

Bird Monitoring Dashboard Analysis: Forest vs. Grassland Ecosystems

This report provides a comparative analysis between forest and grassland ecosystem bird monitoring data with important insights into observer trends, environmental conditions, activity patterns, diversity, and conservation implications.

Initially with the provided dataset for “forest” and “grassland” separately, I decided to handle both the datasets separately.



Both the dataset's contained series of sheets for each **admin_unit**. Using the python script “**extracting_different_sheets.py**” combined all sheets together for both the datasets.

Data cleaning:



- There was so many empty sheets, those were initially removed and columns such as “**Sub_unit_code**”, “**Initial three min_cnt**”, has been deleted manually since most of the rows were empty in “**Sub_unit_code**” column.
- Under “**Sex**” column most of the rows were empty since it was useful column instead of deleting it I handled the missing values as NaN since more than 50% of the rows was empty implementing any statistical method would create bias.
- Could observe 1% of data was empty under “**ID_method**” section, hence filled those missing row with the mode of the column.

I. Forest Data Analysis (Power BI)



1. Observer Trends and Contribution:

-  **Dominant Observers:** The dominant observers are Elizabeth Oswald, Kimberly Serno, and Brian Swimelar. Elizabeth Oswald has the highest contribution (38.44%), followed by Brian Swimelar (34.05%) and Kimberly Serno (27.51%). The distribution indicates a focused effort by a few dominant individuals.
-  **Seasonal Activity:** Observations are consistently made across Spring and Summer, with a slightly higher count in Summer. This indicates year-round or multi-seasonal monitoring, which is crucial for capturing migratory patterns and breeding activities.




2. Environmental Conditions and Disturbance:

-  **Wind Effect:** Bird counts tend to reduce with rising wind perturbation. "Calm" (<1 mph) and "Light air movement" (<4 mph) conditions are related to larger common name figures, while "Moderate" and "Serious" impacts on count are found in more powerful winds. This indicates that wind regimes have strong effects on bird activity and visibility in woodland habitats.
-  **Effects of Disturbance:** The information classifies disturbance as "No effect," "Slight effect," "Moderate effect," and "Serious effect." Although particular types of disturbance are not specified, the definite pattern of declining bird population with growing disturbance underlines the susceptibility of forest bird communities to disturbances in the environment.







3. Conservation Insights & PIF Watchlist Status:

-  **PIF Watchlist Status:** Most of the species seen (97.34%) are NOT included in the PIF Watchlist, which means most widespread forest birds are currently stable. Nevertheless, 25.78% of species seen are on the watchlist, highlighting the need for ongoing monitoring and conservation efforts for those threatened populations.
-  **Regional Stewardship:** The inclusion of a "Regional Stewardship" metric (albeit not fully described) indicates an evaluation of the success of local conservation programs.

4. Distance and Behaviour:


-  **Distance Categories:** The data separates observations into physical distance categories (<50 meters, 50-100 meters). The greatest common name number is in <50 meters, showing a keen interest in close observations.
-   **Behaviour (Increase/Decrease/Total):** This is most probably referencing population trends or observed change in behaviour. The "Total" figure of 4.16K is perhaps the overall observations, with the breakdown into increase, decrease, and other.

5. Visit Patterns and Activity:

-  **Visit Frequency:** The "Visit patterns" pie chart indicates that most visits fall under "1" (48.72%) or "2" (51.28%). This may be indicative of how many times a specific site was visited or for how long visits were made.
-  **Monthly Observation:** June has the greatest number of monthly observations, closely followed by May and July, which may be indicative of a high point in bird activity or monitoring during late spring and early summer.
-  **Day Analysis:** "Early Morning" receives the maximum number of visits (4.6K), which is much greater than "Morning" (2.9K), "Evening" (0.6K), or "Fore-noon" (0.4K). This establishes the significance of early morning surveys of forest birds.
-   **Activity Patterns (ID Method):** "Calling" is the leading identification method (about 3.1K), followed by "Singing" (about 2.3K) and "Visualization" (about 2.6K). This indicates that auditory signals play a crucial role in bird detection in closed forest environments.
-  **Diversity Indicators:** PRWI, CHOH, CATO, and NACE are some of the most commonly seen species (using AOU Code counts). This represents the most prevalent bird species in the forest biome.

II. Grassland Data Analysis

1. Observer Trends and Contribution:

-  **Consistent Observer Distribution:** Just as in the forest data, Elizabeth Oswald (36.41%), Brian Swimelar (35.07%), and Kimberly Serno (28.52%) are the lead observers, with a consistent monitoring team between habitats.

2. Environmental Conditions and Disturbance:

- 🌿 **Wind Effect:** Like forest data, "Calm" (<1 mph) and "Light air movement" (<4 mph) correlate with greater numbers of birds. The effect of "Gentle breeze" (8-12 mph) and "Light breeze" (4-7 mph) still indicates a decline in common name number, but the drop is less precipitous than in forests. This indicates that although wind has an influence on detectability, its effect may be somewhat less extreme in open grassland habitats than it is in dense forests.
- 🚧 **Disturbance:** "Slight effect on count" is the most relevant disturbance category, suggesting that grasslands may face more general, less intense disturbances than forests, or that birds in grasslands are rather more resistant to some levels of disturbance.

3. Conservation Insights & PIF Watchlist Status: 📋

- ✨ **PIF Watchlist Status:** A very large percentage (95.00%) of grassland bird species are not listed on the PIF Watchlist. This is more than in forests, which might reflect a better status for grassland bird populations or fewer problematic species in the grassland types visited. Nevertheless, 17.69% of visited species are watch listed, and they need to be addressed.

4. Distance and Behaviour: ➡️

- 🎯 **Distance Categories:** Distance pattern of observation is similar to forests with a highest number in <50 meters. But there's a high "Decrease" (-1053) observed in the "Distance and behaviour" diagram, which might indicate population reductions or displacement from observer during monitoring.

5. Visit Patterns and Activity: ⌚

- 📊 **Frequency of Visits:** The patterns of visits are slightly different, with "Visit 1" (30.91%), "Visit 2" (31.51%), and "Visit 3" (37.58%) having a more even pattern than forest data. This could reflect more varied or more regular visit schedules in grasslands.
- 🌞 **Observation by Month:** As with forests, May and July are important months for observations, and June also has high activity.
- 🌄 **Day Analysis:** "Early Morning" prevails again in visit numbers (4.2K), reaffirming its significance for bird tracking among habitats. "Morning" (2.8K), "Fore-noon" (0.8K), and "Evening" (0.7K) rank after it.
- 🎵 **Activity Patterns (ID Method):** "Calling" (2.3K) and "Singing" (2.9K) continue to be dominant identification methods, but "Visualization" (1.5K) seems less common than in woodlands. This could mean grassland birds are more difficult to observe visually because of their habitat or activity, or that sound signals are even more paramount.
- 🦋 **Diversity Measures:** ANTI, MONO, and MANA are the most frequent species found in grasslands. This is indicative of the unique avian assemblages occurring in grassland habitats versus forests.

III. Comparative Insights and Documentation Points: 🔄

Similarities: ✔

- 🧑‍🤝🧑 **Observer Consistency:** The same group of main observers is responsible for both forest and grassland monitoring, maintaining a consistency of data gathering methodology, if not quantity.
- ⌚ **Early Morning Peak:** "Early Morning" is always the most productive period of bird observations in both habitats, pointing to peak survey time.
- 🗣️ **Auditory Detection:** "Calling" and "Singing" are key methods of identification in both ecosystems, underlining the significance of sound monitoring.
- 🌬️ **Wind Impact:** Wind always adversely affects bird observations in both habitats, although with different levels of severity.

Differences & Key Insights: 🔍

- ⚠️ **PIF Watchlist Status:** Although both habitat types have species on the PIF Watchlist, grasslands have a slightly higher proportion of non-watchlist species. This might reflect potentially healthier overall bird populations in the sampled grasslands or differing conservation priorities/challenges.
- resilience.
- 👁️ **Emphasis on Identification Method:** "Visualization" is less common as an ID method in grasslands than in forests, perhaps because the open habitat makes birds more difficult to approach visually, or merely alternate observer methods in that habitat.
- 🌿 **Diversity of Species:** The leading species (as represented by AOU Code counts) are different for every habitat (e.g., PRWI, CHOH in forests vs. ANTI, MONO in grasslands), further supporting the need for habitat-specific conservation methods.
- 📖 **Visit Patterns:** The pattern of visitation frequencies is more diverse in grasslands (Visits 1, 2, and 3 more evenly distributed) than in forests (primarily Visits 1 and 2). This might suggest alternative survey methods or easier access in grasslands.
- 📉 **Behavioural Trends (Grasslands):** The "Decrease" in number of common names in the grassland's distance and behaviour graph warrants further examination. It may indicate real population decline, elevated shyness, or observer bias at some distances.