

BIRD SPECIES OBSERVATION ANALYSIS



Analyzed Bird Diversity Analysis Across
Forest and Grassland Ecosystems



Used Python for data cleaning,
visualization, and Tableau for insight
generation to support operational
improvements.



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Project Objective



- The project aims to analyze the distribution and diversity of bird species in two distinct ecosystems: forests and grasslands.
- By examining bird species observations across these habitats, the goal is to understand how environmental factors influence bird populations.
- Identifying patterns of habitat preference and assessing the impact of these habitats on bird diversity.
- Provide valuable insights into habitat conservation, biodiversity management, and the effects of environmental changes on avian communities.

About the Dataset

- The dataset contains 17077 birdwatching data in forest and grassland habitats.
- Includes columns like Observer, ID_Method, Common_Name, Temperature, Humidity.
- Interval_Length, Visits gives information about the observer.
- The original file was cleaned in Colab, handling with missing values.
- Created new columns like Habitat, Seasons for analysis and insights.

Data cleaning

- Performed data cleaning and handled missing values using pandas in Colab.
- Handled blanks and NA values with 0 or the mode of the column.
- Created a Habitat column to segregate between datasets.
- Created a column to find the seasons of the year when observation is noted.
- Downloaded the cleaned file with CSV format to perform Dashboards in BI tools (Tableau).

Exploratory Data Analysis in Colab



- Fig 1 shows shows the distribution of bird observations across Forest and Grassland

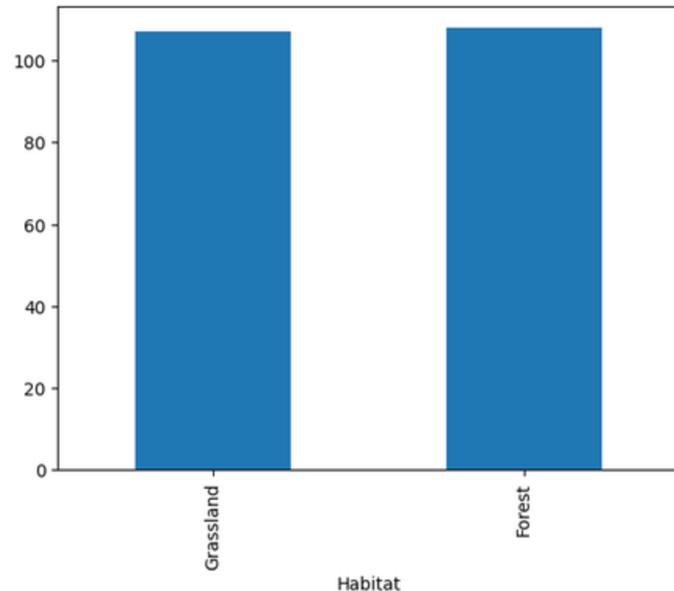


Fig 1

- Fig 2 shows us to spot which species are most and least commonly observed

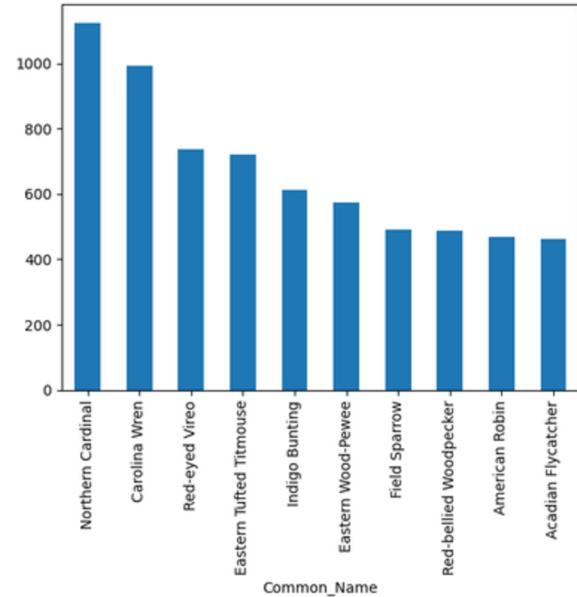


Fig 2

Exploratory Data Analysis in Colab



- Fig 3 shows how counts vary by sex in forest vs grassland, side by side
- Fig 4 shows counts across two categories (Forest and Grassland) for each observer.

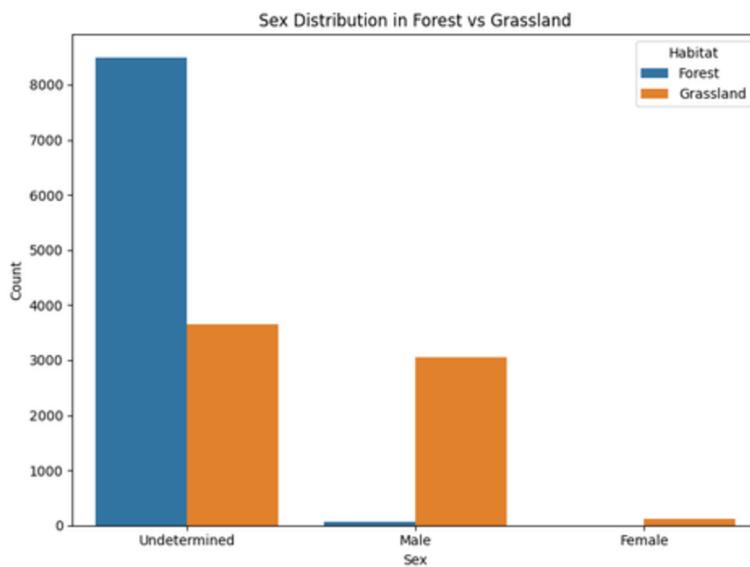


Fig 3

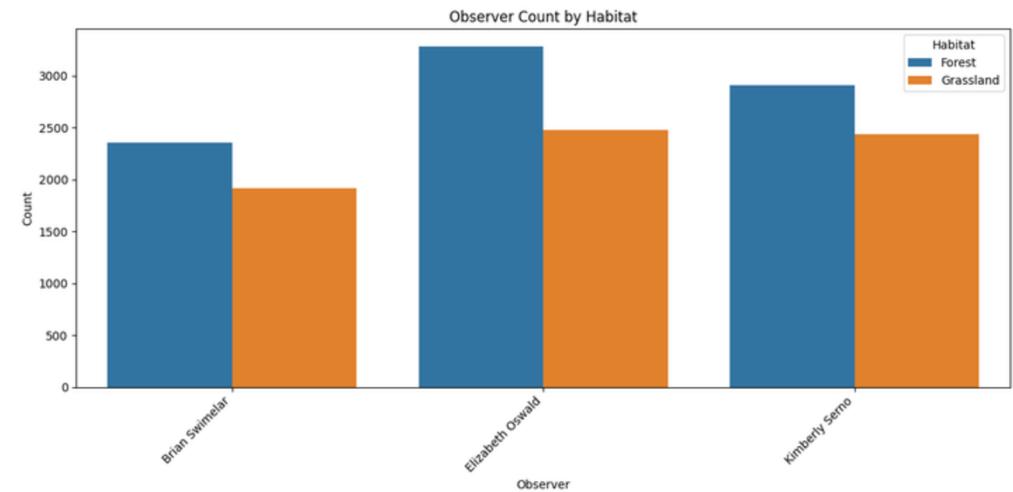


Fig 4

Exploratory Data Analysis in Colab



- Fig 5 allows direct visual comparison of how each observer contributed across four time intervals within both habitats.

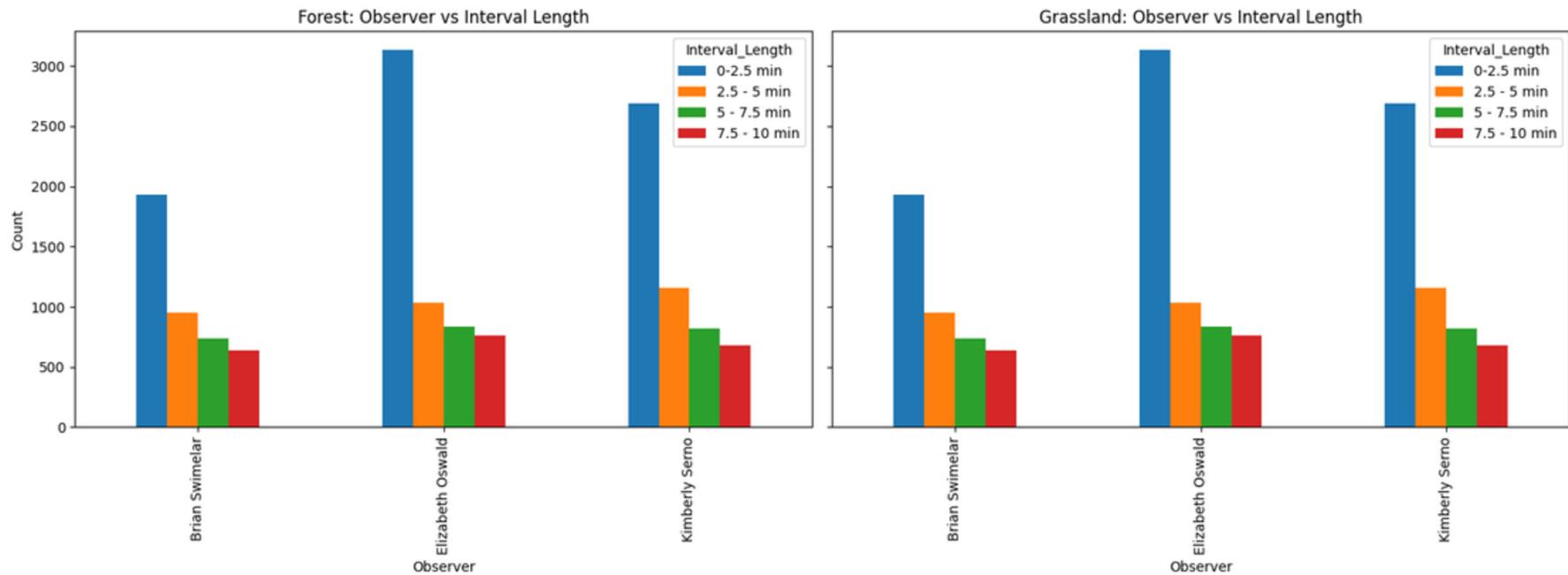


Fig 5

Exploratory Data Analysis in Colab



- Fig 6 allows us to compare how each observer uses different ID methods (Calling, Singing, Visualization) in two distinct habitats.

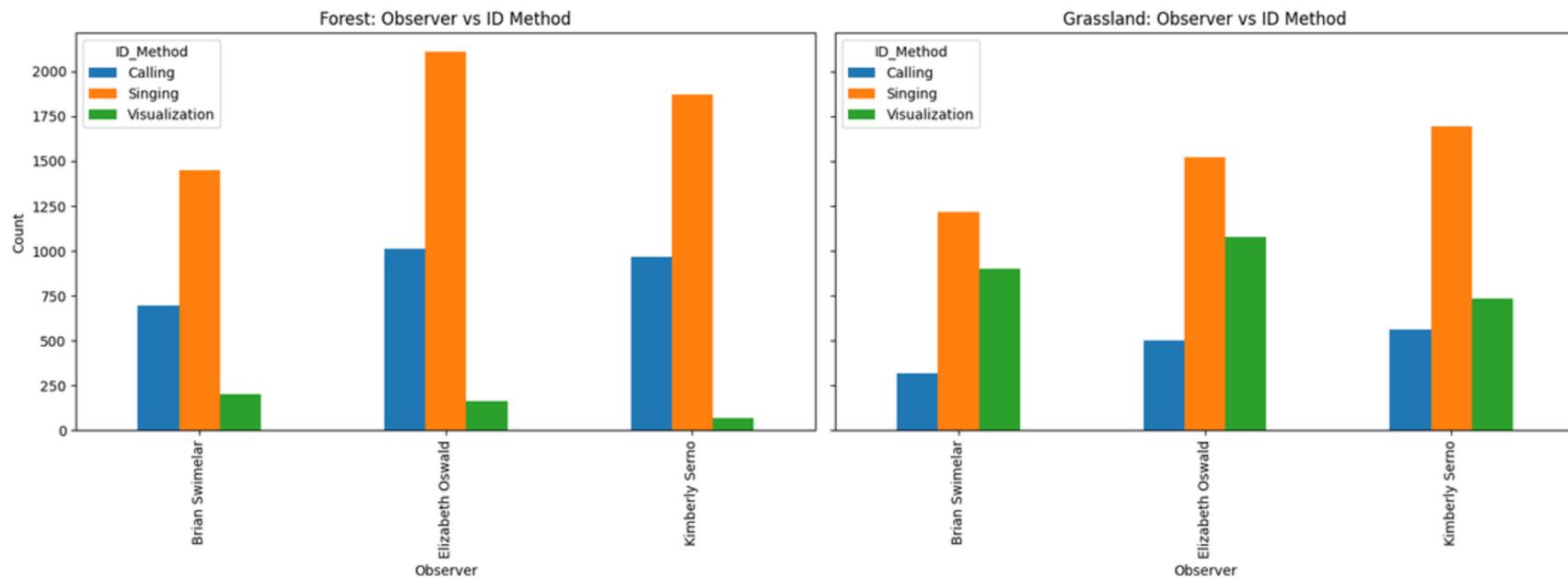


Fig 6

Exploratory Data Analysis in Colab



- Fig 7 allows us to visually highlight patterns and trends in bird behavior based on weather.

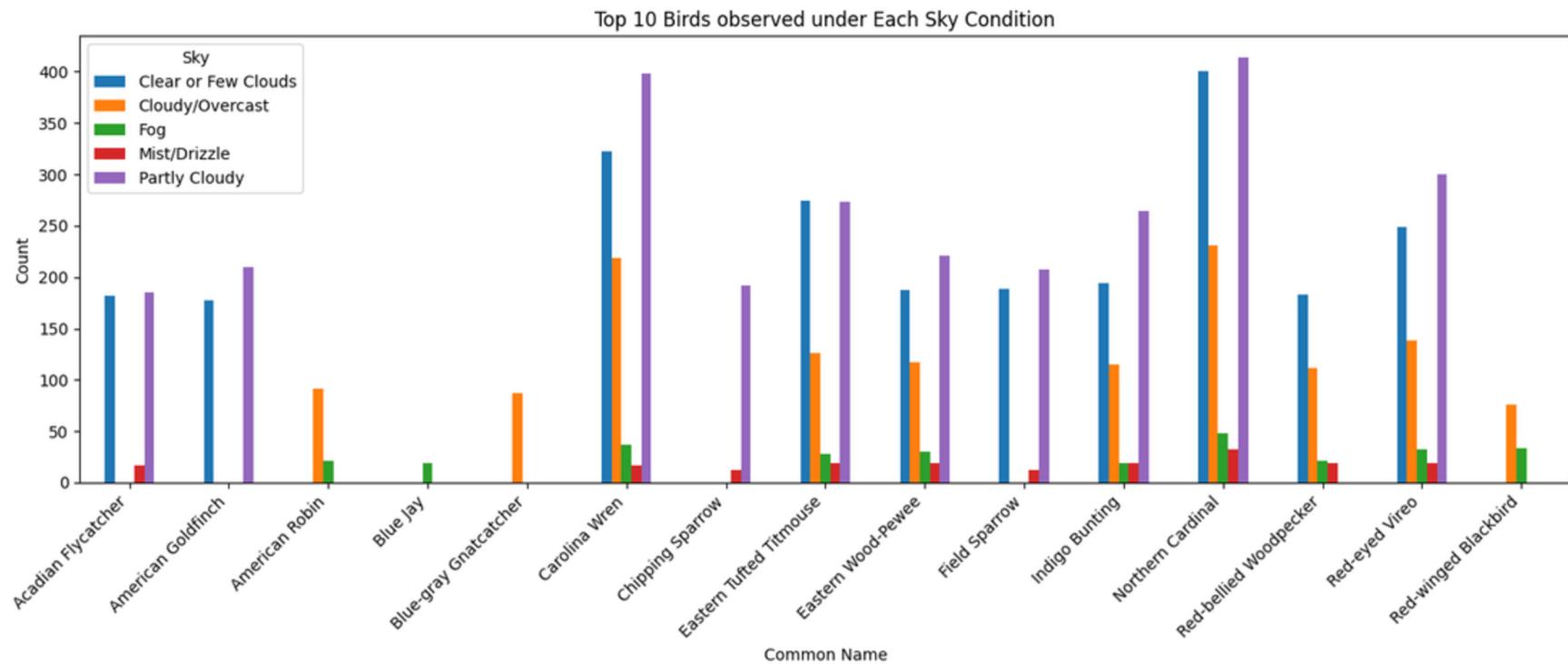


Fig 7

Exploratory Data Analysis in Colab



- Fig 8 shows how temperature and humidity vary under different sky conditions for two habitats (Forest and Grassland).

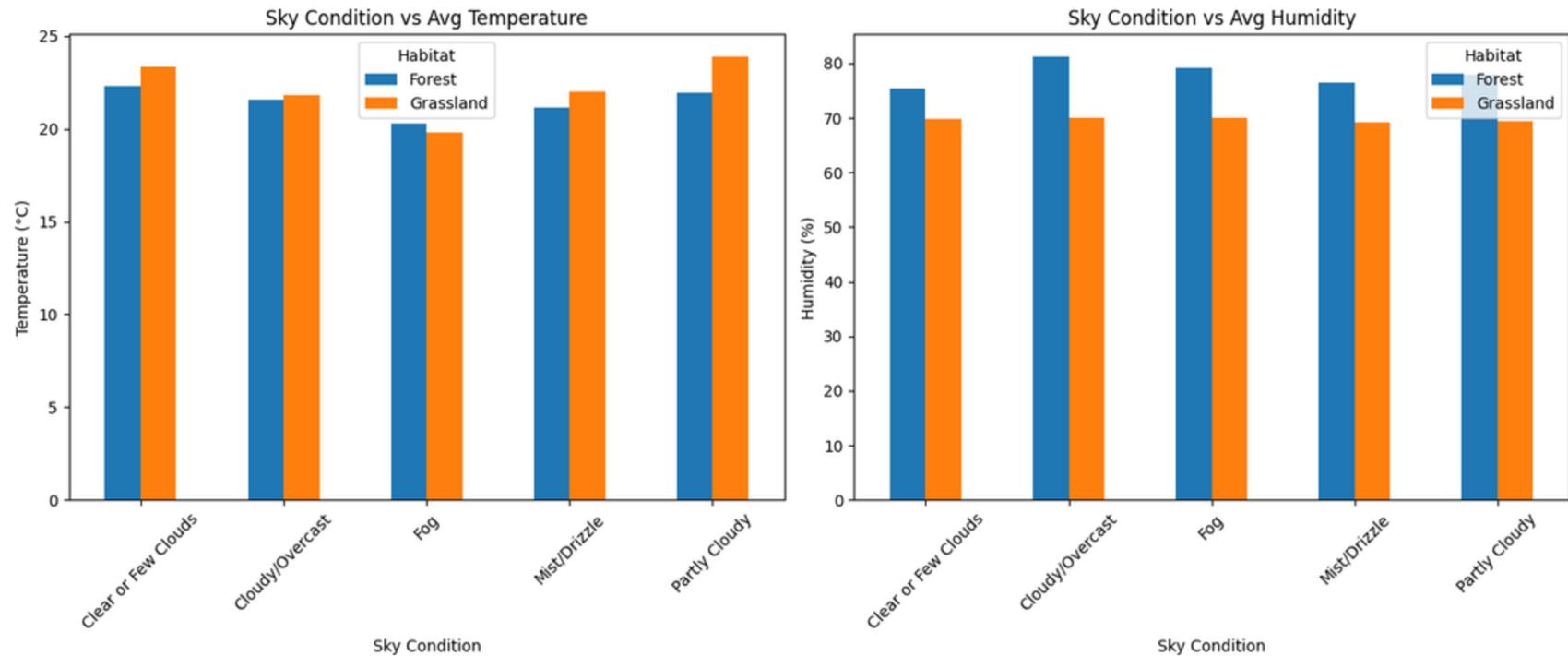


Fig 8

Exploratory Data Analysis in Colab



- Fig 9 compares temperature and humidity under different wind conditions for Forest and Grassland habitats.

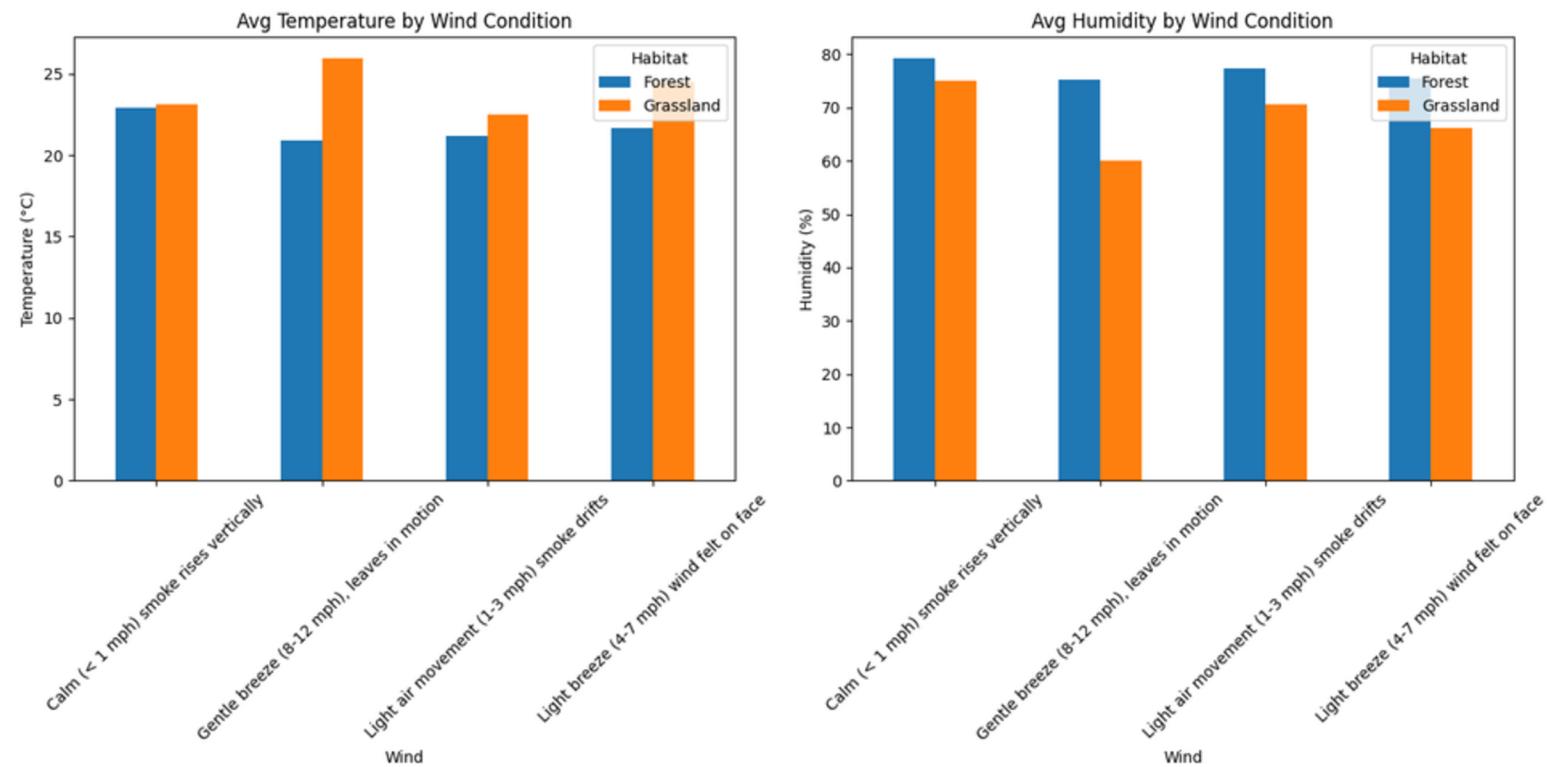


Fig 9

Exploratory Data Analysis in Colab



- Fig 10 shows the impact of different disturbance levels on bird observation counts across two habitats.

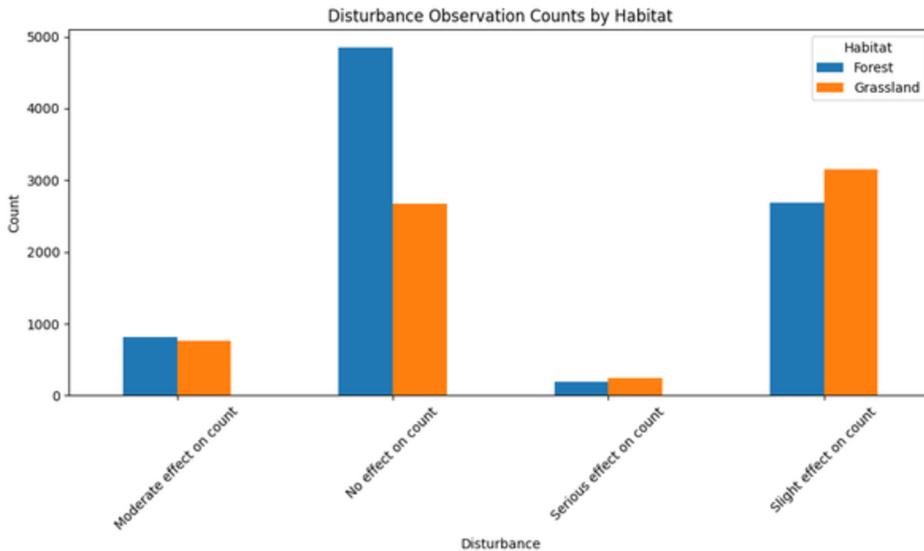


Fig 10

- Fig 11 compares species richness across habitats (Forest vs. Grassland) and seasons (Spring vs. Summer).

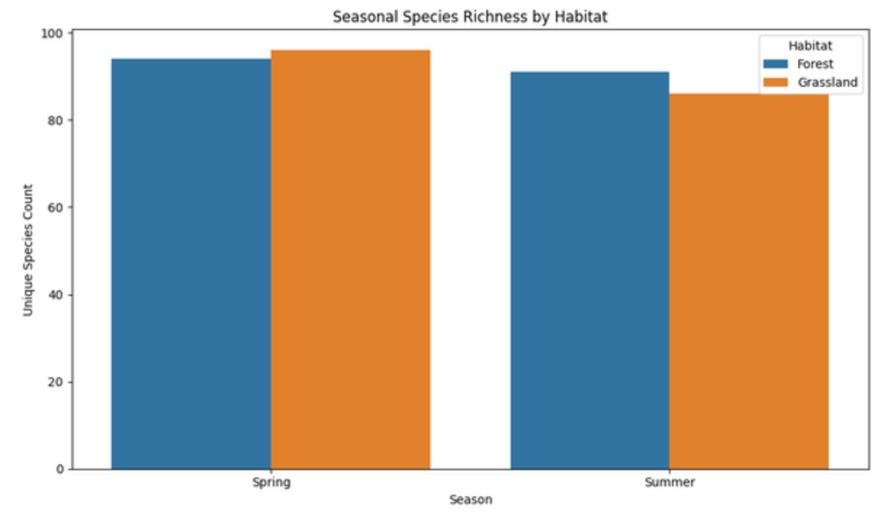


Fig 11

Exploratory Data Analysis in Colab



- Fig 12 shows the relationship between humidity and bird activity.

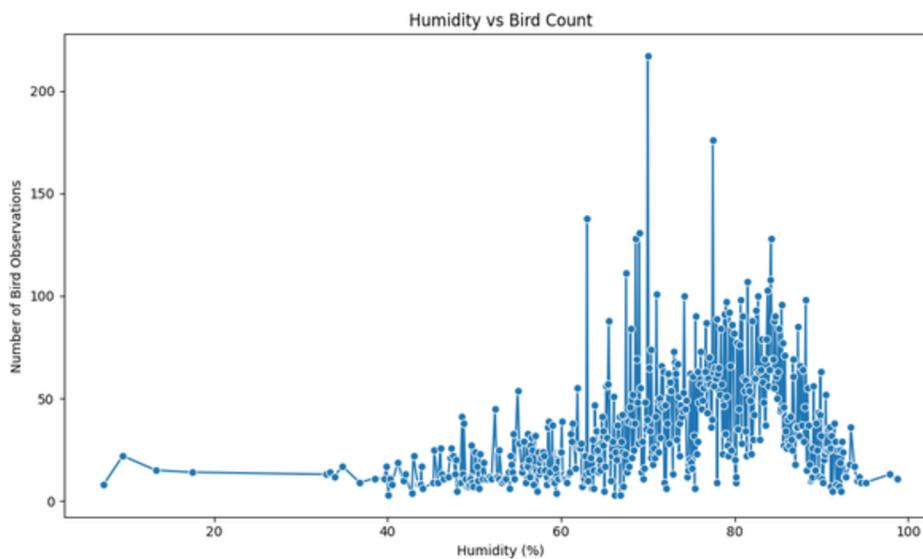


Fig 12

- Fig 13 shows the impact of temperature on bird activity.

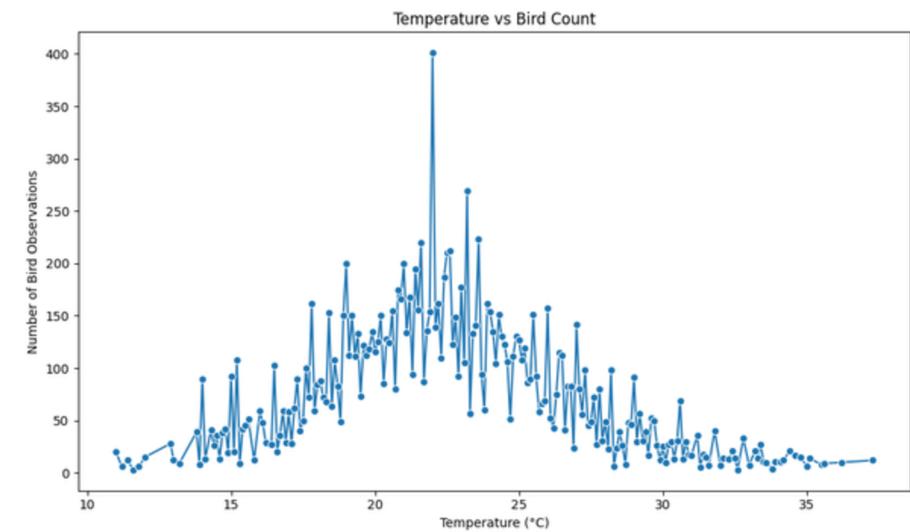


Fig 13

Exploratory Data Analysis in Colab

- Fig 14 gives visual representation of how strongly variables relate to each other.
- Fig 15 helps detect outliers, trends, and clusters across variable pairs.

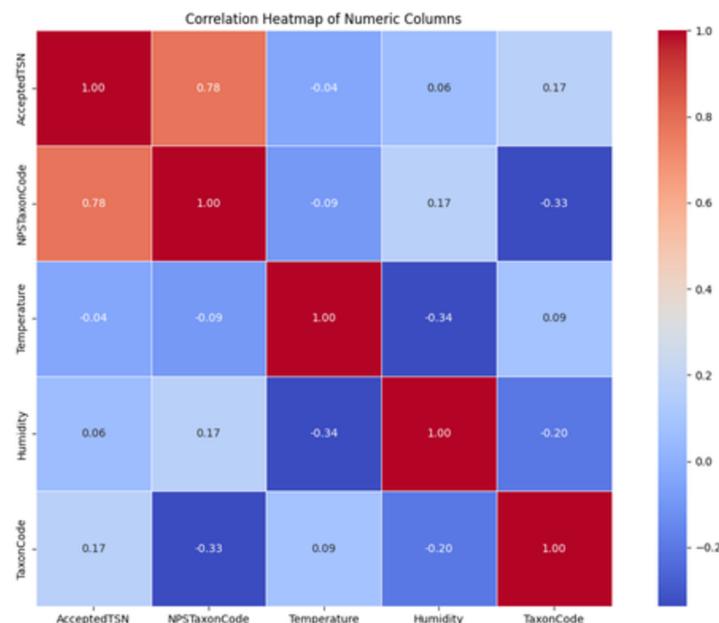


Fig 14

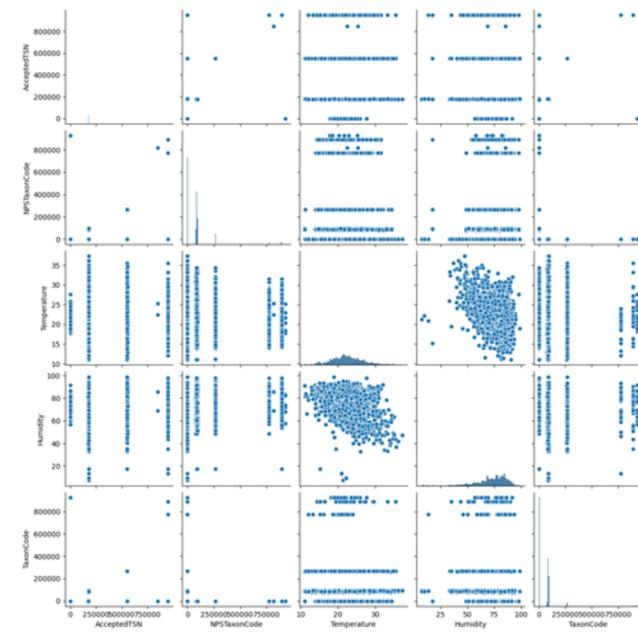


Fig 15

Dashboards



- Fig 16 highlights key bird observation metrics, showcasing habitats, most sighted bird species, and leading observers.

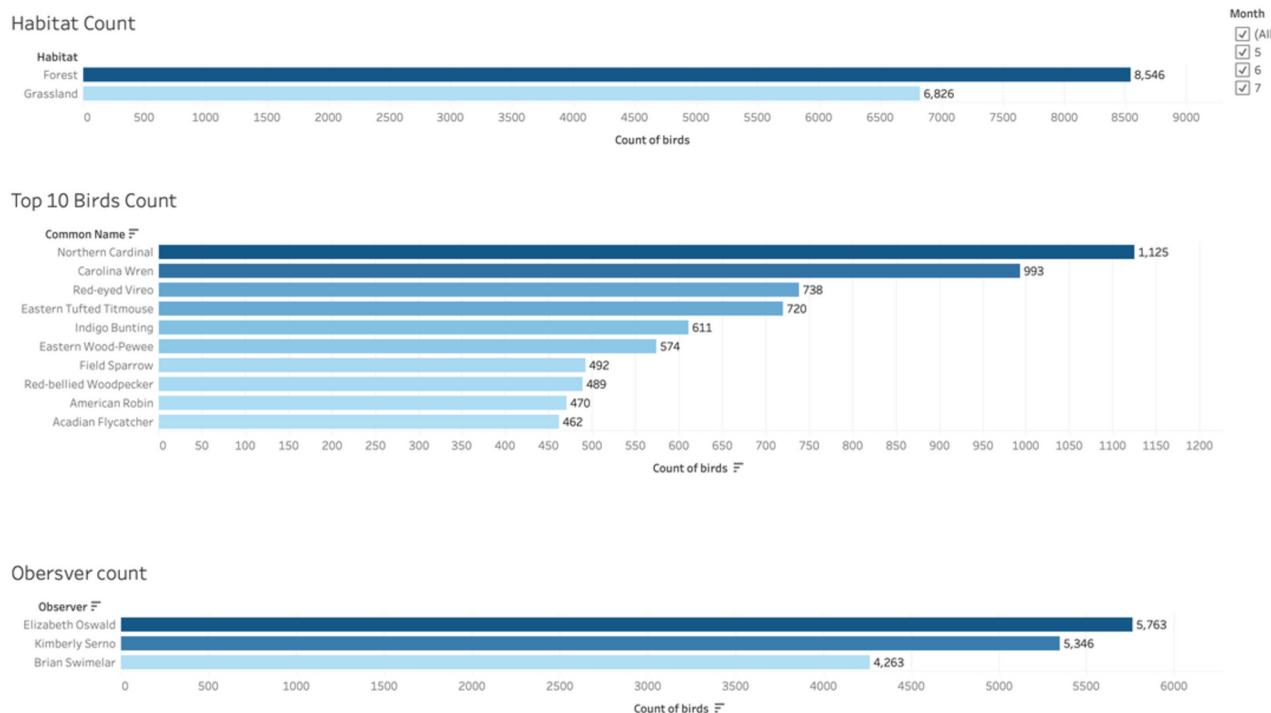


Fig 16

Dashboards



- Fig 17 highlights that most bird observations were of undetermined sex, predominantly in forests and identified through singing.

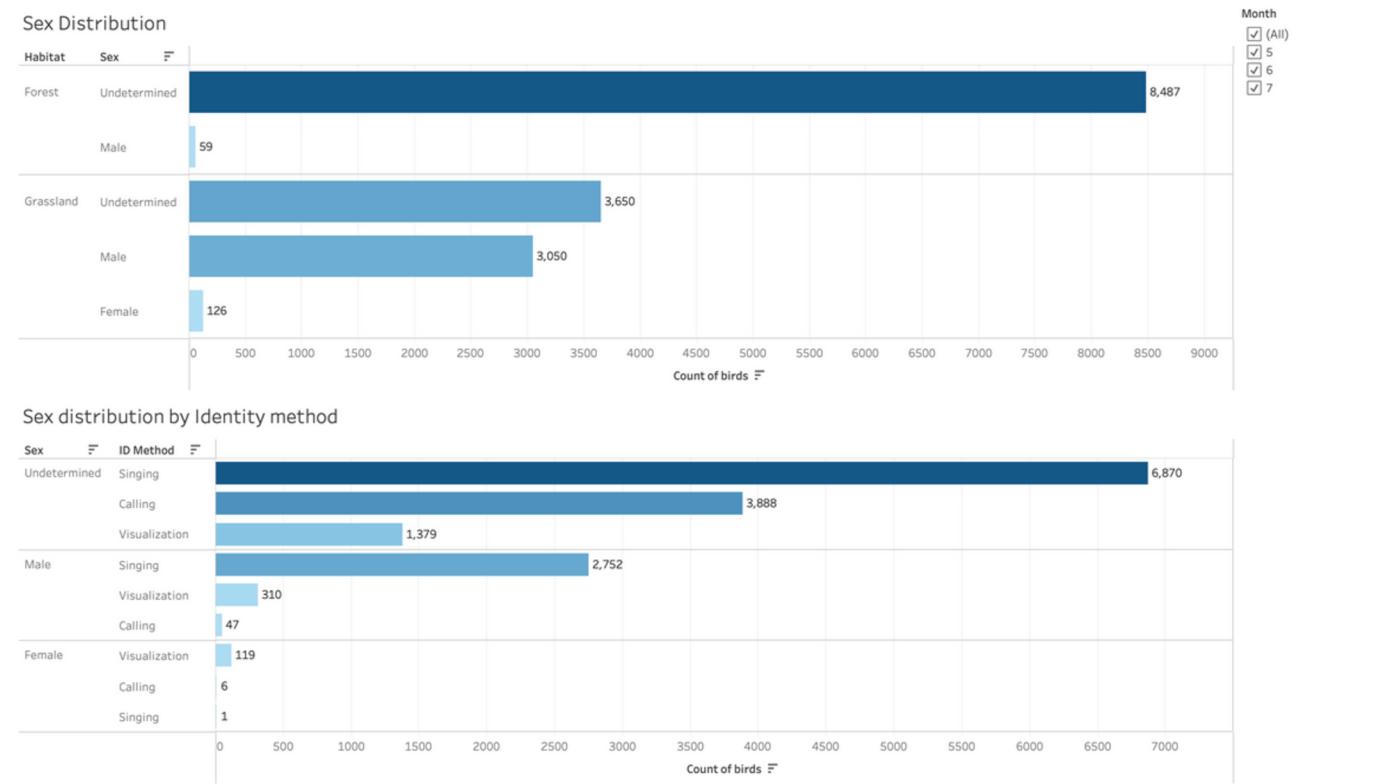


Fig 17

Dashboards



- Fig 18 shows that bird sightings are highest during Partly Cloudy and Clear or Few Clouds and Northern Cardinal and Carolina Wren were the most observed.

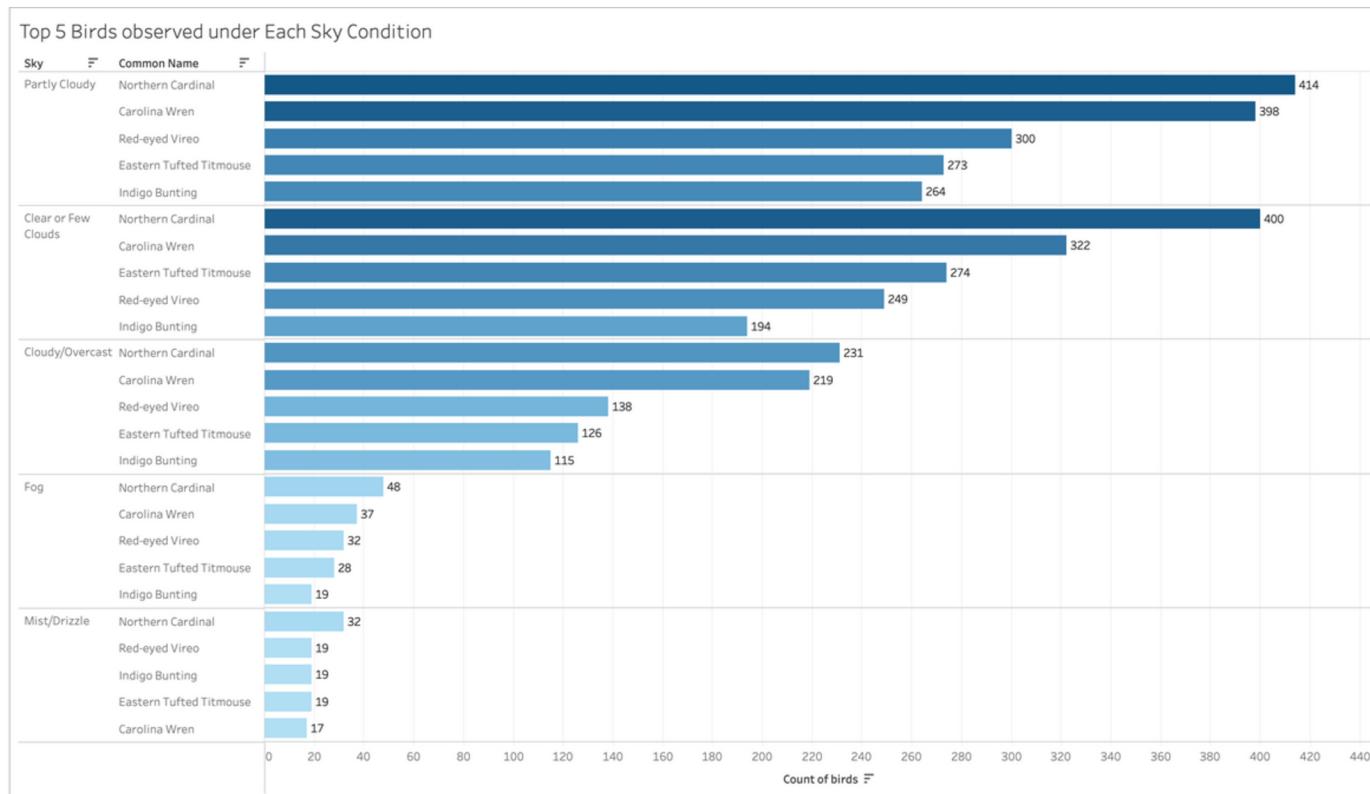


Fig 18

Dashboards



- Fig 19 Most bird observations show "no effect" or "slight effect" of disturbance.

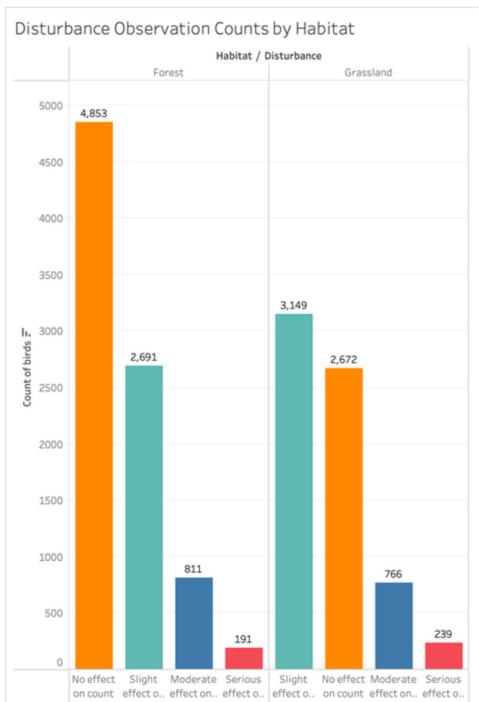


Fig 19

- Fig 20 Spring shows higher bird species richness than summer in both grassland and forest habitats.

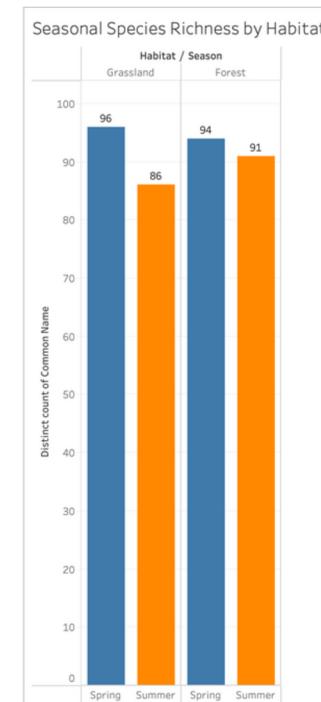


Fig 20

Dashboards



- Fig 21 shows distributions of bird observations occurred most at higher humidity (80–90%) and moderate temperatures (22–24°C).

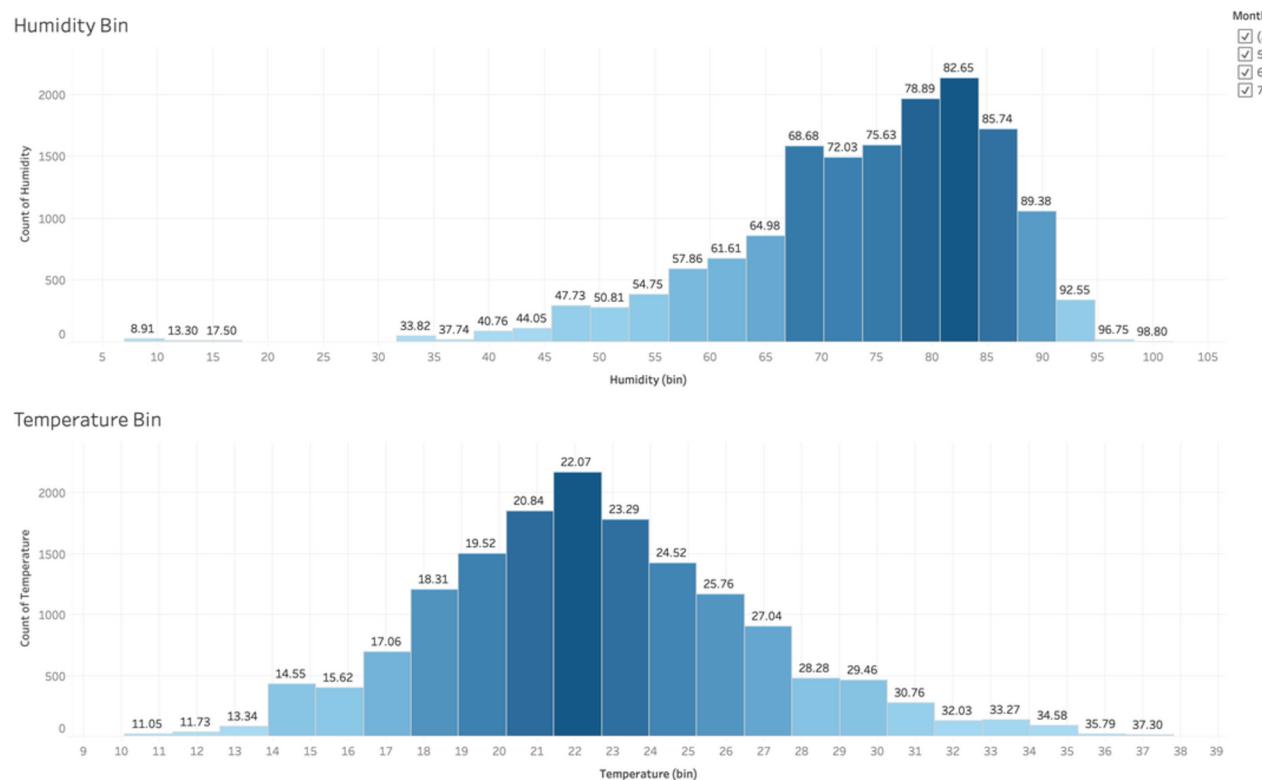


Fig 21

Dashboards



- Fig 22 Elizabeth Oswald consistently recorded the highest bird counts across both forest and grassland habitats. Singing was the most effective ID method.

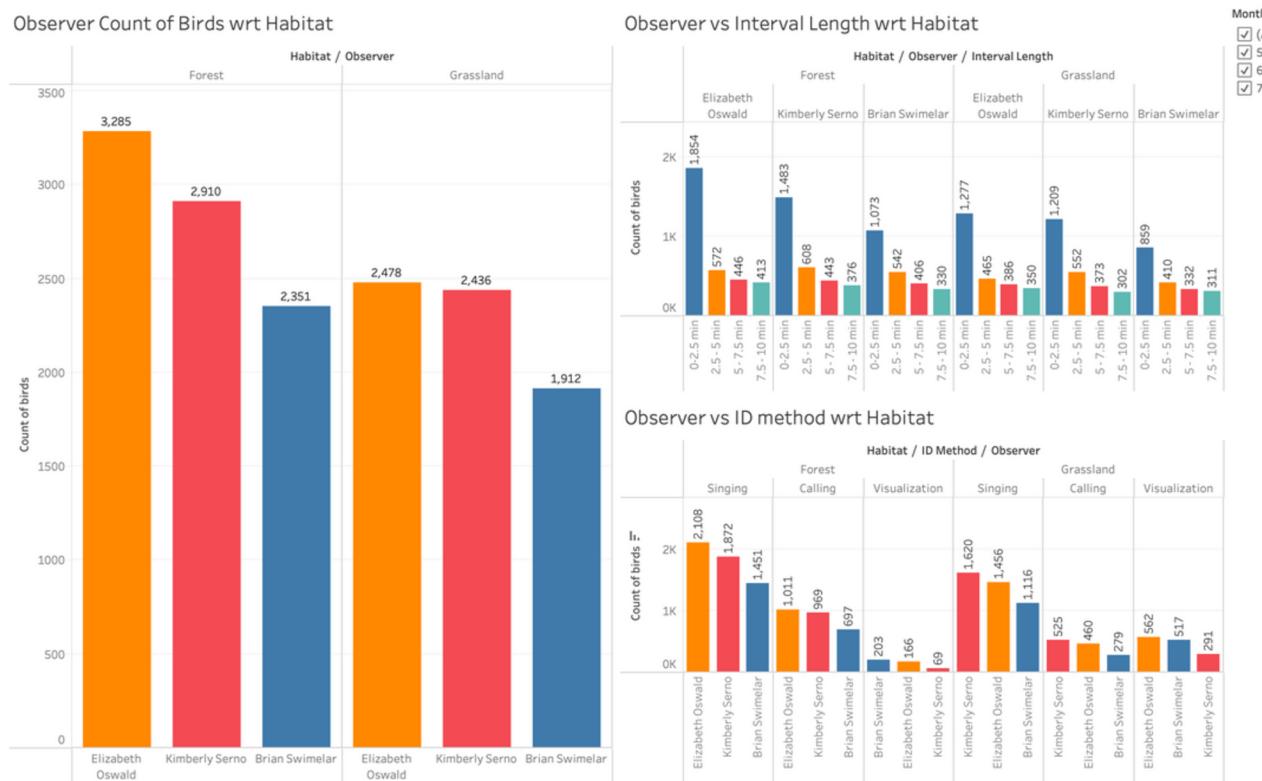


Fig 22

Dashboards



- Fig 23 Bird counts peaked around 22°C. Higher humidity levels (60–80%) generally supported greater bird activity.

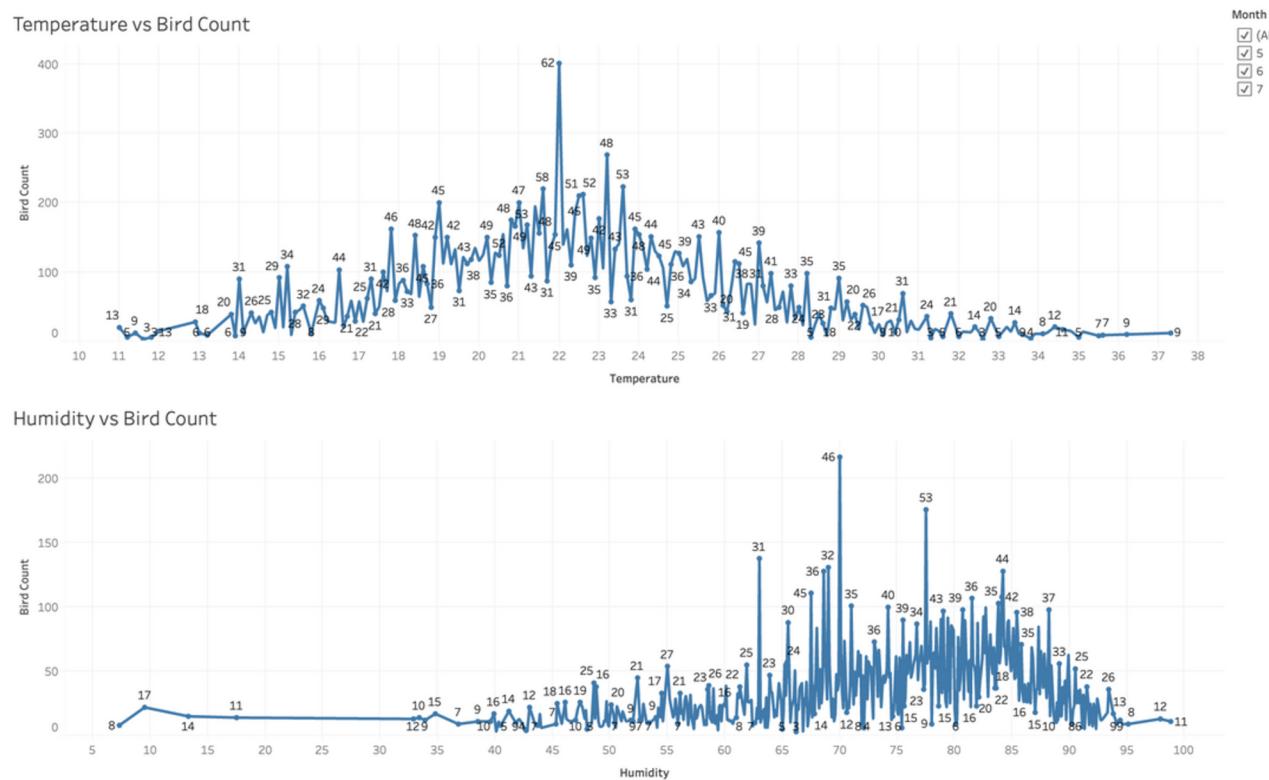


Fig 23

Dashboards



- Fig 24 Cloudy forests show highest humidity (81.23%). Grasslands have humidity around 69–70%.
- Gentle breeze in grassland gives highest temperature (25.9°C). Forests stay more humid.

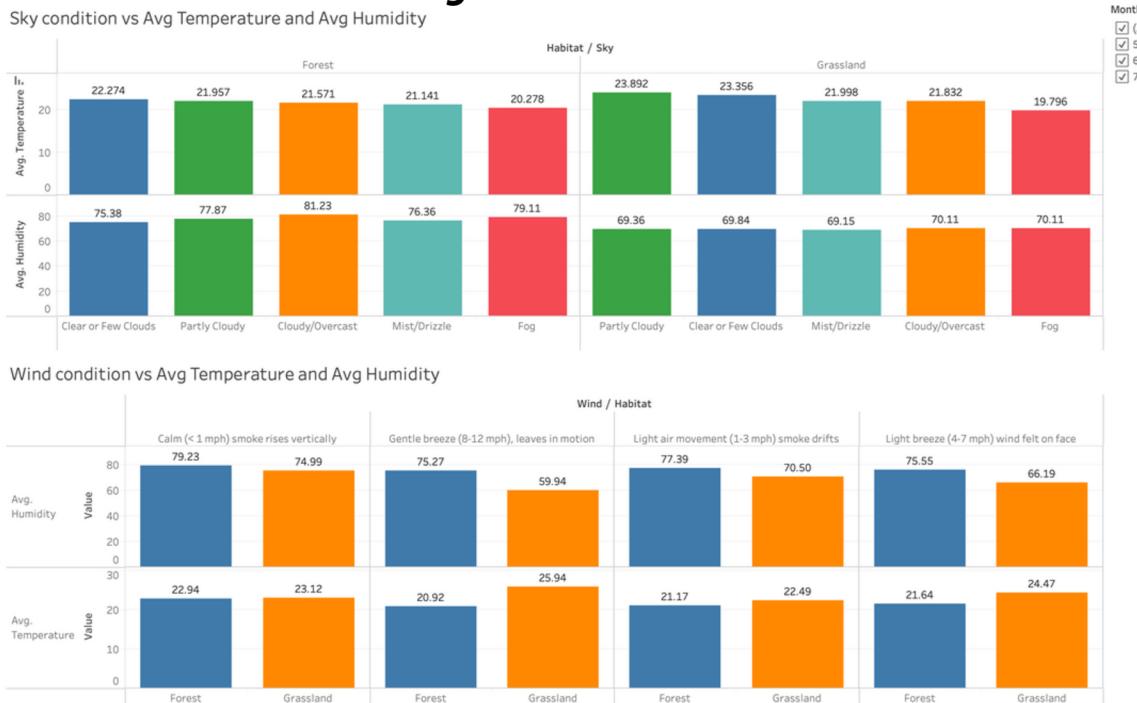


Fig 24

Dashboards



- Fig 25 Vireo olivaceus is most seen (694) in forests. Carolina Wren is mostly spotted by singing (879). Northern Cardinal is the top bird across all seasons.

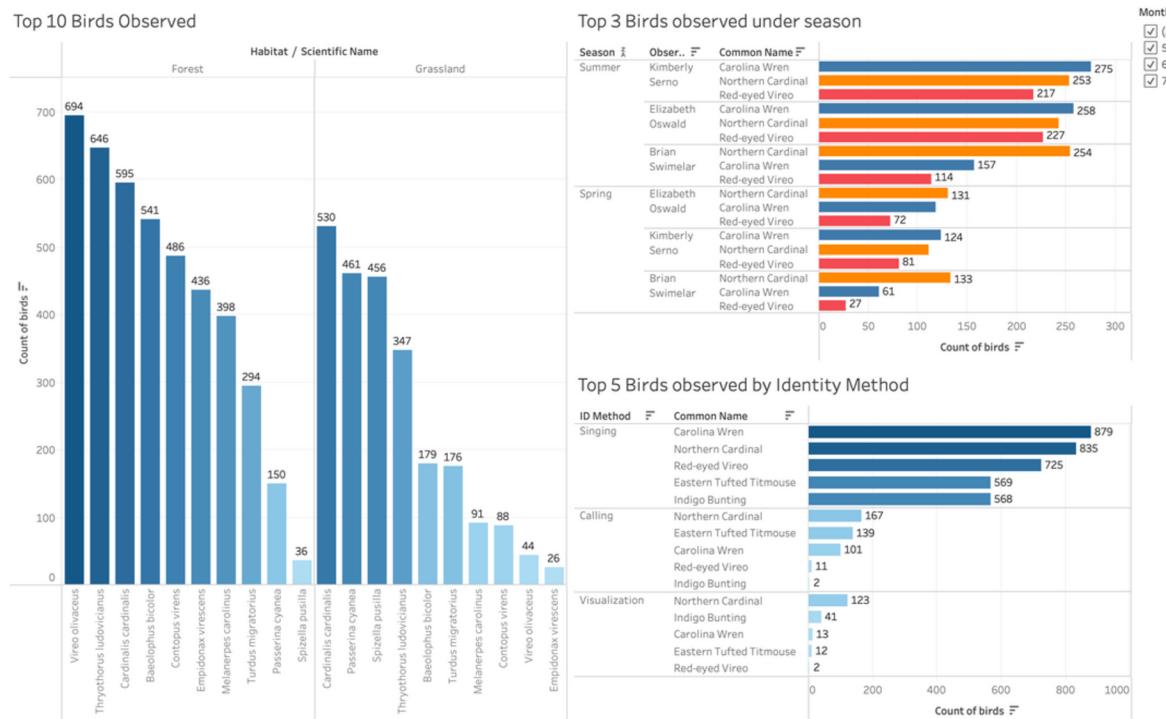


Fig 25

Dashboards



- Fig 26 shows the count of birds discovered within first 3 mins in Habitats.

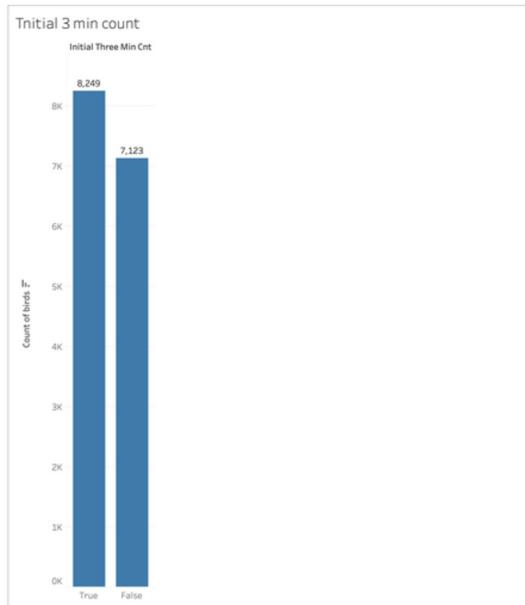


Fig 26

- Fig 27 Kimberly Serno and Elizabeth Oswald have most visits to Habitats (4,896) and (4,790).

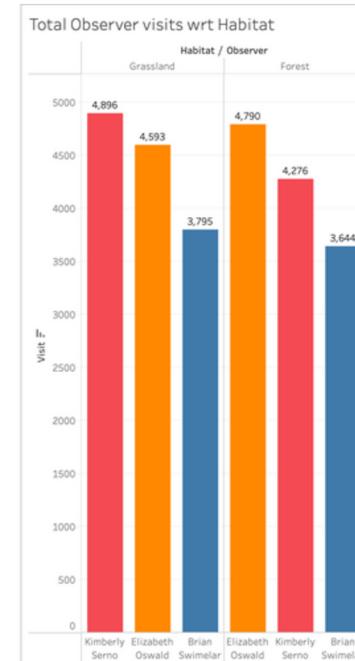


Fig 27

Solution

- Implement tailored ID methods for different habitats for better detection rates.
- Align surveys with high bird activity windows to improve species capture and reduce noise in data.
- Regular workshops will reduce inconsistencies and enhance overall data reliability across regions.
- Design surveys to cover all seasons and help forecast biodiversity shifts over time.
- Use temperature, humidity, and sky conditions to build predictive models that improve the efficiency of survey scheduling.

Conclusion

- Forests and grasslands host distinct species, influenced by climate and terrain.
- Temperature, humidity, and sky conditions show measurable impact on bird counts.
- Variations in observer effort and methods can skew data.
- Bird populations fluctuate across months for accurate biodiversity insights.
- The analysis helps prioritize areas for protection and design focused conservation plans designed to each ecosystem needs.