

**Evaluation Approach for Assessing  
Wildlife Management Programs at  
Canadian airports / Enfoque de valoración  
de un programa de gestión de la vida  
silvestre en aeropuertos canadienses.**

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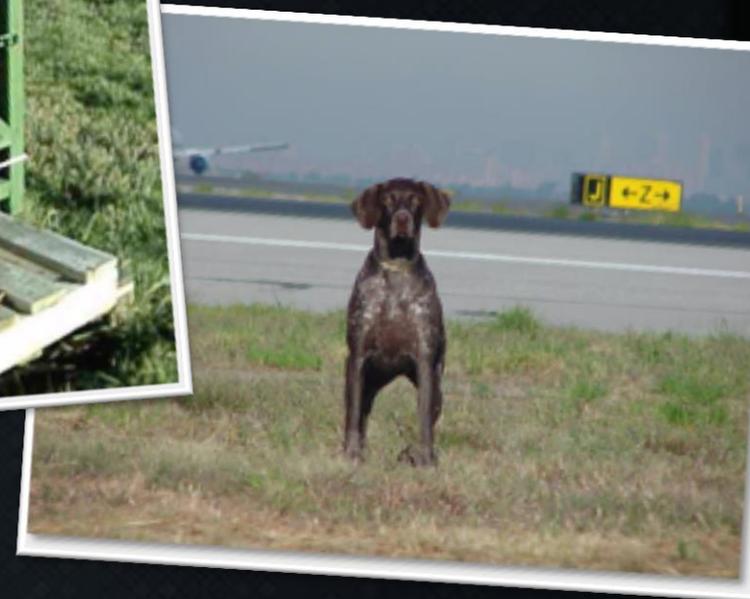
**LEADERS IN THE FIELD SINCE 1989**

Wildlife Management & Consulting

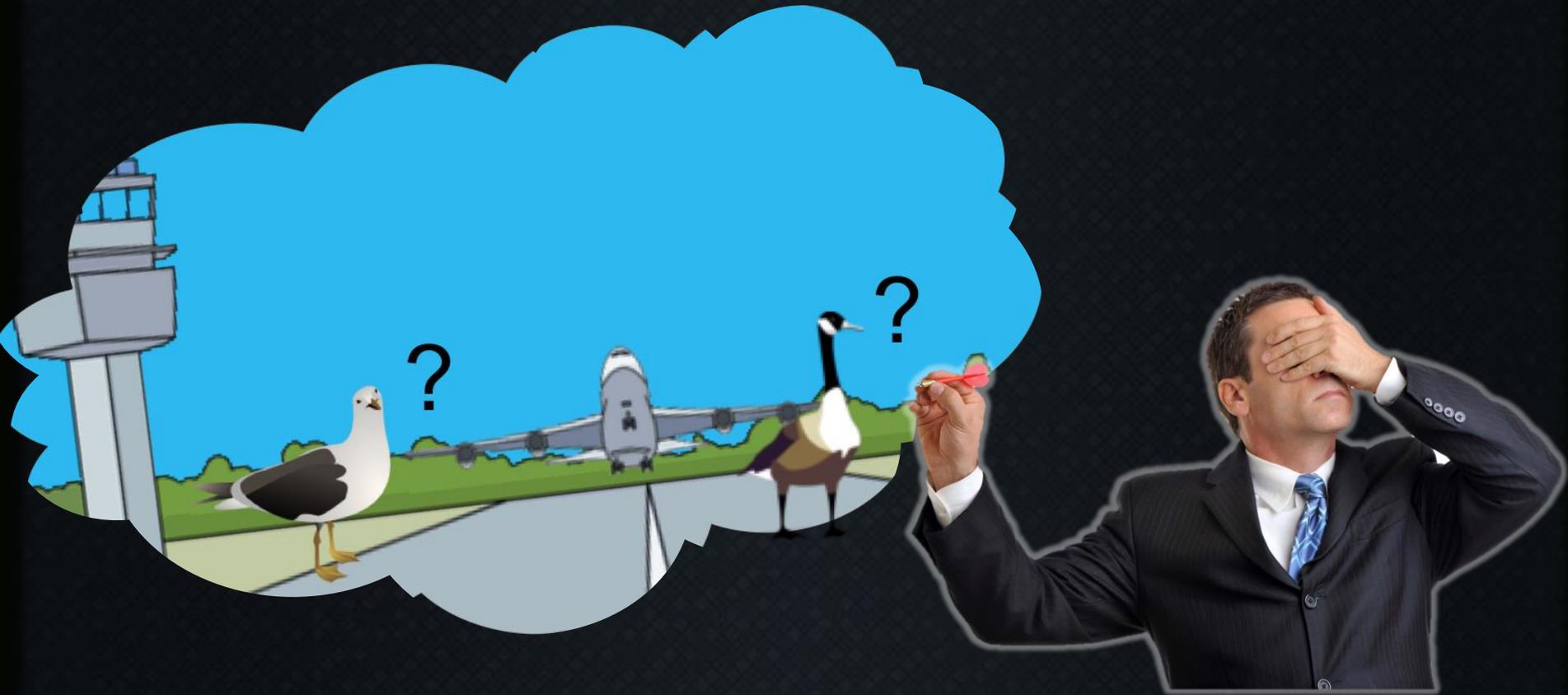


**FALCON**  
Environmental Services

# You think you have a great wildlife program!



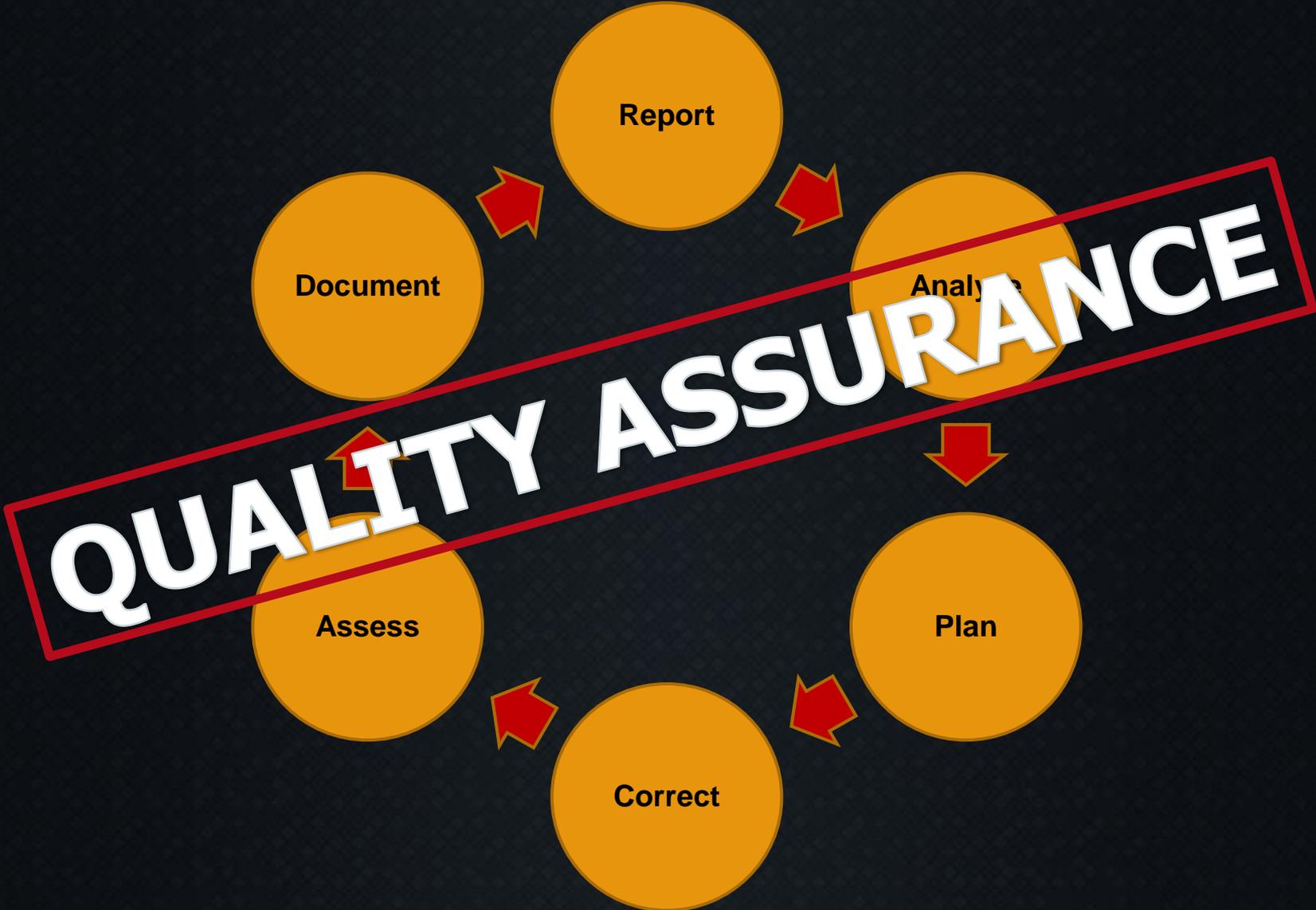
# How do you measure the QUALITY of your program?



# SMS is a QUALITY ASSURANCE Process

- ✈ **Canadian SMS Regulation is mandatory** (2008)
- ✈ **A safety management system shall include** (CAR 107.03):
  - ✈ a process for **setting goals** for the improvement of aviation safety and for **measuring the attainment of those goals**;
- ✈ **A QUALITY CONTROL** indicator is needed

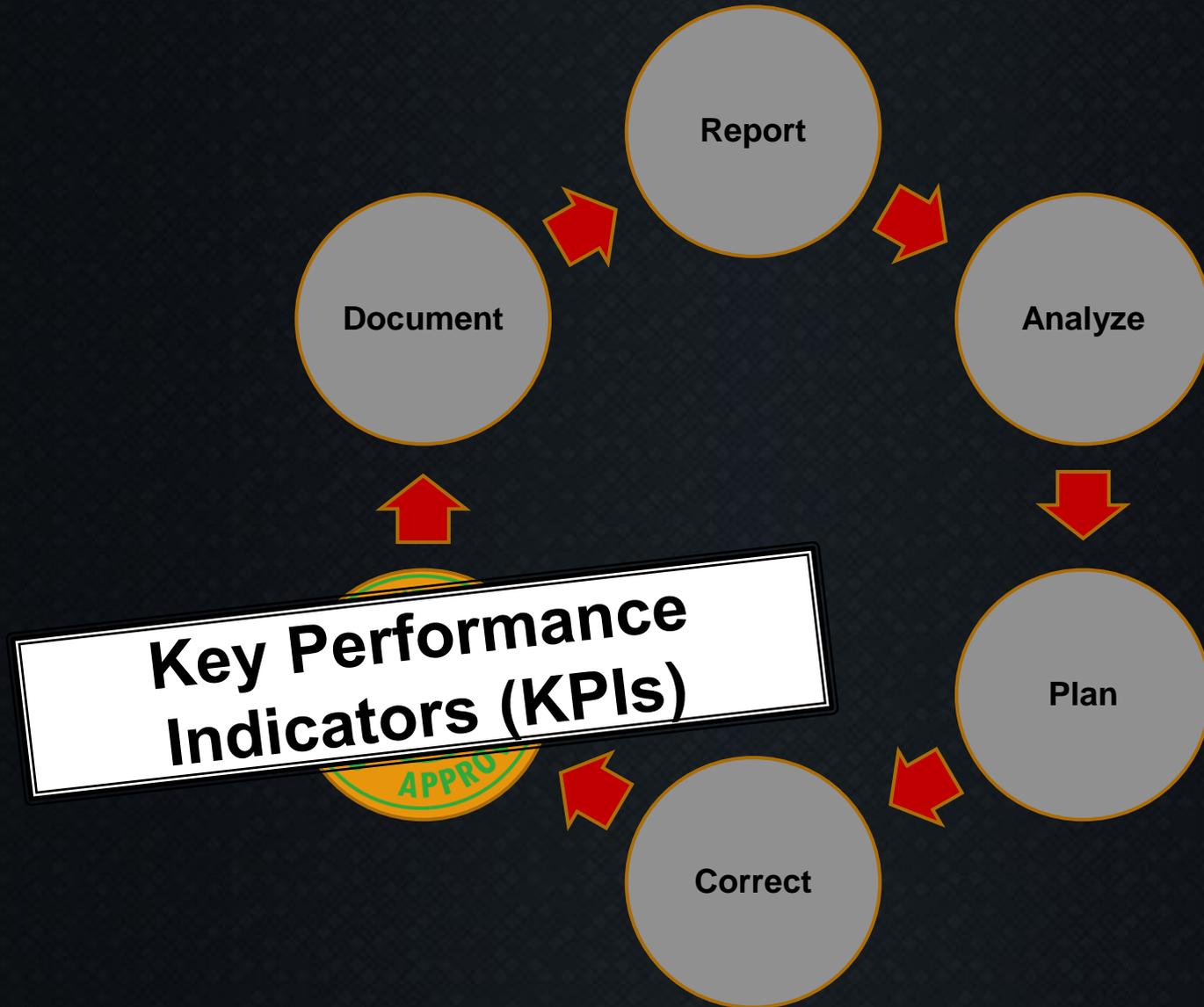
# SMS is a QUALITY ASSURANCE Process



# The Process of Managing Risk



# The Process of Managing Risk



# KPI 101

## REGULATION!

- ✈ Why we need them;
- ✈ How we develop them;
- ✈ How do we use them.

# How We Develop Them?

## First Identify Goals!

- Decrease the risk of wildlife strikes

## Measurable Objectives!

- Reduce the number of bird strikes to maximum of  
3 strikes / 10 000 movements

# What is a KPI?

## Identify Indicator

- Ex.: Number of **wildlife strikes** per 10,000 movements

## Data Needed

- Properly compiled **Strike Data**
- Yearly **movements/operations numbers**

# KPI #1 – Montreal Int. Airport

## ✈ Annual Strike Rate per 10 000 mvmts

Year	Strike / 10 000 mvmts
2003	2.7
2004	1.8
2005	2.8
2006	3.0
2007	2.7
2008	3.3
2009	3.9
2010	3.7
2011	2.6
2012	3.7
2013	3.5
2014	3.6

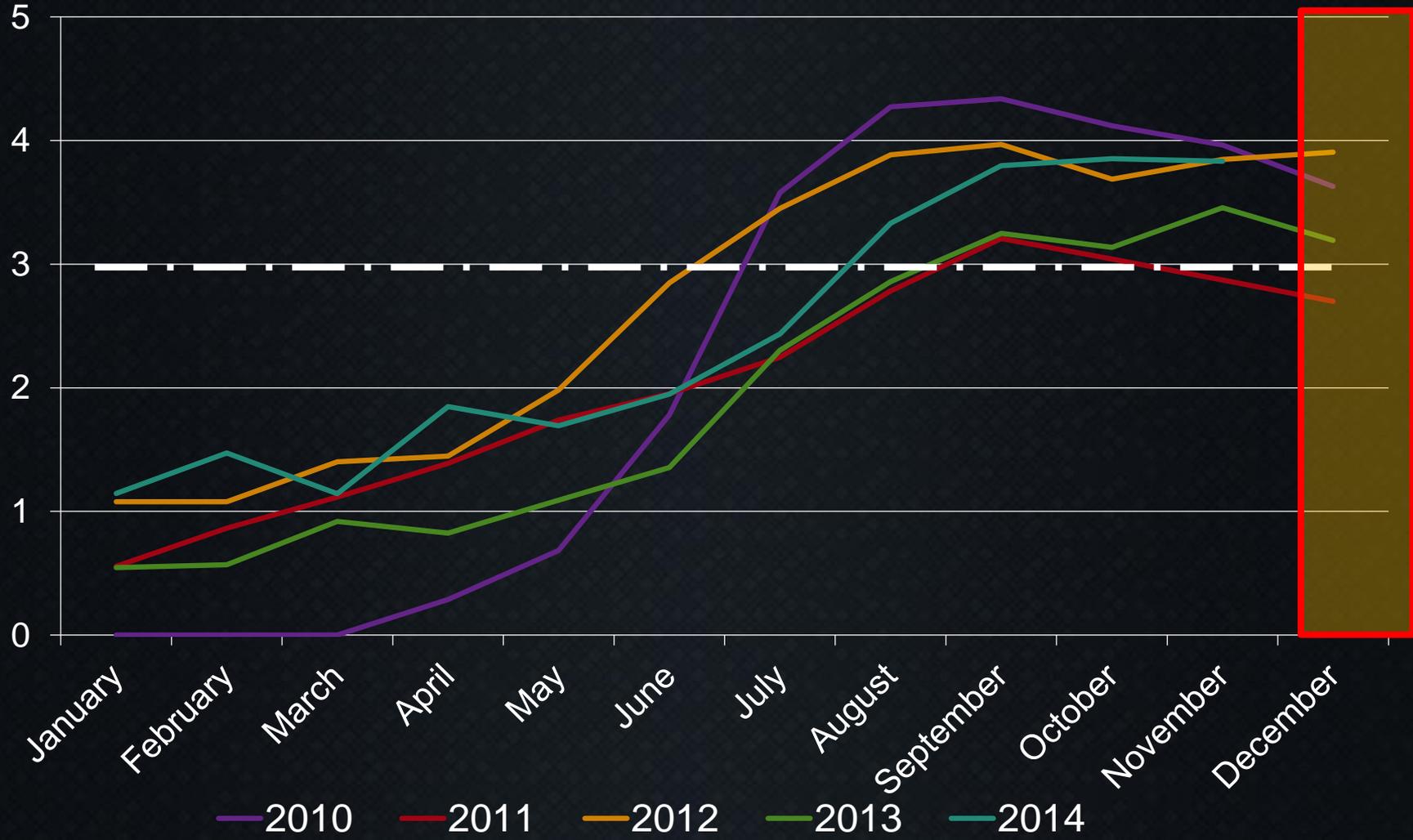
**KPI threshold = 3 strikes / 10 000 mvmts**

# But why choose this threshold ?

- ✈ On average there are 5 strikes per 10 000 mvmts for airports worldwide. Thorpe 1992
- ✈ Canada has an average of 2.6 strikes / 10 000 mvmts from 2010 to 2014
- ✈ One Canadian target was 3 strikes / 10 000 mvmts. TP 11 500

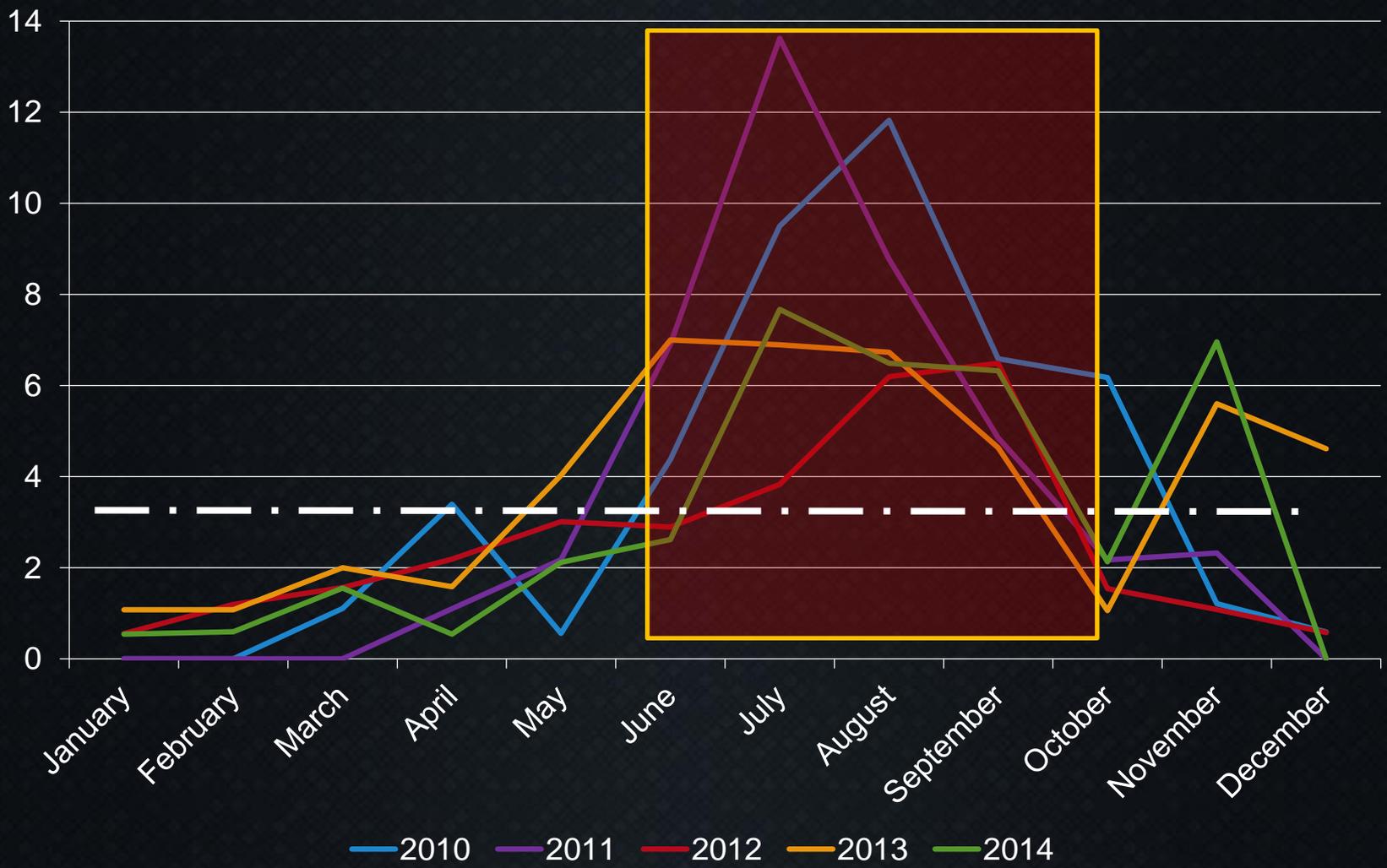
# KPIs Case Study – Montreal Int. Airport

## ✈ Cumulative Strike Rate per 10 000 mvts



# KPIs Case Study – Montreal Airport

✈ KPI: Strike Rate per 10 000 mvts from 2010 to 2014

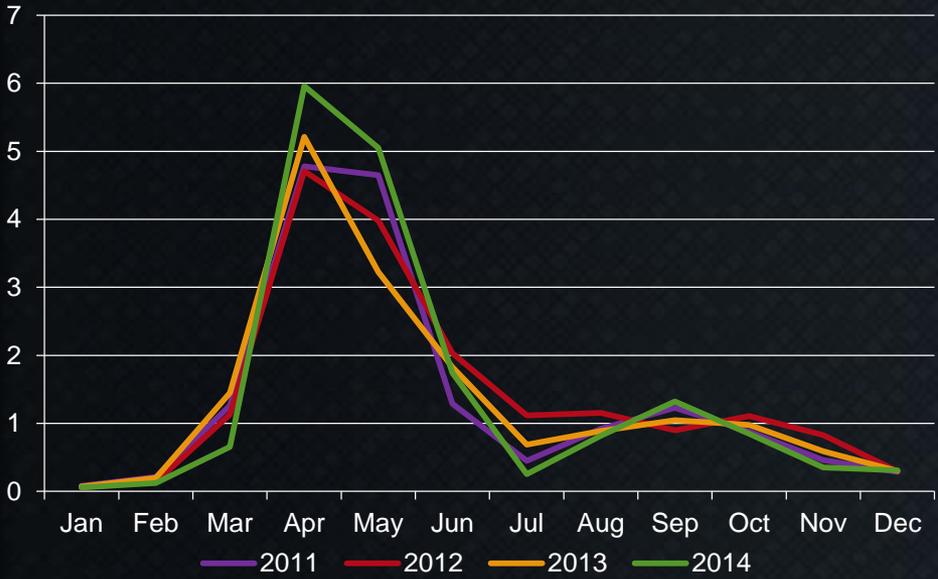
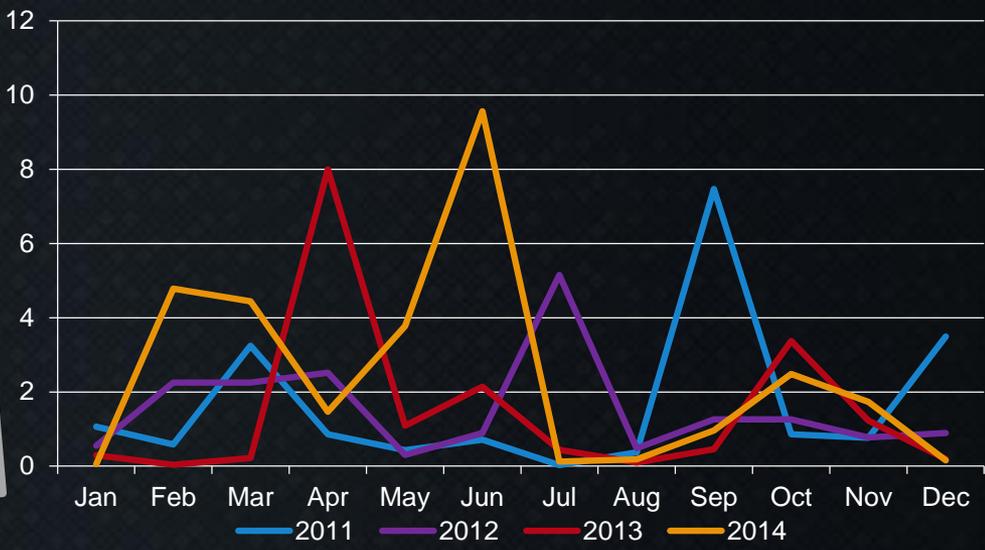


**Strike Rates** is the  
oldest **KPI** but not  
applicable for all  
airports

# How to determine if a KPI is reliable?

**Are Strike Rates a good KPI ?**  
Not recommend at airports with <50 000 operations

**Better KPIs?**  
Damaging Strikes Rates  
Strikes with high risk species



# Potential KPI #2: Many Canadian Airports

## Yearly # Wildlife Adverse Effect Events (AEE)

### DEFINITION of AAE

Any occurrence involving wildlife:

- Resulting in damage, or;
- Effect on flight:
  - Emergency/precautionary landing
  - Rejected take-off or missed approach
  - Obstructed vision
  - Fire, smoke in cabin, or
  - Any change to the flight plan.

# Potential KPI #2: Many Airports

## Yearly # Wildlife Adverse Effect Events (AEE)

- Relatively rare events
- The strike events that “count” in the end
- Primary prevention events

# Calculations for KPI #2

## Yearly # Wildlife Adverse Effect Events (AEE)

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
AEE	10	5	11	10	8	7	5	4	4	10

**KPI threshold = SITE SPECIFIC**

# Potential KPI #3 – Toronto Int. Airport

## Monthly # High Risk Species Strikes / 10 000 mvmts

- Primary High Risk Events (prevention events)



High risk Species :

**Most likely** to be involved in collisions with aircraft & cause the **greatest damages**

**Very High**

# High Risk Species Identified

**High**



Gulls and Terns



Starlings



Geese



Hawks

## Identify Wildlife Risk Priorities



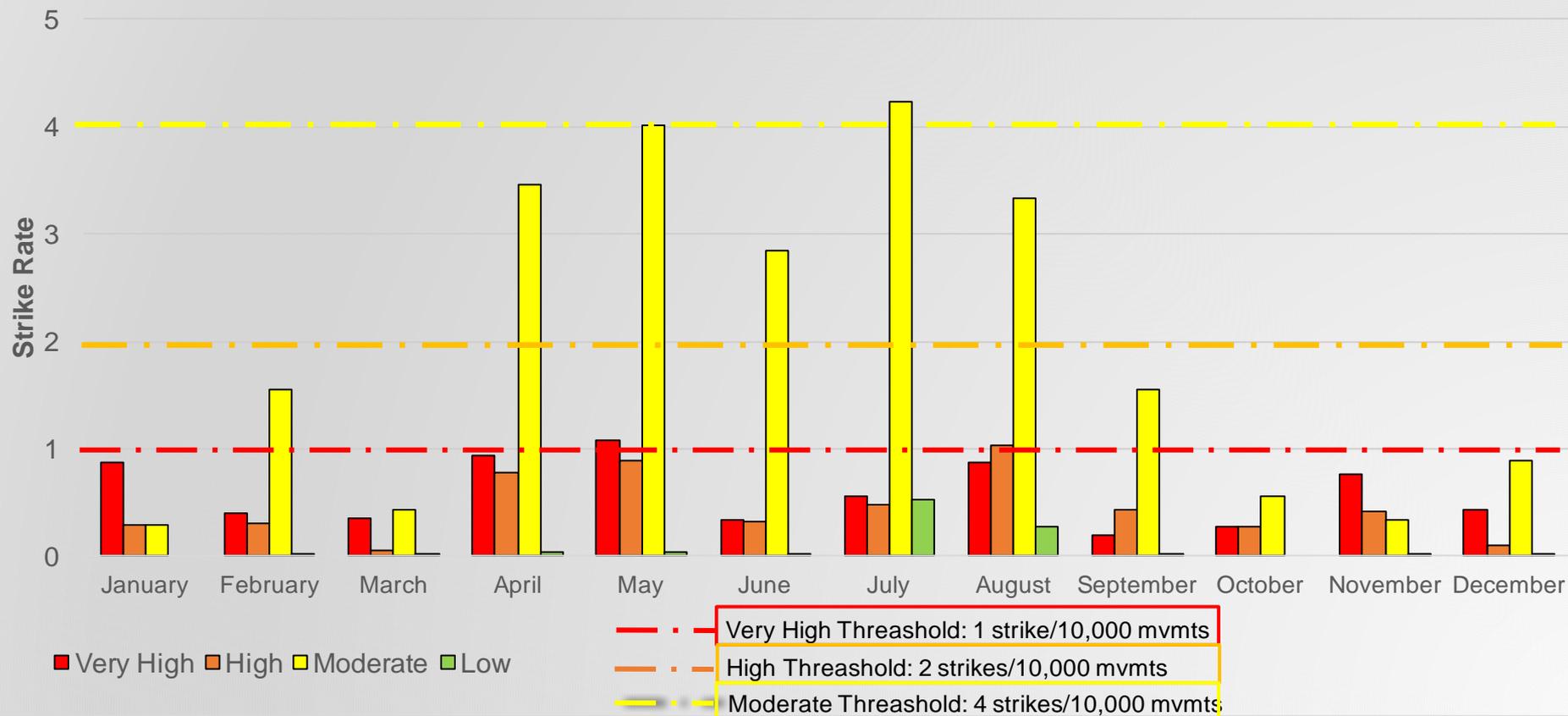
Ducks and Allies

# Calculations for KPI #3

## Monthly # High Risk Species Strikes / 10 000 mvmts

Year	2010	2011	2012	2013	2014	2015
# of High Risk Species Strikes / Month	5	4	4	10	12	9
# of Movements / Month	28 000	32 000	34 000	33 000	36 000	38 000

# Calculations for KPI #3



# Potential KPI #4

**Yearly Mass of Strikes relative to bird abundance normalized by movements**

Mass of confirmed strikes  
Mass of birds monitored  
in vicinity of airport

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Total Movements  
10,000

# Calculations for KPI #4

## Yearly # Strikes relative to bird abundance normalized by movements

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Confirmed strike mass(g)	34486	49683	80651	73180	46453	79470	106666	85561	83000	81685
Bird Mass Monitored(kg)	15030	25114	29754	29775	24529	22337	31076	27669	26072	16962
Movements / 10 000	28.9	31.5	32.3	32.2	32.8	33.9	31.4	29.5	29.7	29.6
KPI	7.9	6.3	8.4	7.6	5.8	10.5	10.9	10.5	10.7	16.2

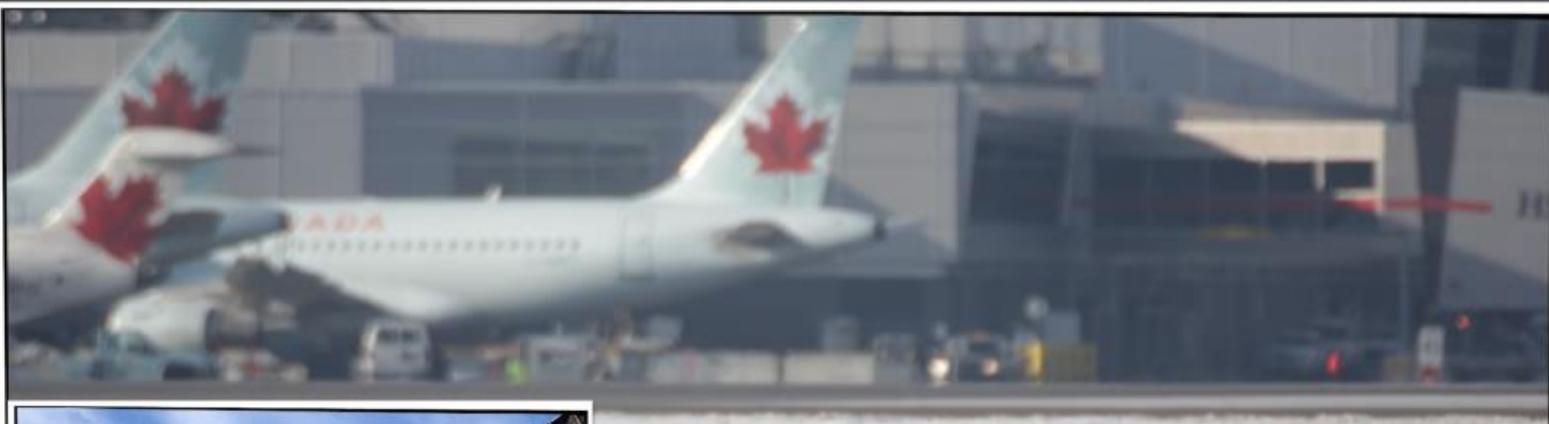
**KPI threshold = SITE SPECIFIC**

# Different use of KPIs!

- ✈ **Quality control: reactive KPIs**
- ✈ **Operational use: proactive KPIs**

# Potential Operational KPI #5

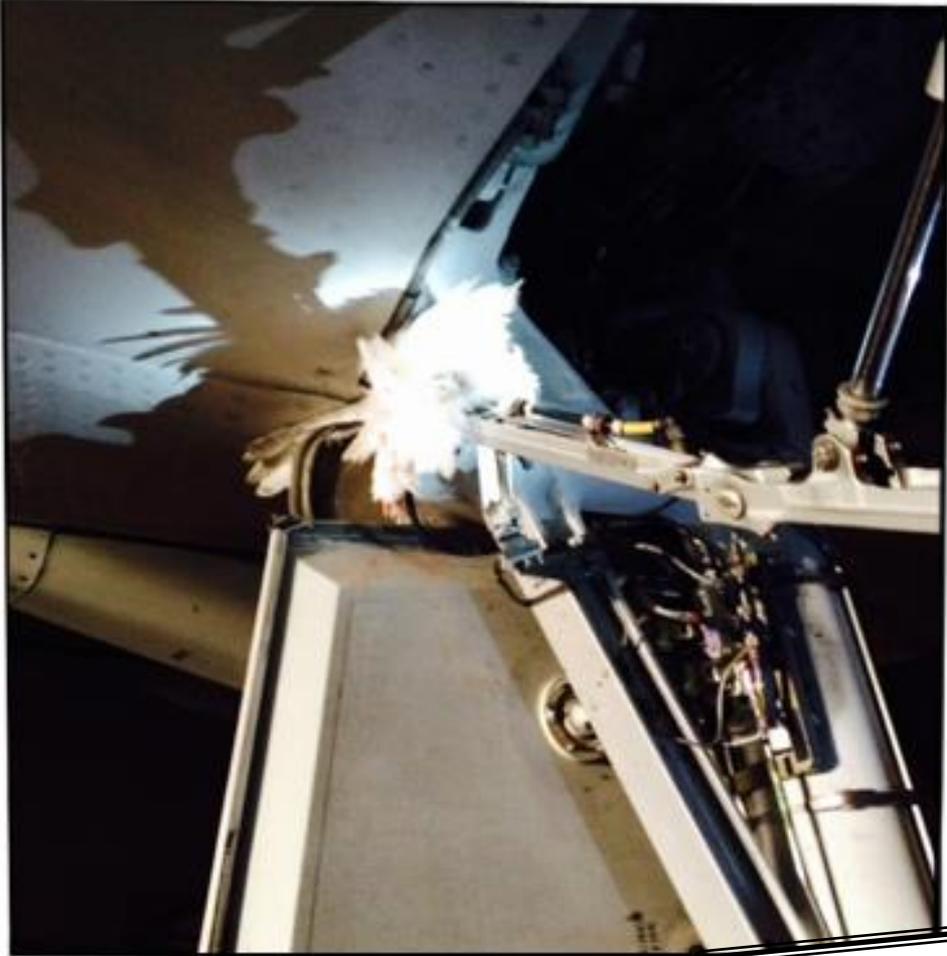
✈️ Snowy Owl invasion 2013 to 2016



41 000 CAN\$



# Snowy Owl Strikes



12 000 CAN\$

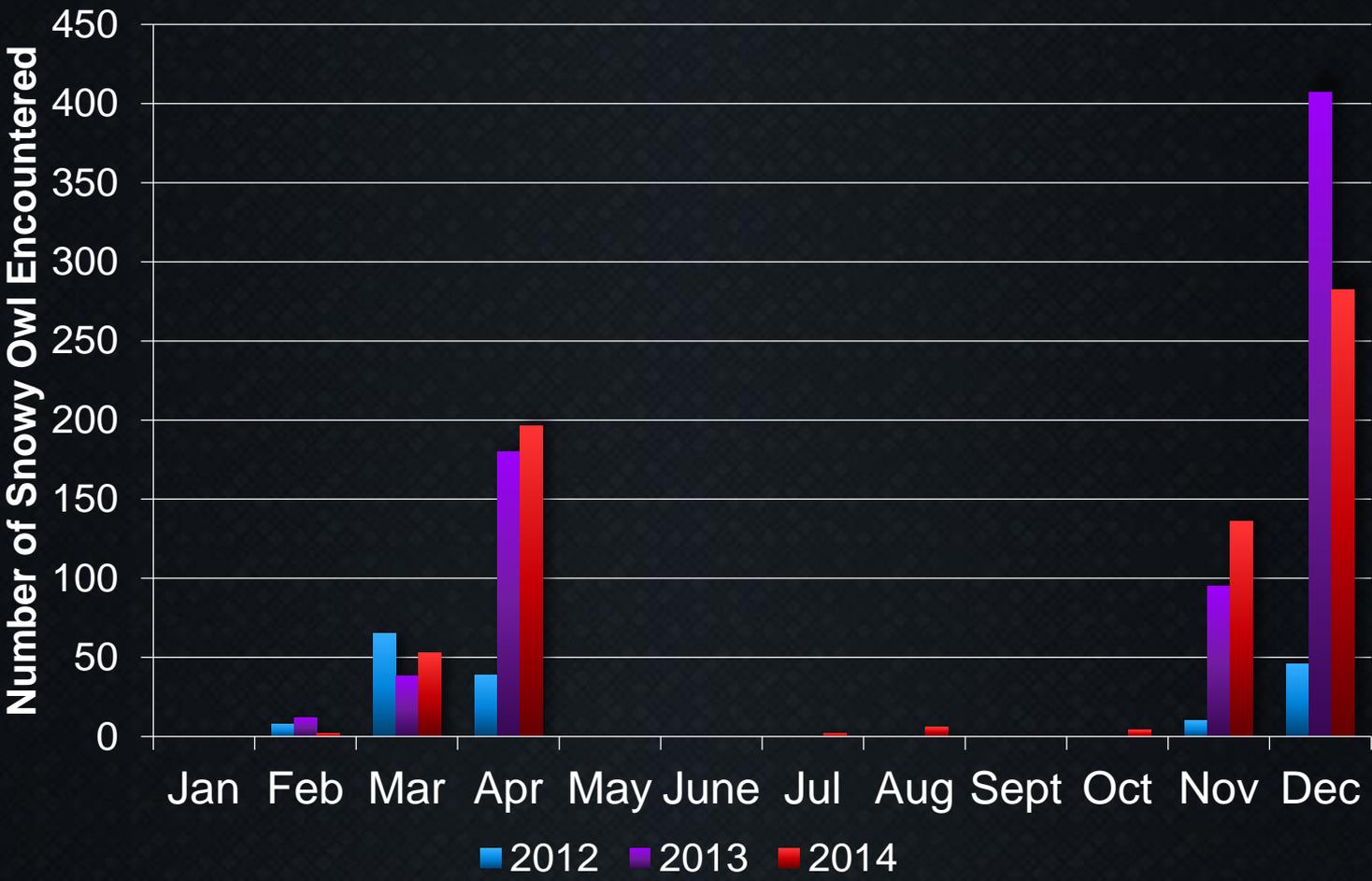
# Snowy Owl Strikes



+500 000 CAN\$

# Operational KPI Case Study – Montreal Airport

✈ Number of Snowy Owl Encountered from 2012 to 2014



# Operational KPI Case Study – Montreal Airport

✈ **KPI:** Daily Number of Snowy Owl



✈ **KPI Analysis Recurrence:** Daily

✈ **Threshold:** When Above 2 Birds on the Airfield

✈ **Action Triggered:** Add manpower = extra 24hrs per week for capturing SNOW until below threshold

# Operational KPI Case Study – Toronto Int. Airport

✈ **KPI:** Daily Number of Snowy Owl



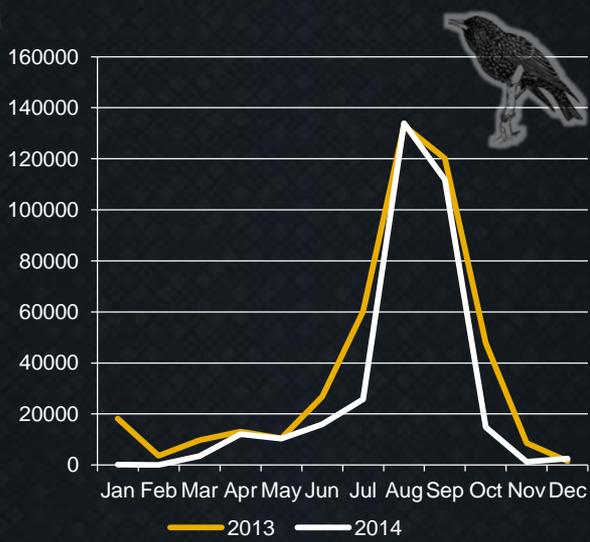
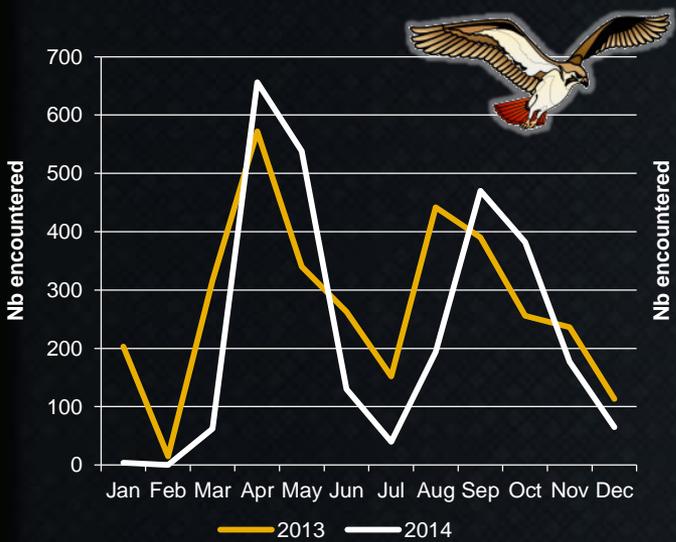
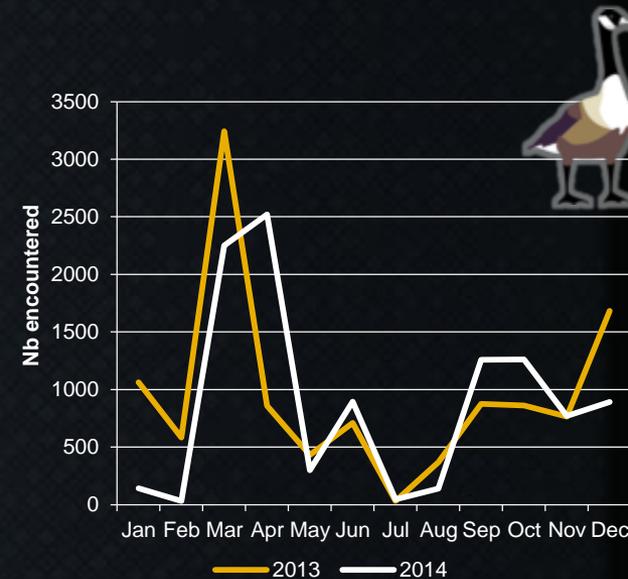
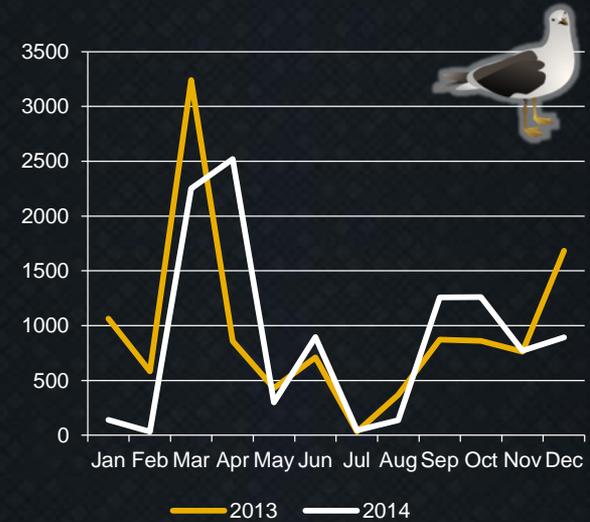
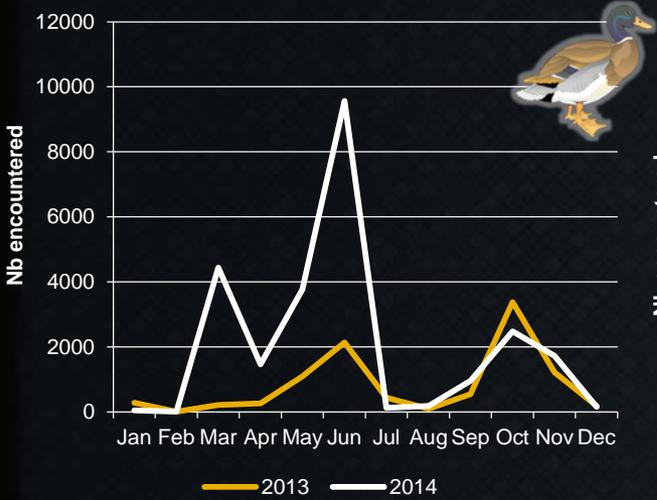
✈ **KPI Analysis Recurrence:** Daily

✈ **Threshold:** When Above 4 Birds on the Airfield

✈ **Action Triggered:** Add manpower = add extra WCO daily for capturing SNOW until below threshold

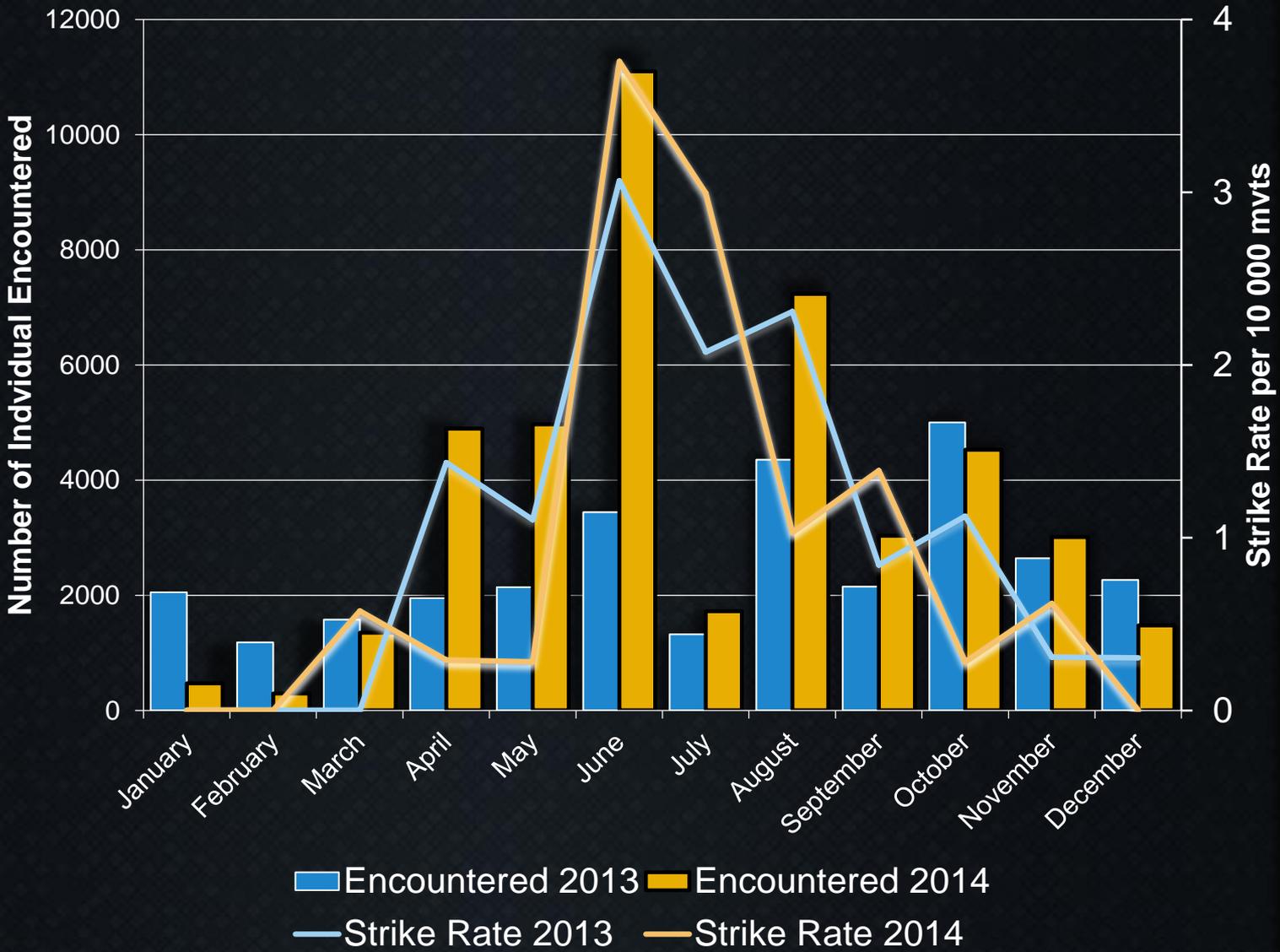
# Operational KPI Case Study – Toronto Int. Airport

## ✈ Counts of Very High and High-Risk Species



# More KPIs for Pearson Airport

✈️ TOTAL High Risk Species Counts as a predictor of High Risk Strikes



# More Operational KPIs for Toronto Int. Airport

✈ Working on Operational KPIs: thresholds of wildlife counts that will identify a Strike Risk **TRIGGER**



✈ There will be used to **add resource** when needed



✈ They need to be **agreed upon** before the wildlife management activities



# What are the features of a good KPI?

- **Quantitative (Measurable value);**
- **Demonstrate Trend (Pattern);**
- **Risk based;**
- **Take into account changing conditions;**
- **Actionable – effect change**

# KPIs Challenge



- ✈ Get the stakeholders interested
- ✈ Set measurable objectives, ex. less than 2 AEE strike / year
- ✈ Capturing the data to generate KPIs
- ✈ Monitor the KPIs on the identified recurrence ex. daily, weekly, yearly, etc.
- ✈ Reassess objectives and KPIs relevance

**QUESTIONS?**

**Thank you!**