

# Comparison of wildlife strike data among airports to improve aviation safety



**Richard A. Dolbeer, PhD, Sandusky, Ohio USA**  
**Michael J. Begier, Washington, D.C. USA**

**30th International Bird Strike Committee Conference,  
Stavanger, Norway**

**26-29 June 2012**



## **Acknowledgements**

**U.S. Federal Aviation Administration**

**U.S. Department of Agriculture, Wildlife Services**



**Findings and recommendations expressed in this  
presentation do not necessarily represent the  
position of the Federal Aviation Administration**

**Question: How do we evaluate programs to mitigate risk of wildlife strikes at USA airports?**

**Answer: Current system is regulatory-driven under 14 CFR Part 139:**

- If airport has Wildlife Hazard Management Plan (WHMP) acceptable to the FAA, the airport is in compliance.
- WHMP is reviewed annually for completion of targeted projects (e.g., drainage improvement).
- **However, there are no objective procedures to evaluate effectiveness of the WHMP and to guide improvements.**



**The current system is the antithesis of Safety Management System (SMS) approach!**



**Airport managers naturally want to know:**

- How does our program compare to other airports?
- How good is our WHMP—are we getting good value (risk mitigation) for money invested?



**At present, the U.S. FAA has no objective process in place to provide answers!!**

**What process does the civil or military aviation authority use in your country??**

## Is there a solution to this dilemma?

We propose that **Wildlife Strike Databases** can play a key role to:

- provide objective benchmarks of airport's performance in mitigating risk compared to other airports.
- Strikes in airport environment ( $\leq 1500$  feet)
- Strikes on approach/climb at  $>1500$  feet



If we do not have objective, comparative data, we must base decisions upon subjective opinion!

**No one is held accountable!**

**Knowledge = Power**

**Power (Improved WHMP)**

↑  
Application of  
knowledge

**Objective (quantitative) knowledge**

↑  
Data analysis

**Database provides scientific foundation**



## Filtering the records in database for analysis:

Years = 2007-2011  
Airports = 100 busiest airports  
(median of 185,000 movements/year)



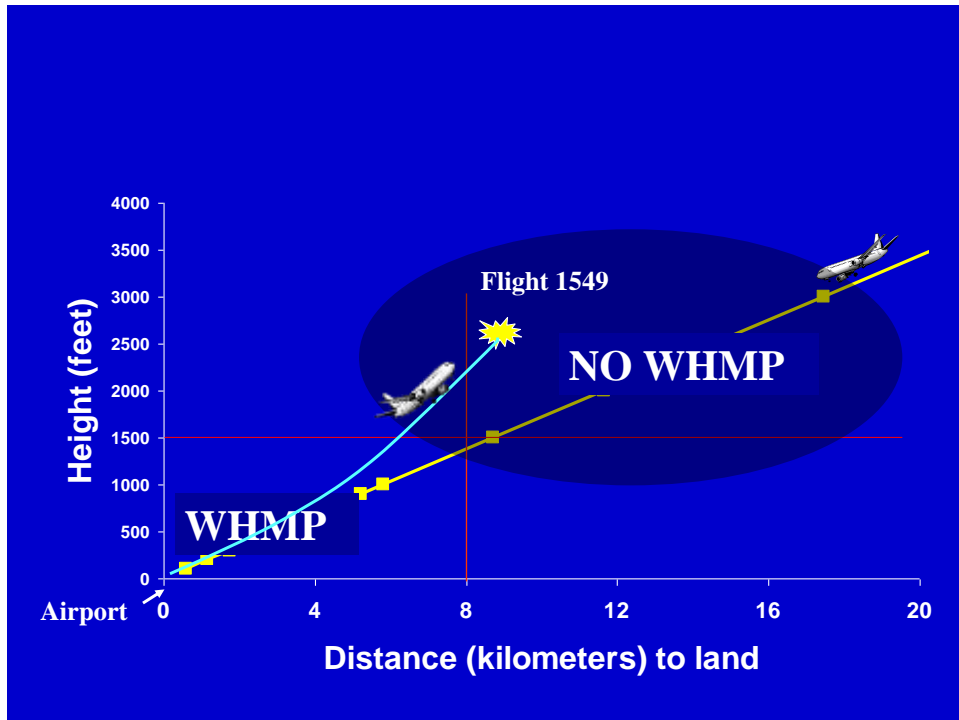
Height (AGL) where strike occurred	Number of strikes:	
	Total	With adverse effect*
<=1,500 feet	24,408	1,429 (5.9%)
>1,500 feet	3,431	409 (11.9%)
Total	27,839	1,838

\*Strikes that cause damage or negative effect on flight (aborted take-off, precautionary/emergency landing, engine shutdown)

## Why should there be a separate benchmark for strikes on approach/ departure at >1500 feet AGL?

### Answer:

- These strikes are usually >8 km from AOA.
- These strikes are important for risk analysis and mitigation... But these strikes typically are not addressed in an airport's WHMP.
- By creating a separate benchmark, it permits an airport to assess the risk for these "off airport" strikes.
- Provides objective basis to incorporate mitigation strategies for these "off airport" strikes into the WHMP.



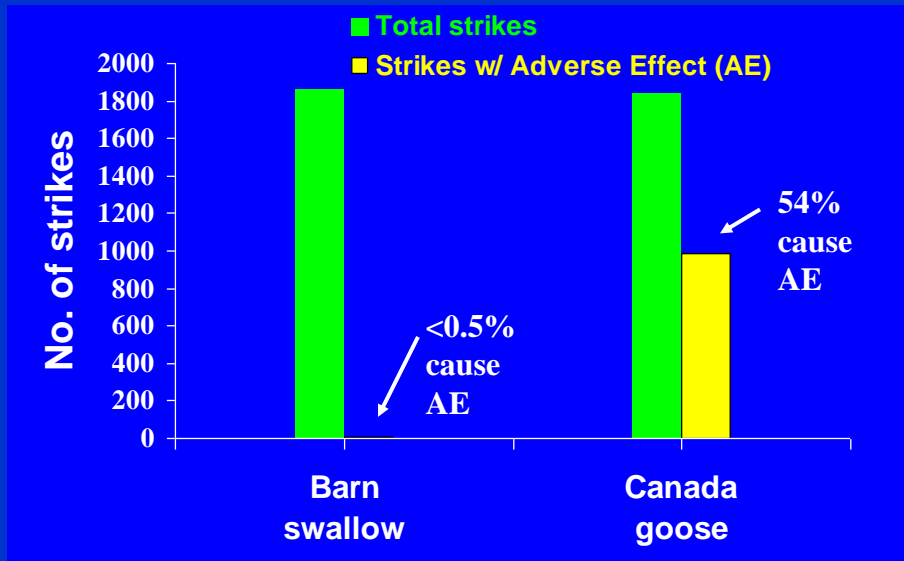
What is an objective benchmark of an airport's performance in mitigating risk?

Should benchmark be the overall strike rate (all reported strikes/100K movements)?

Answer: **No!** Comparison of the reported strike rate at an airport in relation to rates at other airports is not a valid metric because airports may vary in:

- hazard level of species struck (e.g., swallow vs. goose).
- completeness of reporting all strikes (e.g., carcasses found on runway).

**Example: Hazard level of Barn Swallows versus Geese, Civil Aircraft, USA, 1990-2011**



Should benchmark be the Adverse Effect strike rate?<sup>1,2</sup>

**Answer: Yes.** Comparison of AE strike rate at airport in relation to rates at other airports is valid metric:

- **AE strike rate incorporates hazard level of species struck (e.g., swallow vs. dove vs. goose).**
- **There is much less bias among airports in reporting AE strikes compared to all strikes.**
- **Bottom line of airport's WHMP is to reduce AE strikes.**

(1) Strikes at  $\leq 1500$  ft AGL that cause damage or negative effect on flight/100K movements

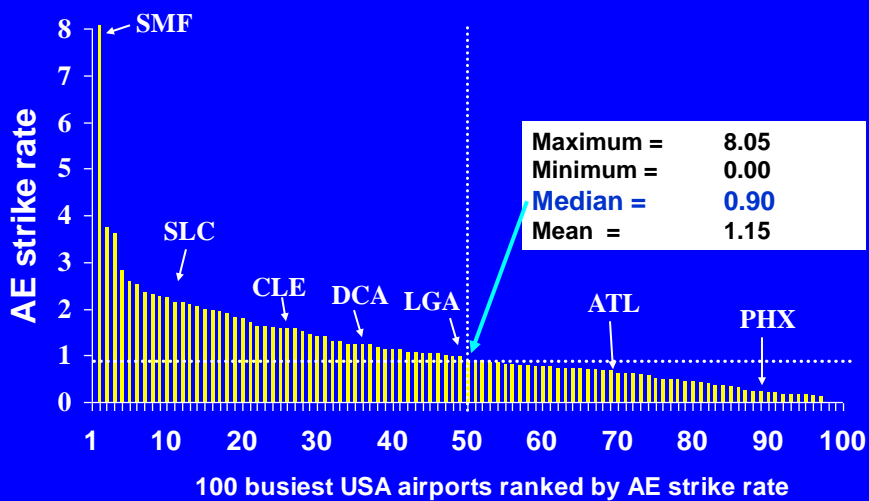
(2) Strikes at  $>1500$  ft AGL on final approach/initial climb that cause damage or negative effect on flight/100K movements

Okay, if we can agree that the AE strike rate is a valid metric, then what are these rates for U.S. Airports?

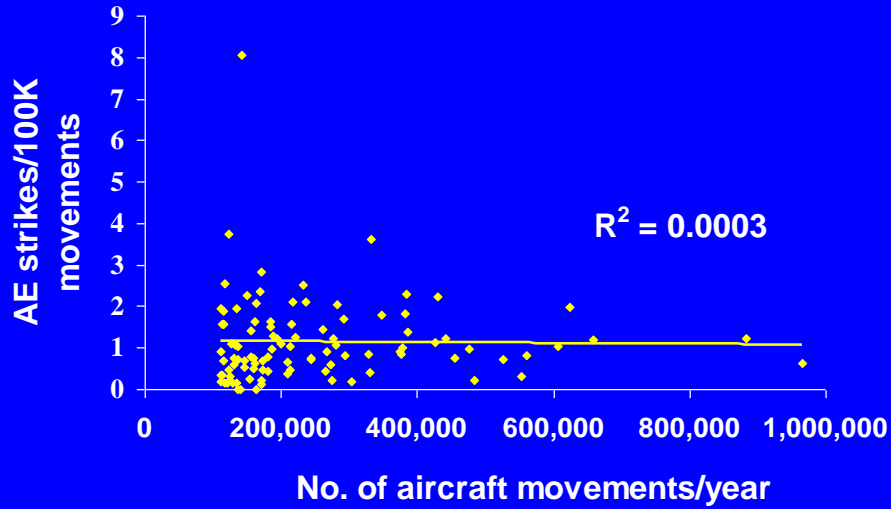


Snow goose strike  
Minneapolis-St. Paul (MSP)  
Nov 2010

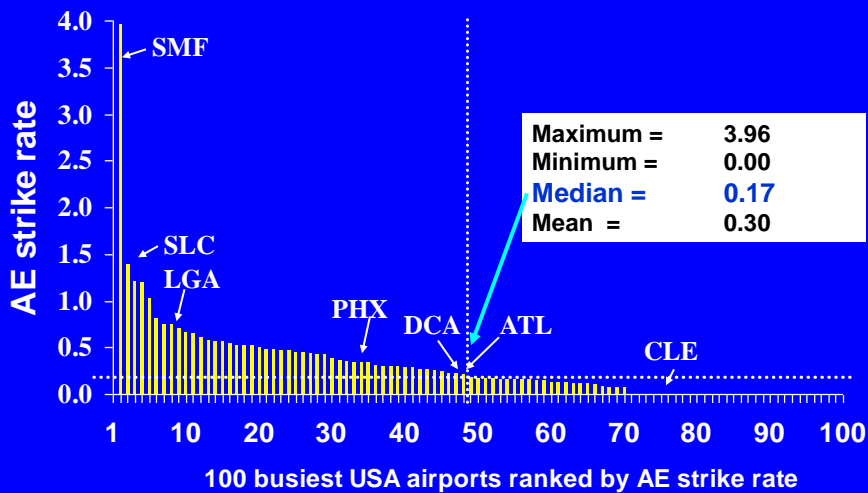
**Adverse Effect (AE) Wildlife Strikes/100K Movements  
( $\leq 1500$  feet AGL), 2007-2011**



**No relationship between movements and Adverse Effect Strike Rate for 100 busiest airports, USA, 2007-2011 ( $\leq 1500$  feet AGL)**

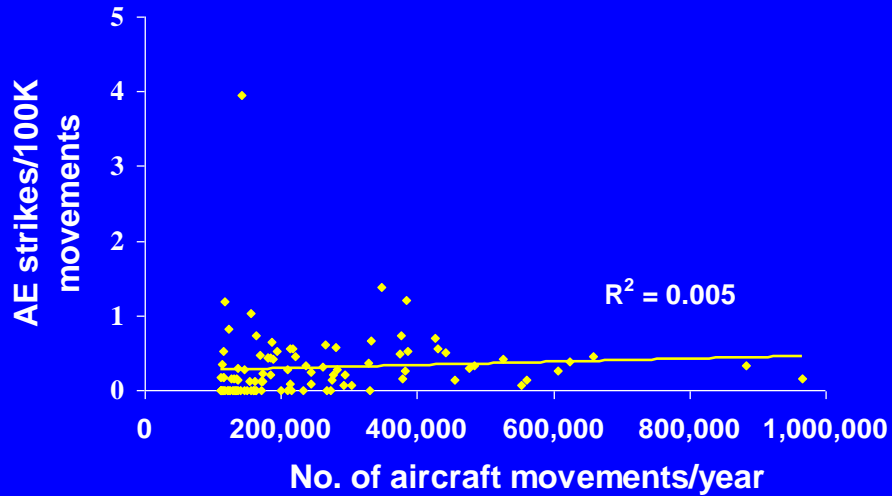


**Adverse Effect (AE) Wildlife Strikes/100K Movements (>1500 feet AGL), 2007-2011**

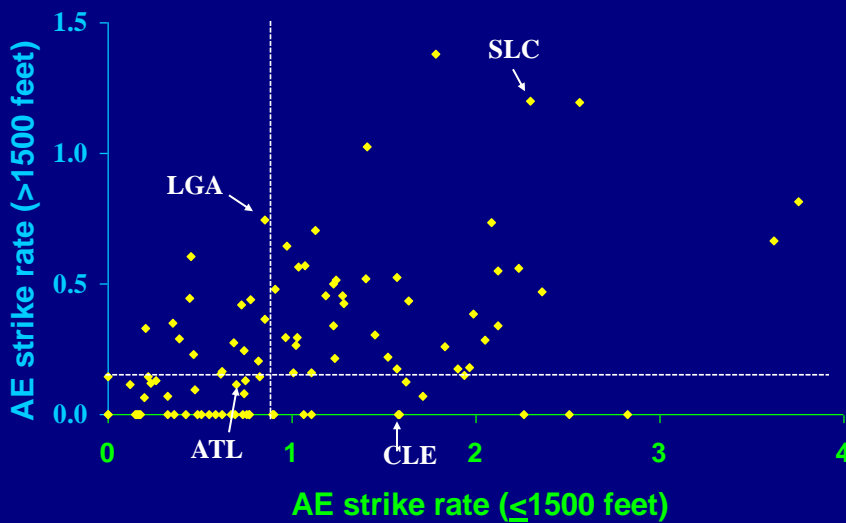




**No relationship between movements and Adverse Effect Strike Rate for 100 busiest airports, USA, 2007-2011 (>1500 feet AGL)**



**Relationship between Adverse Effect Strike Rates at  $\leq 1500$  and  $>1500$  feet AGL for 100 busiest airports, USA, 2007-2011**



Does this mean that if my airport is below the median AE strike rates (0.90; 0.17), I don't need to improve anything to mitigate risk?



**Answer: No. Every airport should strive for an AE strike rate of 0 at both <1500 and >1500 feet.**

Your airport may have a lower risk than many other airports because of:

- a) Inherent geographic or site-specific location.
- b) Superior WHMP and personnel.

Knowing your airport's AE strike rate provides a "benchmark" or goal to measure future progress or setbacks.

If my airport is above the median AE strike rates (0.90; 0.17), should I be criticized/penalized?



**Answer: Not necessarily. Your airport may have a higher risk because of:**

- a) Inherent "birdy" geographic or site-specific location.
- b) An inferior WHMP.
- c) Good WHMP but poorly trained or motivated staff.



**However, a high AE strike rate is a **red flag**; the WHMP needs to be evaluated to lower the rate.**

The AE strike rates simply show where your airport stands in relation to other airports and provide "benchmarks" or goals to measure future progress.

**Is it really fair to compare airports when one airport has more wildlife inherently present than another airport?**



**Answer: Yes. The FAA compares airports for other safety-related issues (e.g., runway incursions) and then:**  
**a) Identifies high-risk airports and pin-points problems.**  
**b) Prioritizes (\$) mitigation efforts to reduce risk.**

**Why should we not do this for wildlife risks?**

**If we refuse to measure and compare risk, how can we wisely manage to mitigate the risk?**

## **Conclusions:**

## **Data Rule!**

- The USA National Wildlife Strike Database has always provided overview of problem from a national perspective.
- The database has matured. It now enables objective evaluation and guidance at individual airports.

1. We propose an annual report for each Part 139 airport that calculates the AE strike rates for past 5- and 1-year periods at  $\leq$  and  $>1500$  feet AGL in relation to national median values (benchmarks).
2. These AE strike rates should form the basis for integrating mitigation efforts for strikes at  $>1500$  feet AGL into each airport's WHMP.

**If you cannot measure it,  
you cannot manage it!**



**Safer skies for all who fly!**

**Thank you.**

USDA/Sandusky, OH