Biodiversity in National Parks

An analysis of published findings.

Purpose

In this analysis we evaluate the prevalence of both feral and threatened species within national parks.

We seek to answer if parks have adequate resources to address the challenges these species present.

Data Sources: species_info.csv

Species_info provides species level information for the survey results contained in observations.csv

- The fields included in the file include:
  - Category: The class of species (ex. Vascular plant, Mammal, etc.)
  - Scientific Name
  - Common Names
  - Conservation Status: (ex. Species of Concern, Threatened, Endangered, etc.)
- The file contains records on 5,824 species, 191 of which include conservation status.

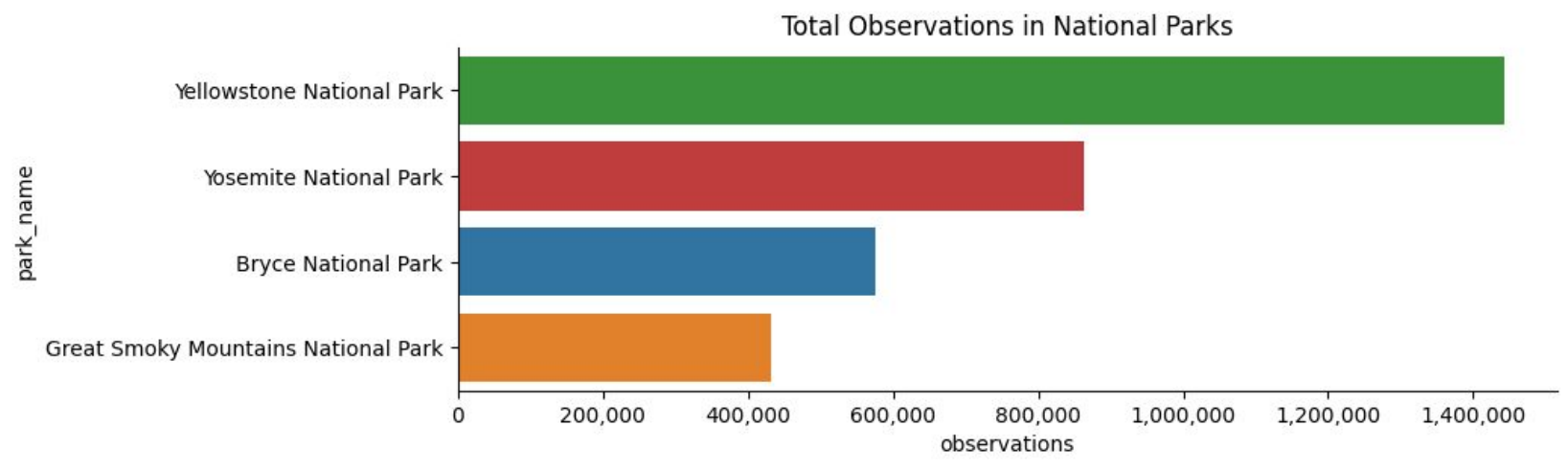
Data Sources: observations.csv

Observations.csv provides the actual results of the species survey.

- The fields included in the file include:
  - Scientific Name
  - National Park Name (Yellowstone, Yosemite, Bryce, and Smokey Mtn.)
  - Observations
- The file contains records on 29,296 observations.

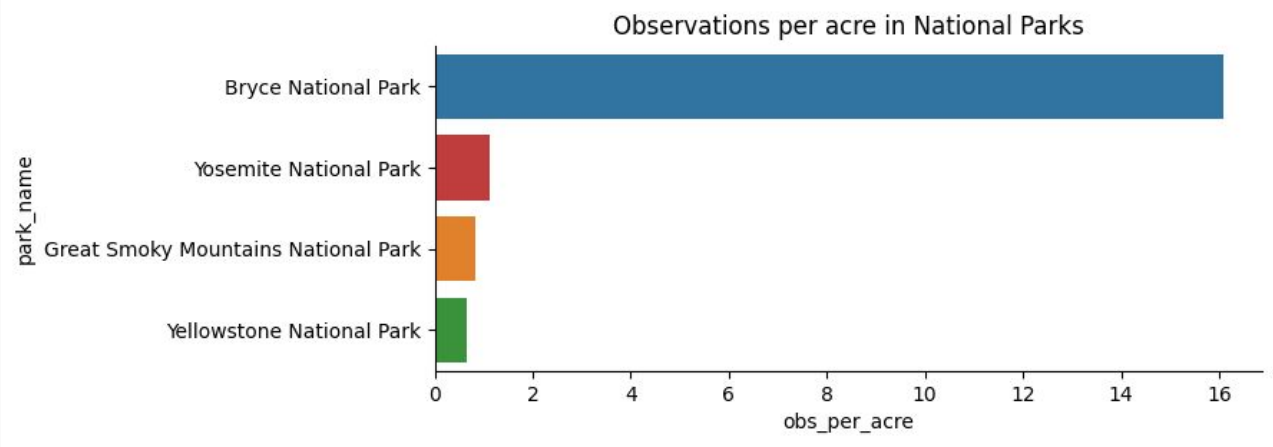
Observations by Park

An overview of the total observations by park (3,314,739 total):



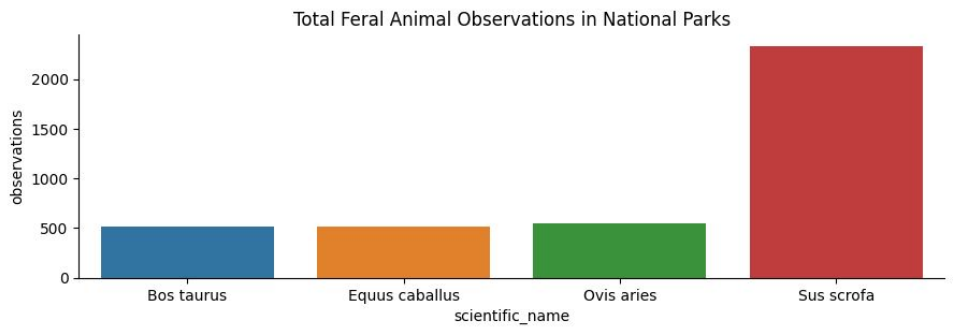
Observations per acre within select national parks

Unfortunately, there is an overrepresentation of observations by acreage within Bryce National Park. This complicates measuring the prevalence of feral and threatened species.



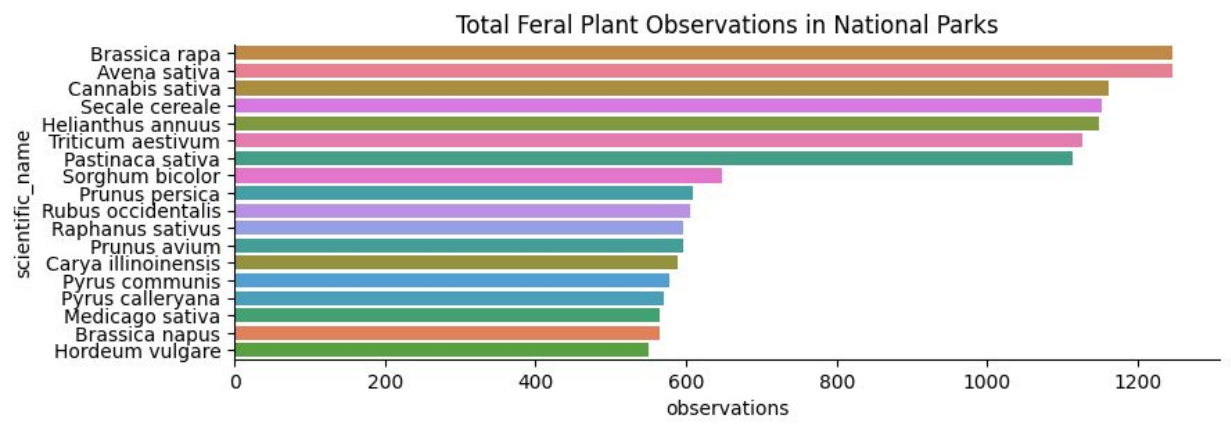
Feral animals

When looking at feral animal populations, feral pigs comprise over 4 times the total number of observed animals within parks. As significant work is being performed to manage feral pig populations, we'll continue on to focus on feral plants.

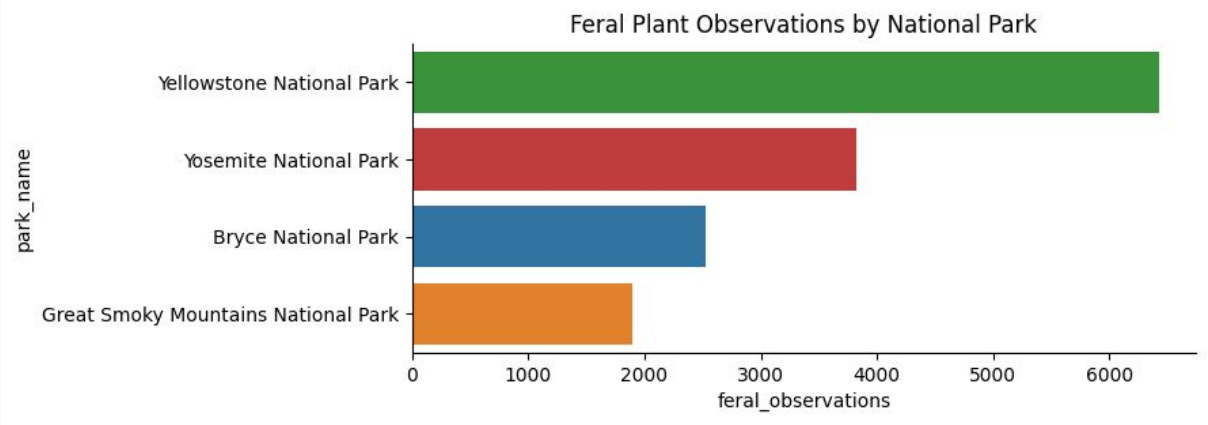


Feral Plant observations

By merging Mabry's feral plant species list (Mabry, 2023) with NPS species survey data, we can summarize feral plants within National Parks.

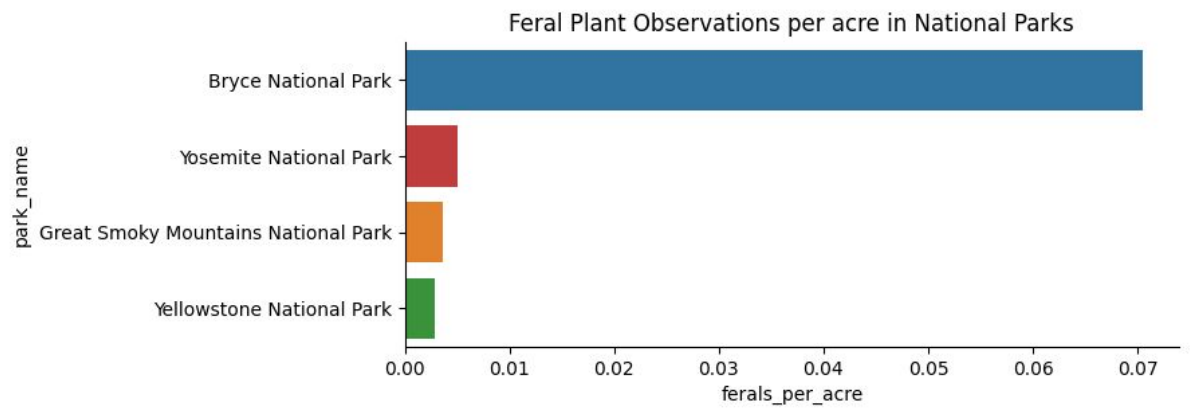


Feral Plant totals by Park



Feral plants observations by Acreage

As feared, the overrepresentation of observations within Bryce frustrate using per acre calculations by park.

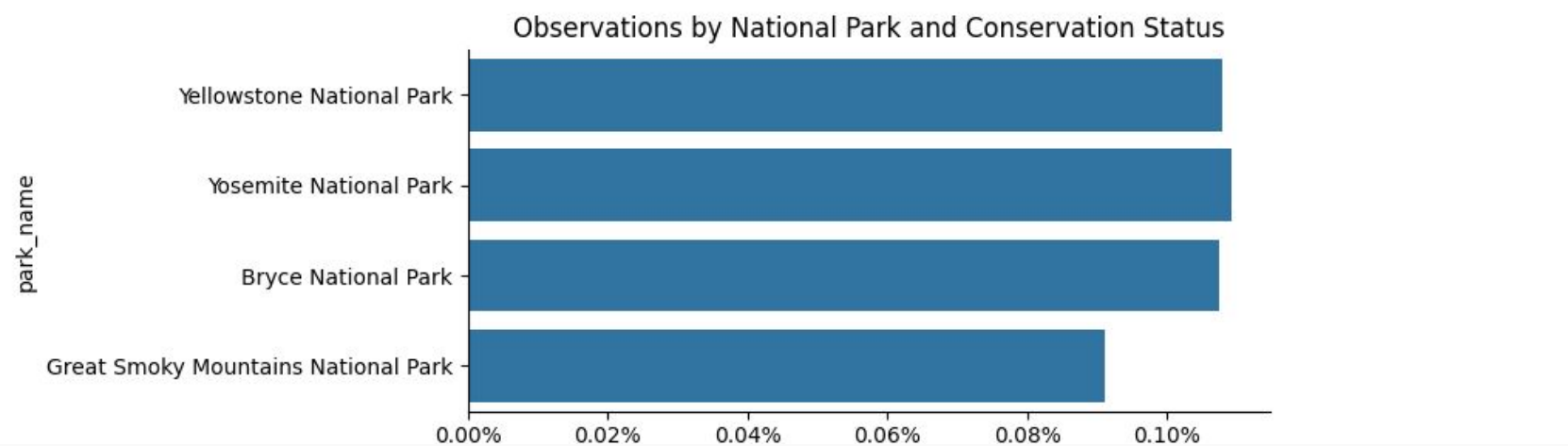


Feral Plant prevalence

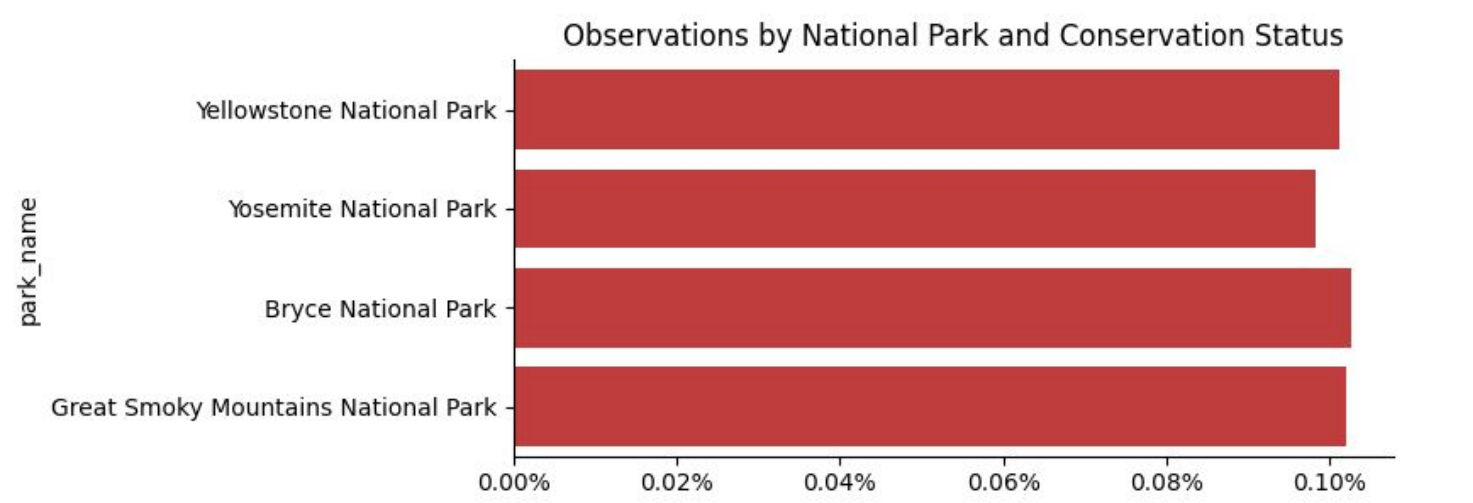
Instead, by focusing on the feral percentage of observed vascular plants, we find that 0.5%, or 1 in 200 observed plants within national parks are a feral non-native species.

Park Name	Vascular Plant Observations	Feral Plant observations	% Feral
Bryce National Park	484,373	2,524	0.52%
Great Smoky Mountains National Park	364,882	1,891	0.52%
Yellowstone National Park	1,218,162	6,422	0.53%
Yosemite National Park	727,895	3,825	0.53%

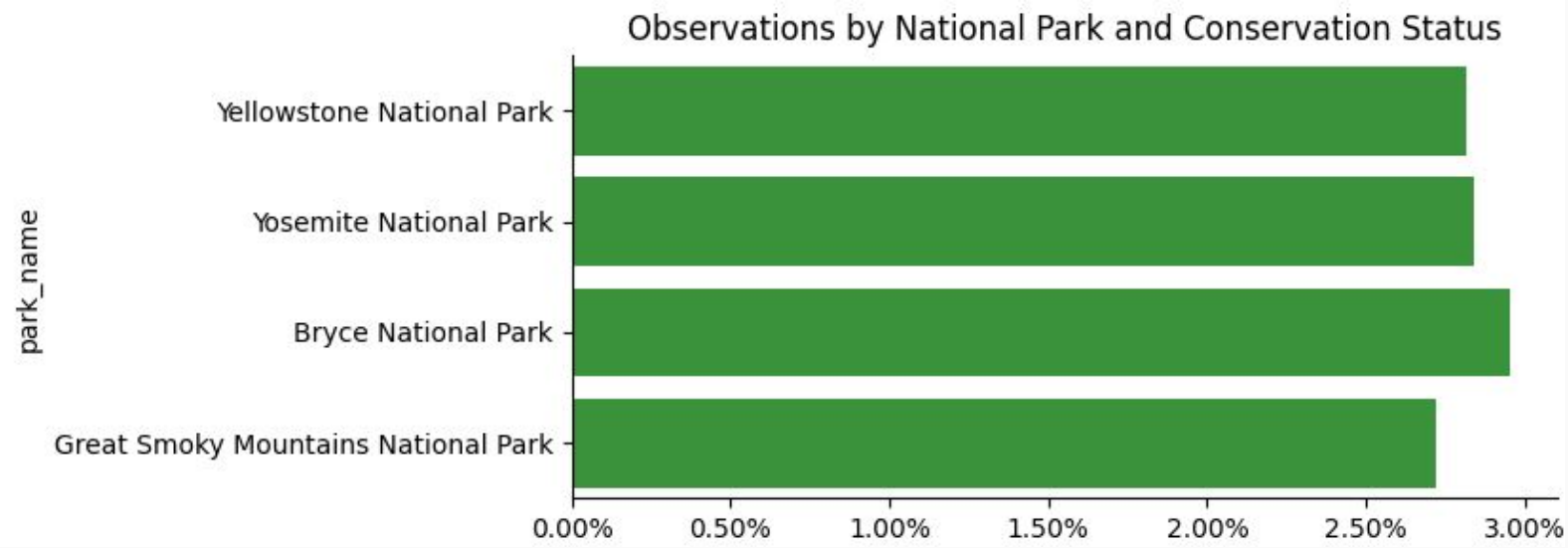
Endangered Species prevalence by National Park



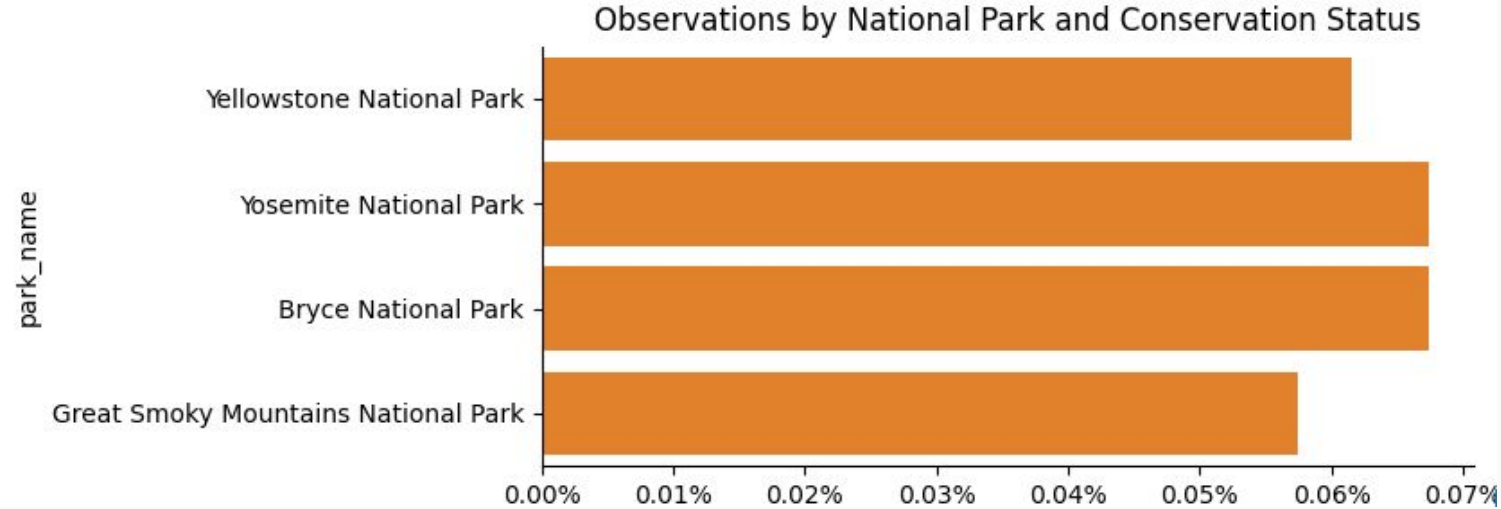
Threatened Species prevalence by National Park



Species of concern prevalence by National Park



Species In Recovery prevalence by National Park



Conclusion

While feral animal and invasive plants within national parks are being managed, we see significant incursions of feral plants in protected areas. There is little to no literature documenting any mitigation work being performed. 1 in 200 of vascular plants observed by NPS within national parks are a non-native feral species. This poses significant risks to protected areas.

We also see that species surveys within parks are not performed equitably by acreage, with smaller parks receiving far more observations per acre.

More work needs to be done to manage feral plant populations, and resources allocated to survey species within national parks should be reviewed.

Appendix (additional Files): NPS-Acreage-03-31-2024.csv

NPS acreage by park

Source: https://www.nps.gov/subjects/lwcf/acreagereports.htm

Park Name	Acreage
Yellowstone National Park	2,219,790.71
Yosemite National Park	761,747.5
Bryce National Park	35,835.08
Great Smoky Mountains National Park	522,426.88

Appendix (additional files): feral_crop_names.csv

List of problematic feral crops:

Source: Building a feral future: Open questions in crop ferality - Mabry - 2023 - PLANTS, PEOPLE, PLANET - Wiley Online Library