

Visualisation of Bird Strikes by an Aircraft (2000–2011)

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Problem Statement

Bird strikes are collisions between birds and aircraft during flight or on takeoff/landing. These incidents pose significant safety risks, especially during low-altitude phases like takeoff and landing, and can cause severe damage to aircraft, including engine failures. This repository analyzes data collected by the FAA from 2000 to 2011 to identify trends, risks, and recommendations for mitigating bird strikes.



Key Questions

01.

General Overview

- How many bird strikes were recorded between 2000 and 2011?
- What is the yearly trend in bird strike incidents?
- What are the total costs incurred due to bird strikes?

02.

Pilot Awareness

- How effective are warnings in reducing bird strike impacts?
- What percentage of incidents occurred without prior warnings?

03.

Altitudes and Locations

- What percentage of bird strikes occur below 1000 feet?
- Which states and airports report the highest bird strike incidents?

04.

Airlines and Aircraft

- Which airlines are most affected by bird strikes?
- During which phases of flight (e.g., takeoff, landing) do most bird strikes occur?

05.

Environmental Factors

- How do weather conditions (e.g., clear skies, overcast) affect bird strike frequency?
- What are the most common sky conditions during bird strikes?

Dashboard Overview



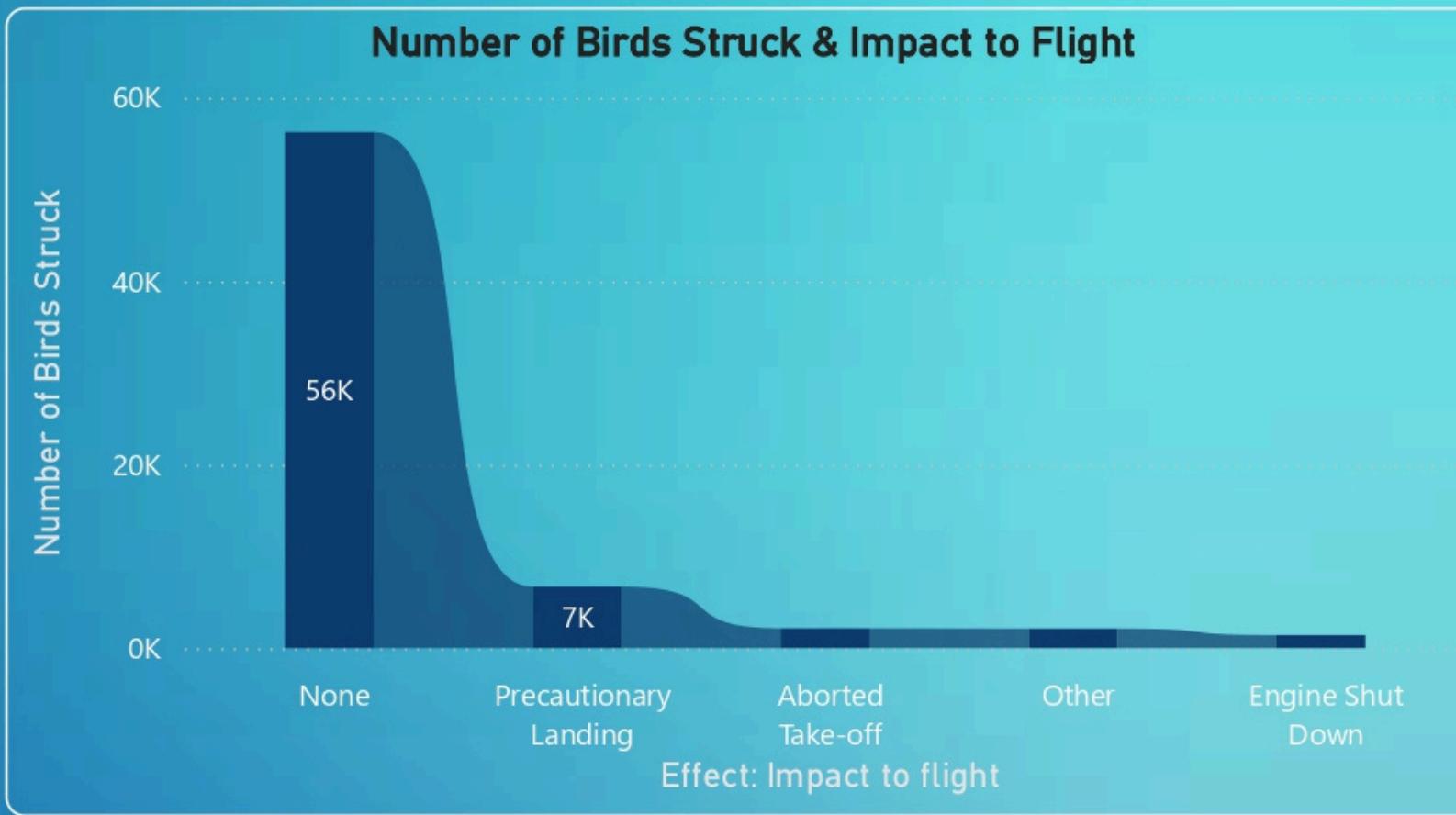
Bird Strikes by an Aircraft (2000-2011)

Airport: Name
All

Flight Year
All

Origin State
All

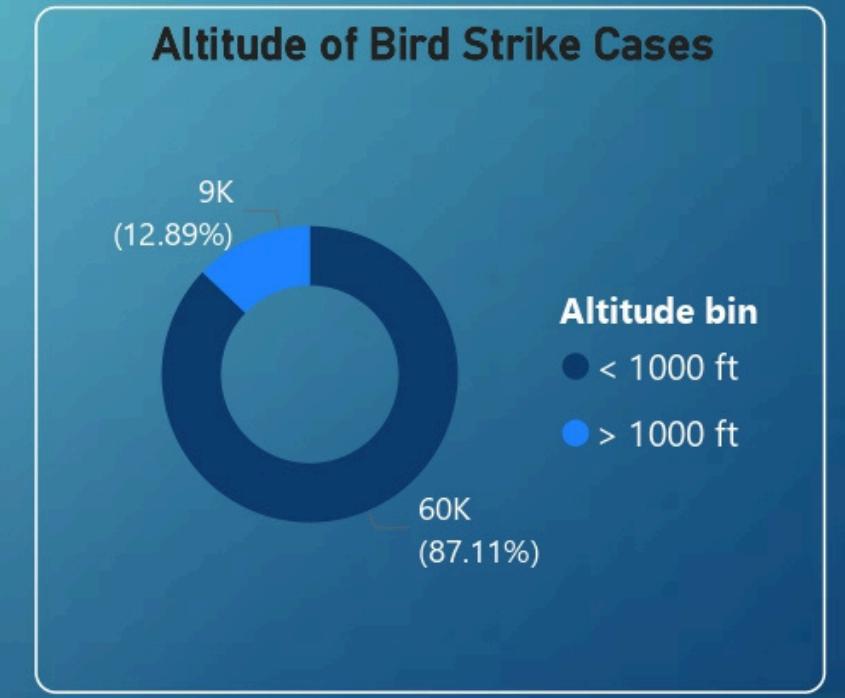
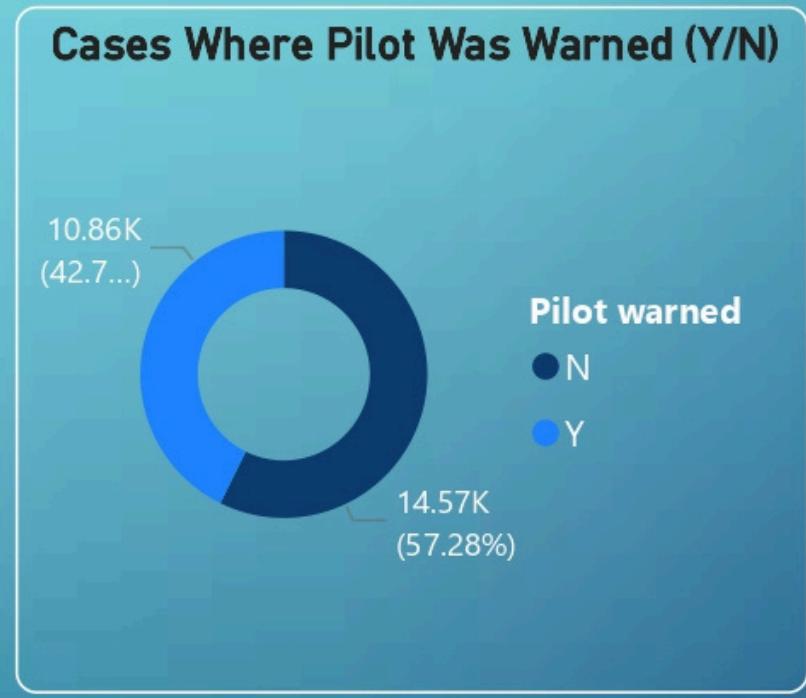
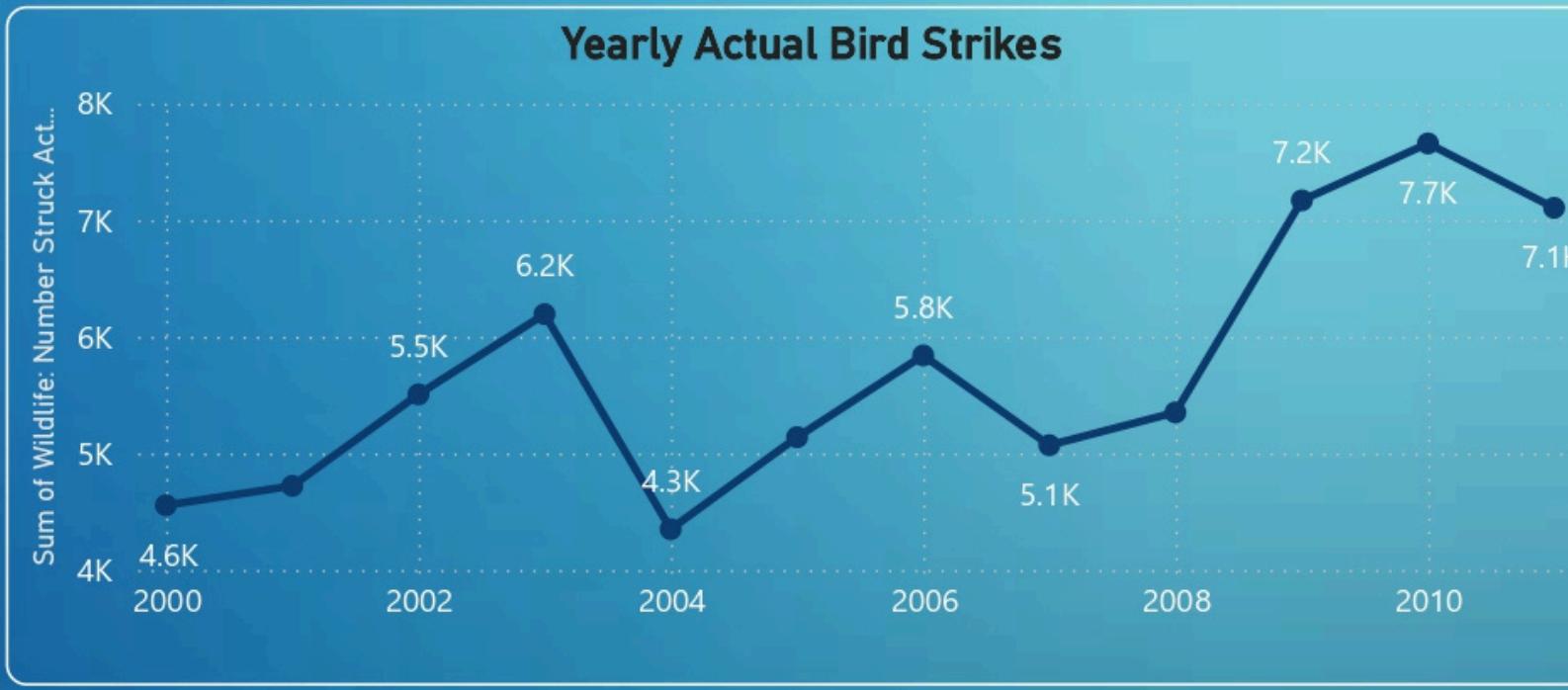
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Total Bird Strikes Cases
25.43K

Total Cost in Repairments
142M

Total Birds Struck
69K



Bird Strikes by an Aircraft (2000-2011)

Airport: Name
All

Flight Year
All

Origin State
All

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Number of Bird Strikes in Each State



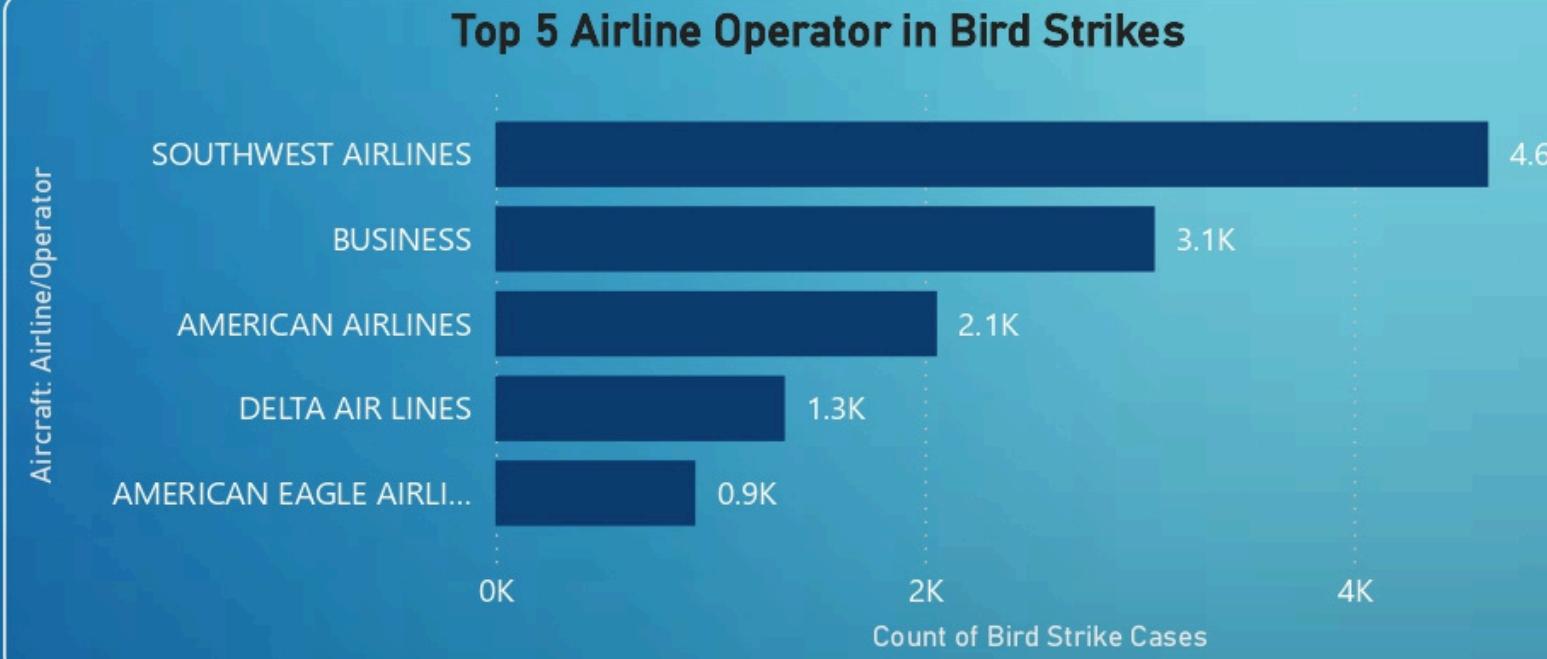
Average Altitude (in feet) of Aircraft in Different Phases of Strikes

798.90

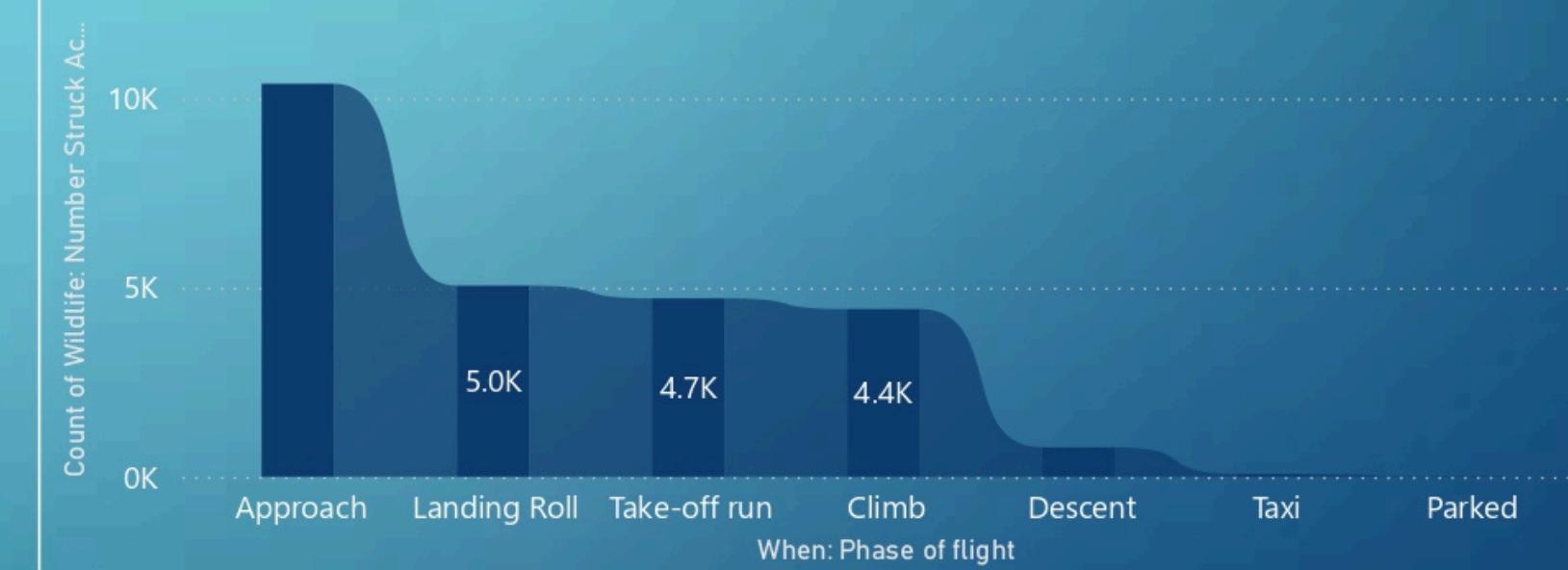
When do Most Bird Strikes Occur (Sky Conditions)?



Top 5 Airline Operator in Bird Strikes



When do Most Bird Strikes Occur (Phase of Light)?



Key Insights

1. Total Overview Metrics

- Total Bird Strike Cases: 25.43K
- Total Cost in Repairments: \$142M
- Total Birds Struck: 69K

2. Number of Birds Struck & Impact to Flight

- No Impact: 56K cases (majority of strikes caused no significant disruption).
- Precautionary Landing: ~7K cases.
- Other minor impacts include Aborted Take-off, Engine Shutdown, and Other Effects.

Insight: Most bird strikes do not critically affect flight safety but contribute significantly to repair costs.



Key Insights



3. Yearly Cost Incurred Due to Bird Strikes

- 2002 and 2010 recorded the highest yearly costs (\$6.2K and \$7.7K respectively).
- 2004 had the lowest cost at \$4.3K.

Trend: Repair costs due to bird strikes have fluctuated but show an upward trajectory.

4. Yearly Actual Bird Strikes

- Bird strikes have been increasing over the years:
 - 2000: 4.6K cases
 - 2010: 7.1K cases
- Peaks observed in 2008 (7.2K) and 2009 (7.7K).

Insight: The rising trend may correlate with increasing air traffic.

5. Cases Where Pilot Was Warned (Y/N)

- Pilots Warned: 57.3% of cases (14.57K).
- Pilots Not Warned: 42.7% of cases (10.86K).

Insight: While pilots were warned in most cases, there is room to improve pilot alert systems.

6. Altitude of Bird Strike Cases

- Below 1000 ft: 87.11% of strikes.
 - Above 1000 ft: 12.89% of strikes.
- Insight: Most strikes occur at lower altitudes during take-off and landing.

7. Average Altitude of Aircraft in Different Phases of Strikes

- The average altitude of bird strikes is 798.90 ft.

8. Number of Bird Strikes by State

- Bird strike frequency varies across states, with higher incidences likely in regions with busy airports or dense bird populations.



9. When Do Most Bird Strikes Occur?

Sky Conditions:

- No Cloud: 12.57K cases.
- Some Cloud: 8.66K cases.
- Overcast: 4.20K cases.

Insight: Clear skies are associated with the highest bird strike activity.

Phases of Light:

- Approach Phase: ~10K cases.
- Landing Roll: ~5K cases.
- Take-off Run: ~4.7K cases.
- Climb: ~4.4K cases.

Insight: Bird strikes are most common during approach and landing phases at low altitudes.

10. Top 5 Airline Operators in Bird Strikes

- Southwest Airlines: 4.6K cases.
- Business Jets: 3.1K cases.
- American Airlines: 2.1K cases.
- Delta Air Lines: 1.3K cases.
- American Eagle Airlines: 0.9K cases.

Insight: Major airlines like Southwest Airlines and American Airlines experience the highest bird strike cases due to extensive operations.

Recommendations

1. Altitude Awareness:

- Focus on take-off and landing phases where strikes are most frequent.
- Implement improved bird detection systems below 1000 ft.

2. Sky Condition Monitoring:

- Prioritize mitigation efforts during clear skies when bird activity is higher.

3. Cost Management:

- Address rising repair costs through preventive measures like wildlife management around airports.

4. State-Specific Action Plans:

- Implement bird control programs in states with higher bird strike incidents.

5. Airline Safety Enhancements:

- Airlines with high bird strike cases (e.g., Southwest Airlines) should focus on enhancing detection and avoidance strategies.

6. Pilot Alert Systems:

- Improve warning systems to ensure more pilots are alerted to potential bird strikes.



Thank you very much!

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