

# ***Bird strikes***

## ***Swedish Airspace 1998 - 2005***

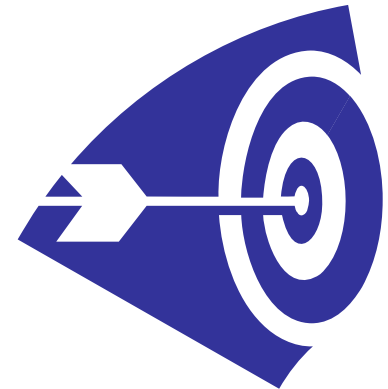
**Nordic Birdstrike Committee**  
**Arlanda**  
**2006-09-21**

***Jörgen Andersson***



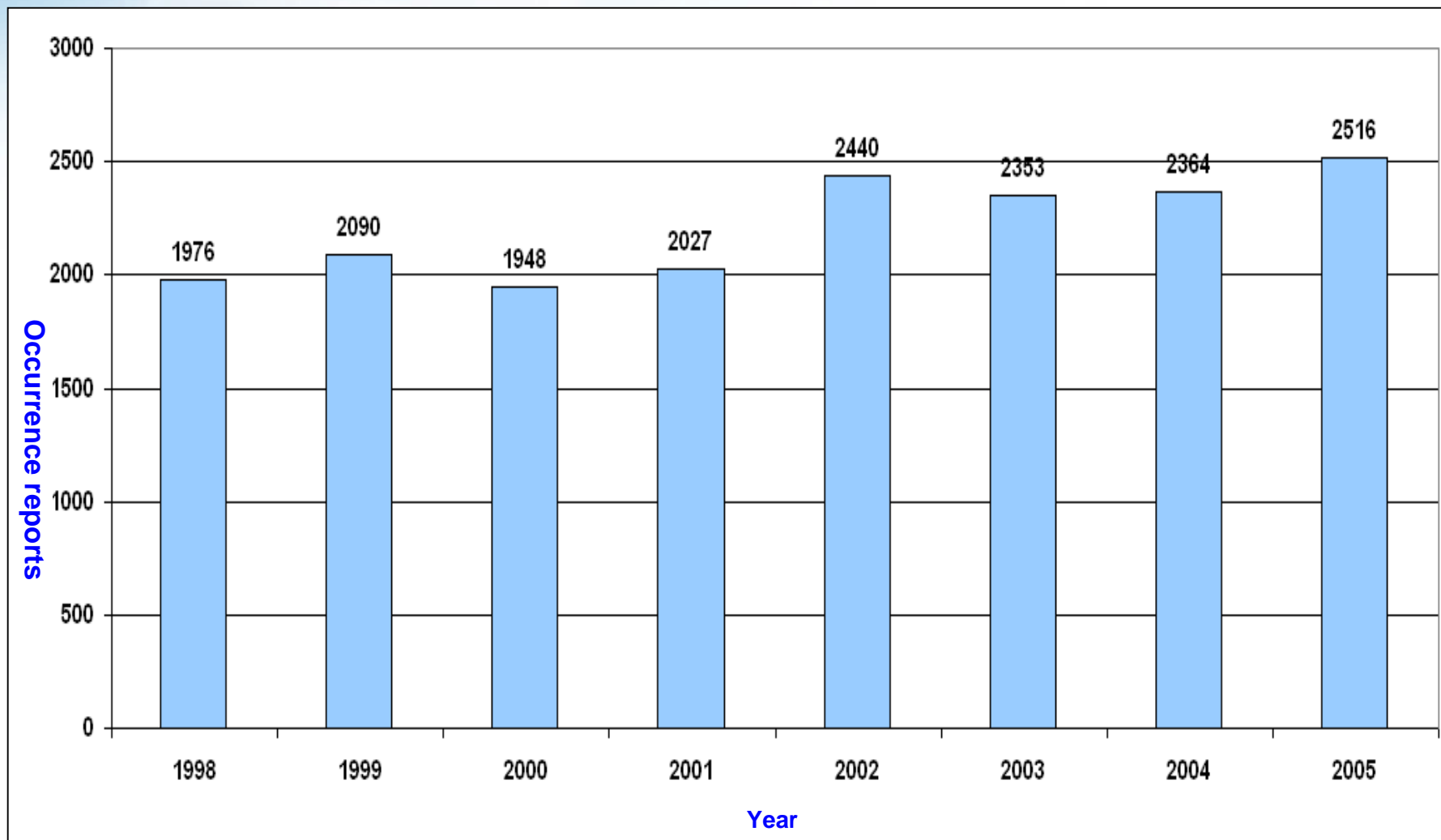
## *Objective*

- ☐ Occurrence reports
- ☐ Bird population
- ☐ Birdstrikes between 1998 – 2005
- ☐ International comparison



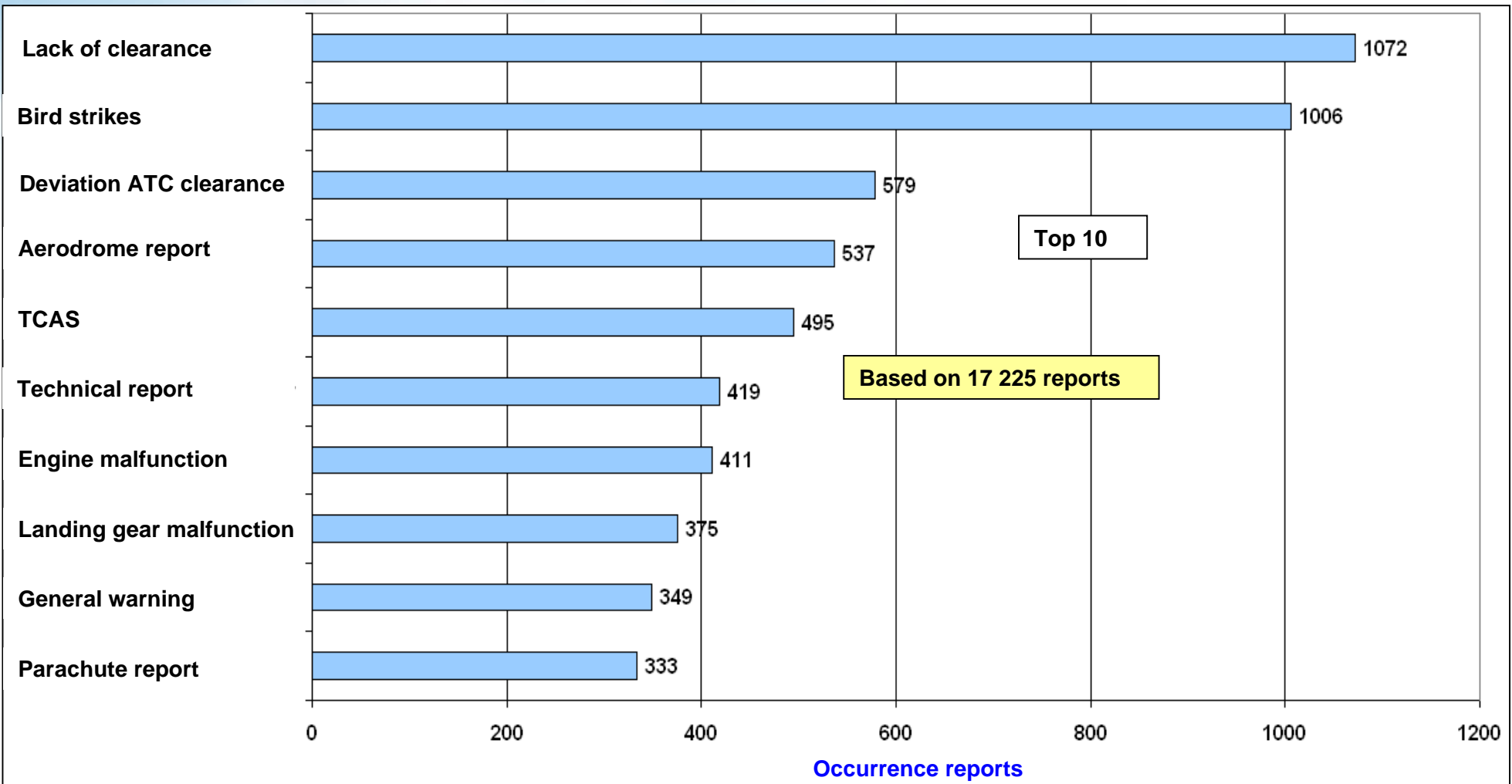
# ***Occurrence reports***

# *Occurrence reports 1998 – 2005*



# Occurrences 1998 – 2005

## “Top ten” types of occurrence



# ***Bird population***

# ***Bird population***

- **Birds are found all over Sweden**
- **Around 240 regular breeding species**
- **1/3 of all species are migratory birds**
- **50-60 million willow warblers (lövsångare) migrate during autumn!**
- **Spring migration around half as big as autumn migration**
- **Local bird movements occur throughout the year**



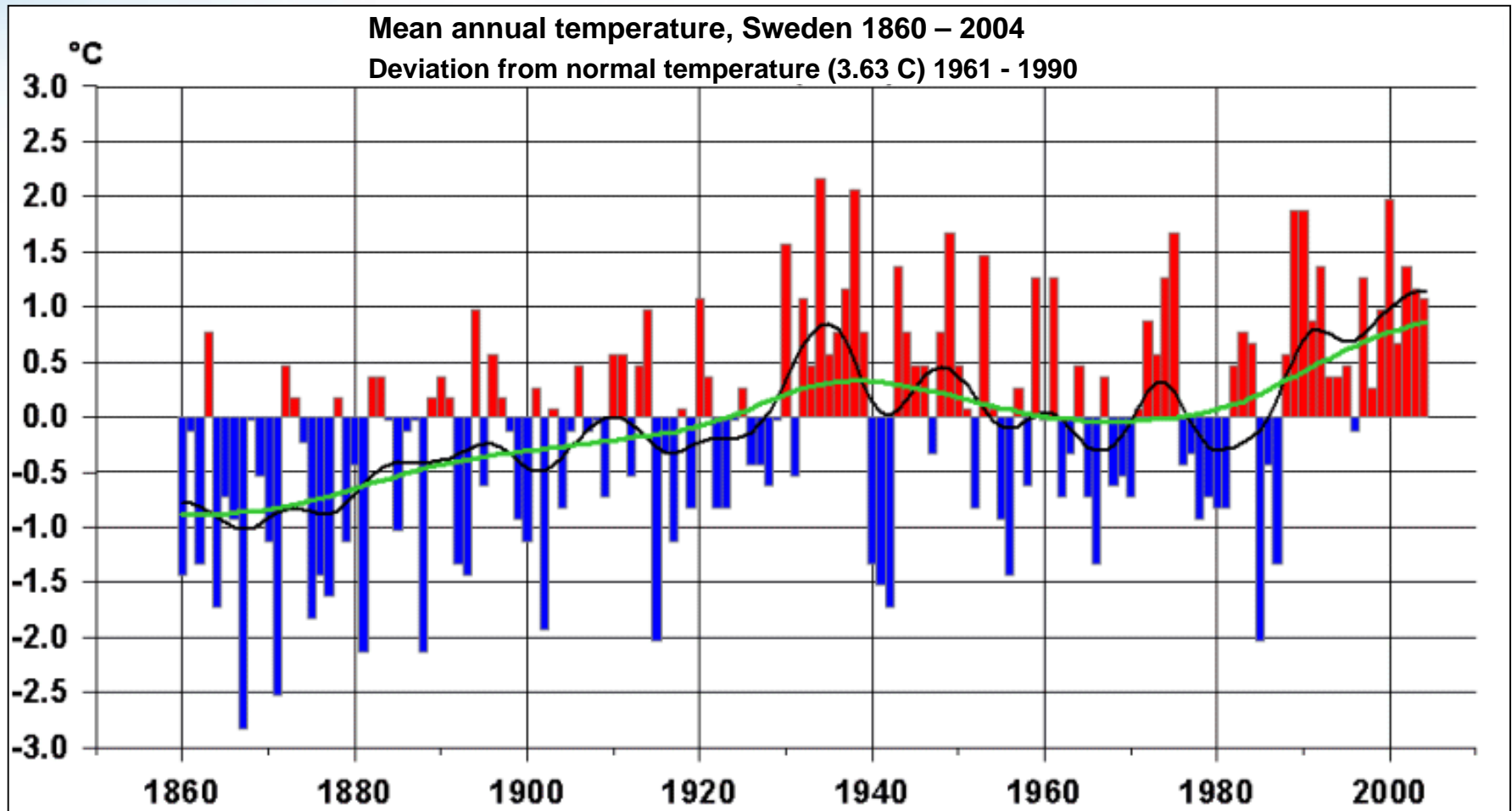
# ***Size of bird population affected by:***

- **Access to feed**
- **Disease**
- **Change of biotope**
- **Environmental influence**



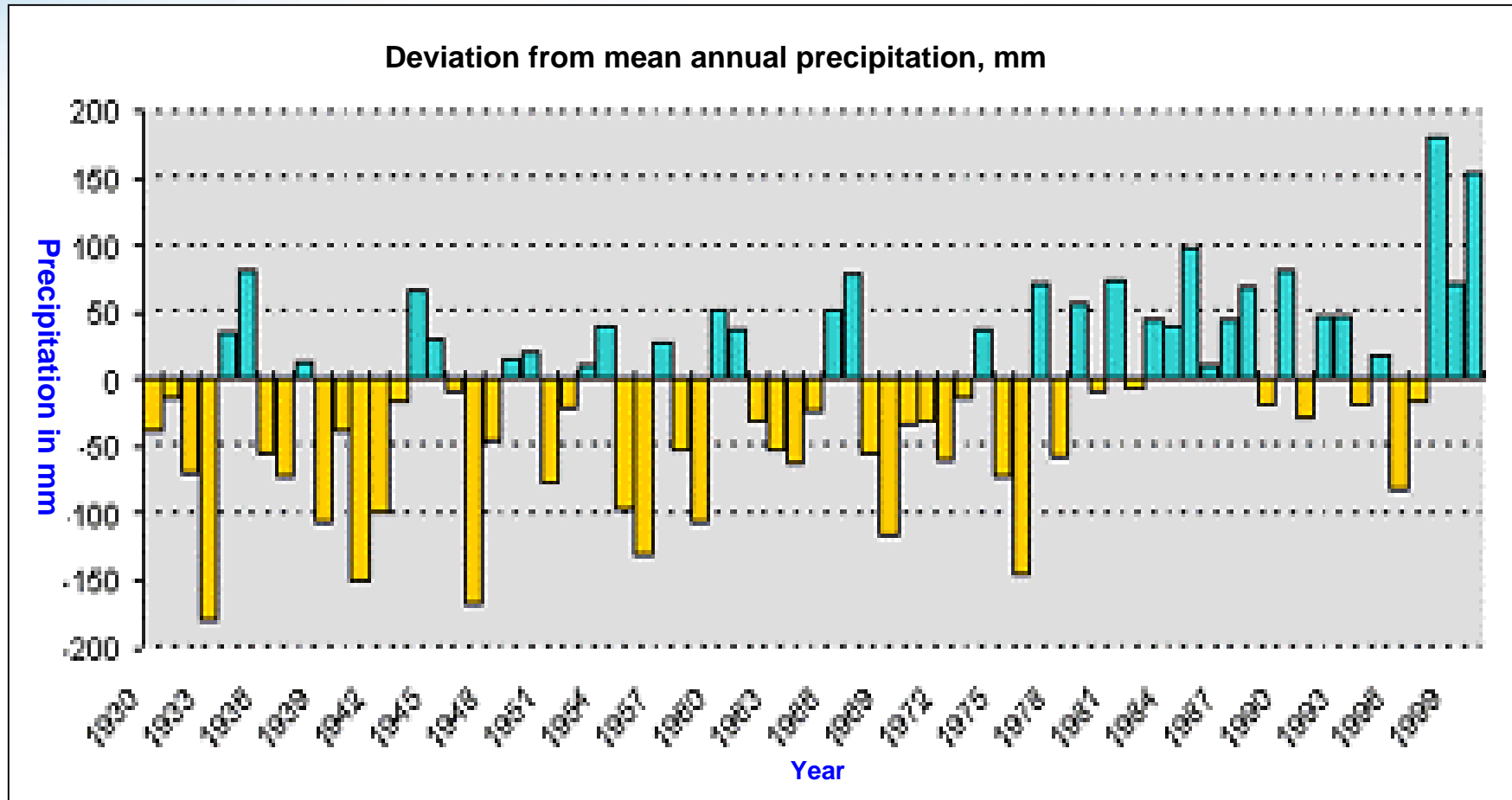
# *Deviation from mean annual temperature*

## *Sweden, 1860 - 2004*



# *Deviation from mean annual precipitation*

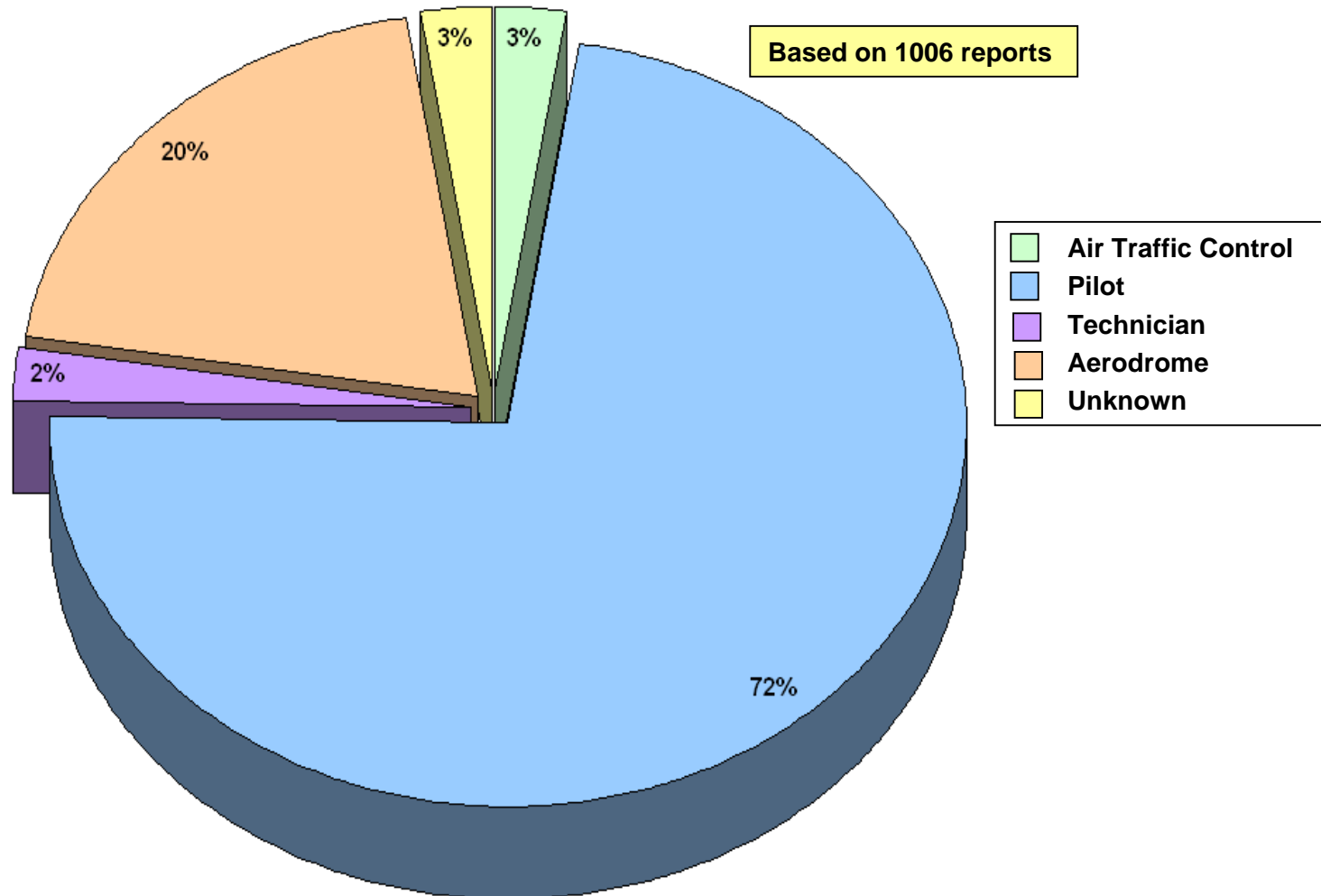
## *Sweden, 1930 - 2004*



# ***Birdstrike reports***

# Bird strikes 1998 - 2005

Reported by:

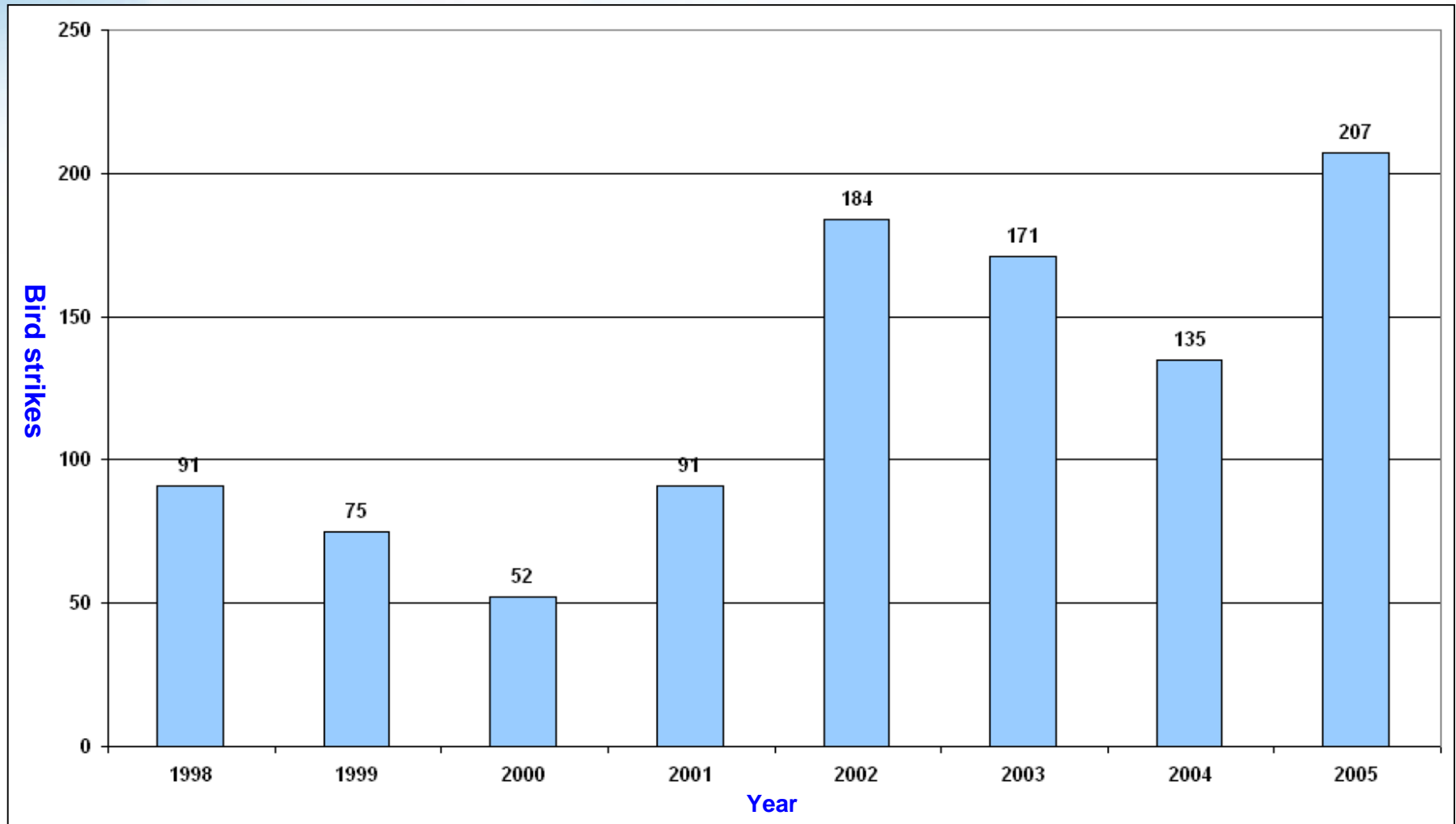


# ***Bird strikes 1998 – 2005***

## ***Location of occurrence***

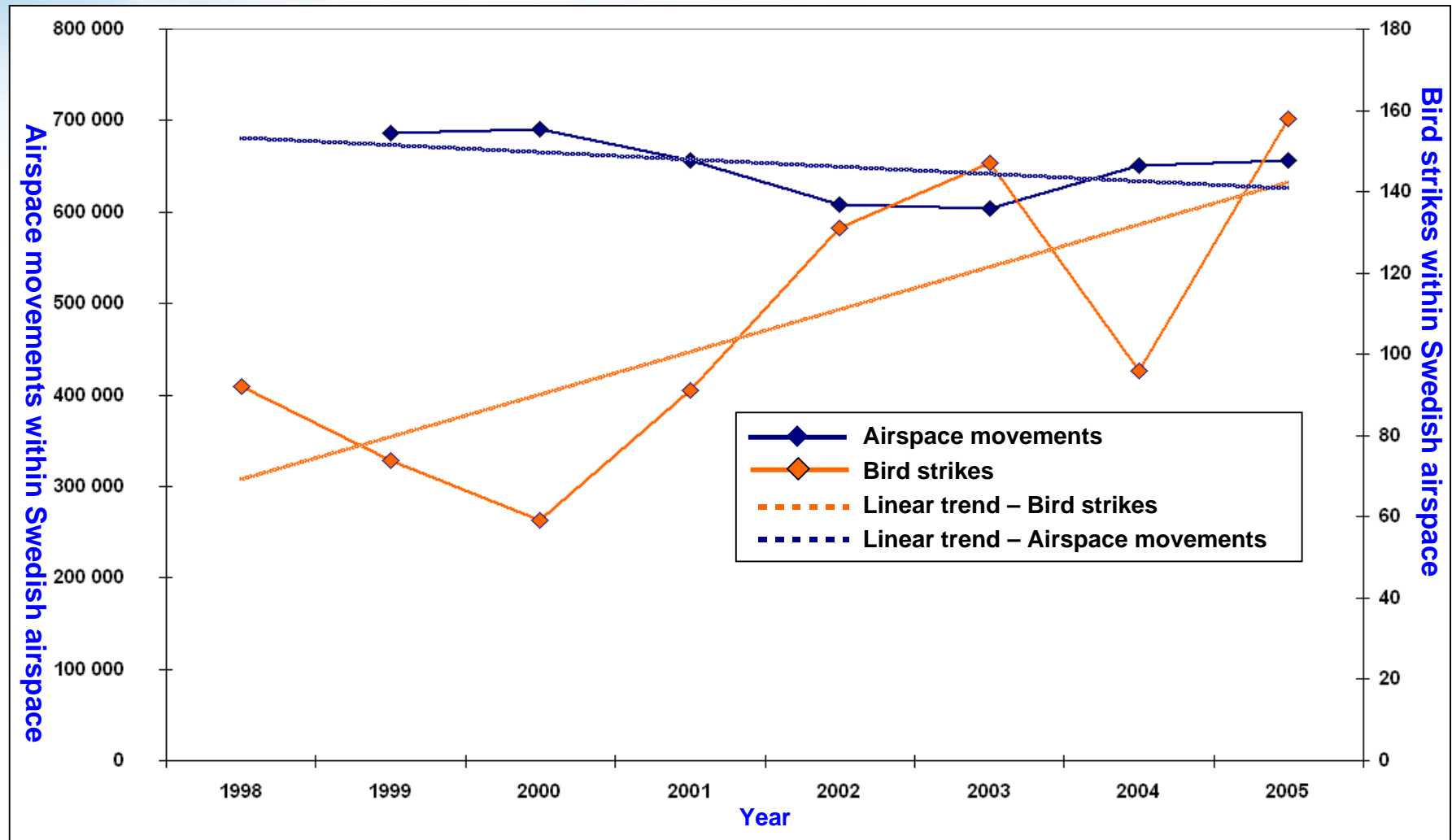
<b>Location</b>	<b>Strikes</b>	<b>Percentage</b>
Swedish airspace	714	71,0
Outside Swedish airspace	286	28,4
Unknown	6	0,6

# Bird strikes 1998 – 2005



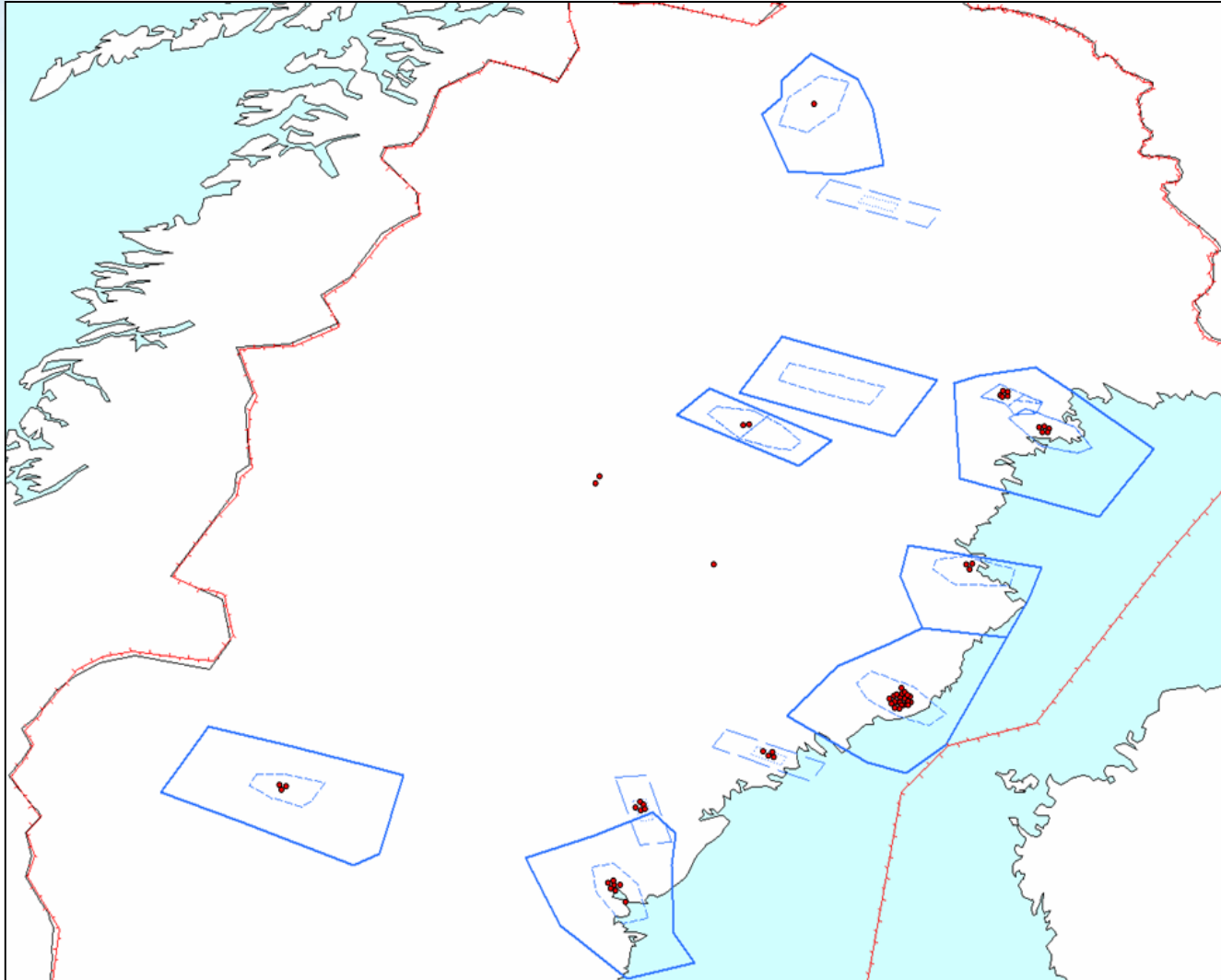
# Bird strikes 1998 – 2005

## Bird strikes vs. airspace movements



# Bird strikes 1998 – 2005

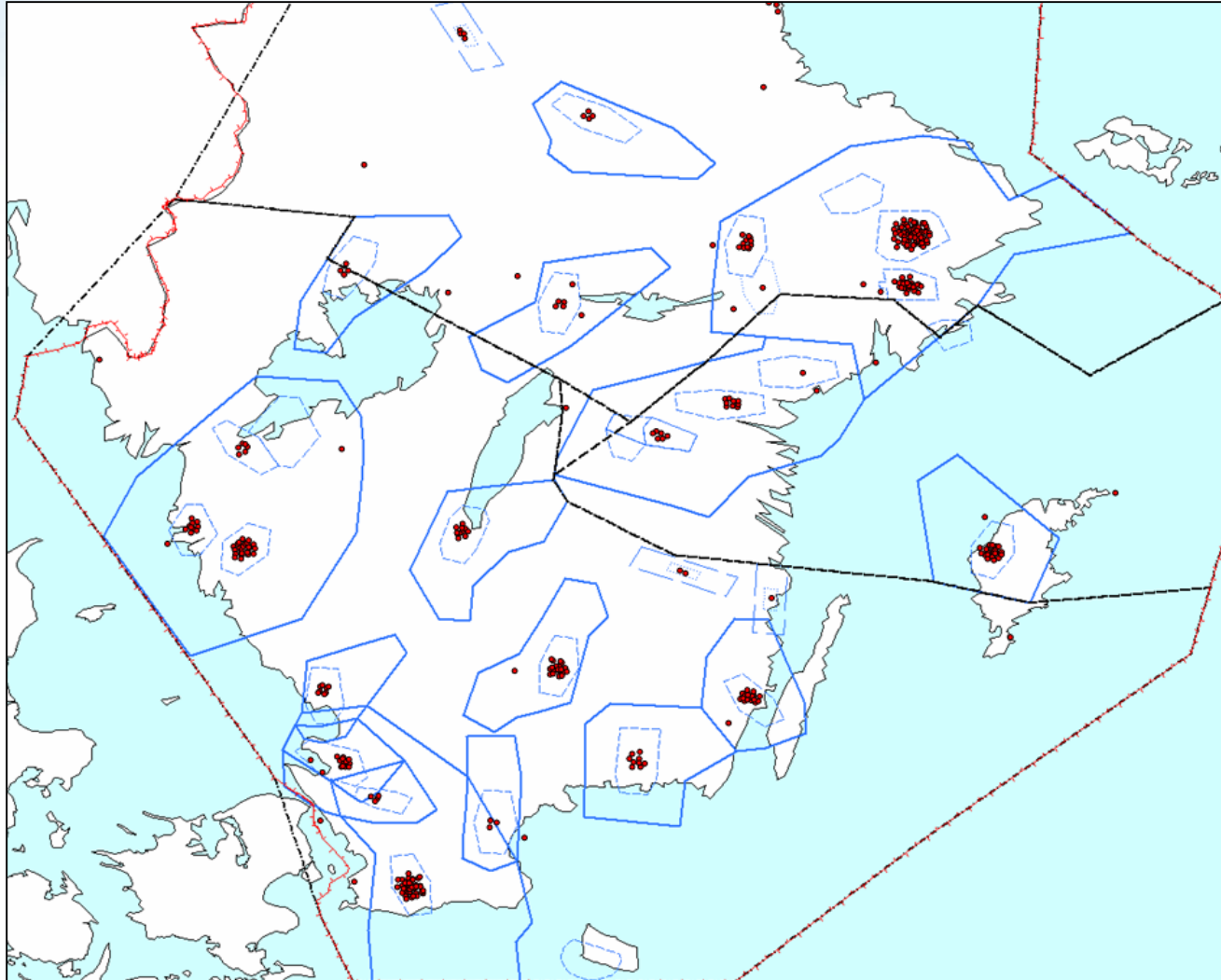
## Locations - northern Sweden





# Bird strikes 1998 – 2005

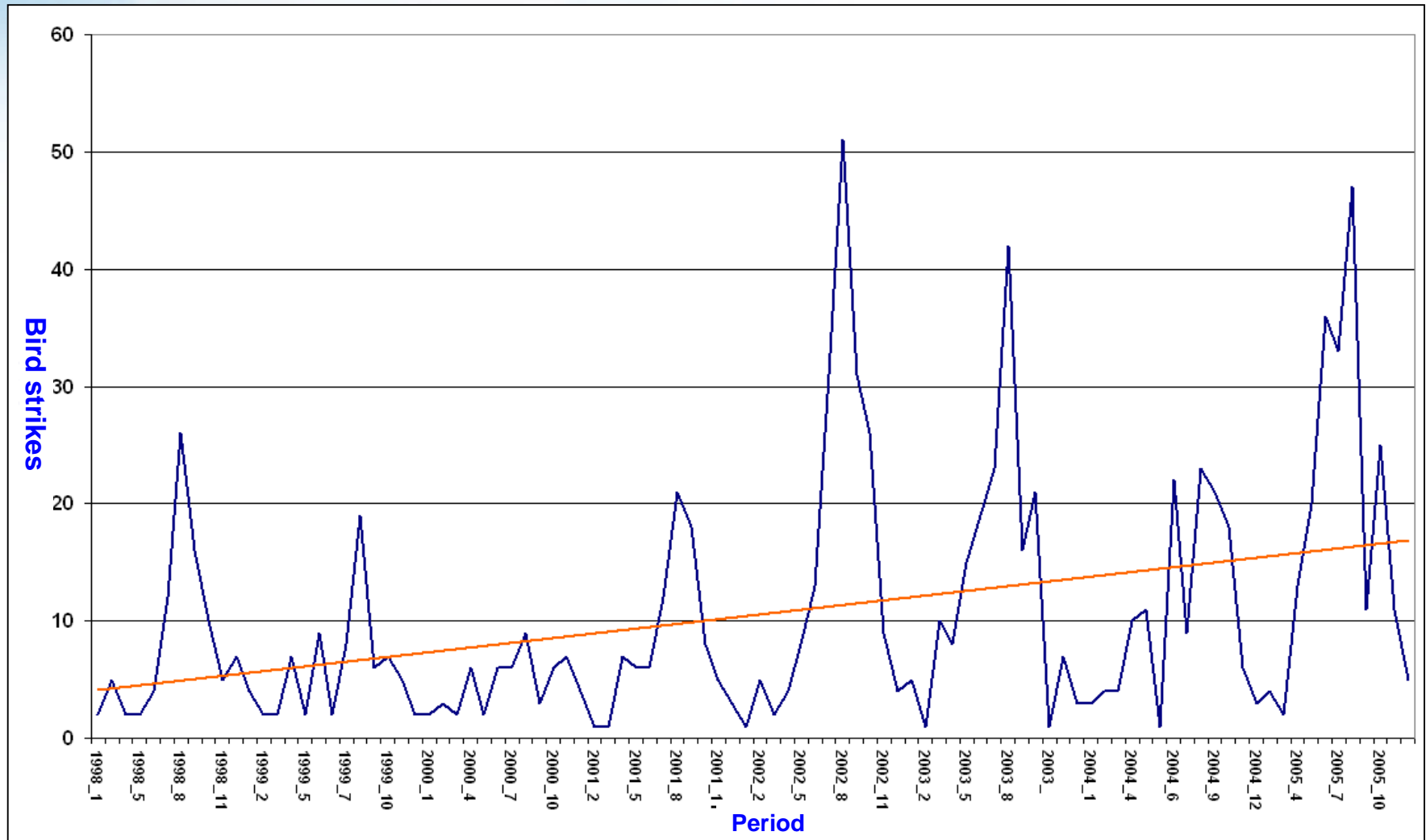
## Location - southern Sweden



# ***Seasonal distribution***

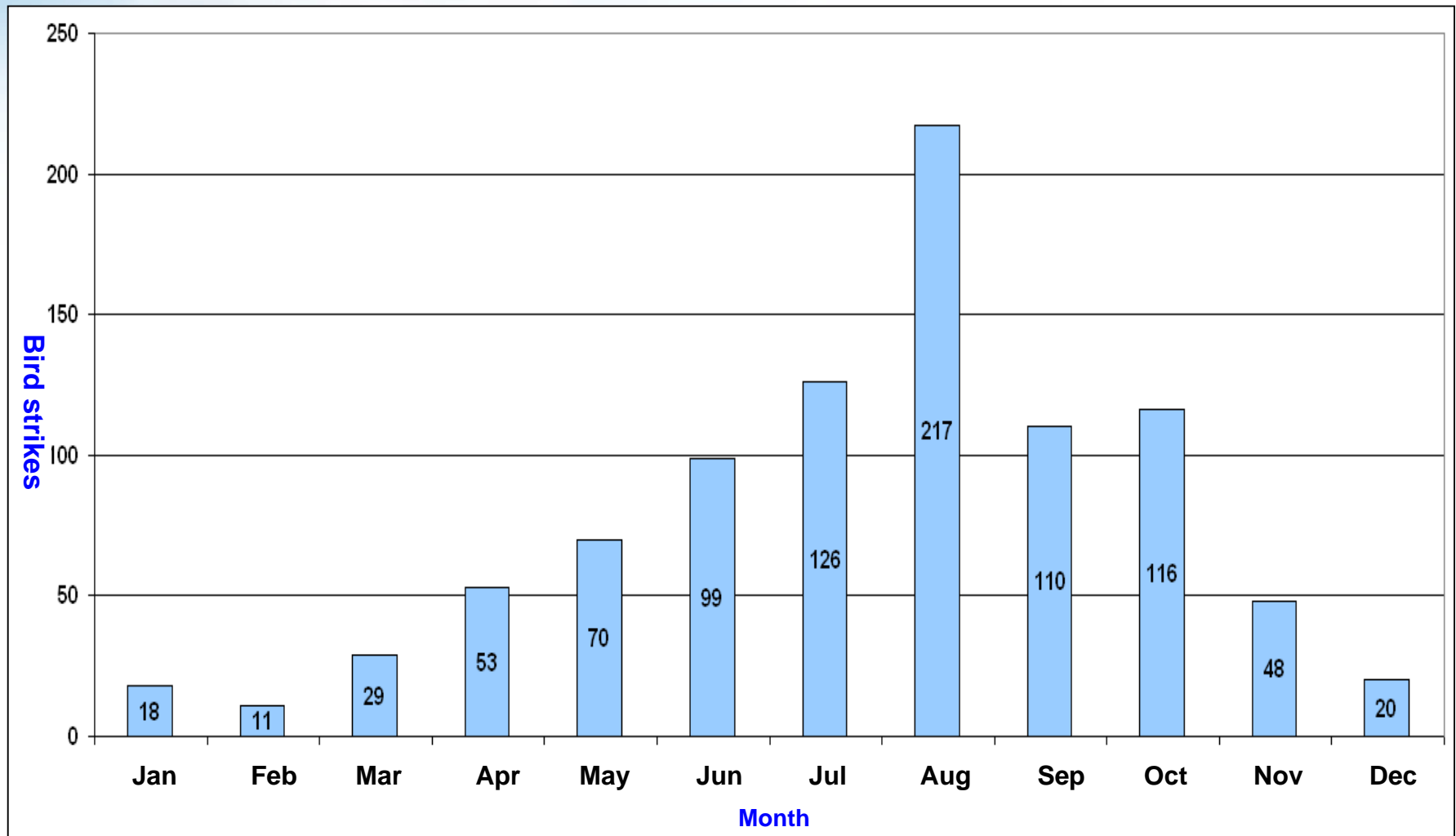
# Bird strikes 1998 – 2005

## Seasonal distribution



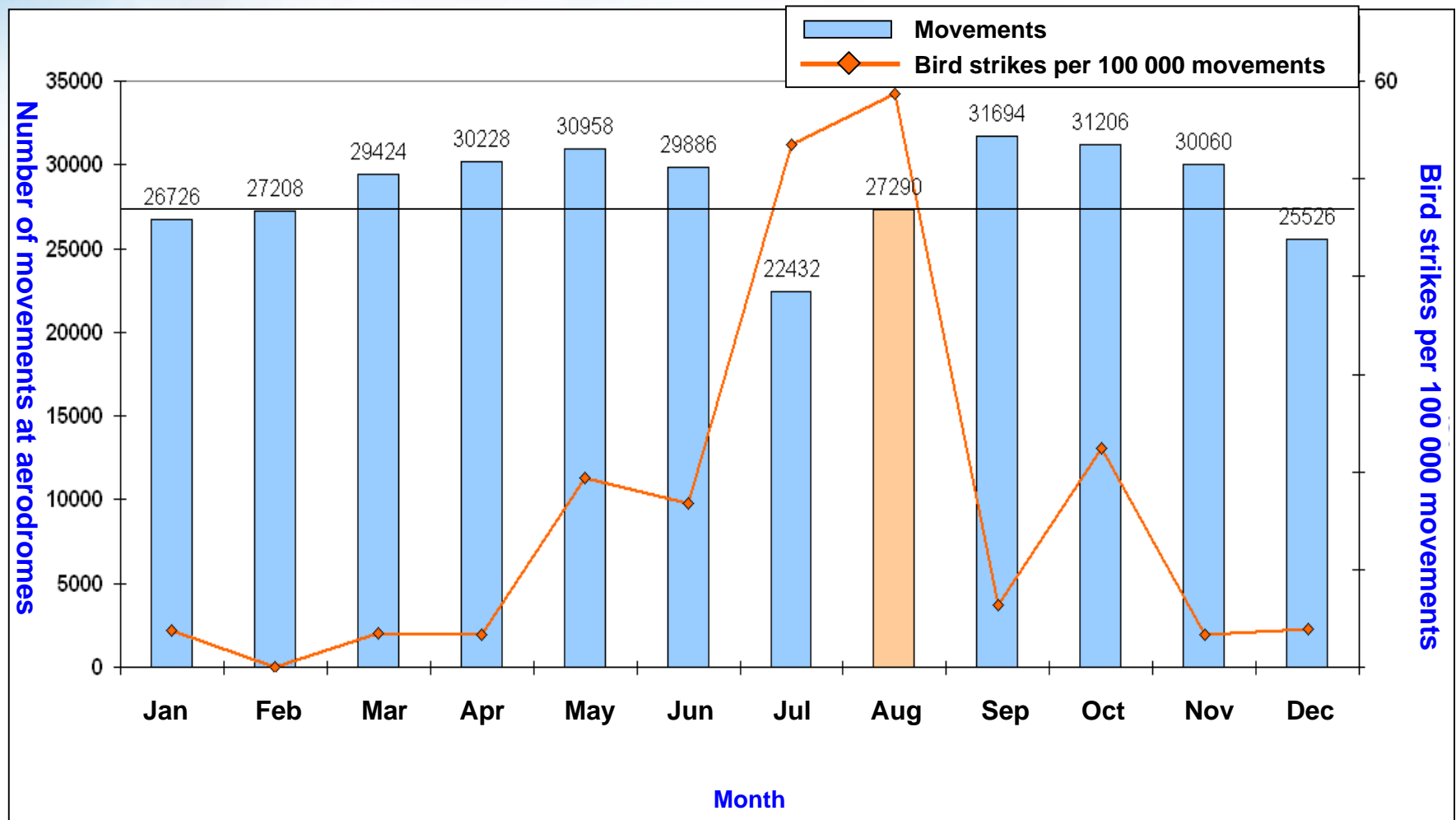
# Bird strikes 1998 – 2005

## Monthly distribution



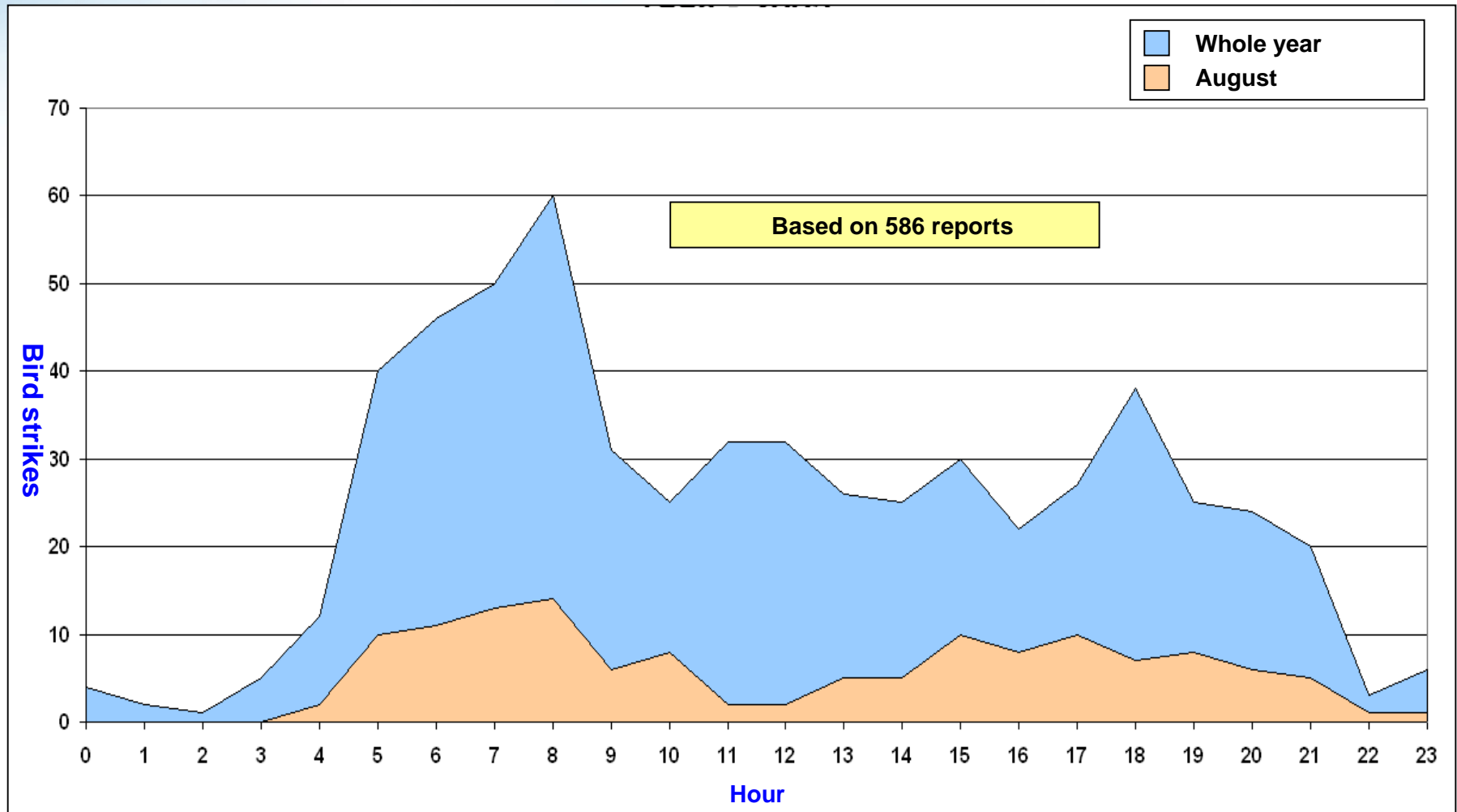
# Bird strikes 2005

## Frequency at Arlanda, Landvetter, Sturup



# Bird strikes 1998 – 2005

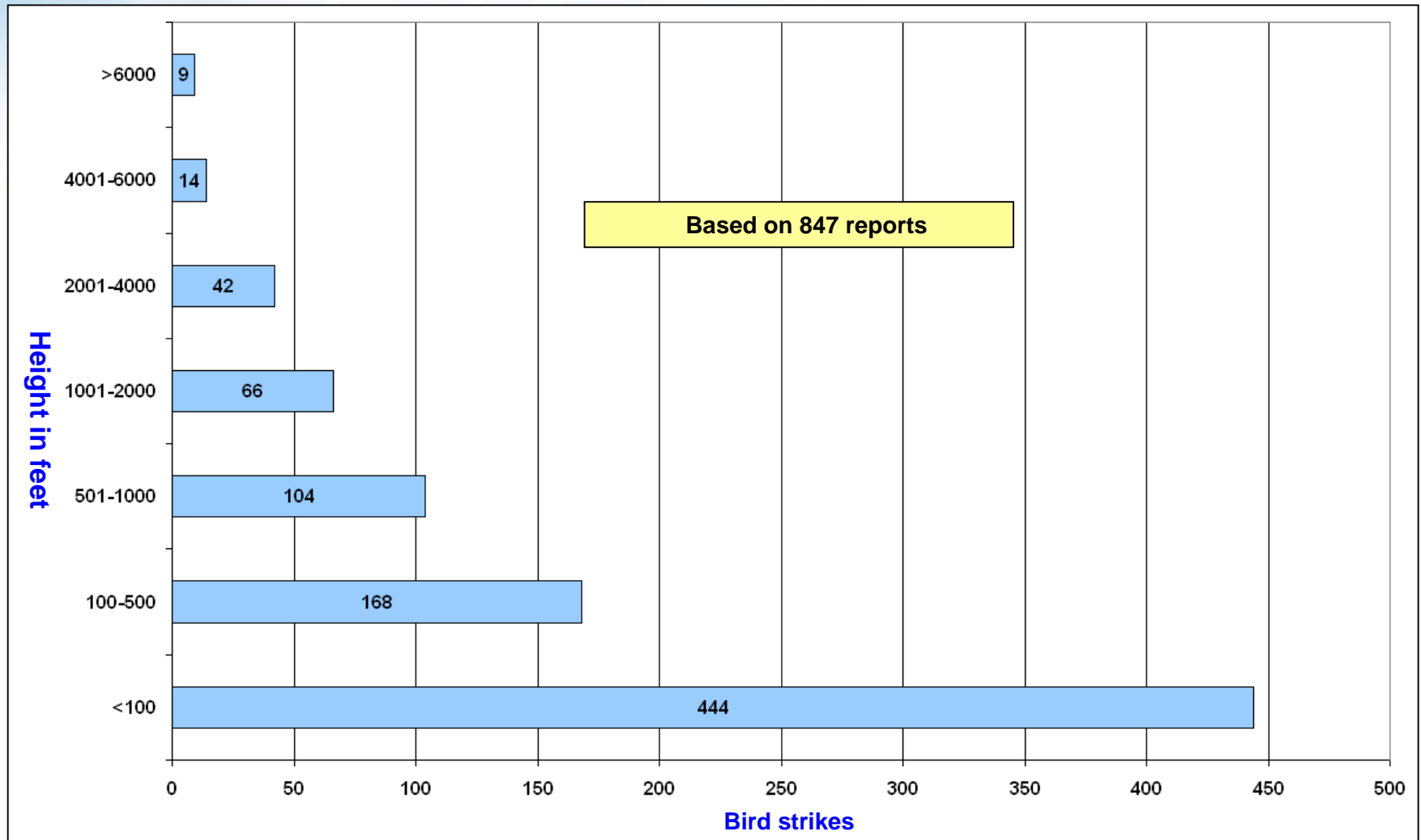
## Distribution over the day



# ***Bird strikes vs. height***

# Bird strikes 1998 – 2005

## Height

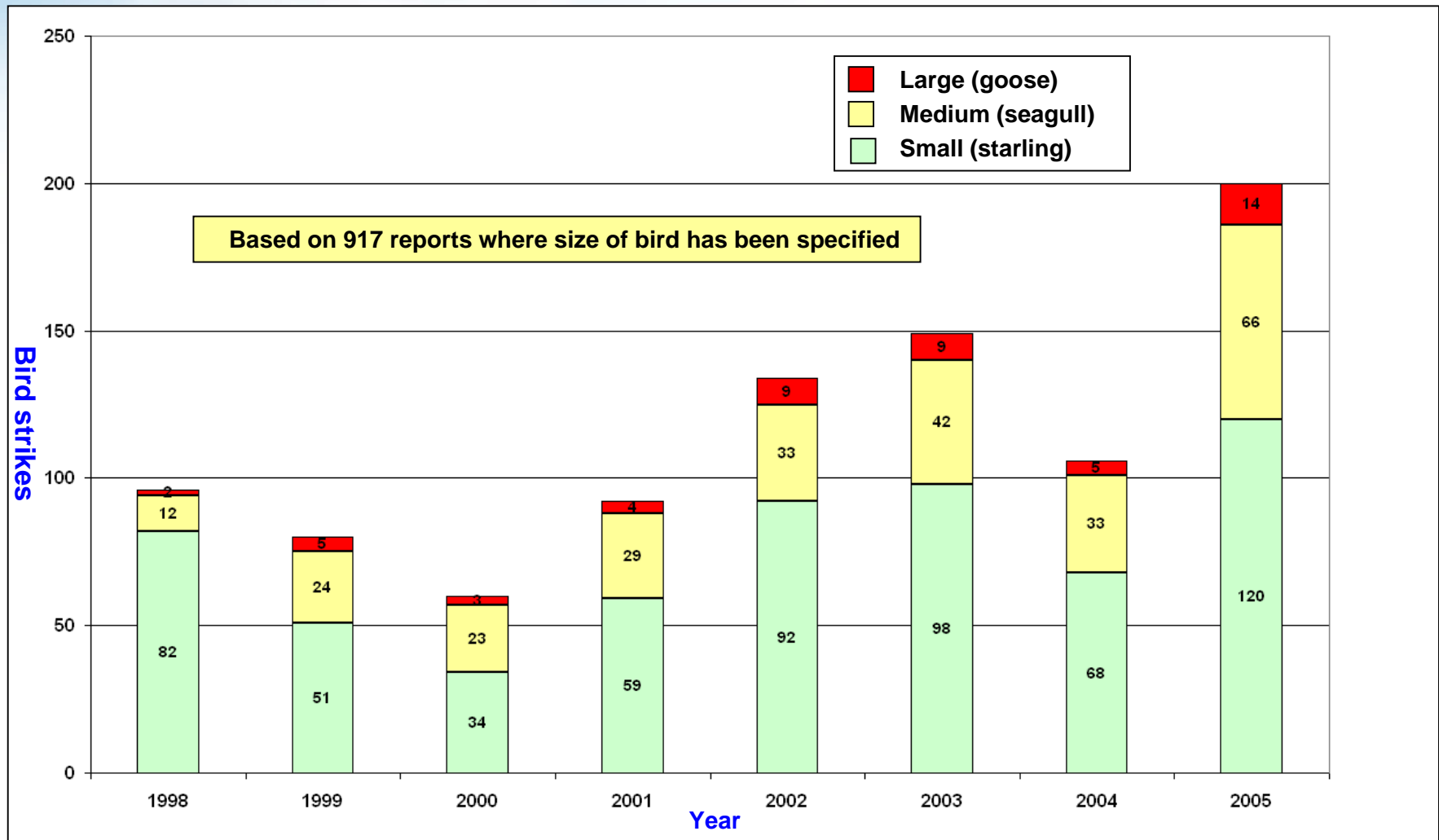




# ***Size of bird***

# Bird strikes 1998 – 2005

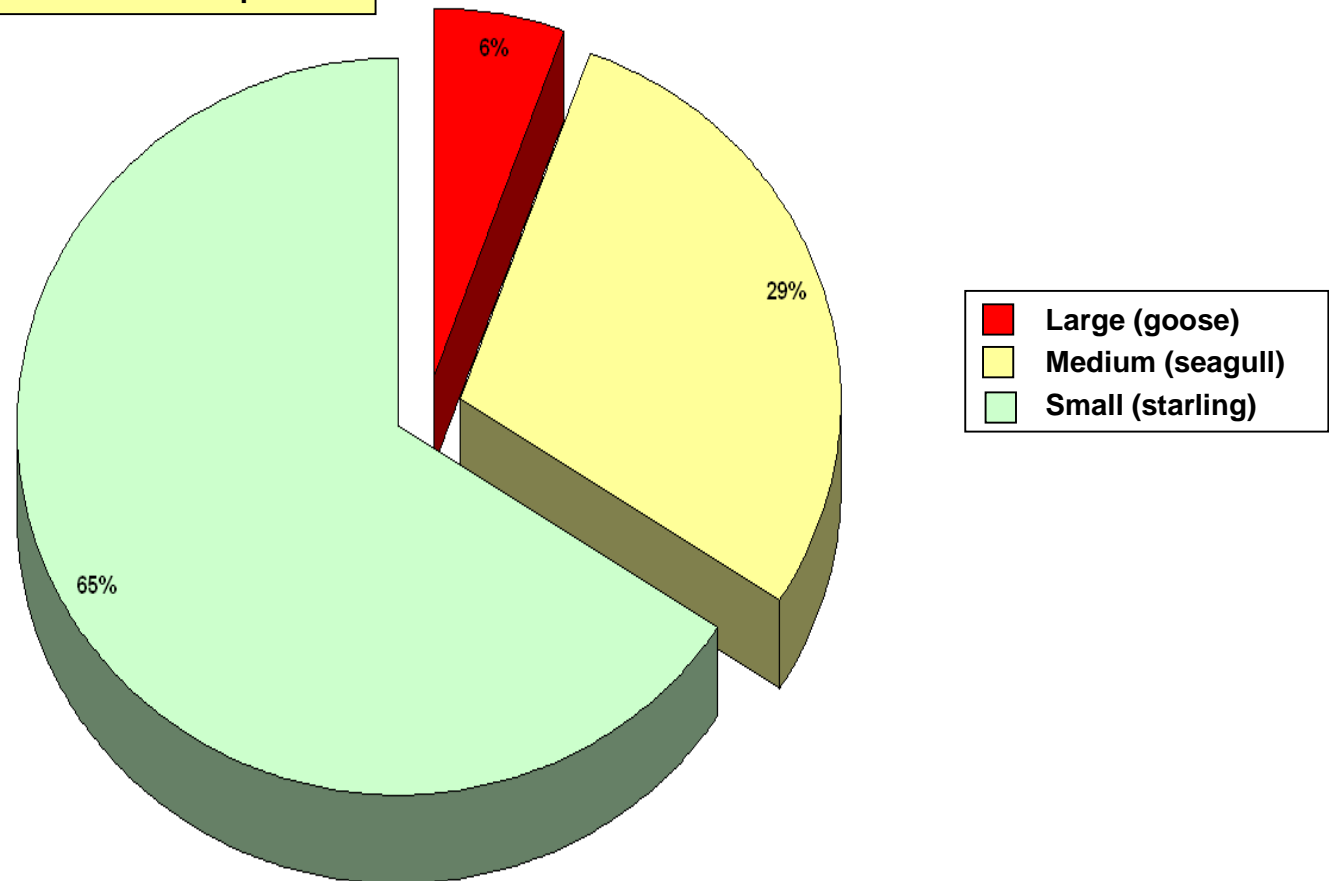
## Size of bird



# Bird strikes 1998 – 2005

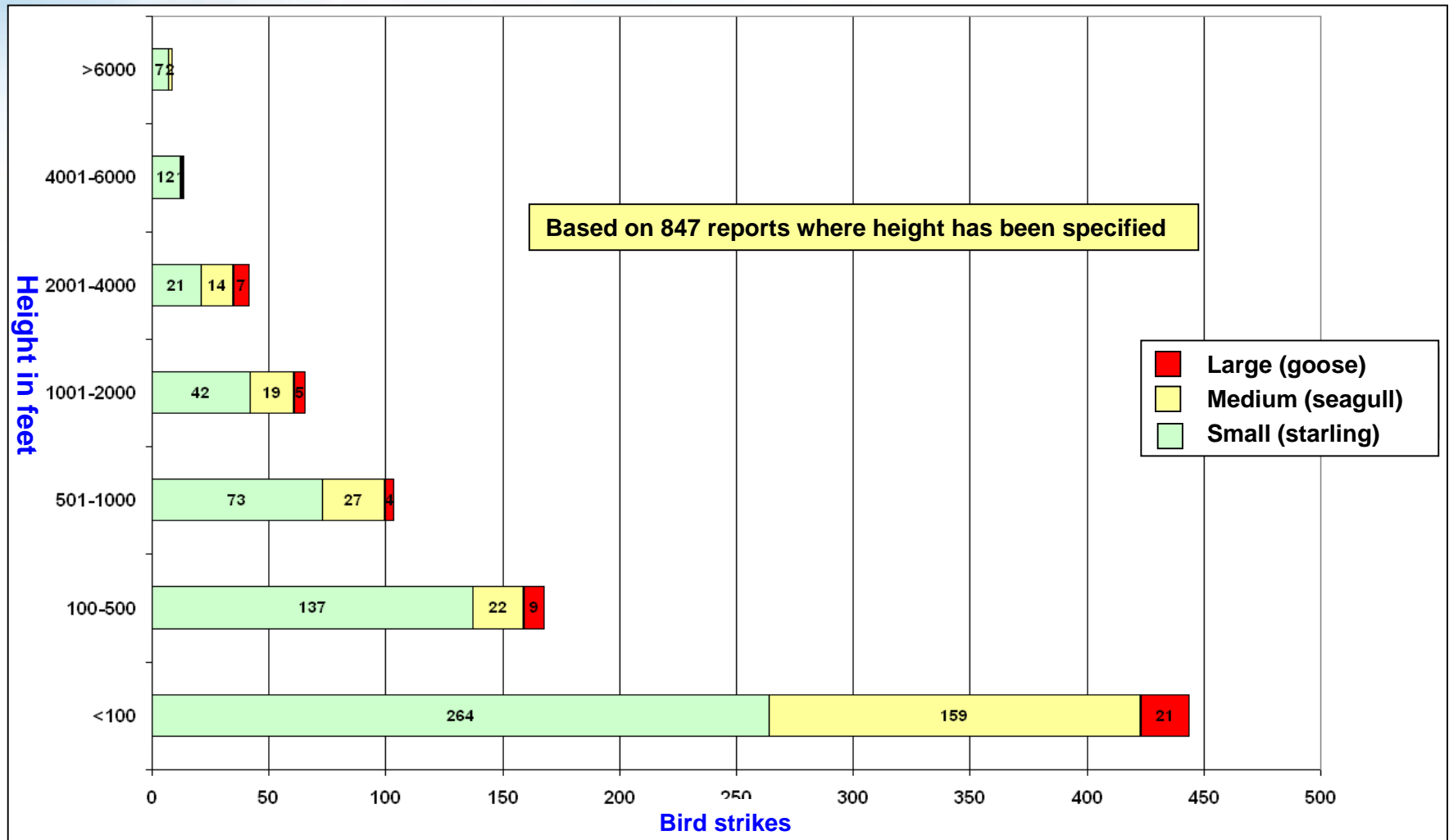
## Size of bird

Based on 917 reports where size of bird has been specified



# Bird strikes 1998 – 2005

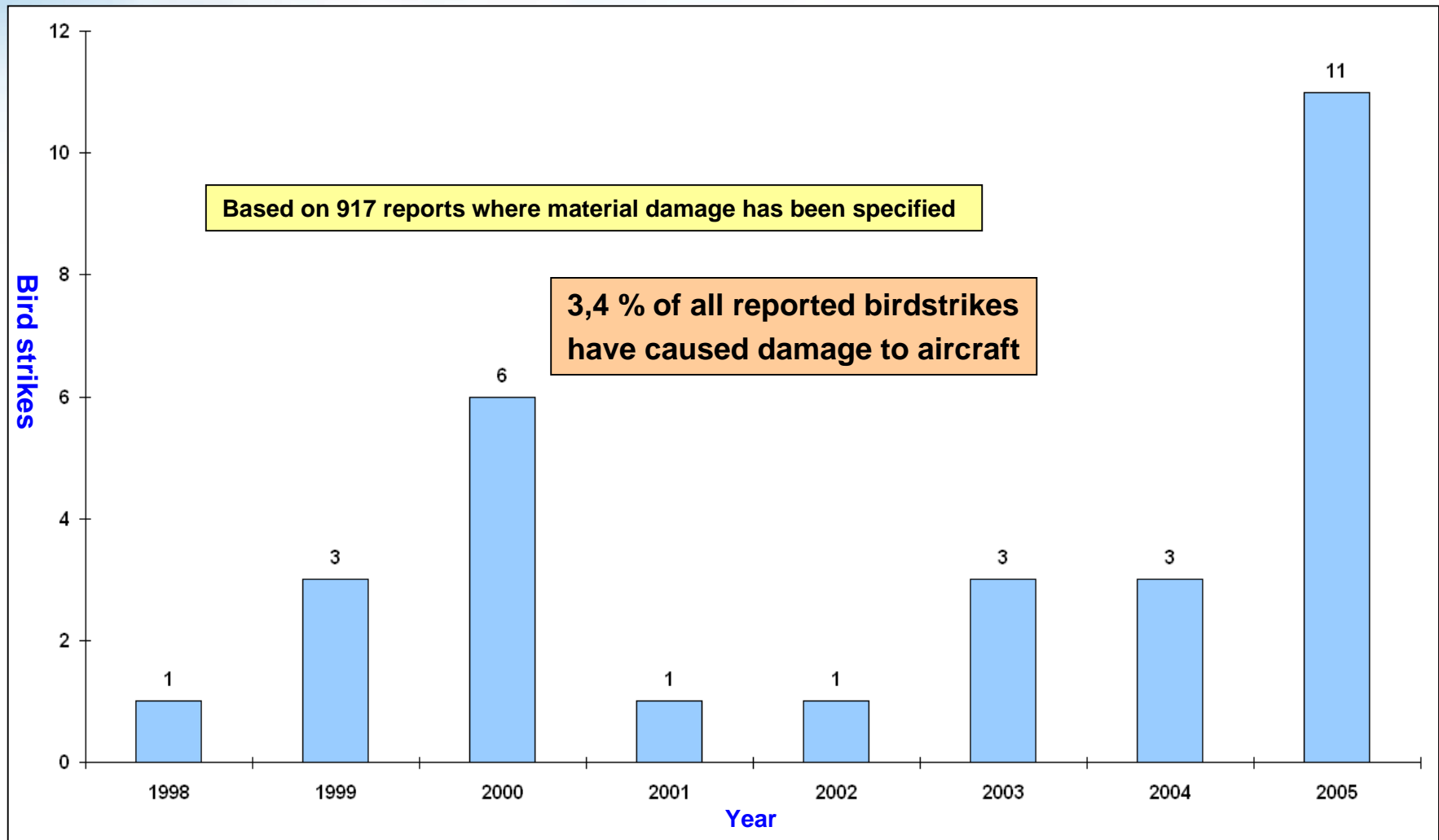
## Height of bird strike vs. size of bird



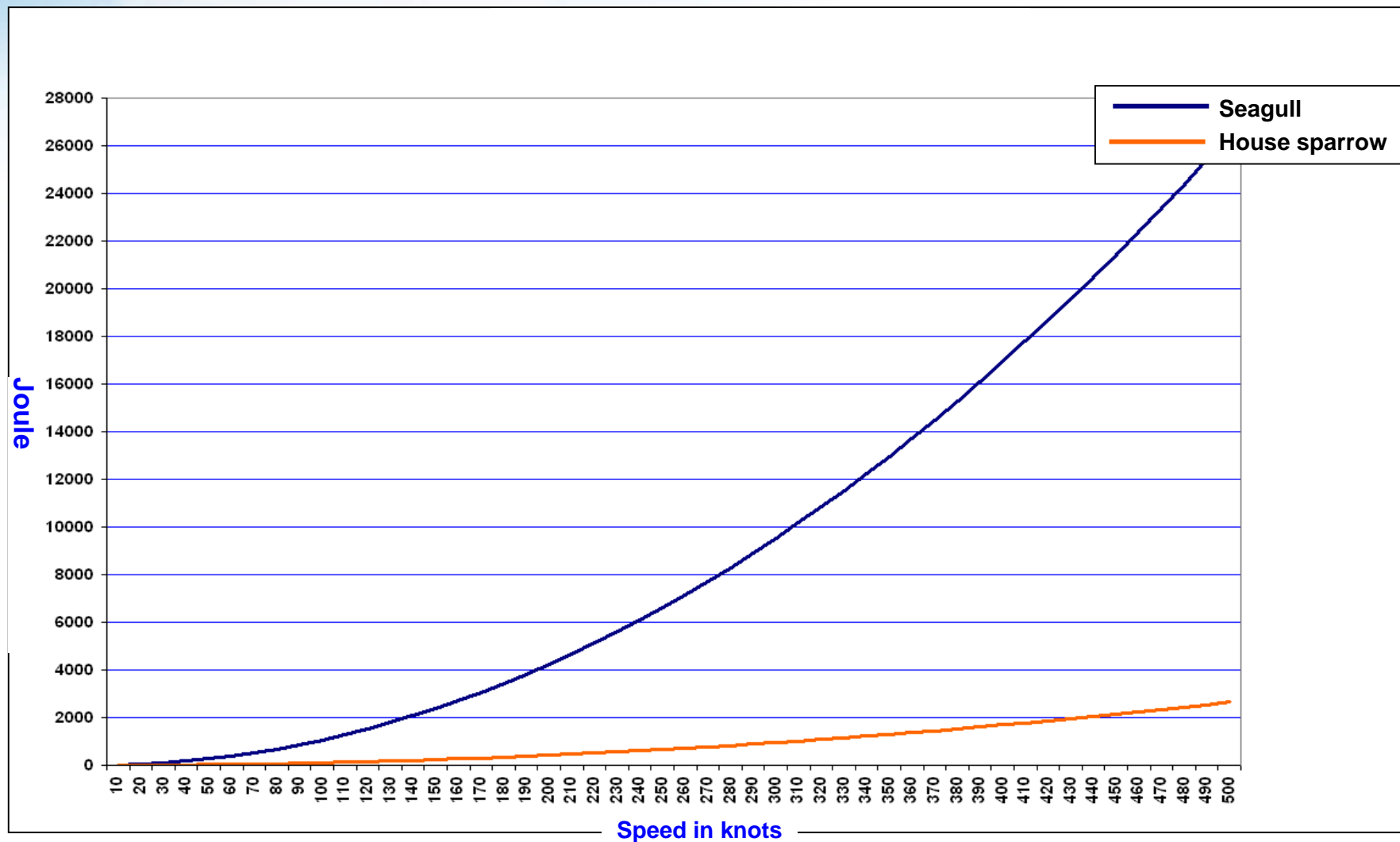
# ***Damage to aircraft***

# Bird strikes 1998 – 2005

## Strikes causing damage



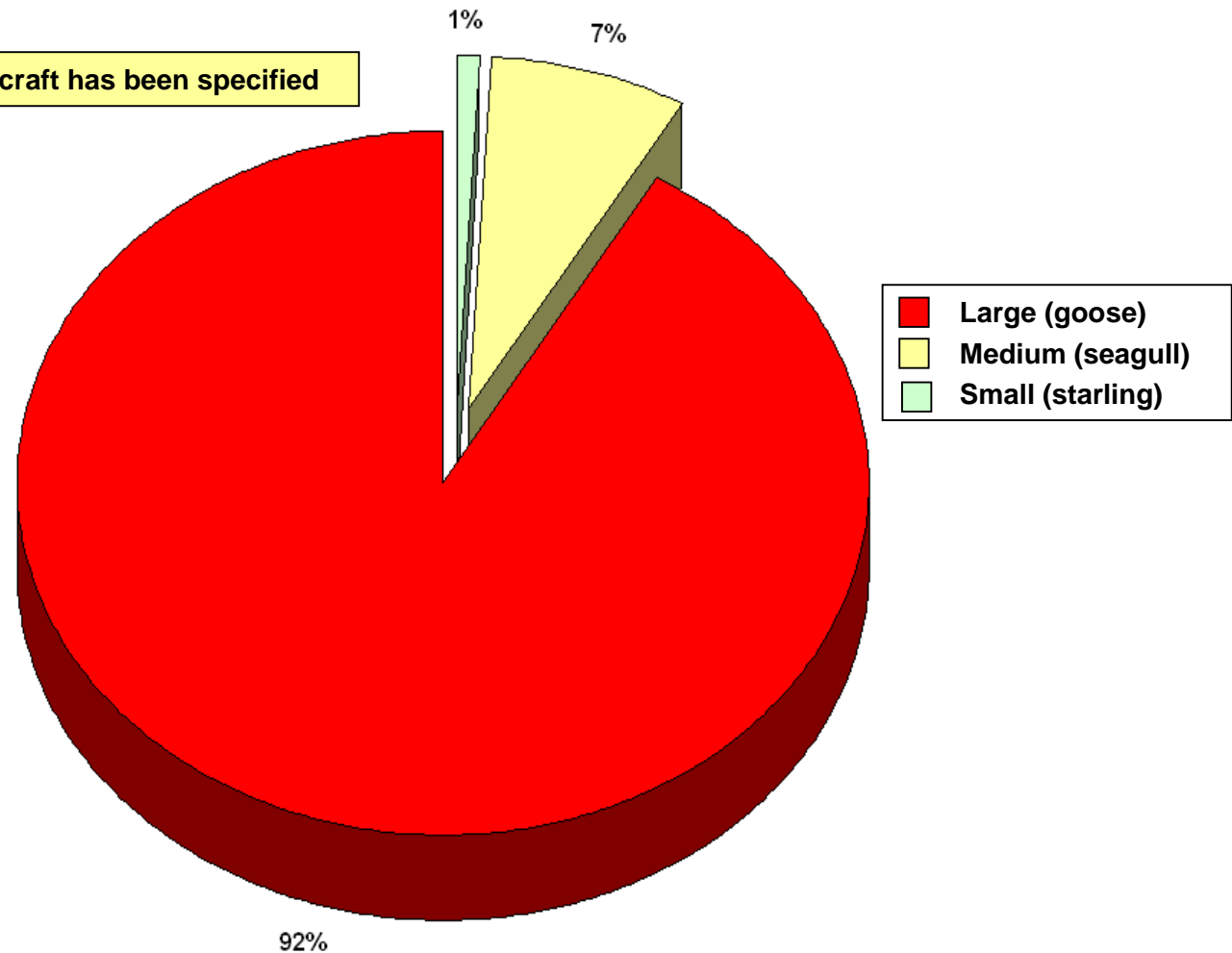
# Force of impact



# Bird strikes 1998 – 2005

## Damage vs. size of bird

Based on 29 reports where damage to aircraft has been specified





# ***Bird strikes 1998 – 2005***

## ***Point of impact***



# Bird strikes 1998 – 2005

## Cockpit

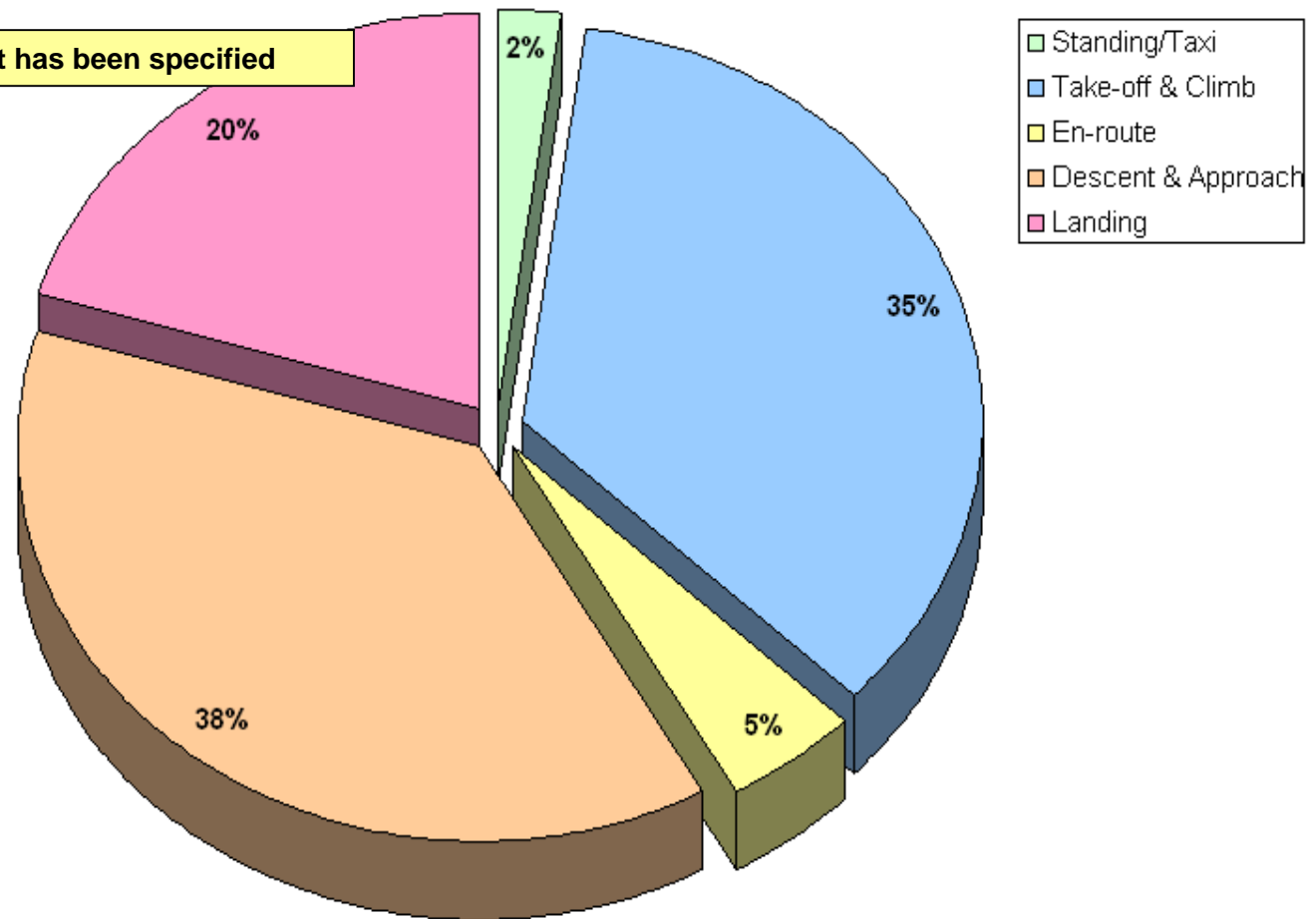


# ***Phase of flight***

# Bird strikes 1998 – 2005

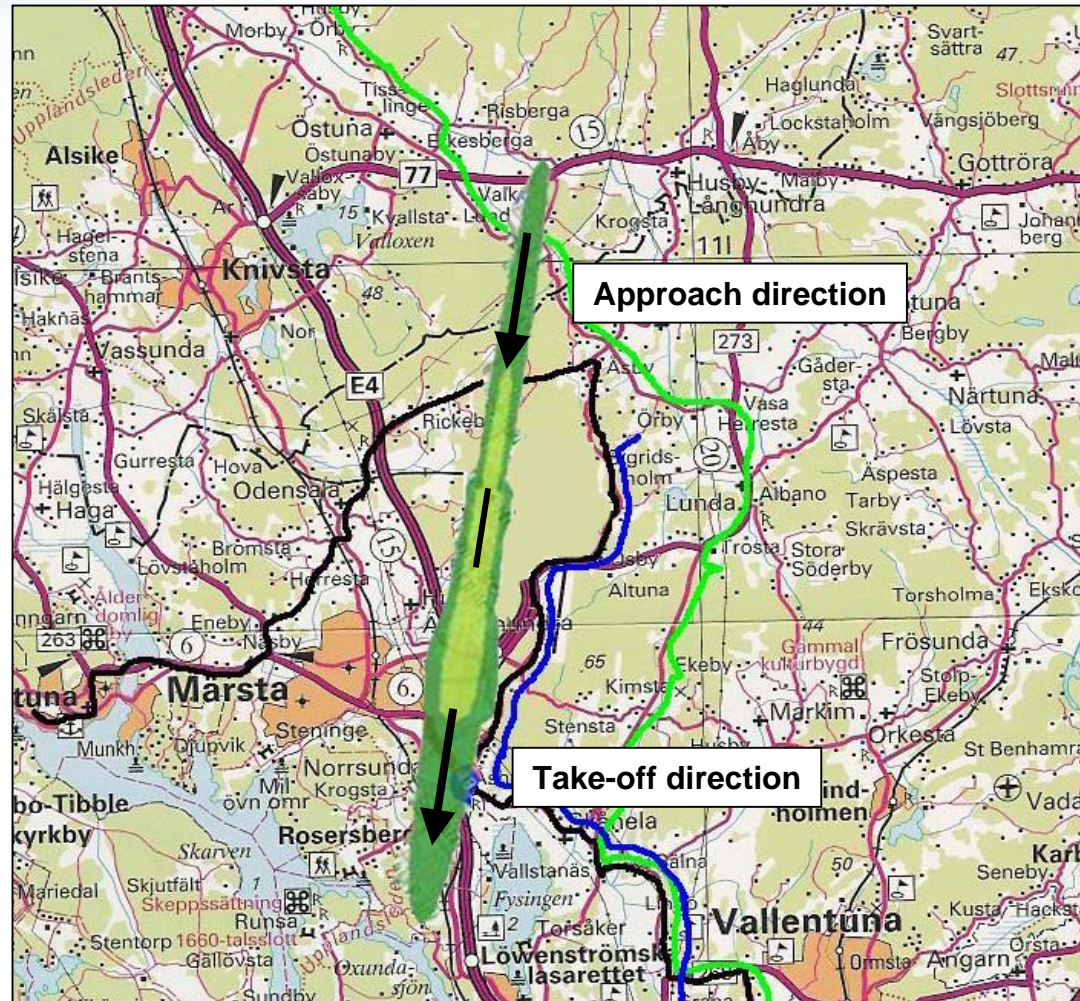
## Phase of flight

Based on 917 reports where phase of flight has been specified

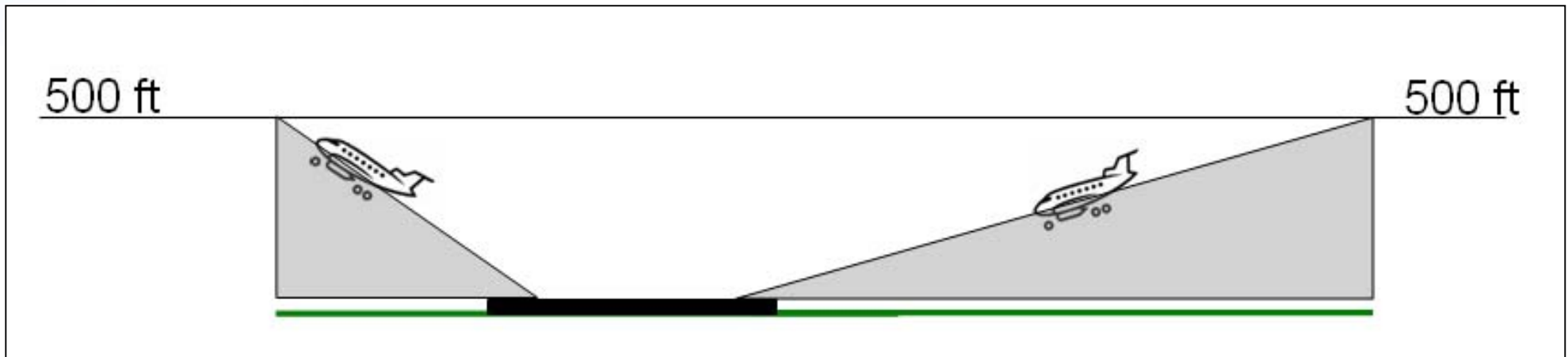




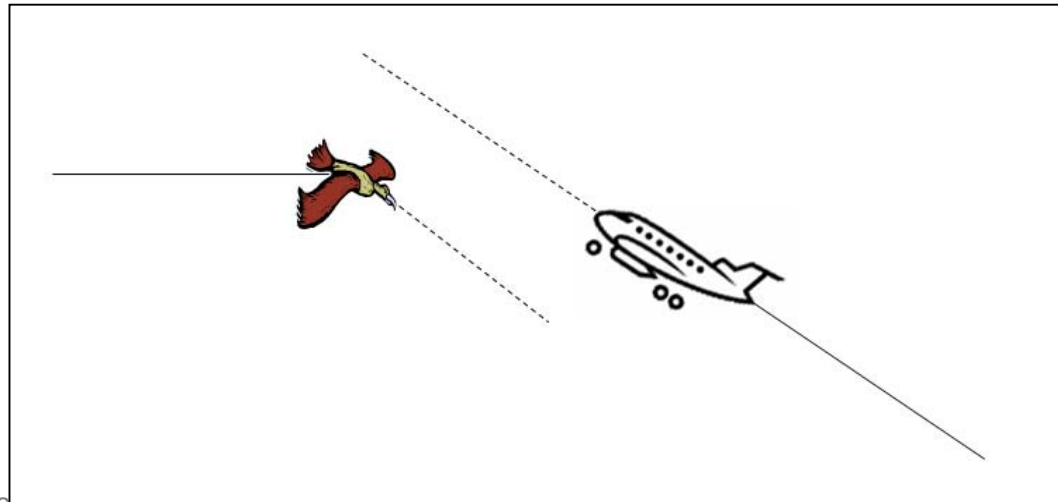
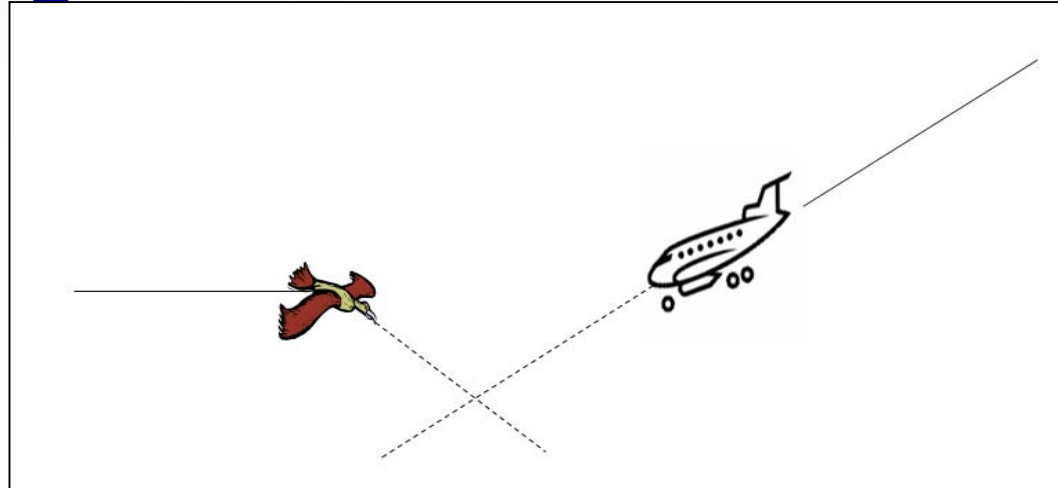
# Noise level during take-off and approach



# ***Descent and climb angles during take-off and landing***



# ***Collision avoidance behaviour of a bird in danger***

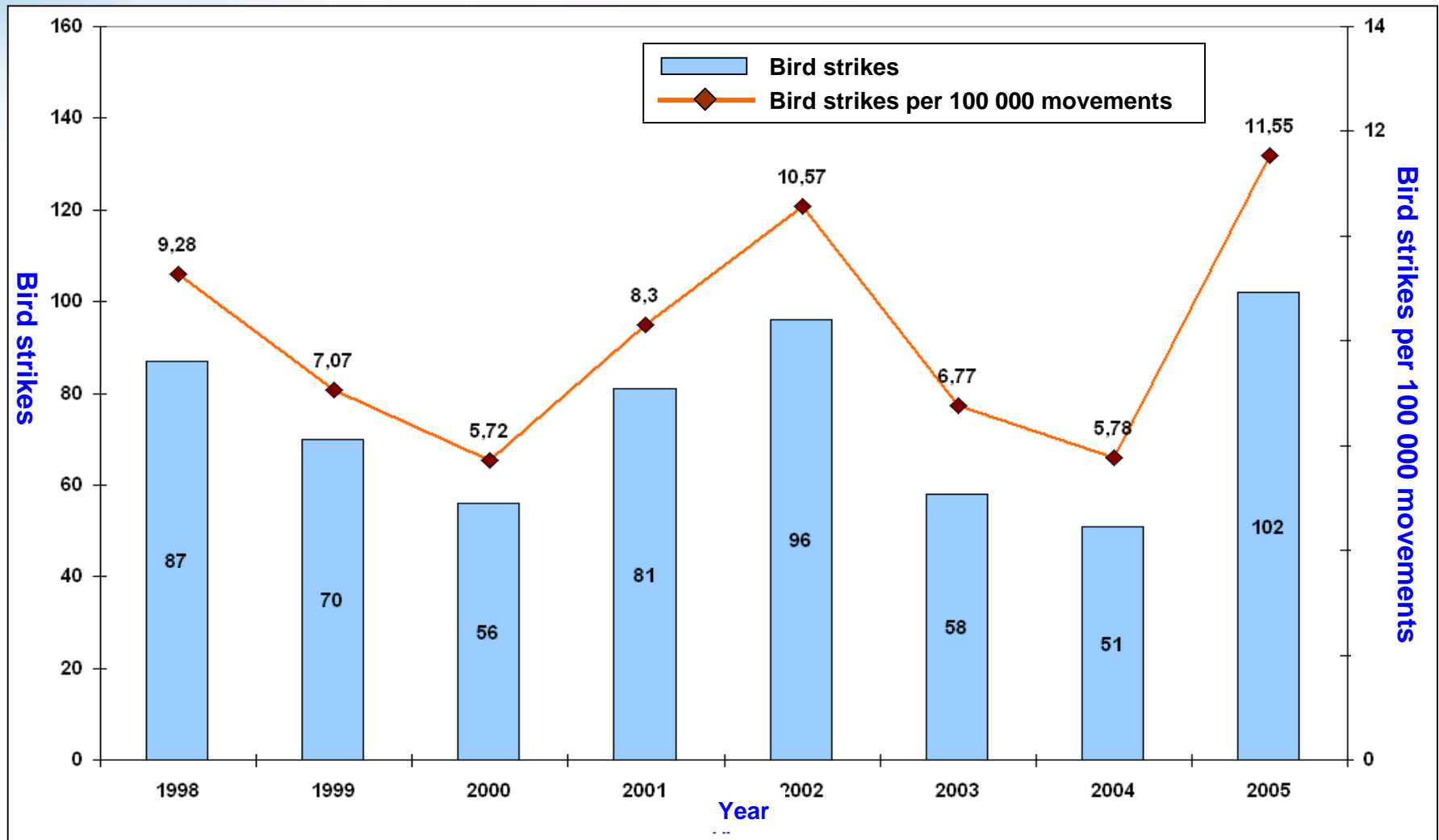


# ***Aerodromes***



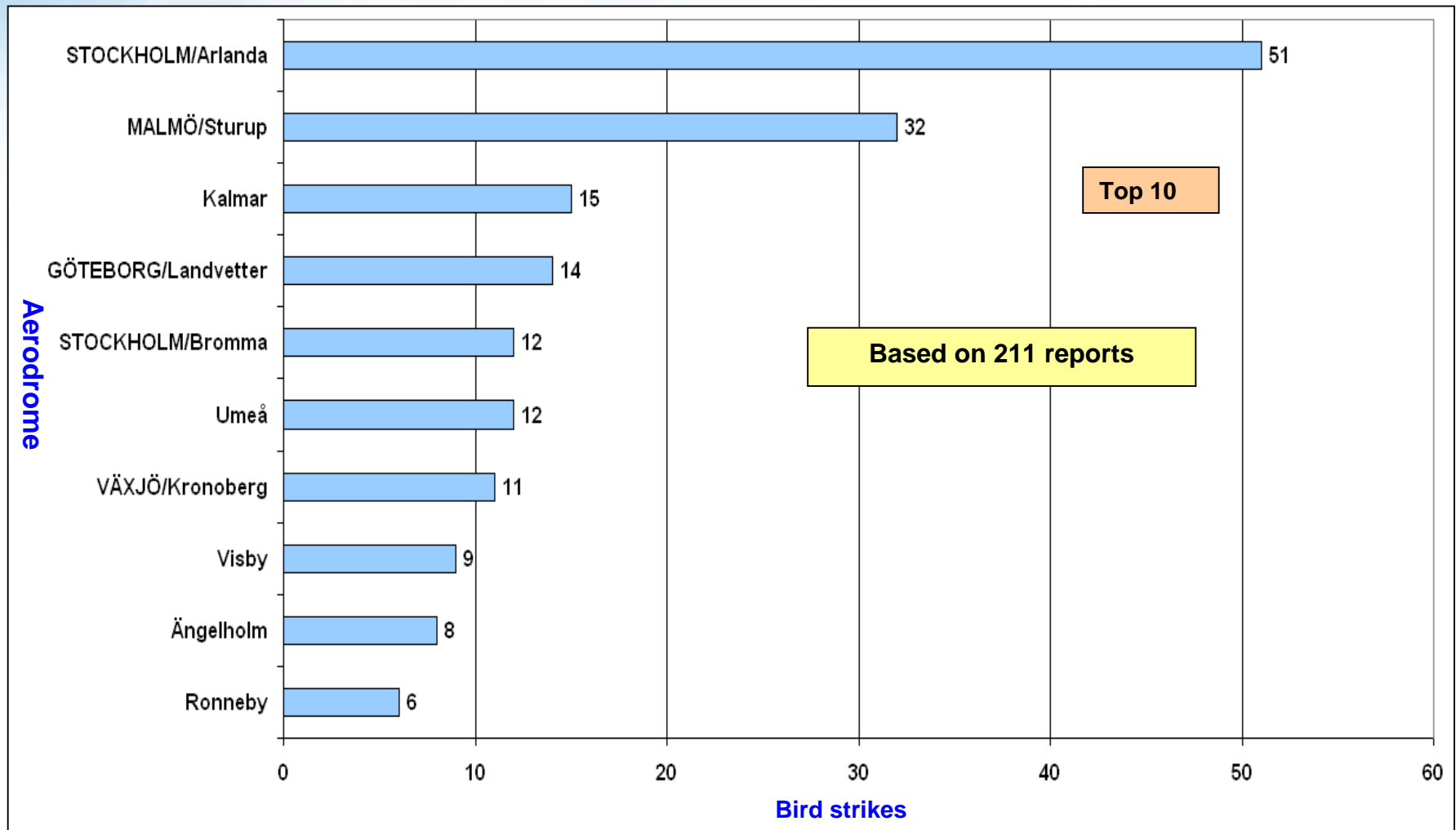
# Bird strikes 1998 – 2005

## Aerodromes



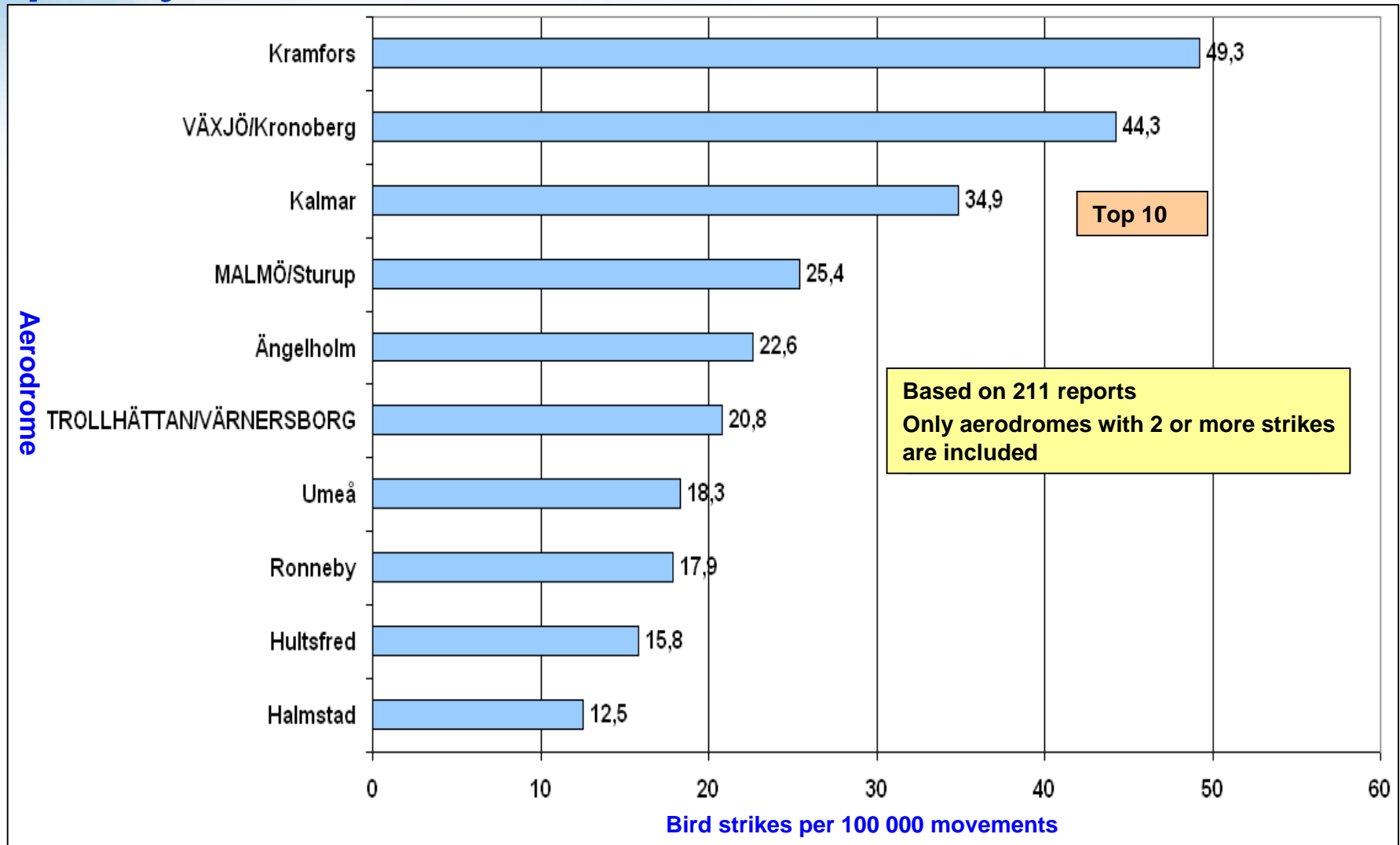
# Bird strikes 2003 - 2005

## Aerodromes



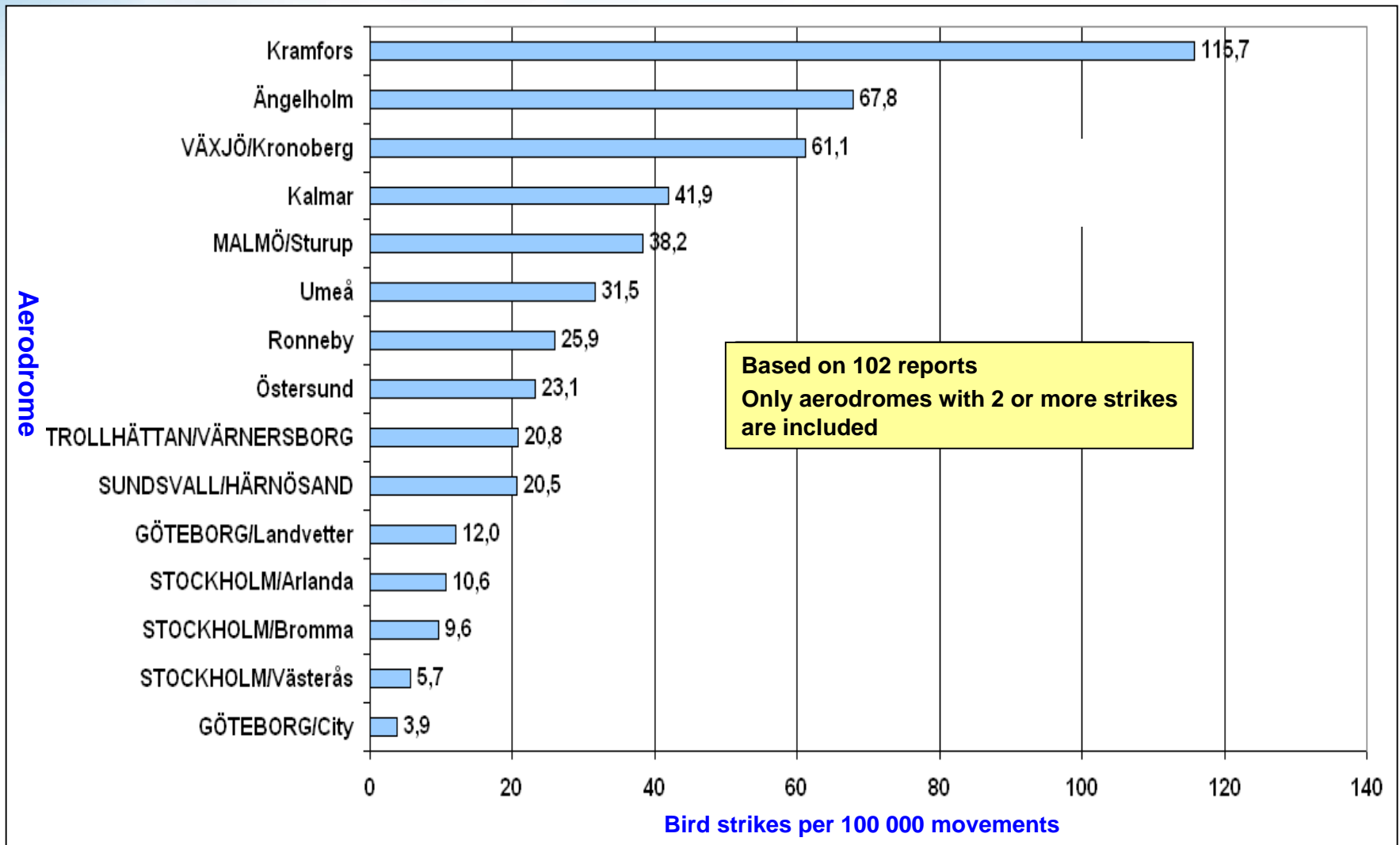
# Bird strikes 2003 – 2005

## Frequency



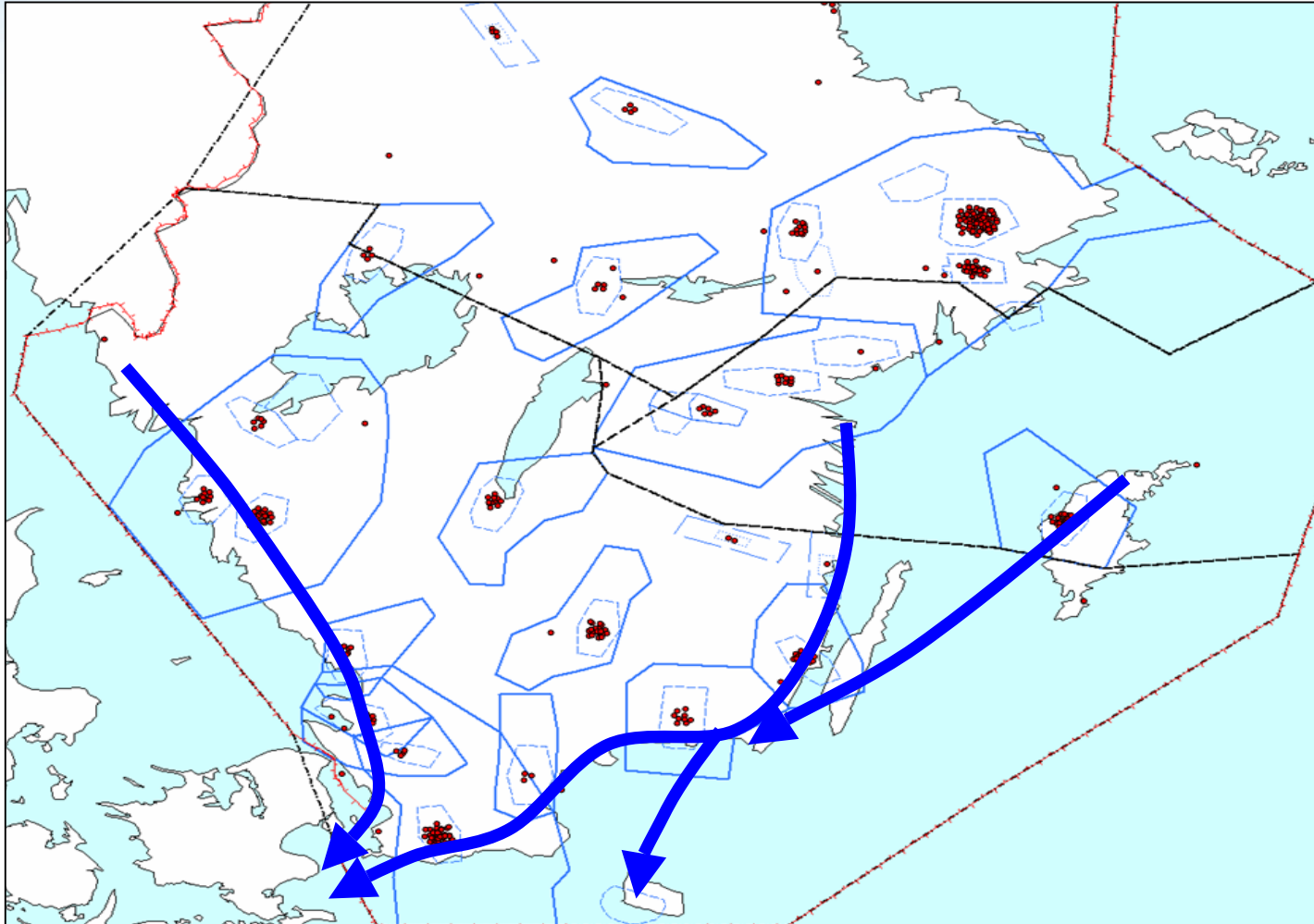
# Bird strikes 2005

## Frequency



# ***Migratory bird tracks***

# ***Migratory bird tracks - autumn***

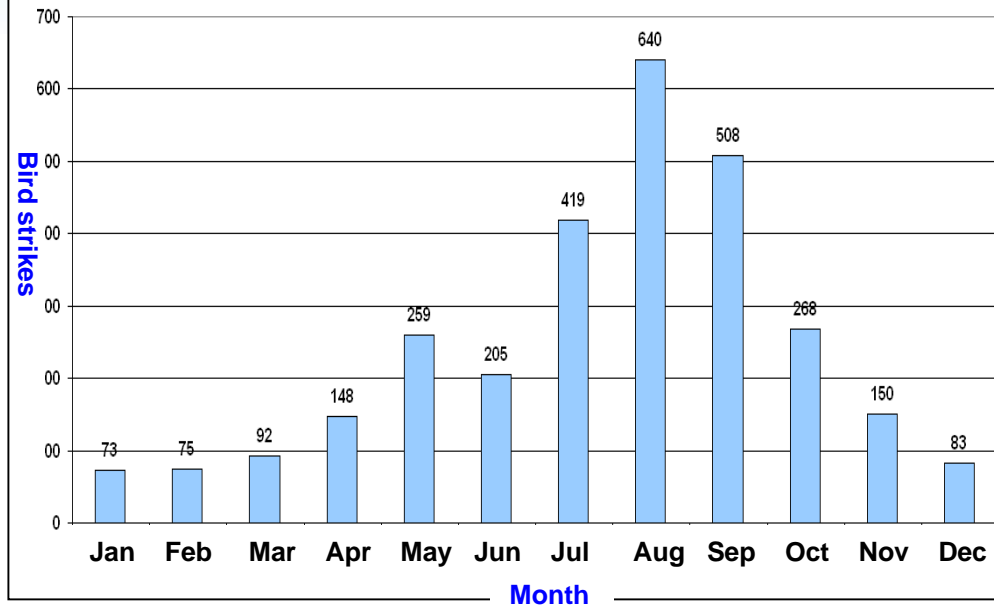


# ***International comparison***

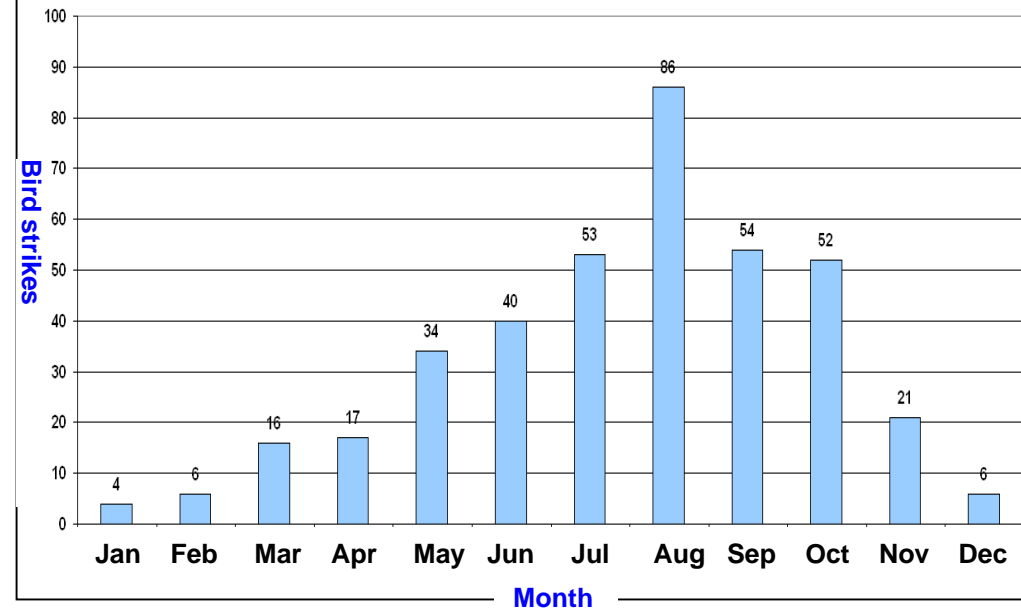
# Bird strikes 2002 – 2004

## Canada vs. Sweden

**Canada**  
2002–2004



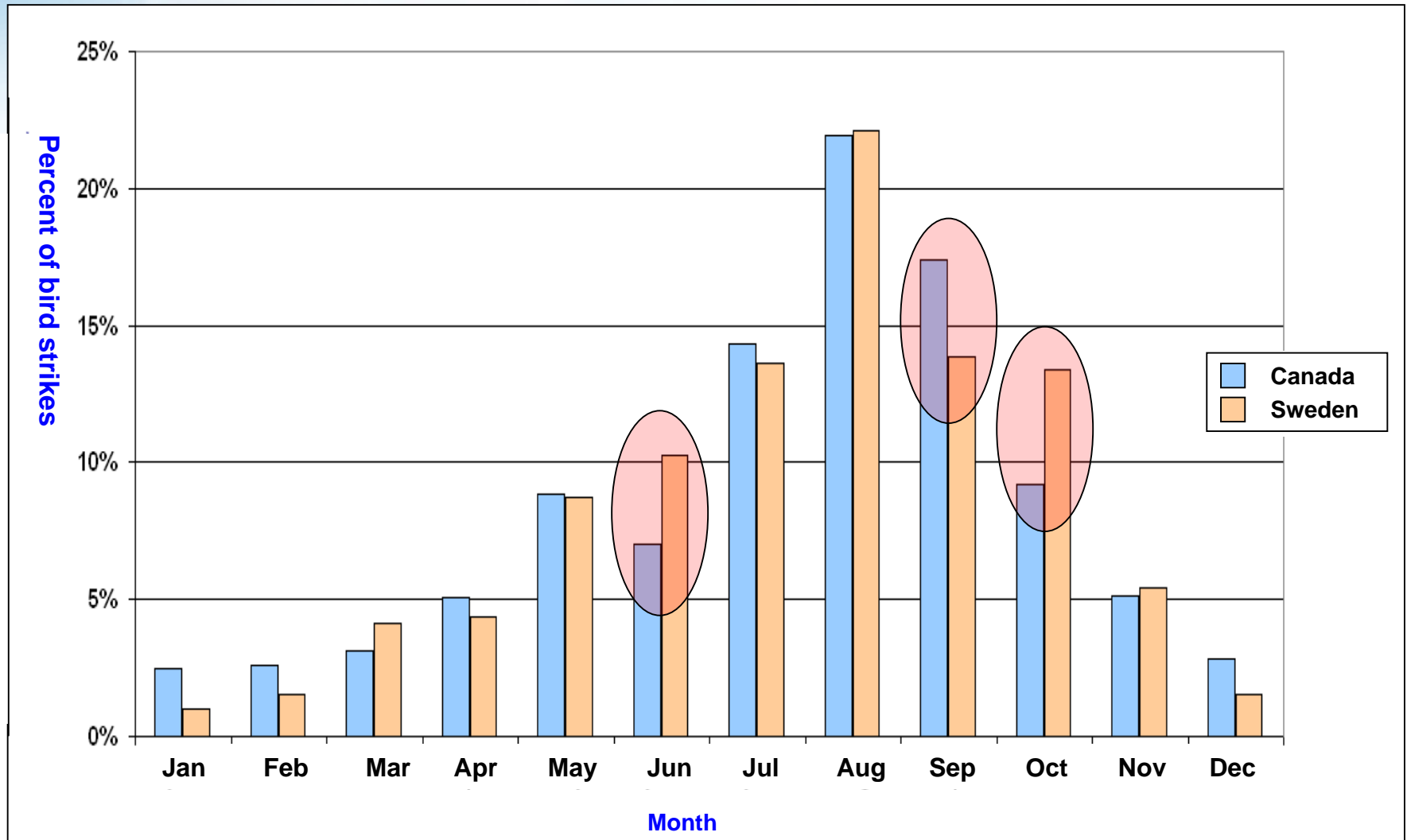
**Sweden**  
2002–2004





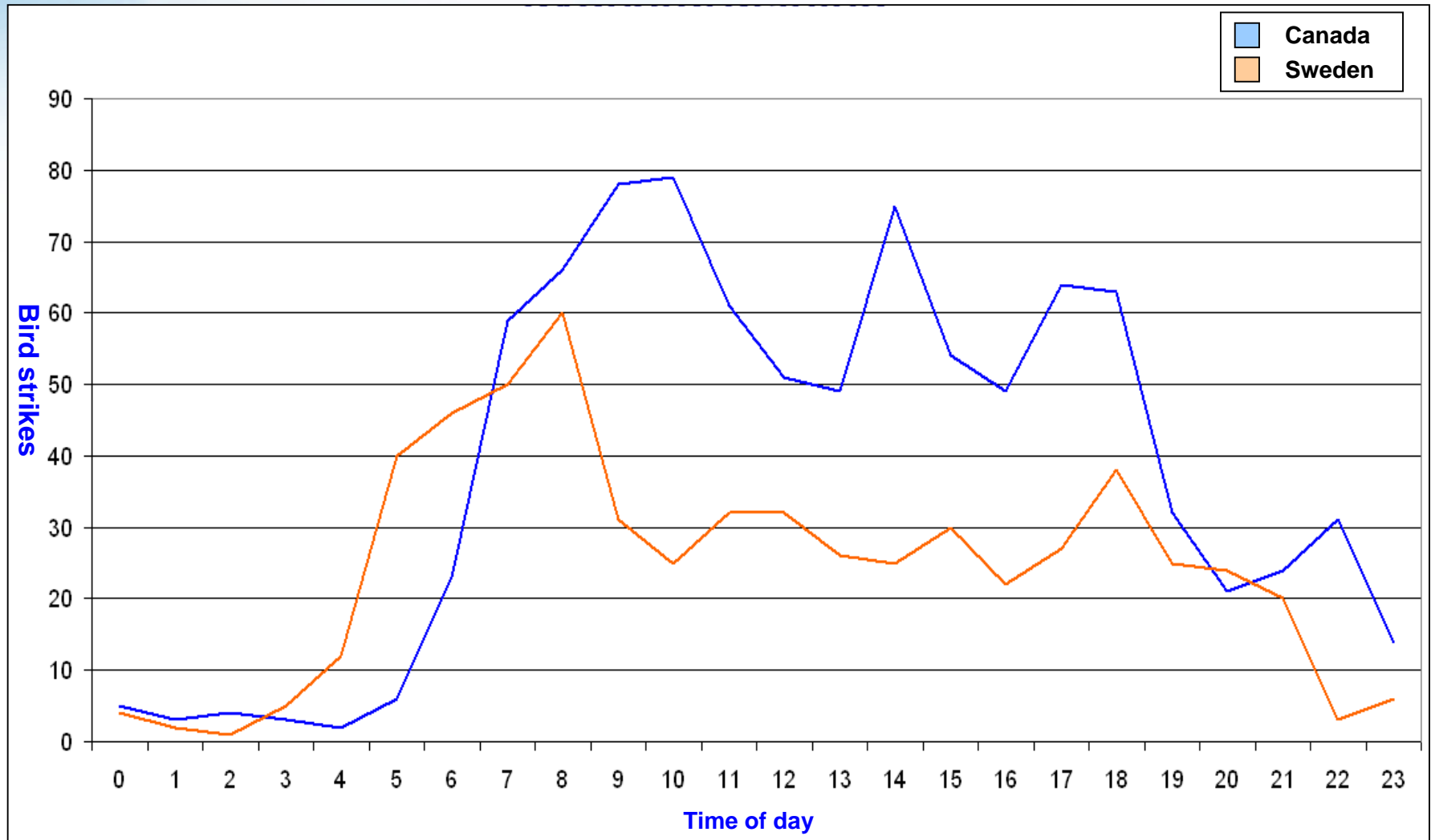
# Bird strikes 2002 – 2004

*Expressed as percentage of bird strikes over the year*



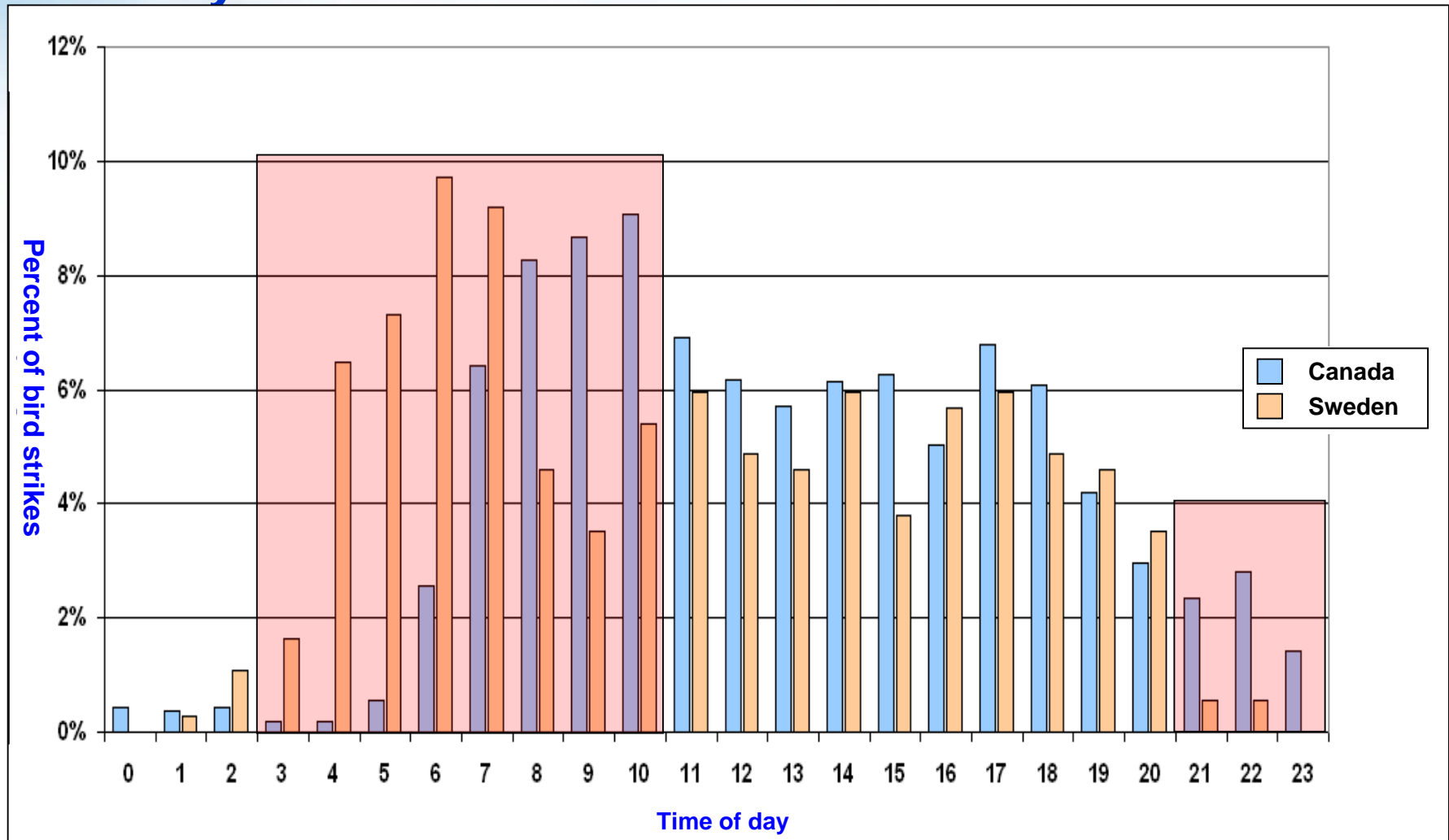
# Bird strikes 2002 – 2004

## Distribution of collisions over the day



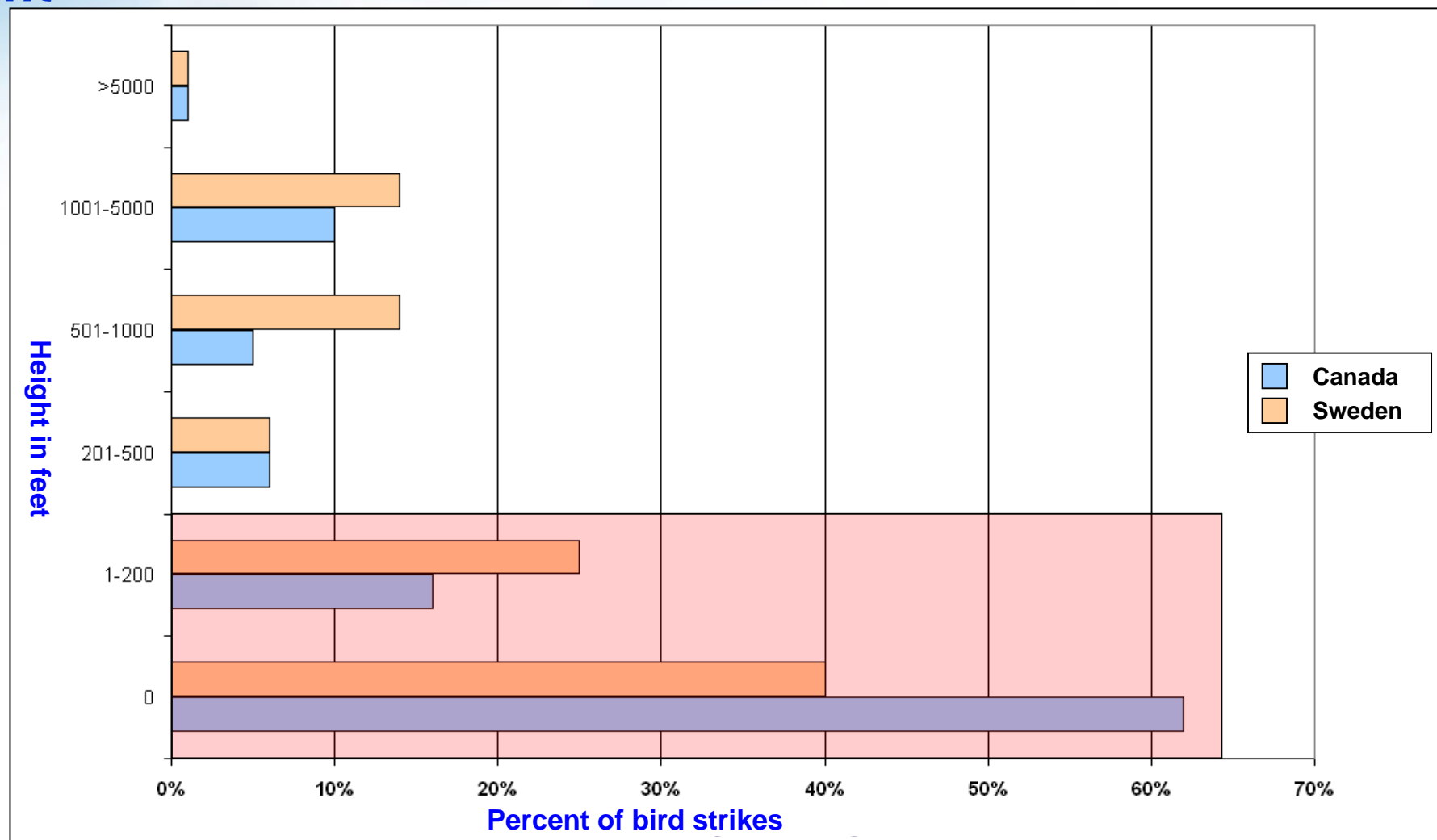
# Bird strikes 2002 – 2004

*Expressed as percentage of the distribution of bird strikes over the day*



# Bird strikes 2002 – 2004

*Expressed as percentage of the distribution of bird strikes vs. height*



# ***Conclusions – International comparison***

- **No significant differences between the countries**
- **The smaller differences can be explained by:**
  - **Geographical location**
  - **Departures / Arrivals**
  - **Different species**

***END***



**Thanks for your attention!**