



# Wildlife Strike: what has happened in the Italian skies in the past 10 years?

**Alessandro Montemaggiori** PhD  
*[alessandro.montemaggiori@gmail.com](mailto:alessandro.montemaggiori@gmail.com)*

*Bird Strike Committee Italy - ENAC (Italian CAA)  
Viale Castro Pretorio, 118 - 00185 Roma, Italy*

# Italian airports

Year 2021

**107** AIRPORTS



# Italian airports

Year 2021



**107** AIRPORTS

**45** certified by ENAC

**39** regularly operative

- 12 Small: < 20 flights/day
- 16 Medium: 21-100 flights/day
- 8 Large: 101-200 flights/day
- 3 Very Large: >200 flights/day



# Italian airports

Year 2021



**107** AIRPORTS

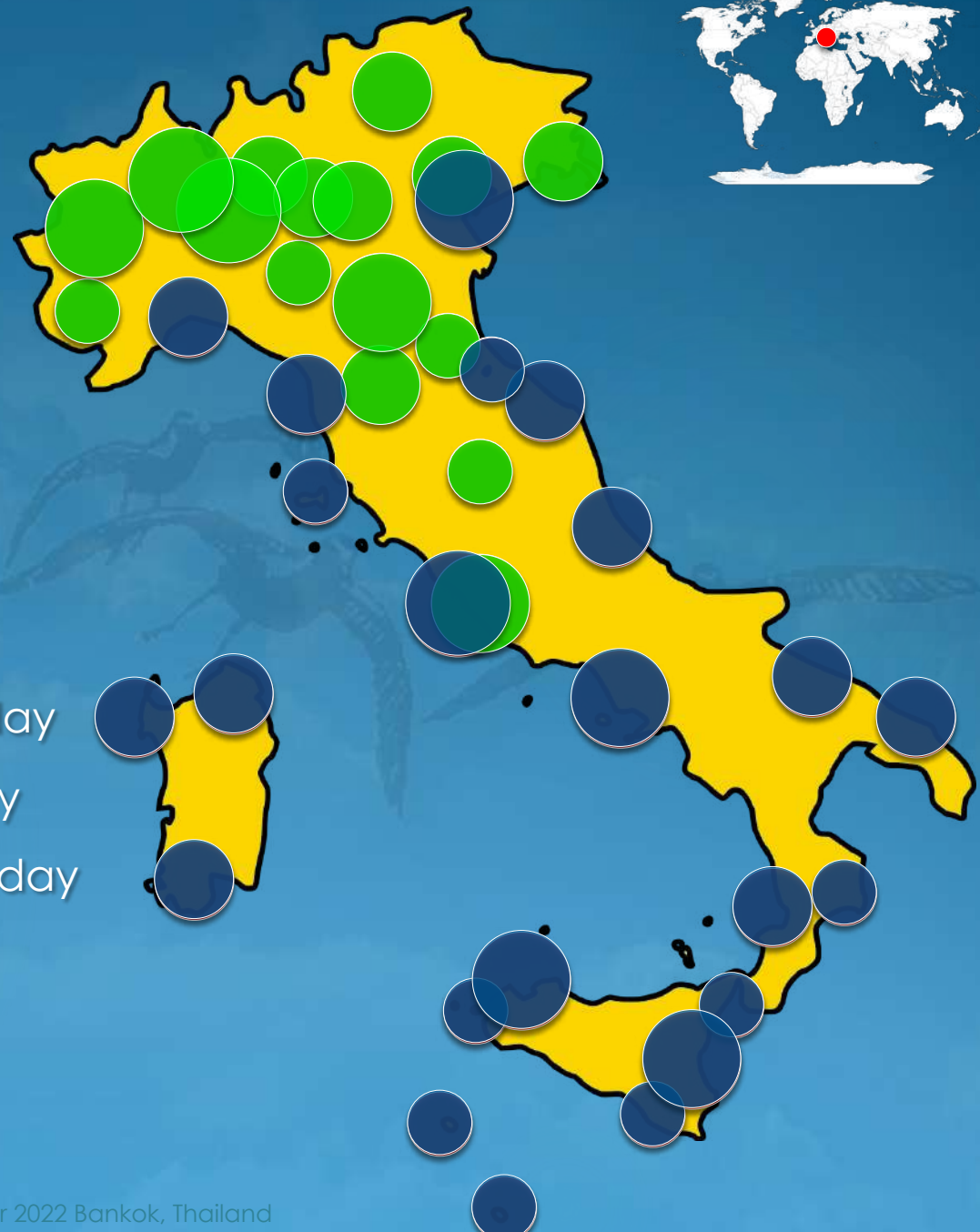
**45** certified by ENAC

**39** regularly operative

- 12 Small: < 20 flights/day
- 16 Medium: 21-100 flights/day
- 8 Large: 101-200 flights/day
- 3 Very Large: >200 flights/day

● 17 Inland airports

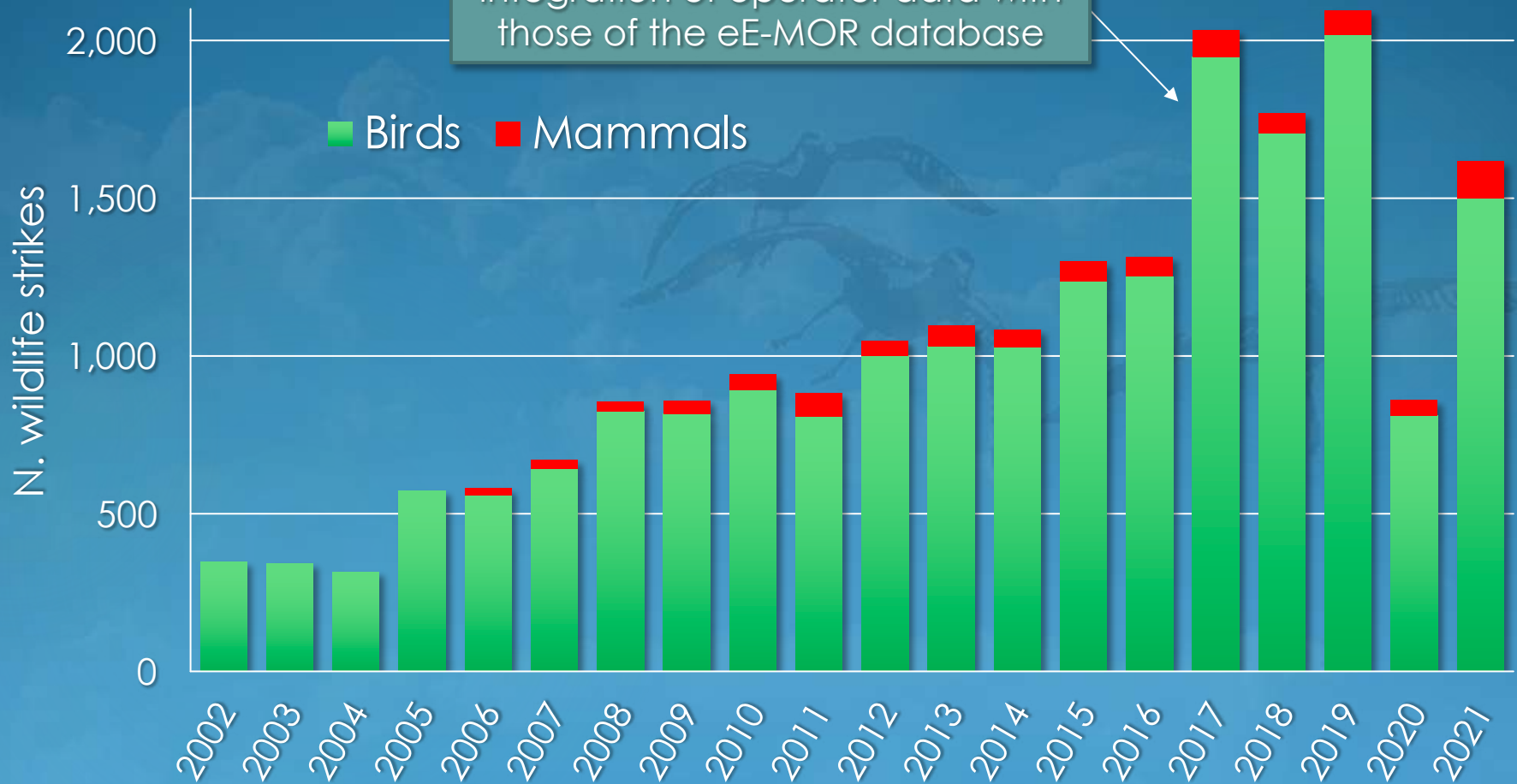
● 22 Coastal airports



# Wildlife strikes in ITALY (civil aviation)

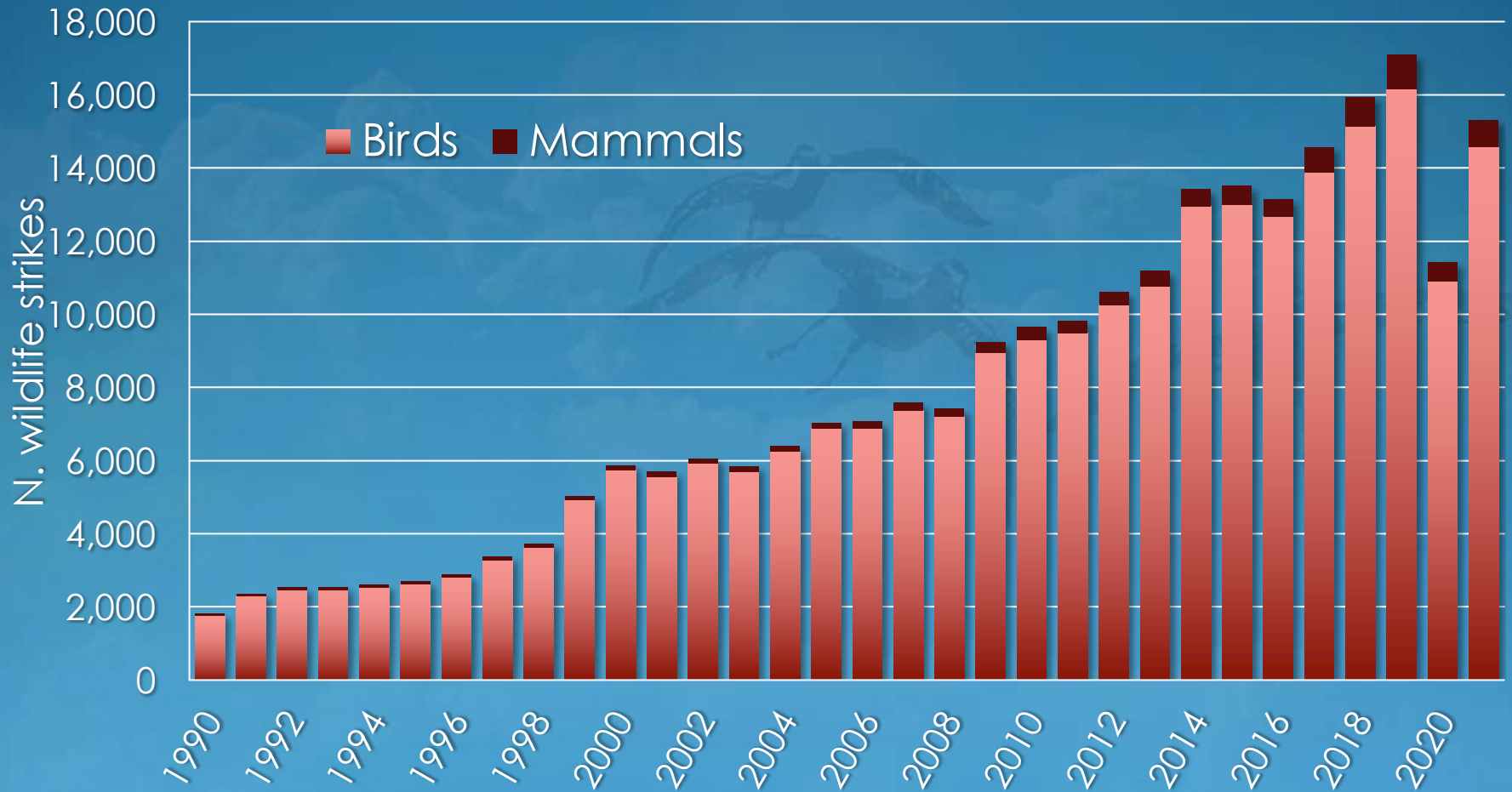
N= 19,903 - Years 2002-2021

Integration of operator data with those of the eE-MOR database



# Wildlife strikes in USA (civil aviation)

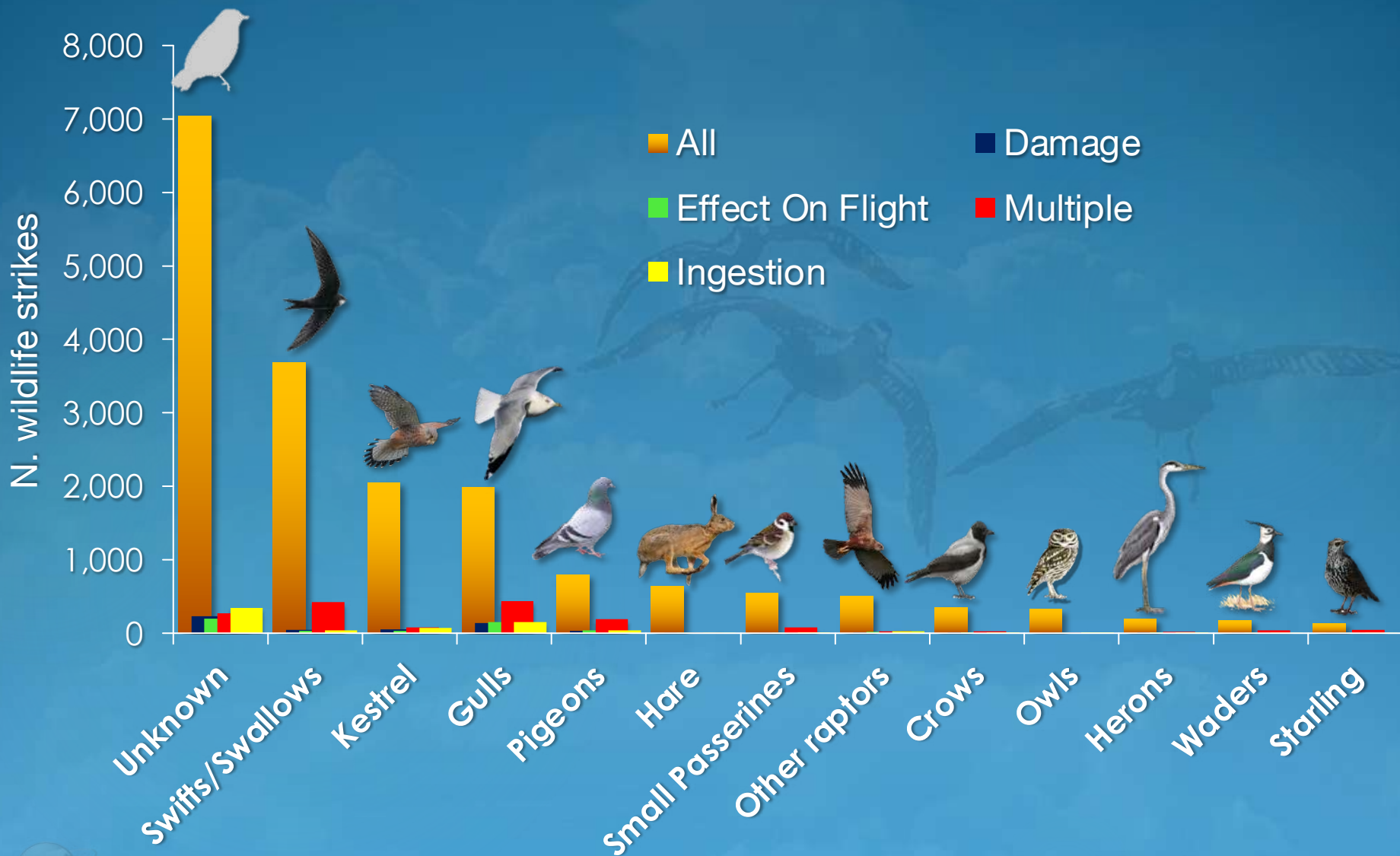
N= 254,022 - Years 1990-2021



Dolbeer et al. 2022

# Who causes the strikes in Italy \*

N = 18,488 - Years 2006-2021



\* > 100 strikes/group

# Where do strikes occur in Italy

2006 - 2021

Strikes/10,000 flights  
annual median

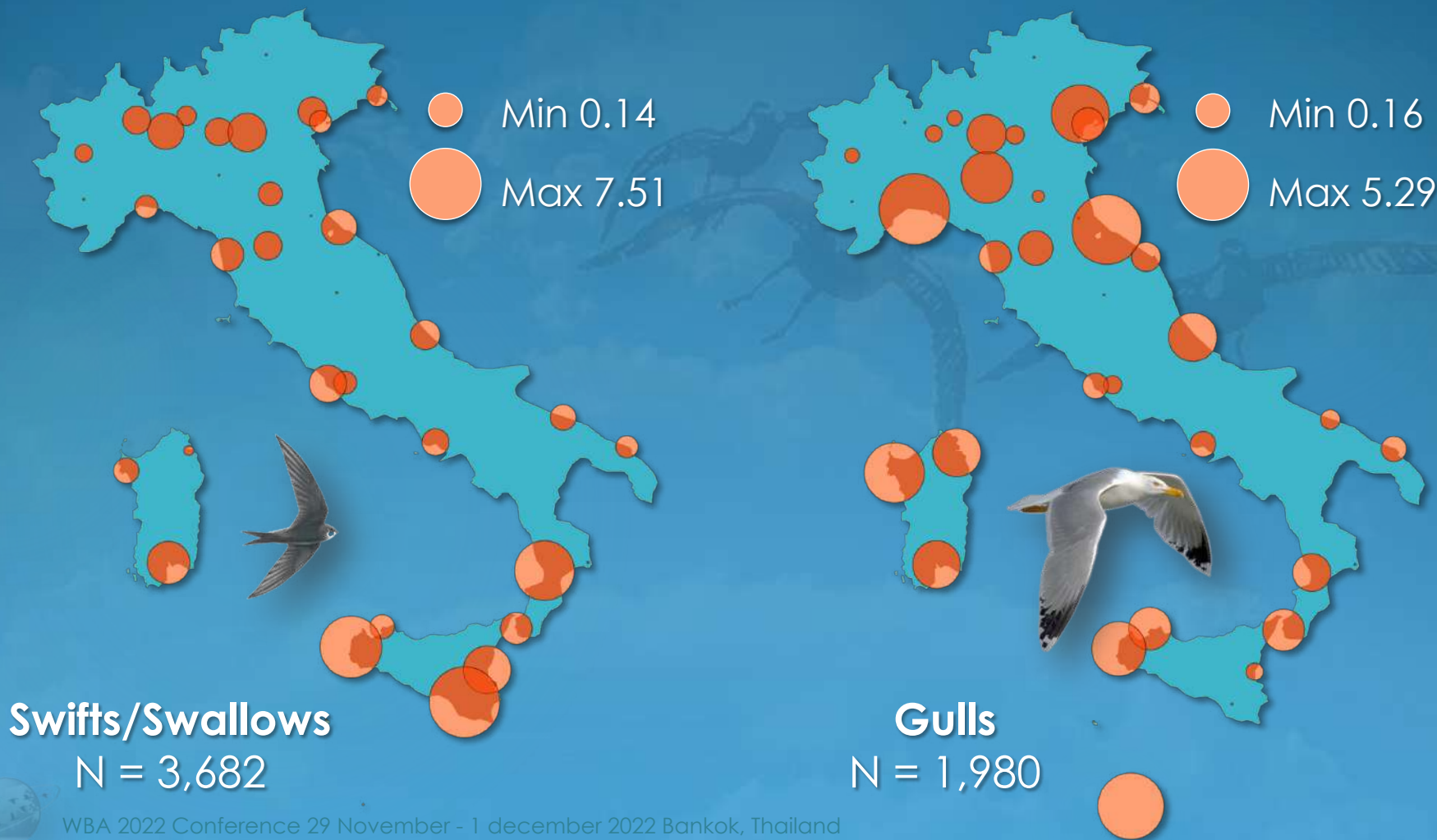


All Species  
N = 18,945





# Wildlife strike occurrence per Group of Species (Strikes/10,000 flights - annual median) 2006 - 2021



# Wildlife strike occurrence per Group of Species (Strikes/10,000 flights - annual median) 2006 - 2021

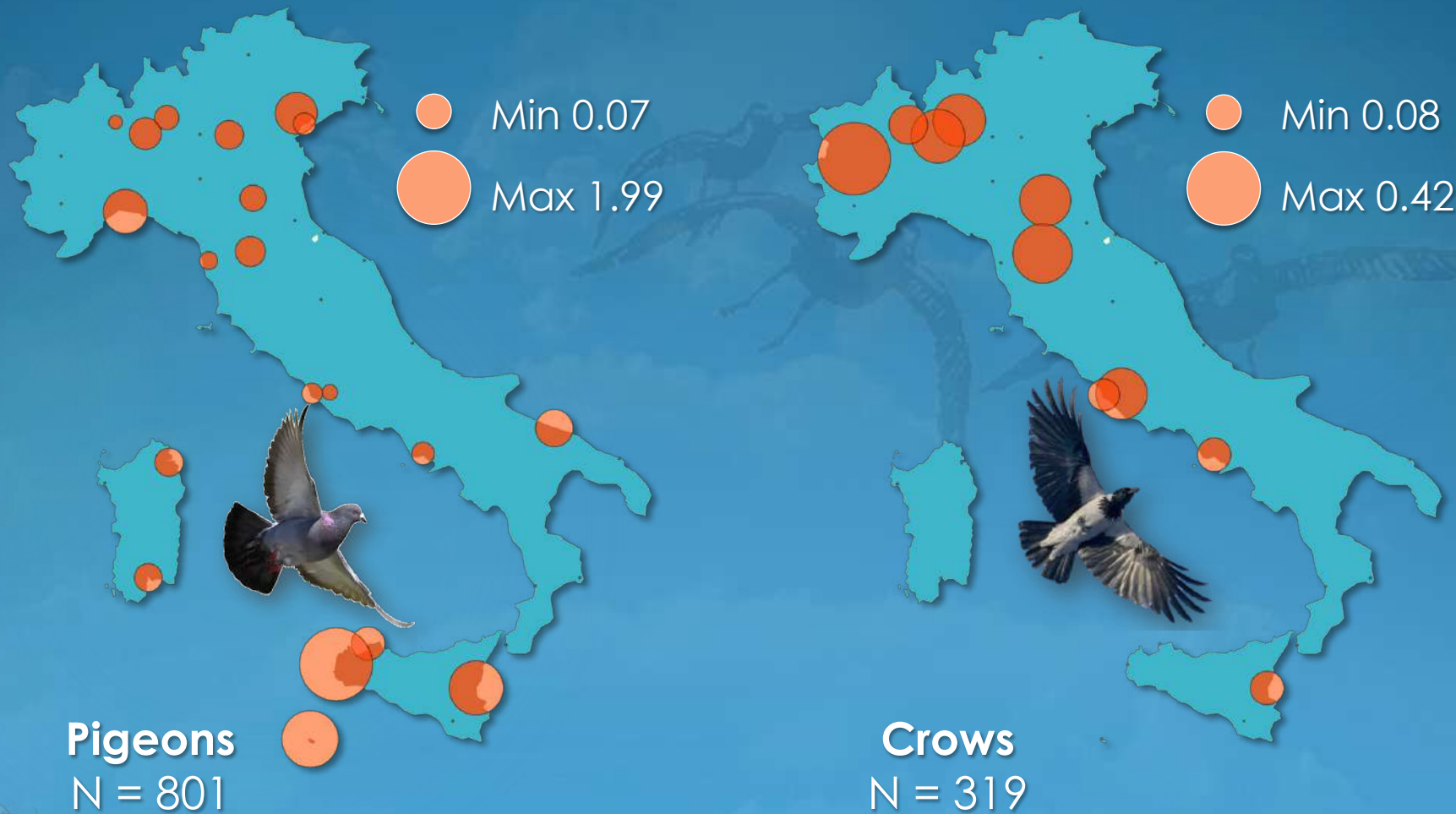


**Eurasian kestrel**  
N = 2,044



**Hare**  
N = 642

# Wildlife strike occurrence per Group of Species (Strikes/10,000 flights - annual median) 2006 - 2021

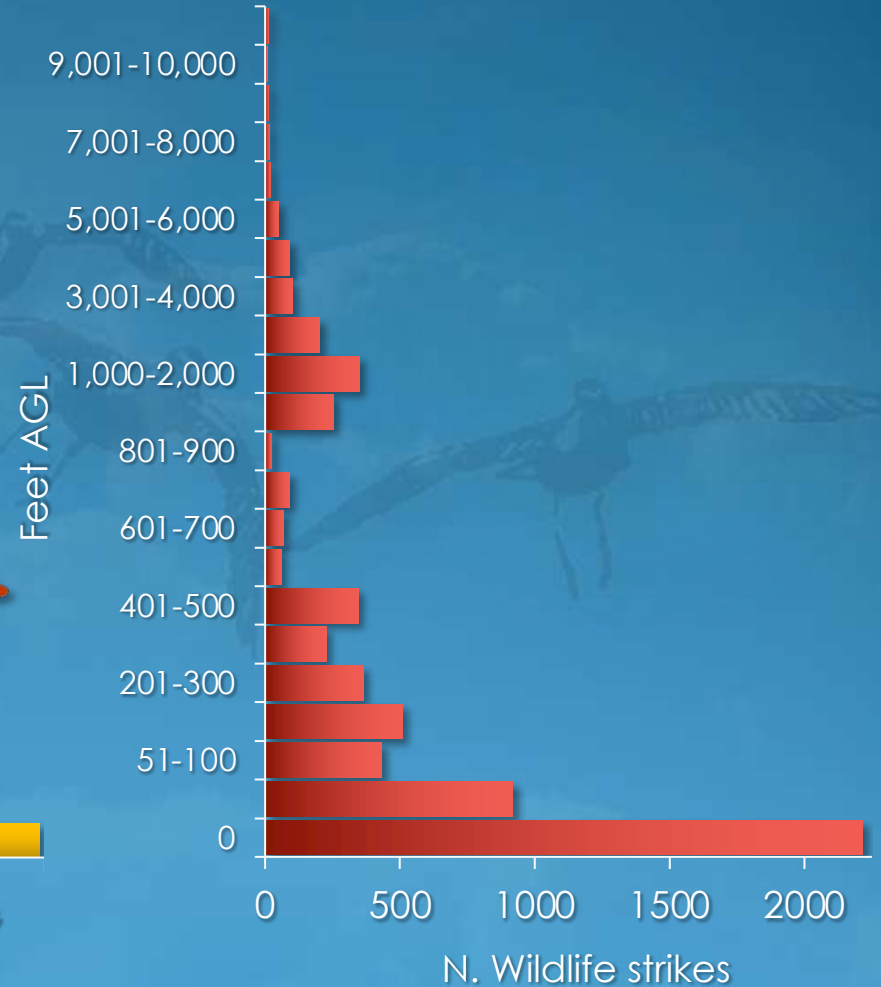
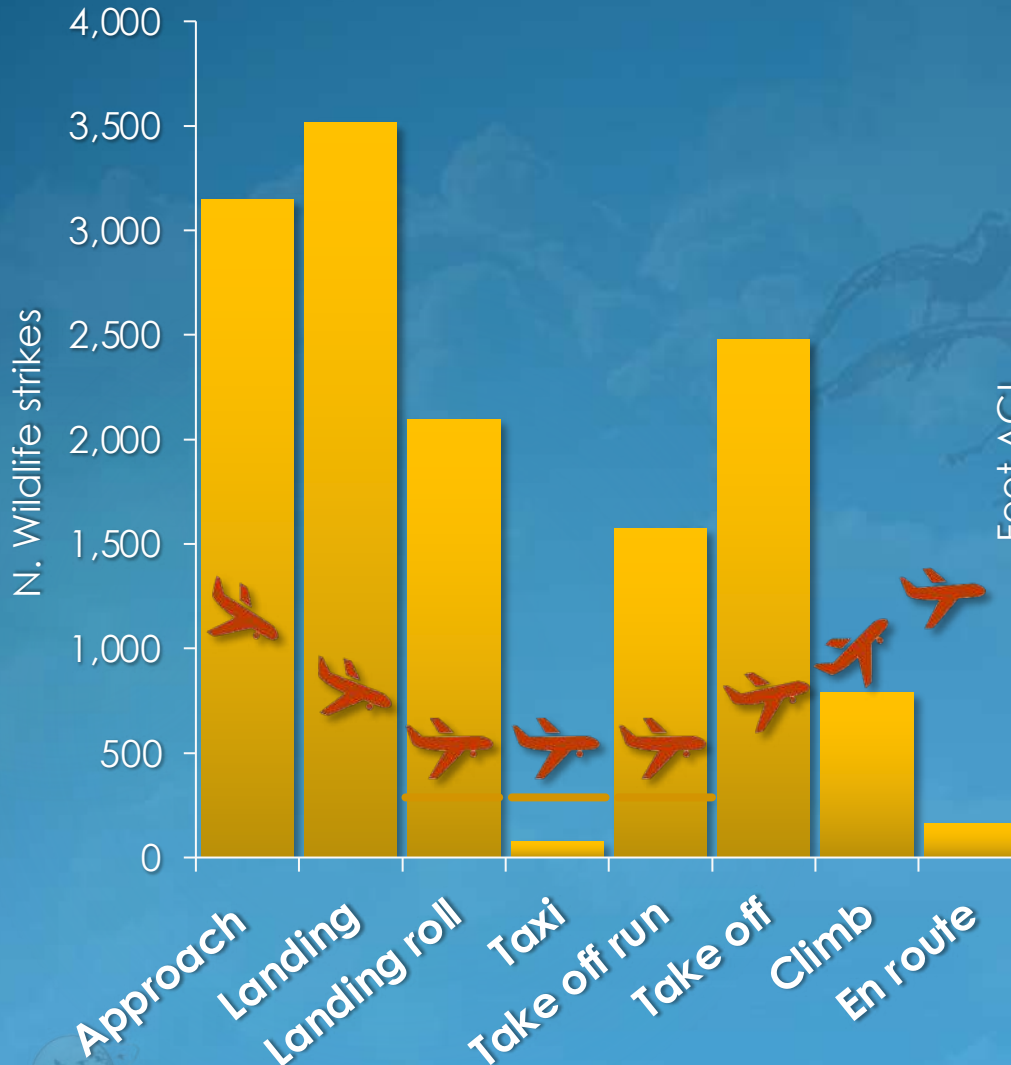


# When, how, and where strikes occur in Italy #1

(2006-2021)

## Flight phase N = 13,847

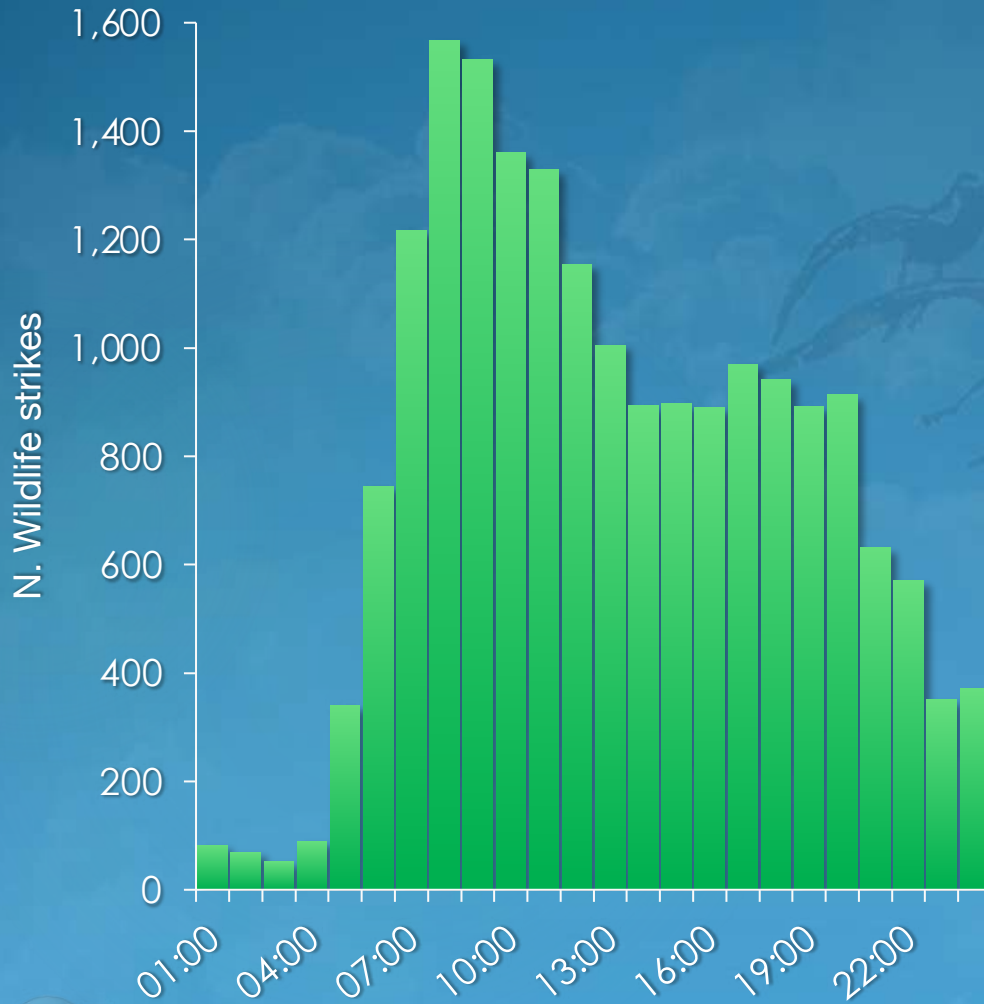
## Height N = 6,378



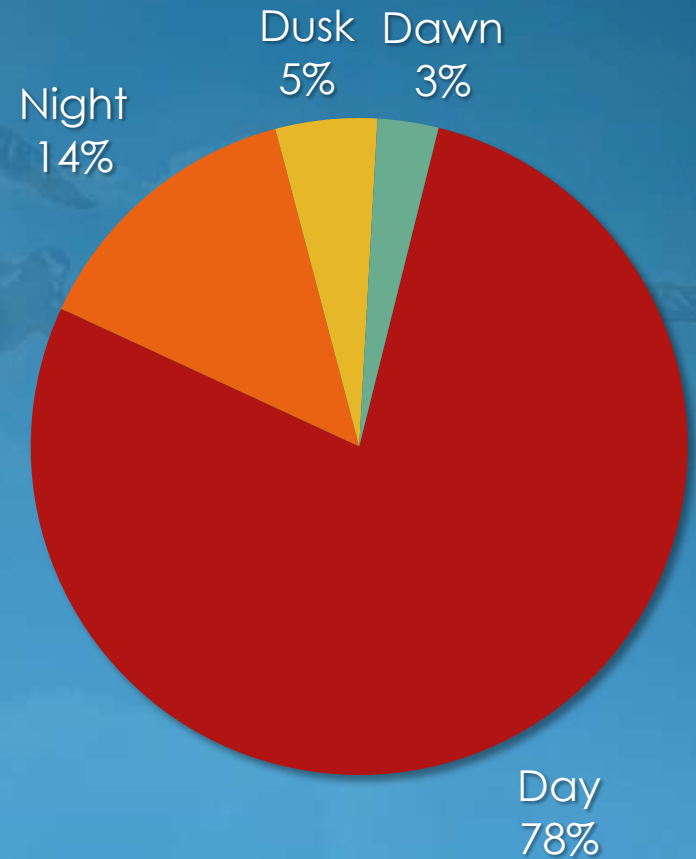
# When, how, and where strikes occur in Italy #2

(2006-2021)

## Local Time N = 18,871



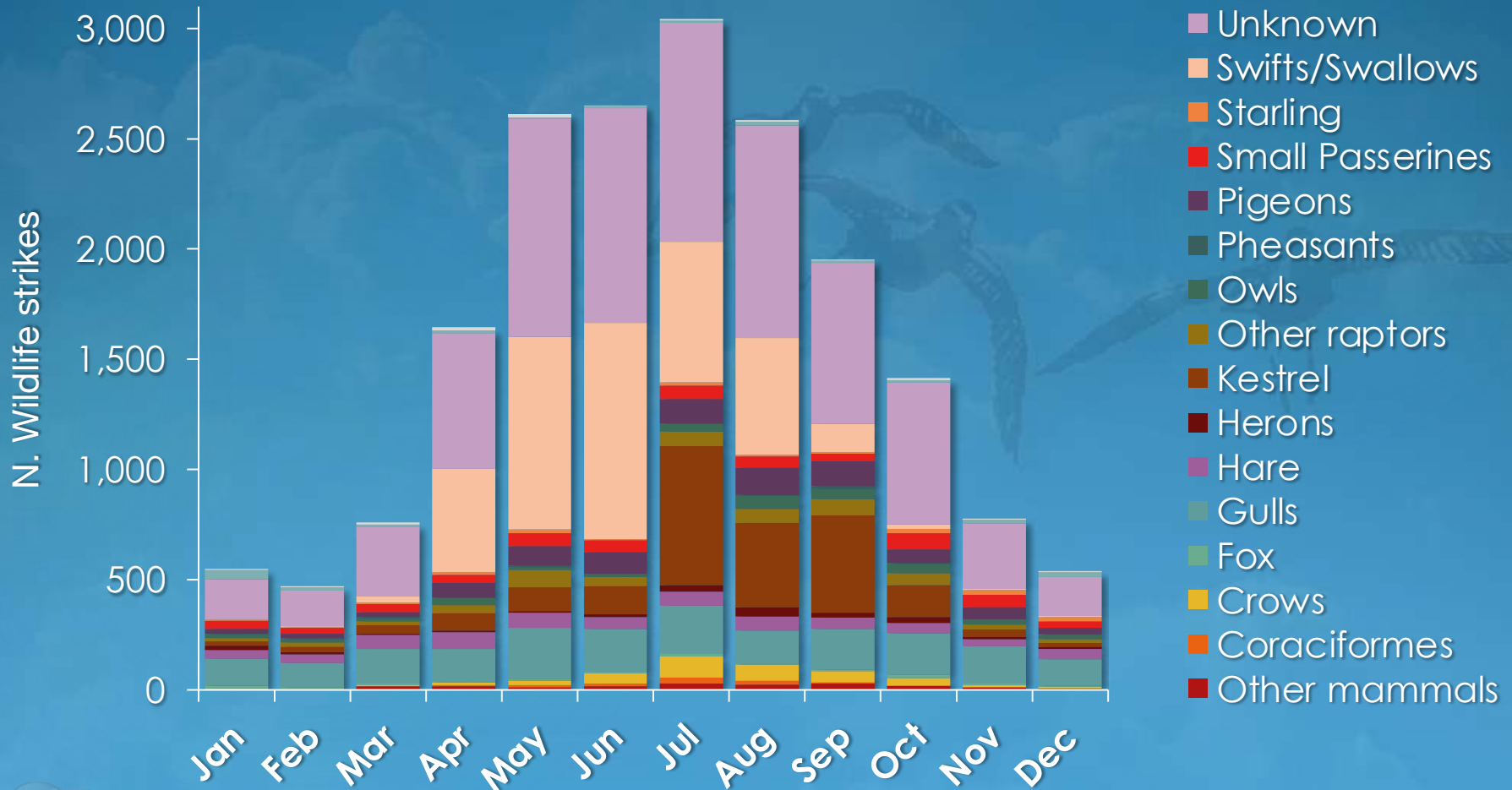
## Daylight N = 18,390



# When, how, and where strikes occur in Italy #3

(2006-2021)

## Seasonality N = 19,000



# When, how, and where strikes occur in Italy #4

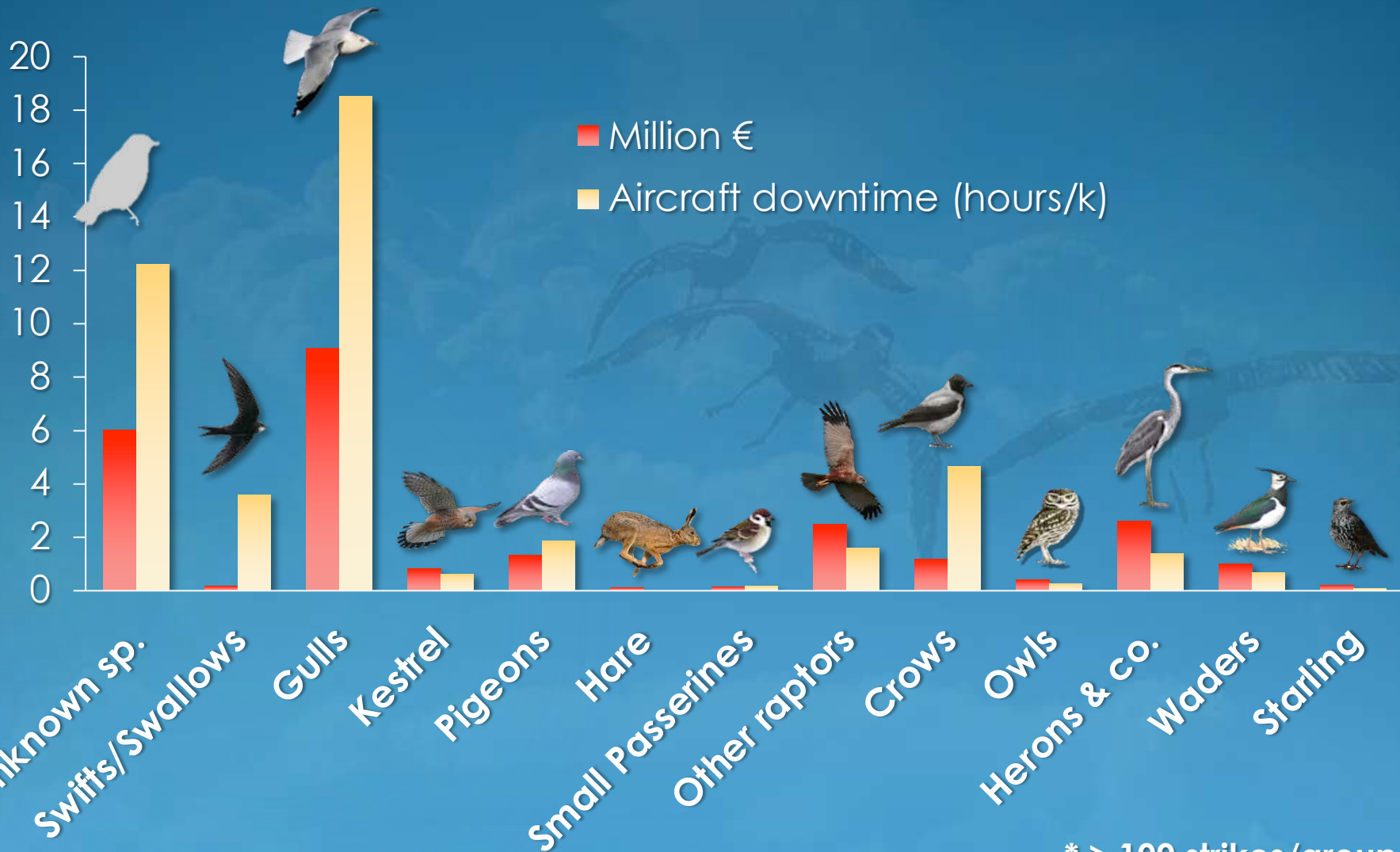
(2006-2021)

Struck parts of the aircraft N = 7,890



# Cost of wildlife strike in Italy (simulation) \*

Years 2006-2021

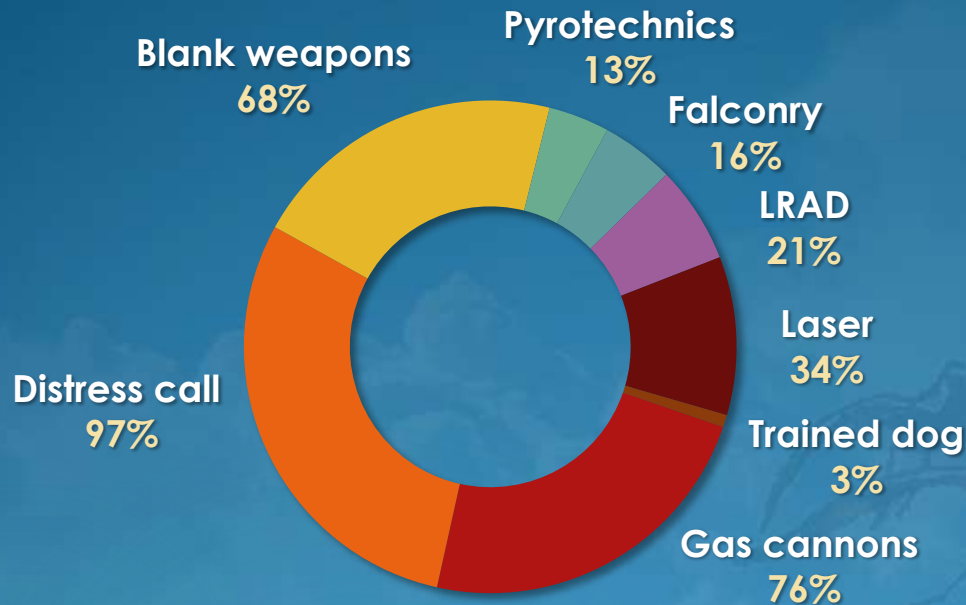


\* > 100 strikes/group





# Active deterrent systems at Italian airports 2021



# Passive deterrent systems at Italian airports 2021

- Tall/poor grass policy and night mowing - 61%
- Canals and open water covering - 20%
- Buildings protection with nets/pins - 16%
- Insecticides/rodenticides - 26%
- Cutting of attractive trees and hedges - 29%
- Capture and/or translocation of fauna - 24%
- Absence of attractive crops - 100%





# The Birdstrike Risk Index (BRI2)

Soldatini et al. (2011) Wildlife Strike Risk Assessment in Several Italian Airports: Lessons from BRI and a New Methodology Implementation. *PLoS ONE* 6(12): e28920.



The historical risk associated to a species, or Group Factor ( $GF_i$ )



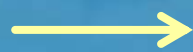
$$GF_i = \overline{W}_i \cdot Ag_i \cdot \frac{BS_i}{TFN} \cdot EOF_i^{95}$$

The actual Group Specific Risk ( $GSR_i$ )



$$GSR_i = \frac{GF_i}{\sum_{i=1,N} GF_i} \cdot DB_i$$

The **BRI** (version 2)



$$BRI2 = \left( \frac{\sum_{i=1,N} GSR_i \cdot DF}{TFN} \right)$$

- $i$  indicates a species group;
- $N$  is the group total;
- $\overline{W}$  the average weight of the  $i^{\text{th}}$  group;
- $Ag$  the group specific aggregation index;
- $BS$  is the mean value of impacts recorded per year;
- $TFN$  is the mean value of flights per year;
- $\overline{W}$  is its monthly average;
- $DB_i$  represents the mean daily number of birds of the  $i^{\text{th}}$  group;
- $DF$  is the mean daily flight traffic calculated on a monthly basis;
- $EOF^{95}_i$  is the 95<sup>th</sup> percentile of the EOF (Effect On Flight).

# Trend of Birdstrike Risk Index

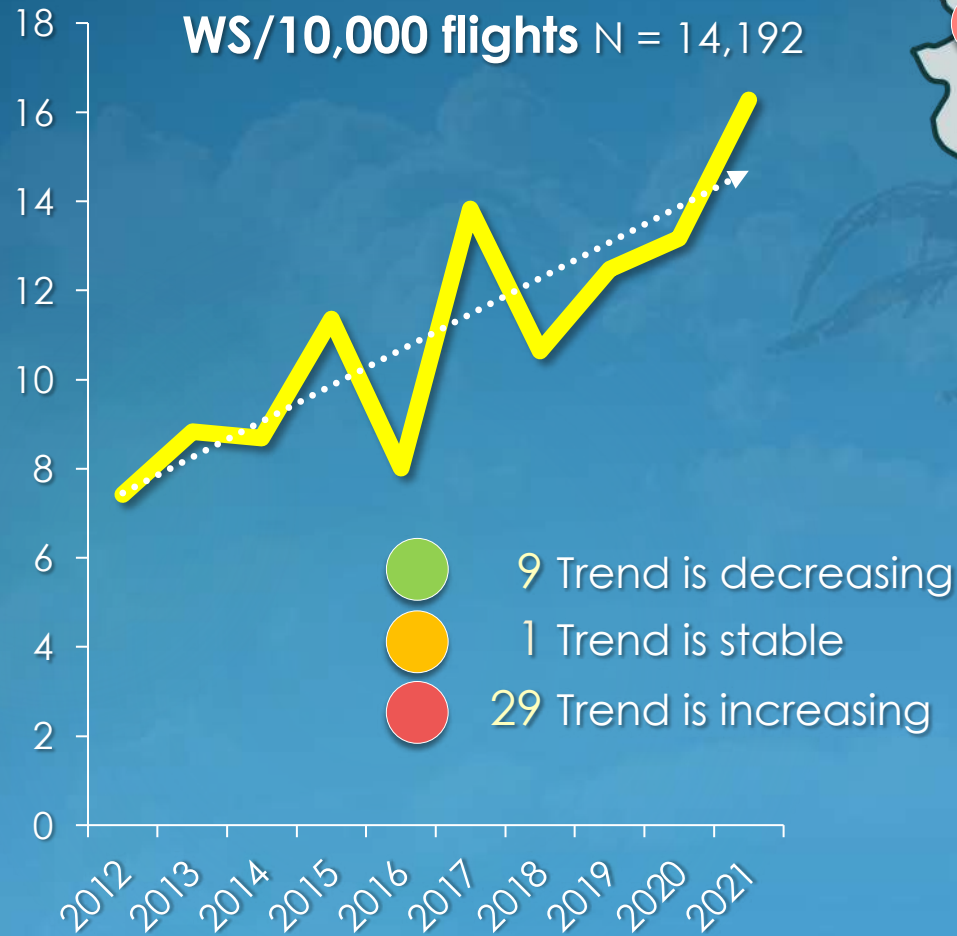
2012-2021

**39** Operative aerodromes

- 21 Trend is decreasing
- 18 Trend is stable
- 0 Trend is increasing



# Trend of wildlife strike occurrence 2012-2021



# Trend of Birdstrike Risk Index

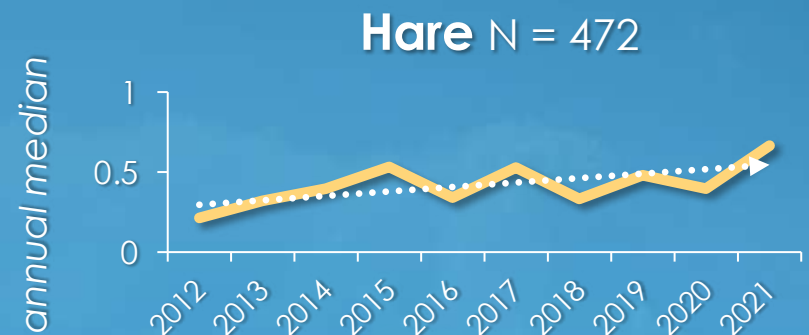
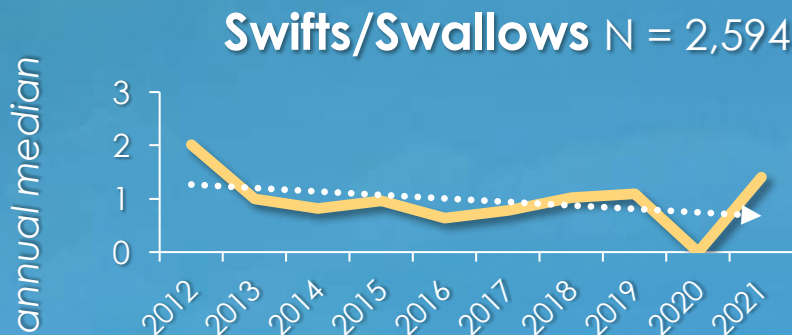
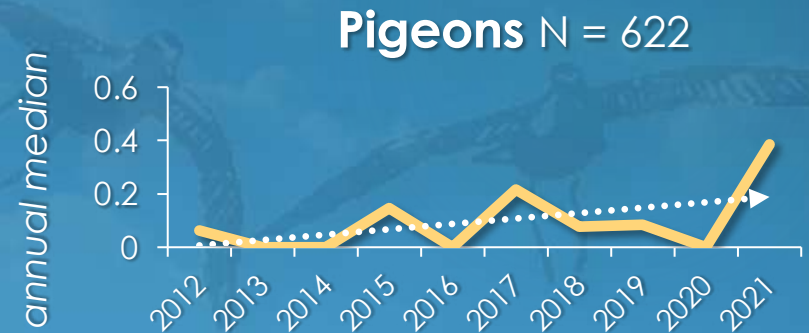
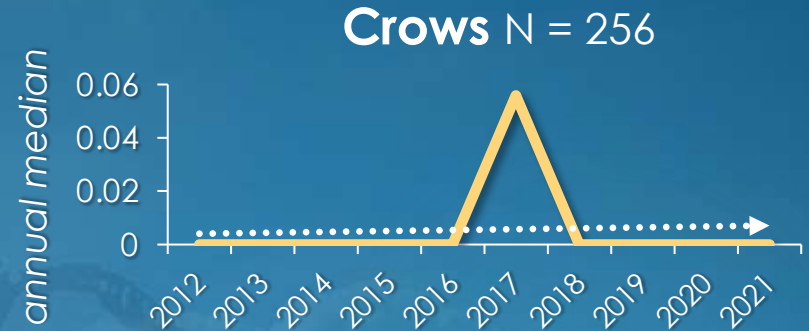
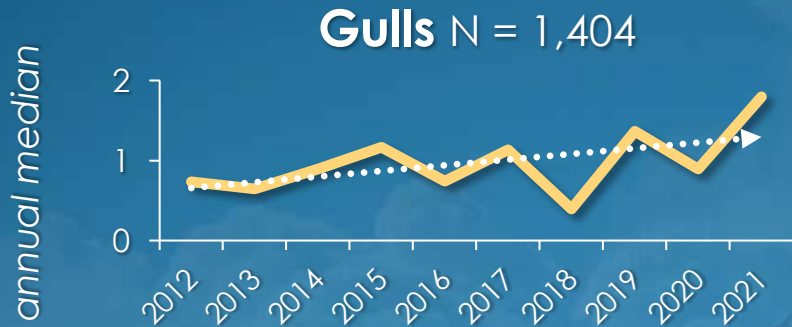
# Trend of WS/10,000 flights

2012-2021



# Trend of wildlife strike occurrence per Group of Species

## WS/10,000 flights 2012-2021



# Trend in wildlife strikes type at Italian Airports

## 2012-2021

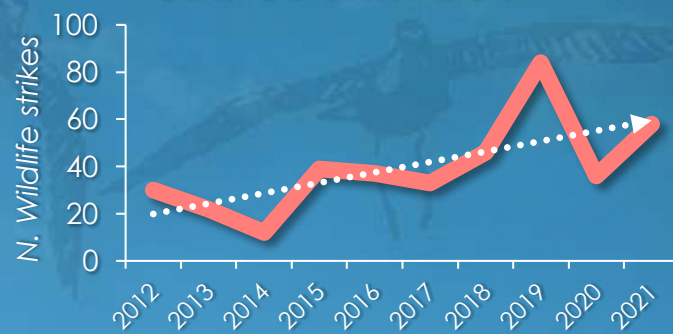
### Strikes with Damage N = 421



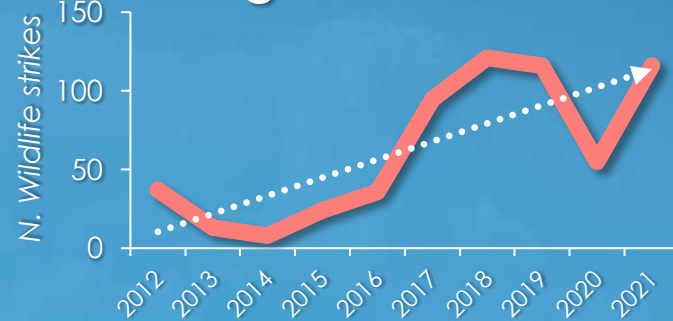
### Multiple Strikes N = 1,144



### Strikes with EOF N = 397



### Ingestions N = 621





# Conclusion

- Wildlife strikes are increasing;
- ...however the associated risk is stable, if not decreasing;
  - The increase of incidents with the most struck species is moderate/absent;
  - The trend of strikes with damage is absolutely stable;

A cautious optimism is legitimate, but...

**always continue to monitor!**





**Thank you for your attention**  
**ขอขอบคุณสำหรับความสนใจของคุณ**

