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Australian aviation wildlife strike statistics

2008 – 2017

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Addendum

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Safety summary

Why we have done this report

Occurrences involving aircraft striking wildlife, particularly birds, continue to be the most common aviation occurrence reported to the ATSB. Strikes with birds are a potential safety risk and present a significant economic risk for aerodrome and aircraft operators. The aim of the ATSB's statistical report series is to provide information back to pilots, aerodrome and aircraft operators, regulators, and other aviation industry participants to assist them with managing the risks associated with bird and animal strikes. This report updates the last edition (published in 2016) with data from 2016 – 2017.

What the ATSB found

Between 2008 and 2017, there were 16,626 confirmed birdstrikes reported to the ATSB. The number of reported birdstrikes has increased in recent years, with 2017 having the highest on record with 1,921. Despite being a high frequency occurrence, birdstrikes rarely result in aircraft damage or injuries. Of the 16,626 birdstrikes in this reporting period, 99.8 per cent were classified as incidents, while 19 (~0.1 per cent) were classified as accidents and another five (~0.03 per cent) as serious incidents. Nine birdstrikes, or approximately 0.05 per cent of the birdstrikes in the ten years, resulted in minor injuries to pilots or passengers. There were no reported serious injuries or fatalities associated with a birdstrike occurrence in the ten-year period.

Domestic high capacity aircraft were those most often involved in birdstrikes, and the birdstrike rate per aircraft movement for these aircraft was significantly higher than all other categories. Both the number and rate of birdstrikes per 10,000 movements in high capacity operations have increased in the past two years 2016 – 2017. In contrast, the number of birdstrikes in low capacity operations and general aviation has remained relatively consistent in the most recent two years.

The number of birdstrikes involving a bird ingested into an engine in high capacity air transport operations has risen in recent years with about one in ten birdstrikes for turbofan aircraft involving a bird ingested into an engine. Additionally, over the ten-year reporting period, there have been 11 occurrences involving one or more birds ingested into two engines of turbofan-powered aircraft.

The five most commonly struck flying animals in the 2016 to 2017 period were flying foxes, galahs, magpies, and 'bats' (many of which were likely to be flying foxes) and plovers.

Compared to birdstrikes, non-flying animal strikes are relatively rare, with 396 animal strikes reported to the ATSB between 2008 and 2017. The most common animals involved were hares, rabbits, kangaroos, wallabies, and foxes. Damaging animal strikes mostly involved kangaroos and wallabies.

Safety message

Australian aviation wildlife strike statistics provide a reminder to everyone involved in the operation of aircraft and aerodromes to be aware of the hazards posed to aircraft by birds and non-flying animals. The growth of reporting to the ATSB over the last 10 years has helped to understand better the nature of birdstrikes, and what and where the major safety risks lie. As such, timely and thorough reporting of birdstrikes is paramount. This assists the aviation industry to manage better their safety risk. Over the ten years from 2008 to 2017, about 40 per cent of all birdstrikes reported to the ATSB contained no species information. The more detailed the information is provided to the ATSB, the more accurate and useful reports like this one will be.

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Context

Each year, the ATSB receives accident and incident notifications from pilots, airlines, aerodrome personnel, air traffic control and others involved in the aviation industry. The reporting of these aviation accidents and incidents, collectively termed occurrences, assists the ATSB in monitoring safety through its core function of independent investigation and the analysis of data to identify emerging trends.

The Transport Safety Investigation Regulations 2003 provide a list of matters reportable to the ATSB.¹ One routine reportable matter is a collision with an animal, including a bird, for:

- all air transport operations (all bird and animal strikes), and
- aircraft operations other than air transport operations when the strike occurs on a licensed aerodrome.

In addition to the above, all accidents² are immediately reportable to the ATSB, and all occurrences involving injury or difficulty controlling the aircraft (including from a bird or animal strike) are reportable matters for all operation types.

A significant proportion of all occurrences reported to the ATSB involve aircraft striking wildlife, especially birds. Wildlife strikes represent an ongoing challenge to the aviation industry. Birds and other animals are hazards to aviation that will always be present and so need to be managed, both in terms of reducing the likelihood of a wildlife strike and reducing the consequences of strikes that occur.

For the purposes of this report, birdstrikes refer to strikes from all flying animals, including bats and flying foxes, while animal strikes refer to strikes from all flightless animals, including flightless birds such as emus and cassowaries.

This report provides aviation birdstrike and animal strike occurrence data for the period 1 January 2008 to 31 December 2017. It should be noted that some data may vary when compared with the previous report, [Australian aviation wildlife strike statistics: 2006 to 2015](#), due to ongoing quality improvements in ATSB data.

The Australian aviation wildlife strike statistics report aims to give industry an insight into the number, locations, and types of wildlife strikes in Australia, and describe characteristics of the common birds and animals involved, and the consequences of these strikes.

In response to stakeholder feedback, the ATSB's wildlife strike statistics report now uses a format that utilises an online interactive tool to display wildlife strike data. This tool allows stakeholders to access and interrogate national data in both a timelier manner, and with greater visibility of the data. Additionally, data tables containing all birdstrike and animal strike data used in this report are available for download from the investigation homepage for more detailed interrogation of the data.

¹ Available from the ATSB website: www.atsb.gov.au/about_atsb/legislation

² Accident refers to aviation occurrences where (a) a person dies or suffers serious injury, (b) the aircraft is destroyed or seriously damaged; or (c) other property is destroyed or seriously damaged.

Data sources

ATSB occurrence data

Birdstrike and animal strike occurrence data used in this report have been reported to the ATSB under the provisions of the Transport Safety Investigation (TSI) Regulations 2003. Only confirmed birdstrikes are included in the report as these are reportable occurrences under the TSI Regulations. This includes birdstrikes reported by pilots that have not been independently verified by aerodrome staff or an engineering inspection. Suspected strikes or near hits with birds or other animals are not reportable matters under the TSI Regulations and, unlike previous reports, are not included in this report. Birdstrike occurrence statistics are updated and published biennially by the ATSB, and can be subject to change pending the provision of new information to the ATSB. When using these statistics, it is important to remember that occurrence data is provided to the ATSB by responsible persons as defined in Part 2.5 of the Regulations. The ATSB accepts no liability for any loss or damage suffered by any person or corporation resulting from the use of these statistics.

Wildlife descriptors and grouping

Bird and animal types have been grouped by similar species rather than reporting data on specific species. Type groupings were defined by grouping birds and animals of similar species, size, and/or appearance. These groupings were applied because similar birds are often reported to the ATSB as an incorrect species. In addition to these groupings, the complete list of bird and animal types is now included in the new interactive web tool.

For the purpose of this report, the birdstrike data included all flying animals - including bats and flying foxes. Animal strikes were considered to involve all non-flying animals, including flightless birds (emus and cassowaries, for example).

Using the bird ingestion (into an engine) requirements outlined in the [United States Federal Aviation Regulations \(FAR\) 33.76](#) as a guide, new bird size categories were developed for the last report. The bird size categories used are outlined below:

- small bird: up to and including 85 grams (0.085 kg)
- medium bird: greater than 0.085 kg and up to and including 1.15 kg
- large bird: greater than 1.15 kg and up to and including 3.65 kg
- very large bird: greater than 3.65 kg.

Location data

Birdstrikes are sometimes identified during a pre-, or post-flight inspection, where the previous flight crew had no knowledge of striking a bird. In these cases, the location of the birdstrike has been set to 'unknown', rather than at the aerodrome where the inspection was carried out. In this report, 1,322 records were identified as having an unknown birdstrike location and as such have been excluded from location reporting.

The proximity of the aerodrome to a birdstrike has been coded as either:

- within the aerodrome confines
- 5 to 15 km from the aerodrome
- more than 15 km from the aerodrome.

Operation types

Some of the data presented throughout this report has been arranged into operation types. This applies only to data where the aircraft involved in the birdstrike was known. The operation types used were:

- *high capacity air transport* – includes regular public transport (RPT) and charter operations on aircraft certified as having a maximum capacity exceeding 38 seats or a maximum payload exceeding 4,200 kg
- *low capacity air transport* – includes all RPT and charter operations on aircraft other than high capacity
- *general aviation* – all aerial work, flying training, and private, business, and sport (including gliding and ballooning) aviation, and recreational (non-VH registered) aviation (including ultralights and trikes)
- *military* – all military operations.

Aircraft movements

Aircraft movements were defined as a take-off, a landing, or a circuit. Therefore, an aircraft completing a single sector will have two movements recorded, one for take-off and one for landing. Aircraft movements are used in this report as the normalising variable for all wildlife strike rate calculations.

Bureau of Infrastructure, Transport and Regional Economics (BITRE) data

Aircraft movement information by operation type, weight category, and engine type was provided to the ATSB by the Bureau of Infrastructure, Transport and Regional Economics.

Movements were calculated by doubling the number of recorded departures, except in the case of international movements, where arrival and departure information was used.

Airservices Australia data

Movement data by aircraft weight category for specific aerodromes was obtained from movement data published by [Airservices Australia](http://www.airservicesaustralia.com/publications/reports-and-statistics).³

³ Located at website: www.airservicesaustralia.com/publications/reports-and-statistics (Airservices Australia data used in this report was current at the time of writing (August 2016)).

Birdstrikes across Australia

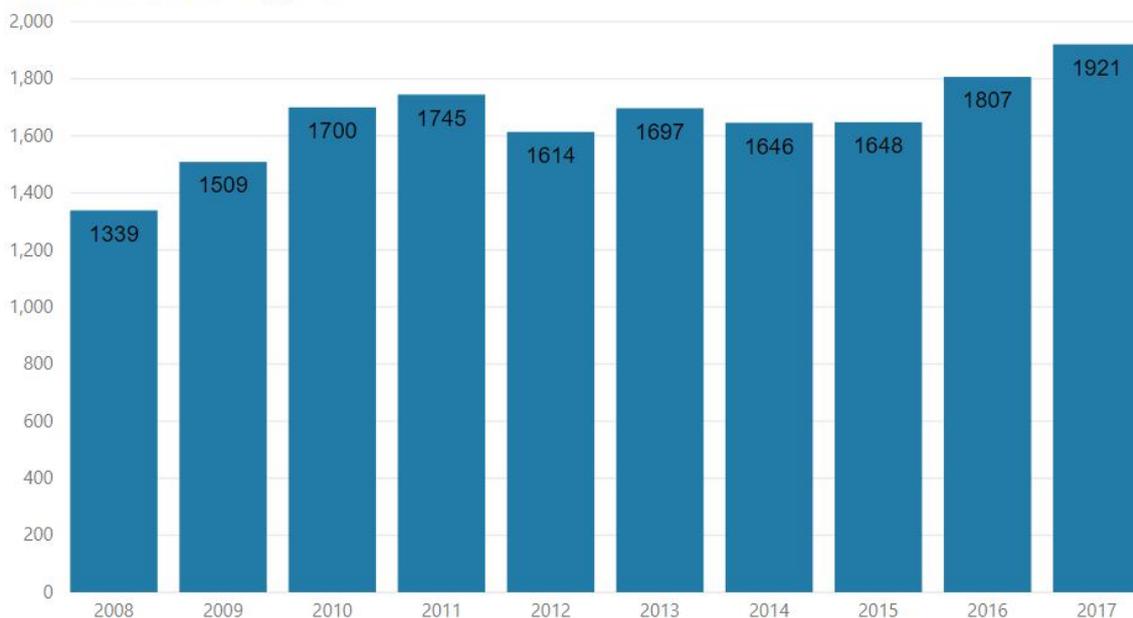
Birdstrikes numbers by operation type and aircraft type

Figure 1 presents a selection of the data available in a web-based [interactive tool](#) that displays the number of reported birdstrikes per year from 2008 to 2017. The interactive tool allows filtering of the data by year, operation type, aircraft type and phase of flight. Additionally, the data can be further interrogated by downloading the birdstrike data table.

Over the ten years between 2008 and 2017, 16,626 birdstrikes were reported to the ATSB. The number of reported birdstrikes has increased in recent years, with 2017 having 1,921 reported birdstrikes, the highest number in the ten-year period.

Figure 1: Number of birdstrikes per year, 2008 to 2017

Count of birdstrikes by year



Data source: ATSB. [Link to interactive tool](#)

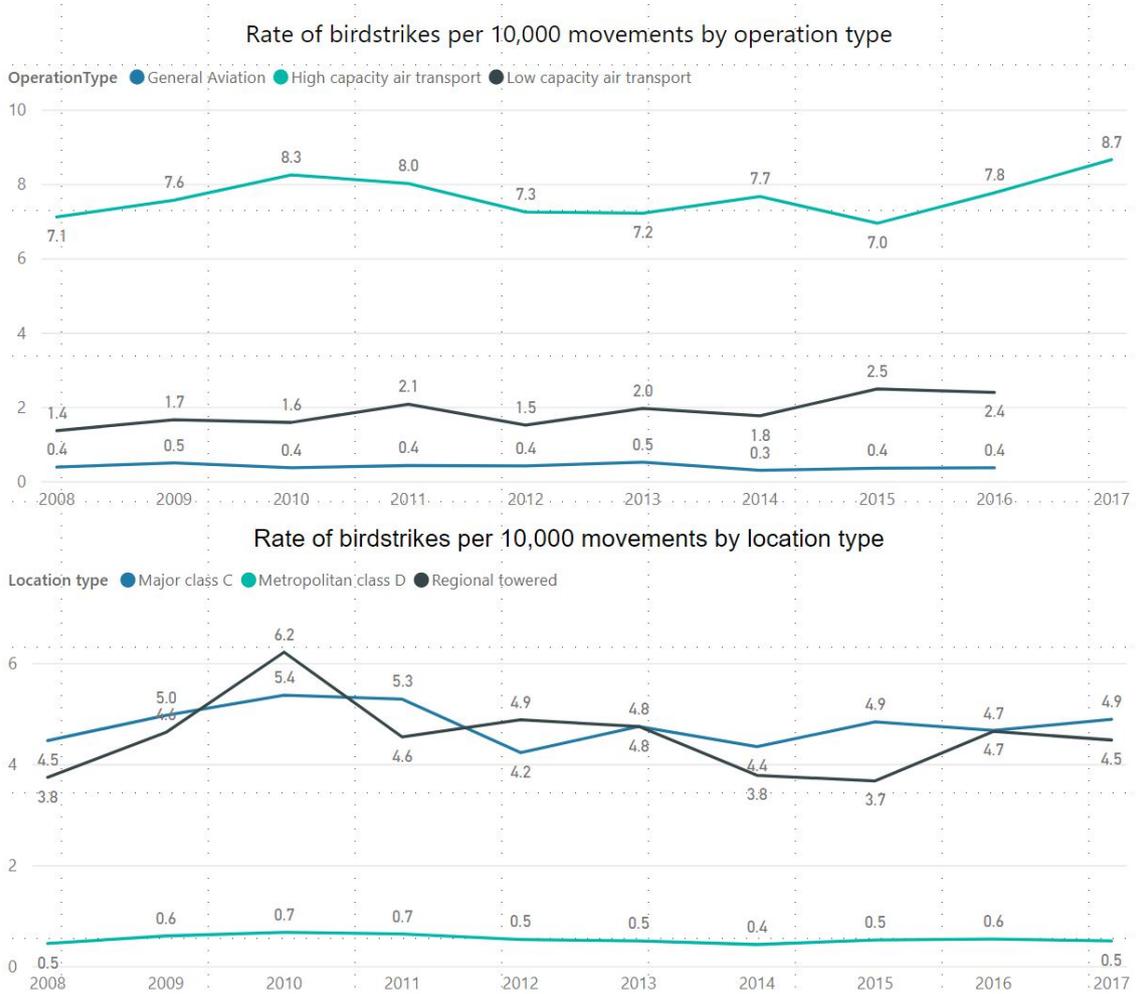
Birdstrikes rates by operation type and location

Rates of birdstrikes for each operational group are shown in Figure 2. The data is displayed in a web-based [interactive tool](#) that shows the rate of birdstrikes per 10,000 aircraft movements from 2008 to 2017. The data can also be filtered by year and location.

High capacity air transport aircraft continue to have a significantly higher birdstrike rate than all other operation types. It is likely that the speed and size of these aircraft, longer take-off and landing rolls, and large turbofan engines are factors contributing to the higher rate. Birdstrike rates for low capacity aircraft have generally increased over the ten-year study period, while general aviation birdstrike rates remain comparatively low and have not changed significantly over the ten years.

Major class C and regional towered aerodromes have had similar strike rates over the ten years between 2008 and 2017 (Figure 2). Both of their rates have fluctuated over the ten years but have remained significantly higher than the strike rates for the metropolitan class D aerodromes.

Figure 2: Birdstrike rates (per 10,000 movements) per year by operation type and location, 2008 to 2017



Data source: ATSB, the Bureau of Infrastructure, Transport and Regional Economics and Airservices Australia.

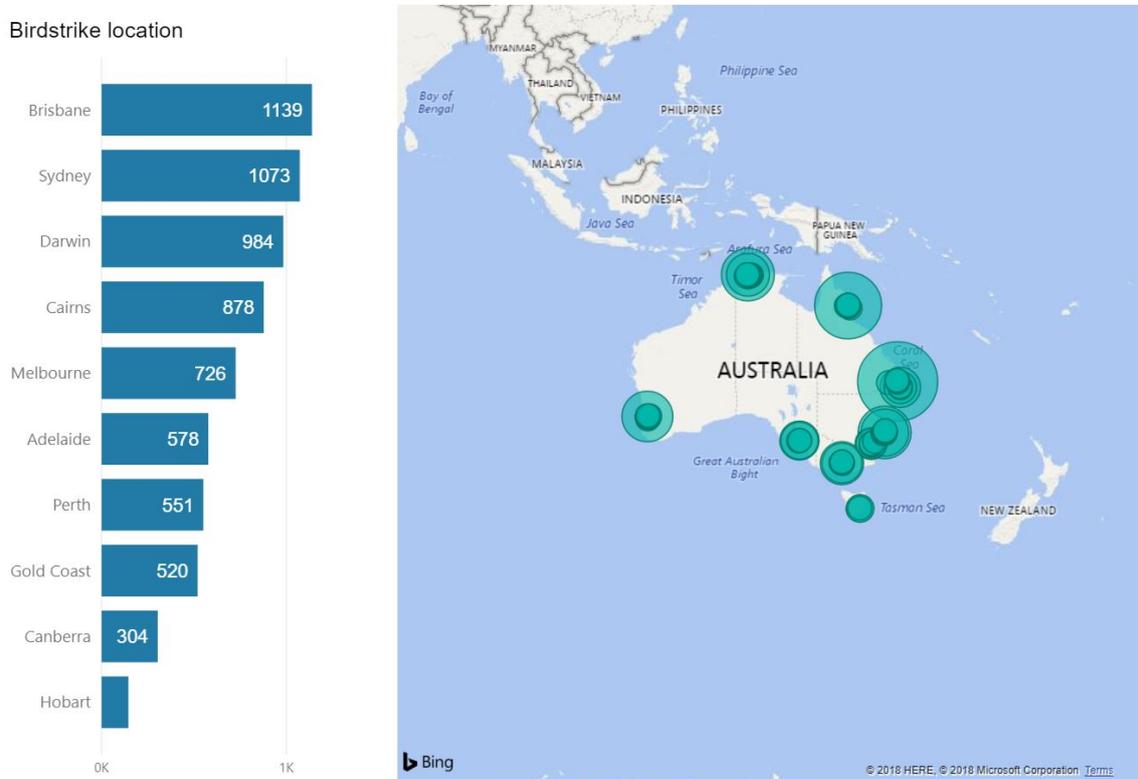
Link to interactive tool [🔗](#)

Birdstrike locations

This chapter reviews birdstrikes at all reported locations around Australia, for all types of aircraft. The majority of birdstrikes occur within the confines of an aerodrome, that is, within 5 km from the aerodrome or on the aerodrome. This is because birds and aircraft more commonly share the same airspace while the aircraft is on the runway for take-off and landing, and during the climb and approach phases of flight. In addition, even when pilots are not aware of a birdstrike on the ground or in the aerodrome confines, remnants of the bird will often be found and reported by aerodrome staff.

Figure 3 presents a selection of the data available in a web-based [interactive tool](#) that displays the locations of birdstrikes reported to the ATSB between 2008 and 2017. The interactive tool allows filtering of the data by year, location type, state, as well as individual aerodromes. The web tool also includes an interactive map to facilitate the examination of all reported birdstrike locations.

Figure 3: Birdstrike locations across Australia, 2008 to 2017



Data source: ATSB. [Link to interactive tool](#)

Significant Australian birdstrikes

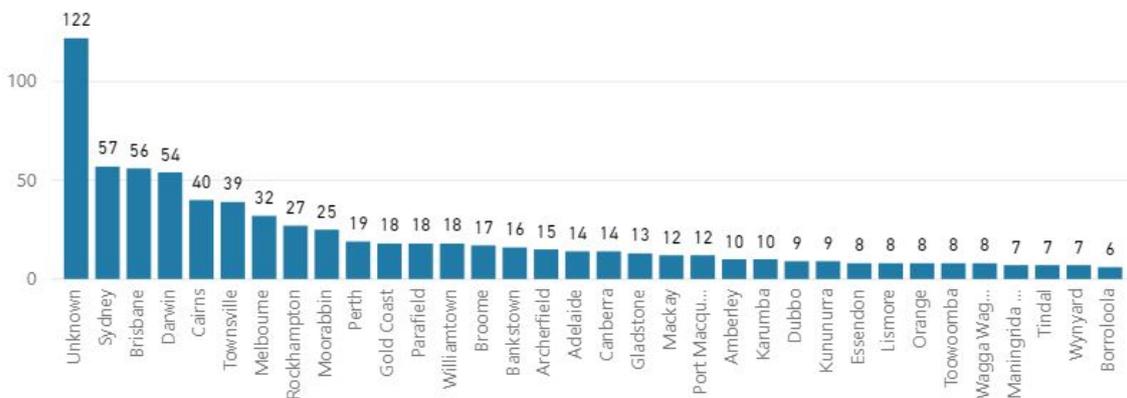
This chapter reviews birdstrikes that have been identified as posing a significant threat to the continued safety of flight of an aircraft. Birdstrikes involving ingestion of a bird, or birds, into a turbine engine, and occurrences involving aircraft damage and personal injuries as a result of birdstrikes are considered.

Significant birdstrikes

Figure 4 presents a selection of the data available in a web-based [interactive tool](#) that displays the number of reported birdstrikes per year from 2008 to 2017. The interactive tool allows filtering of the data by year, aircraft damage level, injury level and whether there were any birds ingested into engines. An interactive map aids visualisation of the locations of damaging birdstrikes.

Between 2008 and 2017, there were 781 birdstrikes involving one or more birds being ingested into an engine of turbofan-powered aircraft. Additionally, there were 11 occurrences involving bird ingestions into two engines. In the ten-year period, six aircraft were reported to be destroyed as a result of a birdstrike, however, four of these aircraft were remotely piloted aircraft systems. The other two were cases where large birds had flown into the tail rotors of light helicopters.

Figure 4: Damaging birdstrike location, 2008 to 2017

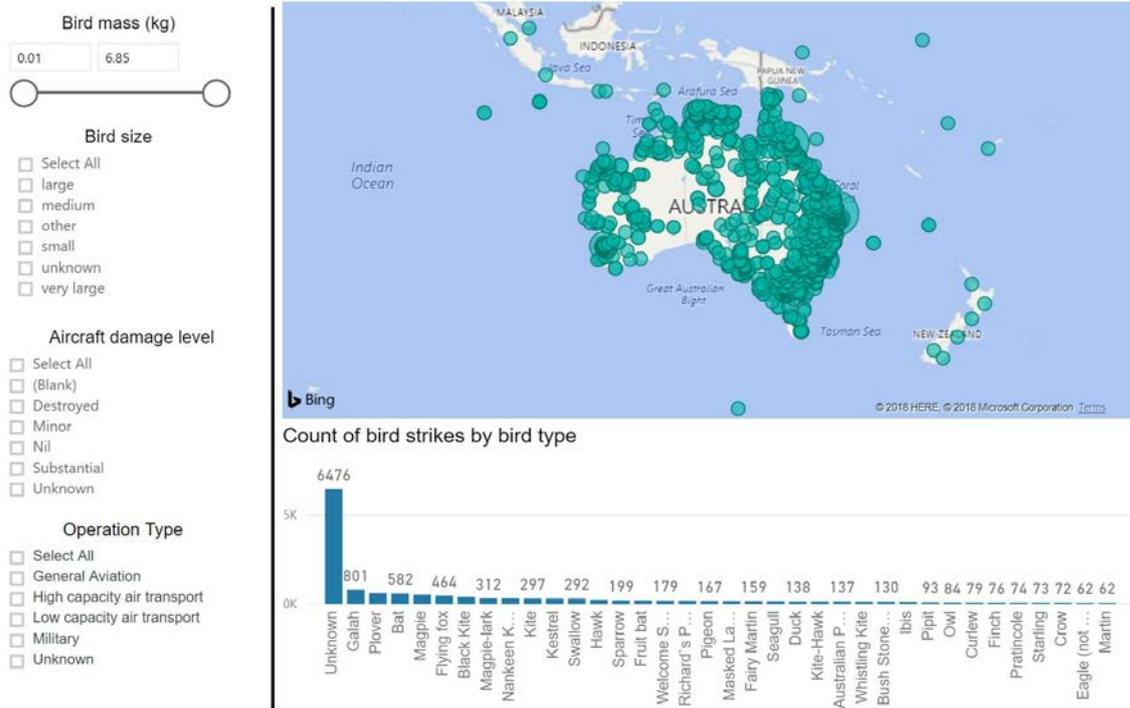


Data source: ATSB. [Link to interactive tool](#)

Birdstrike numbers by bird size and aircraft damage

Figure 5 presents a selection of the data available in a web-based [interactive tool](#) that displays the number of reported birdstrikes per year from 2008 to 2017. The interactive tool allows filtering of the data by year, operation type, location, aircraft damage level as well as bird size grouping and bird mass (kg). An interactive map also helps visualisation of the locations of damaging birdstrikes and/or bird size.

Figure 5: Damaging birdstrike location, 2008 to 2017



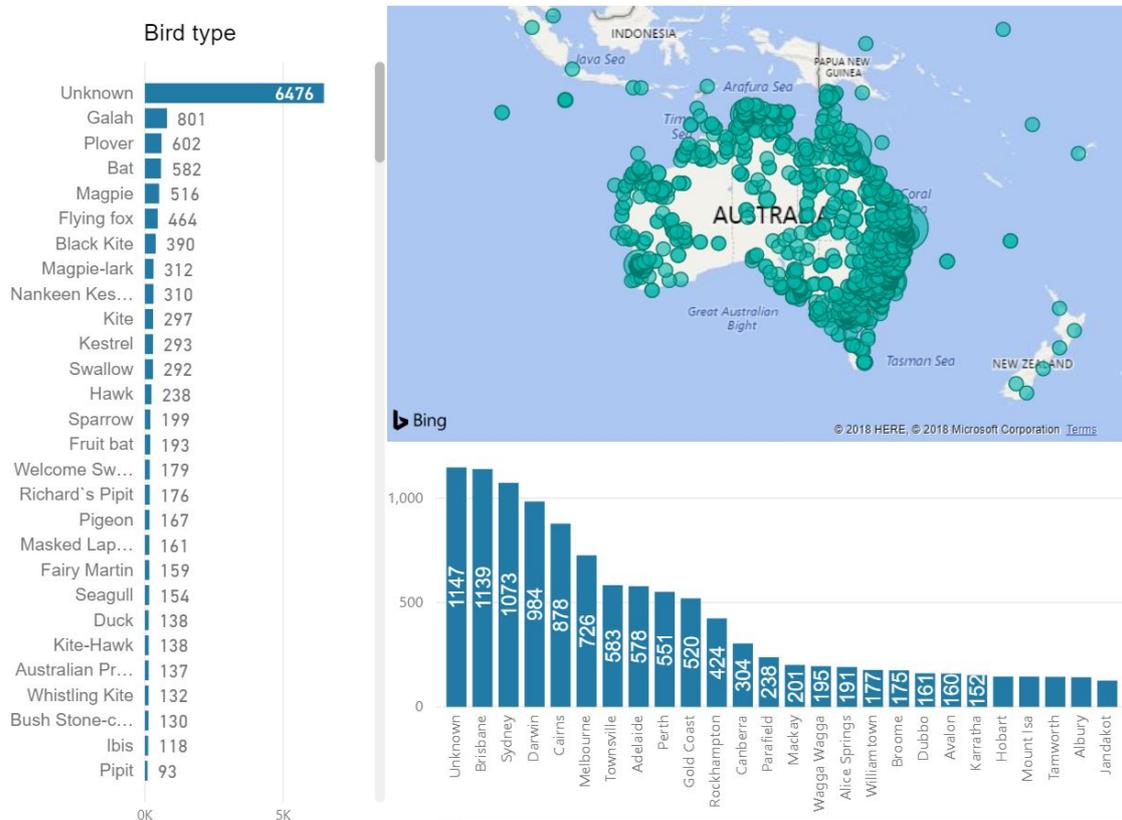
Data source: ATSB. [Link to interactive tool](#)

Birdstrikes locations by species

Figure 6 presents a selection of the data available in a web-based [interactive tool](#) that displays the number of reported birdstrikes per year from 2008 to 2017. The interactive tool allows filtering of the data by year, location, bird type/group as well as the individual bird species (as reported). The interactive map also helps visualisation of the locations of birdstrikes for each bird species.

Nearly 40 per cent of all birdstrikes between 2008 and 2017 involved a bird of unknown species. This is typically the case when pilots don't have time to identify the species, or indeed, don't have an opportunity to see the bird before striking it. Where bird type was known, galahs are the species reported to be involved in the most birdstrikes, with 801 between 2008 and 2017. They are followed by plovers (602), bats (582), magpies (516) and flying foxes (464). It is likely, however, that many of the strikes involving animals reported as 'bats' actually involved flying foxes.

Figure 6: Birdstrikes by species and location, 2008 to 2017



Data source: ATSB. [Link to interactive tool](#)

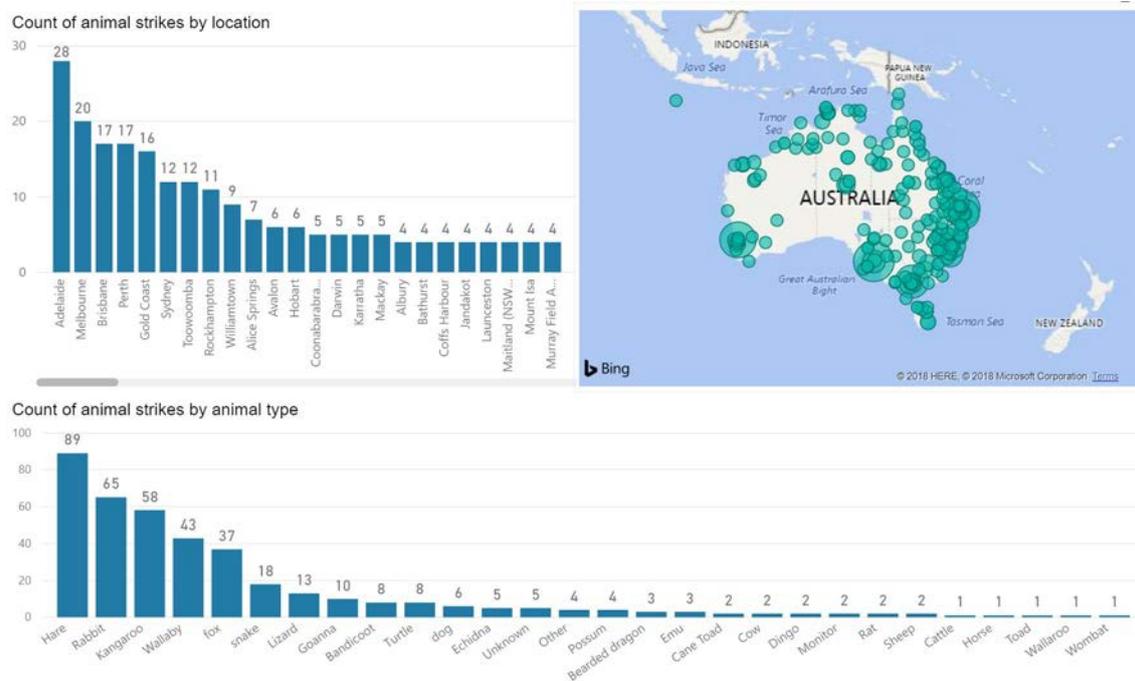
Non-flying animal strikes

Animal strikes across Australia

Figure 7 shows ground-based animal strikes in a web-based [interactive tool](#) that displays the number of reported animal strikes from 2008 to 2017. Using the interactive tool, the data can be filtered by year, animal type and location. Additionally, the animal strike data table is available from the investigation web page, which can be downloaded for further interrogation of the data.

When compared with birdstrikes (which are the most commonly reported type of air safety occurrence to the ATSB), cases of an aircraft striking ground-based animals are not as common. Between 2008 and 2017, 396 animal strikes were reported to the ATSB. Hares, rabbits, kangaroos, wallabies and foxes were the most commonly struck ground-based animals.

Figure 7: Ground-based animal strikes by location and animal type, 2008 to 2017



Data source: ATSB. [Link to interactive tool](#)

Animal strikes by animal size and aircraft damage level

Figure 8 shows the animal sizes of the ground-based animals involved in strikes between 2008 and 2017. The [interactive tool](#) can be used to filter the data on animal size, animal mass (kg) and the damage level to the aircraft involved. Selected occurrences are displayed in an interactive map to show the location of the animal strikes.

Figure 8: Ground-based animal strikes by location, animal size and aircraft damage level, 2008 to 2018



Data source: ATSB. [Link to interactive tool](#)

Australian Transport Safety Bureau

The ATSB is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to operations involving the travelling public.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.