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IT'S A BIRD, IT'S A PLANE, IT'S A PROBLEM: THE IMPACT OF BIRD STRIKES ON THE CIVIL AVIATION INDUSTRY

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I. INTRODUCTION

"THERE IS ONE form of collision which must not be altogether forgotten; the possibility of colliding with birds in flight . . . [A]n aeroplane encountering a flock of ducks at night . . . might lead to danger of injury to the pilot, the propeller or wing structure."¹ Avian collisions with aircraft began when humans started flying planes. In fact, the first reported fatality caused by a bird, purported to be a gull, was in 1912 when the bird became stuck in control wires of a Wright Flyer.² These bird strikes have appeared to be nothing more than a minor issue affecting the aviation industry until recently. All it took was the “Miracle on the Hudson” to open the eyes of the American public. On January 15, 2009, US Airways Flight 1549 was forced to land on the Hudson River after the engines were destroyed by birds.³ A final report detailing the events of Flight 1549 has not yet been issued by the National Transportation Safety Board (NTSB), who held a public hearing regarding the

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incident as late as June 2009. According to the Feather Identification Lab at the Smithsonian Institute, the birds that destroyed the engines were identified as three Canada Geese. "A 12-lb Canada goose struck by a 150-mph aircraft at lift-off generates the kinetic energy of a 1,000-lb weight dropped from a height of 10 feet." Chelsey Sullenberger's heroic landing brought all 155 people on board to safety, but this flight should resound to the public as a warning call. The passengers on that plane were very fortunate, and another pilot might not have been able to produce the same, safe outcome. With many more planes taking flight every day, and the increasing reliance on air travel, bird strikes are now rising to the forefront of the aviation industry and truly present a global problem.

This article reviews the background, current manifestation, and the overall implications of bird strikes. Part II of this article offers a statistical analysis of bird strike data within the United States and details several recent incidents. Part II also examines current technologies that exist to prevent bird strikes and to reduce the presence of birds near airports. Part III of this article provides the existing state of the law, including rules and regulations from the Code of Federal Regulations, the International Civil Aviation Organization (ICAO), the Federal Aviation Administration (FAA), and recommendations and best management practice guidelines from the Birdstrike Committee USA (Committee). In addition to the current state of the law from a regulatory perspective, Part III includes information regarding

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7 Wald & Robbins, supra note 3, at A25. 57-year old Captain Sullenberger graduated from the Air Force Academy in 1973, where he was deemed to be the top flier in his class. Prior to the accident "[h]e had worked with federal aviation officials investigating crashes and improving training and methods for evacuating aircraft in emergencies." Ray Rivera, In a Split Second, a Pilot Becomes a Hero Years in the Making, N.Y. TIMES, Jan. 17, 2009, at A21.
potential liability when a bird strike causes damage to a plane or death or injury to a person. Part IV is an in-depth analysis of the current state of the law and of proposals for improvement, specifically in the areas of reporting. Part IV of this article seeks to provide recommendations with respect to proposed legislation, including provisions absent from the proposed legislation that should be considered. Additionally, this article demonstrates the need for more uniformity, both internationally and within the United States. Lastly, the article suggests improvements for preventive techniques in the areas of technology, certification standards for aircraft components, and pilot training and education. Ultimately, this article will determine that bird strikes are a problem of ever-increasing importance, and thus must adequately be recognized with improved legislation, effective uniformity among nations, and changes in basic premises of bird strike control management programs to better achieve the goal of collision prevention.

II. BACKGROUND

According to the FAA, a bird strike is believed to have occurred when a pilot reports striking a bird, when maintenance personnel identify the cause of aircraft damage as a bird strike, when ground personnel report witnessing an actual strike, when bird remains "are found within 200 feet of a runway centerline, unless another reason for the animal's death is identified," or when the presence of a bird had a "significant negative effect on a flight," such as an aborted takeoff or landing. This section offers an overview of bird strike statistics from the last two decades, along with detailed accounts of several important incidents involving bird strikes in recent years, followed by an examination of the various approaches to bird strike control management programs.

A. BIRD STRIKE STATISTICS AND INCIDENTS

For the very first time, the FAA made the National Wildlife Strike Database, containing annual data on bird strikes, availa-

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ble to the public on April 24, 2009. Most likely, the FAA released this data because of heightened media awareness about bird strikes on aircraft after the “Miracle on the Hudson.” This FAA report details and analyzes bird strike data existing within the National Wildlife Strike Database from the last nineteen years (1990-2008). During this period, “89,727 strikes were reported to the FAA.”

In 1990, 1,738 bird strikes to civil aircraft were reported to the FAA. In 2008, however, an overwhelming 7,286 bird strikes were reported, which is more than four times the number of strikes that occurred in 1990. In fact, on average, from 2004 to 2008, there were approximately twenty wildlife strikes per day. Additionally, recent figures suggest that approximately 50,000 bird strikes occur worldwide on civil aircraft every year. The five states with the highest number of bird strikes over this nineteen year period were California with 7,442 strikes; Texas with 5,963 strikes; Florida with 5,571 strikes; New York with 4,732 strikes; and Illinois with 3,958 strikes. Note that half of the top ten busiest airports in the United States are located within these five states. Over 85 percent of all strikes occurred on commercial airliners, with the remaining 15 percent occurring on small, single- or twin-engine aircraft and Learjets. It is

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10 See generally FAA STATISTICS, supra note 5, at viii. Never before has the FAA released this information specifying bird strike activity by airport. In fact, the FAA initially proposed to keep the database a secret, fearing that it might cause airports to cease reporting if the results caused any certain airport to appear unsafe. See Matthew L. Wald, Agency Releases Data on Birds Hitting Aircraft, N.Y. TIMES, Apr. 24, 2009, at A9.

11 FAA STATISTICS, supra note 5, at 1.

12 Id. at 4. In addition to birds, this number includes terrestrial mammals (2.1 percent), bats (0.3 percent), and reptiles (0.1 percent). Thus, birds were found to be the cause in over 97 percent of these strikes. Id.

13 Id. at 19.

14 Id.

15 Id. at vii.


17 FAA STATISTICS, supra note 5, at 5, 22. The four months of July through October represent approximately half of the total number of strikes since out of 87,416 strikes, 44,745 occurred during these months. Id. at 5, 23.


19 FAA STATISTICS, supra note 5, at 5, 21. Merely because strikes on smaller aircraft represent only 15 percent of the total number of strikes, these should not
possible that pilots of smaller, private aircraft do not report bird strikes as often as commercial airlines currently do, so these strikes may be reported even less than the FAA’s original estimate that reports are made only 20 percent of the time. A bird is approximately five times more likely to strike a plane with an engine located under the wing, such as a Boeing 737, than it is a plane with the engines mounted on the fuselage like an MD-80.

Bird strikes are costly, both in terms of dollars and in terms of the loss of human lives. In the last nineteen years, there have been fifteen fatalities on civil aircraft due to bird strikes. This number, however, does not include a recent accident. On January 4, 2009, just days before the “Miracle on the Hudson,” a helicopter crashed into a marsh just a few minutes after takeoff from Amelia, Louisiana. The helicopter hit a Red Tail Hawk, which weigh 2.4 pounds on average. There was evidence of bird remains on the windscreen on the pilot-side and “in the folds of the right side engine inlet filter.” The cockpit voice recorder (CVR) recorded a large banging sound, followed by a

be ignored. If hit, smaller planes are vulnerable to significant damage. Wald, supra note 10.


Brendan Borrell, What is a Bird Strike? How Can We Keep Planes Safe from Them in the Future?, SCIENTIFIC AM., Jan. 15, 2009, http://www.scientificamerican.com/article.cfm?id=what-is-a-bird-strike&page=2. “It is probably because the airflow over the MD-80 causes the birds to get blown away from the engines.” Id.

FAA STATISTICS, supra note 5, at 9, 48. It is important to mention that this number includes only civil aircraft. Military planes have also gone down as a result of bird strikes. See Safety Recommendation Letter from John Hall, Chairman, Nat’l Transp. Safety Board, to Hon. David R. Hinson, Adm’r, Fed. Aviation Admin. (July 8, 1996), available at http://www.ntsb.gov/recs/letters/1996/a96_38_42.pdf. In 1995, a military plane crashed in Alaska after a flock of geese flew in front of the plane and were ingested in the engines, killing all twenty-four people on board. Id.


NTSB INTERIM FACTUAL SUMMARY, supra note 23.
lot of background noise, and the tape ended seventeen seconds later. There was one survivor who was critically injured, but both pilots and six other passengers did not survive the crash. Additionally, 2,455 civil aircraft were reported to have suffered substantial damage due to bird strikes during the nineteen-year period from 1990-2008. Air collisions with wildlife cost the civil and military aviation industry approximately $600 million dollars in damage annually and over 500,000 hours of aircraft down-time. The cost to repair the damaged planes since 1990 is believed to be more than $267 million dollars. The Air Force has reported over $250 million dollars in bird strike damage involving just one type of bird, the American White Pelican. Less often considered are the indirect bird strike costs, including delays, passenger routing, and losses in fuel.

The four-fold increase in strikes is due to the increase in wildlife populations, air travel, and quieter, more efficient engines that birds cannot as easily detect. Regarding the increase in wildlife population, although many bird populations may have declined in recent years, the species specifically posing threats to the aviation industry have not. Certain “[c]limatological changes have allowed new species to forage and breed in geographic areas which were not particularly suitable to them several decades ago.” A reduction in pesticides and DDT has also caused increases in certain populations. Additionally, increases in waterfowl, such as geese and ducks, may be attributed

26 Id.
27 Id.
28 FAA Statistics, supra note 5, at 29.
29 Naumann, supra note 16 (noting the amount of downtime resulting from bird strikes); Bird Strike Committee, supra note 6 (noting the cost resulting from bird strikes).
31 BSI: Bird Strike Investigation, supra note 4.
33 FAA Statistics, supra note 5, at 2–3.
36 Id.
to measures taken to protect the wetland habitats for birds of this type.\textsuperscript{37}

The FAA specifically takes note of Canada geese—the bird species that destroyed the engines of US Airways Flight 1549—whose population has "increased at a mean rate of 7.3 percent each year" from 1980 to 2007.\textsuperscript{38} Indeed, the "Miracle on the Hudson" was not the first reported bird strike occurring in New York around the Hudson River nor the first involving Canada geese. On November 19, 2008, a helicopter near West Point Military Academy struck a Canada goose and made a precautionary landing; the total damages amounted to over $91,000.\textsuperscript{39} Nearby in Morristown, New Jersey on July 24, 2008, takeoff was aborted when a Learjet struck a flock of Canada geese, resulting in three million dollars worth of damage.\textsuperscript{40} Additionally, the American white pelican population has also increased.\textsuperscript{41} On March 4, 2008, just a few minutes after takeoff from an airport in Oklahoma City, Oklahoma, a Cessna 500 collided with one or more American White Pelicans, damaging the wing causing the plane to crash, and killing all five passengers on board.\textsuperscript{42} Although the plane was required to meet the "bird-strike certification standards for transport category airplanes," found in 14 C.F.R. § 25,\textsuperscript{43} the small charter plane was equipped to withstand only a four-pound bird, not one weighing nearly twenty pounds, as the pelican does.\textsuperscript{44} Notably, Wiley Post Airport (WPA), the airport the plane took off from, is located near "[t]wo large lakes, a river, and a wildlife refuge area."\textsuperscript{45}


\textsuperscript{38} \textit{FAA Statistics}, supra note 5, at 2.

\textsuperscript{39} \textit{Id.} at 60.

\textsuperscript{40} \textit{Id.} at 58.

\textsuperscript{41} \textit{Id.} at 2.

\textsuperscript{42} \textit{Nat'l Transp. Safety Bd., Accident Report, Crash of Cessna 500, N113SH Following an In-Flight Collision with Large Birds, Oklahoma City, Oklahoma, Report No. AAR09-05, vii (2009), available at http://www.ntsb.gov/publictn/2009/AAR0905.pdf} [hereinafter NTSB Accident Report AAR09-05]. It is upsetting to think that if the FAA had focused on the reduction of the birds that were known to be experiencing population increases, then quite possibly the three passengers and two pilots aboard the Cessna charter plane would still be alive, and Captain Sullenberger would not have been forced to land the US Airways plane on the Hudson River.

\textsuperscript{43} \textit{Id.} at 6.

\textsuperscript{44} \textit{Id.} at 11–12.

\textsuperscript{45} \textit{Id.} at 8.
The second factor impacting the number of bird strikes over the last nineteen years is the increase in aircraft travel. Since 1970, global air travel has grown by a remarkable factor of five.\textsuperscript{46} The FAA states that “commercial air traffic increased from about 18 million aircraft movements in 1980 to 28 million in 2008.”\textsuperscript{47} Further emphasizing the importance of developing proper management techniques for bird control, air travel is estimated to double in the next twenty years.\textsuperscript{48}

The final factor causing the increase in the number of bird strikes is that loud engines on aircraft have been replaced with quieter, more efficient engines that birds cannot detect as easily.\textsuperscript{49} There is evidence that some of these species are seemingly becoming immune to the noise made by the aircraft.\textsuperscript{50} Further, much of the sound comes out of the back of the engine instead of the front, as it did in earlier propeller-driven aircraft.\textsuperscript{51} This problem has the potential only to worsen, considering fairly recent interest in "going green."\textsuperscript{52} Pratt & Whitney has created a new engine with a larger fan that “spins at one-third the speed of the turbine, creating a quieter, more powerful engine the company says requires less fuel, emits less CO\textsubscript{2}, and costs 30 percent less to maintain.”\textsuperscript{53} Fan jets are supposedly quieter, so birds simply cannot hear them as well.\textsuperscript{54}

Additionally, the FAA report also reveals specifics regarding monthly activity and indicates that bird strikes more frequently occur during the months of July and October.\textsuperscript{55} This time period is just after the breeding season, when adult birds and their

\textsuperscript{46} Ausubel, et al., supra note 8.
\textsuperscript{47} FAA STATISTICS, supra note 5, at 2–3.
\textsuperscript{49} FAA STATISTICS, supra note 5, at 2–3.
\textsuperscript{50} BSI: Bird Strike Investigation, supra note 4.
\textsuperscript{51} Borrell, supra note 21.
\textsuperscript{53} Id. The industry “is lining up behind the engine” and Pratt & Whitney anticipates the engine to be “in regular service by 2013.” Id. Additionally, Pratt & Whitney is already planning to put the engines in certain smaller aircraft, including Mitsubishi and Bombardier jets. Id.
\textsuperscript{55} FAA STATISTICS, supra note 5, at 5.
young are present during the fall migration.\textsuperscript{56} Birds migrate annually along routes that generally have many airports located along their paths, and the potential for a bird strike occurrence along these paths is approximately five times higher during this season.\textsuperscript{57} For example, recently the Sacramento Airport reported three incidents on two different airlines that all occurred on January 5, 2010.\textsuperscript{58} Luckily, the incidents did not involve any injuries and resulted in only minor damage to two of the aircraft, but the problem remains: the Sacramento International Airport “sits beneath a bird migration path.”\textsuperscript{59} This particular airport has experienced the highest number of strikes in its region, with approximately 1,300 reported strikes from 1990–2007.\textsuperscript{60}

Additionally, sixty percent of the strikes occur during the landing phase, with over seventy percent of the strikes occurring when the aircraft was at a height of 500 feet or less above ground level.\textsuperscript{61} Bird strikes are more likely to occur during the day, which is not a surprise considering that most air travel is conducted during the daylight hours.

Lastly, the FAA report includes details on the information provided in the bird strike report although the actual species of bird was provided in the bird strike report less than half the time.\textsuperscript{62} This might be because generally, the pilot may not even know that the collision has occurred or the pilot may not have had ample opportunity to view the bird or birds. Additionally, a pilot may not know every type of bird species that is found in the region he is flying over. Nonetheless, gulls were the highest number of birds to be reported at nineteen percent, followed by doves and pigeons at fifteen percent and waterfowl at eight percent.

\textsuperscript{56} Robert J. Brown, Bird Strike Hazards at Airports and Assessment of Bird Strikes at a Midwestern Airport: 2000–2007 12 (2008) (unpublished thesis for Master of Environmental Science requirement), available at http://etd.ohiol ink.edu/send-pdf.cgi/Brown%20Robert%20Jeffrey.pdf?acc_num=miami1229046725. It is not known if this is due to the rise in population of the birds after successful nesting or an increase in travel and frequency of flight. \textit{Id.}

\textsuperscript{57} \textit{Id.}


\textsuperscript{59} \textit{Id.}

\textsuperscript{60} \textit{Id.}

\textsuperscript{61} FAA STATISTICS, supra note 5, at 5–6.

\textsuperscript{62} \textit{Id.} at 8.
It is interesting to note that the waterfowl were involved in "1.2 times more damaging strikes . . . than were gulls." As of the time of this writing, the FAA has not completed the final numbers for bird strikes in 2009. However, the data that is available proves alarming. It is believed the final number for bird strike occurrences in 2009 could reach 10,000, which amounts to approximately twenty-seven strikes occurring each day. From January 2009 to July 2009, there were at least fifty-seven reported bird strikes that caused extensive damage, and there were eight people killed and six injured. Even though the numbers are outstandingly high, the FAA's initial concern when it released the data from 1990-2008 that airports might be more reluctant to report may even be true; Teterboro Airport in New Jersey, which had shown 46 strikes in the first seven months of 2008, only reported 12 strikes in the first seven months of 2009.

**B. Bird Strike Control Management Programs**

The Committee suggests four main areas for the employment of tools to solve the airport's wildlife problems; these include: "(1) [a]ircraft flight schedule modification; (2) [h]abitat modification and exclusion; (3) [r]epellent and harassment techniques; and (4) [w]ildlife removal." It is suggested that the airport manager integrate these four basic control strategies into the Wildlife Hazard Management Plan (WHMP), which will

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63 Id.
64 Id.
65 Bird Strikes may Hit Record High of 10,000, N.Y. Post, Jan. 12, 2010, available at http://www.nypost.com/p/news/local/bird_strikes_may_hit_record_high_XIiu0IEwwA0pESu8L1ONOP.
66 Id. Eight fatalities in seven months is an astonishing number considering that throughout a nineteen year period from 1990–2008, the FAA claims that there were sixteen fatalities from wildlife strikes, fifteen of which resulted from some species of bird. See FAA STATISTICS, supra note 5, at 48. Thus, by relying on the data from 1990–2008 as an indicator, it should have taken approximately nine or ten years for eight fatalities to occur from bird strikes; instead, this number was met in a mere seven months.
67 See Wald, supra note 10; see also Bird Strikes May Hit Record High of 10,000, supra note 65. When asked about the numbers, the airport stated that there were actually 28 strikes, instead of 12. Bird Strikes May Hit Record High of 10,000, supra note 65. A Port Authority Spokesman referred to this mishap as an "oversight" that would be corrected. Id.
68 BIRD STRIKE COMMITTEE USA, INTERNATIONAL BIRD STRIKE COMMITTEE, BEST MANAGEMENT PRACTICES FOR AIRPORT WILDLIFE CONTROL § 2.2.1 (June 15, 2007), http://www.birdstrike.org/meetings/BMP.htm [hereinafter BEST MANAGEMENT PRACTICES].
generally serve as the airport's main guidance tool for managing the problem of birds and other wildlife. Thus, it is the airport itself that is ultimately responsible for properly identifying and assessing the problem and for creating appropriate prevention methods. There are many specific approaches that can be applied to avoid bird strikes altogether, or at least to mitigate the potential for harm due to bird strikes. The types of methods typically included in a bird control management program are discussed in detail in the next paragraphs.

Modifying flight paths and flight times is one way to attempt to reduce the number of bird strikes that occur. Given the inflexibility of most passengers' schedules, aircraft flight schedule modification may not be an altogether feasible option for the commercial aviation industry. Commercial passengers are relying on a scheduled flight, and they most likely would not handle cancellations merely due to the presence of birds. Certainly, the Air Force can choose when to fly a plane to its destination and what route it will take, but commercial airliners do not necessarily have that flexibility. The Committee indicates that making changes to flight schedules could lessen the potential for a collision occurring with a “species that has a predictable pattern of movement.” This would be especially true during the migratory season when the migratory routes of certain bird species are known.

Habitat management is the second type of control technique recommended by the Committee. First, airports can be designed to avoid certain bird habitats. The 1990–2008 reporting data is helpful in that it informs the aviation industry of the particular bird species that have the highest number of bird strike incidents and the types of birds that have been linked to the most extensive types of damage to aircraft components. In order to avoid potential types of species, it would be vital to

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69 Id. § 2.2.5.
70 Id. § 2.2.1.
71 BSI: Bird Strike Investigation, supra note 4.
72 Id.
73 Best Management Practices, supra note 68, § 2.2.2.
74 Id. § 2.2.1.
build airports in locations that are not near wetlands. The FAA designates separation criteria in the form of distances from hazardous wildlife attractants. Even if the airport cannot physically relocate, the airport could make modifications to the environment so the birds would be forced to relocate or never attempt to make their homes there in the first place. The Committee places emphasis on the fact that all airports are different and have different needs tailored to the presence of particular species, so it is therefore impossible to name the particular modifications that would be applicable to all airports. This is why species identification is so important. A perfect example of this is how often to mow the grass around the airport. If birds or other wildlife present a problem at a particular airport, the species would need to be appropriately identified and researched to determine if the species prefers areas with tall grass or areas with almost no grass. Netting water bodies or removing greenery, including trees and shrubs, are two possible options that airports may employ when performing habitat modification. Alternatively, halting any agricultural activity near the airport and selecting planting that does not attract wildlife near the terminals may also be employed. Most importantly, the airport operators need to develop a plan that works for that specific airport, which most likely will involve "trial and error."

The basic idea behind the third and fourth techniques the Committee provides for in the Best Management Practice recommendations is to reduce the number of birds available, which will in turn reduce the number of strikes. Repellent and har-

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77 See Judkis, supra note 75. To determine what is or is not a wetland, the airport management can contact "the local division of U.S. Army Corps of Engineers, the Natural Resources Conservation Service, or a wetland consultant qualified to delineate wetlands." See FAA ADVISORY CIRCULAR 150/5200-33B, supra note 9, at 8.

78 FAA ADVISORY CIRCULAR 150/5200-33B, supra note 9, at 1. The distances are based on "(1) flight patterns of piston-powered aircraft and turbine-powered aircraft; (2) the altitude at which most strikes happen (78 percent occur under 1,000 feet and 90 percent occur under 3,000 feet above ground level); and (3) National Transportation Safety Board (NTSB) recommendations." Id.

79 Judkis, supra note 75.

80 BEST MANAGEMENT PRACTICES, supra note 68, § 2.2.3.

81 Wald, supra note 10.

82 Id.

83 Id.

84 Id.

85 See id. §§ 2.2.4, 2.2.5.
assessment techniques are used merely to keep the birds away from the airport. One of the biggest decisions facing the airport operator is whether to apply hi-tech electronic solutions for bird dispersal or to adopt more of a physical approach. First of all, the airport may employ specific “scare tactics” in an attempt to force the birds to relocate. For example, the airport might employ the assistance of other animals like trained dogs; in addition, the airport might also use remote-control boats to chase birds out of ponds or light firecrackers to scare them away.

After employing techniques such as “noise makers, ultra sonic frequencies, and fake owls” with no success at a marine corps air station in North Carolina, they began using vulture effigies hung from roost structures which eliminated vultures from the airport towers within a couple of days. If this technique is used, the effigy must become a permanent structure because there is some evidence that if removed, the vultures will return.

Internationally, there are some airports that have experienced success using sound to reduce the number of birds present in the area on or near the airport. In Italy, where it is reported that gulls are the biggest problem, there are over forty airports using a “high-tech digital bio-acoustic system” to manage the birds. This technology, originating from a system employed at Gatwick airport in London in the 1980s, involves broadcasting “carefully edited digital recordings of birds’ distress calls from vehicles or individual staff members patrolling an airport.”

London discontinued the use because there were reliance issues with the audiotapes that caused confusion among the birds.

86 Id. § 2.2.1.
87 Tom Allett, The Ultima Solution: Tom Allett Reports on How Modern Distress Call Technology is Being Used to Solve an Age-old Problem, AIRPORTS INT’L, May 1, 2008, at 36.
88 BSI: Bird Strike Investigation, supra note 4.
90 See Stephen A. Ball, Suspending Vulture Effigies from Roosts to Reduce Bird Strikes, 3 HUMAN-WILDLIFE CONFLICTS 257, 258 (Fall 2009), available at http://www.berrymaninstitute.org/journal/fall2009/vulture_effigies_ball.pdf. Interestingly, the effigies could be created either from real turkey carcasses or fake ones, and it does not seem to affect the success if the effigy is headless! Id.
91 Rose, supra note 2, at 20.
92 Id.
while the tapes were rewinding. Appropriately named “Scarecrow,” the system is much more reliable now that it is digital. In use since 1998, Scarecrow has a success rate of nearly 100 percent and is being used in over twenty countries. Italy has also seen success with “habitat studies and setting up bird control units.” U.K. airports have replaced nearly all of their bio-acoustic distress call systems with Scarecrow’s new product called Ultima. Ultima is GPS-based, and in addition to playing the proper distress call at the appropriate pitch, it saves administration time by recording the details of species, counting birds, and identifying whether the dispersal was a success. This is an important advancement in the area of reporting as it allows for more flexibility and provides for more options. Further, the data reports have been tailored to the requirements set out by the ICAO. The system is believed to have a 75 percent success rate overall and is multilingual to further accommodate the global bird strike problem. Pittsburgh International Airport recently began testing Ultima, so it is possible that the United States will use products like this at some point in the near future.

The Committee indicates that wildlife removal, the fourth method, should be exercised only upon the failure of all others. As possibly a milder method of reduction, eggs can be oiled to prevent them from hatching in order to reduce population growth. However, some of these elimination efforts may be hindered by animal protection laws. Perhaps the most widely-recognized law protecting wildlife is the Endangered Species Act (ESA). Essentially, the ESA prevents the taking of any endangered species, encompassing any act “to harass, harm,
pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.\textsuperscript{107} Permits authorizing an incidental take, however, may be issued.\textsuperscript{108} Additionally, migratory birds are protected under the Migratory Bird Treaty Act of 1918.\textsuperscript{109} Unlike the ESA, the Migratory Bird Treaty Act does not allow a permit for an incidental take.\textsuperscript{110} On October 11, 2009, California signed Senate Bill 481 into law, which “gives all public use airports with federal depredation permits assurances that they have a legal right to remove birds they believe may endanger planes.”\textsuperscript{111} In other words, the birds can now be freely killed without the airport officials fearing prosecution. Laws of this sort will more than likely spark outrage and debate from animal rights and conservation groups, especially considering that many bird populations are decreasing.\textsuperscript{112} An interesting point on eliminating birds by killing them is that “[e]liminating any one problem species will only lead to some other species taking its place.”\textsuperscript{113} An airport is an ecosystem, and the role that the eliminated species served within that ecosystem will likely be filled by another species.\textsuperscript{114}

Falconry, a technique used as early as 1940, has gained significant importance in airports in Spain and was also recommended by the International Birdstrike Committee in 2006.\textsuperscript{115} Falconry is not always used as a kill technique. Rather, “[t]he objective of modern airport falconry is not primarily to prey on invading birds, but rather to prevent them encroaching on airport grounds by the use of a natural predator.”\textsuperscript{116} In order to suc-

\textsuperscript{107} Id. §§ 1532, 1538.
\textsuperscript{108} Id. § 1539.
\textsuperscript{109} Id. §§ 703–711.
\textsuperscript{112} See generally NORTH AMERICAN BIRD CONSERVATION INITIATIVE, supra note 37.
\textsuperscript{114} Id. The Committee has determined the superior solution to reducing the potential for bird strikes is to employ a “combination of bird control measures which take into account habitat management to reduce the attractions of food, water and shelter.” Id.
\textsuperscript{115} Naumann, supra note 16.
\textsuperscript{116} Id.
cessfully employ falconry, it must be determined what bird species present problems for the particular airport so that the proper species of prey is selected. In Spain, it is common for falcons to be used. And the Spanish airport falconers utilize many methods to control bird populations. The first method distinguishes between hunting flights, where the falcon is set loose, and covering flights, which function as an advertisement of the falcon’s presence and merely serve as a preventative measure. There are also two techniques used, including the “waiting on” style, where the falcon flies in circles above the falconer “until he (or his dog) flushes prey from the cover below.” A second technique is known as “out of hood” and is more commonly used in shortwing hawks. Captures are more frequent with this method because it is a direct attack technique. Falconry may experience positive successes during the migratory period, since it is a method of driving away birds that invade airport grounds. On a positive note, this method does not have to be at the expense of the invading birds, because the falcon selects the weakest member of the flock, performing its own “natural selection.” However, falconry is costly because it requires considerable staff, procedures, and infrastructure. Although shown to be successful in Spain, there have been some complaints about using birds of prey in the United Kingdom, recognizing that there is simply “no guarantee that [a] bird of prey will rise to the occasion.” When evaluating methods for bird control management, it is important to realize that different species prefer different things, so each airport will need to find methods and techniques that work specifically for that airport and the types of species present near it.

III. CURRENT STATE OF THE LAW

Airports are governed by their own rules and practices, subject to federal rules imposed by the FAA. Internationally, the

\[\text{footnotes}\]

\[\text{Id.}\]
\[\text{Id.}\]
\[\text{See id.}\]
\[\text{Id.}\]
\[\text{Id.}\]
\[\text{Id.}\]
\[\text{Id.}\]
\[\text{Id.}\]
\[\text{Id.}\]
\[\text{Id.}\]
\[\text{Id.}\]
\[\text{Id.}\]
\[Allett, supra note 87.\]
ICAO sets guidelines and provides recommendations and practices for states to follow. This section provides a summary of the various governing bodies that all contribute to the rules the civil aviation industry as a whole currently follows. Additionally, this section offers a glimpse into the courtroom in the United States and how litigation concerning bird strikes is most likely to conclude, from the perspectives of the relevant parties.

A. The International Civil Aviation Organization’s Approach

The ICAO has long recognized the problem of bird strikes, as evidenced by the fact that an amendment concerning the issue of bird strikes was added to Annex 14 in 1969.\textsuperscript{128} The ICAO has provided some valuable suggestions that, if followed by all member States, would assist in better decision-making for effective measures to control and prevent bird strikes. For example, a national procedure should be developed for recording and reporting bird strikes.\textsuperscript{129} The data can then be forwarded on to ICAO for inclusion in the ICAO Bird Strike Information Database (IBIS).\textsuperscript{130} Additionally, the appropriate authority must take proper measures when a hazard is present.\textsuperscript{131} Finally, the creation of garbage dumps or other types of establishments that might encourage bird activities near airports is discouraged.\textsuperscript{132} The ICAO recommends that “[d]ue consideration . . . be given to airport operators’ concerns related to land developments close to the airport boundary that may attract birds/wildlife.”\textsuperscript{133} The ICAO suggestions pertaining to bird strikes are all fairly general, such as recommending that action be taken to reduce the number of birds that have the potential to cause a bird strike around the aerodrome.\textsuperscript{134} The ICAO, however, further states that “[g]uidance on effective measures for establishing whether or not birds, on or near an aerodrome, constitute a potential hazard to aircraft operations, and on methods for discouraging their presence, is given in the Airport Services Manual, Part

\textsuperscript{129} Id. § 9.4.
\textsuperscript{130} Id. § 9.4.2.
\textsuperscript{131} Id. § 9.4.3.
\textsuperscript{132} Id. § 9.4.4.
\textsuperscript{133} Id.
\textsuperscript{134} See id. § 9.4.3.
This planning manual should serve as the international model for guidance and is what the FAA uses to determine its basic standards for airports in the United States.

B. The Federal Aviation Administration’s Approach

1. FAA Advisory Circular

The FAA Advisory Circular 150/3200-33B sets out guidelines for airports having the potential to attract hazardous wildlife. The FAA makes the standards mandatory for airports that receive “[f]ederal grant-in aid assistance,” but for other airports, the standards are merely recommendations. The circular provides separation criteria for various land uses deemed to be hazardous wildlife attractants depending on the type of aircraft the airport serves. More specifically, the Circular restricts certain types of facilities including waste disposal facilities, maintaining that they must not be located closer than six miles from the airport property line. There are also provisions specific to wastewater treatment plants and storm water management facilities, which are known to typically attract potentially hazardous wildlife. Constructing an airport on or near a wetland is not prohibited, but the FAA states that a Wildlife Hazardous Management Plan (WHMP) will “outline appropriate wildlife hazard mitigation techniques,” and that airport personnel “should develop measures to minimize hazardous wildlife attraction in consultation with a wildlife damage management biologist.” Further, the FAA may require a WHMP when certain events occur at the airport, including when an “aircraft experiences multiple wildlife strikes;” when an aircraft experiences substantial damage; when an aircraft ingests wildlife into the engine; or when “[w]ildlife of a size, or in numbers, capable of causing” substantial damage, capable of striking an aircraft multiple times, or capable of being ingested by an engine, “is observed to have access to any airport flight pattern or aircraft movement.

135 Id.
136 See generally FAA ADVISORY CIRCULAR 150/5200-33B, supra note 9. Bird attractants include shelter, water, and food, such as seeds and vegetation; garbage cans and litter; and small mammals such as field mice and squirrels that are present in wood lots and construction sites. Brown, supra note 56, at 25–27.
137 FAA ADVISORY CIRCULAR 150/5200-33B, supra note 9, at 1.
138 Id.
139 Id. at 3.
140 Id. at 5–7.
141 Id. at 8.
The wildlife hazard assessment must also consist of: (1) evaluation of the event or events prompting the assessment; (2) species information and their location and movements; (3) features near the airport attracting wildlife and a description; and (4) recommendations for wildlife hazard reduction. A WHMP must then be created based on the assessment and according to the regulations. The plan shall include the list of personnel with authority to implement the plan; permit requirements; implementation resources; and a priority list of actions and target completion dates in three areas: “(i) Wildlife population management; (ii) Habitat modification; and (iii) Land use changes.” Certain procedures are also to be followed during air carrier operations, including designating personnel responsible for implementation, conducting inspections of aircraft movement areas, adopting “[w]ildlife hazard control measures,” and developing methods for effective communication between airport personnel and air traffic control. Annually, the “plan’s effectiveness in dealing with known wildlife hazards on and in the airport’s vicinity” are to be reviewed, along with “[a]pects of the wildlife hazards described in the wildlife hazard assessment.”

2. Reporting

The reporting system for bird strikes from the aviation industry is currently voluntary, so presumably, airports and airlines are not uniform in their reporting procedures. The FAA placed a disclaimer on the database released in April of 2009. The agency specifically stated that it believed only 20 percent of bird strikes were currently being reported. In 2001, the reporting form became available online, and by 2008, 68 percent of the strikes were reported electronically. Undoubtedly, the online reporting tool has contributed significantly to the increase in the number of reports.

The FAA has noted that the current database contains data that is “un-even,” because even though the number of strikes has

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142 14 C.F.R. § 139.337(b) (2009).
143 Id. § 139.337(c).
144 Id. § 139.337(f)(1–4).
145 Id. § 139.337(f)(5).
146 Id. § 139.337(f)(6).
147 Wald, supra note 10.
148 BSI: Bird Strike Investigation, supra note 4.
149 FAA Statistics, supra note 5, at 5.
increased every year, only 44 percent of those reports included information as to the species of bird involved. Therefore, not only are the specific bird strike incidents currently underreported, but the actual submitted forms are often incomplete. Species identification based on feathers is a free service provided to U.S. airport operators and aircraft owners and operators flying anywhere in the world and also to foreign carriers if the strike occurred in the United States. The feathers are mailed to the Feather Identification Lab, affiliated with the Smithsonian Institute, and a biologist makes the determination and formulates a response, typically within twenty-four hours. The museum has over 620,000 specimens within its collection, and the feather identification lab receives approximately ten to eighteen mailings of feathers each day.

C. U.S. COURTS

Liability in bird strike cases rests on general negligence principles. There is potential for litigation in situations where birds have struck aircraft, whether it is the injured passenger or the estate of the deceased suing the airline or the airline suing the manufacturer in a products liability action. "Circuit courts are split on whether the [entire] field of aviation safety is preempted by the Federal Aviation Act" (the Act). For example, in Monroe v. Cessna Aircraft Co., the plaintiff sued the manufacturer in a wrongful death action for negligence and products

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150 Id. at viii.
152 Id. at 3-4.
154 Kathlynn G. Fadely & Kathleen Musslewhite, Wire and Bird Strike Cases: A Bird's Eye View, in AIRCRAFT CRASH LITIGATION 1984, at 123, 144 (PLI Litig. & Admin. Practice, Course Handbook Series No. H4-4952, 1984). Plaintiffs seeking to establish liability on the part of the U.S. federal government have been largely unsuccessful. See id. at 145-48. The United States could, however, be held liable as an owner of the airport for the airports it owns, which include Washington National Airport and Dulles. Id. at 144.
155 Monroe v. Cessna Aircraft Co., 417 F. Supp. 2d 824, 834 (E.D. Tex. 2006). The court also noted that the Supreme Court has never held that the Act preempts the entire range of aviation safety. See id. at 828.
liability due to the aircraft's collision with a bird.\textsuperscript{156} The court found that the entire field of aviation was not preempted by the Act; thus, state law claims could still be brought.\textsuperscript{157}

There is also potential for liability on behalf of the airport facility itself and its operators. One case notes that liability for bird strikes is typically placed on the operator of the airport, due to the duty the operator has “to keep the airport free from hazards, or at least use reasonable care to warn of hazards not known to the pilots.”\textsuperscript{158} In \textit{Safeco Insurance Co. of America v. City of Watertown}, a pilot had to perform an emergency landing just after takeoff when the aircraft lost all power due to the ingestion of a flock of gulls.\textsuperscript{159} Both the pilot and co-pilot suffered minor injuries, and the aircraft was a total loss.\textsuperscript{160} The court found the airport operator negligent and that the proximate cause of the crash was due to the fact that he failed to properly warn the pilots about the birds through a Notice to Airmen (NOTAM).\textsuperscript{161} The city that owned and operated the airport was ultimately liable for the damage to the twin engine aircraft.\textsuperscript{162}

Lastly, there may be liability potential in the case of the pilot. The FAA governs a pilot's duty, which states the “pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.”\textsuperscript{163} It is generally thought that where the pilot acted reasonably by reviewing the NOTAMs and following any warning signs, the pilot should be able to avoid being found contributorily negligent.\textsuperscript{164} On the other hand, if the pilot did not act reasonably to avoid the bird strike, the pilot may be considered a “proximate cause of the crash.”\textsuperscript{165}

Overwhelmingly, the data from the FAA indicates that the engine is the component that is most often damaged from a bird strike. Although only four percent of reported strikes involve significant damage, any amount of damage results in economic

\textsuperscript{156} \textit{Id.} at 826–27.
\textsuperscript{157} \textit{Id.} at 834.
\textsuperscript{159} \textit{Id.} at 1222.
\textsuperscript{160} \textit{Id.}
\textsuperscript{161} \textit{Id.} at 1230.
\textsuperscript{162} \textit{Id.} at 1234.
\textsuperscript{163} 14 C.F.R. § 91.3(a) (2008).
\textsuperscript{164} Fadely & Musslewhite, \textit{supra} note 154, at 149.
\textsuperscript{165} \textit{Id.}
loss for aircraft owners. Additionally, from 1990–2008, there were sixteen fatalities reported and 209 injuries. Thus, with bird strikes undoubtedly on the rise and with state-law claims still available, states should anticipate actions of this type to be more prevalent in their courtrooms.

IV. ANALYSIS

When the FAA does finalize the bird strike data from 2009, the facts will lead to one clear notion: things must change or the U.S. aviation industry could be facing a major catastrophe. This section will highlight the problem of reporting and will discuss proposed legislation that would change the nature of bird strike reporting. Additionally, this section will recommend international uniformity of rules and standards and national uniformity of FAA’s enforcement power over U.S. airports and aircraft. This section will conclude with advice for how to improve the measures that exist to mitigate and prevent bird strikes.

A. NEW LEGISLATION PROPOSAL FOR BIRD STRIKE REPORTING

Currently, the reporting of a bird strike is voluntary, and the FAA believes that only 20 percent of bird strikes in New York are reported. In 1999, however, the NTSB expressed concern to the FAA over the voluntary nature of the bird strike program, and subsequently, the NTSB issued a safety recommendation requesting that the FAA make reporting mandatory. The FAA responded that it believed the current level of reporting was sufficient “to obtain adequate trend analysis data.” Then, following the “Miracle on the Hudson,” the FAA released the 1990–2008 statistics that paint an inaccurate picture of actual bird strike incidents in the United States with inadequate species information. So, the question to the FAA is simple: do you still believe the reporting is sufficient?

166 See FAA Statistics, supra note 5, at 7 (noting that out of the 87,416 strikes that occurred from 1990-2008, four percent of them claimed to involve significant damage, which is approximately 3,500 aircraft).
167 Id. at 48.
169 NTSB Accident Report AAR09-05, supra note 42, at 27. The NTSB expressed an opinion at this time that it believed approximately 50 percent of the reports were incomplete. Id.
170 Id.
United States Senator Charles E. Schumer from New York has proposed legislation, known as The Wildlife Strike Act, to better "protect[ ] the public from costly repairs and dangerous situations." The people of New York's interest in bird strikes should be higher than average. In addition to the "Miracle on the Hudson," New York's JFK Airport was at the top of the list from the FAA report for airports where planes suffer the most damage due to bird strikes. Not only is JFK an extremely busy airport—the sixth busiest in the United States—it is located near a wetland that is a breeding ground for geese. The proposed legislation would require that the FAA be notified as soon as possible of a bird strike incident; in addition to those witnessing the strike, any aircraft maintenance personnel who identify damage believed to be caused by a bird strike would also be required to report the strike.

Even though only 20 percent of all bird strikes have been reported, the FAA believes that they are made aware of the most damaging strikes. Therefore, the Agency believes that the strikes that cost the most money and the ones that cause the most injury to people are known about, so adding to that number the smaller, inconsequential strikes would not have any real, statistical effect on the bottom line as far as cost and injury. The FAA has provided $387 million since 1997 to deal with the issue of wildlife management around airports, which is based on the current bird strike estimates. If there are more strikes than the current statistics, then the FAA is not allocating enough money to successfully work on the problem of bird strikes. Thus, the only way the FAA will spend more money on this particular area is for all of the strikes to be reported to present the most accurate picture possible of just how big the problem truly is.

In addition to being somewhat incomplete, in reality, the proposed legislation would merely serve as a key to the cash register, but once the cash register is open, the question then

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174 Id.
176 BSI: Bird Strike Investigation, supra note 4.
177 See id.
178 Id.
becomes, “Now what?” Therefore, reporting, or lack thereof, is only part of the problem. Although Schumer’s legislation will not make the situation any worse, it certainly is not going to solve the problem of bird strikes and the implications they present to the aviation community.179 The proposed legislation does not detail or outline what should be included in a bird strike report.180 The FAA is aware that the particular species of bird remains unidentified in over 50 percent of the reports.181 If the reporter does not know what type of bird was involved in the strike, then the reporter cannot be aware of the appropriate steps to take in order to determine what type of bird was involved in the incident. Thus, information about the Feather Identification Laboratory at the Smithsonian Institute should also be included in the legislation, as the law should require that when a species cannot be properly identified, the remains must be sent to the lab. Therefore, not only should reporting be made mandatory, but the legislation should indicate that reporting the specific details of the incident is a mandatory requirement. Data such as species identification, time of occurrence, and altitude levels would be extremely beneficial to improve existing techniques for mitigation and prevention. Another important aspect of identifying trends in the actual wildlife-strike risk is to separate the strikes “that occur on or near the airport from those that occur further out in the approaches.”182 This is vital to identifying the best techniques to reduce the potential for bird strikes, and should also be added to the reporting form. Further, a non-incident, which is essentially any collision with a bird that almost happened or a “near-miss,” should also be reported, in addition to reporting actual strikes. If time is going to be spent on the Senate floor to discuss a bill that has the potential to save the lives of air passengers, then it should be to discuss legislation that is thorough enough to make a difference.

In summary, the legislation proposed by Senator Schumer is missing a few essential provisions: mandatory requirements about what type of information should be included in the report; mandatory requirements that bird sightings or “near misses” be reported; and a mandatory requirement that feathered remains of any unidentified species be sent to the

179 Nonetheless, Senator Schumer should be commended for his efforts and this article recognizes he has taken steps in the right direction.
181 FAA Statistics, supra note 5, at 8.
182 Best Management Practices, supra note 68, § 2.6.3.
Feather Identification Lab at the Smithsonian Institute. Ultimately, however, changing the current reporting system from voluntary to mandatory is a move in the right direction that will have a positive effect on the issue of bird strikes in the United States.

B. Uniformity Among Nations

International uniformity with respect to regulations and reporting would serve the aviation industry by providing a better opportunity to share information regarding the most effective measures to reduce bird strikes. The 1944 Convention on International Civil Aviation states in the preamble that “future development of international civil aviation can greatly help to create and preserve . . . understanding among the nations and peoples of the world,” and the signatories agreed on “certain principles and arrangements in order that international civil aviation may be developed in a safe and orderly manner.” The States agreed to “adopt measures to insure that every aircraft flying . . . within its territory . . . shall comply with the rules and regulations relating to the flight and maneuver of aircraft there in force.” Most importantly, each State “undertakes to keep its own regulations in these respects uniform, to the greatest possible extent, with those established . . . under this Convention.”

Annex 14 requires the member states to report all bird strikes occurring at an airport at a national level and then forward the reports to the ICAO for placement in the IBIS database. Of course, in the United States, while most people have heard of the FAA, the ICAO is not a household name. The ICAO should take center stage in bird strike management and become the recognized leader for airports and aviation agencies worldwide to strengthen the overall collection of knowledge for bird strike reduction and prevention methods in order to best protect the worldwide passenger safety. The ICAO, in seeking data from all participating nations, can compile the best research, including successes and failures in dealing with bird control to

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184 Id. art. 12.
185 Id.
186 Annex 14, supra note 128, § 9.4.1–2. The ICAO uses the term “aerodome,” which it defines as an “area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.” See id. § 1.1.
reduce the number of bird strikes occurring at airports across the world. The rules should be a uniform set of standards that all countries follow to achieve the best possible outcome.

C. National Uniformity

Along with international uniformity, the United States should also ensure uniformity among the states with respect to bird strikes in order to ensure safety nationwide for aircraft passengers. The FAA recommends that all airports near a wetland and those that have identified potential wildlife hazards conduct a Wildlife Hazard Assessment (Assessment). The Assessment is an extremely important tool for the airport to create to better protect itself from the dangers of wildlife, yet approximately ninety-five airports with “triggering events” have presented no evidence of an existing Assessment. As a prime example, Wiley Post Airport in Oklahoma, discussed earlier, had not conducted an Assessment, even though it was federally obligated to do so. Following the crash, the U.S. Department of Agriculture performed a site survey of the area and found “16 American white pelicans . . . 106 ring-billed gulls, 11 geese (Canada goose species), 58 double-crested cormorants, 4 pied-billed grebes (small, diving waterbirds), 74 American coots (waterbirds), 1 snowy egret, and various ducks, including 96 common mergansers, 18 Northern shovelers, 4 blue-winged teals, and 31 mallards.” Surely, with an aviary of that magnitude located in such close proximity to the airport, it would have occurred to the airport personnel that there was a need to conduct some version of an Assessment, to better protect pilots, passengers, and airplanes taking off from and landing at their airport.

187 FAA Advisory Circular 150/5200-33B, supra note 9, at 11. Further, if certain events occur that involve a bird strike or evidence of a bird strike, the FAA may require a Wildlife Hazard Management Plan (WHMP). Id. at 13.


190 NTSB Accident Report AAR09-05, supra note 42, at 8–9.

191 The United States should make better use of committees that exist to fight for a particular cause. The Bird Strike Committee recommends that all certified airports assign the responsibility of managing the wildlife strike program for the
Also, the FAA regulations should apply to all airports located in the United States, regardless of their status. Currently, the rules and recommendations provided by the FAA apply only to those that receive "[f]ederal grant-in-aid assistance."\(^{192}\) The FAA, however, provides funding and technical expertise, even to the airports that do not receive this assistance.\(^{193}\) Therefore, the rules and recommendations should be mandatory for all airports, as there is no basis to separate them.

In addition to uniform national rules mandated by the ICAO, there should also be uniform, enforceable thresholds for what triggers an airport to begin employing certain types of bird strike control management. The Bird Strike Committee's Best Management Practices emphasize that "the total number of strikes at an airport is not a good indicator of risk."\(^{194}\) The number of strikes per year, however, should be considered as a threshold for what types of technology the airport should employ and whether the airport employs a manager to oversee the bird strike management control program. Steps to improve an existing problem must make sense economically. Thus, if an airport has only incurred marginal costs due to bird strikes, and the reported number of strikes per year is next to none, then that airport should not be expected to allocate significant resources to employ preventative techniques when there is no evidence of anything to prevent.

D. Preventative Measures

Unquestionably, with some bird populations on the rise and flights becoming more frequent, competition over the skies between the birds and planes will inevitably increase. The FAA has stated that it is "not reasonable to expect that engines can accommodate all threats under all conditions."\(^{195}\) However, that does not, by any stretch of the imagination, mean that it is reasonable to expect bird strikes to increase year upon year with absolutely no reasonable steps made toward attempting to miti-
igate the problem. An enormous problem exists in the lack of preventative measures being put forth by airports in the United States. If the United States looked to the ICAO and the information retrieved from the IBIS database, there would be an arsenal of successful techniques and methods that could be used to mitigate and possibly prevent bird strikes. This article recommends that more focus be placed on the notion of dealing effectively with the birds in the sky rather than focusing on removal and dispersal. This article does not suggest that the methods for removal and dispersal be completely ignored or forgotten, but does instead advocate for better detection equipment on aircraft, new design standards for engines, and required pilot training to teach the pilot how to recognize a potential bird strike and the best ways to avoid the strike.

First of all, better detection equipment for both aircraft and the airport could be a win-win for all parties, including the aircraft, the airport, and the birds. The U.S. Air Force developed the Bird Avoidance Model (BAM), which is an electronic decision-making tool that can be utilized by both pilots and flight planners to determine whether bird activity will be high in a particular area. There is an interface available to civilian users as well. This model originated from over thirty years of detailed bird analyses, including data about their “habitat, migration and breeding behavior” from numerous sources. There are three basic thresholds for BAM—low, moderate, and severe—which indicate the likelihood for a bird strike. This data could be useful for pilots and planners to best determine when a plane should fly and what route it should take. The BAM maintains data for over seventy types of bird species that are “considered

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196 See ANNEX 14, supra note 128, § 9.4.1–2. If data was properly collected from all member states, then it could provide an excellent source of information as to successful reduction and preventative methods.


199 NTSB SURVIVAL FACTORS, supra note 197.

200 Id. The question that must be asked is at what particular threshold is the flight path changed or the entire flight aborted? For example, the crash outside of Oklahoma City that killed all five on board indicated the risk for a bird strike was “medium.” See NTSB ACCIDENT REPORT AAR09-05, supra note 42, at vii, 24.
most hazardous to low flying aircraft." Obviously, there are some routes, times of day, and situations that simply cannot be avoided, but this would be one way to attempt to reduce the potential for a strike. Bird-detection radar has become more viable and more affordable in the last ten years due to computer advances and the availability of lower-cost digital signal processors. At the airport, bird-detection radar is operated by air-traffic controllers, who are responsible for ensuring that aircraft traveling within the same airspace successfully avoid each other. Given the enormous duty air-traffic control has to prevent mid-air collisions of airplanes, it is debatable whether the group would typically have the capabilities to facilitate this avian radar.

In their current forms, most airport radars are not equipped to detect birds, and although a bird may sometimes appear on the radar screen, the radar systems are fairly short-range. The FAA is engaged in some testing of bird-detecting radar devices at two U.S. airports and one in Canada. Part of a research effort that started nearly ten years ago, the agency is attempting to determine “whether low-cost radars can detect birds as far as 3 to 5 miles from airports.” If successful, radar detectors of this type could display information on bird locations on the screens in the air-traffic control center and possibly even in the cockpits. It is unknown whether this system “would be operationally suitable for making a specific decision on landing or takeoff” or if it would better serve the operator of the airport’s

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203 Id. at 2.

204 NTSB Survival Factors, supra note 197, § 3.2.3.


206 Id.

207 Id.
wildlife control management program.\textsuperscript{208} Either way, the detection radar would benefit the industry and should be used.

The FAA has stated that "there is considerable room for improving the bird strike capability of modern aircraft," yet the FAA has not taken action to improve the certification standards and requirements.\textsuperscript{209} As for new design standards, some aircraft components must complete and pass certification tests before they are used.\textsuperscript{210} The test is designed to meet a probability of less than one in every one billion flying hours that a catastrophic event will occur.\textsuperscript{211} Most components are tested to withstand collisions with smaller birds, yet the most damage occurs from much larger birds.\textsuperscript{212} The NTSB has recently expressed concern that airframe standards are not uniform and that "different criteria apply to different structures on the same airplane," as they "have evolved piecemeal as a result of past accidents."\textsuperscript{213} The NTSB further indicates that the current certifications "are not based on . . . current bird-strike and bird-population data and trends" and asks the FAA for consistency.\textsuperscript{214} For example, smaller planes, such as the one involved in the accident in Oklahoma City, are required to be built to withstand a strike from a bird weighing eight pounds.\textsuperscript{215} Thirteen of the fourteen identified species of birds in North America weighing over eight pounds have a reported population increase,\textsuperscript{216} and of the most recent FAA statistics, there were a higher number of strikes that were reported for birds weighing over eight pounds than for

\textsuperscript{208} Id.

\textsuperscript{209} NTSB Accident Report AAR09-05, supra note 42, at 33.


\textsuperscript{211} Id. "When these certification tests are designed, a calculation is undertaken which evaluates the frequency of strikes with a particular size and number of birds, the probability of an engine losing power after hitting a bird of this size, and the probability of that power loss leading to a crash." Id.


\textsuperscript{213} NTSB Accident Report AAR09-05, supra note 42, at 34.

\textsuperscript{214} Id.

\textsuperscript{215} Id.

\textsuperscript{216} Jan W. Steenblik, Bird Strike: Doesn't Mean No Baseball in Baltimore, Airline Pilot, Feb. 2000, at 29. Some of these increases have been significant, such as in the case of the Canada geese, whose population has tripled in the last decade, and the white pelican, whose population increases 3.1 percent each year. FAA Statistics, supra note 5, at 2.
birds that weighed between four and eight pounds. It is true that the engines on US Airways 1549 “performed exactly as they were certified to perform.” The real question then that must be asked is: if Captain Sullenberger had not successfully landed the plane and the passengers had been killed, would there be a more recognized need for stricter certification standards? Yes. The appropriate time to review and revise the certification standards is now, on the heels of the “ Miracle on the Hudson” and before a tragedy occurs and many lives are lost.

Pilots need to be trained to deal with bird strikes. Astonishingly, no U.S. airline currently offers any sort of specific guidance for pilots on when and how to avoid birds. Pilots need to be provided with more real-life scenarios and better information on the actual hazards birds can have on particular aircraft during takeoff, landing, and in-flight. Pilots must log hours and use simulators to recreate real-life experiences, so simulators could very well be used to create circumstances such as a bird strike. Certainly, offering better training and education to aircraft operators in the area of bird strikes would be a feasible option to reduce the number of strikes or mitigate their damage potential. The expense of training and education is great, but unquestionably it is cheaper than the cost of a badly damaged plane or the loss of a human life.

V. CONCLUSION

The “Miracle on the Hudson” was responsible for bringing to light the issue of bird strikes and their implications on the civil aviation industry. Were it not for this incident, the FAA more than likely would not have released the data concerning nearly the last two decades of bird strike activity. Now that the data is available and the country is aware that the problem is much larger than was once thought, there are questions surrounding what efforts should be taken to improve the situation and to ensure that it does not worsen. The 2009 data, although not yet final from the FAA, is believed to contain the highest number of

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217 Dolbeer, supra note 34, at 8.
218 Dolbeer, supra note 212, at 166.
220 Id.
221 FAA Statistics, supra note 5, at vii–viii.
bird strike incidents than ever before.\textsuperscript{222} Lives were lost in 2009,\textsuperscript{223} and appropriate steps must be taken to avoid the loss of more lives in the future.

In conclusion, legislation to make reporting of bird strikes mandatory is but one of the numerous steps that must be undertaken.\textsuperscript{224} In addition to mandatory reporting, the legislation must include provisions about what the report must consist of, including species information. Additionally, non-incidents or near misses also must be reported to better identify patterns and habitats of particular bird species. Further, stricter uniformity must exist at an international level, with the ICAO taking the lead. Not only should the FAA adopt guidelines from the ICAO and create regulations for enforcement, the FAA should also make its rules and recommendations applicable to all airports and not simply the airports that receive federal assistance. Also, improvements should be made in the areas of preventive techniques, and more focus should be placed on avoidance rather than elimination or modifications. Avoidance can properly be achieved through better radar detection devices in both airports and on aircraft, stricter regulatory standards on aircraft components to ensure they are built to withstand collisions with large birds, and effective pilot training programs and education that will help to facilitate a pilot’s avoidance skills and also to improve the pilot’s odds in the case of a debilitating bird strike. Bird strikes cannot be ignored any longer, and the recommendations within this article would facilitate positive changes so that birds and airline passengers can peacefully and safely co-exist.

\textsuperscript{222} See Bird Strikes May Hit Record High of 10,000, supra note 65.
\textsuperscript{223} See id.