

National Parks Service Biodiversity Project

An Endangered Species Perspective and
Sheep Observations for Disease Reduction



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Presentation Outline

- DataFrame species_info.csv: the data and duplicates
- Conservation status results: tables and graphs
- Observations: 7 day recorded sightings
- Sheep: sightings needed to observe disease reduction

Data overview of the species_info.csv file

- DataFrame contains 5541 species with scientific names and common names
- Inclusive to Animal and Plant Kingdoms across 7 general categories
 - 5 vertebrate animal
 - 2 plant
- Species conservation status is grouped into 5 levels

category	conservation_status
Amphibian	In Recovery
Bird	Threatened
Fish	Endangered
Mammal	Species of Concern
Nonvascular Plant	No Intervention
Reptile	
Vascular Plant	

Data overview of the species_info.csv file

- Duplicate rows were observed in the original DataFrame
- One case a species had three duplicates and two conservation groups

	category	scientific_name	common_names	conservation_status
8	Mammal	Canis lupus	Gray Wolf	Endangered
3020	Mammal	Canis lupus	Gray Wolf, Wolf	In Recovery
4448	Mammal	Canis lupus	Gray Wolf, Wolf	Endangered



- Duplicates were removed from analysis; Canis lupus corrected to 'Endangered'

Conservation Status Results

- The majority of species need no intervention, 5362
- 179 species from both animal and plant Kingdoms are in protection
- 3.2% of the 5541 recorded species are in protection

conservation_status	scientific_name
In Recovery	3
Threatened	10
Endangered	15
Species of Concern	151
No Intervention	5362

Conservation Status Results

- The three species 'In Recovery' are all predatory birds

	category	scientific_name	common_names	conservation_status
100	Bird	<i>Haliaeetus leucocephalus</i>	Bald Eagle	In Recovery
3143	Bird	<i>Falco peregrinus anatum</i>	American Peregrine Falcon	In Recovery
4565	Bird	<i>Pelecanus occidentalis</i>	Brown Pelican	In Recovery



conservation_status	scientific_name
In Recovery	3
Threatened	10
Endangered	15
Species of Concern	151
No Intervention	5362



Conservation Status Results

- Threatened organisms are 8 animal species and 2 vascular plants



Threatened
Fish
Erimonax monachus

conservation_status	category	scientific_name
Threatened	Amphibian	2
Threatened	Fish	4
Threatened	Mammal	2
Threatened	Vascular Plant	2

- Endangered organisms are 14 animal species and 1 vascular plant



Endangered
Vascular Plant
Geum radiatum

Endangered	Amphibian	1
Endangered	Bird	4
Endangered	Fish	3
Endangered	Mammal	6
Endangered	Vascular Plant	1

Conservation Status Results

- Species of Concern organisms are 103 animal species and 48 plant species (nonvascular and vascular)



Species of Concern
Amphibian
Hydromantes
platycephalus

- No Intervention organisms are 813 animal species and 4544 plant



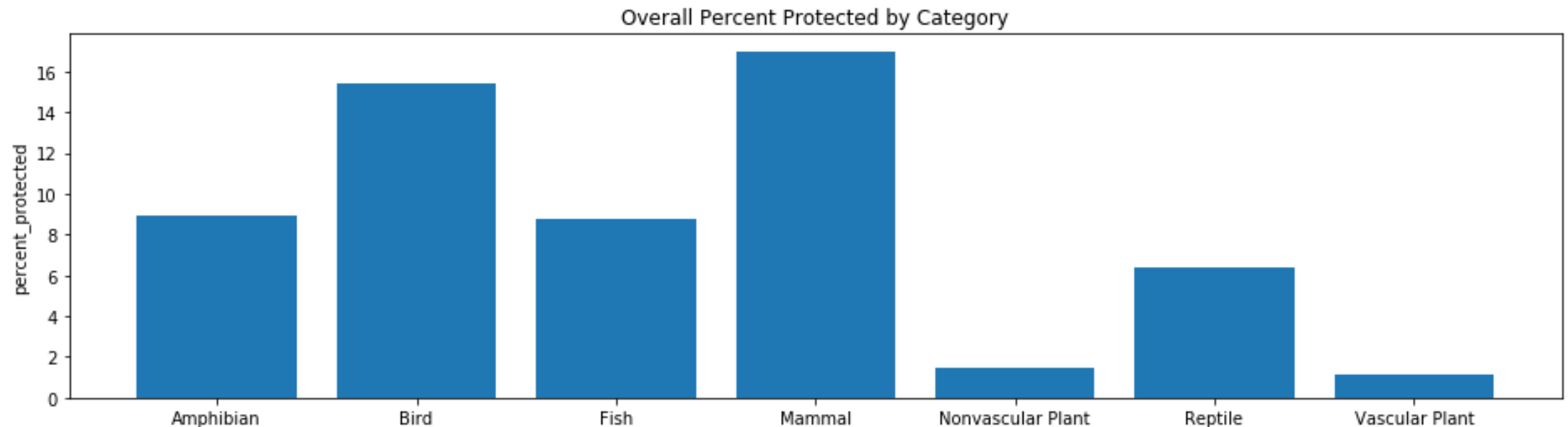
No Intervention
Reptile
Phrynosoma
hernandesi

conservation_status	category	scientific_name
Species of Concern	Amphibian	4
Species of Concern	Bird	68
Species of Concern	Fish	4
Species of Concern	Mammal	22
Species of Concern	Nonvascular Plant	5
Species of Concern	Reptile	5
Species of Concern	Vascular Plant	43
No Intervention	Amphibian	72
No Intervention	Bird	413
No Intervention	Fish	114
No Intervention	Mammal	146
No Intervention	Nonvascular Plant	328
No Intervention	Reptile	73
No Intervention	Vascular Plant	4216

Conservation Status Results

- Birds and Mammals have the most protected species
- Reptiles have significantly less protected species than Mammals $p\text{-value} = 0.038$
- Recommend higher protection on all known protected species

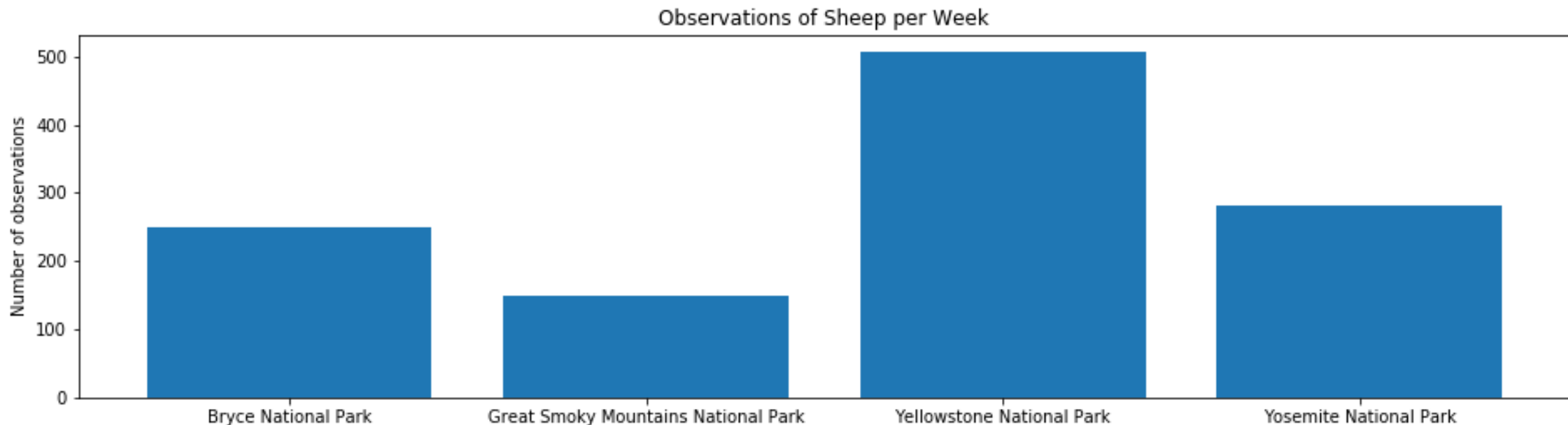
category	not_protected	protected	percent_protected
Amphibian	72	7	8.9
Bird	413	75	15.4
Fish	114	11	8.8
Mammal	146	30	17.0
Nonvascular Plant	328	5	1.5
Reptile	73	5	6.4
Vascular Plant	4216	46	1.1



Observations: recorded 7 day sightings

- Sheep sightings at four Parks
- Across all sheep species
Yellowstone had the highest observations

park_name	observations
Bryce National Park	250
Great Smoky Mountains National Park	149
Yellowstone National Park	507
Yosemite National Park	282



Observations: recorded 7 day sightings

- Same sheep species observed at each Park
- Sheep species observations follow conservation status

scientific_name	observations
Ovis aries	542
Ovis canadensis	493
Ovis canadensis sierrae	153

scientific_name	common_names	conservation_status
Ovis aries	Domestic Sheep, Mouflon, Red Sheep, Sheep (Feral)	No Intervention
Ovis canadensis	Bighorn Sheep, Bighorn Sheep	Species of Concern
Ovis canadensis sierrae	Sierra Nevada Bighorn Sheep	Endangered

park_name	scientific_name	observations
Bryce National Park	Ovis aries	119
Bryce National Park	Ovis canadensis	109
Bryce National Park	Ovis canadensis sierrae	22
Great Smoky Mountains National Park	Ovis aries	76
Great Smoky Mountains National Park	Ovis canadensis	48
Great Smoky Mountains National Park	Ovis canadensis sierrae	25
Yellowstone National Park	Ovis aries	221
Yellowstone National Park	Ovis canadensis	219
Yellowstone National Park	Ovis canadensis sierrae	67
Yosemite National Park	Ovis aries	126
Yosemite National Park	Ovis canadensis	117
Yosemite National Park	Ovis canadensis sierrae	39

Sightings needed to observe disease reduction



- Program initiated to reduce sheep mouth and food disease at Yellowstone Park
- Determine sample size needed to examine project progress
- Determine time needed to record observations
- 15% Bryce Park sheep are diseased
- Want to identify reductions at a 5% point level and at a 90% confidence level
- Need 520 observations
- Bryce Park would take 2.1 weeks
- Yellowstone Park would take 1 week
- If 10% Yellowstone Park sheep are diseased and want to identify reductions at a 5% point level and at a 90% confidence level
- Need 890 observations and would take 1.8 weeks

Thank you for your attention!




Endangered
Fish
*Etheostoma
percnurum*

Species of Concern
Nonvascular Plant
Tortella tortuosa



Appendix

- Conservation status of *Canis lupus* is 'Endangered'
- Image from
- <https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=A00D>

**U.S. Fish & Wildlife Service**

Search ECOS

ECOS Environmental Conservation Online System
Conserving the Nature of America


ECOS / Species Profile for Gray wolf (*Canis lupus*)

Gray wolf (*Canis lupus*)

[Range Information](#) | [Federal Register](#) | [Recovery](#) | [Critical Habitat](#) | [Conservation Plans](#) | [Petitions](#) | [Life History](#)

Taxonomy: [View taxonomy in ITIS](#)

Listing Status: **Endangered** ([and others listed below](#))



Appendix

- <https://pixers.se/fototapeter/skallig-orn-for-amerikan-haliaeetusleucocephalus-4737714>
- <https://www.laughingfrogphotography.com/Nature/American-Wildlife/i-JKZgPfchhttps://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=A00D>
- https://upload.wikimedia.org/wikipedia/commons/5/51/Brown_Pelican21K.jpg



Appendix

- https://en.wikipedia.org/wiki/Geum_radiatum
- http://explorer.natureserve.org/servlet/NatureServe?sourceTemplate=species_RptComprehensive.wmt&loadTemplate=species_RptImages.wmt&paging=&elKey=105913&save=false&page=1

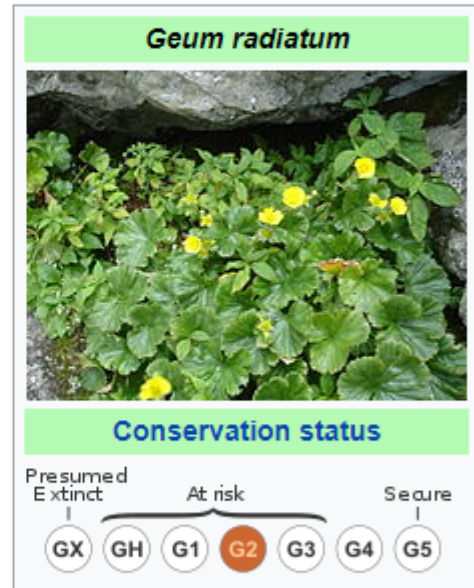
Geum radiatum

From Wikipedia, the free encyclopedia

Geum radiatum is a rare species of flowering plant in the [rose family](#) known by the common names **spreading avens**, **Appalachian avens**, and **cliff avens**. It is native to the region of the border between [Tennessee](#) and [North Carolina](#) in the southeastern United States, where there are eleven known populations remaining.^[4] The plant was federally listed as an [endangered species](#) in 1990.^[4]

Geum radiatum is a perennial herb with a horizontal [rhizome](#) spreading beneath the soil. From the rhizome, several rosettes appear, each with all clo

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Appendix

- <http://www.californiaherps.com/salamanders/images/hplatycephalusin7113.jpg>
- <http://www.redcliffsdesertreserve.com/mountain-short-horned-lizard-phrynosoma-hernandesi>



Appendix

- Image from
- <https://pixnio.com/fauna-animals/sheeps/bighorn-sheep-ovis-canadensis>



bighorn, sheep, ovis canadensis

[DOWNLOAD](#)

JPG, 3559 x 2376 (8.6 MP), 865.9 KB

Appendix

- <https://www.joelsartore.com/esa002-00329/>
- https://species.wikimedia.org/wiki/Tortella_tortuosa#/media/File:Tortella_tortuosa_270108.jpg

