

# Effectiveness of falconry in reducing risk of bird strikes under study at JFK International

*Data so far indicate that trained birds of prey can reduce significantly the number of problem birds that visit the airport.*

STEVEN D. GARBER

PORT AUTHORITY OF NEW YORK  
& NEW JERSEY  
(UNITED STATES)

THE Port Authority of New York and New Jersey, operator of New York's John F. Kennedy International Airport (JFK), has been experimenting with the use of trained falcons and hawks to keep flocks of gulls away from the aerodrome. The programme has achieved considerable success in reducing the risk of bird strikes, according to the data collected so far.

The ongoing trial, the first of its kind in the United States, has been in progress since June. Results to date suggest that falconry, when implemented properly, holds tremendous promise as a means of bird control. Data show that bird strikes involving gulls at JFK fell by 66 per cent during June-September 1996, compared to the same period one year ago when falconry was not in use (see *Figure 1*).

Given this success, the airport authority is considering expanding the programme next year to cover a longer period, beginning in the spring before most gulls return to nest in the vicinity. It will also turn more attention to other "problem" birds.

## Risk evaluation

The increasing risk of bird strikes at JFK posed by a number of species — they include various gulls, geese, swans, cormorants, pigeons, starlings, swallows, black-birds and cowbirds — has compelled the Port Authority to take new steps to reduce the threat. As the most recent initiative,

1. For statistical purposes, the Port Authority defines a bird strike as any incident in which a bird collides with any part of an aircraft or when it is caught in the aircraft's wash and is found within 38 metres (125 ft) of the centreline of a runway.

officials hope falconry will improve bird control efforts that have relied to a great extent on a shooting programme carried out by the U.S. Department of Agriculture.

The problem at JFK is compounded by the airport's location. The busy airport (with over 321,000 aircraft movements in 1995) lies under two major bird migratory routes and is adjacent to a national park and wildlife refuge providing an ideal habitat for bird life. Nearly 300 different species of birds are found in the immediate vicinity.

That birds present a risk for aircraft is without doubt. About 5 per cent of bird ingestions lead to engine failure, according to a study undertaken by the U.S. Department of Transportation in 1984. In the period since 1979, collisions with birds at JFK Airport have caused damage to 13 engines (*Figure 2*). In the most serious incident, a McDonnell Douglas DC-10 crashed at JFK in November 1975 after colliding with gulls on take-off. Although no fatalities resulted from the accident, the DC-10 was destroyed by fire.

Following this incident, new procedures were implemented to prevent a recurrence, but bird strikes<sup>1</sup> have continued to occur at JFK on a regular basis. In the 1979-95 period, more than 3,900 bird strikes were experienced. The collisions with gulls alone, numbering over 2,600 (*Figure 3*), resulted in aircraft damage or delays on 45 occasions over the same period. In other words, aircraft damage or flight delays caused by bird strikes occurred an average 2.65 times per year.

Recent improvements in management of the bird hazard at JFK are producing encouraging results, as reflected in the sta-

tistics concerning the laughing gull (*Figure 4*). The use of trained birds of prey complements a number of other measures enacted in recent years by personnel employed full-time in the fight against bird strikes. Their activities concentrate on accomplishing:

- better planning and implementation of a regimen for vegetation management on the airport's property;
- effective insect control;
- improvements in solid waste management;
- proper water retention management (this includes better drainage, elimination of wetlands and low areas, virtually eliminating fresh water, a strong attraction for birds);
- continual upgrading of scientific methods

used in assessing the effectiveness of different bird control methods;

- better training and management of a team of 30 people dedicated to bird hazard management at JFK.

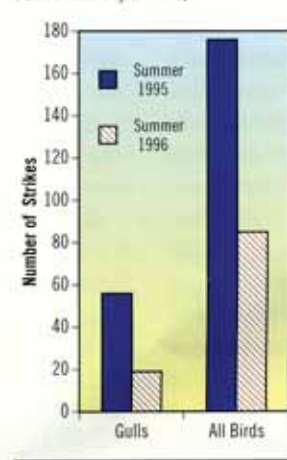
With a massive gull colony located so close to the airport, the ideal solution to the bird problem at JFK would entail moving the entire colony to a safer location. This could be done, humanely, and would virtually end a shooting programme that has killed more than 50,000 birds

over the past six years. However, this measure is unlikely to be taken in the near future.

## Programme goals

The falconry programme introduced this year is designed to test whether it is possible to reduce the number of gulls at the airport. The objective is to determine whether birds of prey can create an effec-

**Figure 1. Bird strikes at JFK**  
(9 June - 25 Sept. 1996 vs  
9 June - 25 Sept. 1995)



tive deterrent to the laughing, herring, ring-billed and great black-backed gulls that reside in the area.

Gulls account for approximately two-thirds of the bird strikes reported at JFK, and accounted for 68 per cent of the incidents that produced aircraft damage or led to flight delays over a recent 10-year period, 1986-95.

If the experiment with controlling gulls at JFK continues to show success, the Port Authority plans to test whether the programme can also be effective against geese. Larger raptors, such as the golden eagle (with a wing span of 198 centimetres), would be employed.

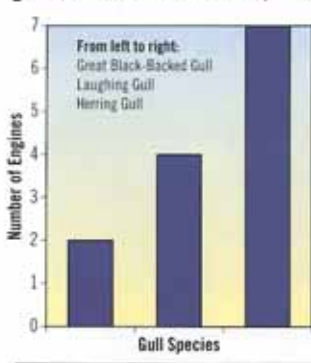
The Canada goose, in particular, is a growing concern. According to data compiled by Transport Canada and the Canadian Department of National Defence, the Canada goose was involved in accidents resulting in over \$200 million of damage and 24 fatalities in North America in 1995.

Canada goose populations in North America and Europe are increasing rapidly. The estimated number of migratory birds in North America has doubled in the last 25 years. The population of non-migratory geese — those that have learned to remain in the United States instead of flying to the tundra for the summer — has increased exponentially with the growth in attractive habitat near major cities. The current number of year-round residents exceeds one million.

Two of the airports operated by the Port Authority (in addition to JFK, the other New York-area airports it operates are LaGuardia, a short distance north of JFK, and Newark International) experienced three serious incidents involving geese last year. In one, an Air France Concorde struck several Canada geese at JFK (as a result of this incident, the airline launched a lawsuit against the airport for \$7.5 million). In September 1995, a Northwest Airbus A320 collided with a flock of Canada geese at LaGuardia, resulting in damage that cost \$2.5 million. Three months later a Polar Air Boeing 747 freighter struck a flock of migrating geese (snow geese this time). That damage also cost millions of dollars.

Canada geese accounted for only about

**Figure 2. Engines damaged by gull strikes at JFK (1979 to Sept. '96)**



1 per cent of all bird strikes at JFK during a 17-year period ending in 1995. However, the number of incidents is on the rise, and experts feel that the population of Canada geese in the area surrounding JFK has increased significantly in recent years.

### Results to date

The project to use falcons at JFK attempts to build on what has been

learned by falconers over the years, what wildlife biologists know about animal behaviour, and experience with falconry (with mixed results) at other airports, particularly in Canada, the United Kingdom and Spain.

The data so far indicate that there have been far fewer collisions with gulls at JFK in a recent three-month period, and the total number of bird strikes is down by 52 per cent. The number of gulls shot by staff also dropped significantly during the recent trial period, decreasing nearly 60 per cent compared with the previous period in 1995. It appears that the decrease in bird strike activity and the reduction in shootings during the June-September period can be explained by the fact that significantly fewer birds flew near or over the airport during the trial period. (So that falconry's impact could be ascertained, the programme was introduced without change to other bird control methods in place at JFK in the previous year.)

The trial has focused on whether birds of prey are able to create a barrier around the airport by simulating the behaviour of raptors defending and maintaining their

territories from incursions from potential competitors, thus frightening gulls and other problem birds.

So far the evaluation has concentrated on the effect on gulls, since gull strikes account for the majority of incidents. The trial this year involved the use of three falcons and five Harris' hawks. Next year, the Port Authority hopes to expand the programme to include other birds of prey.

### Intervention techniques

Three falconers were hired with 60 years' combined experience working with trained hawks and falcons. These handlers had the necessary skills to conduct the specialized flights required in an airport environment. They brought their own birds to the programme and acquired additional birds as needed.

Costing several thousand dollars each, the birds demand special care and attention. For instance, they are usually fed quail that are specially bred and flown in from 3,000 miles away. The handlers found that when the birds ate the meat of local gulls, they had stomach convulsions.

The birds at JFK are not released with the idea of catching prey, but only to deter other birds by their presence. In this sense, the programme is not true falconry, which involves the hunting of game.

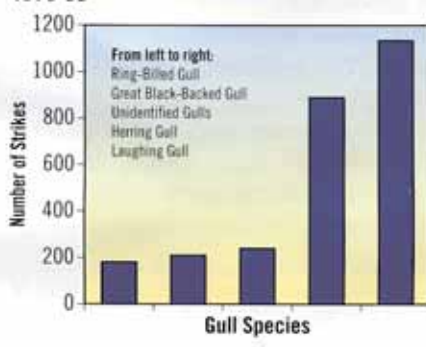
Most of the time the falcons are flown in areas where gulls fly near or over the airport in the greatest numbers. With long, pointed, powerful wings adapted for swift flight, the falcons fly up to four times per day. A typical flight is 15 to 45 minutes in duration.

The falcons used in the JFK programme are hybrids (i.e. a bird bred from a gyrfalcon and a peregrine falcon). Hybrids are preferred because they are larger than peregrines. There was also the matter of obtaining permits: with a hybrid, this is a simpler matter because the birds are obviously bred in captivity and not taken from the wild.

The falcons are usually flown twice in the morning and twice more in the evening, when problem birds tend to peak in number and when the summer temperatures are cooler. (The falcons prefer to fly in the cooler air.)

Two female hybrids, with a wing span of roughly 122 centimetres (48 in) and a weight of 1,025 grams (36 oz), are bigger and more effective than males at scaring

**Figure 3. Gull strikes at JFK (by species), 1979-95**



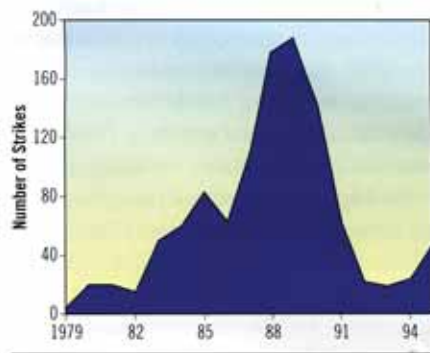
the larger birds, such as gulls. One male falcon, however, is employed in dispersing flocks of smaller problem birds.

Also involved in the programme are three female Harris' hawks, at 1,200 grams (42 oz), and two smaller, male Harris' hawks. These birds can be flown in very hot and cold weather and are often flown from a perch on the roof of a vehicle (see photo). Harris' hawks are native to the American south-west and do well in New York's summer temperatures as long as they are sprayed periodically with fresh water or, if perched outside, allowed to bathe and drink frequently.

Each Harris' hawk flies up to eight times daily, with each flight from 30 minutes to one hour in duration. The birds spend the entire day on the airfield. They perch on the hood of the patrol vehicle, flying on occasion from the car to a perch or to intercept a bird. When an area of high gull activity is encountered, the driver stops and allows the hawks to fly throughout the area. In this situation, pyrotechnics might also be used, distress calls might be played, or a mock gull tossed into view. A dead bird might be given to one or more of the hawks to feed on in the open, a sight meant to intimidate problem birds.

The falcons are flown from the ground and from the tops of buildings where the additional elevation gives them more speed and greater visibility. The birds are flown to show as many gulls as possible that a predator is present. This is done at strategic locations, such as along a shoreline where gulls gather at low tide to collect clams which they often break open by dropping on a runway or taxiway, and areas where birds rest on the airport (often for the warmth of the pavement) or where they feed on insects.

**Figure 4. Total annual laughing gull strikes at JFK, 1979-95**



**Harris' hawks on their perch atop a patrol vehicle at JFK Airport.** Photo: Ralph Ginzburg

When not being flown, the hawks are tethered to perches in localities that gulls are known to frequent. For example, a hawk might be tethered near an area where insect activity is high, or where fish are schooling. Gulls flying over will see the hawk and associate the area with danger. (The distance from which gulls can recognize the raptor is remarkable. Although the hawk is tethered, its presence would seem to have an effect nevertheless.)

For a programme of this nature to be successful, constant vigilance is necessary. The programme cannot be effective if activity is slowed or stopped when it appears that the problem birds have been frightened away. Also, we have found it is necessary to constantly change the bird control methods and schedules. Gulls and geese have the capacity to rapidly take advantage of opportunities made available by human oversight.

Several intervention techniques are used by the falconers. To summarize:

- a dead gull may be placed next to a perched raptor in a strategic location, so gulls in the area will associate the raptor with the dead bird;
- raptors are allowed to feed on a gull in the open on occasion;
- tapes of gull distress calls are played and usually attract the attention of gulls from the surrounding area. At this point, the raptors are released so that the birds associate the distressing cries with the predators. Pyrotechnics may also be set off to frighten stubborn birds away;
- the falcons and hawks are on display as much as possible to give the impression that JFK Airport is a territory or series of overlapping territories defended by raptors.

#### Observations

Aside from the statistics to date, which indicate that the falcons and hawks are

having an impact on bird activity at JFK, a number of observations are encouraging.

Flights by the falcons and hawks definitely attract the attention of gulls in the area, and all the problem gulls at JFK have responded to the programme. When the project began, gulls routinely flew over the airport at lower than 200 feet above ground; now the birds tend to stay higher, up to 1,000 feet or more. Also, the gulls do not fly over the airport in the previous numbers — at any altitude.

We have found that most of the gulls won't move into an area where a falcon is visible, and tend to avoid any area recently visited by a falcon or hawk. In general, the birds appear to be avoiding JFK. Those that fly toward the airport usually turn parallel to the shore and bypass JFK by flying over Bergen or Thurston basins.

#### Future plans

We hope to improve on the results of the falconry programme next year by having the birds fly in the spring, when gulls are returning to the area, and by increasing the number of birds and falconers, with a wider range of trained birds in order to have an impact on more species.

More effort will be made to deter Canada geese and other waterfowl. A golden eagle would be ideal for this purpose. With its giant wing span, a golden eagle may be seen by birds from a distance that far exceeds the range of human vision.

The addition of two female saker falcons from the Middle East would permit mid-day flights in the hottest weather. Other birds under consideration are merlins, gyrfalcons, peregrines and even bald eagles. □

Dr. Garber is a wildlife biologist in the Aeronautical Services Division at the Port Authority of New York & New Jersey. He is responsible for evaluating the effectiveness of the falconry programme introduced recently at JFK Airport.