

# Bird Strike Analysis 2000 - 2011



By  
SONIYA CHANDRAN

# CONTENTS

**01**

**Introduction**

**1.1**

**Impact of Bird strike**

**02**

**Problem Statement**

**03**

**About the Data**

**04**

**List of Case Studies**

**05**

**KPIs Extracted**

**06**

**Visuals depicting the Analysis**

**07**

**Bird Strike Analysis Dashboard**

**08**

**Impressions**

# Introduction

Bird strike refers to a collision between an airborne animal and an aircraft. Bird strikes can have various impacts depending on factors such as the size and speed of the bird, as well as the location of the strike on the aircraft. Most accidents occur when a bird (or group of birds) collides with the windscreen or is sucked into the engine of jet aircraft. This can occur during takeoff, landing, or during flight. Bird strikes can be considered as a severe threat to the aircraft potentially causing damage to the aircraft's structure, engines, or other critical components.

To mitigate these risks, airports and aviation authorities employ various measures, such as wildlife management programs and technological solutions, to reduce the likelihood of bird strikes. Bird strike is also sometimes referred to as bird hit or Bird Aircraft Strike Hazard (BASH). The term is also used for bird deaths resulting from collisions with structures, such as power lines, towers and wind turbines.



# 1.1

## Impact of Bird strike

**Structural Damage:** Bird strikes can cause damage to the aircraft's structure, including the fuselage, wings, and control surfaces. This damage may require extensive repairs and can lead to costly downtime for the aircraft.

**Engine Damage:** One of the most significant concerns with bird strikes is damage to the aircraft's engines. Birds can be ingested into jet engines, causing engine failure or reduced performance. Even smaller birds can cause significant damage to engine components, necessitating inspection and potentially costly repairs.

**Safety Risks:** Bird strikes pose a safety risk to passengers and crew onboard the aircraft. In some cases, bird strikes have led to emergency landings or accidents resulting in injuries or fatalities.

**Financial Costs:** Bird strikes can result in significant financial costs for airlines, including repair expenses, operational disruptions, and potential legal liabilities.

**Environmental Impact:** Bird strikes can also have environmental consequences, particularly if the aircraft needs to jettison fuel or if there are concerns about the impact of debris resulting from the strike.

## Problem Statement

Transport and communication are in the crucial domain in the field of analytics. Environmental impacts and safety are, nowadays, two major concerns of the scientific community with respect to transport scenarios and to the ever-growing urban areas. These issues gain more importance due to the increasing amount of vehicles and people. Seeking new solutions is reaching a point where available technologies and artificial intelligence, especially MAS, are being recognized as ways to cope with and tackle these kinds of problems in a distributed and more appropriate way.

Bird Strike is common and can be a significant threat to aircraft safety. For smaller aircraft, significant damage may be caused to the aircraft structure and all aircraft, especially jet-engine ones, are vulnerable to the loss of thrust which can follow the ingestion of birds into engine air intakes. This has resulted in several fatal accidents.

Bird strikes may occur during any phase of flight, but are most likely during the take-off, initial climb, approach and landing phases due to the greater numbers of birds in flight at lower levels.



## About the Data

The analysis is conducted on the data collected on bird strikes by FAA between 2000 and 2011

- The data is collection over the time period of 2000-2011
- There are 25558 Records and 26 features
- **Null values are omitted during the visualisation**
- Out of these 26 ,some columns shows Null values, count of the same as follows;
  - ✓ 129 Null values: Aircraft: Type , Airport: Name ,Altitude bin, Wildlife: Number struck , Effect: Impact to flight , Effect: Impact to flight , Flight Date ,Aircraft: Airline/Operator, When: Phase of flight, Wildlife: Size ,Pilot warned of birds or wildlife? ,Feet above ground, Is Aircraft Large?
  - ✓ 267 Null values: Aircraft: Number of engines?
  - ✓ 449 Null values: Origin state
  - ✓ 4771 Null values: Remarks

## List of Case Studies

- Visuals Depicting the Number of Bird Strikes
- Yearly Analysis & Bird Strikes in the US
- Top 10 US Airlines in terms of having encountered bird strikes
- Airports with most incidents of bird strikes – Top 50
- Yearly Cost Incurred due to Bird Strikes:
- When do most bird strikes occur?
- Altitude of aeroplanes at the time of strike
- Phase of flight at the time of the strike.
- Average Altitude of the aeroplanes in different phases at the time of strike
- Effect of Bird Strikes & Impact on Flight
- Effect of Strike at Different Altitude
- Were Pilots Informed? & Prior Warning and Effect of Strike Relation



05

## KPIs Extracted

**25429**

**Total Bird Strikes**

**\$14,22,90,445**

**Total Cost**

**27**

**Total Injuries**

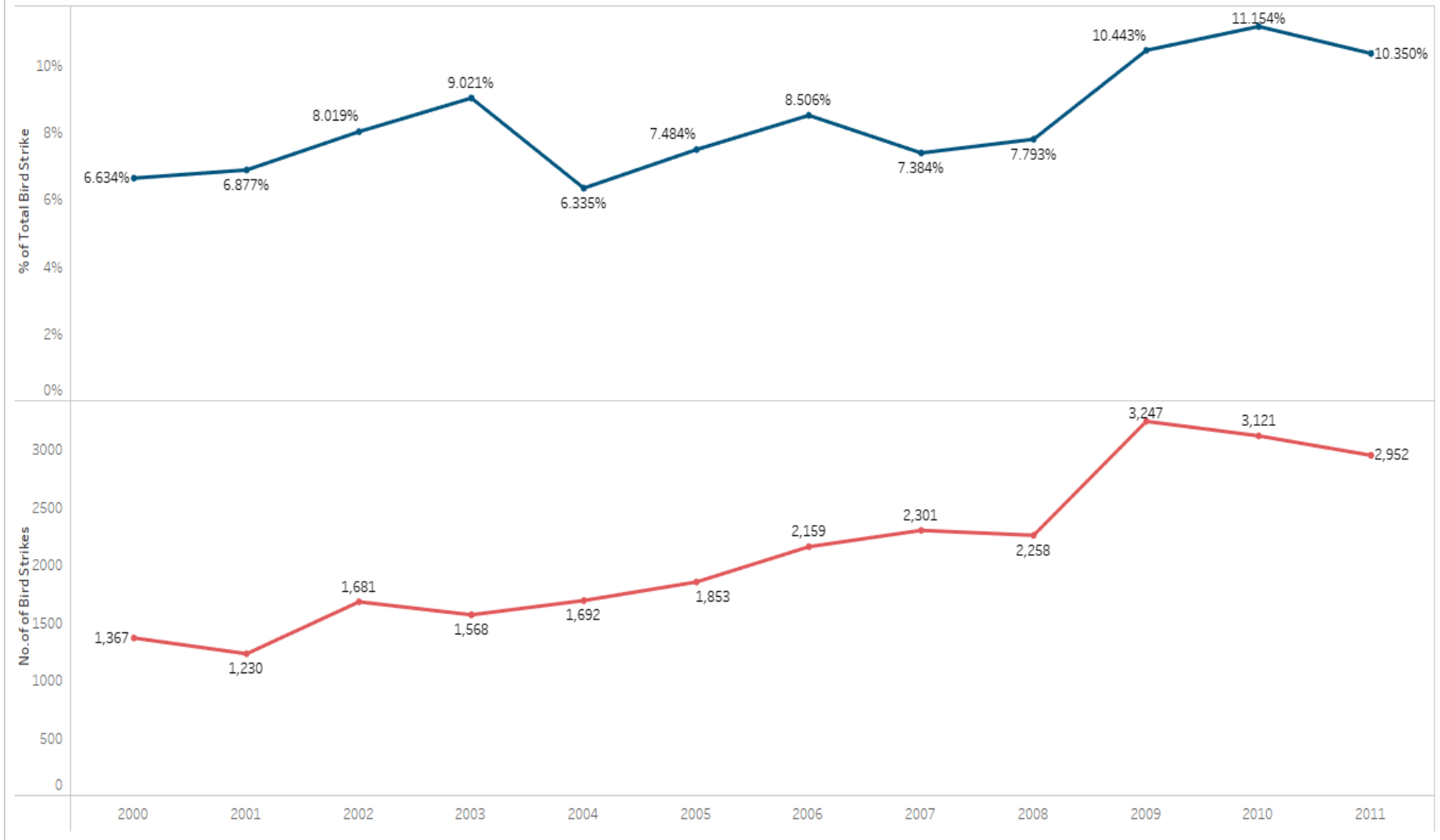
**292**

**Number of Airports**

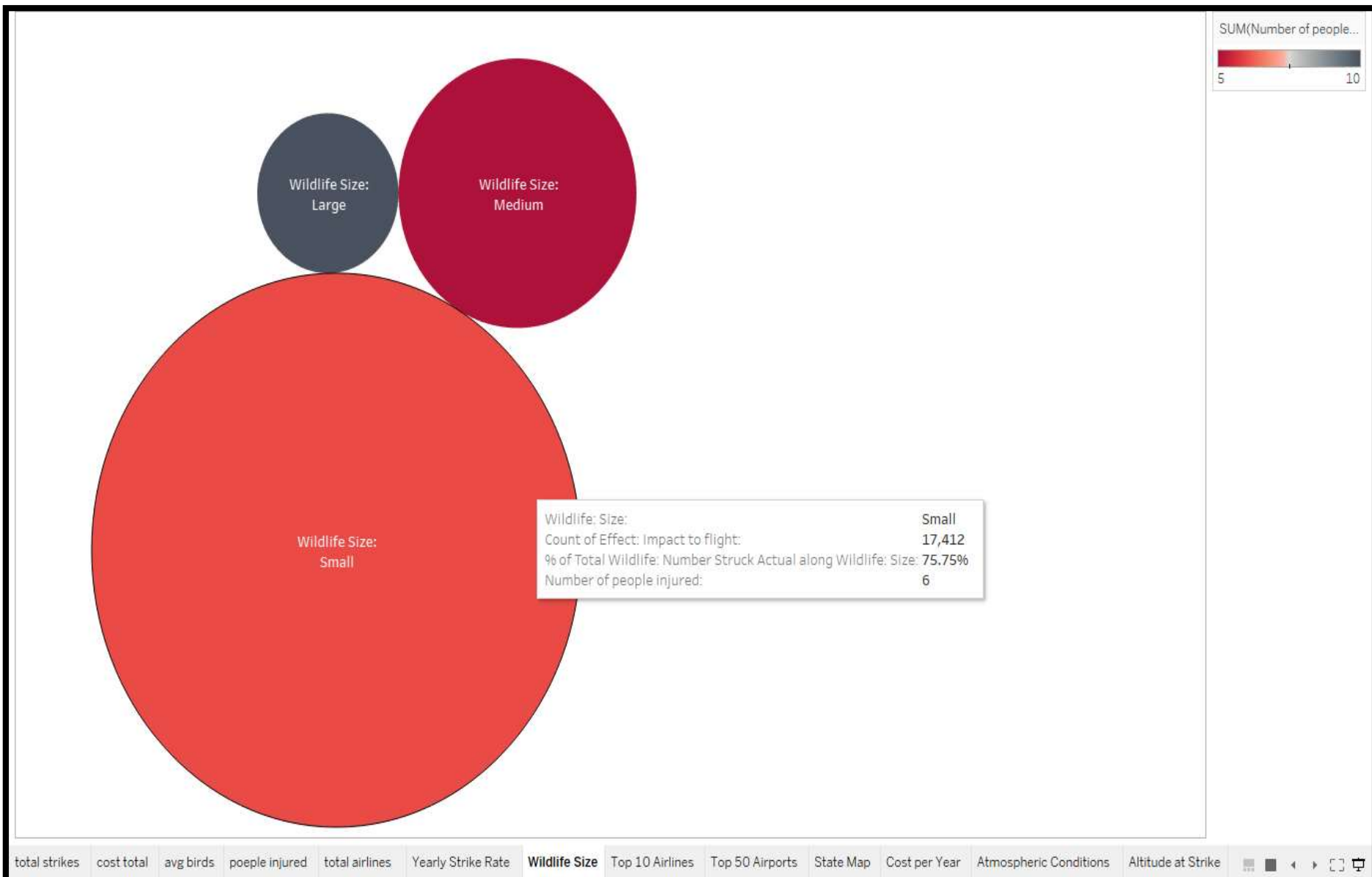


# Yearly Analysis & Strike Rate in the US

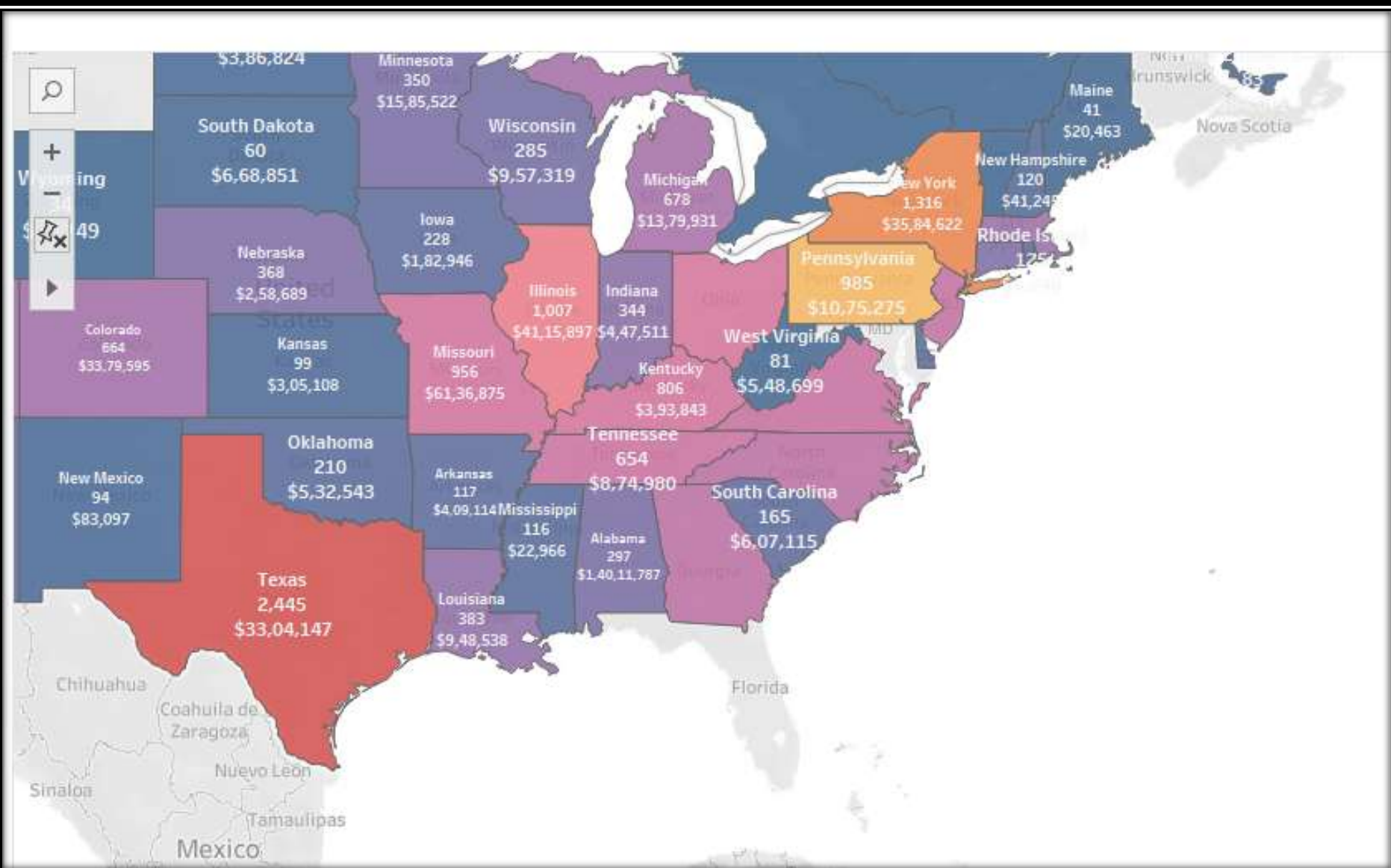
06



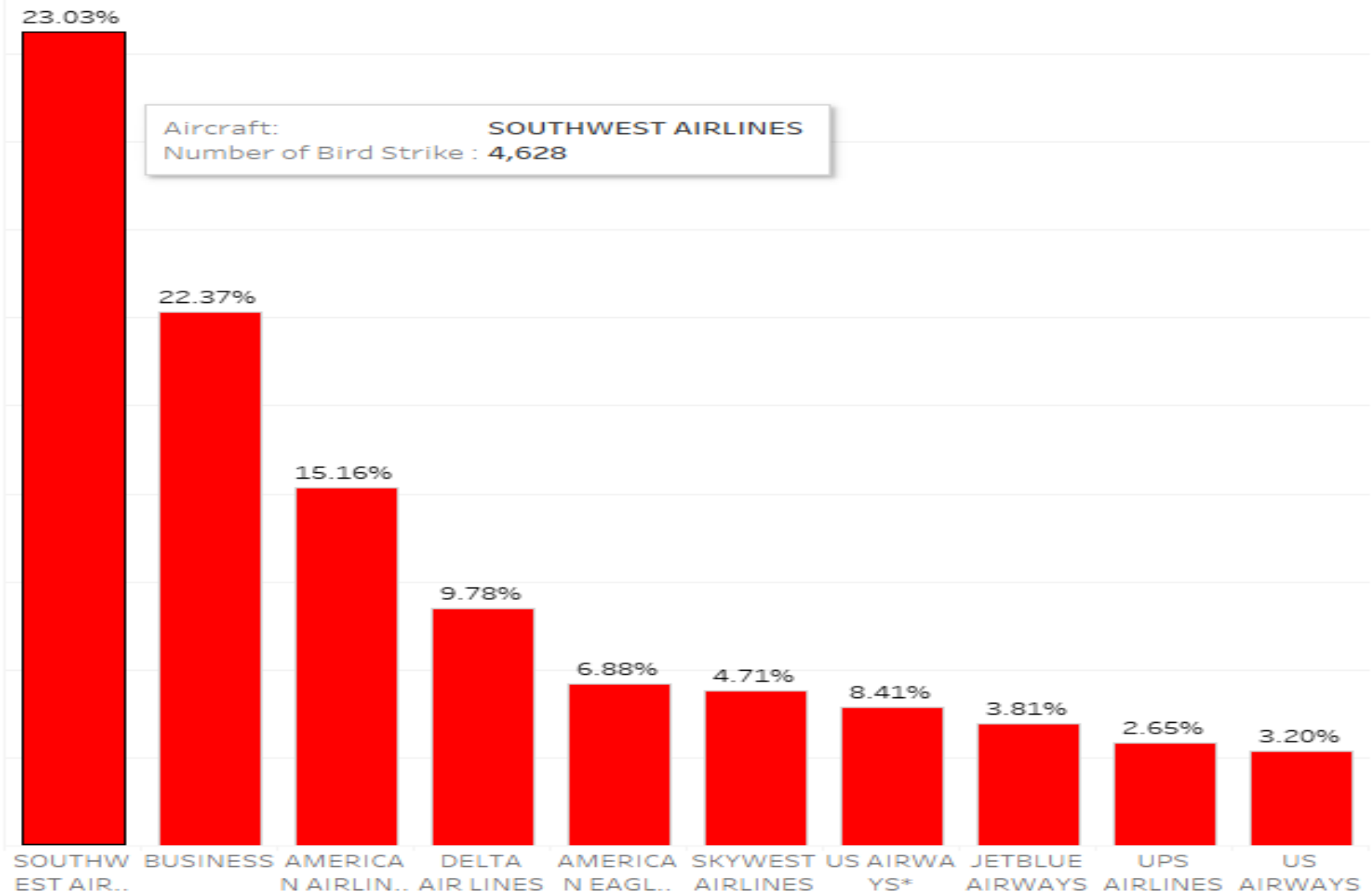
# Number of bird strikes and Injuries analyzed across Bird size



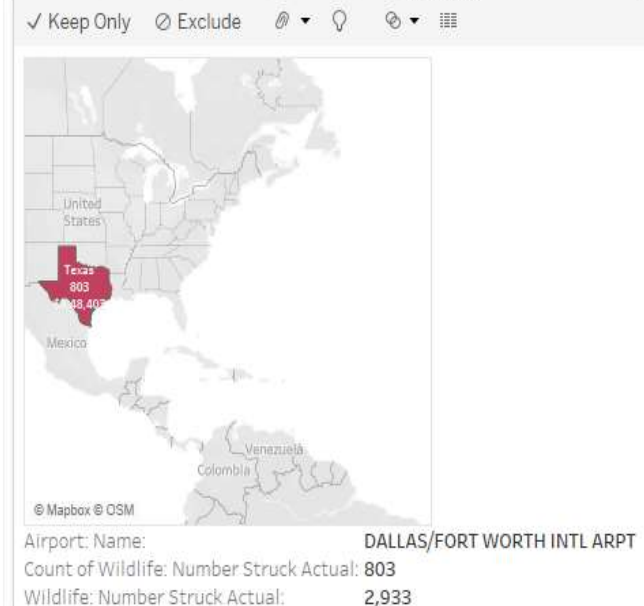
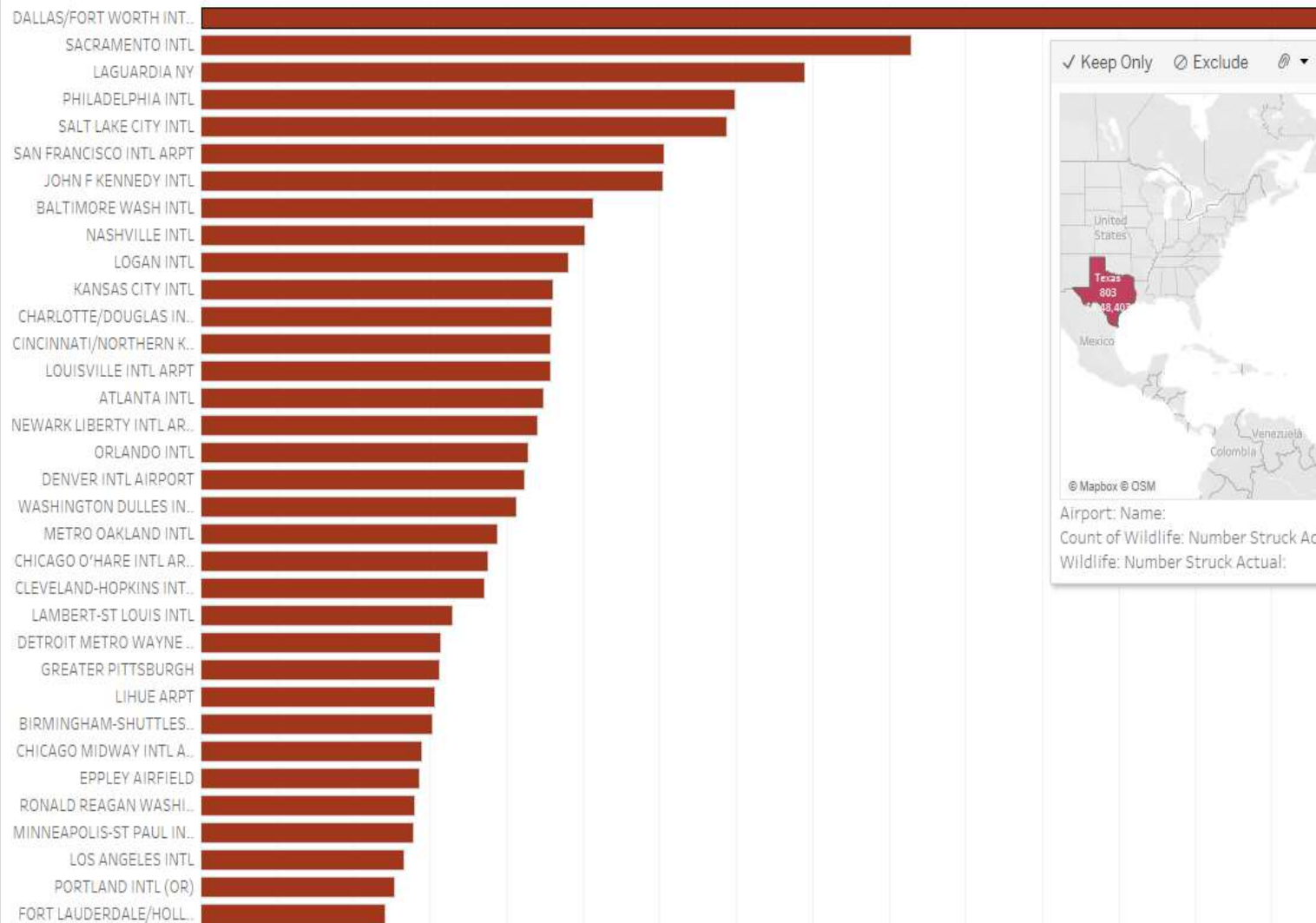
# US states encountered Bird strikes



# Top 10 Airlines affected by Strikes

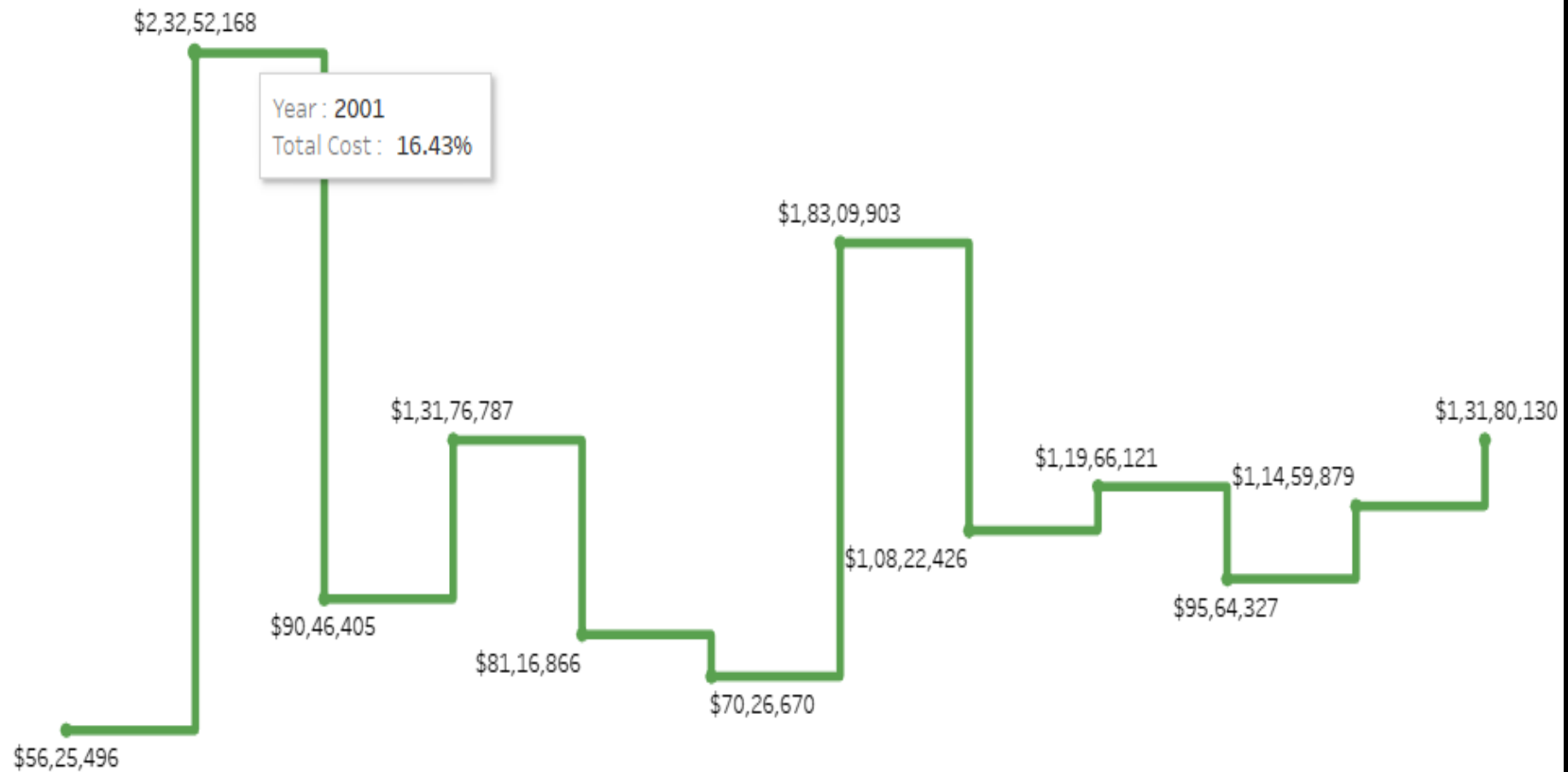


# Top 50 Airports with corresponding strikes

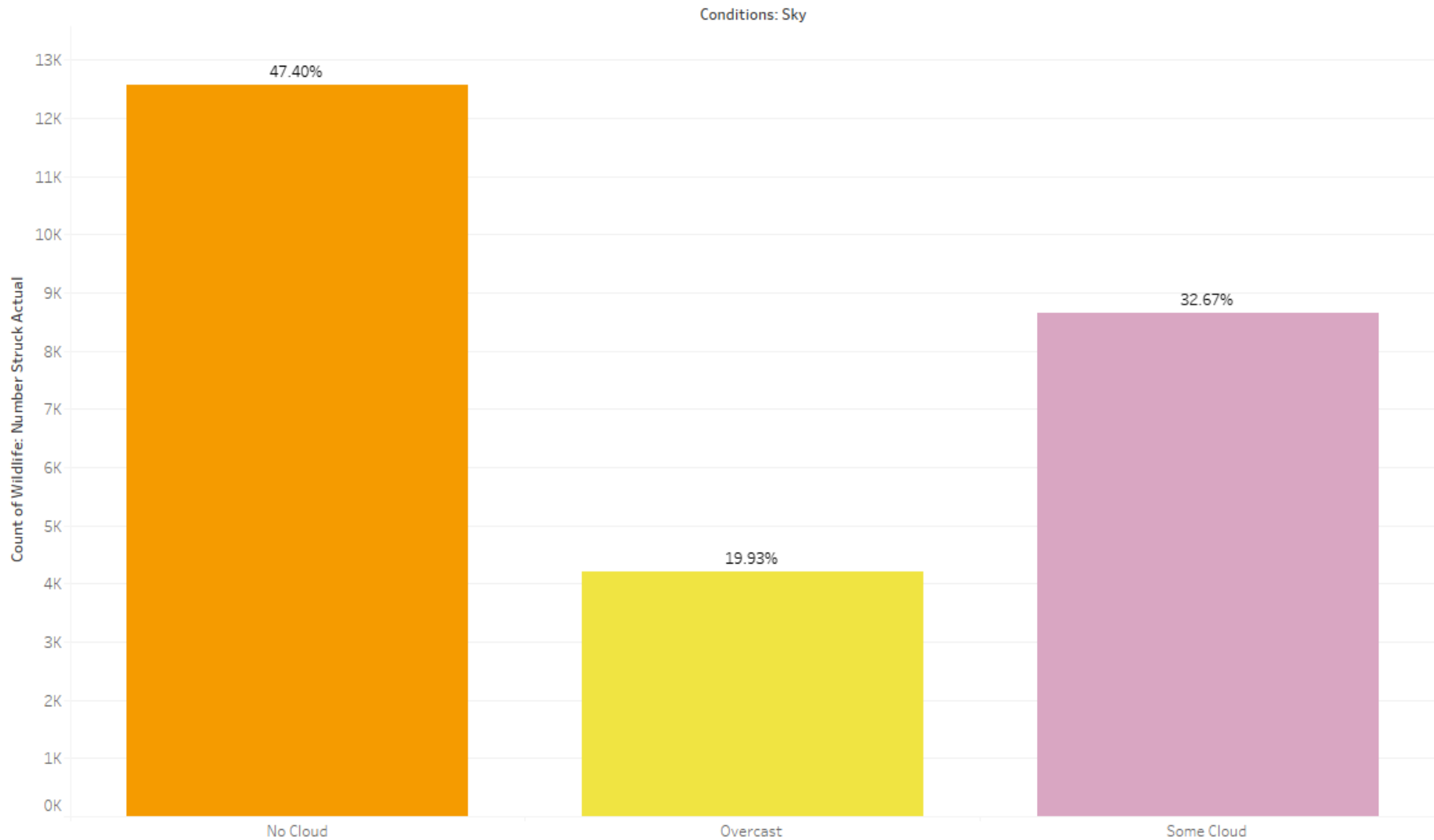




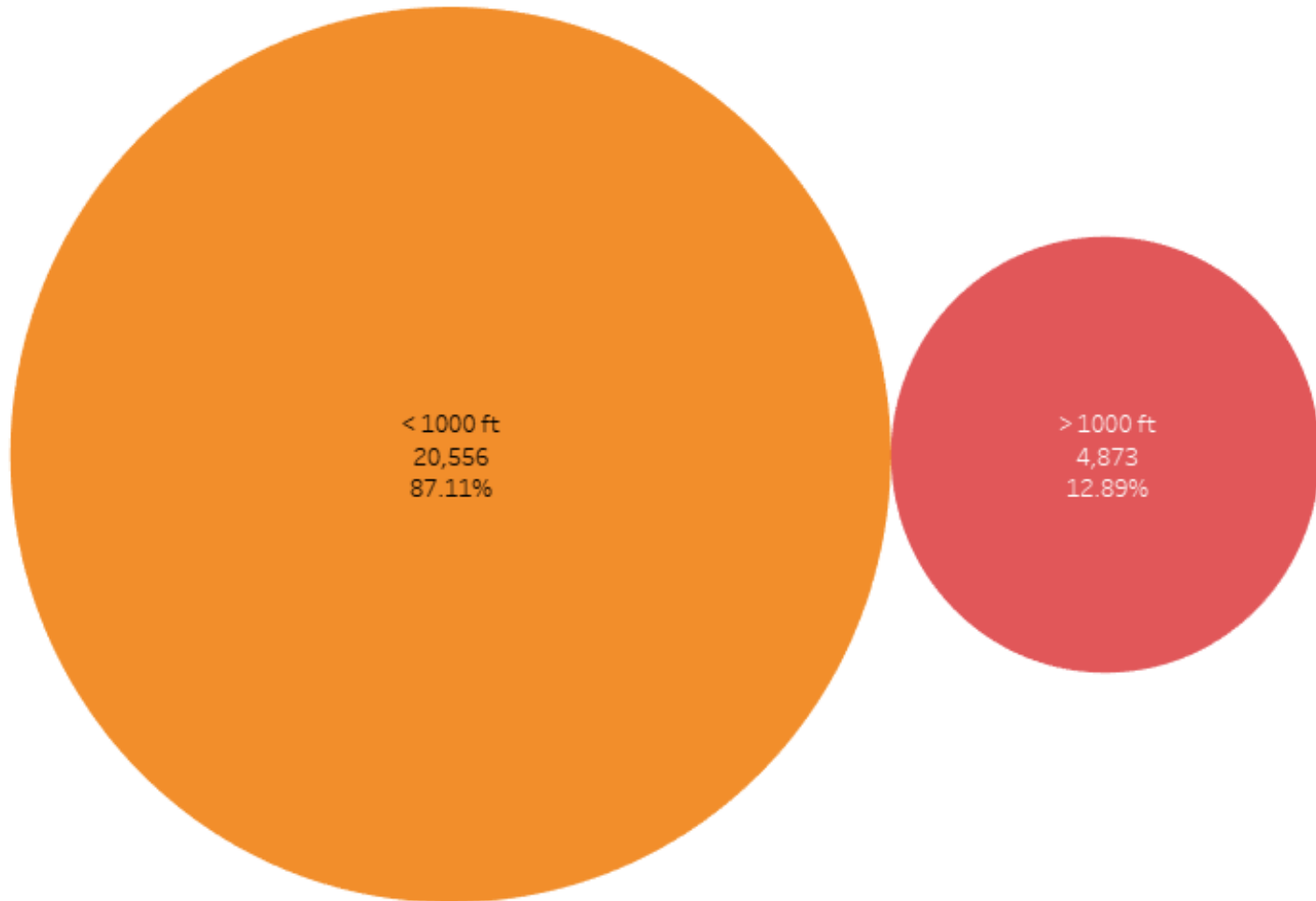
# Cost Incurred per year



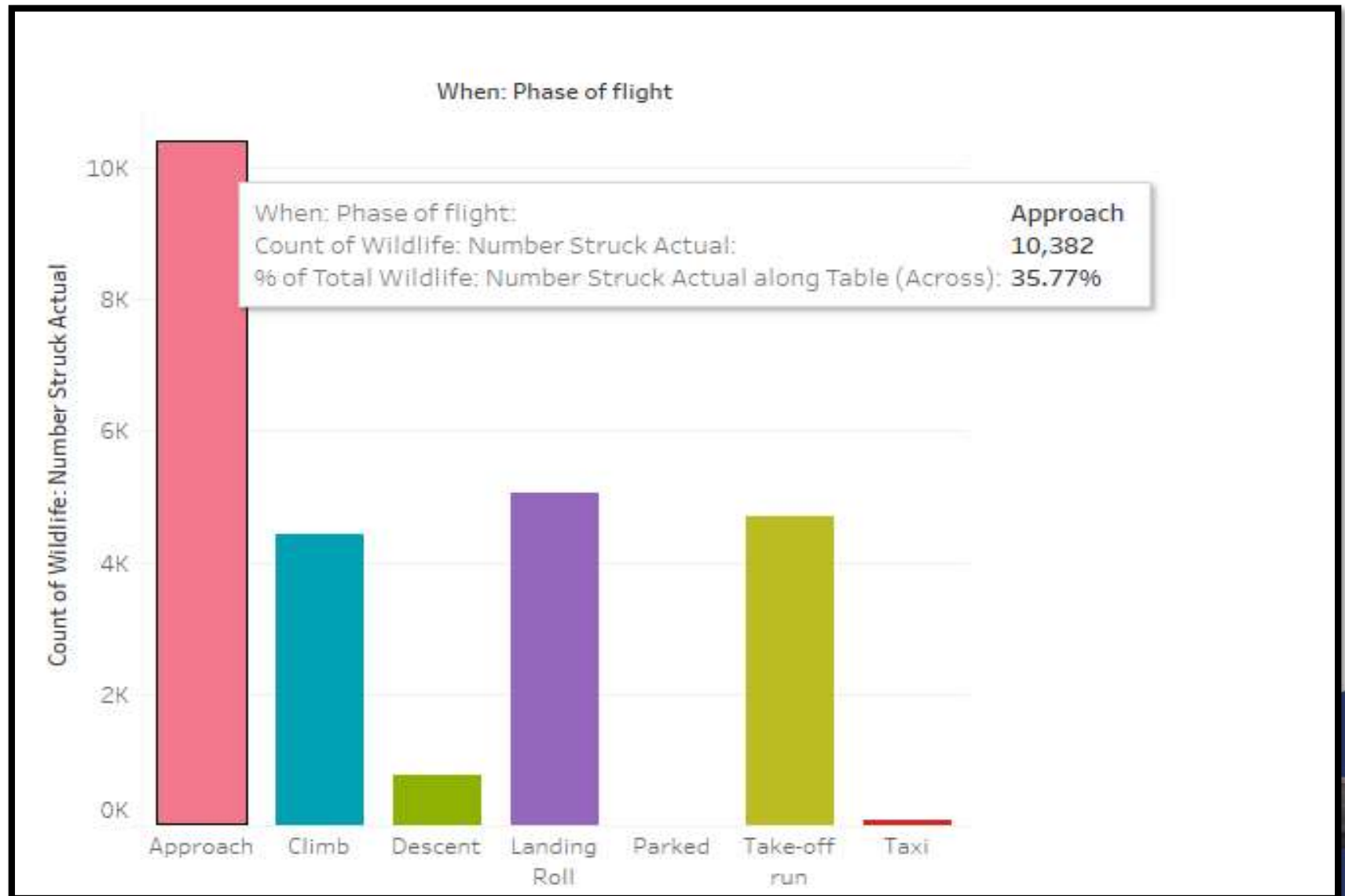
# When do most bird strikes occur?



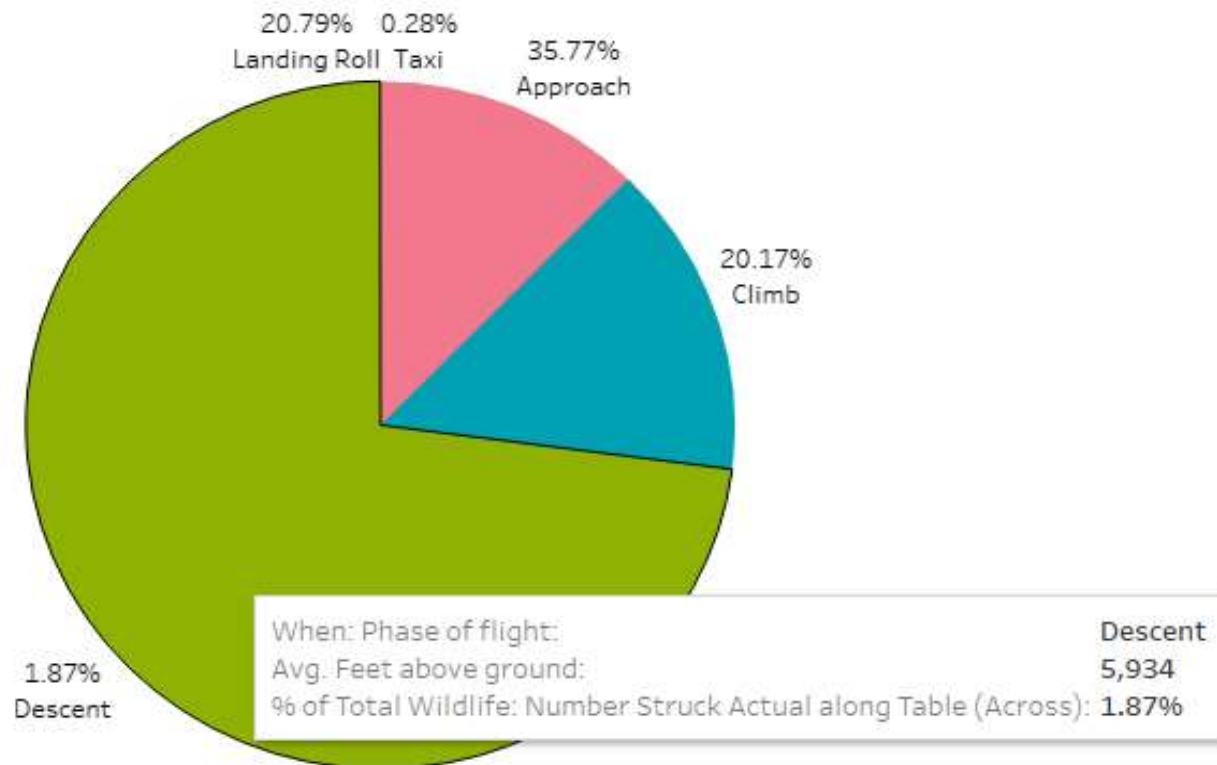
# Altitude of Aeroplanes at the time of strike



# Phase of flight at the time of the strike.

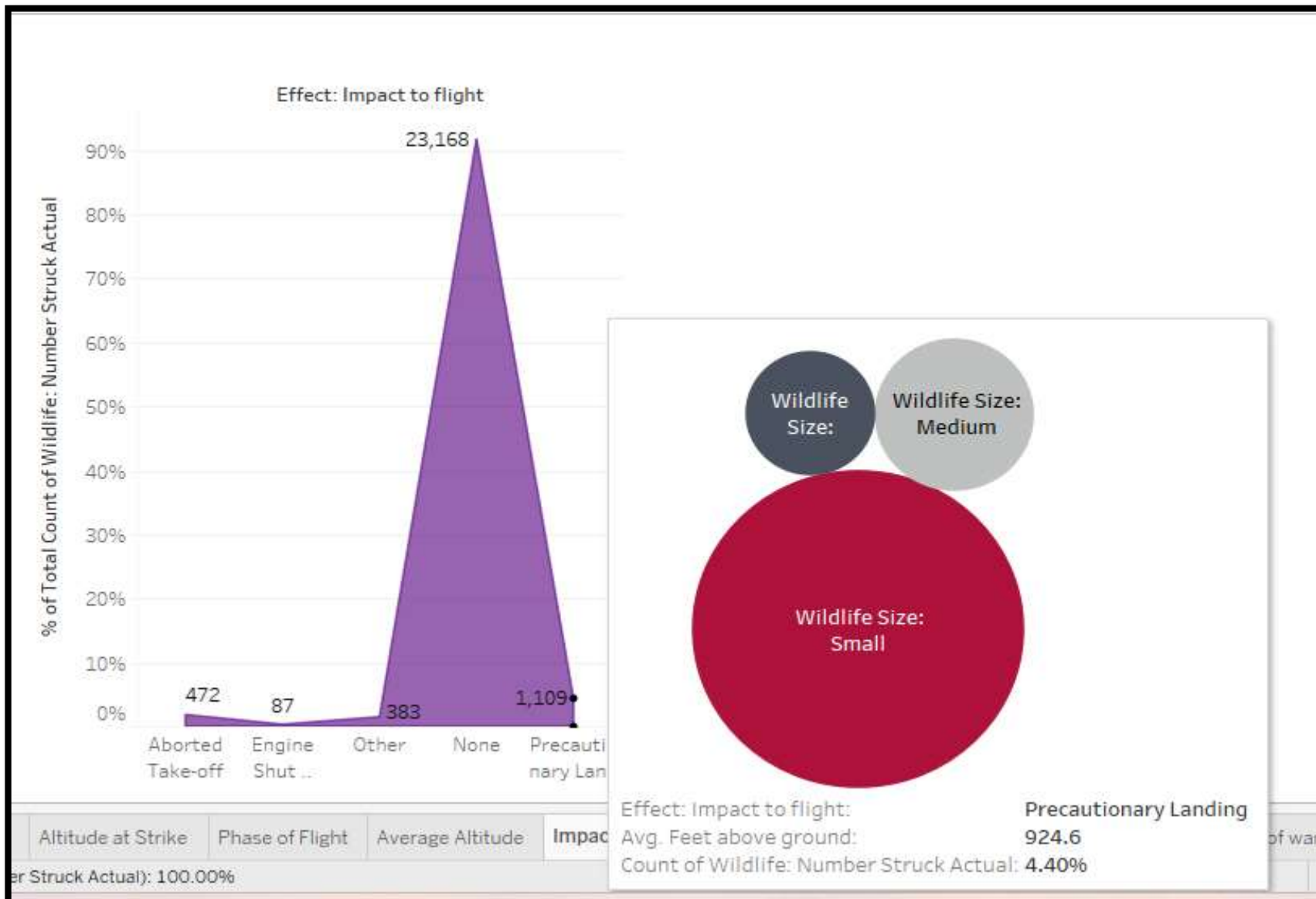


# Average Altitude of the aeroplanes in different phases at the time of strike

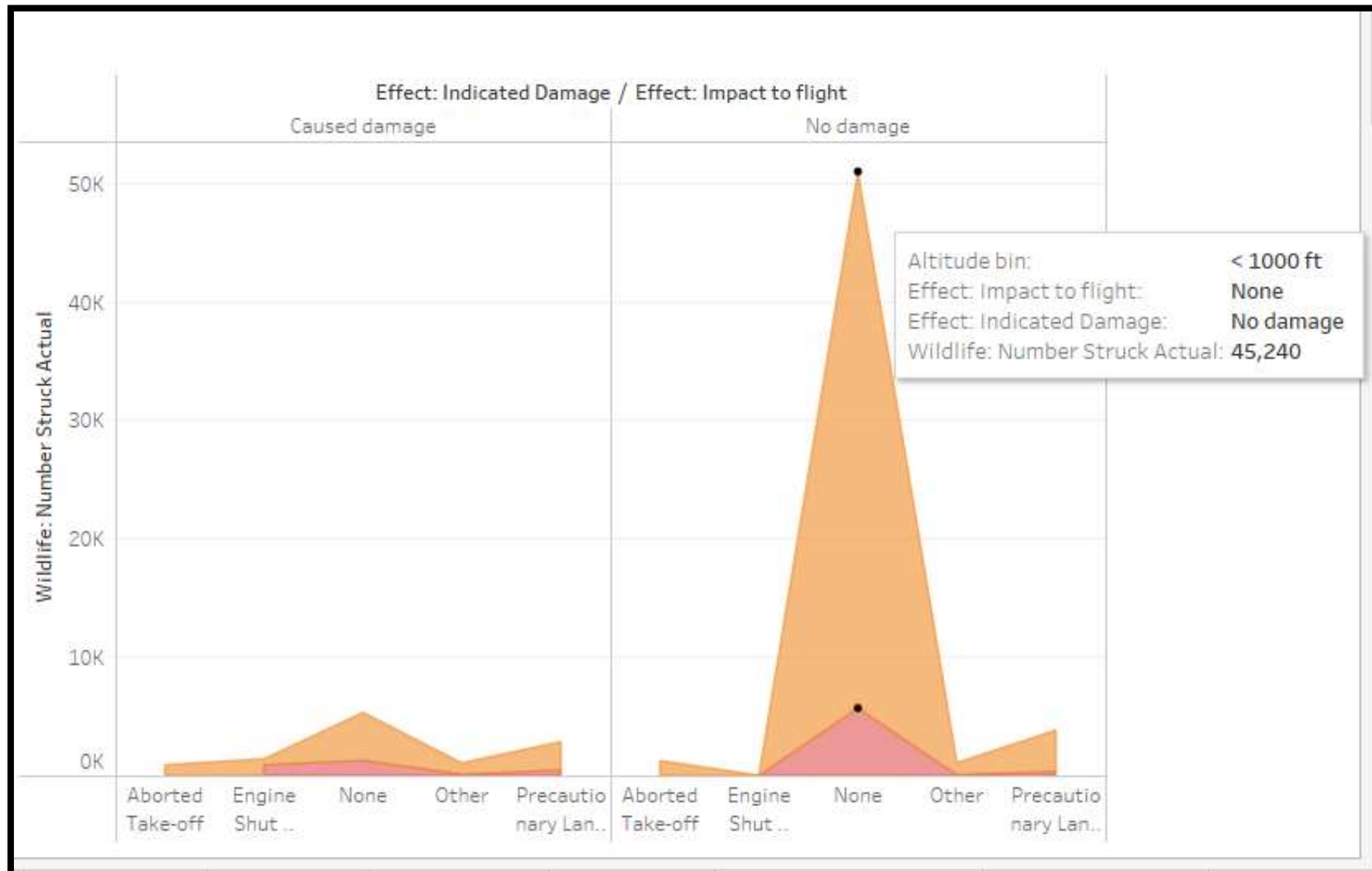




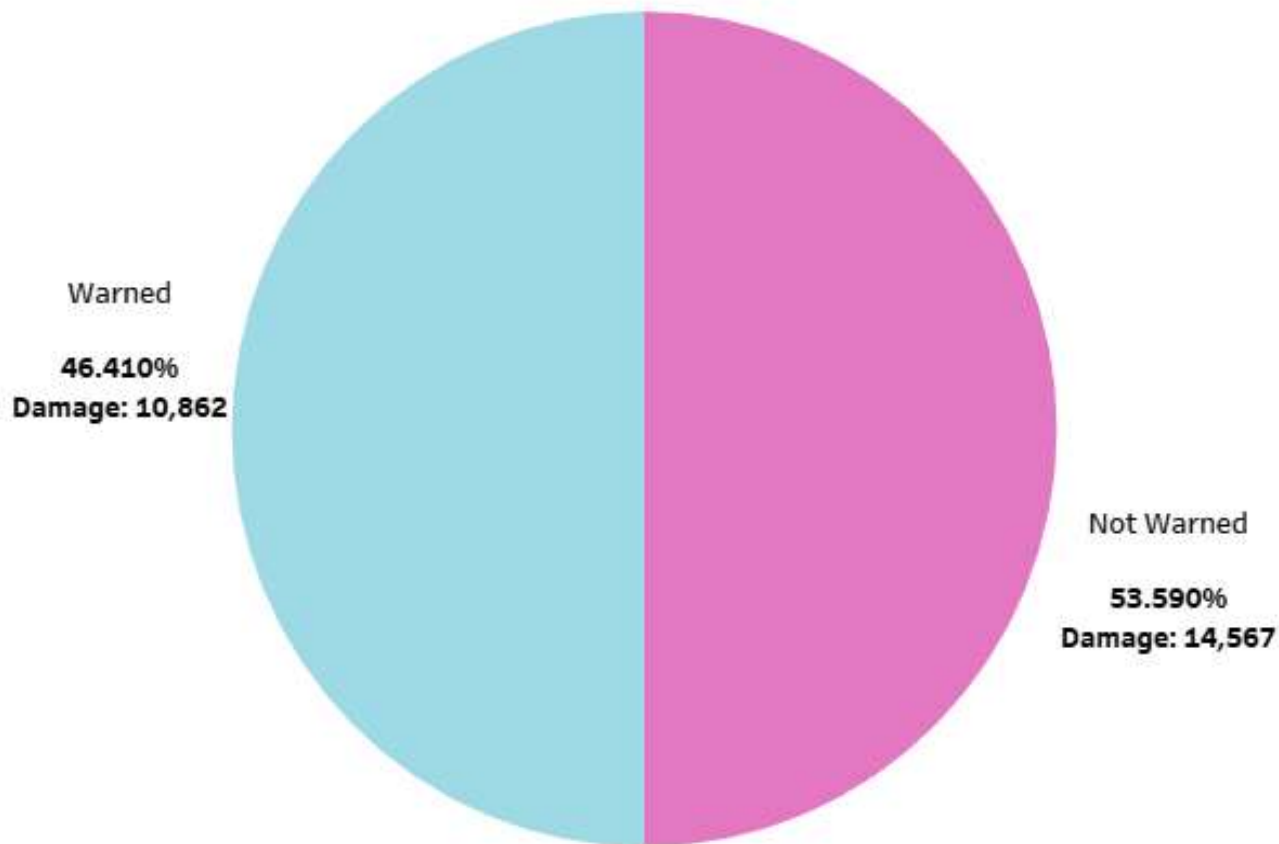
# Effect of Bird Strikes & Impact on Flight



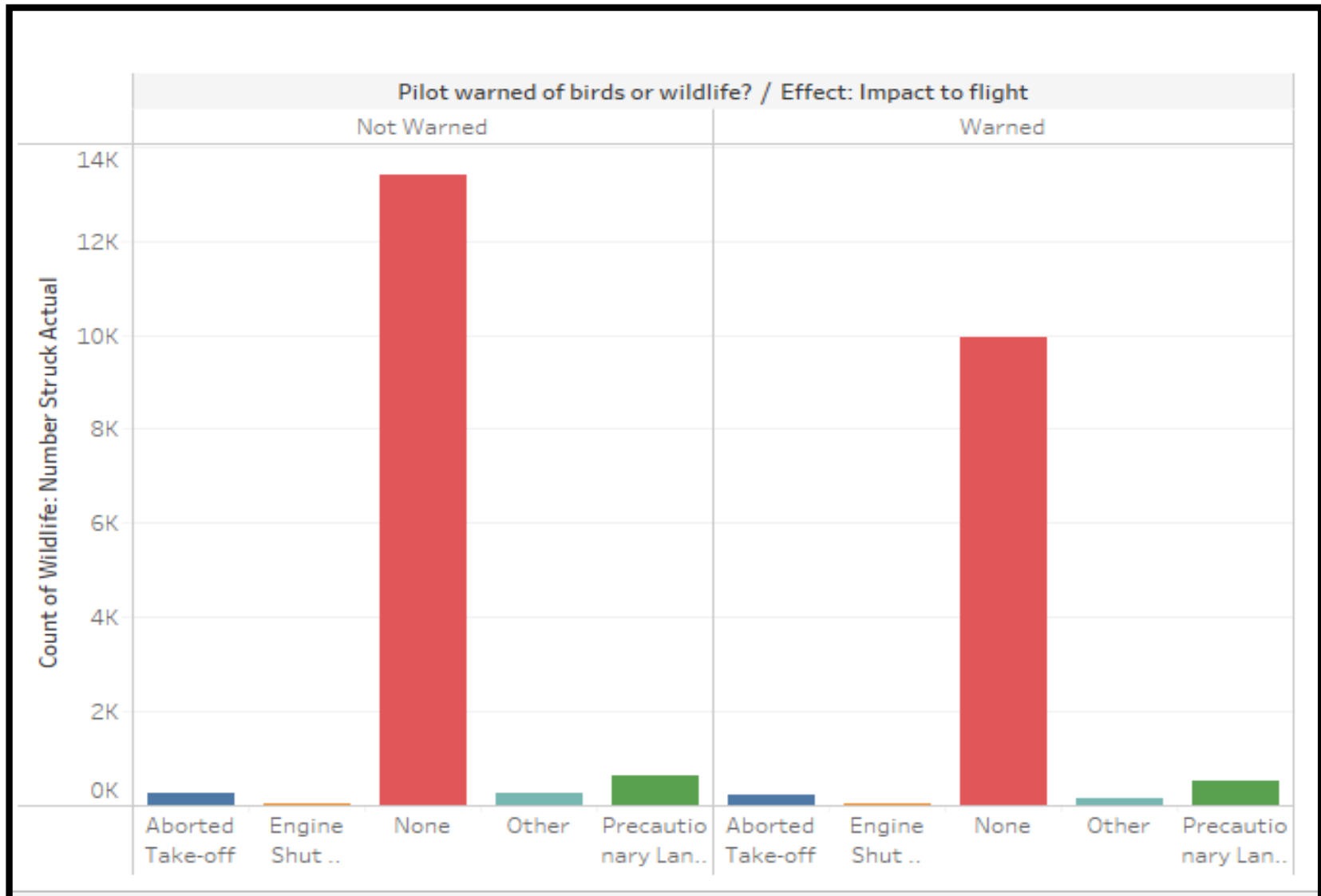
# Effect of Bird Strikes & Impact on Flight



# Were Pilots Informed: Prior Warning and Effect of Strike

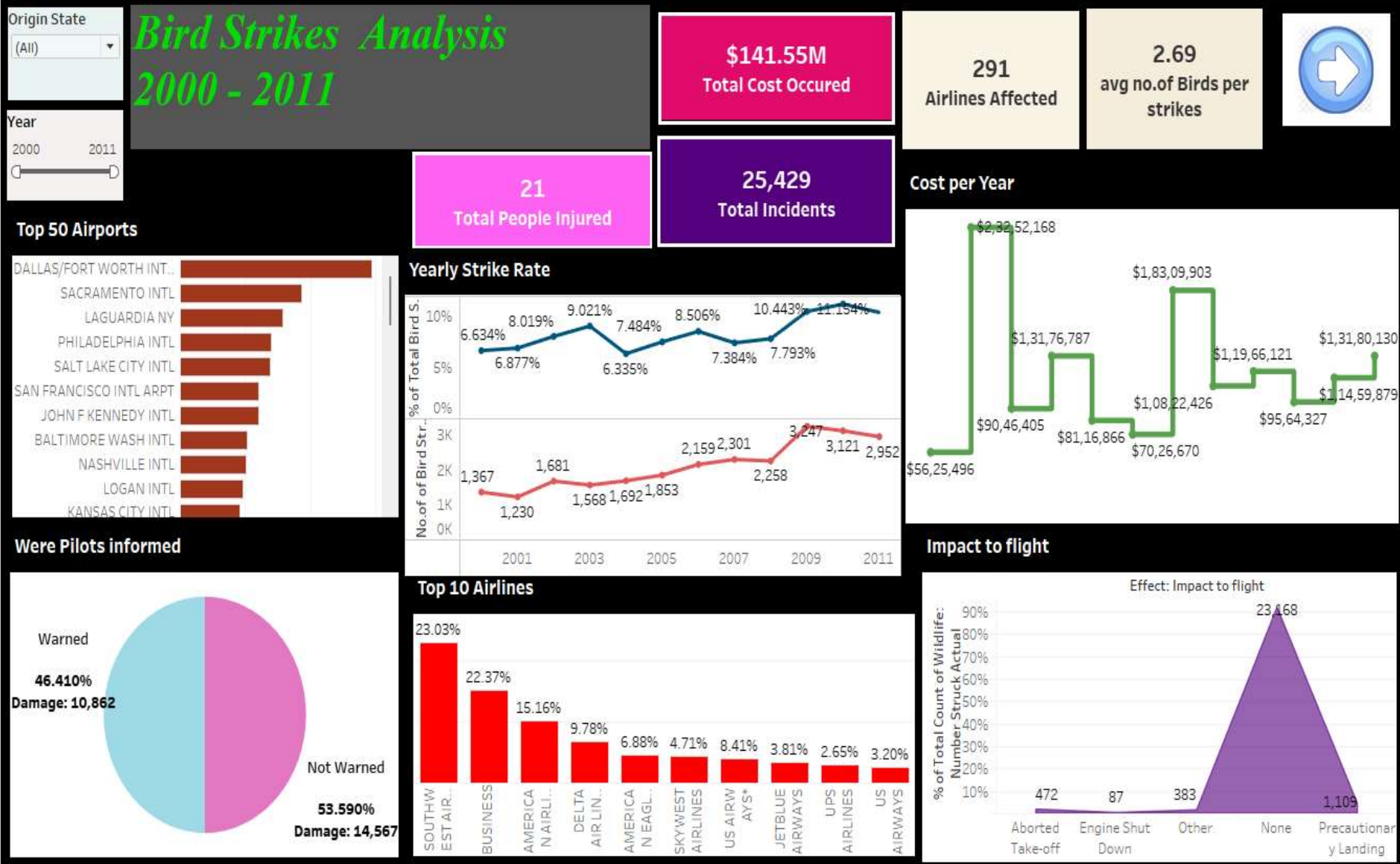


# Were Pilots Informed: Prior Warning and Effect of Strike



# Bird Strike Analysis -Dashboard

07





# Bird Strike Analysis –Dashboard page 2

## Bird Strike Analysis 2000 - 2011

Conditions: Sky

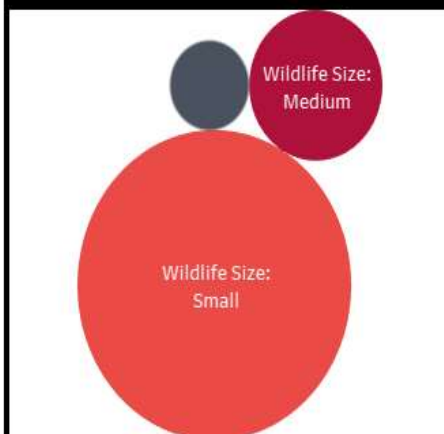
(All)

Pilot warned ?

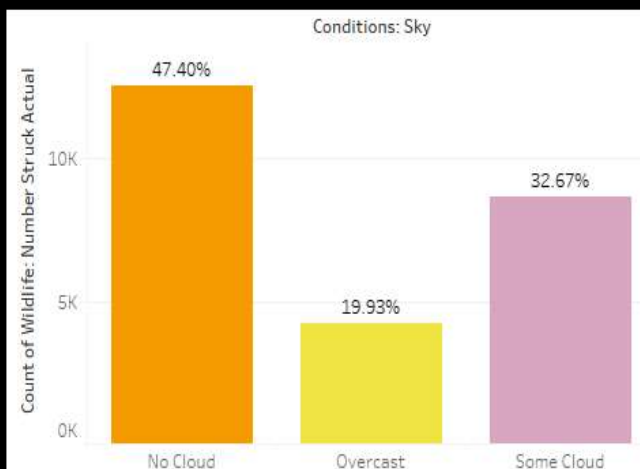
(All)



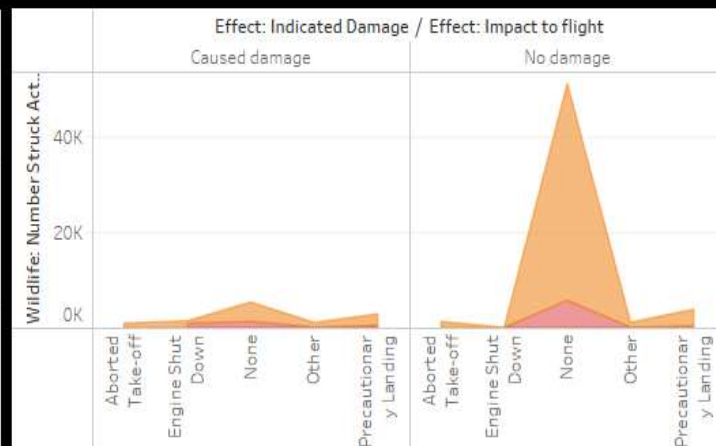
### Wildlife Size



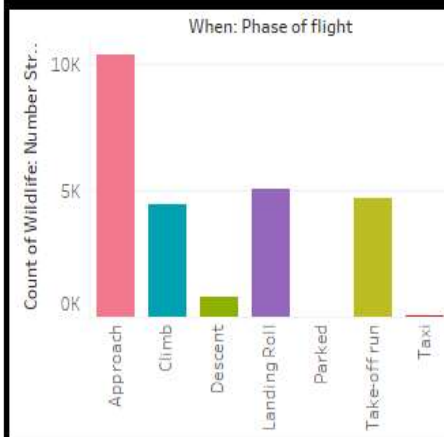
### Atmospheric Conditions



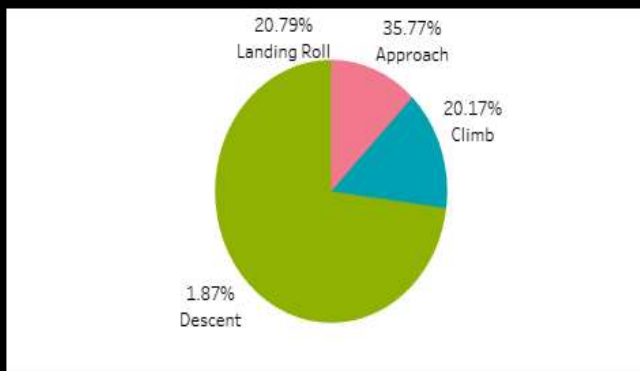
### Effect at Different altitude



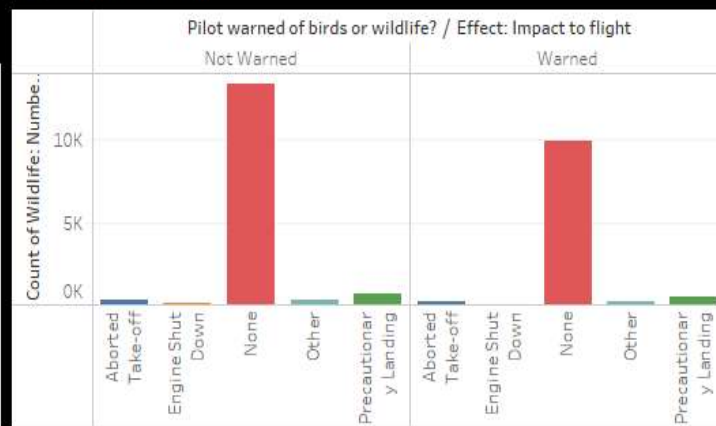
### Phase of Flight



### Average Altitude



### Impact of warning



# Impressions

- ❖ Bird strike rate shows an upward trend during the years. 2009 and 2010 are the years with highest strikes rates.
- ❖ Considering the Cost occurred due to damages, in 2001 highest damage happened Around \$2,32,52,168 and lowest in 2000
- ❖ Out of the total, 75.75% of attacks were caused of Small Birds. Attacks caused by Large wildlife are comparatively lower.
- ❖ Texas ranks first in number of bird strikes cost incurred
- ❖ 86% of accidents happen in < 1000 ft and 35.7 % in the phase of Approach
- ❖ Considering the atmospheric conditions, the Bird strikes stands high even if there is no cloud
- ❖ Only 4.4% of strikes results in a Precautionary landing and 91.8% has not affected the flight
- ❖ 53.6 % of time the pilots are not prior warned of the bird strikes resulting in injured passengers
- ❖ The difference in damage with regarding the warning is 3705



THANK YOU