

# National Park Service

---

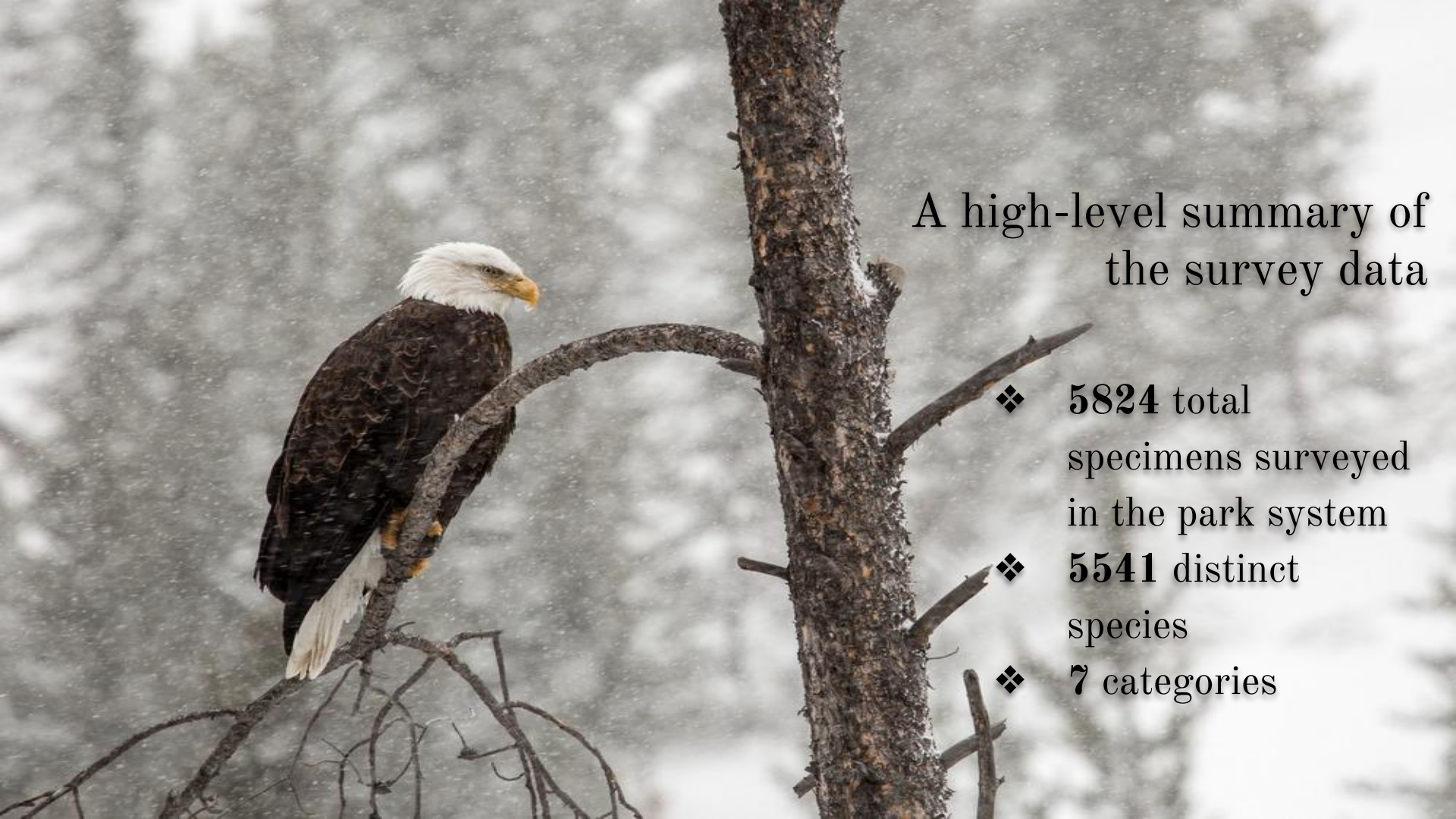
Conservation Studies



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





A bald eagle with a white head and neck and dark brown body is perched on a thin, curved tree branch. The background is a soft-focus, snowy forest scene with a larger tree trunk visible to the right.

## 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.

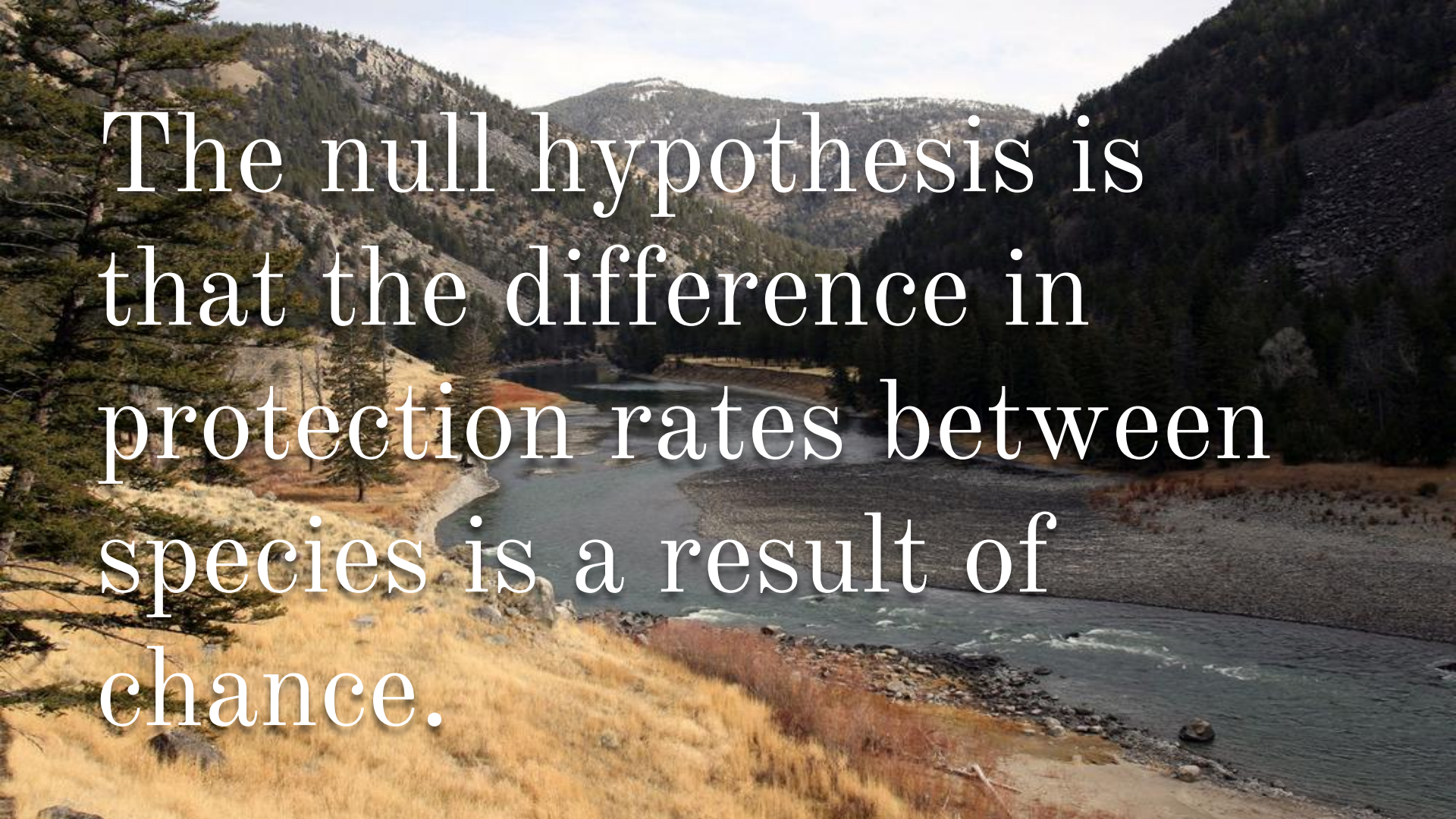
Is there a reason mammals are more likely to be protected than reptiles?

How about birds versus reptiles?

Is there significance or is it chance?

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



A scenic view of a river flowing through a dense forest of evergreen trees. The river is in the center, surrounded by lush greenery. In the foreground, there are large, light-colored rocks. The sky is overcast with grey clouds.

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.



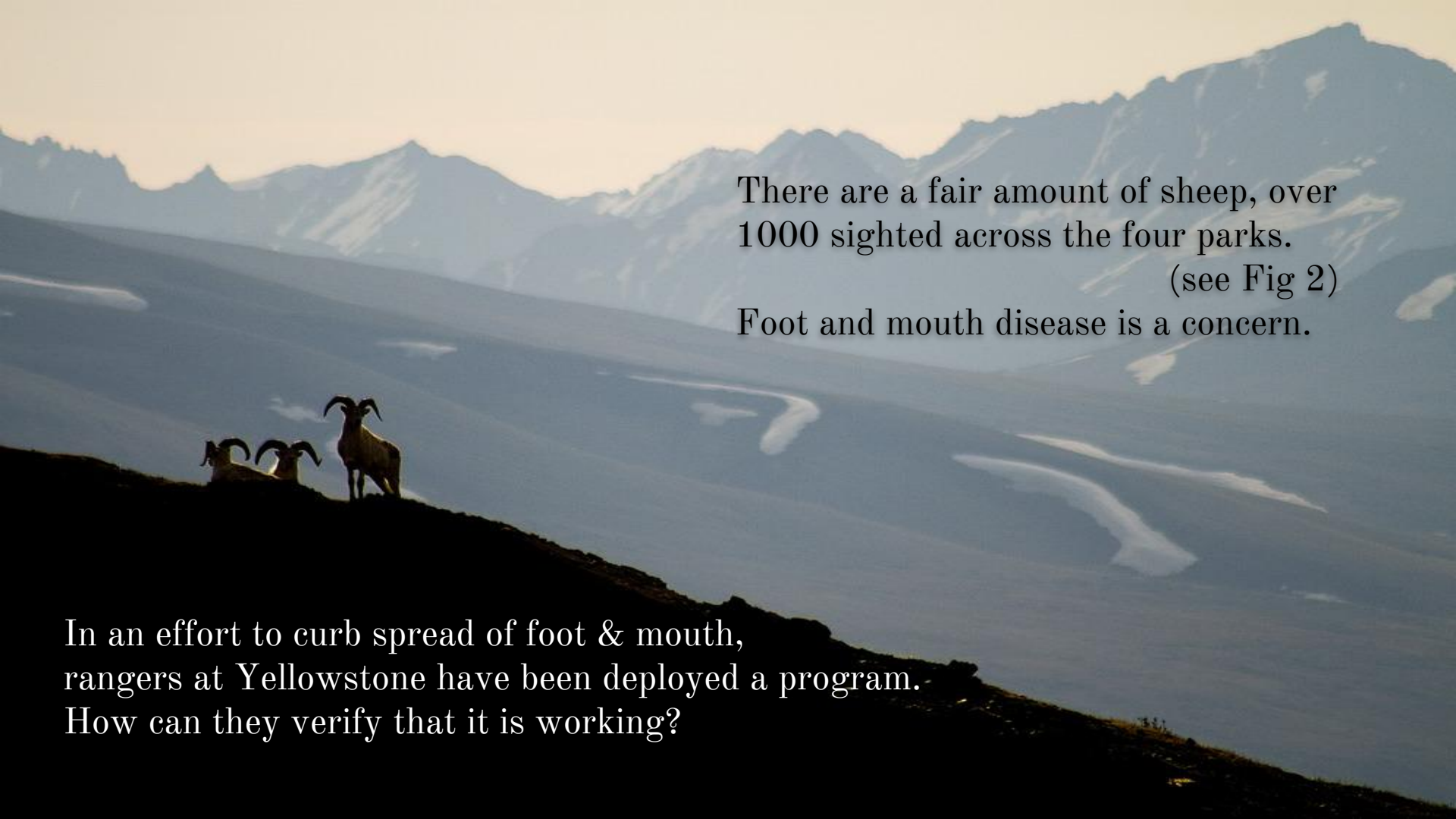


Meanwhile...

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





A scenic mountain landscape with three mountain goats in the foreground. The goats are silhouetted against a bright, hazy sky. They are standing on a dark, rocky ridge. In the background, there are several mountain ranges with patches of snow or light-colored rock. The overall tone is soft and atmospheric.

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?

A landscape photograph of a grassy field with yellow trees and mountains under a cloudy sky. The foreground is filled with dry, yellowish-brown grass. In the middle ground, there are several trees with bright yellow leaves, some standing alone and others in small groups. In the background, there are dark, forested mountains under a sky with heavy, grey clouds and patches of blue.

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.



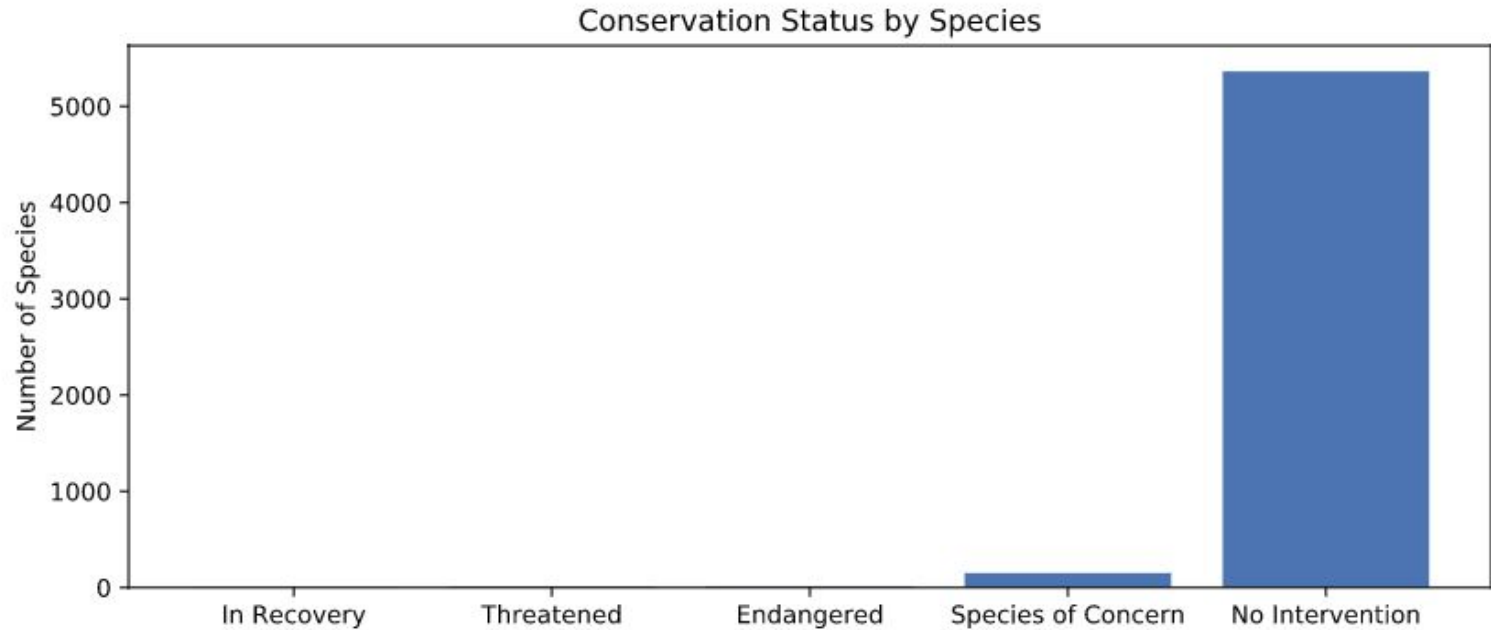
A scenic landscape featuring a log cabin nestled among trees with vibrant yellow autumn foliage. In the background, a mountain rises under a sky filled with dramatic, dark clouds. The foreground is a grassy field with some shrubs.

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*

