Managing Raptors to Reduce Wildlife Strikes at Chicago's O'Hare International Airport

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ABSTRACT: Wildlife-aircraft collisions (wildlife strikes) have increased nationally over the past 22 years; denoted in the National Wildlife Strike Database that has been maintained by the Federal Aviation Administration (FAA) since 1990. Increasing wildlife populations and air traffic coupled with quieter, faster aircraft create a significant risk to aviation safety; the cost to the civil aviation industry is an estimated $718 million dollars annually. USDA/APHIS/Wildlife Services provides technical and direct assistance to over 785 airports and airbases around the United States, including Chicago's O'Hare International Airport (ORD). At ORD, raptors are the most commonly struck bird guild accounting for 25% of all damaging strikes in 2011. An integrated wildlife damage management program is implemented at ORD to reduce the presence of wildlife on the airfield, consequently lowering the risk of wildlife strikes. Professional airport wildlife biologists at ORD concentrate much of their efforts on raptor damage management due to the high strike risk these birds pose to aircraft on the airfield itself. A variety of techniques are currently used to manage raptor populations at ORD.

Key Words: airport, bird strikes, relocation, raptors, wildlife-aircraft collisions

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INTRODUCTION

Wildlife-aircraft collisions (wildlife strikes) pose a serious human health and safety risk to civil aviation. Aside from safety risks, wildlife strikes cost the aviation industry an estimated $718 million annually during 1990–2011 (Dolbeer et al. 2012). During this period, a total of 119,917 wildlife strikes affecting civil aviation were reported to the Federal Aviation Administration (FAA) (Dolbeer et al. 2012). In 1990, the FAA started collecting data concerning wildlife strikes at civil airports throughout the United States in the FAA's National Wildlife Strike Database (NWSD) (Dolbeer et al. 2012). Airline pilots and maintenance personnel, the air traffic control tower, airfield operations, USDA/APHIS/ Wildlife Services personnel, and others typically file the information with the NWSD. Chicago's O'Hare International Airport (ORD), located near Rosemont, IL, has been reporting strikes to this database since its inception in 1990.

In 1992, ORD partnered with the USDA/APHIS/Wildlife Services (WS) program to reduce the frequency and severity of wildlife strikes at the airport. A wildlife hazard assessment (WHA) was conducted by WS following a triggering wildlife strike event (see FAA 2007).

Following the completion of the WHA, a full-time WS airport biologist was employed to implement the wildlife hazard management plan (WHMP) mandated by the FAA. Since that time, ORD has increased the funding to staff 3 wildlife biologists and 2 biological science technicians at the airport to implement the WHMP.

In late 2005, the O'Hare Modernization Project (OMP) began at ORD. Since that time, significant habitat changes have occurred on the airfield. Prior to 2005, the airport habitats that were most attractive to wildlife hazardous to aviation consisted of numerous, large detention basins that held water year round and several wetland areas just outside the air operations area (AOA) of ORD. As part of the expansion project, additional land was purchased around the airport, including many of the wetland areas. As the project moved forward, these wetlands were mitigated and "banked" in areas away from ORD, reducing the amount of wetland habitats within the airport environment. Also, many of the detention basins on the airfield were redesigned to be less attractive to wildlife, particularly waterfowl. In recent years, many of the areas awaiting construction in the AOA were seeded in turf grasses and maintained per standard airport protocol (e.g., regularly mowed), thus changing the general characteristics of wildlife habitats within the airport environment. Our objective is to review past and current wildlife strike information, wildlife habitat management actions, raptor management efforts, and explore future management options to reduce wildlife strikes at ORD.

ANALYSIS OF WILDLIFE STRIKES AT ORD

Wildlife strike reporting to the FAA database is a voluntary system where reports are generally made by airport operations staff, pilots, or airline maintenance crews (Dolbeer and Wright 2009). Reports to the database are extremely important to airport wildlife managers in that it allows for the "fine tuning" of the wildlife management strategies on the airport. When managers can observe what species are being struck with regularity and identify the species that are causing damaging strikes to aircraft, management efforts can be focused on those species of wildlife that are posing the most risk to safe aircraft operations.

An analysis of the wildlife strike data from ORD over the past 11 years (2000−2012) shows there has been an increase in the number of wildlife strikes reported annually during this time period (Figure 1).

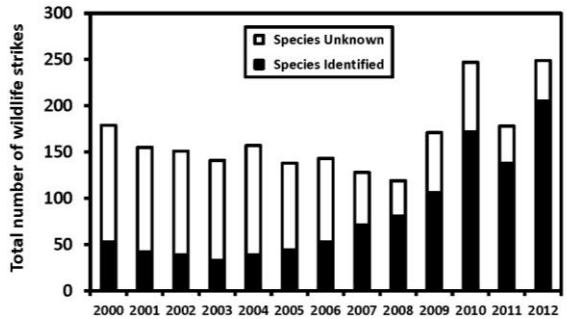

Figure 1. Total number of reported wildlife strikes, where the species involved was identified and where the wildlife involved was not identified (unknown), at Chicago's O'Hare International Airport during 2000−2012.

This increase is most likely attributed to an increased awareness of the importance of reporting strikes to the database by the airport, airline, and other personnel at the airport. Airport wildlife biologists and wildlife specialists working at ORD have conducted outreach efforts to various entities at the airport to attempt to ensure that all wildlife strikes are reported, and to reduce the proportion of 'unknown species' strikes that are reported to the FAA. During 2007−2012, the number of unknown strikes has been steadily decreasing, indicating to managers that the outreach efforts have been effective (Figure 1).

By comparing wildlife strike data across time periods (e.g., previous years to more recent data), managers are able to identify shifts in the guilds and specific wildlife species that are causing damage to aircraft (Figure 2), and in turn causing increased safety concerns (Pitlik and Washburn 2012).

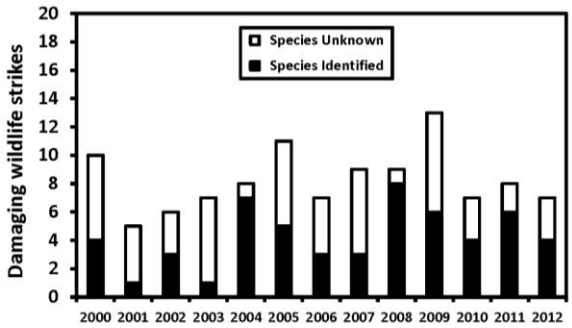

Figure 2. Total number of damaging wildlife strikes, where the species involved was identified and where the wildlife involved was not identified (unknown), at Chicago's O'Hare International Airport during 2000−2012.

The raptor guild (i.e., compilation of all hawk, owl, and vulture species) caused the most damaging wildlife strikes during 2007−2012, whereas waterfowl remain a concern and represent the second most struck and identified wildlife group (Figure 3). Thus, an integrated wildlife damage management plan is clearly needed and airport wildlife managers at ORD should focus their efforts on the management of raptors.

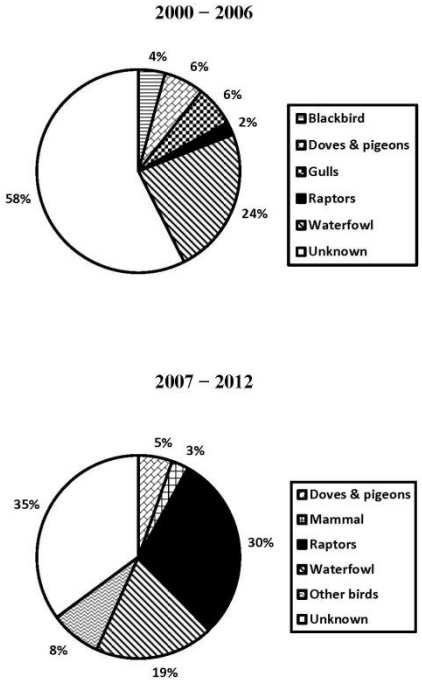

Figure 3. Proportion of reported wildlife strikes with damage to aircraft, by wildlife guild, at Chicago's O'Hare International Airport during 2000−2006 and during 2007−2012.

WILDLIFE MANAGEMENT EFFORTS

Airfield Habitat Management

Much of the wildlife management efforts at ORD are focused on the airfield habitats. During the ongoing OMP, WS airport biologists provide guidance on planting/landscaping proposals, detention basin design, and various other aspects of the expansion that could become attractants to wildlife hazardous to aviation. Habitats on the airport have changed drastically since the OMP began, including the redesign of most storm water detention basins on the airfield and the acquisition of additional acreage that has since been converted to open grasslands that are awaiting further conversion and incorporation into airport operations area. These habitat alternations have made areas of ORD much more attractive to a different suite of hazardous wildlife in comparison to the pre-OMP era. Wildlife strike data from each period indicates that, as a whole, ORD has become much more attractive to raptors but slightly less attractive to waterfowl species (Figure 3). Consequently, the integrated wildlife damage management program was modified and airport biologists are now focusing much of their attention on managing raptors in an effort to make the airport as safe as possible for air traffic.

Other techniques currently in use at the airport include planting of tall fescue (*Lolium arundinaceum*) varieties that are infected with an endophyte which has proven to be unattractive to some species of wildlife (Washburn et al. 2007, Washburn and Seamans 2012), mowing regimens to maintain airfield vegetation (i.e., grasslands) at a short height to reduce the number of small mammals present on the airport (Washburn and Seamans 2004, Washburn and Seamans 2007), removal of frequently used perching sites (e.g., trees, old structures/fences), and non-lethal hazing and harassment tools (e.g., pyrotechnics). Unfortunately, the non-lethal harassment techniques are not very effective at deterring raptors from the airport.

Raptor Management

Red-tailed hawk numbers in the midwestern USA have been increasing over time, as indicated by the trend data provided by the Breeding Bird Survey (Sauer et al. 2012).

During 1966−2011, red-tailed hawk (*Buteo jamaicensis*) populations increased annually by 1.9% in the USA and by 3.6% in Illinois (Sauer et al. 2012). Increases in raptor abundance have also occurred at ORD; numbers of red-tailed hawks and all raptors (8 species combined) removed from the airport has increased over time (Figure 4).

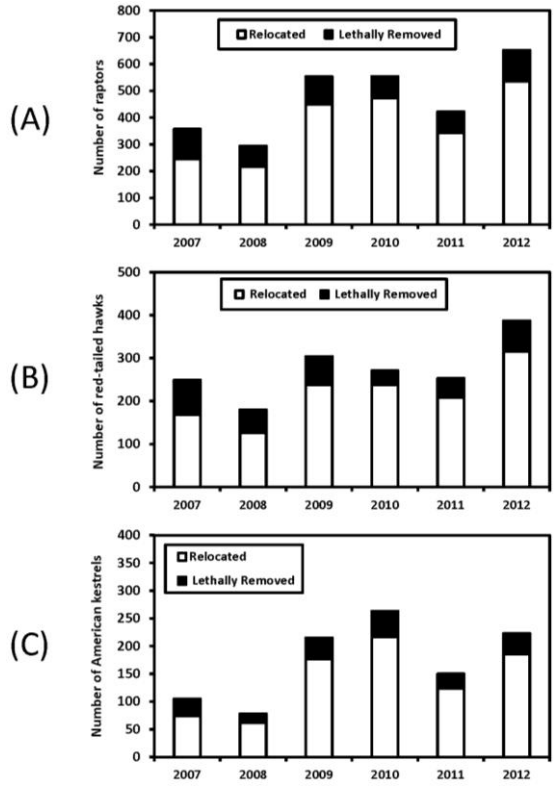

Figure 4. Total number of (A) raptors (8 species combined), (B) red-tailed hawks, and (C) American kestrels (Falco sparverius) lethally removed or live-captured and relocated from the Chicago's O'Hare International Airport during 2007−2012.

Removing raptors from the airport environment is an essential part of the management of this guild, but other management techniques are also important. Among the species of raptors that are observed at ORD, red-tailed hawks have become the major focus of our efforts, as they have caused the most damaging wildlife strikes at the airport during 2007−2012 (Table 1).

Current methods used at ORD to reduce the risk of raptor-aircraft collisions are generally focused on a live-trapping and relocation program. Raptors that are using the airport environment, more specifically the airfield itself, are captured using a variety of live-capture traps, including: Swedish goshawk traps, pole traps, dho-gaza traps, and bal-chatri traps (Bub 1978, Bloom et al. 2007). These methods are used throughout the year to live-capture and remove raptors from the airport environment. All captured birds are banded with a standard U.S. Geological Survey metal band and relocated away from the airport at a distance of 80 km or more. If the birds are captured a second time at the airport, they are relocated again. If they return a third time and are recaptured, they are humanely euthanized as these birds are exhibiting a high affinity for the ORD airfield. In addition, direct lethal control is used when individual raptors are identified as posing an immediate and direct threat to air traffic safety.

Raptor management on the airport has historically been a reactive measure to remove these species from the airport when they are observed. These methods have worked well, but due to a large influx of raptors and increasing efforts to remove those birds from the airport environment in recent years (Figure 5), wildlife management efforts need to consider additional techniques to increase effectiveness of the wildlife damage management program at ORD and consequently reduce the frequency and impacts associated with raptor-aircraft collisions at the airport.

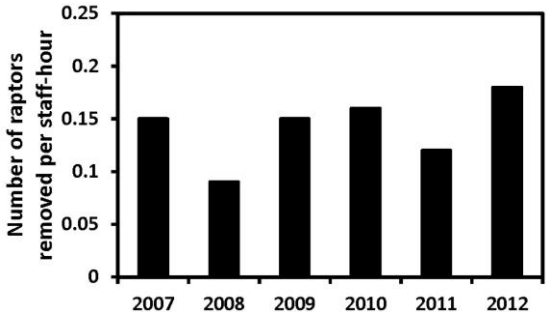

Figure 5. Number of raptors removed per staff-hour of effort at Chicago's O'Hare International Airport during 2007−2012.

Table 1. Average number of damaging wildlife strikes per 100,000 aircraft movements (range of damaging strikes per year), by wildlife species/group at Chicago's O'Hare International Airport during 2000−2006 and 2007−2012.

Wildlife species	Average number of damaging wildlife strikes per 100,000 aircraft movements (range of damaging strikes per year) 2000−2006			2007−2012	
Red-tailed hawk	-----	-----		0.152	(0 − 3)
Canada goose	0.076	(0 − 2)		0.057	(0 − 1)
Mallard	0.015	(0 − 1)		0.057	(0 − 2)
Double-crested cormorant	0.045	(0 − 2)		-----	-----
Peregrine falcon	-----	-----		0.038	(0 − 1)
Hawks (species unknown)	-----	-----		0.038	(0 − 1)
Ring-billed gull	0.030	(0 − 1)		0.019	(0 − 1)
Rock pigeon	0.030	(0 − 1)		0.019	(0 − 1)
Mourning dove	0.015	(0 − 1)		0.019	(0 − 1)
Gulls (species unknown)	0.015	(0 − 1)		0.019	(0 − 1)
Geese (species unknown)	0.015	(0 − 1)		0.019	(0 − 1)
Other wildlife[a]	0.015	(0 − 1)	***(or)***	0.019	(0 − 1)
Unknown	0.455	(1 − 6)		0.417	(1 − 7)
TOTAL	0.819	(5 − 11)		1.010	(7 − 13)

FUTURE MANAGEMENT

Future management of this species group includes investigation of installing perch deterrents on FAA structures around the airport to reduce foraging opportunities. Installation of these devices will require close coordination with the FAA and airport managers. Wildlife managers at ORD are also considering a study to investigate if alternative habitat management practices (e.g., taller grass management) on the airport can be effective at reducing the foraging success of raptors at the site, in turn reducing the overall number on and around the airport. Pesticide applications (e.g., zinc phosphide for small mammals; insecticides for grasshoppers) are also being considered in the runway safety areas in an effort to reduce the prey base for raptor species (Washburn et al. 2011, Witmer 2011). These treatments are expensive and will require close coordination with the FAA and ORD managers.

LITERATURE CITED

BUB, H. 1978. Bird trapping and bird banding: a handbook for trapping methods all over the world. Cornell University Press, Ithaca, NY.

BLOOM, P. H., W. S. CLARK, and J. W. KIDD. 2007. Capture techniques. Pages 193−220 *in* D. M. Bird and K. L. Bildstein, (eds.). Raptor research and management techniques, Hancock Publishers Ltd., Blaine, WA.

DOLBEER, R. A., and S. E. WRIGHT. 2009. Safety management systems: how useful will the FAA National Wildlife Strike Database be? Human-Wildlife Conflicts 3:167−178.

DOLBEER, R. A., S. E. WRIGHT, J. WELLER, and M. J. BEGIER. 2012. Wildlife strikes to civil aircraft in the United States 1990-2011. U.S. Department of Transportation, Federal Aviation Administration, Serial Report Number 18, Washington, DC. 81pp.

FEDERAL AVIATION ADMINISTRATION. 2007. Hazardous wildlife attractants on or near airports. Advisory Circular 150/5200-33B. U.S. Department of Transportation, Federal Aviation Administration, Office of Safety and Standards, Washington, DC.

PITLIK, T. J., and B. E. WASHBURN. 2012. Using bird strike information to direct effective management actions within airport environments. Proceedings of the Vertebrate Pest Conference 25:225-229.

SAUER, J. R., J. E. HINES, J. E. FALLON, K. L. PARDIECK, D. J. ZIOLKOWSKI, Jr., and W. A. LINK. 2012. The North American Breeding Bird Survey, Results and Analysis 1966 − 2011. Version 12.13.2011. USGS Patuxent Wildlife Research Center, Laurel, MD.

WASHBURN, B. E., and T. W. SEAMANS. 2004. Management of vegetation to reduce wildlife hazards at airports. Proceedings FAA Worldwide Airport Technology Transfer Conference. Atlantic City, NJ.

WASHBURN, B. E., and T. W. SEAMANS. 2007. Wildlife responses to vegetation height management in cool-season grassland. Rangeland Ecology and Management 60:319–323.

WASHBURN, B. E., S. C. BARRAS, and T. W. SEAMANS. 2007. Foraging preferences of captive Canada geese related to turfgrass mixtures. Human-Wildlife Conflicts 1:188−197.

WASHBURN, B. E., G. E. BERNHARDT, and L. A. KUTSCHBACH-BROHL. 2011. Using dietary analyses to reduce the risk of wildlife-aircraft collisions. Human-Wildlife Interactions 5:204−209.

WASHBURN, B. E., and T. W. SEAMANS. 2012. Foraging preferences of Canada geese: implications for reducing human-goose conflicts. Journal of Wildlife Management 76:600−607.

WITMER, G. W. 2011. Rodent population management at Kansas City International Airport. Human- Wildlife Interactions 5:269−275.