# Aviation Wildlife Strikes

## A Regional Perspective

RAAA
REGIONAL AVIATION ASSOCIATION OF AUSTRALIA

Serving regional aviation, and through it,
the people and businesses of regional Australia.

# About the RAAA

- The Regional Aviation Association of Australia (RAAA) is a not-for-profit organisation formed in 1980 as the Regional Airlines Association of Australia to protect, represent and promote the combined interests of its regional airline members and regional aviation throughout Australia.

# About the RAAA

- The Association changed its name in July 2001 to the Regional Aviation Association of Australia (RAAA) and widened its charter to include a range of membership, including regional airlines, charter and aerial work operators, and the businesses that support them.

# About the RAAA

- The RAAA has 28 Ordinary Members (AOC holders), 69 Associate/Affiliate Members and 4 Honorary Members. The RAAA's AOC members directly employ over 2,500 Australians, many in regional areas.

- On an annual basis, the RAAA's AOC members jointly turnover more than $1.5b, carry well in excess of 2 million passengers and move over 23 million kilograms of freight.

# About the RAAA

- RAAA members operate in all States and Territories and include airlines, airports, engineering and flight training companies, finance and insurance companies and government entities.

- Many of RAAA's members operate successful and growing businesses providing employment and economic sustainability within regional and remote areas of Australia.

# Wildlife Strikes - Definition

- **Confirmed Wildlife Strike**

A wildlife strike is confirmed in the following cases:

- When physical evidence of a wildlife strike is found on the runway or runway strip used by the aircraft involved (unless another reason for the death of the wildlife can be found);
- When physical evidence of the strike is found on the aircraft involved following an inspection; and
- In any other instance where it can be reasonably proved from evidence that wildlife was struck as a direct result of a moving aircraft. For example, when aircrew report they definitely saw, heard or smelt a wildlife strike.

***CASA Advisory Circular – AC139-26(0) Wildlife Hazard Management at Aerodromes***

# Wildlife Strike Cost to Global Industry

- Bird and other wildlife strikes to aircraft annually cause well over $700 million in damage to U.S. civil and military aviation.

- Furthermore, these strikes put the lives of aircraft crew members and their passengers at risk: over 250 people have been killed worldwide as a result of wildlife strikes since 1988.

***Bridstrike Committee USA - 2014***

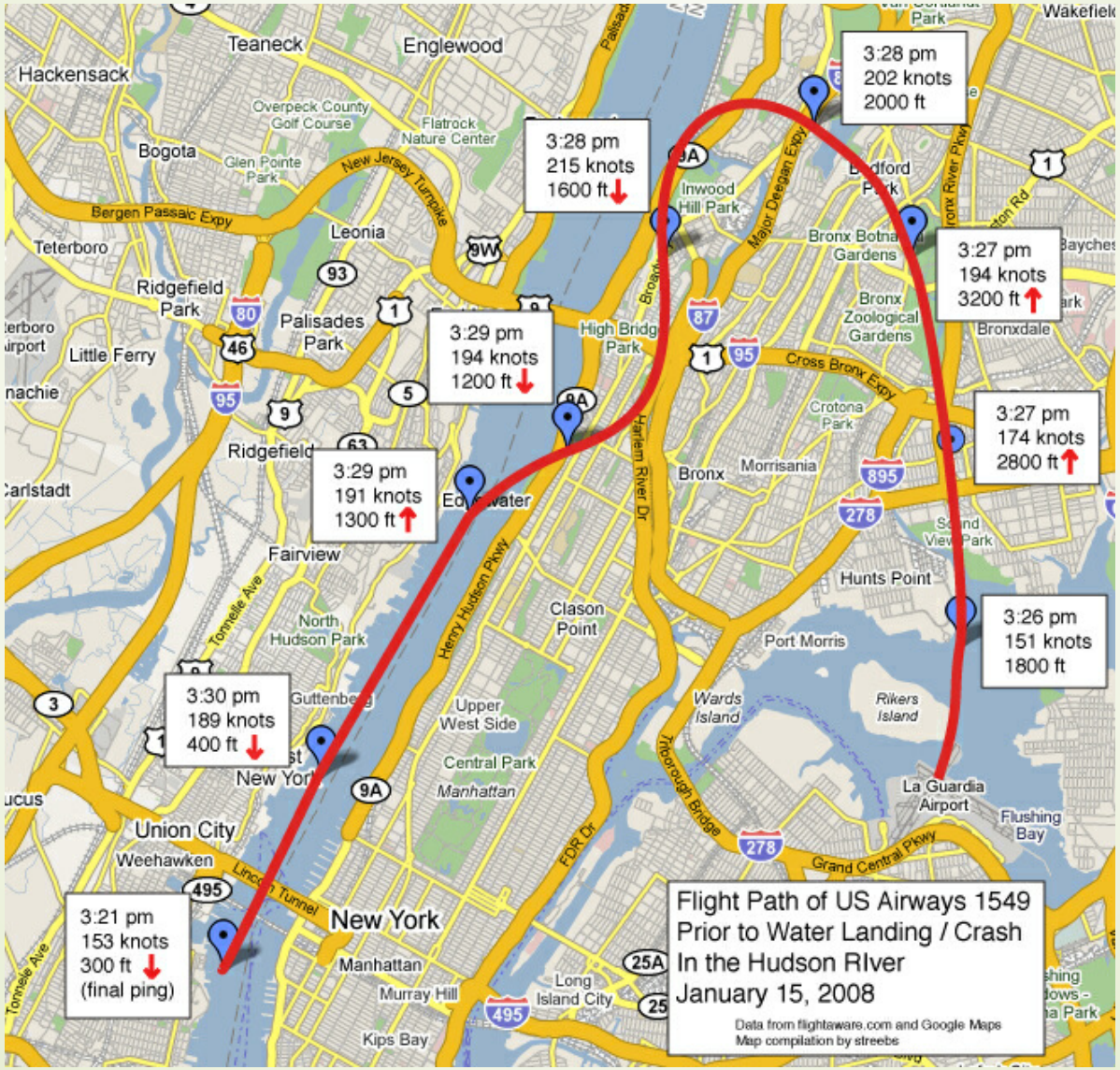
# Famous/Infamous Wildlife Strikes

- Five years ago, US Airways Flight 1549 struck a flock of Canada geese just after taking off from New York's LaGuardia Airport, resulting in both engines losing power and forcing Capt. Chesley B. “Sully” Sullenberger and his crew to glide the Airbus A320-214 to an unpowered crash landing in the Hudson River between New York and New Jersey.

- **The culprits: Canada Geese**

- **The Aircraft an A320 was at 2800’ when it struck the birds.**

# Famous/Infamous Wildlife Strikes

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# Famous Wildlife Strike Incidents

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# Australian Perspective

- The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers.

- 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.

# Australian aviation wildlife strike statistics: Bird and animal strikes 2002 to 2011

- This report provides aviation birdstrike and animal strike occurrence data for the period 1 January 2002 to 31 December 2011.
- It should be noted that some data may vary when compared with the previous Australian aviation wildlife strike statistics report from 2002 to 2009 due to ongoing quality improvements in ATSB data.

# Australian aviation wildlife strike statistics: Bird and animal strikes 2002 to 2011

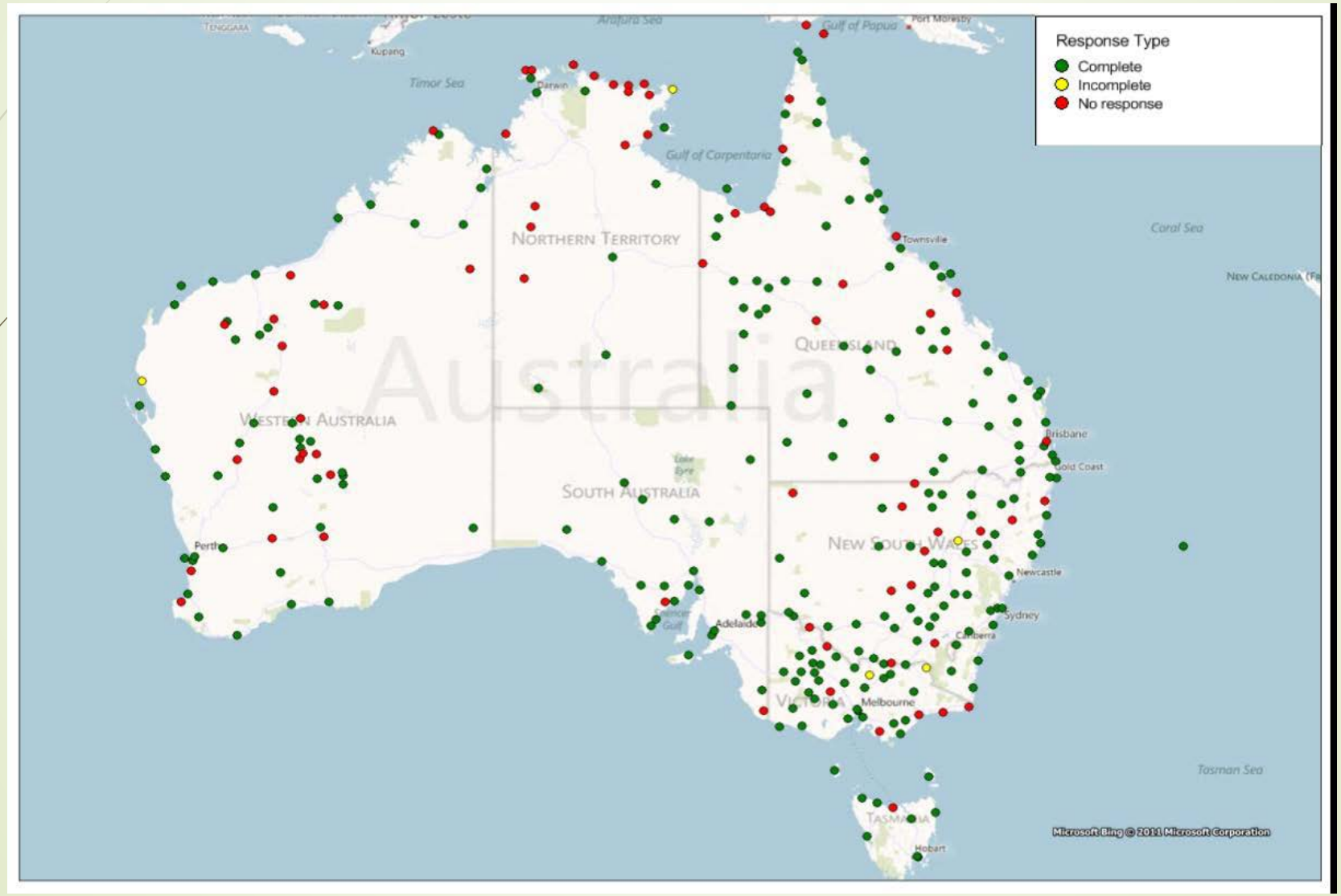
- In 2011, there were 1,751 birdstrikes reported to the ATSB. Most birdstrikes involved high capacity air transport aircraft. For high capacity aircraft operations, reported birdstrikes have increased from 400 to 980 over the last 10 years of study, and the rate per aircraft movement also increased.
- Domestic high capacity aircraft (such as Boeing 737 and Airbus A320) were those most often involved in birdstrikes, and the strike rate per aircraft movement for these aircraft was significantly higher than all other categories. Larger high capacity aircraft (such as Boeing 747 and Airbus A340 and A380) had a significantly lower strike rate.
- One in eight birdstrikes for turbofan aircraft involved an engine ingestion.

# Australian aviation wildlife strike statistics: Bird and animal strikes 2002 to 2011

**Table 1: Number of birdstrikes per year by operation type**

| Operation type | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| High capacity air transport | 400 | 413 | 596 | 684 | 631 | 646 | 762 | 809 | 969 | 980 |
| Low capacity air transport | 163 | 167 | 195 | 204 | 199 | 216 | 218 | 257 | 263 | 338 |
| General Aviation | 96 | 92 | 97 | 124 | 90 | 129 | 158 | 183 | 149 | 164 |
| Military | 6 | 9 | 11 | 15 | 16 | 31 | 10 | 58 | 88 | 73 |
| Unknown | 115 | 152 | 186 | 251 | 298 | 240 | 192 | 203 | 241 | 203 |
| **Total** | **780** | **833** | **1,085** | **1,278** | **1,234** | **1,262** | **1,340** | **1,510** | **1,710** | **1,758** |

# Aerodromes responding to CASA Survey



# Anatomy of a Birdstrike

- **Birdstrike on final to YBRY (Barimunya)**
  - Aircraft Fokker F70 (70 seat regional jet)
  - Description of event:
    - Birdstrike approximately 1000ft on final approach Runway 10 YBRY
    - After landing small blood streak on fuselage found.
    - Nil damage and nil critical area impact
    - Intakes for ACM and engines appear clear
    - Engineering notified

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# Anatomy of a Birdstrike

- No damage to aircraft but due to maintenance provisions under the current regulations, engineering assessment was required.
- Barimunya is 1.5hrs flight time from YPPH (Perth). This is the closest maintenance base.
- Aircraft cost recovery 3hr ferry with engineer $20,000 AUD
- Disruption to passengers 3hrs resulting in missed connections and site disruptions.
- Potential for penalty clauses to be invoked against contract

# Anatomy of a Birdstrike

- Potential for a direct recovery cost to the operator of in excess of $30,000AUD
- When we consider this against the graph on slide 14, wildlife strike occurrences with commercial aircraft represents a potential exposure to the industry of **$13, 338,000 AUD** per annum assuming a conservative 30% of the wildlife strikes occurring at other than maintenance bases manned with qualified engineering staff.
- This would appear to be not inconsistent with those figures quoted in the Bridstrike Committee USA report when comparing industry scope and overall number of movements.

# Cost to Industry

- Qantas estimated the combined cost of aircraft inspections, repairs, cleaning and delays related to birdstrike events was $2.3 million in 2006.

- This included flight delays, crew alterations, rescheduling flights and accommodation, and injuries

**(Taylor, 2007).**

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# Composite Structures

- **Issues**
  - More difficult and costly to repair
  - In may instances more susceptible to damage
  - Often superficial damage hides greater delamination issues in substructure making pilot assessment impossible. This requires greater engineering input and greater associated costs.

# What Creates Increased Risk?

- Landfill and other waste disposal sites often attract large numbers of birds if they are not carefully managed.
- Some types of agricultural activity, on or in the vicinity of an airport, may attract birds.
- Migrating birds often follow well-defined flight paths in considerable numbers. This can create a hazard if the flight paths are near an airport.
- Airports in coastal locations often have a much higher level of un-managed bird activity than do inland airports.
- Most airports contain considerable areas of grass within their perimeters. Since even dry grass can be attractive as a loitering area for birds by day or night, appropriate grass management policies, especially the grass height maintained, can be very important.

# Possible Strategies to Minimise Risk

- Habitat management, including reduction or elimination of trees, shrubs and other plants which provide food, shelter or roosting sites for birds.
- Netting or draining of streams, routinely wet grassland and areas of standing water. Prevention of transient formation of such areas after heavy rainfall.
- Aerodrome grass management appropriate to the prevalent species and the degree of risk that they pose.
- Liaison with local authorities to ensure that landfill waste disposal sites are not operated so as to create an aircraft hazard.
- Liaison with local farmers to limit the attraction of birds to fields.

# Possible Strategies to Minimise Risk

- Use of bird scaring techniques such as:
- Broadcast of bird distress signals;
- Firing of pyrotechnic bird scaring cartridges.
- Tactical detection of large flocking birds using specialised ground-based radar equipment

# What can we do?

- In July 2011the Civil Aviation Safety Authority (CASA) released Advisory Circular AC 139-26(0) Wildlife Hazard Management at Aerodromes
- The AAWHG has available for download, significant resources to assist aerodrome operators in developing a Wildlife Management plan.
  - The publications provide guidance materials on:
  - The requirement for Wildlife hazard management at certified aerodromes
  - Wildlife hazard management at registered aerodromes
  - Wildlife hazard monitoring
  - Wildlife hazard treatment
  - Reporting requirements for certified and registered aerodromes

# What can we do? (Airport Operators)

**Pre-emptive treatments.**

These are generally applied to the aerodrome environment and can include but are not limited to:

- provision of appropriate fencing around the aerodrome boundary;
- removal of food and habitat sources; • covering of open water sources, drains etc.;
- use of spikes, wire, nets and/or mesh to prevent roosting;
- selection of plant species with reduced attraction qualities;
- maintenance of grasses at set lengths above the ground;
- removal or covering of exposed sources of waste, sewage, offal etc.; and
- the use of appropriate landscaping techniques.

# What can we do? (Airport Operators)

- **Active Treatments.**

These are generally applied to the actual wildlife hazard and could include but are not limited to:

- the use of scare tactics such as horns, sirens, loud hailers, gas cannons, pyrotechnics, arm waving and chasing;
- the simulation of threats to wildlife such as lures, dogs, distress call generators etc.; and
- the use of capture or culling practices.

# What can we do? (Aircraft Operators)

- Education and awareness programmes for all crew
- Continued reporting and cooperation with all stakeholders
- Promote schedules which keep us out of known periods of increased wildlife activity

# Aircraft Mitigation Systems

- Pulse Lights
- Low Speed Profiles
- Painted Surfaces and Spinners

# What can we do? (Aircraft Operators)

- Adopt a risk management approach and reduce the risk to ALARP
  - **Elimination**
  - **Substitution**
  - **Engineered Control**
  - **Administrative Control**
  - **Protective Equipment**

# What can we do? (Aircraft Operators)

- Make it your business to have access to up to date bird strike rates for each airport used
- Ensure that flight crew are properly informed about known bird hazards which may affect them before commencing their flights, whether such information is published in AIPs or NOTAMs, or has been directly determined by the Operator.
- Ensure that flight crew are provided with appropriate guidance on response to the hazard.
- Ensure that flight crew make reports on all actual or suspected bird strikes and any instances of observed bird activity which they consider could have been hazardous.

# Educating Aircrew

- It is important aircrew understand the following physics of a birdstrike:
  - The energy of the impact is proportional to the mass of the bird multiplied by the square of the speed of the impact
  - If you double the mass of the bird then the energy of the impact will double
  - If you double the speed, the energy of the impact is quadrupled.
  - **Consider**
    - Even if there are no applicable ATC speed restrictions, apply a Company Maximum Speed below FL100 / 10000 feet of 250 KIAS for both climb and descent.
    - This will ensure that damage from any impact with the larger birds that increasingly predominate at higher altitudes is minimised.

# Not Just Birds

- Whilst not as common, infact quite rarely, aircraft do collide with wildlife other than birds and often with catastrophic results.
- Encounters with fox, kangaroos, deer and even water buffalo have been know to occur in Australia.
- Personally I have had several significant bird strikes and one encounter with a hapless green tree snake at Hamilton Island!

**Trike collision with multiple Wallaroos during flare – Serious Injuries**

Following a short local flight in the Northern Territory, the pilot of a trike[14] flew overhead Emkaytee ALA to check the wind sock, and elected to land on a secondary cross strip into the wind. During the flare (at a height of about 6 feet above the ground and at a groundspeed of 60 knots), approximately five Antilopine Wallaroos jumped out from the right hand side of the airstrip into the path of the aircraft. The pilot reported that he did not see the animals on the approach, as they were in scrub just prior to landing.

The aircraft collided with multiple Wallaroos. As a result of the impact, the pilot lost directional control of the trike, and it skidded along the gravel strip, sustaining serious damage.

The pilot broke his lower back and right ankle, fractured his right eye socket and broke his nose, and received severe lacerations to his right leg, arm and hand. The pilot was admitted to hospital for 6 weeks, and required lower back surgery as a result of his injuries.

After the accident, the pilot was unable to exit the aircraft or walk to safety due to injuries sustained. Due to filling out his planned flight on the search and rescue (SAR) board[15] at the local flying club, assistance arrived in less than 20 minutes after a brief search was conducted (15 September 2010).

# As recent as early this month!

- The ultralight plane “fell” out of the sky about 1.5km east of Mossy Point, south of Batemans Bay, at 12.10pm.
- Police investigating what went wrong on the routine flight are looking into unconfirmed reports something fell off the plane or it possibly hit a bird.
- There is believed to have been no mayday call and the sudden nature of the crash means it may have struck a bird.
- Mr Monck said with the crash occurring close to the coast a bird strike could be one possibility.

# Summary

- A real and ever present risk to aviation exists in the form of wildlife encounters.
- We need to continue to work as an industry to minimise the potential for encounters and to control wildlife populations around the vicinity of aerodromes.
- A collaborative approach and the sharing of information or data is our best way forward.

# THANK YOU

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