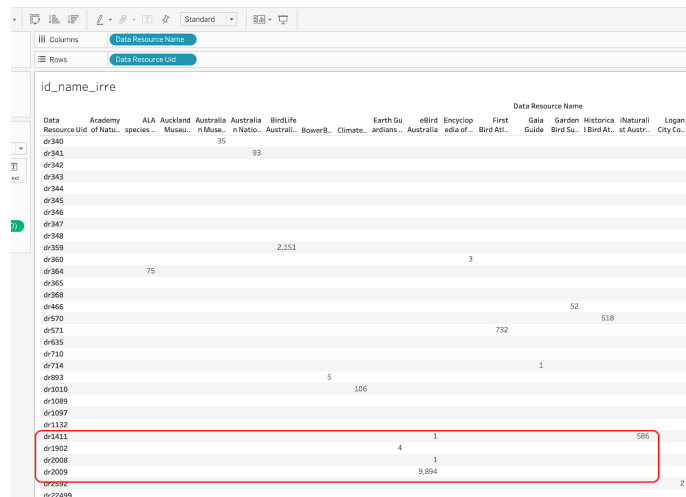


# 1. Data Loading, Checking & Cleaning

The dataset was loaded into Tableau Public for visual exploration. Before analysis, the data was inspected for irregularities, defined here as values that are inconsistent with expected formats, domain rules, or internal data integrity constraints. Two irregularities were identified and corrected using R (tidyverse package).

## 1.1 Irregularity 1 — dataResourceId and dataResourceName Mismatch

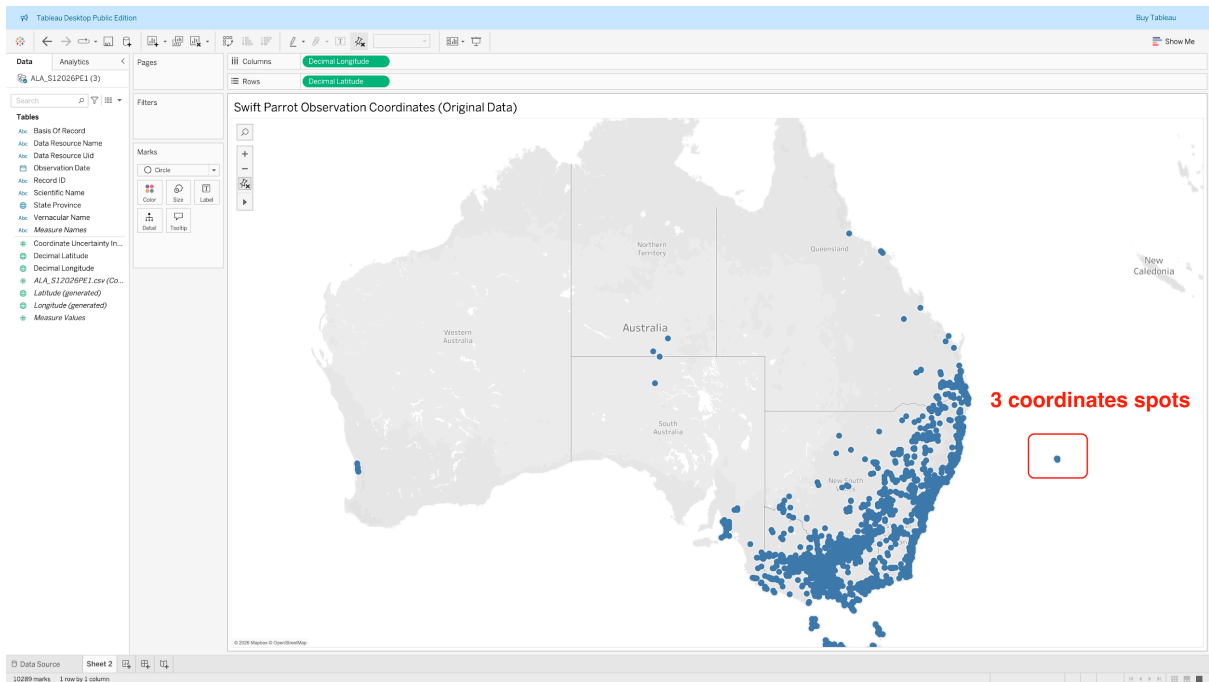
A cross-tabulation of dataResourceId against dataResourceName in Tableau revealed that UID dr1411 was associated with two resource names: iNaturalist Australia (586 records) and eBird Australia (1 record) [Figure 1]. Since dr1411 is definitely the UID for iNaturalist Australia based on its 586 records, the single eBird Australia record under dr1411 was identified as a data entry error. Additionally, dr2008 was observed to contain a single eBird Australia record alongside the dominant eBird UID dr2009 (9,894 records). As the origin of dr2008 could not be confirmed, it was left unchanged to avoid introducing assumptions. The confirmed error was corrected in R by reassigning the mislabelled record to dr2009.



[Figure 1: Cross-tabulation of dataResourceId vs dataResourceName, revealing dr1411 mapped to two resource names]

## 1.2 Irregularity 2 — Implausible Observation Coordinates

A geographic scatter plot of all observation coordinates in Tableau revealed three records located at approximately 159.08°E, 31.5°S — a remote NSW territory approximately 600km offshore (Figure 2). According to the Department of Natural Resources and Environment [Tasmania](#) (n.d.), Swift Parrots migrate between Tasmania and southeastern mainland Australia, with no documented range extending to Lord Howe Island. As the correct mainland coordinates could not be determined, these three records were removed from the cleaned dataset in R.



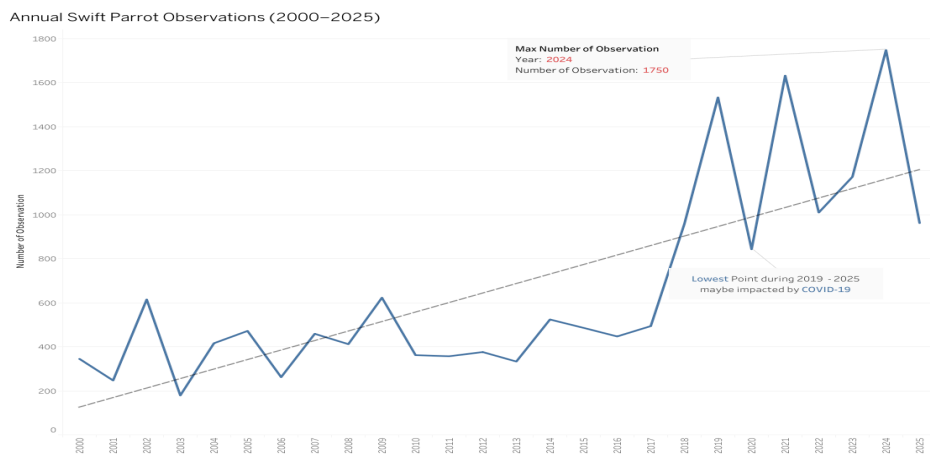
[Figure 2: Geographic scatter plot of all observation coordinates revealing three outlier records at Lord Howe Island]

## 2. Data Exploration and Visual Analysis

Observations were filtered to 2000–2025 for visual analysis. Pre-2000 records are sparse, reflecting limited digital data collection before citizen science platforms emerged, and 2026 was excluded as an incomplete year. The retained 26-year period exceeds the minimum two-decade requirement.

### 2.1 Q1A — When Were These Birds Observed Over Time?

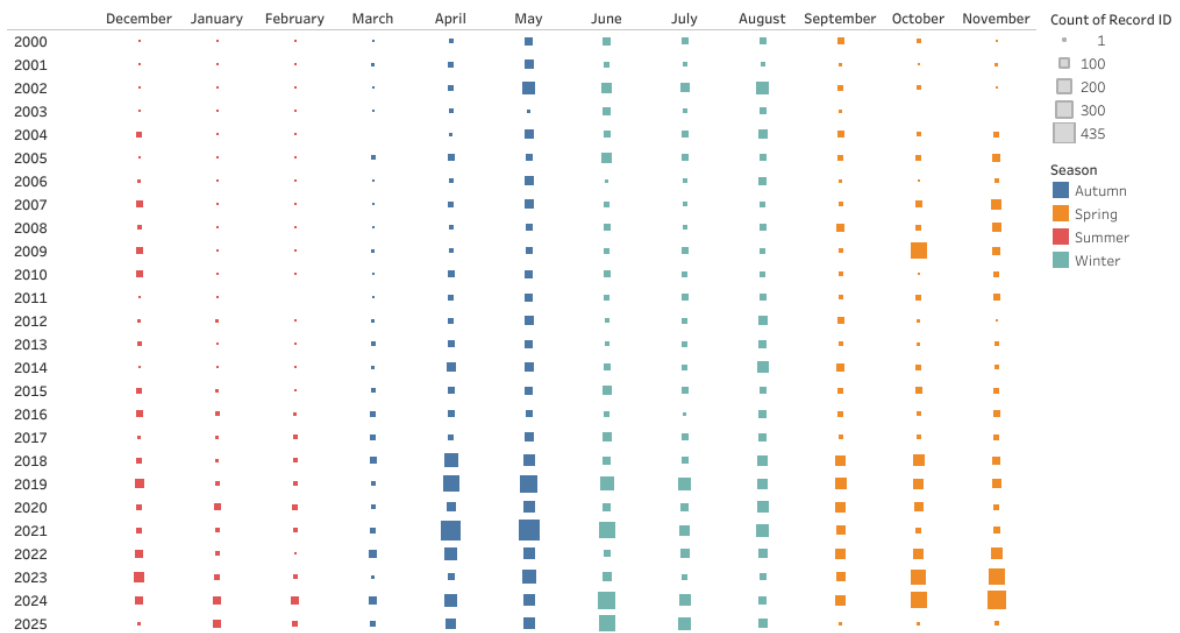
Figure 3 shows a clear long-term increasing trend in Swift Parrot observations from 2000 to 2025, confirmed by the overlaid linear trend line. Observations remained relatively stable between 2000 and 2016 before surging notably from 2017, peaking at 1,750 records in 2024. A marked dip in 2020 may partly reflect reduced citizen science activity during the COVID-19 pandemic, though this cannot be confirmed from the data alone. A line chart is appropriate here as it effectively communicates continuous change over time, with year encoded on the X-axis as an ordered temporal variable and observation count on the Y-axis as a quantitative measure.



[Figure 3: Annual Swift Parrot Observations (2000–2025)]

The seasonal heatmap (Figure 4) complements Figure 3 by revealing monthly patterns within each year. Most observations occur between April and November — autumn through spring in the Southern Hemisphere — consistent with the Swift Parrot's migratory behaviour of leaving Tasmanian breeding grounds in autumn and returning in spring. April and May 2021 recorded the highest monthly counts (378 and similar, respectively), while recent years show growing October and November activity, suggesting increased spring sighting engagement. The heatmap encodes year on the Y-axis, month on the X-axis, season through colour, and observation count through mark size — enabling two temporal dimensions and magnitude to be read simultaneously, which a line chart alone cannot achieve.

Monthly Observation Patterns by Season (2000–2025)



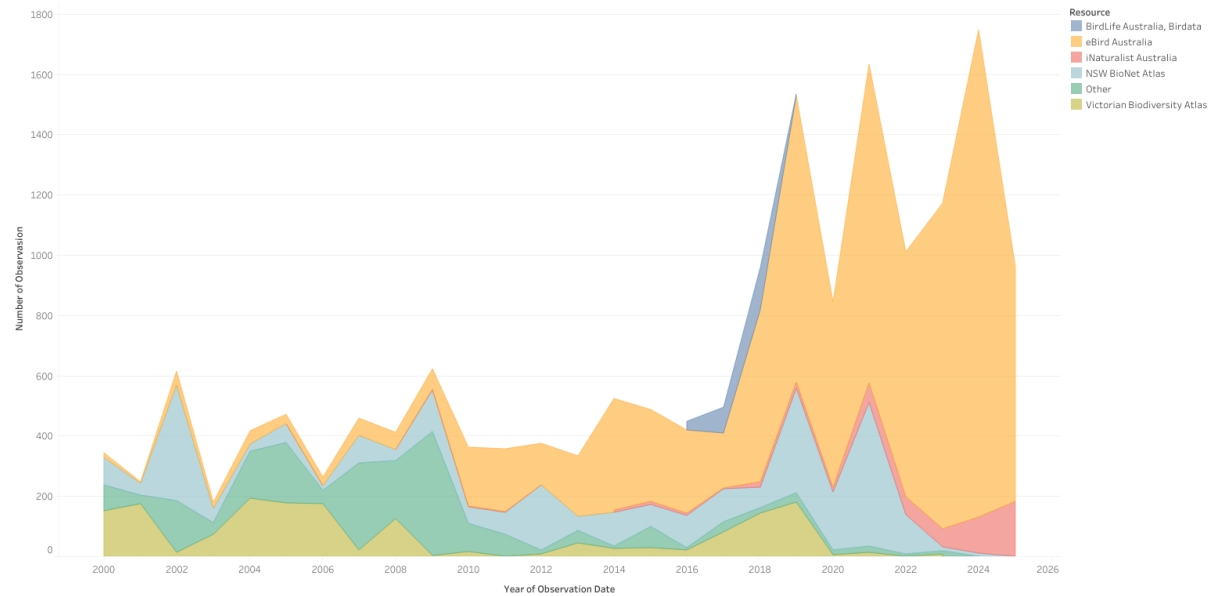
[Figure 4: Monthly Observation Patterns by Season (2000–2025)]

## 2.2 Q1B — How Have Observations from Different Data Resources Changed Over Time?

Figure 5 shows that the composition of data resources has shifted substantially over the study period. In the early 2000s, contributions were relatively balanced across institutional sources, including the Victorian Biodiversity Atlas and NSW BioNet Atlas. From approximately 2019, eBird Australia emerged as the dominant contributor, growing rapidly to account for the majority of observations through 2024. iNaturalist Australia also grew notably from around 2017, reflecting the broader global rise of smartphone-based citizen science. BirdLife Australia Birddata maintained a modest but consistent contribution throughout, while the remaining resources grouped as "Other" remained negligible across the entire period.

A stacked area chart is appropriate here as it simultaneously conveys total observation volume and each resource's relative contribution over time. Year is encoded on the X-axis as a continuous temporal variable, observation count on the Y-axis, and resource group through six visually distinct colours. The 36 original data resources were consolidated into the five most prolific contributors plus an "Other" category to maintain legibility without losing meaningful information.

Observations by Data Resource Group (2000–2025)



[Figure 5: Observations by Data Resource Group (2000–2025)]

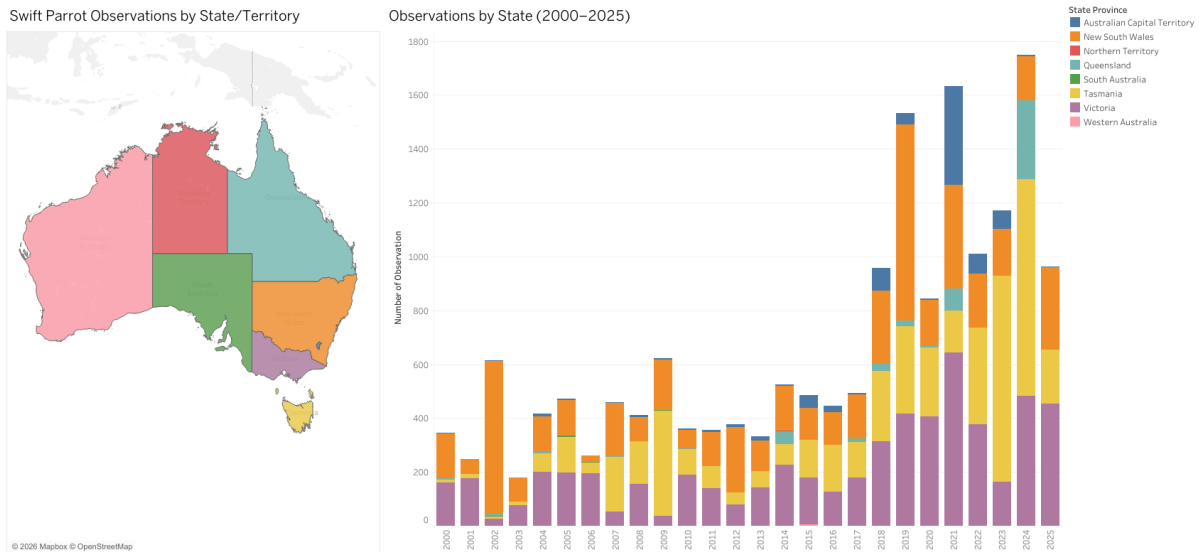
### 2.3 Q1C — In Which Australian States and Territories Were These Birds Mainly Spotted?

Figure 6 combines a choropleth map and a stacked bar chart to illustrate the geographic distribution of Swift Parrot observations across Australia.

Observations are strongly concentrated in southeastern Australia. New South Wales and Victoria are the dominant states across the study period, with Tasmania also showing significant representation consistent with the species' known breeding habitat. Queensland contributes a smaller but visible share, while South Australia, the Australian Capital Territory, Western Australia and the Northern Territory record minimal observations, reflecting the species' limited presence outside the southeastern migration corridor.

A choropleth map is appropriate for this question as it directly encodes observation distribution by geographic region, allowing spatial patterns to be understood immediately. Each state is assigned a distinct colour, enabling rapid visual differentiation. The map confirms that sightings are largely absent from inland, western and northern Australia, consistent with the known ecology of the species. The stacked bar chart complements the map by adding a temporal dimension, showing how state-level contributions evolved year by year from 2000 to 2025. Consistent state colours within the dashboard allow direct cross-referencing between both charts. A stacked bar chart is appropriate as it encodes both total observation volume per year and each state's proportional contribution simultaneously, which the map alone cannot convey.

Notably, the surge in total observations from 2017 identified in Q1A appears driven primarily by increased records from New South Wales and Tasmania, suggesting citizen science activity intensified particularly in these states during this period.



[Figure 6: Swift Parrot observations by state/territory — choropleth map (left) and annual stacked bar chart (right), 2000–2025]

## 2.4 Q2 — Can the Visualisations from 1A–C Determine Which Resources Best Show Seasonal Migration?

Based solely on the visualisations produced for Q1A–C, it is not possible to conclusively determine which data resources best capture the seasonal migration of Swift Parrots. While Figure 4 reveals clear seasonal patterns in aggregate observations — with peaks in autumn and spring consistent with migratory movement — it does not disaggregate these patterns by data resource. Similarly, Figure 5 identifies which resources dominate overall contribution, but does not reveal whether those resources capture observations across different seasons or states in a manner that reflects migration. To answer this question, a visualisation combining data resources, month of observation, and state province simultaneously would be required, which falls outside the scope of Q1A–C.

### Reference

- Atlas of Living Australia. (n.d.). Atlas of Living Australia (ALA). Retrieved February 27, 2026*  
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- BirdLife Australia. (2025). Swift Parrot.*  
[birdlife.org.au/bird-profiles/swift-parrot](http://birdlife.org.au/bird-profiles/swift-parrot)
- Department of Natural Resources and Environment, Tasmania. (n.d.). Swift Parrot.*  
<https://nre.tas.gov.au/conservation/threatened-species-and-communities/lists-of-threatened-species/threatened-species-vertebrates/swift-parrot>

### Declaration of Generative AI Usage

**Claude (Anthropic)** — Used to assist with grammar correction and refinement of academic writing expression. Also used to validate suspected data irregularities by cross-checking findings against the dataset programmatically.

Key prompts included: “Check this dataset for irregularities”, “Refine the grammar and academic expression of this paragraph.”

Additionally, “Lord Howe Island” mentioned in the report is told by AI, Prompts: “Where is this place? Does it belong to AU?”

**Grammarly** — Used for spelling and grammar checking throughout the report.

All visualisations, analytical findings, interpretations, and conclusions are the author's own work. AI tools were used solely to support writing quality and data validation, not to generate insights or analysis.