Endangered Species Analysis in U.S. National Parks

An Analysis of Conservation Status, Species Categories, and Observations

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Project Overview

Objective

- Analyze endangered species data from the National Parks Service

- Identify patterns in conservation status across species categories

- Determine whether certain species types are more likely to be endangered

- Communicate findings to inform conservation efforts

Data Sources

- species_info.csv

- observations.csv

Dataset: species_info.csv

What the Data Contains

- Category (e.g., Mammal, Bird, Reptile, Fish)

- Scientific name

- Common name

- Conservation status

Key Observations

- Many species have **no listed conservation status**

- Missing conservation values were treated as **"No Intervention"**

- Mammals and birds represent a large portion of recorded species

- Endangered and threatened statuses occur far less frequently than non-endangered

Conservation Status Distribution

Overall Findings

- Most species fall under **No Intervention**

- Smaller subsets are classified as:

  - Species of Concern

  - Threatened

  - Endangered

  - In Recovery

Insight

- Endangered species represent a **small but critical portion** of total biodiversity

Conservation Status by Species Category

Patterns Observed

- Mammals show a higher proportion of endangered and threatened species

- Birds and reptiles have fewer endangered classifications

- Insects and plants are underrepresented in endangered categories

Key Question

- Are these differences statistically significant, or due to chance?

Significance Testing (Endangered Status)

Approach

- Compared endangered vs. non-endangered species across categories

- Focused primarily on **mammals vs. non-mammals**

- Used hypothesis testing to determine significance

Hypotheses

- **Null Hypothesis (H_0):** Species category has no effect on endangered status

- **Alternative Hypothesis (H_1):** Species category affects endangered status

Significance Results

Findings

- Mammals were significantly more likely to be endangered than other categories

- Differences observed were **unlikely due to random chance**

- Supports rejecting the null hypothesis

Interpretation

- Species category is an important factor in conservation risk

Conservation Recommendation

Recommendation for Conservationists

- Prioritize conservation efforts for **mammals**, especially those already labeled as Species of Concern

- Increase monitoring and habitat protection for high-risk categories

- Allocate funding based on statistically significant risk differences

Rationale

- Targeted conservation strategies maximize impact with limited resources

Sample Size Determination (Foot and Mouth Disease Study)

Purpose

- Determine how many observations are required to detect meaningful differences

- Ensure statistical results are reliable and not due to chance

Key Considerations

- Desired confidence level

- Expected effect size

- Variability in observations

Sample Size Insights

Key Takeaways

- Larger sample sizes increase confidence in conclusions

- Small samples may miss true effects or exaggerate differences

- Proper sample size ensures valid comparisons between affected and unaffected populations

Why It Matters

- In conservation and disease studies, decisions impact ecosystems and livelihoods

Final Conclusion

Summary

- Most species are not endangered, but mammals are disproportionately at risk

- Statistical analysis confirms meaningful differences between categories

- Data-driven conservation strategies are essential

- Proper sample size and significance testing strengthen ecological research

Thank You