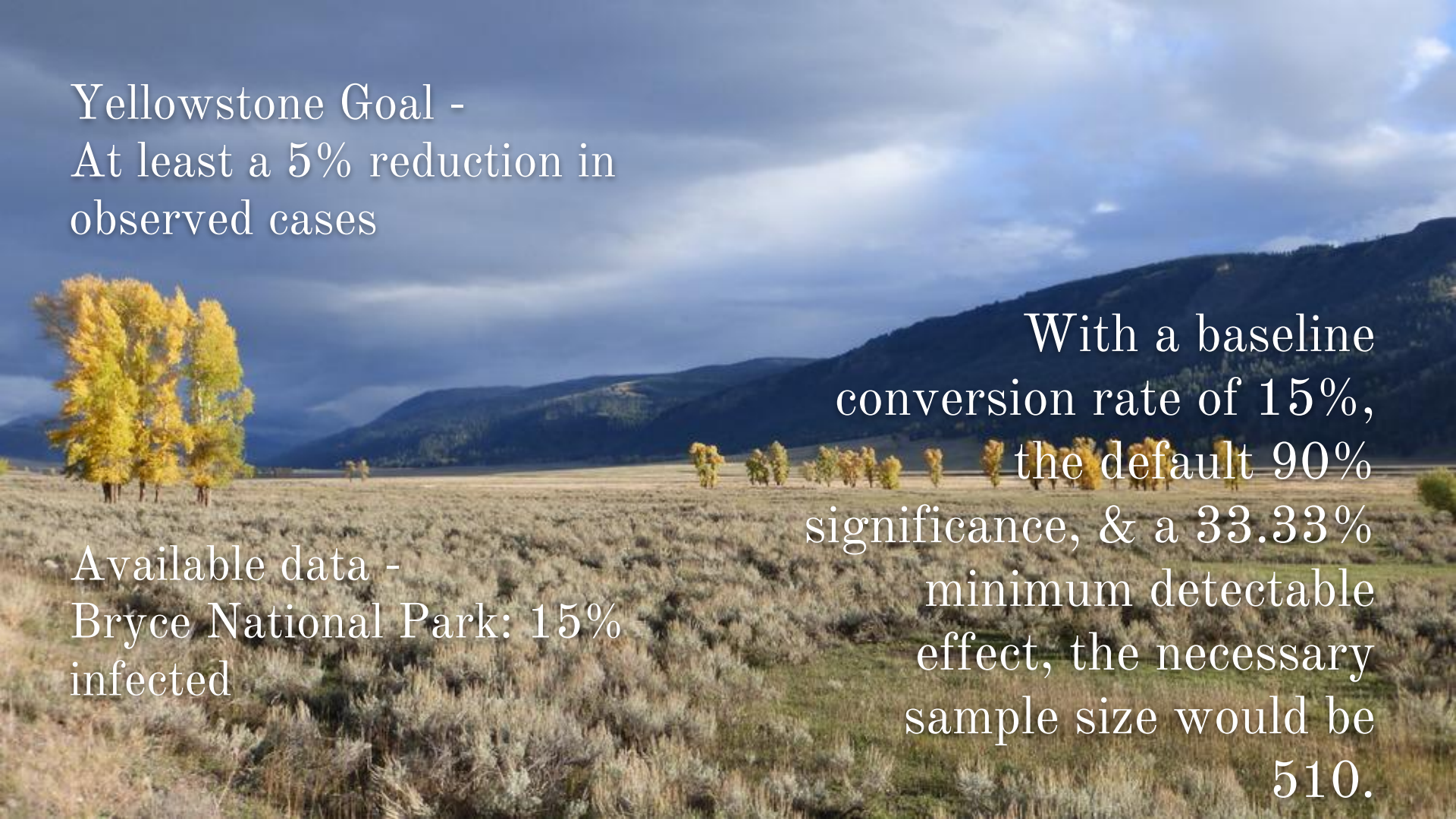




There are a fair amount of sheep, over 1000 sighted across the four parks. (see Fig 2)

Foot and mouth disease is a concern.

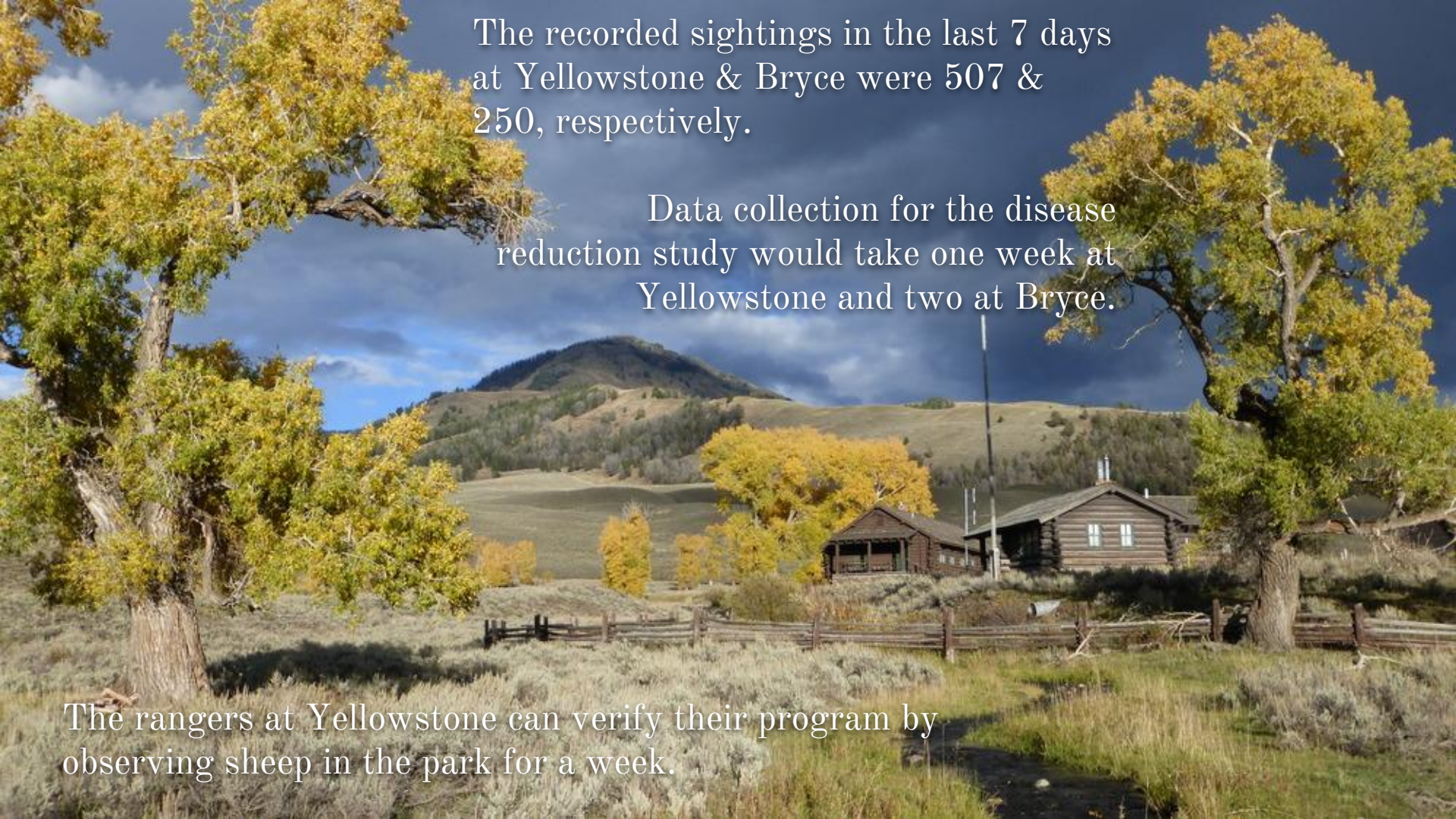
In an effort to curb spread of foot & mouth, rangers at Yellowstone have been deployed a program. How can they verify that it is working?



Yellowstone Goal -
At least a 5% reduction in observed cases

Available data -
Bryce National Park: 15% infected

With a baseline conversion rate of 15%, the default 90% significance, & a 33.33% minimum detectable effect, the necessary sample size would be 510.

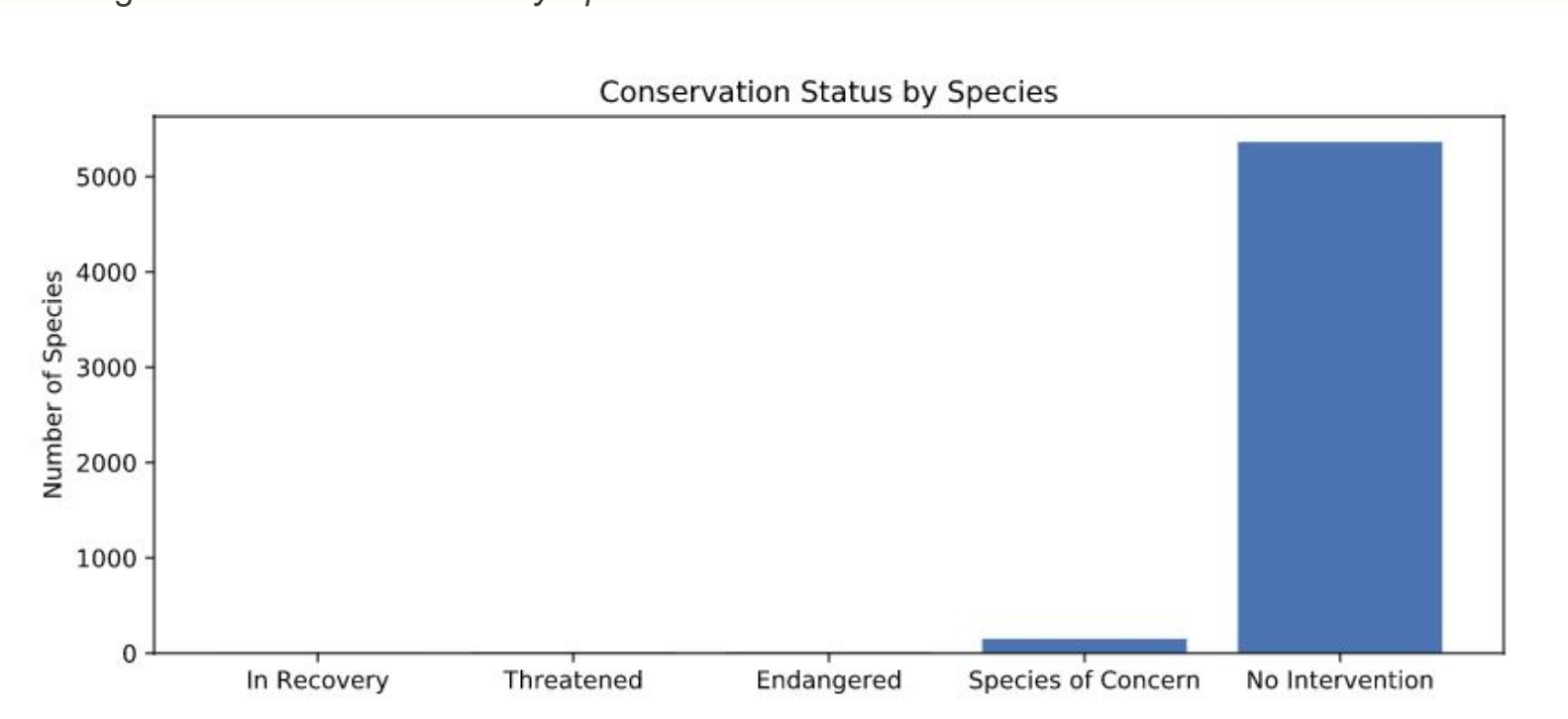


The recorded sightings in the last 7 days at Yellowstone & Bryce were 507 & 250, respectively.

Data collection for the disease reduction study would take one week at Yellowstone and two at Bryce.

The rangers at Yellowstone can verify their program by observing sheep in the park for a week.

Appendix: Fig 1 *Conservation Status by Species*



Appendix: Fig 2 *Observations of Sheep in the last 7 days by each surveyed National Park*