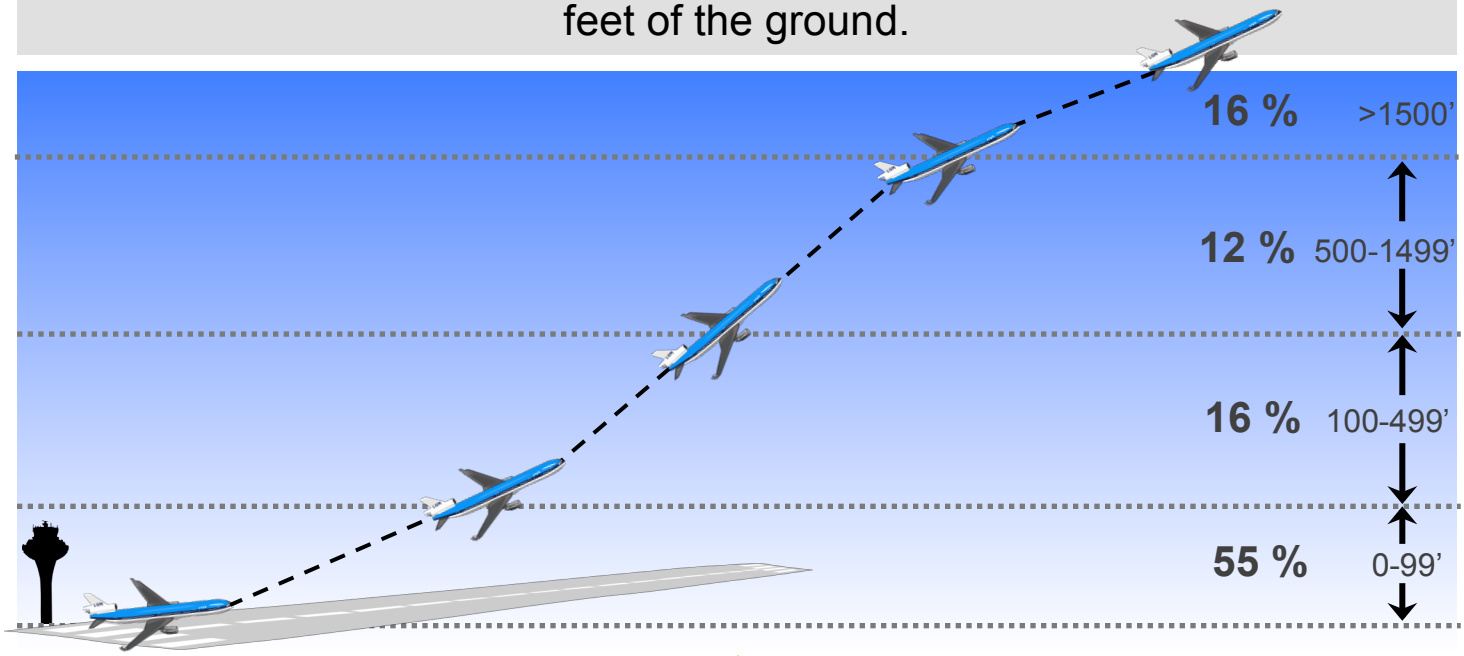
INFORMATION SHEET

ALTITUDE STRIKES AND CORMORANTS ISSUES

Aircraft are most likely to encounter birds during takeoff and landing phases (40 %), as the majority of bird flights occur within a few hundred feet of the ground.



Sharing the Skies (TP 13549)[1]

U.S. data on bird strikes at altitudes above ground level (AGL) are summarized in next table. The figure is based on 20,893 reported strikes with known altitudes during the period 1990-1999:

• 40 % occur while the aircraft is still on the ground—primarily during takeoff and landing roll,

• 15 % of strikes occur between one and 99' above ground, and

• 16 % occur between 100 and 499' AGL.

In total, 71 % of these strikes occur on, or immediately adjacent to, airport properties. Above 500', the number of bird strikes decreases proportionally as altitude increases.

Bird strikes that do occur above 500' AGL generally involve flocking birds, particularly migratory waterfowl that can exceed 5 kg. Multiple strikes to several parts of an aircraft are not uncommon in these incidents, creating potential for loss of more than one engine and damage to other major aircraft systems. While chances of a bird strike at altitudes above 500' AGL are statistically low, the potential consequences of a high-altitude bird strike may be more significant.

Table 1. Altitude of Bird Strikes in the U.S. (1991-1999)

Altitude (AGL)	Percent of Known Total
0	40
1-99	15
100-299	11
300-499	5
500-999	7
1000-1499	5
1500-3999	10
>4000	6

Wildlife Control Procedures Manual (TP 11500)[2]

According to available data concerning the altitudes at which civil and military aviation bird-strikes have occurred, low-altitude strikes are the most common. Preliminary data analysis, however, shows that high-altitude strikes (above 500' AGL) involving large birds are occurring more frequently. These strikes often cause substantial aircraft damage and adverse flight effects, as aircraft are traveling at higher speeds and pilots are less aware of the presence of birds.

Only a small percentage of strikes occur at heights above 3,000' AGL. Transport Canada data shows that within the airport environment 90 % of bird-strikes in which altitude is recorded occur below 500-feet AGL. The highest reported bird-strike took place at 37,000' on November 29, 1973; a commercial jet airliner collided with a Ruppeli's Griffon Vulture over Abijan, Ivory Coast. It is also common for strikes to occur at 0' AGL, immediately prior to takeoff and just after landing.

A total of 16,488 reported bird-strikes took place between 1989 and 1992.

Table 1. Altitude of Bird Strikes Canada

Altitude (AGL)	Number of Strikes
0-100	7 801
101-200	984
201-500	1 348
501-100	922
1001-2500	1 194
Over 2501	1 195
Unknown	124

Source: Bird-strike Information System (IBIS) of the International Civil Aviation Organization (ICAO) in 1998

1. Transport Canada. 2004. TP 13549 - Sharing the Skies, Chapter 7, pages 125-126. Ottawa, On. 322 pages.
2. Transport Canada. 2002. TP11500 – Wildlife Control Procedure Manual, Section B, pages B9, B14, B15. Ottawa, On. 270 pages.

The majority of the strike occurs under 500' at 71-75 % depending of the source.

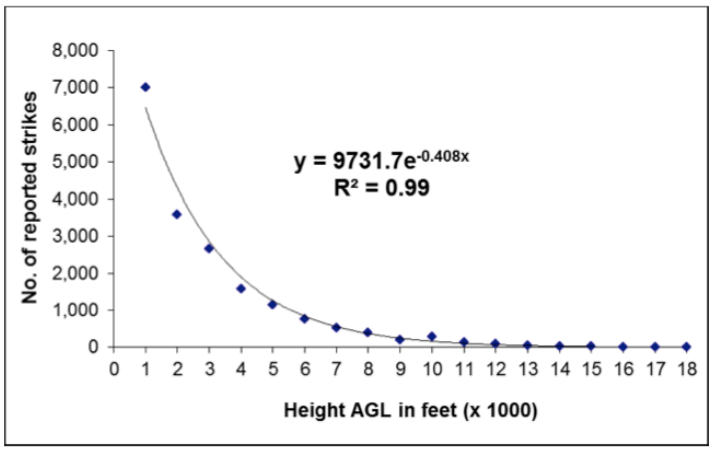


Figure 1. Number of reported strikes in commercial aviation aircraft by height AGL in feet

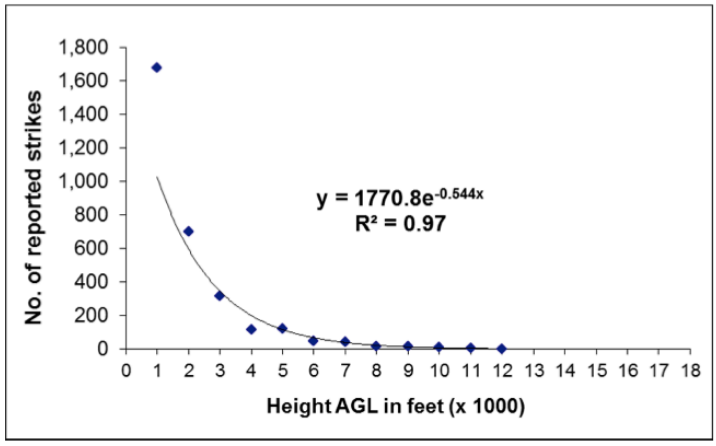


Figure 2. Number of reported strikes in general aviation aircraft by height AGL in feet

Table 3. Number of reported bird strikes to commercial civil aircraft[1] by height above ground level (AGL), USA, 1990–2012.

Height of strike (AGL in feet)	All reported strikes			Strikes with damage		
	23-year total	% of total known	% cumulative total	23-year total	% of total known	% cumulative total
0	26 773	41	41	1 651	29	29
1-500	20 154	31	72	1 583	28	57
501-1 500	7 014	11	82	833	15	72
1 501-2 500	3 591	6	88	505	9	80
2 501-3 500	2 600	4	92	315	6	86
3 501-4 500	1 578	2	94	186	3	89
4 501-5 500	1 153	2	96	151	3	92
5 501-6 500	772	1	97	114	2	94
6 501-7 500	530	1	98	76	1	95
7 501-8 500	394	1	99	69	1	97
8 501-9 500	214	<1	99	30	<1	97
9 501-10 500	281	<1	99	49	<1	98
10 501-11 500	149	<1	>99	39	<1	99
>11 500[3]	249	<1	100	80	<1	100
Total known	**65 512**	**100**		**5 681**	**100**	
Unknown height	**21 369**			**2 411**		
Total	**86 881**			**8 092**		

1. Air carrier, commuter, and air taxi service with 3-letter Operator Code; 1,100 strikes in which height of strike was reported but type of operator was unknown were excluded from analysis.

Federal Aviation Administration[3]

Number of reported bird strikes with commercial (left graph) and general aviation aircraft (right graph) in USA from 1990–2012 by 1,000' height intervals AGL from 501– 1,500' (interval 1) to 17,501–18,500' (interval 18). These graphs exclude strikes occurring at 500' or less. Above 50', the number of reported strikes declined consistently by 34 % and 42 % for each 1,000' gain in height for commercial and general aviation aircraft, respectively. The negative exponential equations explained 97 to 99 % of the variation in number of strikes by 1,000' intervals from 501 to 18,500'.

3. Federal Aviation Administration. 2013. Wildlife Strikes to Civil Aircraft in the United States 1990-2012. National Wildlife Strike Database – Serial Report Number 19. Washington, DC. 98 pages.