WILDLIFE
in Airport Environments

Preventing Animal–Aircraft Collisions through Science-Based Management

EDITED BY
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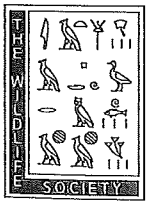

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Preface

On 15 January 2009, the world learned—in dramatic fashion—that wildlife pose serious hazards to aircraft. On that day, US Airways Flight 1549, an Airbus 320 carrying 155 people, made an emergency landing in the Hudson River in New York City after ingesting Canada geese (*Branta canadensis*) into both engines at an altitude of ~2,900 feet (880 m) following takeoff from LaGuardia Airport (Marra et al. 2009, National Transportation Safety Board 2010). Historically, most people had never considered the extent of hazards posed to aircraft by birds and other wildlife. After all, how can birds, which generally weigh a few kilograms at most, bring down an airliner? Don't they just bounce off or get shredded by the powerful engines?

The Flight 1549 incident brought about widespread awareness of wildlife–aircraft collisions (also called wildlife strikes or bird strikes), which has been welcomed by biologists, airport managers, and other personnel who manage wildlife at airports and worked to develop solutions to this problem for several decades. Reporting of wildlife strikes increased following Flight 1549 (reporting is voluntary in the USA; Dolbeer 2009), and in many cases more resources have been allocated to management activities and research efforts. Increased awareness of the wildlife-strike problem also has ushered in a new wave of devices, materials, and services designed to reduce the risk of wildlife strikes; these range from grass-seed mixtures intended to deter foraging by Canada geese to sophisticated avian radars. Some of these products are quite promising, whereas others might not mitigate risk any better than vehicle-mounted "deer whistles" (Valitzski et al. 2009). In our efforts to reduce strike risk, how can we discern the effective tools from the ineffective ones? Where should we direct our research and development efforts in the future?

As with any technical challenge, we must rely on science. Effective management of wildlife in airport environments, like all types of wildlife damage management, is based on principles from wildlife ecology, physiology, and behavior (Conover 2002). By considering how these disciplines interact in the airport context, we can better understand how and why animals respond to various mitigation methods (at both the individual and population levels), learn why and under what conditions some management tools and techniques work better than others, and more intelligently direct our future research and management efforts. To that end, this book provides a broad review of tools and techniques used to prevent wildlife collisions with aircraft, focusing on the science underlying the methods. Readers interested in a "how-to" guide for airport wildlife management should further consult MacKinnon (2004) and Cleary and Dolbeer (2005).

We begin this book with an introductory chapter summarizing the history of wildlife strikes with aircraft and organize the remainder into three parts. In the first, Wildlife Management Techniques, six chapters cover wildlife deterrents (visual, chemical, tactile, and auditory), exclusion methods, translocation strategies, and population management. The second part, Managing Resources (four chapters), begins with two chapters that discuss food and water resources, two key wildlife attractants that are present at nearly all airports. Part II continues with a chapter on managing

turfgrass, a dominant land cover (and wildlife attractant) at airports across the world. Chapter 11 considers alternatives to turfgrass at airports and the proper role of airports in wildlife conservation. In Part III, Wildlife Monitoring, we present an overview of animal movements followed by two more specialized chapters on avian radar and avian survey methods at airports. We conclude the book with a discussion on directions for future research.

The alert reader will notice a few themes that emerge from these chapters. First, there is an emphasis on managing for the most hazardous wildlife (i.e., those species most likely to cause aircraft damage when struck; DeVault et al. 2011) present at a particular airport. Although some management activities are considered common sense and good practice at all airports (e.g., covering trash containers and discouraging the deliberate feeding of wildlife), others are more specific to context, such as the various types of vegetation management. Care should always be taken that the elimination of one species does not inadvertently create an attractant for another, more hazardous species. No single strategy or tool will be developed that successfully mitigates wildlife strikes in every location for every species; therefore an approach that combines techniques in an integrated fashion is most effective (Conover 2002). The wide array of topics covered in this book underscores the importance of using an integrated approach to managing wildlife at airports. Finally, although we focus on wildlife management at the airport (where most strikes occur), we also recognize the importance of reducing strikes at higher altitudes, outside the airport environment. Strikes at higher altitudes are more likely to cause substantial damage than strikes at lower altitudes (Dolbeer 2006) and are increasing in frequency (Dolbeer 2011). Some of the techniques we discuss, such as aircraft lighting that elicits earlier alert and escape behaviors by birds in response to oncoming aircraft, are promising for reducing strikes at higher altitudes, away from the airport environment.

Without question, modern airports face many demands. They must promote safety above all else, but airports are increasingly considered to be drivers of local economies, promoters of "green" energy production and other environmental initiatives, and, at times, sites for the conservation of rare species (Blackwell et al 2009, DeVault et al. 2012). The demands confronting airports are expected to intensify as air traffic increases and as airport infrastructures change to meet increased capacity. These necessary changes must consider how wildlife—particularly those species posing the greatest strike hazards—is managed. It is our hope that this book will help airport managers, biologists, airport and urban planners, students, consultants, businesspeople, and others understand how effective wildlife management at airports contributes to the safety and efficiency of air travel worldwide.

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