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Research Notes

Wildlife Sightings at Western Canadian Regional Airports: Implications for Risk Analyses

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Aircraft collisions with wildlife result in substantial personal and economic losses, requiring airport authorities to utilize all available resources to develop effective management strategies. We surveyed 16 western Canadian regional airports to document the use of wildlife strike and sighting records (WSSRs). Ninety-four percent of airports kept wildlife strike records, 19% kept bird sighting records and 25% kept animal sighting records. Of 12 airports, 33% used WSSRs to identify problem species or trends and 25% used WSSRs for risk analysis and management planning. Our findings suggest that WSSRs are underutilized in risk analyses and ungulate strike risk may be underestimated at most respondent airports. Airport managers must stress due diligence in record keeping and the application of wildlife data to support risk analyses and sound wildlife management practices at airports.

Keywords aircraft, airport risk analysis, airport wildlife management plans, bird strikes, collision, ungulate, wildlife strikes

Introduction

Aircraft collisions with wildlife (wildlife strikes) result in substantial personal and economic losses. In Canada, from 1991–2009, 18,506 wildlife strikes were reported, 353 of which were caused by mammals (Transport Canada, 2010a). In the United States, from

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1990–2009, 99,411 wildlife strikes were reported, 2,674 of which were caused by mammals (Dolbeer, Wright, Weller, & Begier, 2011). Adding to public concern are events such as the Canada goose (*Branta canadensis*) strike which caused the highly publicized January 2009 crash of US Airways Flight 1549 into the Hudson River (Marra et al., 2009).

In Canada, wildlife strike reporting is both voluntary (by pilots and airlines) and mandatory (by airports and the Department of National Defense). Therefore, “. . . there is no way of knowing precisely how many strikes go unreported . . .” (Transport Canada, 2009:2) In the United States, where strike reporting is voluntary, analyses indicate that between 20% and 39% of all U.S. civil aircraft strikes are reported (Dolbeer et al., 2011).

Regional airports are generally located near small or medium sized municipalities (DeVault, Kubel, Glista, & Rhodes, 2008), and are often located adjacent to agricultural, rural, grassed, or forested areas. These areas support wildlife species of concern to airport authorities and pilots, including ungulate populations such as moose (*Alces alces*) and deer (*Odocoileus* spp.). There are more regional airports than national airports. Regional airports service large geographic areas within western Canada, but often do not meet the *Canadian Aviation Regulations (CARs)* requirements for wildlife monitoring and management (Hesse, Rea, & Booth, 2010).

Few studies have explored wildlife management practices at small or regional airports (DeVault et al., 2008). We conducted a survey of western Canadian regional airports regarding Airport Wildlife Management Plans (AWMPs), wildlife strike records, bird and animal sighting records, and the use of these records in wildlife management. Our goal was to synthesize these findings and provide recommendations to improve wildlife management planning, practices, and safety at regional airports.

Methods

We used an exploratory online survey to investigate and describe airport professionals' responses regarding airport wildlife management practices in western Canada. Our online survey was designed for a small and distinct population. We pretested the survey and amended any terminology, instructions or questions that were unclear. Survey participation was voluntary and confidential.

A hazard was defined as “. . . the conditions or circumstances that could lead to damage or destruction of an aircraft, or to loss of life as a result of aircraft operations and risk was defined as the consequence of a hazard, measured in terms of likelihood and severity” (Transport Canada, 2004, p. xxi). A regional airport was defined as having scheduled annual passenger traffic of <200,000 passengers and located in other than a national, provincial, or territorial capital (Transport Canada, 2010b).

We compiled a list of 37 regional airports in British Columbia (BC), Alberta (AB), and Saskatchewan (SA) using the websites from Transport Canada, the Canadian Owners and Pilots Association, and municipalities. We solicited the opinions of experts who were knowledgeable about actual airport wildlife management practices. We employed purposive and expert sampling to select our sample group of 27 airports. We eliminated 10 airports from the sample group because they had only minor amounts of scheduled air traffic.

During June and July 2007, we phoned airport staff responsible for wildlife management and informed them of our intent to conduct an online survey, verified their e-mail addresses, and assessed their willingness to participate. E-mail invitations containing a link to the online survey website were sent to the sample group between January 14 and January 28, 2008. A follow-up e-mail, also containing the link to the online survey website, was sent on February 22, 2008. The online site closed for responses on February 29, 2008.

Results

We received a total of 16 completed surveys (response rate = 59%); nine from BC, three from AB, and four from SA. Of these 16 airports, 81% had an AWMP and 94% reported keeping records of wildlife strikes or near misses. Three quarters of respondents reported that carnivores (e.g., coyotes [*Canis latrans*] and bears [*Ursus americanus*]) were very commonly or often seen, and 50% of respondents reported ungulates (e.g., deer, moose) as very commonly or often seen.

Bird sightings were recorded by 19% of airports and animal sightings were recorded by 25% of airports. Some respondents said that sightings were recorded under special circumstances such as “only if control measures were used or if a strike occurs,” “only when damage is incurred,” “only if the animal is seen airside,” with the additional comment “can’t report small birds or gophers, they are all over the place.” Respondents indicated that some wildlife sightings should have been more correctly reported as strikes rather than sightings, therefore, it is likely that the number of strikes was underreported.

One third of respondents used wildlife strike and sighting records (WSSRs) to identify problem species or trends and 25% used WSSRs for risk analyses and management plan development.

Discussion

Hazards at airports cannot be completely eliminated. The risk that they present, however, can be reduced by conducting risk analyses and developing and implementing AWMPs. In Canada, *CARs Sections 302.302(1)* and *302.304* designate which airports are required to conduct risk analyses. National and international bird strike committees frequently publish recommendations for airports to record bird and animal strikes and sightings and use these data to mitigate collisions. Despite these regulatory requirements and expert recommendations, our results indicate that wildlife sighting data are being routinely recorded at <25% of responding airports and <33% of responding airports incorporated sighting data into risk analyses.

Reasons for not taking mitigative actions are complex and vary by airport, but at some level may reflect the “black swan” nature of the problem that describes an event in terms of its rarity, extreme impact, and retrospective probability (Taleb, 2010). The risk of a wildlife strike may be underestimated or even ignored regardless of its significant ramifications because the probability is too low to evaluate intuitively (Agius & Seaton, 2005; March & Shapira, 1987).

Wildlife Sightings, Wildlife Hazard Rankings, and Ungulate Hazards

To determine the hazard potential of each species group, rank wildlife strike threat, and conduct risk analyses at airports, wildlife species presence, abundance, and behavior must be monitored (Klope, Beason, Nohara, & Begier, 2009). Dolbeer and Wright (2009) and *CARs 322.302(1)* rank deer highest on their wildlife hazard lists because they pose significant risks to aircraft. Deer were reported as very commonly or often seen at 50% of responding airports, and are ranked sixth overall on our survey’s “very commonly or often seen” list. From 1990–2009, the most frequently struck terrestrial mammals in the United States were deer (44% of all mammal collisions) and coyotes (32%), with moose, deer, and elk (*Cervus elaphus*) responsible for 89% of the mammal strikes that resulted in aircraft damage and 46% of strikes that had a negative effect on flight (Dolbeer et al., 2011).

In Canada, from 1998–2009, coyotes were most frequently struck (24% of all mammal collisions), followed by skunk (*Mephitis mephitis*; 20%), rabbit and hare (*Sylvilagus* spp. and *Lepus* spp.; 17%), and deer (16%) (Transport Canada, 2010a).

Although moose (600 kg) are larger than deer (150 kg), they are not ranked by either *CARs Section 322.302(1)* or Dolbeer and Wright (2009), but can obviously pose a threat to air traffic wherever airports occur within their range. Particularly concerning in the case of moose–aircraft interactions would be spring landings and takeoffs in low-light conditions (when moose are most active; Klassen & Rea, 2008) during an outbreak of Winter Ticks (*Dermacentor albipictus*). Moose heavily infested with ticks exhibit erratic and unpredictable behavior and lose inhibitions normally exhibited in the face of impending threats (Lankester & Samuel, 1998).

From the two airports that reported moose sightings in our survey, moose were reported as “often seen” at one airport, and at the other airport, five moose, five elk, and two deer were recorded airside from January 2010 until October 2010 (pers. comm. Ogilvie, 2010). Despite low encounter rates, moose collisions with aircraft have been documented at airports in Alaska (Child, 1998; Dolbeer et al., 2011; Timmerman & Rodgers, 2005) and Norway (Kastdalen, 1998), and moose damage to parked aircraft has also been reported (Anonymous, 1999; Timmerman & Rodgers, 2005). Obviously, airports must immediately implement mitigation measures if ungulates are observed on airport property. Such was the case during July 2010 when, despite the presence of a wildlife perimeter fence at the Prince George Airport (YXS), four bull moose were located inside the perimeter fencing. Camera trap data from a wildlife monitoring program at the Prince George Airport were used to determine moose movement patterns and aid in the development of a successful extraction plan for the four moose that had been trapped airside.

Liability and Due Diligence

The high personal and economic costs of wildlife strikes require airport authorities to address issues that increase their liability (Dale, 2009). Failure to adhere to *CARs* regulatory requirements, conduct risk analyses, or develop and implement effective wildlife management plans increases the liability of airport authorities in the event of a wildlife strike. Managers exhibiting due diligence will take all appropriate actions to ensure that wildlife hazards are mitigated. Airport managers must consider safety in every decision affecting airport operations including the successful management of any wildlife that may impact its operations.

Management Implications

Under *CARs Section 302.302(1)(5)*, the presence of wildlife hazards in the flight pattern or movement area requires airports to conduct risk analyses. However, airports in our survey that were not routinely recording mammal sightings (75%) and bird sightings (81%) do not appear to be collecting the necessary information to establish if a risk analysis was necessary, or to adequately carry out such an analysis if one was required. Airports reporting that their most commonly observed species are also those that rank high on the hazard scale must allocate resources and implement appropriate mitigation measures to reduce risk.

Deer (and where present, moose and elk), are first-ranked wildlife hazards for aircraft, making it incumbent on airports within their range to use every tool at their disposal to mitigate any of these high magnitude, albeit unlikely, encounters. We recommend that senior managers, who regulate safety policies and procedures, should strive for a continued

cultural shift in the perception of, and attitudes toward, wildlife collision risk at regional airports to one in which administrators and staff remain vigilant and responsive to possible “black swan” events.

Our study points to the need for continued discussion with regional airport managers about the value of wildlife monitoring, including maintaining strike and sightings records and counter measures outcomes (such as using trail cameras to monitor the efficacy of excluding moose from airside properties). Such monitoring and record-keeping supports risk analyses; wildlife management planning, development, and implementation; expenditure justification; and evidence of due diligence; thereby increasing aircraft and passenger safety as well as animal welfare.

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