Critters on My Runway: Aviation Wildlife Management

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History of Bird Strikes

• 1st recorded bird strike?
  September 7th, 1905 – Orville Wright struck a red-winged blackbird near Dayton, OH.

• 1st recorded fatality from a bird strike?
  April 3rd, 1912 – Calbraith Rodgers struck a gull in Long Beach, CA.

As long as we have been flying, wildlife hazards have been an issue for aviation!
A wildlife strike is defined as:

- A pilot reports striking one or more birds, or other wildlife.
- Aircraft maintenance personnel identify aircraft damage as having been caused by a wildlife strike.
- Personnel on the ground report seeing an aircraft strike birds or other wildlife.
- Wildlife remains, whether whole or in part, are found within 200 feet of runway centerline.
- The wildlife’s presence had a significant negative effect on a flight.
WARNING
This gallery contains graphic images that some viewers may find disturbing
Modern History
Expanding Wildlife Populations

- Several waterfowl and gull species (particularly Canada Geese) have shown dramatic population growth over the past 20 years.

- 13 of the 14 North American bird species with a mean body mass over 8 lbs. have shown significant population increases over last 30 years.

- Large mammal species (such as white-tailed deer) have also shown population increases in recent years.
Increased Air Traffic

- Domestic passenger enplanements rose from just over 310 million in 1980 to 696.02 million in 2015.
Wildlife Strikes by Month

Table from “Wildlife Strikes to Civil Aircraft in the United States 1990 - 2015”, November 2016
Wildlife Strikes by Month

Table from “Wildlife Strikes to Civil Aircraft in the United States 1990 - 2015”, November 2016
Wildlife Strikes by Height AGL

Table from “Wildlife Strikes to Civil Aircraft in the United States 1990-2015”, November 2016

Commercial aviation aircraft

\[ y = 12427e^{-0.413x} \]

\[ R^2 = 0.99 \]
Cost of Wildlife Strikes

Collisions with birds and other wildlife cost the airline industry (and the flying public) approximately $2,000,000,000 annually.

It is estimated that only 40% of wildlife strikes are actually reported, so the actual cost may be much higher.
What can we do????

Are wildlife strikes an inevitable part of aviation?

It has been 22 years since the last commercial accident due to wind shear.
According to section 139.337 (b)

• “In a manner authorized by the Administrator, each certificate holder must ensure that a Wildlife Hazard Assessment is conducted when any of the following events occurs on or near the airport:

• (1) An air carrier aircraft experiences multiple wildlife strikes;
• (2) An air carrier aircraft experiences substantial damage from striking wildlife. As used in this paragraph, substantial damage means damage or structural failure incurred by an aircraft that adversely affects the structural strength, performance, or flight characteristics of the aircraft and that would normally require major repair or replacement of the affected component;
• (3) An air carrier aircraft experiences an engine ingestion of wildlife; or
• (4) Wildlife of a size, or in numbers, capable of causing an event described in paragraphs (b)(1), (b)(2), or (b)(3) of this section is observed to have access to any airport flight pattern or aircraft movement area.”
Assessing Wildlife Hazards

Wildlife Hazard Assessment
• Conducted over 12 month period to cover seasonal fluctuations in wildlife populations.
• This is NOT a academic research study in wildlife biology!
  – Focus is on identifying wildlife hazards, not compiling a life list of observed bird species.
  – If a potential hazard is identified, it should be immediately communicated to the airport.

Wildlife Hazard Site Visit
• A short term visit to assess potential hazards through evaluation of existing habitat.
Wildlife Hazard Assessment

- Both assessment methods should contain at least the following information:
  - An analysis of the events or circumstances that prompted the assessment.
  - Identification of the wildlife species observed and their numbers, locations, local movements, and daily and seasonal occurrences.
  - Identification and location of features on and near the airport that attract wildlife.
  - A description of wildlife hazards to aircraft operations.
  - Recommended actions for reducing identified wildlife hazards to aircraft operations.
Separation Distances

Perimeter A:
For airports serving piston-powered aircraft, hazardous wildlife attractants must be 5,000 feet from the nearest air operations area.

Perimeter B:
For airports serving turbine-powered aircraft, hazardous wildlife attractants must be 10,000 feet from the nearest air operations area.

Perimeter C:
5-mile range to protect approach, departure, and circling airspace.
Potential Wildlife Attractants

- Landfills
- Trash transfer stations
- Composting operations
- Underwater waste discharge
- Recycling centers
- Construction and Demolition debris facilities
- Restaurant/hotel waste storage
- Stormwater facilities
- Wastewater facilities
- Wetlands
- Agricultural activities
  - Livestock production
  - Aquaculture
  - Crop production
- Golf Courses/ponds
- Landscaping
- Synergistic effects
Wildlife Hazard Management Plan

• Deliverable result of both assessment methods

• Provides specific management actions to control and mitigate the wildlife hazards identified.
  – Should be drafted cooperatively with stakeholders in airport operations.
  – Functions as a living document and should respond to any changes seen on and around the airport.
Wildlife Control Measures

• **Passive Control Measures**
  - Habitat modification.
  - Provides permanent control.
  - Serves as the foundation of an effective WHMP.

• **Active Control Measures**
  - Use of various repellants and hazing techniques to remove wildlife from airport
  - Provides immediate but short term control
  - An integrated array of techniques must be used judiciously
Passive Wildlife Control

- **Turf management**
  - Single most effective deterrent
  - Maintain grass between 6 and 12 inches in height
  - Eliminate bare ground areas and broad leaved weeds

- **Drainage management**
  - Reduce/eliminate standing water whenever possible
  - Design/retrofit storm water storage to reduce attractiveness to wildlife

- **DO NOT INSTALL WETLAND MITIGATION ON AIRPORT PROPERTY!**
- **Reduce/eliminate wildlife habitat within AOA**
  - Trees/brush and roost sites

- **Airport Landscaping**
- **Perimeter fencing**
- **Agriculture production methods/crop selection**
Passive Wildlife Control

- **Facilities**
  - Design of airport buildings and hangars
  - Exclusion techniques
  - Anti-perching devices

- **Waste management**
  - Manage dumpster/waste storage effectively

- **Scarecrows, effigies, etc.**
Active Wildlife Control

- Dispersing/repelling wildlife
  - Chemical, Auditory and visual techniques
  - Requires airport staff involvement
    - Commitment
    - Training
- Trap and relocation
  - Requires federal/state permits
  - Can be effective depending upon species
- Lethal Control
  - Must have federal/state permits
  - Can be accomplished through shooting/trapping/poisoning
  - MUST be done by trained professional
Case Study: McGhee Tyson Airport

TYS Stormwater Management Plan

Figure 1-2: McGhee Tyson Stormwater Outfall Locations
Case Study: McGhee Tyson Airport

ENHANCED SWALE WATER QUALITY BERMS PLAN VIEW

ENHANCED SWALE WATER QUALITY BERMS SECTION A-A
Case Study: McGhee Tyson Airport

ENHANCED SWALE WATER QUALITY BERMS SECTION B-B

NOT TO SCALE
Case Study: White County Airport
Case Study: White County Airport
Case Study: White County Airport
Case Study: Gordon Graham Field
Case Study: Gordon Graham Field
Case Study: Gordon Graham Field
Questions??