

# **Species, Endophytes, and Wildlife - A Primer on Turf Management for Airports**

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# Aircraft Strikes Should Gain More National Attention Now!



# How Much of A Problem Are Wildlife Strikes at Airports?

- Since 1988, global wildlife strikes have killed more than 194 people and destroyed >163 aircraft.
- From 1990-2005, 66,392 strikes were reported to the FAA. FAA estimates only 20% of wildlife strikes are reported.
- Birds were involved in 97.5 % of the strikes.
- Reported strikes increased from 1,744 in 1990 to 7,236 in 2005.

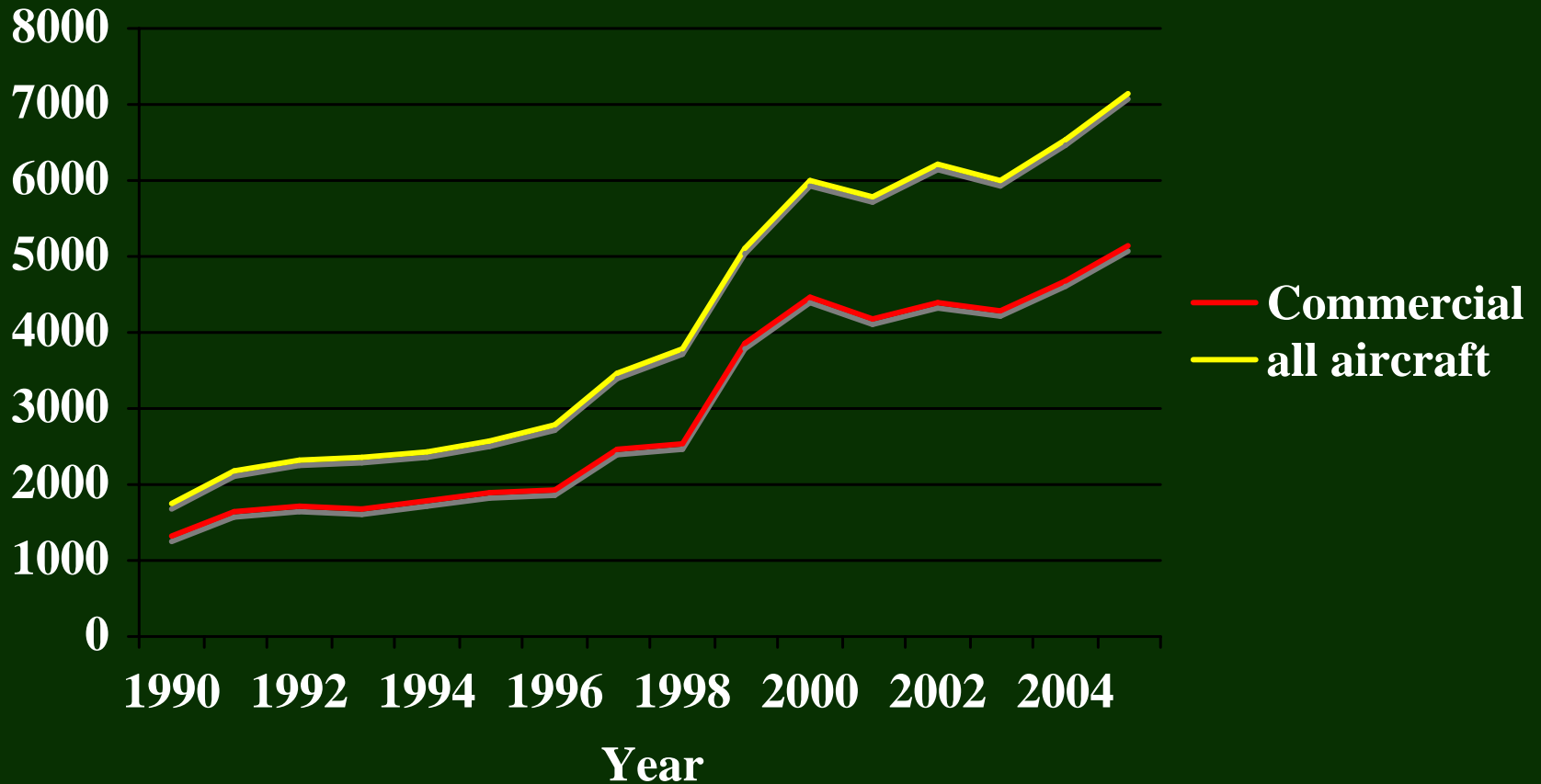
# How Much of A Problem Are Wildlife Strikes at Airports?

- Over 695 deer-aircraft strikes occurred between 1990-2005.
- 79 aircraft-reptile strikes were reported over this period.

# Increasing Wildlife Populations

- The white-tailed deer population has increased from 0.3 million in 1900 to 17 million in 2005.
- From 1980 to 2005, the resident Canada goose population has risen 7.9 %/yr.
- Over the same time period:
  - Red-tailed hawks - 1.9 %
  - Wild turkeys - 12.7 %
  - Turkey vultures - 2.2 %
  - Double-crested cormorants - 4.9%

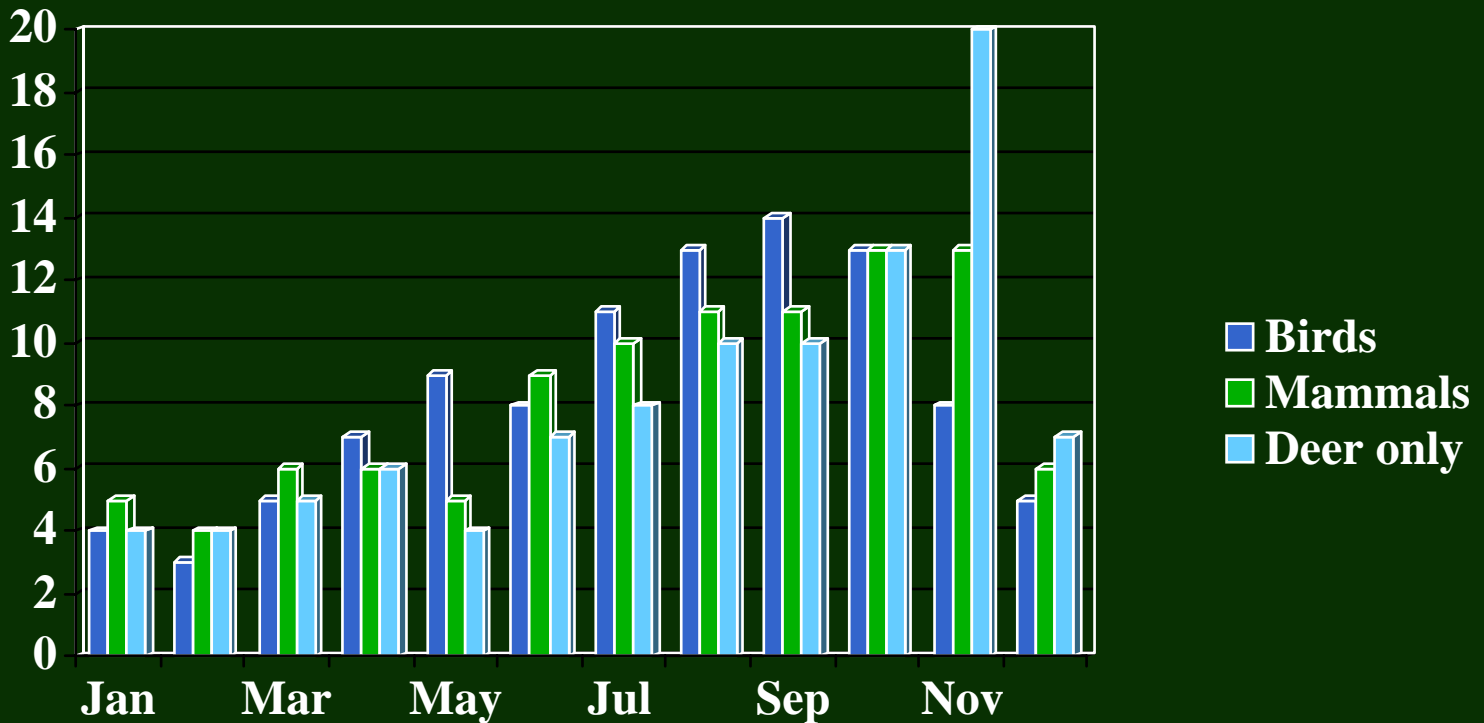
# Reported Wildlife Strikes 1990-2005



# States with the Most Reported Strikes

State	Number of strikes, 1990-2005
California	5590
Florida	4447
Texas	4245
New York	3632
Illinois	3139
Pennsylvania	2335
Ohio	2119

# When do Most Strikes Occur?



# Turf Management for Airports

- Cool season turfgrass species
  - Kentucky bluegrass
  - Perennial ryegrass
  - Tall fescue
  - Fine fescues
    - At least 4 species make up this group, most do very well under low maintenance conditions.
- Warm season turfgrass species
  - Zoysiagrass
  - buffalograss

# Turf Management for Airports

- Mixes and blends
  - Using several cultivars of the same species is called a blend - used to increase diversity.
  - Seeding more than one species is called a mix.
    - Kentucky bluegrass, perennial ryegrass, & fine fescue is a general purpose mix
    - Tall fescue does not mix well with other species
  - Generally don't mix cool & warm season species

# Kentucky bluegrass

- Best grass for general turfs.
- Rhizomes give recuperative ability that other species lack
- Prime rib for geese!
- Shouldn't use on airport property

# Endophytes - What are they?

- Endophytes are symbiotic fungi that live in certain grasses. Grasses provide substrates necessary for endophyte growth. What benefits do endophytes provide grasses?
- Many endophytes produce alkaloids, some of which are toxic to invertebrates. Endophyte infection has been shown to provide resistance to many foliar-feeding insects.

# ABC's of Endophytes

- About 20-30 % of all grass species contain some endophytes.
- Endophytes are fungi, so expect significant variation even amongst the same fungal species.
- Tall fescue is infected by *Acremonium coenophialum*, which produces ergot alkaloids, notably ergovaline.

# ABC's of Endophytes

- Perennial ryegrass is typically infected with *Neotyphodium lolii* which produces lolium alkaloids.
- Fine fescue is typically infected with *Epichloe festucae*.
- Kentucky bluegrass is not infected with endophytes.

# ABC's of Endophytes

- Endophytes are living organisms. Storing seed in hot, humid conditions can result in death of the fungus.
- In turfgrasses, transmission of endophytes is by seed. Not all seed will contain endophytes. Important to obtain fresh seed with a high level of endophyte infection.

# Do Geese Eat Endophyte Infected Turfgrasses?

- Short answer - yes.
- But geese fed only tall fescue infected with endophytes lost weight whereas geese feeding on uninfected tall fescue gained weight.
- In this study, geese initially showed no preference for infected vs uninfected tall fescue. However, after a period of time, geese spent 86% of their time grazing on uninfected tall fescue.

# Importance of Endophytes in Deterring Wildlife

- Certainly, endophyte containing tall fescue is less attractive to birds; however, birds will be still feed on endophyte tall fescue. Will over time, they learn to avoid it?

# Turf Establishment - Reality versus Ideality

- Tall fescue establishes best with soil temperatures above 55 F. Perennial ryegrass is a better at establishing under non-optimal conditions.
- Most construction seeding is often done at the end of the year, when establishment conditions are poor.
- How should these seedings be handled?

# Turf Establishment - Reality versus Ideality

- Many low maintenance plantings use a shotgun approach, seed 5-10 species and may the best adapted win. Any grasses which produce seedheads can be particularly problematic since seeds are high in energy and may attract wildlife.
- Example: Recent bulletin from FAA on millet.

# Turf Establishment - Reality versus Ideality

- I would never recommend seeding tall fescue with perennial rye for a turf.
- However, in this case we need to explore whether this mixture could work under airport conditions.
- Temporary cover may be needed if grasses make a substantial difference in wildlife attraction.

# Turf Establishment - Reality versus Ideality

- We recommend seeding between 8/15 and 9/15.
- This year was unseasonably cool in October, waiting to establish until October probably resulted in failure.
- Tall fescue and perennial ryegrass can winterkill when seeded late in the growing season.
- Many contractor mixes contain species that establish well when seeded late in the growing season.

# Turf Establishment - Reality versus Ideality

- Other species may need to be considered to get the most wildlife detestable turf.
- Late season seedings may need to be temporary, and reestablished the next spring with the correct mix.
- We may need to combine bird detraction with bird attraction at nearby locations.

# Turf Establishment - Reality versus Ideality

- We need sites for bird attraction/detraction studies.
- Any ideas?

# Turf Establishment - Reality versus Ideality

- Thank you!
- Questions?