



BY RICK DARBY

Striking Coincidence

Bird strikes are on the increase in Australia.

Australia is home to some 800 bird species, ranging in size from the 8-cm (3-in) weebil to the emu (up to 2 m [7 ft] in height), which doesn't fly but can run 31 mph (50 kph).¹ Some of the natural birds and other creatures present a significant risk to engineered birds — airplanes and helicopters.

“While it is uncommon that a bird strike causes any harm to aircraft crew and passengers, many result in damage to aircraft, and some have resulted in serious consequential events, such as forced landings and high speed rejected takeoffs,” says a recent report by the Australian Transport Safety Bureau (ATSB) on the nation’s aviation wildlife strikes from 2002 to 2011.²

“In 2011, there were 1,751 bird strikes reported to the ATSB,” the report says. “For high capacity aircraft operations,³ reported bird strikes have increased from 400 to 980 over the last 10 years of study, and the rate per aircraft movement also increased.”⁴

The ATSB, by regulation, is notified of accidents and incidents by pilots, airlines, airport personnel, air traffic control and others involved in the aviation industry. The report says that one type of event that must be reported is “a collision with an animal,

including a bird, for all air transport operations (all bird and animal strikes) and [for] aircraft operations other than air transport operations when the strike occurs on a licensed aerodrome.” For the report’s purposes, bird strikes are strikes from all flying animals, including bats, and animal strikes are strikes from all flightless animals, including flightless birds.

Not only did the annual numbers of reported bird strikes per year increase over the 10-year study period, but also, in 2010 and 2011, “bird strikes were significantly higher than in previous years, although both

years had similar numbers of bird strikes,” the report said. The ATSB did not estimate how much of the difference among years was due to greater consciousness of the risk and stronger reporting compliance.

Nevertheless, bird strike rates — measured in strikes per 10,000 aircraft movements — also increased over the reporting period for high capacity air transport (Table 1). The report says, “High capacity air transport aircraft have a significantly higher bird strike rate than all other operation types. It is likely that the speed and size of these aircraft, longer takeoff and landing

Australian Bird Strike Rates, by Operation Type, 2002–2011

Operation type	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
High capacity air transport	6.45	6.32	7.85	8.45	7.49	7.35	7.76	8.28	9.34	9.03
Low capacity air transport	1.23	1.31	1.40	1.51	1.52	1.52	1.71	2.18	2.12	—
General aviation	0.17	0.17	0.19	0.21	0.18	0.26	0.30	0.37	0.28	—

Notes: Rates are per 10,000 aircraft movements. An aircraft movement is a takeoff, landing or circuit. 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 (9,260 lb). Low capacity air transport includes all RPT and charter operations on aircraft other than high capacity. General aviation includes all aerial work, flying training, and private, business, and sport aviation. Data are not available for 2011 for low capacity air transport and general aviation.

Source: Australian Transport Safety Bureau

Table 1

rolls, and large turbofan engines are factors contributing to the higher rate.”

The increase in low capacity air transport bird strike rates “has accelerated since 2007, and appears to be becoming more significant,” the report says.

Airplanes in the second-greatest weight category were most prone to bird strikes in 2010, the last year for which data were available (Table 2). Those included aircraft with a maximum takeoff weight (MTOW) between 27,001 and 272,000 kg (about 60,000 to 600,000 lb). “Typical aircraft models in this category flying in Australia range from the Bombardier Dash 8 Q400 to the Boeing 737 and Airbus A320, and include larger widebody aircraft such as the Airbus A330,” the report says.

Between 2002 and 2010, the sharpest rate increase was in the third-greatest weight category, with MTOW between 5,701 and 27,000 kg (about 12,500 and 60,000 lb). The 2010 rate was 112 percent of that for 2002.

Very large, and generally long-haul, aircraft — those with an MTOW greater than 272,000 kg — “had a strike rate of less than half that of smaller, typically domestic, jet aircraft,” the report says.

“Both the number and rate of bird strikes are significantly lower for most helicopter weight categories when compared with most airplane groups,” the report says. “For helicopters with [an] MTOW below 2,250 kg [about 5,000 lb], the number and rate of reported bird strikes is similar to that for fixed-wing aircraft. The lower number and rate of bird strikes generally seen for helicopters may be due to helicopters flying at lower speeds, making it easier for birds and pilots to see and avoid each other.

“There is a notable increase in the strike rate between 2007 and 2009 for helicopters with maximum weight categories below 27,000 kg, which has

Australian Airplane Bird Strike Rates, by Airplane Weight Category, 2002–2010

Maximum weight category	2002	2003	2004	2005	2006	2007	2008	2009	2010
Over 272,000 kg (599,657 lb)	3.49	2.11	4.05	5.3	3.39	3.08	1.74	2.95	4.06
27,001–272,000 kg (59,527–599,657 lb)	6.59	7.03	8.2	8.88	7.68	7.61	7.93	8.36	9.55
5,701–27,000 kg (12,569–59,525 lb)	2.83	3.02	3.93	3.63	4.25	4.26	4.25	5.49	5.99
2,251–5,700 kg (4,963–12,566 lb)	0.66	0.7	0.77	0.93	1.15	1.08	1.17	1.45	1.14
Less than 2,250 kg (4,960 lb)	0.29	0.25	0.26	0.29	0.34	0.3	0.28	0.42	0.35

Note: Data for 2011 are not available.
Source: Australian Transport Safety Bureau

Table 2

remained high in 2010. It is worth noting though that these figures are still slightly lower than those for the lightest airplane category.”

The report says that although the helicopter bird strike rate is low, the consequences are generally more severe, depending on the component struck. Therefore, the risk to flight safety can be much higher than the number of occurrences suggests.

“The vast majority of bird strikes occurred at airports,” the report says. “More than 40 per cent of bird strikes with a known phase of flight involving airplanes occurred during takeoff, and almost 30 per cent occurred during landing [Figure 1]. In total, 96 percent of bird strikes with a known phase of flight occurred while the aircraft was on the runway, on approach to land or just after takeoff.” There was little variation in the proportions of phase of flight for high capacity, low capacity and general aviation airplanes.

The picture was different for helicopters in the study period. Cruise, “standing” and approach were the most common phases of flight for helicopter

Australian Airplane Bird Strikes, by Phase of Flight, 2002–2011

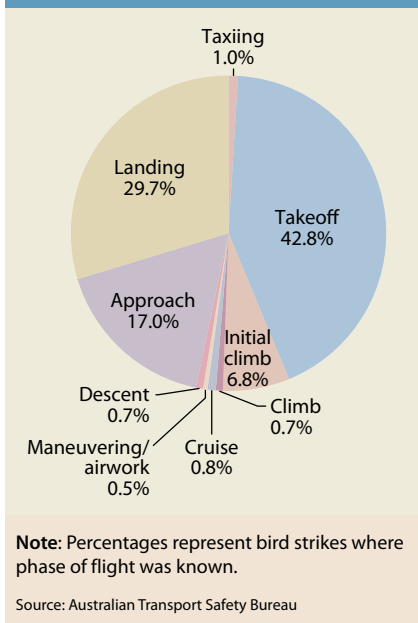


Figure 1

bird strikes (Figure 2). “A high proportion of bird strikes while on the ground (standing) is likely to be due to birds colliding with the moving rotor blades of a stationary helicopter,” the report says. “The lower proportion of strikes during landing and takeoff may be due to the louder and varying noise caused

by helicopter rotor speed and pitch changes during these flight phases.”

Over the study period, bird strikes were most common between 0730 and 1030 (Figure 3).

Numbers then slumped to a low from about 1330

to 1430, picking up again from around 1800 to 2000. A steady reduction followed, reaching the lowest numbers from 0130 to 0400.

Common sense explains the finding — not that birds feel especially eager to fly in the morning and evening, taking a siesta in between, but that more aircraft movements occur at the “rush hours.” However, different species’ habits influenced the times they were most often struck. In the combined category of bat/flying fox (often confused with one another), they were most at risk in the nighttime, around 1800 and 1900 hours. Ducks were unluckiest around 1800. The most lethal period by far for curlews and sandpipers, a single category, was between 1900 and 2100.

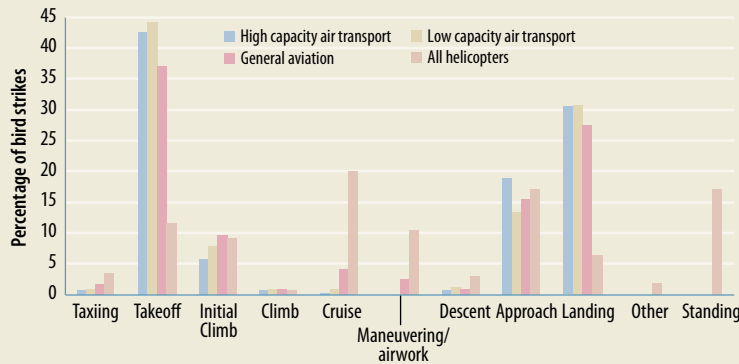
“Flying foxes and bats were the most commonly struck species in Australia between 2002 and 2011, with the majority of strikes occurring at locations on the east coast,” the report says. “Birds in the lapwing and plover families were the second most frequent bird type struck over the 10-year period; however, it is likely that this is influenced by the broad species range included in this bird type (banded plover, black-fronted plover, dotterel, lapwing, masked lapwing, masked plover, oriental plover, pacific golden plover, plover, [and] spur-winged plover).”

In 2011, the galah — a type of cockatoo with a pink breast and gray wings — was the single most frequent species struck by aircraft across Australia.

“Bats and flying foxes had the most significant increase in the number of reported strikes per year in the last two years, with these species being involved in an average of 119 strikes per year compared with 78 times per year on average across the entire 10-year reporting period,” the report says.

Pelican strikes were hardest on aircraft during the period. “More than 65 per cent of pelican strikes resulted in aircraft damage, with the swan, magpie goose and Australian brush turkey having a high rate of damaging strikes (at least one in every three reported strikes resulted in some level of damage),” the report says. “More than one in every five reported bird

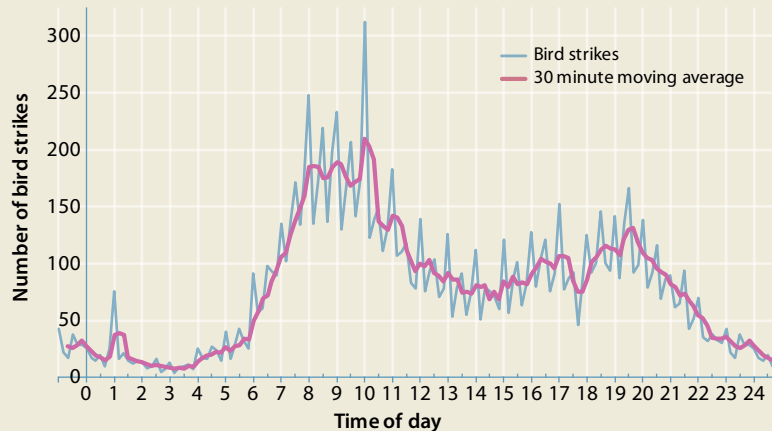
Australian Bird Strikes, by Phase of Flight and Type of Operation, 2002–2011



Notes: Data are aggregated for the entire 10-year period. 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 (9,260 lb). Low capacity air transport includes all RPT and charter operations on aircraft other than high capacity. General aviation includes all aerial work, flying training, and private, business, and sport aviation. Source: Australian Transport Safety Bureau

Figure 2

Australian Bird Strikes, by Time of Day, 2002–2011



Note: Data, recorded at 10-minute intervals, are aggregated for the entire 10-year period. One hour is repeated on the horizontal scale to enable the 30-minute moving average to be calculated. Source: Australian Transport Safety Bureau

Figure 3

strikes involving eagles, bustards, ibis and frigates resulted in damage.”

For every bird type involved in aircraft-damaging strikes, instances of minor damage far outweighed those involving serious damage. Seven reported bird strikes in which the bird type was known caused serious aircraft damage between 2002 and 2011. One involved a pelican that hit a Robinson R44 helicopter conducting low capacity air transport operations, and the others involved general aviation operations.

Researchers examined whether daily rainfall had any correlation with bird strikes during 2010 and 2011. Of 58 airports studied, a statistically significant relationship was found at seven. But at those seven airports, the correlation was “weak.”

Because of its relatively large number of bird strikes, Sydney Airport was chosen for a case study of bird strikes and average rainfall per month (Figure 4). Except in Australia’s late spring and early summer months of November and December, no close correlation was visible.

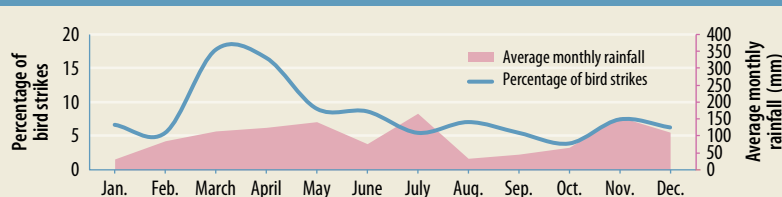
Strikes of birds of all sizes increased during the study period (Figure 5). Over the full study period, in every operation type, medium-sized birds were struck the most often, followed by small birds.

“Proportionally, the number of larger birds struck has increased more than other sizes of birds struck,” the report says. “This was especially the case in 2010 and 2011, where an 80 percent increase above the 10-year average was observed for strikes involving large birds. This is compared with a 41 percent increase for strikes involving small birds, and a 24 percent increase for those involving medium-sized birds.”

The report says that nonflying animal strikes are rare compared with bird strikes, but “there is a relatively high possibility that animal strikes could more frequently result in significant aircraft damage when compared with bird strikes.” High capacity air transport animal strikes averaged 13.1 per year over the study period. Hares and rabbits were the most common animals struck, followed by kangaroos, dogs and foxes, and wallabies.

In case you were wondering: No duck-billed platypus strikes were reported, probably

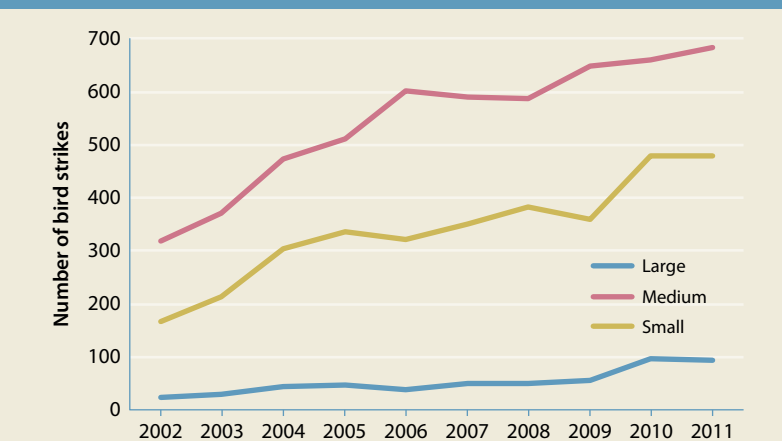
Correlation of Bird Strikes With Average Monthly Rainfall, Sydney Airport, 2010–2011



Source: Australian Transport Safety Bureau

Figure 4

Australian Bird Strikes, by Bird Size, 2002–2011



Source: Australian Transport Safety Bureau

Figure 5

because this strange mammal spends most of its time in the water. ➔

Notes

1. Wikipedia. “Birds of Australia.” <en.wikipedia.org/wiki/Birds_of_Australia>.
2. ATSB. “Australian Aviation Wildlife Strike Statistics: Bird and Animal Strikes 2002 to 2011.” Report no. AR-2012-031. June 4, 2012.
3. High capacity air transport includes regular public transport and charter operations on aircraft certified as having a maximum capacity exceeding 38 seats or a maximum payload exceeding 4,200 kg (9,260 lb).
4. Aircraft movements were defined as a takeoff, a landing or a circuit (flying a traffic pattern at an airport). Therefore, an aircraft completing a single flight would have one movement for takeoff and one for landing.