



Canadian Study Finds Greatest Frequency of Bird Strikes to Turbofan and Turboprop Aircraft Below 100 Feet in Summer

Only 12 percent of bird strikes caused problems, which included obscured cockpit vision, an engine fire and a forced landing.

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Aviation Writer

Most reported bird strikes involving Canadian aircraft in 1994 occurred at altitudes below 100 feet [30.5 meters] above ground level, often during either the takeoff run or the landing roll (Figure 1 and Figure 2, page 2), according to a Transport Canada study. The survey found that gulls were hit by aircraft far more than any other type of bird.

Bird Strikes to Canadian Aircraft: 1994 Summary Report was issued by Transport Canada's environmental services office and the agency's safety and technical services section in December 1995.

Turbofan and turboprop aircraft were the types most likely to report striking birds, the survey found. The majority of damage from strikes involved aircraft wings, radomes, noses and engines.

Canadian experts analyzed 655 bird strikes that were reported to Transport Canada's airports group in 1994. Of those, 623 strikes occurred in Canada, 23 took place outside Canada (involving Canadian aircraft) and in nine strikes the location was not reported.

In addition to bird strikes, the study mentioned 15 cases in which aircraft struck mammals at airports in 1994. Rabbits were the most common animals, accounting for a third of mammal strikes. Other animals included gophers (two), coyotes (two) and skunks (two).

Although most aircraft that struck birds reported no adverse effects, the bird strikes did cause problems in 12 percent of the reports. Effects ranged from obscured cockpit vision to an engine fire and a forced landing.

The analysis focused on bird strikes that were reported by Canadian airports, airlines, pilots and Transport Canada. Analysts took steps to avoid duplication in analyzing the results. At most of Canada's civilian airports in 1994, the rate of bird strikes ranged from one strike to five strikes per 10,000 aircraft movements. The data are intended to help airports improve their bird-control and mammal-control programs, as well as for employee training and public awareness programs.

According to the data, a typical bird strike in Canada occurred during takeoff or landing in the late morning of a summer's day, and involved a gull hitting the wing, nose or fuselage of either a turbofan or a turboprop aircraft.

The consequences of bird strikes can range from engine fires to obscured vision from the cockpit windows, sometimes forcing aborted takeoffs or precautionary landings.

In most of the reports analyzed — 382 of the 655 reported bird strikes (about 55 percent) — the flights were not affected by the incidents. In 197 other cases, the effects, if any, on the flight or the aircraft were not reported.

Altitude* of Reported Canadian Bird Strikes, 1994

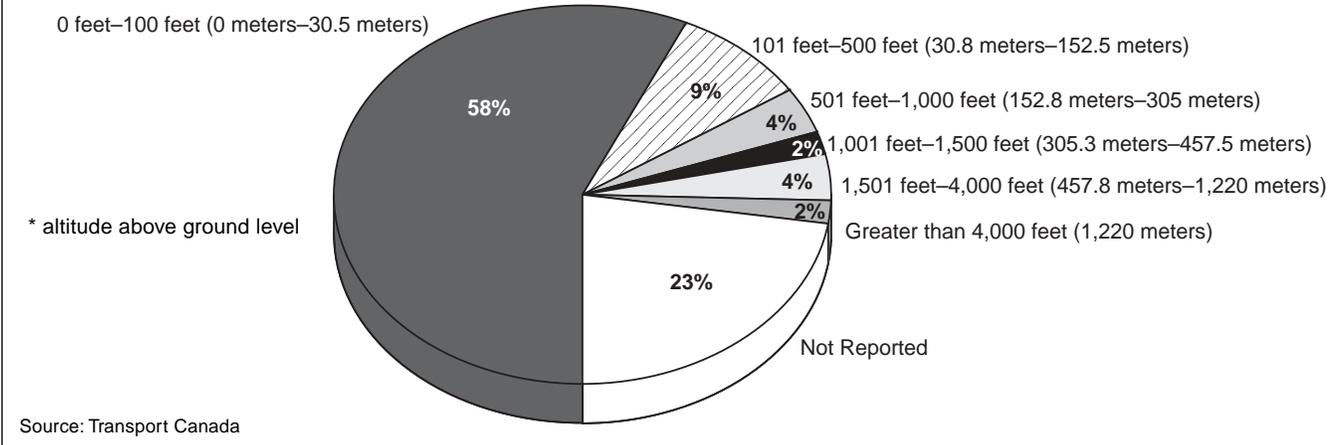


Figure 1

Effects reported in 76 cases included:

- 47 reports in which the aircraft made a “precautionary landing” after the bird strike;
- A dozen reports in which the aircraft aborted takeoff;
- Six bird strikes that resulted in “engine ingestion”;
- Six reports in which the strike obscured cockpit vision;
- One report that led to a forced landing; and,
- One report in which the bird strike resulted in a fire.

Three reports cited “other effects” (unspecified in the reports) from bird strikes.

The majority of aircraft affected by bird strikes were either turbofan or turboprop aircraft, with far fewer incidents involving turbojet, turboshaft or piston-powered aircraft. Those

statistics partly reflect the proportions of types of aircraft that typically use Canadian airports.

- **Turbofan.** Thirty-five percent of reported bird strikes, in which the type of aircraft was identified, involved turbofan aircraft. Of the various types of aircraft, turbofans also reported the highest percentage of engine damage when birds struck the engines.

Of the approximately 230 bird strikes to turbofans, 10 percent were strikes to the engines. And 26 percent of those strikes resulted in engine damage, the report said.

- **Turboprop.** After turbofans, the type of aircraft struck most often by birds were turboprops. One-quarter of all reported bird strikes involved turboprop aircraft.

Of those approximately 160 reports, 15 percent involved strikes to the engine/propeller. But only 12 percent of those strikes to turboprops resulted in engine damage.

Phase of Flight of Reported Canadian Bird Strikes, 1994

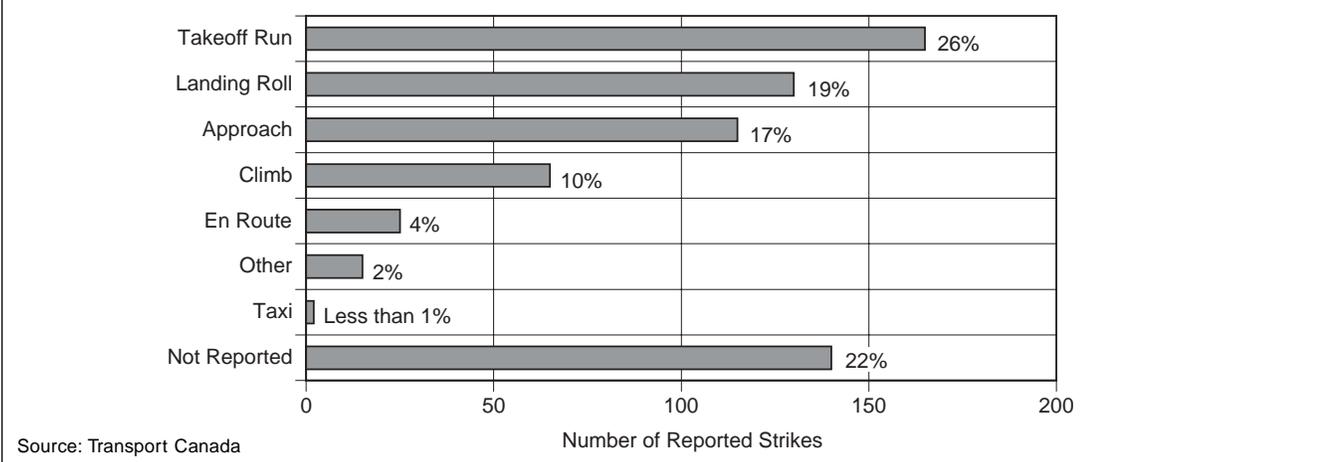


Figure 2

Aircraft Most Frequently Involved in Reported Canadian Bird Strikes, 1994

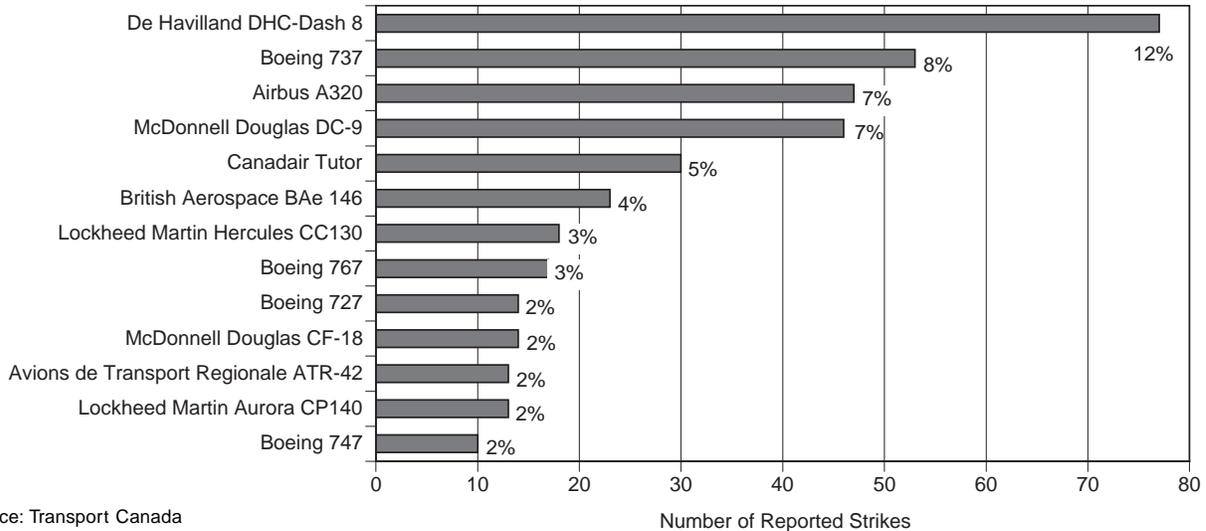


Figure 3

Other types of aircraft were involved in fewer bird strikes:

- **Turbojet.** Seven percent of reported strikes involved turbojet aircraft. Ten percent of those strikes were to the engine. And one-quarter of those strikes to the engine resulted in damage.
- **Piston-powered aircraft.** Five percent of strikes involved piston aircraft. Only 1 percent of those strikes hit the engine/propeller, and none of those strikes resulted in damage.
- **Turboshaft.** Less than 1 percent of the Canadian bird strikes involved turboshaft aircraft. None of the birds struck the engine/propeller of those planes.

The aircraft model most often involved in bird strikes, regardless of the number of aircraft flights, was the de Havilland DHC-Dash 8 (Figure 3). Dash 8s were in 77 reports (about 12 percent of the total bird strikes).

Other aircraft involved in a relatively large number of bird strikes were the Boeing 737 (53 strikes, or 8 percent of the total); the Airbus A320 (47 strikes, or 7 percent) and the McDonnell Douglas DC-9 (46 strikes, or 7 percent).

Bird strikes most often resulted in damage to the:

- Engine (in 24 percent of the 49 strikes to that aircraft component);
- Radome (in 17 percent of the 35 strikes);
- Wings/rotor (in 16 percent of the 90 strikes);
- Canopy/nose (in 14 percent of the 57 strikes); and,
- Windshield (in 10 percent of the 39 strikes).

Late summer — July, August and September — was the most common period for bird strikes to occur in Canada, and between 8 a.m. and noon was the most likely time of day.

The survey found the most bird strikes in the following months:

- August (20 percent);
- September (15 percent);
- July (13 percent);
- October and May (both 9 percent);
- November (8 percent); and,
- June, March and December (each 6 percent).

The fewest bird strikes occurred in January and February (each month with 2 percent of the total strikes), and April (4 percent).

The most bird strikes were reported between 9 a.m. and 10 a.m. (62 strikes). Strikes also occurred relatively often in other late-morning hours:

- From 8 a.m. to 9 a.m., there were 50 strikes;
- From 11 a.m. to noon, there were 47 strikes; and,
- From 2 p.m. to 3 p.m., there were 42 strikes.

The fewest strikes occurred between midnight and 6 a.m., when relatively few aircraft were landing or taking off. In general, the number of bird strikes per hour slowly decreased after 3 p.m.

Most of the reported bird strikes — where such details were reported — took place during the day when there was no precipitation, the report found. There was rain during 9 percent

of the incidents; there was fog during 4 percent; and there was snow during fewer than 1 percent.

When reported, the sky conditions during bird strikes were about evenly divided among clear, partially cloudy and overcast days. The light conditions were not reported in more than half of the reports, but most of the bird strikes occurred during the day. Only 7 percent occurred at night, 3 percent at dusk and 1 percent at dawn.

As part of Canadian airports' wildlife-control programs, Transport Canada requires airport personnel to submit an "Airport Staff Bird Strike Report" after observing or being told of a strike.

"The emphasis is on identifying the kinds of bird(s) involved," said the report. One reason to gather more information about the types of birds is to help improve the airports' bird-control programs.

About 35 percent of the strike reports did not identify the kinds of birds involved. But, of the identified species, the survey found that the kinds of birds struck most often were:

- Gulls (26 percent);
- Sparrows (6 percent);
- Swallows (5 percent);
- Snow buntings (4 percent);
- Hawks, owls and starlings (each 3 percent); and,
- Geese, ducks and kestrels (each 2 percent).

Other kinds of birds in reported strikes were doves, crows, egrets, a pelican and a number of shorebird species, such as killdeer and plovers.

Although Transport Canada's study was as comprehensive as possible from the reports, the authors — staff members of Transport Canada — cautioned that some strikes go unreported.

The report said that the data presented provide "a reasonably clear description of the 1994 bird-strike situation." The report added, however, that "there is no way of knowing precisely how many strikes go unreported, or how they may or may not affect" the report's data. ♦

Editorial Note: This article was adapted from *Bird Strikes to Canadian Aircraft: 1994 Summary Report*, Transport Canada, Airports Group, Report no. TP10573E. December 1995. The 29-page document includes an index, a summary of bird-strike highlights, an introduction and numerous charts and graphs.

About the Author

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